THE PROPOSED DOORNHOEK 1 PV FACILITY AND ASSOCIATED INFRASTRUCTURE, NORTH WEST PROVINCE, SOUTH AFRICA

Visual Impact Assessment Report

Draft v_2

DATE: 29 April 2022

Document prepared for Cape EAPrac (Pty) Ltd
On behalf of Doornhoek PV (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.'

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 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

Table 2 Specialist report requirements in terms of Appendix 6 of the EIA Regulations (2014), as amended in 2017

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 Par: 3.2Study Team
The expertise of that person to compile a specialist report including a curriculum vitae	Registration with Association of Professional Heritage Practitioners Par: Professional Registration Certificate
A declaration that the person is independent in a form as may be specified by the competent authority	Table 1. Specialist declaration of independence.
An indication of the scope of and the purpose for which, the report was prepared	

A specialist report prepared in terms of the Environmental Impact Regulations of 2014 (as amended in 2017) must contain:	**Relevant section in report**
	Par: Terms of Reference
A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Par: Visual Resource Management (VRM) Classes
The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	NA
A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Par: 3.5 Impact Assessment 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	Par: Visual Resource Management
An identification of any areas to be avoided, including buffers	Small hill area with 150m buffer. 50m boundary buffer.
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	Figure 18: Visual Resource Management Classes Map
A description of any assumptions made and any uncertainties or gaps in knowledge;	Par: 3.6 Assumptions and Limitations
A description of the findings and potential implications of such findings on the impact of the proposed activity or activities	Par: 7 Visual Resource Management Classes
Any mitigation measures for inclusion in the EMPr	Par: 9 Environmental Management Plan
Any conditions for inclusion in the environmental authorisation	Executive Summary: Key Mitigation Measures
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	Par: 11 Conclusion
Regarding the acceptability of the proposed activity or activities; and	Par: 11 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	The proposed project can be authorised WITH MITIGATION as the reduced scale and height of the PV panels can be partially screened, retaining landscape resources.
A description of any consultation process that was undertaken during the course of carrying out the study	A Draft Basic Assessment Report containing this VIA will be subjected to a consultative process

A specialist report prepared in terms of the Environmental Impact Regulations of 2014 (as amended in 2017) must contain:	Relevant section in report
	as required in terms of Regulation 56 of the NEMA 2014 EIA Regulations.
A summary and copies if any comments that were received during any consultation process	Pending I&AP comments
Any other information requested by the competent authority.	Pending I&AP comments

1 EXECUTIVE SUMMARY

Visual Resource Management Africa CC (VRMA) was appointed by Cape EAPrac (Pty) Ltd (hereafter referred to as EAP) to undertake a ***Visual Impact Assessment*** on the proposed Doornhoek 1 PV Facility and Associated Infrastructure, on behalf of Doornhoek PV (Pty) Ltd. (Proponent). The Proponent proposes to construct two Photovoltaic (PV) solar energy facilities with Doornhoek 2 (which is being assessed in a separate BA process) located adjacent to the Doornhoek 1 site, and a Loop In Loop Out (LILO) connection to the existing Eskom power line routed across the site.

POLICY FIT	**Medium**

In terms of regional and local planning, the ***expected visual/ landscape policy fit of the landscape change is rated Medium.*** While located within the Klerksdorp REDZ, the proposed PV development is located on a relatively prominent spur with a small hill feature. The local municipal planning highlights the importance of retaining high ridgelines and hills as nature elements.

METHODOLOGY	**Bureau of Land Management's Visual Resource Management (VRM) method**

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 region**

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 location of the development site on a relatively prominent spur has the potential to extend the project zone of visual influence over a wider area. To reduce this visual effect and maintain landscape integrity, the hill section of the study area and the ridgeline buffer should be excluded.

RECEPTORS AND KEY OBSERVATION POINTS	**50 plus Receptors and 17 Key Observations Points.**

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. Located on a relatively prominent spur within a valley context, the viewshed extends across many farming/ small farming and

rural residential receptors located within the Skoonspruit River Valley. Two tourist related receptors are located within the viewshed but with Medium Levels of Visual Exposure, and with partial views. The adjacent tarred road does service many rural farms and would have High Visual Exposure to these motorists.

SCENIC QUALITY	**Medium to High**

Although not pristine, the Skoonspruit River Valley does have value as a landscape resource, with no dominating mining landforms to degrade landscape character. This has value in that much of the area around Klerksdorp has been visually degraded by large scale mining landscapes.

RECEPTOR SENSITIVITY TO LANDSCAPE CHANGE	**High**

Maintenance of visual quality to sustain adjacent land uses is rated Medium. Located in an area that is surrounding by many smaller farming units that are beginning to be used for rural-residential purposes, sensitivity to landscape change is likely to be experienced as High.

VISUAL RESOURCE MANAGEMENT ASSESSMENT

The Bureau of Land Management (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

Class I (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.
- The small hill with a 150m buffer.
- 50m buffer on the PV area that needs to be retained for tree screening.

Class II (Not recommended without mitigation)

- Prominent spur areas.

Class III (suitable for restrained development)

- Lower lying topographic areas defined as grasslands.

Class IV (not applicable)	• As the area is zoned agricultural and located adjacent to an area that does have scenic value and could carry tourist receptors in the area region, no Class IV areas were defined.

VISUAL & LANDSCAPE IMPACT SIGNIFICANCE	
High *(without mitigation)*	Without mitigation the proposed development is likely to result in Strong levels of visual contrast and will exceed the carrying capacity of the rural landscape, degrading the Medium to High levels of Scenic Quality of the Skoonspruit Valley that currently includes no dominating man-made or mining landscapes. As such, the value of this agrarian landscape is emphasised, and the Landscape Significance is rated High. Even though the development site is located within the Klerksdorp REDZ, to ensure that landscape degradation of the Skoonspruit River Valley does not take place, the development should only take place with mitigation (*The previous development proposal that included three large PV areas wrapped over the spur was defined as a Fatal Flaw*).
Medium *(with mitigation)*	With mitigation, the visual intrusion of the proposed semi-industrial landscape can be moderated to some degree, with the use of existing and new tree plantings providing an effective mitigation against the risks of skyline intrusion, and rural landscape degradation. The smaller view parcels that are visible from the surrounding rural receptors, and the low angle of the slope, would also assist in reducing the visual intrusion of the proposed development. The retaining of the existing gum tree windbreaks that are located on the ridgeline, would reduce the visual intrusion to some degree. The landscape also includes a 132KV Eskom power line that does degrade the local landscape character of the ridgeline to some degree. There are many trees in the landscape that currently reduce the visual exposure of the site for close proximity and southern receptors.

KEY MITIGATIONS MEASURES		
Landscape Element	**Mitigation**	**Motivation**
Proximity to hill top landscape features and areas of prominence	150m No-go buffer defined	The small hill located within the project area defined as Class I should be excluded from development as the area is prominent and this issue is flagged as High Sensitivity in the DFFE SSV mapping.
Neighbours who are sensitivity to landscape change.	Boundary 50m No-go buffer defined	A buffer of 50m should be maintained on all boundaries to retain existing tree vegetation, as well as to relocate small trees to this area

		for further visual screening and maintenance of the rural agricultural sense of place.
Risks to rural landscape character that has Medium to High levels of scenic quality.	Retain the existing windbreaks and plant trees around the heritage stone house.	As the area is rural with no dominating man-made features and has Medium to High level of scenic quality, large area coverage of PV panels should be discouraged. While the visual resources of the site are not so significant as to constitute a fatal flaw, the key agricultural features associated with the old farm house should be retained. These windbreaks will also assist in visual screening of the PV areas from southern rural-residential receptors.
PV Panel Height Restriction	2.5m	To align with the rural landscape character and prevent a dominating semi-industrial landscape character change, it is recommended that a 2.5m height restriction is maintained for the PV Panels.

IMPACT ASSESSMENT CONCLUSION	**Authorisation should be provided but only WITH mitigation**

Located on a relatively prominent spur within the valley context of the Skoonspruit River, the viewshed extends across many farming/ small farming and rural residential receptors located within the Skoonspruit River Valley with many receptors identified. Although not pristine, the Skoonspruit River Valley does have value as a landscape resource, with no dominating mining landforms to degrade landscape character. This factor has significance in that much of the area around Klerksdorp has been visually degraded by large-scale mining landscapes. Even though the development site is located within the Klerksdorp REDZ, to ensure that landscape degradation of the Skoonspruit River Valley does not take place, **the development should only be authorised with mitigation (*The previous development proposal that included three large PV areas wrapped over the spur was defined as a significant landscape risk*).**

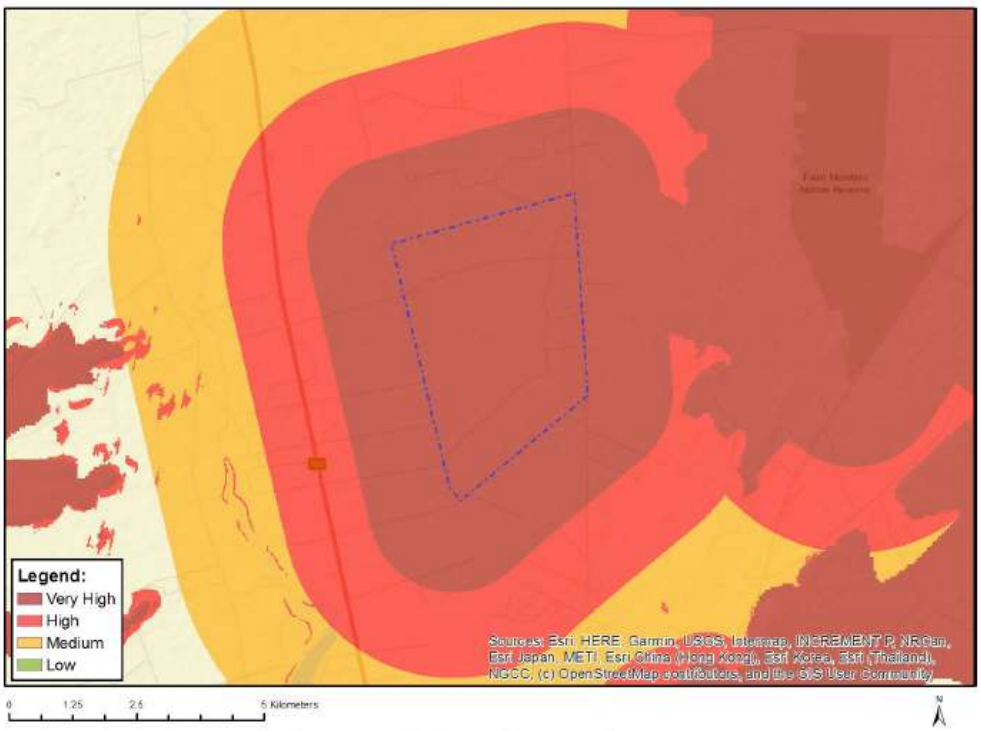
With mitigation, the visual intrusion of the proposed semi-industrial landscape can be moderated to some degree, with the use of existing and new tree plantings providing a partial mitigation against the risks of skyline intrusion, and rural landscape degradation. The smaller development parcels that were defined during the EIA process (with the larger development footprint defined as a Visual / Landscape Fatal Flaw) would have less visibility to the surrounding rural receptors. Retaining of the existing gum tree windbreaks that are located on the ridgeline, would reduce the skyline visual intrusion to some degree. The landscape also includes a 132KV Eskom power line that does degrade the local landscape character of the ridgeline to some degree. There are also many trees in the landscape that currently reduce the visibility of the site for close proximity, and southern receptors.

As the site is located within the Klerksdorp REDZ, and the size, skyline intrusion area and height of the PV panels have been significantly reduced, the recommendation of the Landscape and Visual Impact Assessment is that development should only take place with mitigation. While the mitigated Doornhoek 1 & 2 developments would be integrated into the valley without significant loss of the landscape resources, multiple PV developments in the valley are likely to significantly degrade the Skoonspruit River Valley landscape character and sense of place.

2 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 DEFF Screening Tool. As indicated in Figure 1 below, the Map of Relative Landscape (Solar) Theme Sensitivity is rated Very High Sensitivity. However, the sensitivity mapping coverage is representing the Private Nature Reserve of the property, which is in question, and the detail on the ridgeline is obscured.

MAP OF RELATIVE LANDSCAPE (SOLAR) THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
High	Slope between 1:4 and 1:10
Very High	Mountain tops and high ridges
Very High	Nature Reserve
Very High	Within 1.5 km of a nature reserve

Figure 1. DEFF Site Sensitivity Verification mapping.

The following table outlines the relevance of the risks raised in the SSV as informed by the site visit. The site survey point map and data base listings are located in Annexure A.

Table 3. DEFF SSV risk table.

DEFF Feature	DEFF Sensitivity	Risk Verification	Motivation
Slope between 1:4 and 1:10	*High*	**Low**	Limited steep slope areas were identified on the study area. These areas were incorporated into the small hill No-go area.
Mountain tops	*Very High*	**Medium to High**	Close proximity to hills to the east that forms part of the landscape context. The hills are medium in size and no significant landform in the landscape. The development site does have a small hill feature. A 150m buffer around the hill feature is proposed as a No-go area.
High ridges	*Very High*	**Medium**	No high ridgelines were identified on the property, but the site is located on a wide spur with relative prominence, where wrap over development is likely to result in local changes to sense of place.
Nature Reserve	*Very High*	**Low**	The site is proclaimed as a Private Nature Reserve but is not used for conservation purposes. The current land use on the property is agricultural
Within 1.5km of a nature reserve	*Very High*	**Low**	

A field survey was undertaken on 3 March 2022 to inform the landscape and visual impact assessment. During the site visit, photographs were taken from each viewpoint, and the view direction and GPS location captured. The main land-use was documented, as well as the nature of the dominant landscape in the vista. In order to represent views of the proposed landscape modification by means of photomontages for assessment purposes, panoramic photographs were also taken from key viewpoints.

The site investigation flagged landscape features and receptors that should be taken into consideration, and that were communicated to the EAP for early planning. The following landscape value issues were flagged:

- The landscape of the Skoonspruit River Valley has Medium to High levels of scenic quality, but with increased significance due to the pervasive landscape degradation that characterises much of the Klerksdorp region. This valley has no mining landscape presence, with land use primarily agrarian.
- Development on the shallow sloped and prominent spur originating from the eastern hills, increases visibility of the property to much of the larger valley. Given the higher

scenic qualities of the surrounds, with the existing rural residential areas, receptor sensitivity to landscape change could be strong.

- There is also the added layer of the old stone farmhouse heritage, with associated tree-lined access road, that should be retained. Aesthetically, the gum tree avenue and windbreaks are related to the old farm landscape context, as is the front field framed by the windbreaks.
- Visual Exposure is also likely to be High due to the close proximity to surrounding rural residential receptors.

3 INTRODUCTION

Visual Resource Management Africa CC (VRMA) was appointed by Cape EAPrac (Pty) Ltd (hereafter referred to as EAP) to undertake a ***Visual Impact Assessment*** on the proposed Doornhoek 1 PV Facility and Associated Infrastructure, on behalf of Doornhoek PV (Pty) Ltd. (Proponent). The Proponent proposes to construct two Photovoltaic (PV) solar energy facilities Doornhoek 2 (which is being assessed in a separate BA process) located adjacent to the Doornhoek 1 site,, and a Loop In Loop Out (LILO) connection to the existing Eskom power line routed across the site.

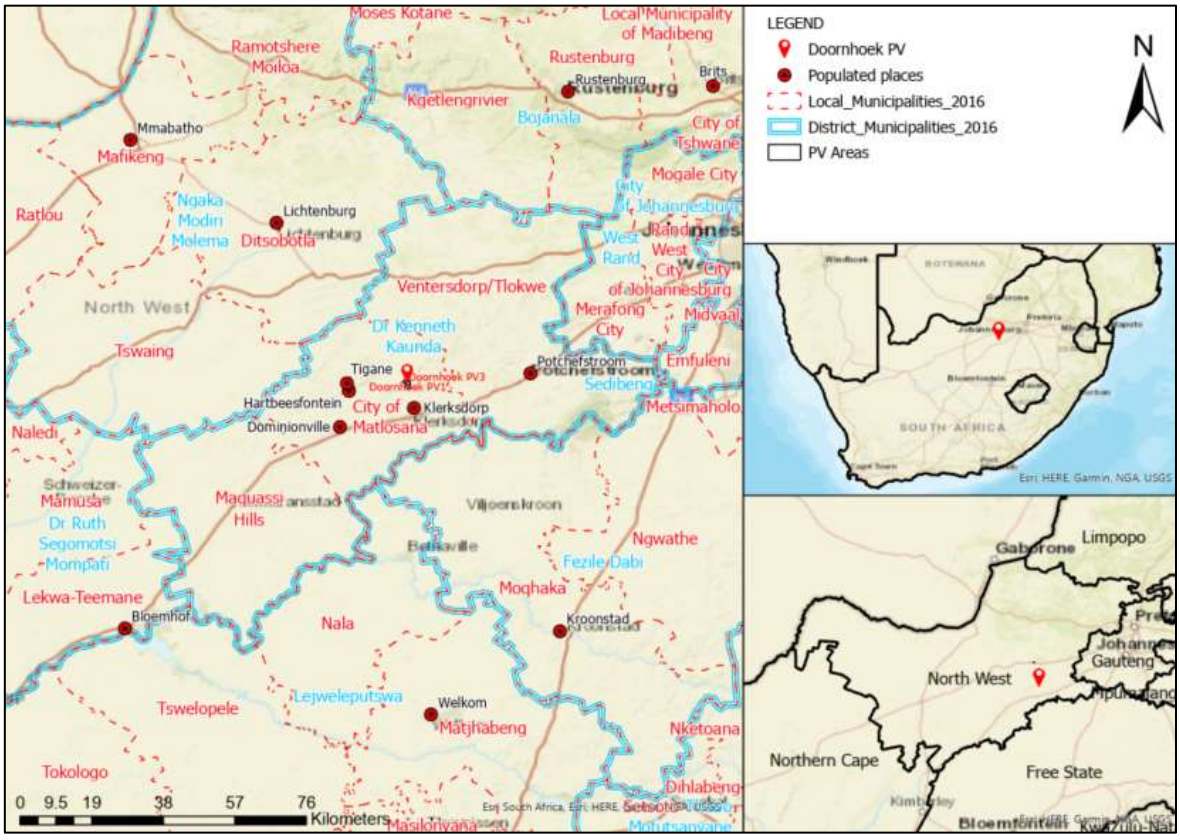


Figure 2: National and regional locality map.

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 4: Authors and Contributors to this Report.

Aspect	Person	Organisation / Company	Qualifications
Landscape and Visual Assessment (author of this report)	Stephen Stead B.A (Hons) Human Geography, 1991 (UKZN, Pietermaritzburg)	VRMA	• Accredited with the Association of Professional Heritage Practitioner and • 16 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 5: 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 6: 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.

Action	*Description*
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 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 7. 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.

4 PROJECT DESCRIPTION

The following table outlines the project information that was provided by the client that will be incorporated into the assessment and proposed infrastructure relating to the project.

Table 8: Project Information Table

PROPONENT SPECIFICATIONS	
Applicant Details	**Description**
Applicant Name:	Doornhoek PV (Pty) Ltd
Project Name:	Proposed Doornhoek 1 PV Facility VIA

The Applicant, Doornhoek PV (Pty) Ltd, is proposing the construction of a photovoltaic (PV) solar energy facility (known as the Doornhoek 1 PV facility) located on a site approximately 11km north of Klerksdorp in the North West Province. The solar PV facility will comprise several arrays of PV panels and associated infrastructure and will have a contracted capacity of up to 115MW. The development area is situated within the City of Matlosana Local Municipality within the Dr Kenneth Kaunda District Municipality. The site is accessible via an existing district road located adjacent to the east of the development area.

The proposed Doornhoek 1 PV facility and associated infrastructure will be located on Portion 18 of the Farm Doornhoek No. 372-IP. The project site is located within the Klerksdorp Renewable Energy Development Zones (REDZ), and therefore, a Basic Assessment (BA) process will be undertaken in accordance with GN R114 (as formally gazetted on 16 February 2018).

An additional 50MW PV facility (Doornhoek 2 PV Facility) is concurrently being considered on the same property and is being assessed through a separate Basic Assessment (BA) process.

The proposed Doornhoek 1 PV Facility will cover approximately 200ha and will include the following infrastructure:

- PV modules and mounting structures
- Inverters and transformers
- Battery Energy Storage System (BESS)
- Site and internal access roads (up to 8m wide)
- Operation and Maintenance buildings including a gate house and security building, control centre, offices, warehouses and workshops for storage and maintenance.
- Temporary and permanent laydown area
- Grid connection infrastructure, including:
    - 33kV cabling between the project components and the facility substation
    - A 132kV facility substation
    - A 132kV Eskom switching station
    - A Loop-in-Loop out (LILO) overhead 132kV power line between the Eskom switching station and the existing Watershed–Klerksdorp 1 132kV power line.

(www.hawaiirenewableenergy.org/Villamesias2, n.d.)

(Photo – Cape EAPrac, 2019)

Figure 3: Photographic example of what the proposed PV could look like as fixed and single portrait model on a tracker.

Figure 4. Example of a Photomontage of Tesla BESS in landscape

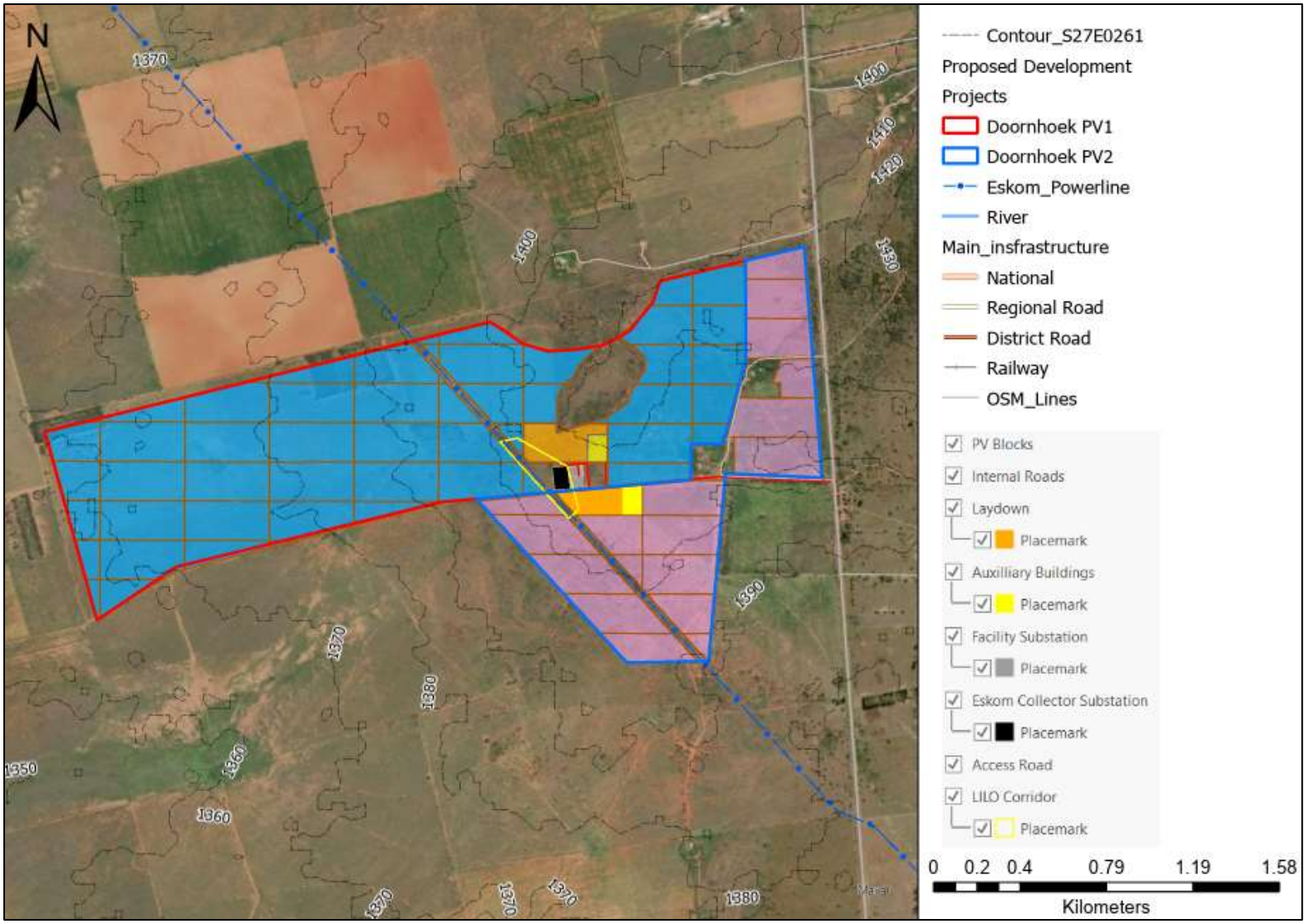


Figure 5: Proposed Doornhoek 1 study area and the proposed Doornhoek 2 study area (which is being assessed in a separate BA process).

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 6. 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	North West Province
District Municipality	Dr Kenneth Kaunda District Municipality
Local Municipality	City of Matlosana Municipality
REDZ	National Energy Planning Klerksdorp REDZ 10

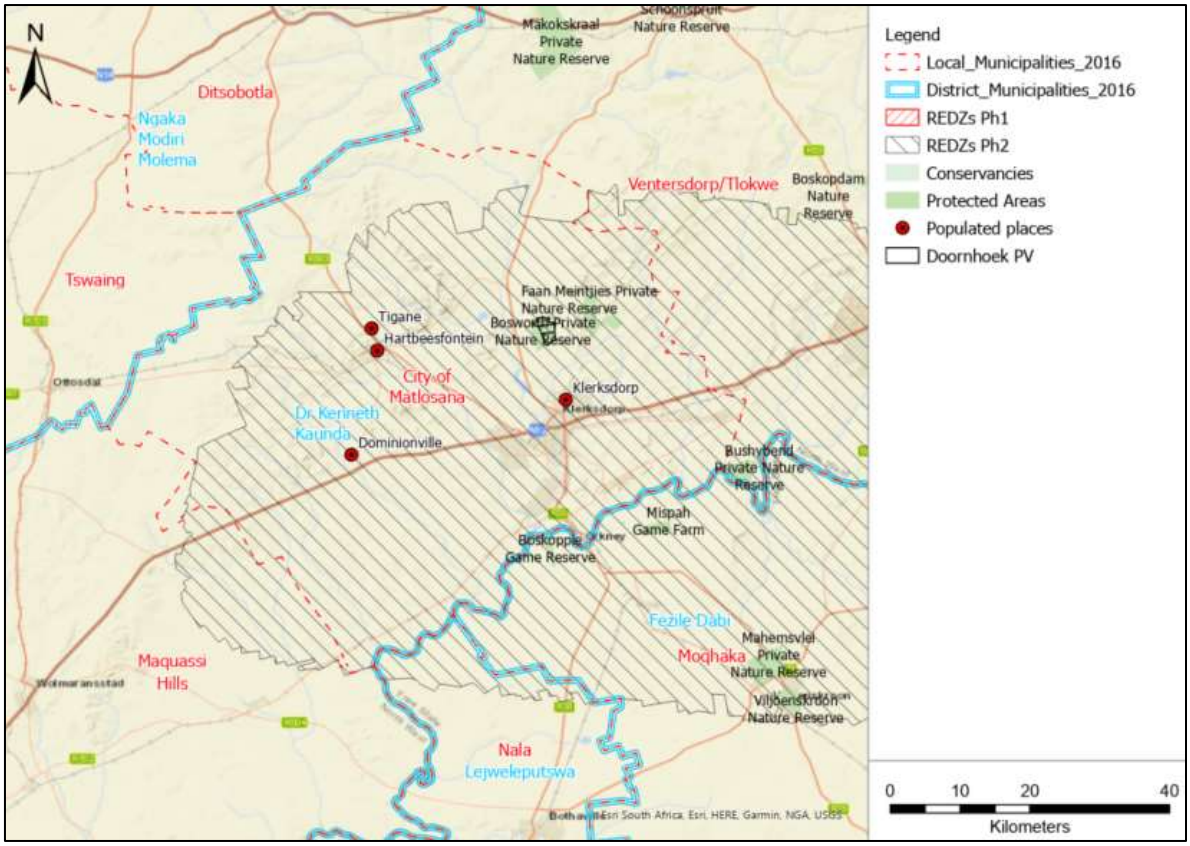


Figure 6: Planning locality map depicting the location of the project within the Klerksdorp REDZ with site currently proclaimed as a Private Nature Reserve.

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). 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 situated within a Renewable Energy Development Zone (REDZ) known as the Klerksdorp REDZ (REDZ10) (Department of Environment Affairs).

5.2.3 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: North West Provincial Development Plan (North West Provincial Government, 2013).

Theme	Requirements	Page
Renewable Energy	Renewable energies, especially solar and waste/biomass to energy initiatives will play an increasingly important role in the following two decades and will contribute a much greater share of provincial energy consumption.	110
	Promote more sustainable and energy efficient building techniques to reduce the demand on electricity over the long-term. Encourage more independent power producers and promote the use of solar power.	79
	The provincial potential as a destination for solar power is often overlooked. The North West province shares a similar solar energy potential to the Northern Cape. The Renewable Energy Strategy for the North West Province (DEDECT, 20129F x) identified two solar power options for the province, Solar Water Heaters and Solar Photovoltaic Technologies.	112
	The North West province has substantial land area available that could potentially be utilised for solar photovoltaic plant applications.	113
Tourism	It is critical to develop linkages with the mining and agricultural sectors in manufacturing (agro-processing, input products and beneficiation) and services and to develop the tourism industry.	125

Table 11: City of Motlosana Local Municipality Spatial Development Plan Framework (City of Matlosana Municipality , 2009)

Theme	Requirements	Page
Environment	A number of prominent environmental features and resources exist in the municipal area that must be protected against negative impacts of human related activities in order to ensure environmental sustainability. These features and resources include: • Existing protected areas • Dolomite aquifers and dolomite eyes • **Hills and ridges** • Wetland areas (dam, river, streams and wetlands) • High potential agricultural land • Cultural heritage sites	39
Agriculture	Agricultural land is the most important natural resource within the municipal area. Most of the cultivated land within the municipal area is classified as 'prime agricultural land'.	41
Tourism	Stimulation of tourism nodes along the Vaal River, Vredefort Dome, Highveld National Park and Boskop Dam Nature Reserve. Sensitive environmental areas and features form a significant structuring element in the form and structure of future development in the region. On	48

Theme	Requirements	Page
	the one hand, it must be protected in order to ensure long term sustainability and on the other the functional, educational, recreational and tourism value of these assets must be enhanced.	

5.3 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*, there were no significant cultural/ landscape resources found on the site or immediate surrounds that are flagged by international landscape guidelines.

In terms of the *local and regional planning*, there is a clear emphasis in support of renewable energy that aligns with the project planning. This is further emphasised by the Klerksdorp REDZ.

The area between the site and the city of Klerksdorp is increasingly being used for rural residential developments, with residents attracted to the area due to close proximity to the urban areas, but with a rural sense of place. The area is also currently proclaimed as a Private Nature Reserve, although the process is underway to change this legal status and there is no indication that conservation is taking place. While there is clear alignment to National RE policy in the Klerksdorp REDZ, there is also a local planning emphasis on tourism and protection of nature resources, specifically hills and ridges. With reference to the property, the location of the site on a wide ridgeline does create visual prominence at a local level, with mitigation required to ensure “protection from the negative impacts of human related activities”.

In terms of regional and local planning fit for landscape and visual related themes, the ***expected visual/ landscape policy fit of the landscape change is rated Medium.*** *While the proposed landscape change is to be seen against the backdrop of the Klerksdorp REDZ planning where renewable energy projects are likely to become more common, there is no precedent for RE development and it is located within the Skoonspruit River Valley where the existing landscape resources are higher and are being used as visual resources. There is also no precedence for mining landscapes, a factor that increases the significance of the landscape resources of the valley.*

6 BASELINE VISUAL INVENTORY ASSESSMENT

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 Landscape Context

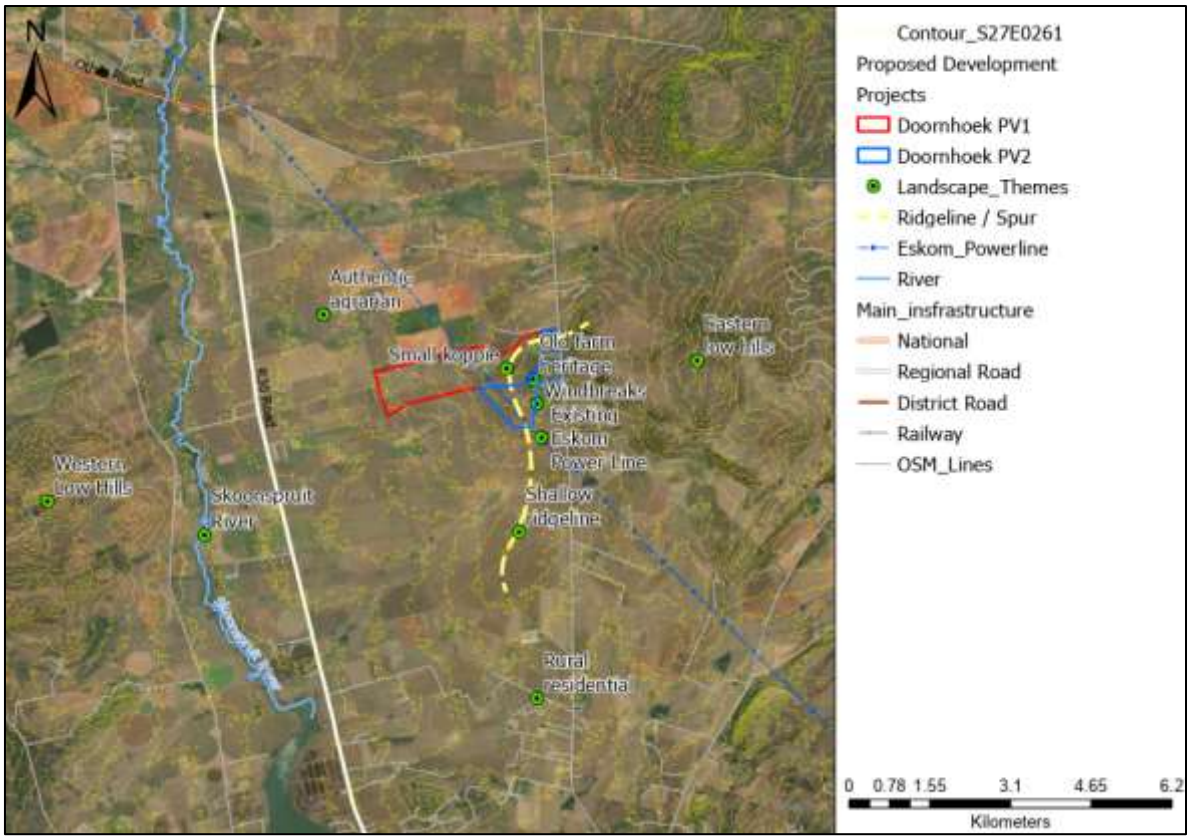


Figure 7. Local landscape themes map.

The Matlosana municipal area has a slightly irregular undulating topography dictated by the Vredefort event, which brought about the Vredefort Dome near Parys. The height above sea level ranges between 1 300m and 1 600m, increasing in a general north-westerly direction. The interaction between climate and topography has led to the evolution of a rich biodiversity. The ridges and hills of Klerksdorp have a characteristic range of different aspects, slopes, altitudes, soils and hydrological conditions conducive to heterogeneous abiotic conditions that provide a greater diversity of potential niches for plants and animals than homogeneous landscapes. As a result, many Red Data or threatened species of plants and animals inhabit ridges. In the North West Province, 65% of Red Data plant species have been recorded on ridges (PFAB, 2001).

The main access road through the valley is the R30 located to the west of the property, with a smaller paved road directly adjacent the property to the east. Minor gravel farm roads service the area as well. In terms of mining, no mining dumps or tailings are visible which could degrade the local landscape setting. A single 132kV Eskom power line runs diagonally across the site and is supported by lattice type structure. While visible in the landscape, it is not a dominating feature and results in limited site landscape degradation.

The local valley topography shaped by the Skoonspruit River creates an interesting landscape character, with low hills to the east and west, and with the river draining into the Skoonspuit Dam in the south. Farms are of a size and scale that are not excessively dominating, with no evidence of mining landscapes within the valley. Given the landscape degradation that characterises much of the Klerksdorp, this local valley landscape value carries significance. Care should be taken to ensure that the landscape integrity of the Skoonspruit Valley is not degraded.

6.1.1 Vegetation

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

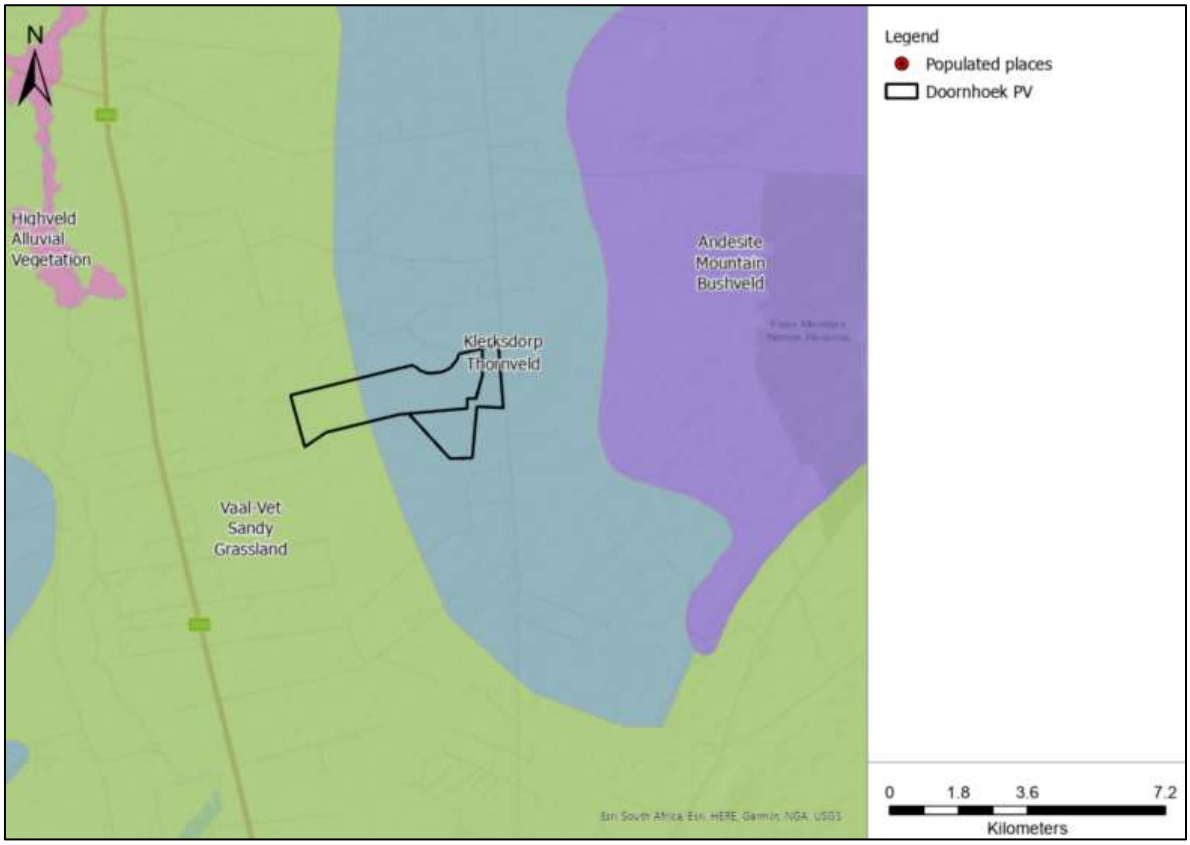


Figure 8. BGIS Biome and Vegetation Type Map (South African National Biodiversity Institute, 2018)

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 Grassland Biome which covers large areas of the central part of southern Africa and includes a wide range of altitude from 300m-400m to over 3000m in the Lesotho highlands. The SANBI Plantzafrica website indicates that the extent of this biome can be defined on a basis of vegetation structure in combination with environmental factors, particularly the amount of summer rainfall and the minimum temperature in winter. The grasslands are strongly dominated by Poaceae (grasses) with woody species limited to specialised niches. Forbs, although not dominate, contribute significantly to the species richness. Three vegetation types characterise the Grassland Biome in the vicinity of the Project Area are: Vaal-Vet Sandy Grassland, Klerksdorp Thornveld and Andesite Mountain Bushveld. The Project Area falls predominantly in the Klerksdorp Thornveld, bordering on, and slightly encroaching into, Vaal-Vet Sandy Grassland to the east. The Klerksdorp Thornveld is characterised by open to dense *Acacia karroo* bush clumps in dry grassland. In terms of conservation value, this vegetation type is characterised as *Vulnerable* with only 2,5% statutorily conserved. Heavy grazing of the thornveld and adjacent grasslands tends to favour the encroachment of *A. karroo*.

As the more elevated portions of the property have a Thornveld type vegetation, there are many small trees in the area. With a lower profile PV height, these trees could provide visual screening for adjacent road users, as well as from the rural residential receptors located at a lower elevation on a similar slope. The existing windbreak and taller trees around the edges of the study area will also assist in providing some visual screening for lower height PV panels.

6.1.2 Other Renewable Energy Projects

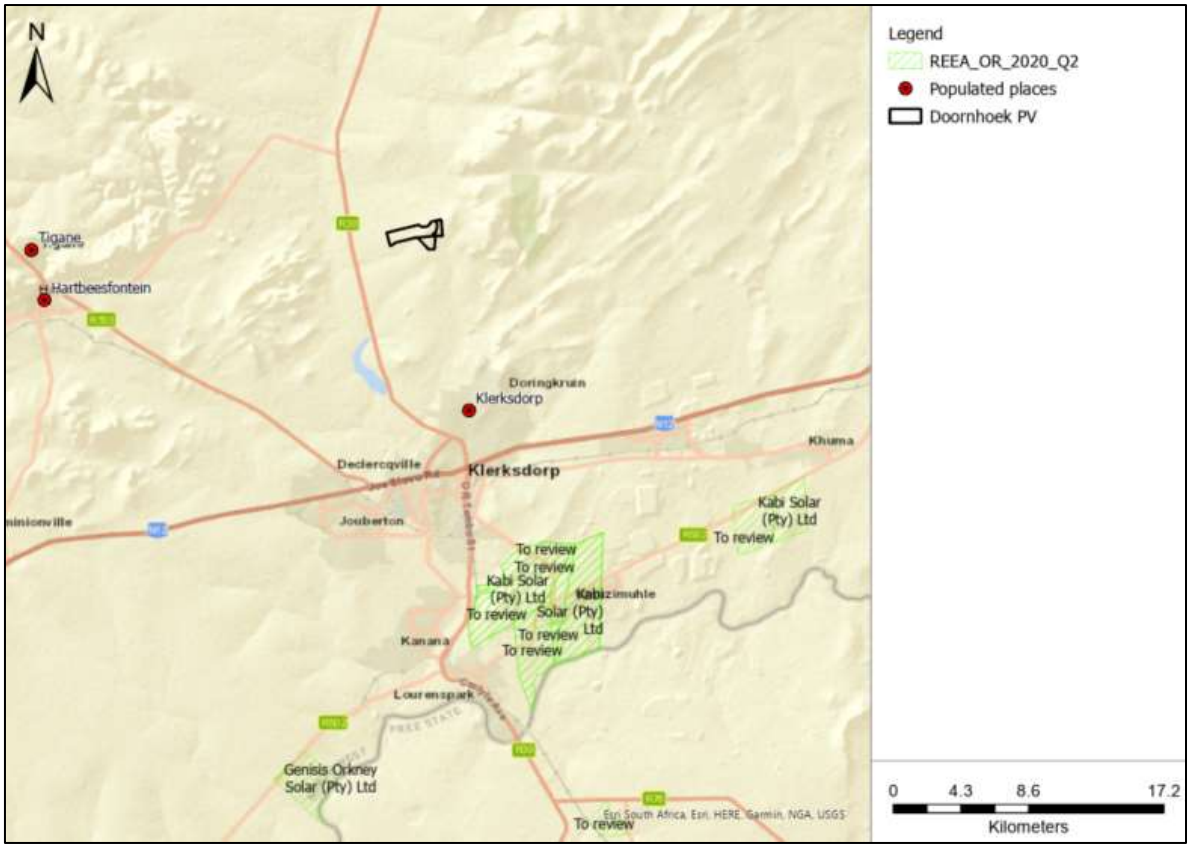


Figure 9: Map depicting DEA Renewable Energy project status.

Even though the area does fall within a REDZ area, there are no other renewable energy projects located within the ZVI that would result is cumulative visual issues associated with landscape cluttering. The significance of this is that should this project be authorised, there is a possibility that other RE developers will be attracted to the area. This massing effect has the potential to change the local rural agricultural sense of place that has higher levels of scenic quality.

6.1.3 Nature and Tourism Activities

As depicted in Figure 10 below, the nearest significant nature conservation area is the Faan Mentjies Private Nature Reserve. This PNR is not located in the project ZVI.

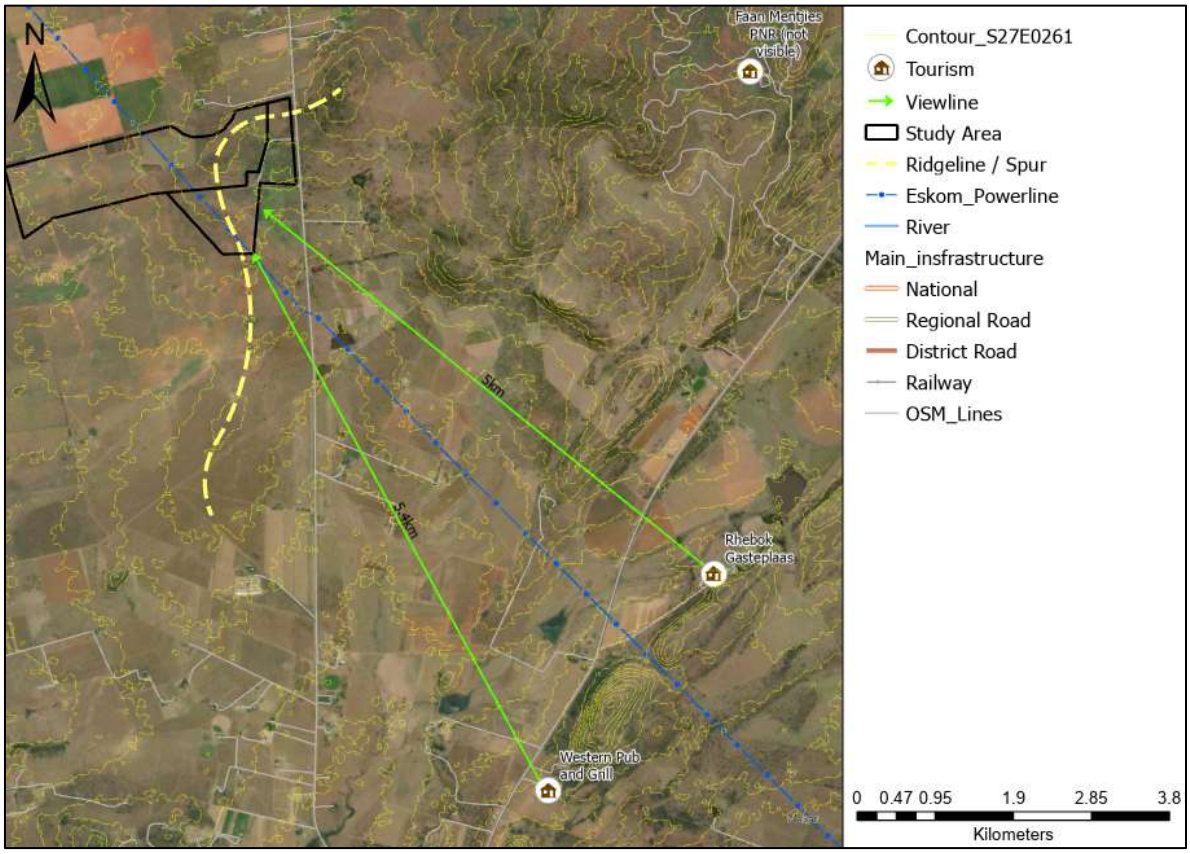


Figure 10: Map depicting the mapped tourism activities and viewlines.

Figure 11: View of the approximate landscape change area as seen from the vicinity of Western Pub and Grill.

As eco-tourism is emphasised in the local and regional planning, from a cumulative landscape impact perspective, care would need to be taken regarding the two tourist-related activities located in the project ZVI. Large coverage and tall PV panels would be visible from the Rhebok Gasteplaas as well as the Western Pub and Grill, which are located within the viewshed and within the Fore Ground/ Midground (6.5km to the southeast), hence both would be exposed to the landscape change. Views from the Western Pub and Grill include the proposed PV site (background distance zone) and the expected landscape change area is depicted in Figure 11 above. As such, this establishments would need to be incorporated as a KOP in the impact assessment.

6.2 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 project, a viewshed analysis was undertaken from the proposed site at a specified height above ground level as indicated in the table below. The viewshed analysis makes use of open-source NASA ASTER Digital Elevation Model data (NASA, 2009).

The extent of the viewshed analysis was restricted to a defined distance that represents the approximate zone of visual influence (ZVI) of the proposed activities, which 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). The viewshed is strongly associated with the regional topography and as such this topic is addressed before the viewshed analysis.

6.2.1 Regional Landscape Topography

Making use of the NASA STRM digital elevation model, profile lines were generated for the area within 3km on either side of the project area. The map depicting the regional elevation profile lines can be view on the following page.

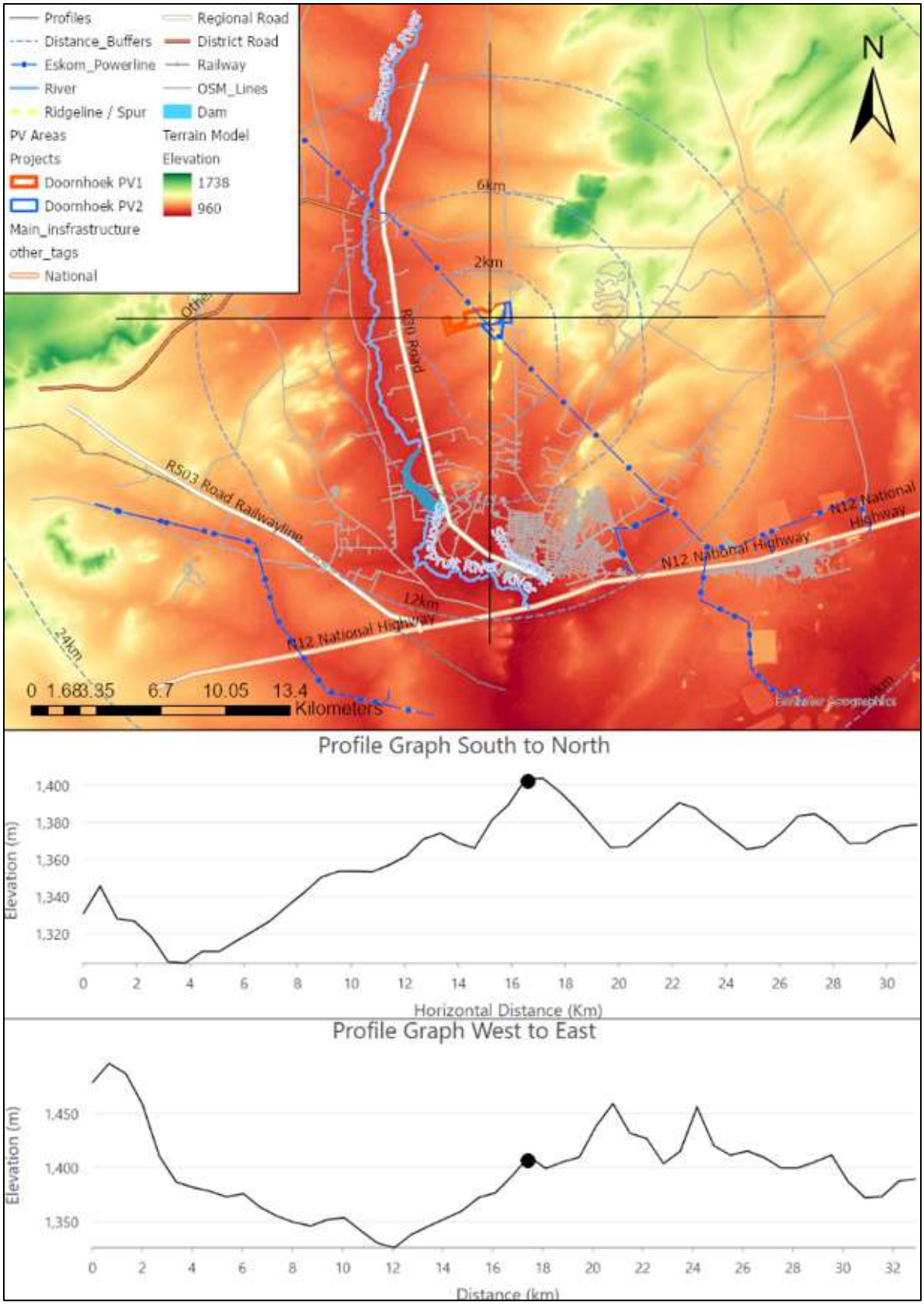


Figure 12: Regional elevation and East to West and North to South profiles map.

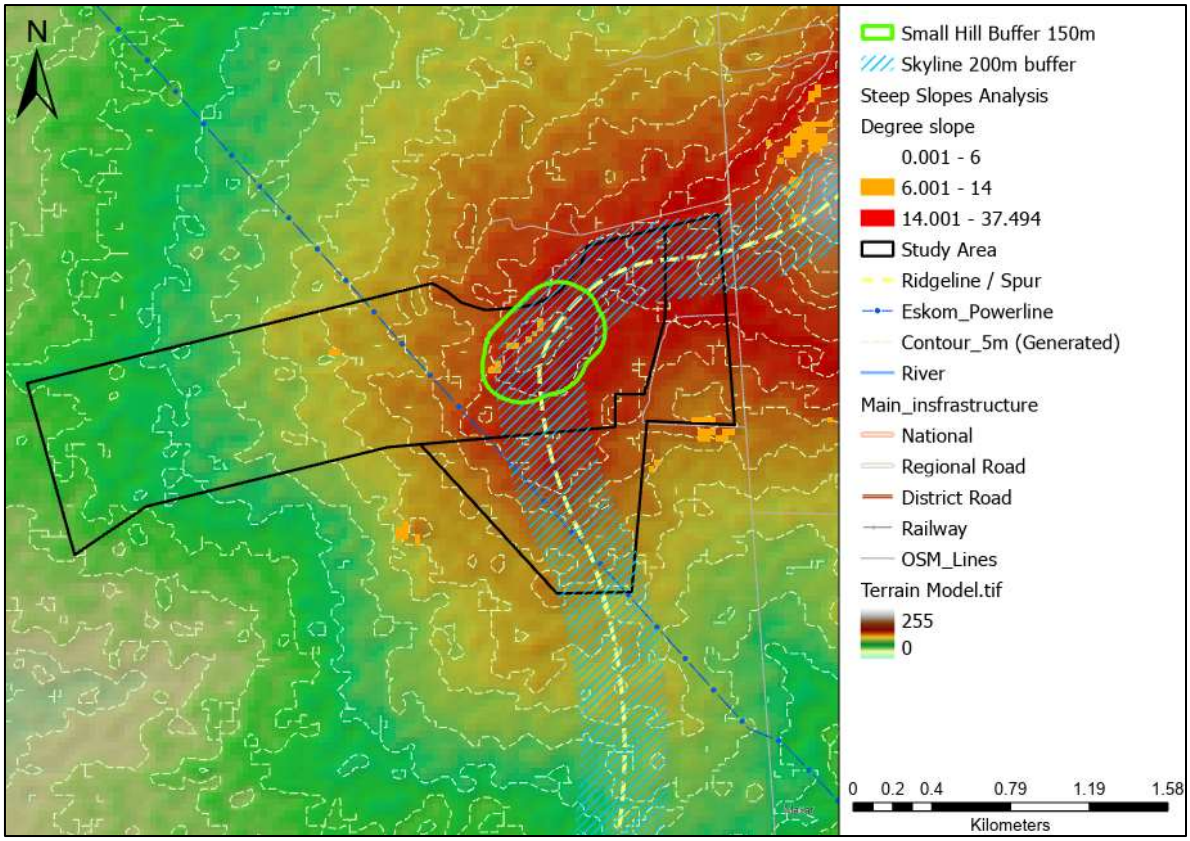


Figure 13: Local slopes and steep areas maps showing 6-degree (1:10m) and 14-degree (1:4m) slopes as well as drainage areas.

The regional topography is dominated by the Skoonspruit River Valley which trends in a north-south direction. The Project area is located on the south-west facing slopes of this valley at an average elevation of 1390mamsl.

Within the immediate regional topographic context, the minimum elevation is 1300mamsl within the Skoonspruit River drainage below Klerksdorp – roughly 12km south of the site. From here, the topography rises relatively consistently in a northly direction towards the project area, which is located slightly below a local highpoint (1440mamsl). Regional highpoints of over 15000mamsl are located roughly 6km to the northeast and 12km to the west of the project area.

In terms of site topography, the project area includes a wide spur which trends in a northerly and easterly direction towards the local highpoint – a small hill roughly 1km to the northeast. There are no defined drainage lines on the site, being located at upper limits of the local watershed. The majority of the site drains in a south-westerly direction towards the Skoonspruit River.

While the site survey found no indication of steep slope areas, the small but prominent hill to the north of the study area needs to be set aside for non-development purposes. The other steep slopes areas need to be verified during design phase and if found to be steeper than 1 in 10m, should not be utilised for development. Of risk to the local landscape character is skyline intrusion generated by the location of PV panel on the spur. As seen from the southeast and road adjacent to the study area, skyline intrusion will take place

increasing visual intrusion. For this reason, it is recommended that mitigation of PV panel height is included, as well as retaining the existing thornveld vegetation around the PV development site. As the spur is not steep sided, this mitigation would be an effective method to reduce the visual intrusion. The small hill would also assist in breaking up visual massing effects generated by the PV on the ridgeline, with the PV appearing as a thin band of dark colour below the small hill.

6.2.2 Viewshed Analysis

A viewshed analysis was undertaken for the site making use of NASA SRTM 30m Digital Elevation Model data. An Offset value representing the height of the PV panels was used to represent the approximate height of the proposed development as reflected in the table below. The viewshed was also capped at a defined extent to take atmospheric influences into consideration where the landscape change would not be clearly visible from.

Table 12: Proposed Project Heights Table

Proposed Activity	Approx. Height (m)	Terrain Model Extent
Doornhoek 1 PV Facility	2.5m	24km

As can be viewed in Figure 14 on the next page, the viewshed is skewed to the west, northwest and southwest of the site, and extends well over 24km from the site. Coverage in this direction is relatively high, given the prominent location of the site in the landscape. For these reasons, the viewshed is rated as Medium to High. The expected ZVI is likely to be contained with the 10km distance given the relative topographic prominence.

Visual coverage changes from almost 100% within 2km of the site to less than 40% within 12km of the site. Eight receptors are located within the 2km zone of visual influence, all of which are remote farmsteads and are defined as Key Observation Points (KOPs). Numerous additional rural residences are located within the 6km zone of visual influence, mainly towards the south, towards Klerksdorp, and west, along the Skoonspruit River valley. Three additional KOPs are located in the 6km zone of visual influence.

In term of intensity of the view, described as the extent of the proposed landscape change as seen from specific locations, there is variation within the viewshed. The darker the colour of the viewshed, the more of the PV area that will be visible from that area. As depicted in the map, the visual intensity of the PV views is more dominant in the western and southwestern areas. The eastern and southeastern area are exposed to less visual coverage of PV area. This is due to mainly the western points of the PV area being more visible. The relevance of this area is that there are many receptors who are rural residential property owners with higher visual exposure, who also likely to have a higher sensitivity to landscape change given the risk of property value decrease. The areas with the higher intensity of view are those receptors located on the west side of the Skoonspruit River, with more elevated views overlooking the river. These receptors are farming related and are also mainly located outside of the 6km Foreground / Mid Ground areas where landscape change is most visible.

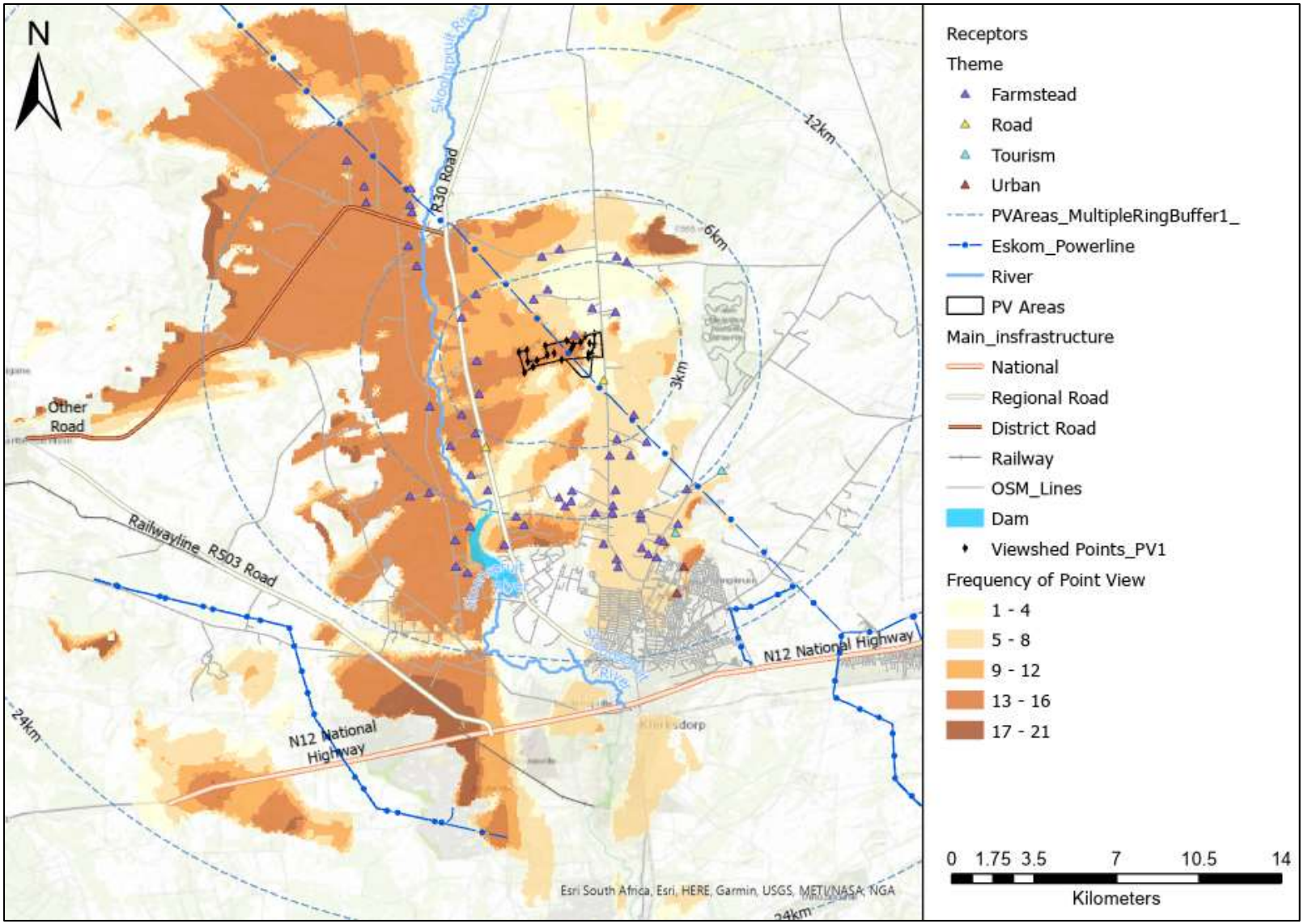


Figure 14: Viewshed analysis map.

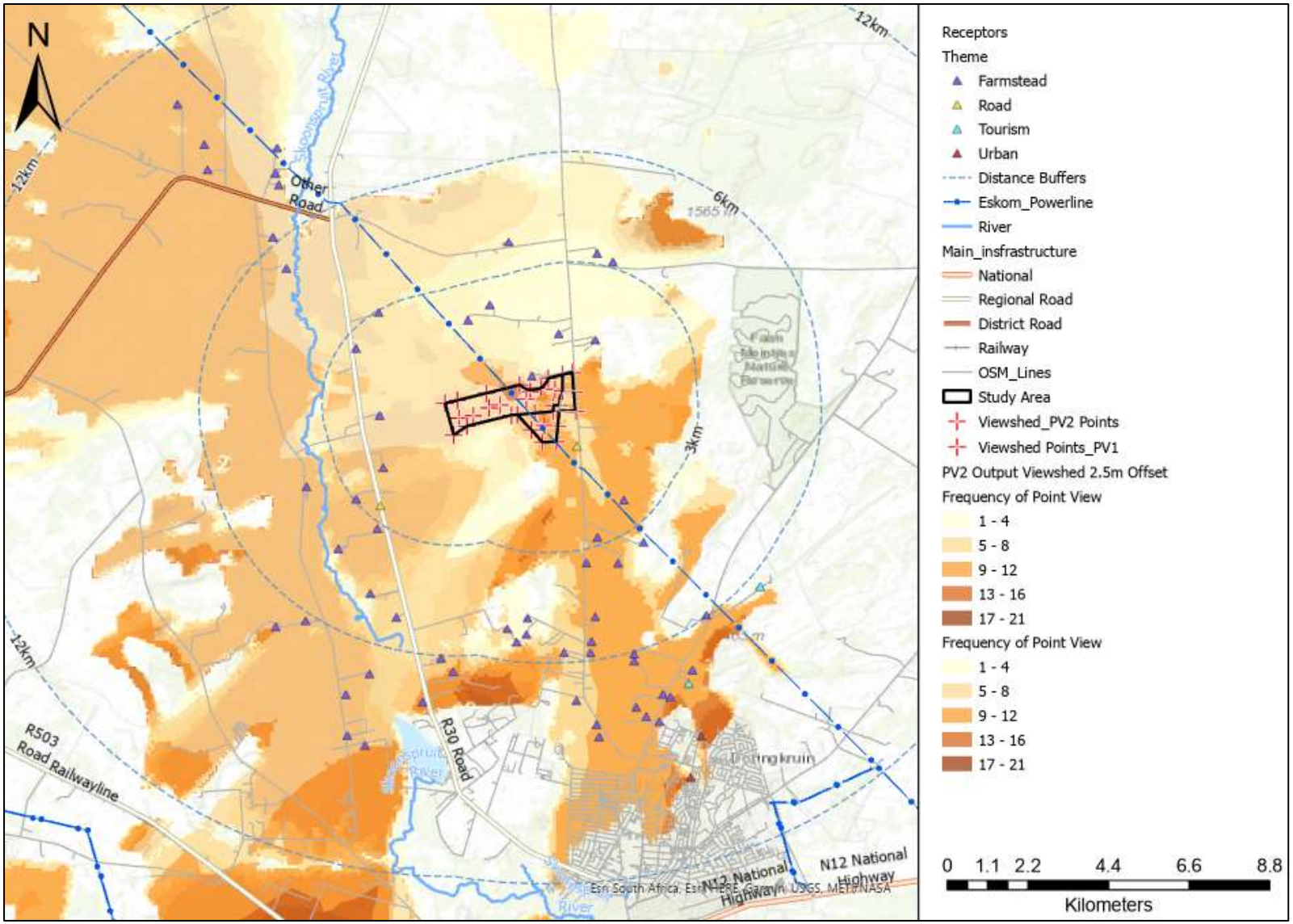


Figure 15: Viewshed analysis map of both PV projects..

From a cumulative effect, the combined PV viewshed depicts a similar spatial spread, with more intensity of visibility to the west (Figure 15). Close proximity northern and western receptors would have partial views of the project, with southern rural residential receptors located in the medium to low intensity area to the south of the proposed project.

6.3 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 the map on the following page. As motivated and mapped in Table 13 below, and mapping in Figure 16 on the following 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 13: KOP Motivation Table.

Name	POINT_X	POINT_Y	Theme	Exposure	Motivation
FS1	26.64061	-26.7198	Farmstead	Very High	Very high exposure and higher levels of scenic quality related to rural and peri-urban landscape context.
FS2	26.64718	-26.7095	Farmstead	Very High	
FS3	26.65615	-26.711	Farmstead	Very High	
FS7	26.62497	-26.7061	Farmstead	Very High	
FS8	26.63029	-26.7024	Farmstead	Very High	
FS9	26.59752	-26.713	Farmstead	Very High	
FS10	26.60416	-26.7423	Farmstead	Very High	
FS11	26.60332	-26.7295	Farmstead	Very High	
FS12	26.59755	-26.75	Farmstead	Very High	
FS5	26.58539	-26.747	Farmstead	Very High	
FS4	26.66316	-26.7502	Farmstead	Very High	
FS6	26.65668	-26.7594	Farmstead	Very High	
Rhebok Gasteplaas	26.6966	-26.7715	Tourism	Medium	Medium level of exposure but making use of visual resources within clear view of project that could influence the local sense of place.
Western Pub and Grill	26.67903	-26.7952	Tourism	Medium	
Farm Road 1	26.6281	-26.6899	Farm Road	High	Very High and High Exposure to roads around the study area that currently have higher levels of scenic quality.
Paved Road	26.65163	-26.737	Road	Very High	
R30 Road	26.6035	-26.7516	Road	Very High	

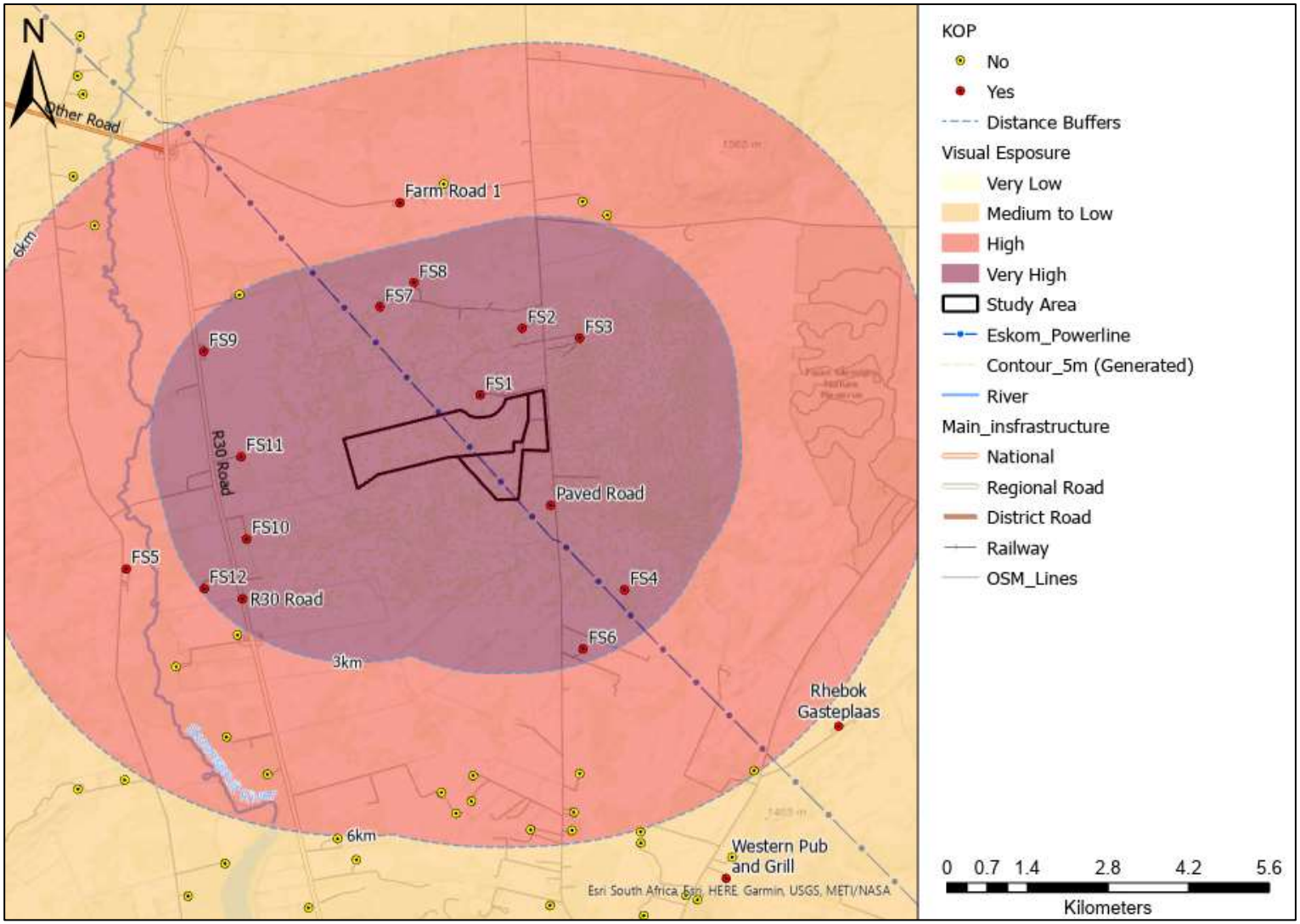


Figure 16: Receptor Key Observation Point and Visual Exposure Map

Due to the number of KOPs, a combined approach to assessment of the visual impact will be used.

- Proximate views from northern receptors.
- Proximate views from southern receptors.
- Proximate views from western receptors.

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 Doornhoek 1 PV Solar Facility 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 mapping and the site visit to define key landscape features, the following broad-brush areas were tabled and mapped in Figure 17 below.

Table 14: Physiographic Landscape Rating Units.

Landscapes	Motivation
Visual buffers for adjacent paved road and skyline.	The ridgeline is locally prominent as seen from adjacent lower lying areas and this has the potential to generate strong skyline visual intrusion. To ensure that skyline intrusion is limited relative to the surrounding rural / rural residential areas, a 200m wide buffer area is retained as a No-go area for high PV panels (greater than 2.5m). Also of relevance to reduce skyline intrusion is the retaining of the existing windbreaks along the top spur, as well as a 50m buffer around the PV area for long-term PV screening by the existing thornveld trees in these areas.
Stonehouse heritage	The stone farmhouse and cluster of other structures, with tree-lined access roads and wind breaks creates landscape heritage scenic value. It is recommended that key landscape elements associated with the farm are retained around the farm site as a No-go area.
Small hill	The small hill to the north of the site is locally prominent and forms an aesthetic element in conjunction with the old farmhouse and should not be developed.
Agriculturally modified thornveld and grasslands.	This area is located on the southern portion of the proposed PV site where the predominant vegetation is defined as Klerksdorp Thornveld. The area is highly vegetated with many small to medium sized trees that characterised the thornveld.

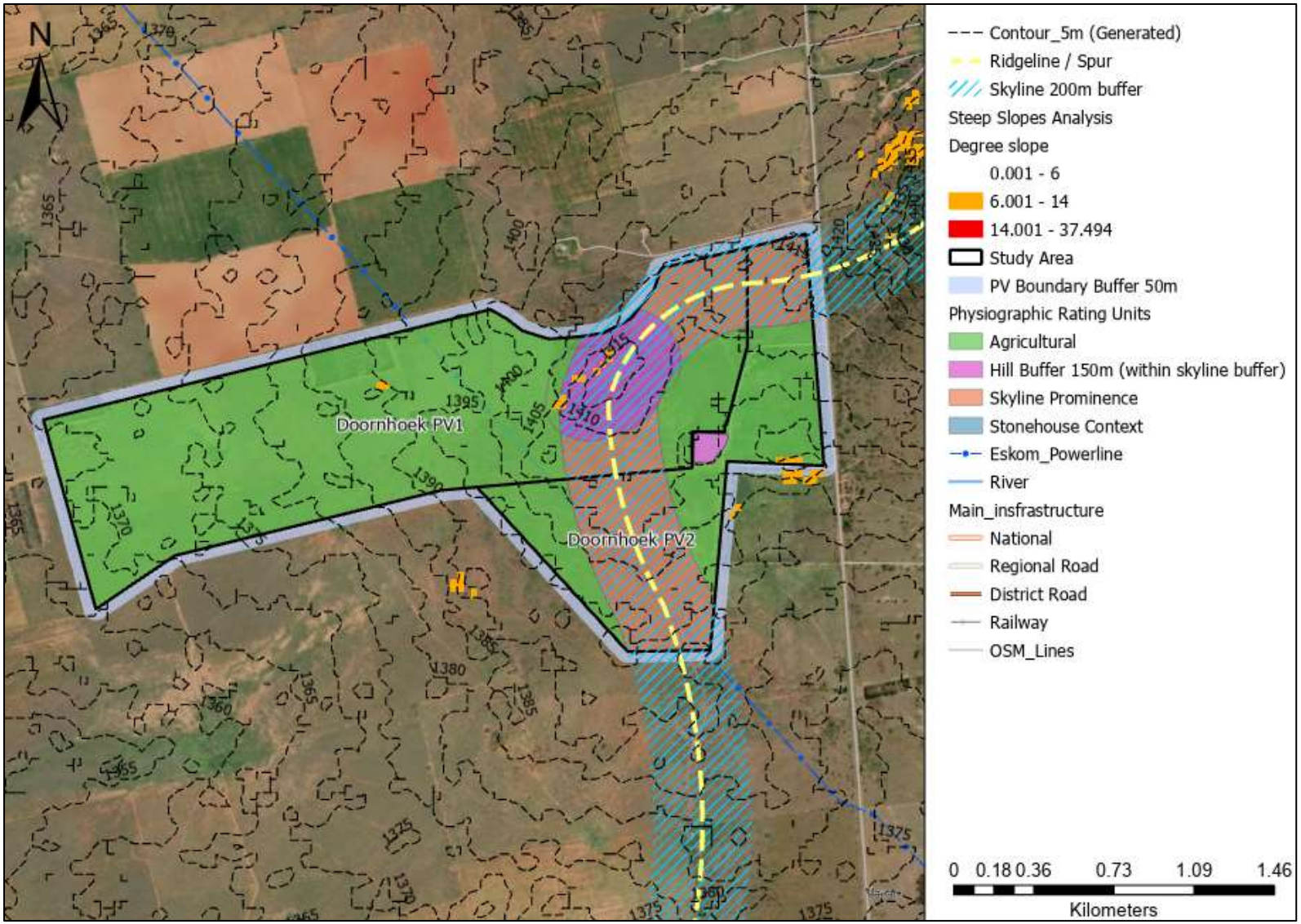


Figure 17: Physiographic Rating Units identified within the defined study area.

Table 15: 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**
Significant Heritage / Ecological / Hydrology. Hill prominence Buffer 150m. Steep slopes (pending survey).	**(Class I is not rated)**																**I**
Visual buffers, landscape skyline buffers	3	2	0	3	2	3	2	**15**	**B**	H	H	M	H	H	**H**	**II**	**II**
Agric. Transformed Thornveld	2	2	0	3	2	3	0	**12**	**B**	H	H	M	H	M	**MH**	**IV**	**III**

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.

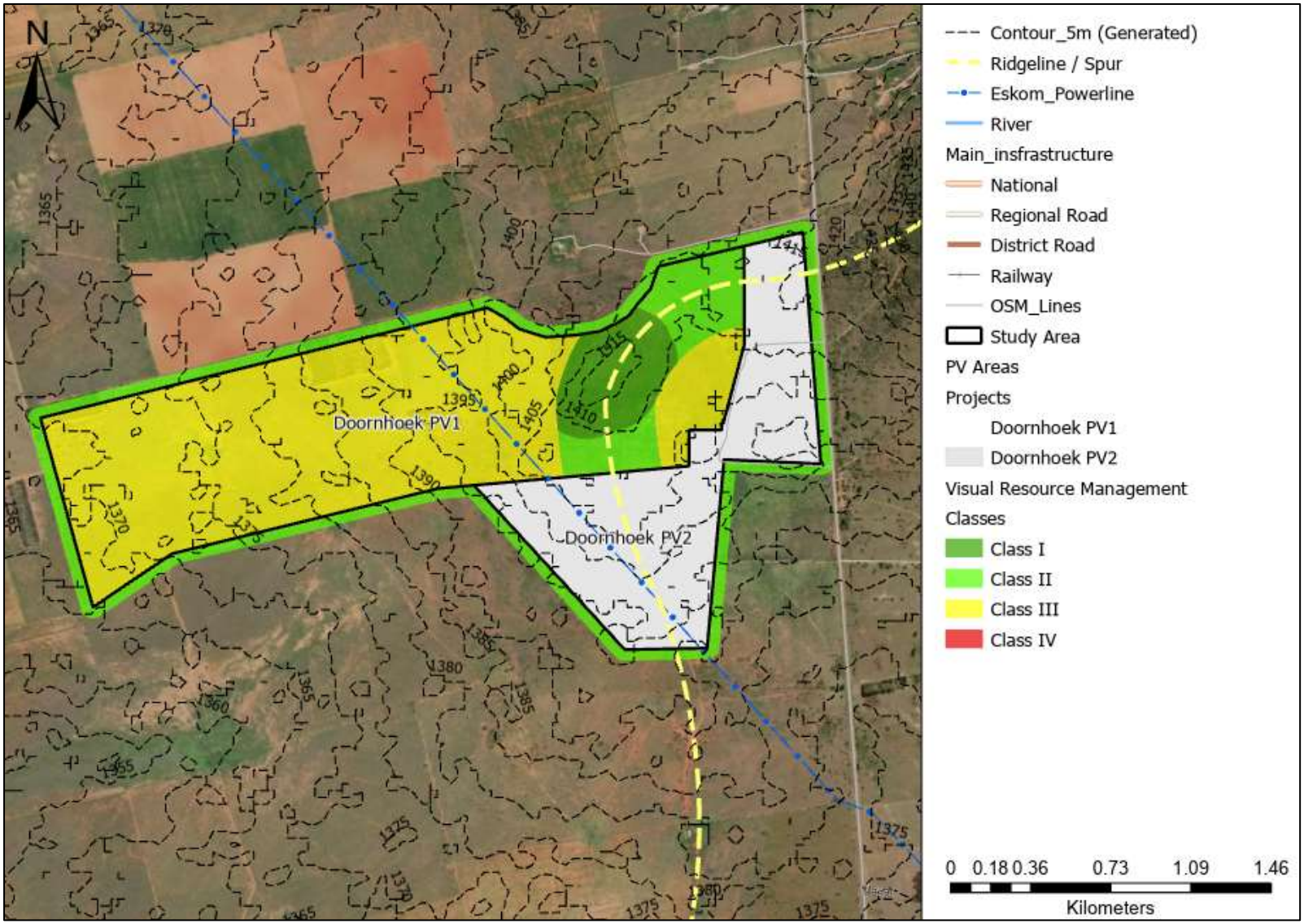


Figure 18: Visual Resource Management Classes map.

7.2 Scenic Quality Assessment

The scenic quality of the proposed development site is rated Medium. Landform consists of a wide spur that is connect to the eastern hills at the top of the study area, forming a small hill. The resultant landform is interesting though not dominant or exceptional and is rated Medium.

Vegetation comprises a combination of thornveld bushes and grasslands that have been transformed by agricultural practices. The rows of gum trees forming avenues and windbreaks do increase the scenic value of the vegetation as a cultural heritage element. As there is some variety of vegetation but only one or two major types, vegetation is rated Medium.

Other than a small drainage area to the southwest of the study area, no water features were found. Landscape colours are derived from vegetation with greens of the thornveld bushes and small trees contrasting with the khaki colours of the veld grassland and is rated Medium.

Located in the Skoonspruit River Valley which is of moderate size with small hills to the east and west, the adjacent rural agricultural landscape which depicts no discordant man-made features, does enhance the visual quality and is thus rated Medium to High. As this type of intact rural valley landscape is often degraded by mining that is common around Klerksdorp, the Scarcity of the landscape is rated Medium to High. Cultural Modifications are rated higher for the areas around the old stone farm, but with the majority of the property depicting an intact rural sense of place that adds favourably to the scenic quality.

7.3 Receptor Sensitivity Assessment

Receptor sensitivity to landscape changes is rated High. Located in an area that is characterised by small farming units, and which is increasingly trending towards a rural-residential nature, sensitivity to landscape change is likely to be experienced as High. For the rural residential/ smaller farm owners as well as the two tourist related receptors, maintenance of visual quality is likely to be a major concern. The area is prominent in the local landscape due to the wide ridgeline landform and as such levels of use are rated High. Public Interest for the maintenance of visual quality is likely to be moderate to low for the general public, as the area is not a well know tourist related destination and only a few tourist facilities are making use of the valley's scenic resources. Due to the rural residential nature of the area located within the ZVI, maintenance of visual quality for adjacent users likely to be very important, and is rated High. As hills and ridgelines are highlighted in local planning documentation as important, the study area is rated Moderate as a Special Area.

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.
- Small hill that is a prominent landform feature.

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.

- ***Visual buffers***
    - ***Skyline intrusion buffer 200m***

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:

- **Agric. Transformed Klerksdorp Thornveld**

7.4.4 VRM Class IV

As the area is zoned agricultural and located adjacent to an area that does have scenic value and could carry tourist receptors in the area region, no Class IV areas were defined.

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.

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.

As this is a Basic Assessment due to the location of the study area within the Klerksdorp REDZ, no photomontages were generated. The expected positioning of the PV area in the landscape was provisionally depicted on KOP photographs in the Annexure. Table 16 identifies the KOP location (groupings) used to assess the suitability of the landscape change. The scale and positioning of the PV areas was informed by a 3D model that replicated the view of the area where the landscape change is proposed as per the examples below. Due to the close proximity of the PV project, a combined view of the two projects is used to better understanding cumulative effects.

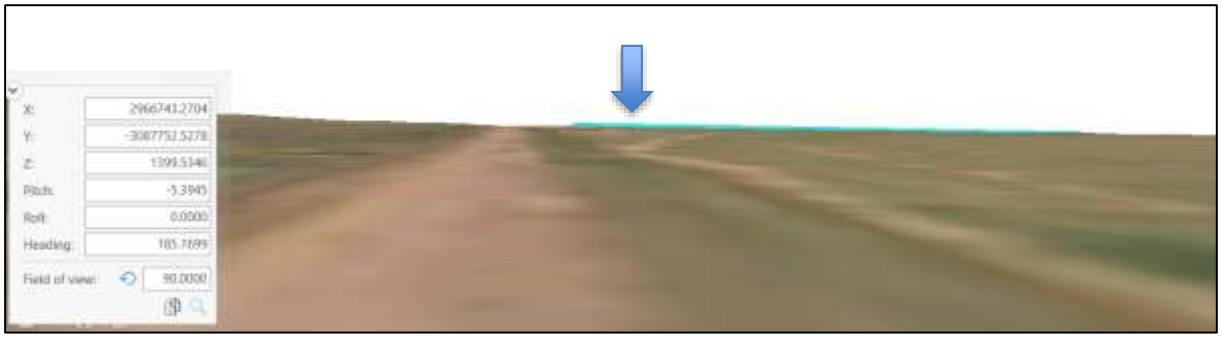


Figure 19: 3D model view as seen from the adjacent tarred road travelling south before reaching the project area (near FS2).

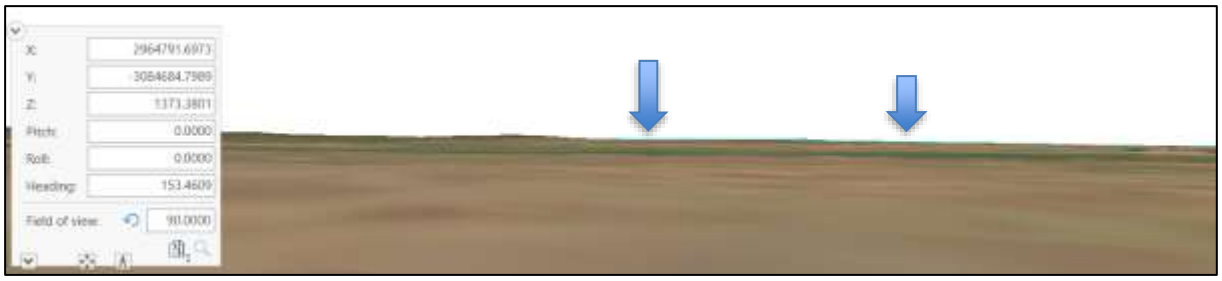


Figure 20: 3D model view as seen from KOP Farm Road 1.

Figure 21: 3D model view as seen from KOP FS1.

Figure 22: 3D model view as seen from the KOP FS3.

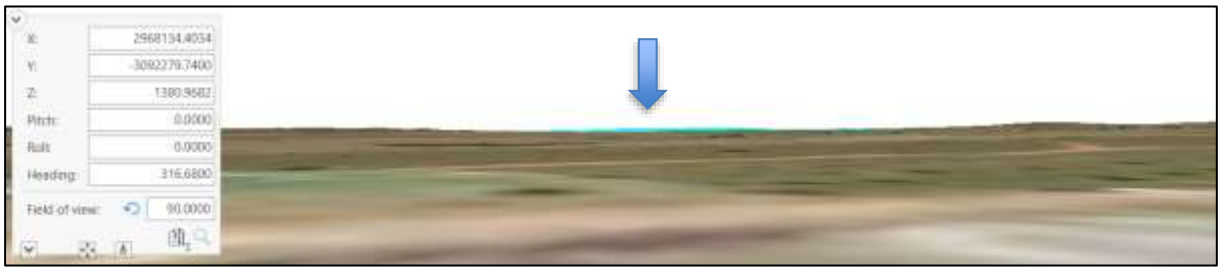


Figure 23: 3D model view as seen from the KOP FS4.

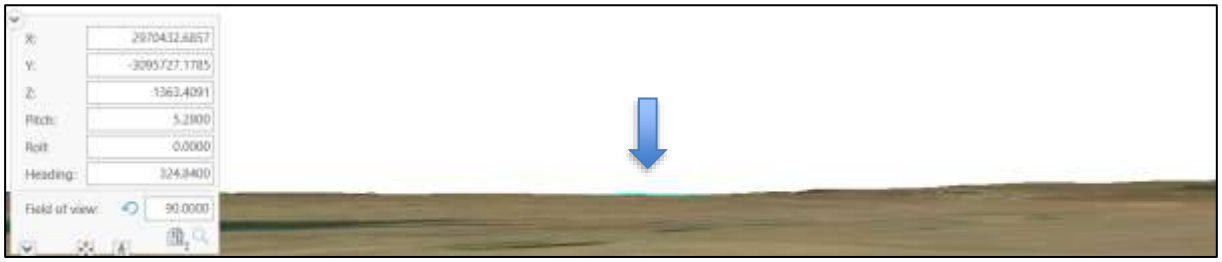


Figure 24: 3D model view as seen from the Western Pub & Grill KOP.

Figure 25: 3D model view as seen from the R30 Road northbound.

Figure 26: 3D model view as seen from KOP FS5.

Figure 27: 3D model view as seen from KOP FS9.

Figure 28: 3D model view as seen from adjacent farm road KOP.

Figure 29: Perspective 3D model view of the small hill for landscape compromise from both PV1 & 2 development areas.

Table 16: 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?**
Proximate views from northern receptors.	350m to 1km	Very High	W/Out	W	S	S	S	W	No
			With	W	M	M	M	M	Yes
Proximate views from southern receptors.	2.5km	High	W/Out	W	W	M	M	W	Y
			With	*Not applicable*					
Proximate views from western receptors & R30.	1.9km to 3.7km	Medium	W/Out	W	W	M	M	W	Y
			With	*Not applicable*					
Adjacent Farm Road	50m	Very High	W/Out	W	S	S	S	S	No
			With	W	M	M	M	M	Yes

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

Contrast Rating Findings

Based on the site visit as well as the 3D model views from the Key Observation Points, the finding of the Contrast Rating is that for most of the farm related KOPs, the contrast will be Medium to Weak. This is due to the Medium distance from the proposed landscape change, in relation to the relatively small size of the coverage that has a broken shaping (i.e., massing effect is limited).

Closer proximity receptors making use of the adjacent road, as well as the High Exposure receptors located to the northeast of the site, will experience medium to higher levels of visual contrast without mitigation. With mitigation and the retaining of the existing screening vegetation and windbreaks surrounding the site, the effective contrast would reduce this to Medium to Weak levels.

8.2 PV Project Impact Ratings and Motivation

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

Construction:

- Loss of site landscape character due to the removal of vegetation and the construction of the PV structures and associated 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 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 solar energy projects, resulting in a loss to the current Medium to High levels of scenic quality of the Skoonspruit Valley.

Table 17: 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 PV structures and associated 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.			
Mitigability	Medium	The mitigation will partially reduce the significance of the visual and landscape impacts		
Potential mitigation	• **Re-design the layout such that the Hill Buffer area is excluded from development.** • **Retain all trees within the 50m boundary buffer area, as well as the outer rows of the gum-tree windbreaks.** • **Limit the height of the PV panels to max. 2.5m above the ground.** • **Plant trees around the stone house heritage complex.** • **Dust mitigation.**			
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	High	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 affected landscape will be able to recover from the impact as there are minimal cut/fills and the thornveld vegetation will regrow over time to some degree.	Medium	The affected landscape will be able to recover from the impact as there are minimal cut/fills and the thornveld vegetation will regrow over time to some degree.

Landscape Significance	**High (-ve)**	**Medium (-ve)**
Motivation	Without a setback from the small but prominent hill on the wide ridgeline, the landscape integrity of this feature would be compromised. This risk is also flagged in the DFFE SSV mapping. Without effective implementation of the adjacent screening trees around the project, the close proximity views from the neighbouring properties could impact their property values.	With mitigation, the small hill and associated thornveld vegetation would not be compromised, adding local value to the existing valley that has Medium to High levels of Scenic Quality. While some skyline development will take place, the wide nature of the spur does allow for tree screening to allow for partial views of the PV landscape. The windbreaks that are a part of the old stone house heritage landscape, are retained in form, but not in function.
Visual Significance	**Medium to High (-ve)**	**Medium (-ve)**
Motivation	As the majority of the receptors, especially southern rural residential receptors, have medium levels of visual exposure, with limited clear view of the PV panel that does not create a dominating massing effect, the views of the construction phase impacts would be minimised. However, there are portions of the PV site located on the prominent portion of the spur, resulting in skyline intrusion where movement of vehicles and dust would be more visible.	With mitigation and the retaining of the windbreaks and thornveld trees in the buffer around the PV development area, visual intrusion is reduced for the majority of the more proximate receptors who are located on the same slope, albeit at a lower elevation. Receptors further afield and on the opposite side of the Skoonspruit River will have more visibility of the site, but with lower intensity of view due to distance and atmospheric effects.
Cumulative Effects	**High (-ve)**	**Medium (-ve)**
Motivation	Negative cumulative risks are rated High without mitigation and Medium with mitigation. This is due to presence of the PV project, although currently visually contained, could set a precedent for Indirect Effects occurring later in time for other land owners within the vicinity to convert their agricultural lands to RE. While this does align with the REDZ planning, should this scenario occur, a larger massing effect could result from the cumulative effects of PV project intervisibility with loss to the landscape character of the Skoonspruit River Valley. For this reason, a larger footprint of the project was not recommended.	

Table 18: Operation Phase Impacts Table

Project phase	**Operation Phase**	
Impact	**Long-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 operation of the PV structures and associated infrastructure. • Visual intrusion to adjacent property owners and road users.	
Mitigability	Medium	The mitigation will partially reduce the significance of the visual and landscape impacts

Potential mitigation	• Allow nature growth of the trees in the buffer without the trees becoming a fire risk. • Allow cattle access to the buffer areas to keep managing grasslands and retain a link to the rural agricultural sense of place.			
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	Medium to High	Natural and/ or social functions and/ or processes are clearly altered.	Medium	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 affected landscape will be able to recover from the impact as there are minimal cut/fills and the thornveld vegetation will regrow over time to some degree.	Medium	The affected landscape will be able to recover from the impact as there are minimal cut/fills and the thornveld vegetation will regrow over time to some degree.
Landscape Significance	**High (-ve)**		**Medium (-ve)**	
Motivation	Without a setback from the small but prominent hill on the wide ridgeline, the landscape integrity of this feature would be compromised. This risk is also flagged in the DFFE SSV mapping. Without effective implementation of the adjacent screening trees around the project, the close proximity views from the neighbouring properties could impact their property values.		With mitigation, the small hill and associated thornveld vegetation would not be compromised, adding local value to the existing valley that has Medium to High levels of Scenic Quality. While some skyline development will take place, the wide nature of the spur does allow for tree screening to allow for partial views of the PV landscape. The windbreaks that are a part of the old stone house heritage landscape, are retained in form, but not in function. However, some development would still be located on the ridgeline that does as Moderate levels of prominence.	
Visual Significance	**High (-ve)**		**Medium (-ve)**	
Motivation	As the majority of the receptors, especially southern rural residential receptors, have medium levels of visual exposure, with limited clear view of the PV panel that does not		With mitigation and the retaining of the windbreaks and thornveld trees in the buffer around the PV development area, visual intrusion is reduced for the majority of the more proximate	

	create a dominating massing effect, the views of the operation phase impacts would be minimised. However, there are portions of the PV site located on the prominent portion of the spur, resulting in skyline intrusion where the installation would be more visible.	receptors who are located on the same slope, albeit at a lower elevation. Receptors further afield and on the opposite side of the Skoonspruit River will have more visibility of the site, but with lower intensity of view due to distance and atmospheric effects. The landscape change would still be noticeable.
Cumulative Effects	**High (-ve)**	**Medium (-ve)**
Motivation	Negative cumulative risks are rated High without mitigation and Medium with mitigation. This is due to presence of the PV project, although currently visually contained, could set a precedent for Indirect Effects occurring later in time for other land owners within the vicinity to convert their agricultural lands to RE. While this does align with the REDZ planning, should this scenario occur, a larger massing effect could result from the cumulative effects of PV project intervisibility with loss to the landscape character of the Skoonspruit River Valley. For this reason, a larger footprint of the project was not recommended.	

Table 19: Decommissioning Phase Impacts Table

Project phase	**Decommissioning Phase**			
Impact	**Short-term landscape change from the removal of the PV structures, followed by rehabilitation of the impacted areas back to agricultural lands.**			
Description of impact	• Movement of large vehicles required for the removal of the PV panels, power lines, mono-poles and substations. • Wind-blown dust from impacts to vegetation. • Wind-blown litter from the laydown and construction sites.			
Mitigatability	Medium	The mitigation will reduce the significance of the visual and landscape impacts		
Potential mitigation	• Dust suppression measures. • Litter management measures. • Rehabilitation of impacted areas to agriculturally viable grasslands.			
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 as there are minimal cut/fills and the thornveld vegetation will regrow over time to some degree.	Medium	The affected landscape will be able to recover from the impact as there are minimal cut/fills and the thornveld vegetation will regrow over time to some degree.
Landscape Significance	**Medium (-ve)**		**Low (-ve)**	
Motivation	The shorter time period of the vehicle movement on the prominent portions of the property would result in Medium VIA Significance.		With dust management, this phase landscape impacts are rated Low (-ve).	
Visual Significance	**Medium (-ve)**		**Low (-ve)**	
Motivation	As the majority of the receptors, especially southern rural residential receptors, have medium levels of visual exposure, with limited clear view of the PV panel that does not create a dominating massing effect, the views of the decommissioning phase impacts would be minimised. However, there are portions of the PV site located on the prominent portion of the spur, resulting in skyline intrusion where movement of vehicles and dust would be more visible.		With mitigation and the retaining of the windbreaks and thornveld trees in the buffer around the PV development area, visual intrusion is reduced for the majority of the more proximate receptors who are located on the same slope, albeit at a lower elevation. Receptors further afield and on the opposite side of the Skoonspruit River will have more visibility of the site, but with lower intensity of view due to distance and atmospheric effects.	
Cumulative Effects	**High (-ve)**		**Low (-ve)**	
Motivation	Failure to remove the PV panels would result in High (-ve) risks to the integrity of the Skoonspruit Valley landscape character, degrading local property values. With full rehabilitation and a continuation of the existing agricultural land uses of the property, Cumulative Effects are likely to be Low (-ve).			

9 PRELIMINARY ENVIRONMENTAL MANAGEMENT PLAN

9.1.1 Design Phase

- The 150m buffer around the hill due to ridgeline prominence should be retained as a No-go area. The PV layout should be amended to exclude this area. This area should be set aside for conservation with thornveld tree growth encouraged.
- The external 50m buffer (with respect to the PV area) should be retained as a skyline intrusion mitigation from existing trees, and planting of further screening trees.
- The gum-tree windbreaks adjacent to the skyline area are key screening elements and are important in retaining the rural agricultural landscape associated with the stone house heritage. These trees also reduce skyline intrusion and massing of PV on the skyline buffer area. As such, this buffer area needs to be managed as a component of the PV project. To reduce the effects of the gum tree windbreaks creating shade/ tree fall onto the PV area, the row of trees closer to the PV area can

be felled prior to development of the PV site. The row away from the PV area need to be retained for the duration of the project.

- To reduce the visual intrusion created by the white paint required for the BESS containers, early planting of screening trees directly adjacent to the BESS area needs to be undertaken.
- A row of trees around the Stone House complex needs to be planted as a windbreak (every 5m) to retain the local landscape character of the old farm complex. This area can be incorporated into the administration area working within heritage building specifications.
- Limit the height of the PV panels to 2.5m above ground level.

9.1.2 Construction Phase

- Thornveld trees surrounding the proposed PV sites should be retained for visual screening. Young thornveld trees that will be removed from the PV development area need to be relocated to the buffer area such that there are trees spaced every 20 m along the boundary buffer.
- In order to retain the functional rural agricultural sense of place, the buffer areas around the PV site should be fenced off (retain existing farm fencing) and used for cattle grazing to reduce the risk of fire.
- 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 should be painted a grey-brown colour.
- Fencing around the offices and laydown area 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.
- Fencing should be placed around the PV panels and not extend up to the boundary. Electric fencing can be used. There should be no security lighting along the fence line.
- Signage on the adjacent road 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).
- No overhead lighting should be used.

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.
- Continue management of the 50m screening buffer such that grasslands and trees do not become a fire risk.

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 basis.

10 PRELIMINARY OPPORTUNITIES AND CONSTRAINTS

10.1 Doornhoek 1 & Associated Infrastructure

10.1.1 Opportunities

- Benefit to the National economy from the generation of renewable energy.
- Employment opportunities during construction and operation.
- Located within the Klerksdorp REDZ.
- Limited Visual Exposure to few tourist related receptors (two locations) who are located in the Midground areas and would have partial views of the landscape change.
- Existing Eskom Power Line creating some visual disturbance to the rural landscape.

10.1.2 Constraints

- Relative prominence of the development on a wide spur that will result in a wider ZVI and some skyline intrusion.
- Possible long-term risks from cumulative effects in the development attracting other RE projects to the valley that currently has no precedent for large scale man-made modifications and has Medium to High levels of Scenic Quality.
- Medium levels of Visual Exposure to southern small-holding receptors who could be sensitive to landscape change.

10.2 No-Go Option

10.2.1 Opportunities

- Maintain the existing Skoonspruit landscape character that currently has Medium to High levels of Scenic Quality in a region that is often degraded by mining landscapes.
- Some limited employment opportunities for farm labourers.

10.2.2 Constraints

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

11 CONCLUSION (PENDING I&AP COMMENT)

Located on a relatively prominent spur within the valley context of the Skoonspruit River, the viewshed extends across many farming/ small farming and rural residential receptors located within the Skoonspruit River Valley. Although not pristine, the Skoonspruit River Valley does have value as a landscape resource, with no dominating mining landforms to degrade landscape character. This factor has significance in that much of the area around Klerksdorp has been visually degraded by large scale mining landscapes. Even though the development site is located within the Klerksdorp REDZ, to ensure that landscape degradation of the Skoonspruit River Valley does not take place, the development WITHOUT mitigation should be considered a Fatal Flaw. (*The previous development proposal that included three large PV areas wrapped over the spur was defined as a Fatal Flaw*).

With mitigation, the visual intrusion of the proposed semi-industrial landscape can be moderated to some degree, with the use of existing and new tree plantings providing a partial mitigation against the risks of skyline intrusion, and rural landscape degradation. The smaller mitigated layouts that were presented in this report (with the larger development footprint defined as a Visual / Landscape Fatal Flaw) would have less visibility to the surrounding rural receptors. Retaining of the existing gum tree windbreaks that are located on the ridgeline, would reduce the skyline visual intrusion to some degree. The landscape also includes a 132KV Eskom power line that does degrade the local landscape character of the ridgeline to some degree. There are also many trees in the landscape that currently reduce the visibility of the site for close proximity and southern receptors.

As the site is located within the Klerksdorp REDZ, and the size, skyline intrusion area and height of the PV panels have been significantly reduced, **the recommendation of the Landscape and Visual Impact Assessment is that development should only be authorised with mitigation.** With authorisation and development, some residual impacts are likely to remain, as new semi-industrial land use precedent would have been set in place in the Skoonspruit River Valley. While the valley landscape could accommodate this PV development, multiple PV developments in the valley are likely to significantly degrade the Skoonspruit River Valley landscape and sense of place. Mitigations to reduce this risk are outside of this EIA but would include similar mitigations defined for this assessment: ensure suitable buffering between projects, reduce area coverage, reduce PV panel height and a property boundary buffer for vegetation screening around the PV site.

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13 ANNEXURE A: SITE VISIT PHOTOGRAPHS AND COMMENTS

The following photographs were taken during the field survey as mapped in Figure 30 below. The text below the photograph describes the landscape and visual issues of the locality, if applicable.

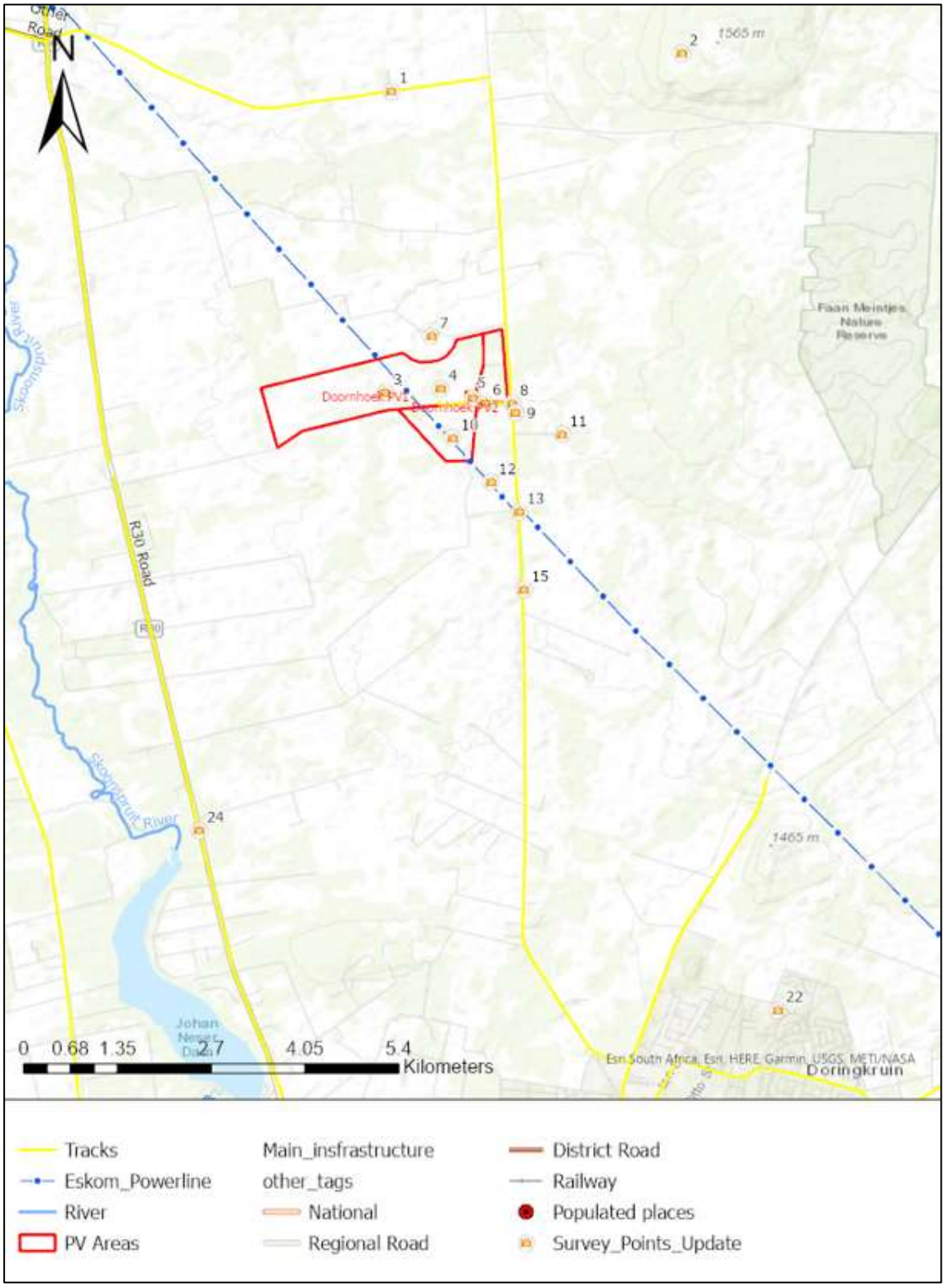
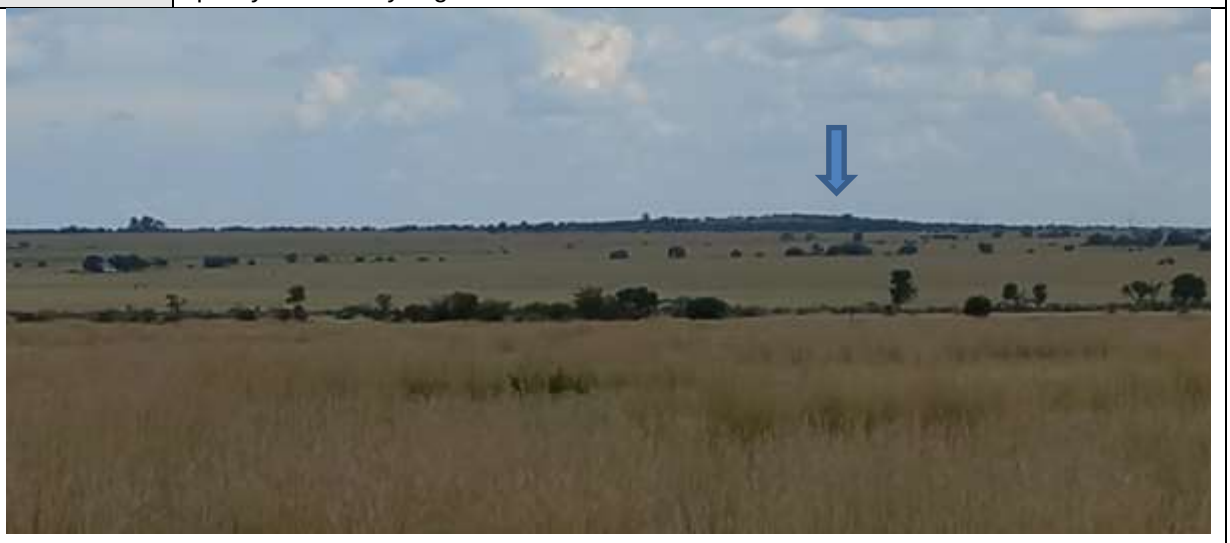


Figure 30: Site Survey Point Map

ID	1
PHOTO	Farm Road receptor
DIRECTION	South
COMMENT	View from farm road towards the proposed PV landscape modification where the panels would be located in the mid ground distance on the low hill. The current lack of intensively modified land uses adds to the landscape character where the scenic quality is currently High.



ID	2
PHOTO	Low hills
DIRECTION	East
COMMENT	View east from the gravel road of the low hills located to the east of the site. While not spectacular, they provide a visual contrast to the wide Skoonspruit Valley with similar low hills to the west of the river.

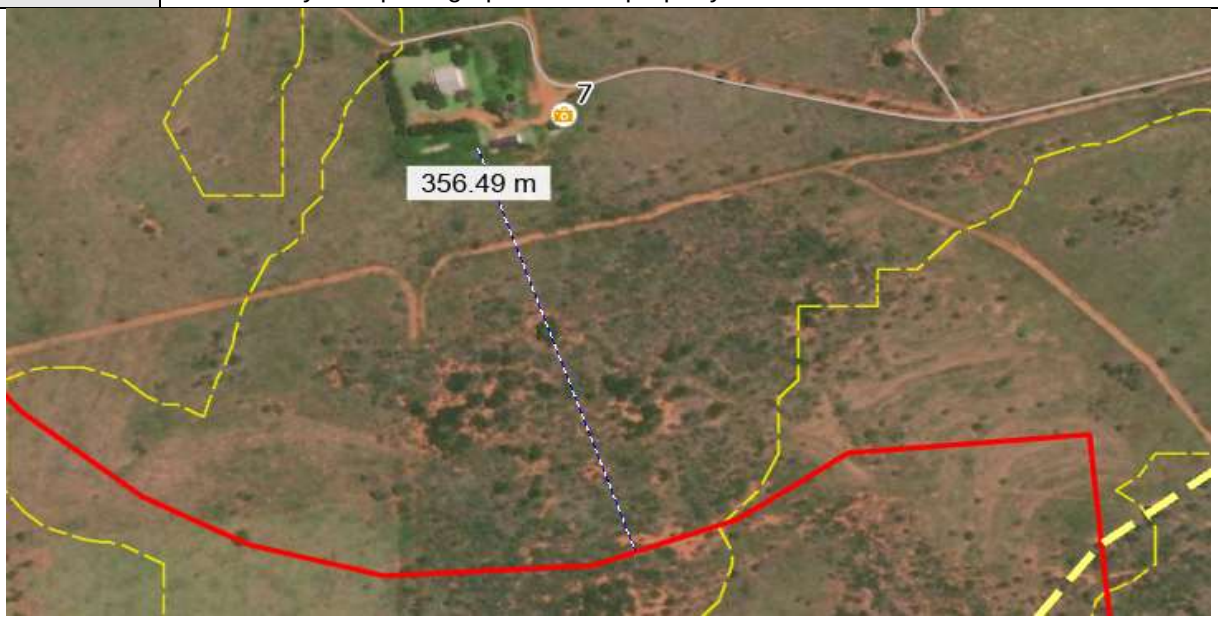
ID	3
PHOTO	Relative prominence
DIRECTION	West
COMMENT	Photograph also depicts the relative prominence of the ridgeline portion of the property with views downslope to the Skoonspruit River located in the valley.

ID	4
PHOTO	Site koppie landform
DIRECTION	North
COMMENT	Slightly raised small hill landform within the study area not suitable for development.

ID	5
PHOTO	Site existing old farmhouse heritage
DIRECTION	North
COMMENT	Old stone farmhouse that is likely to have heritage value but is excluded from the development area. Aesthetically, the rural cultural landscape associated with the old farmhouse would also include the tree lined access roads and local windbreaks.

ID	6
PHOTO	Site old gum avenue
DIRECTION	East
COMMENT	Old avenue of gum trees along old farmhouse access road. Landscape value in association with stone house. Off-site but a non-development buffer should be retained.

ID	7
PHOTO	High Exposure to rural residential receptor
COMMENT	Adjacent farm receptor located in close proximity to project site. Screening around house from trees and topographic screening reduces potential for direct visual intrusion from locality. No photograph taken of property as the owner was not available.



ID	8
PHOTO	Road Receptor
DIRECTION	South
COMMENT	Photograph depicts the view as seen from Todd Road travelling south. Some existing trees on the road verge offer some visual screening but is not a consistent theme. The road does have scenic value and is used by rural residential type receptors. Skyline intrusion from tall PV panels would increase visual intrusion.

ID	9
PHOTO	Labourer Cottage Receptor
DIRECTION	East
COMMENT	Photo of labourer cottages adjacent to site with very high exposure. Existing tree screening is available and visual intrusion will be reduced if retained.

ID	10
PHOTO	PV2 site on low ridgeline
DIRECTION	Southwest
COMMENT	Site rural agriculture sense of place with the proposed development located on low ridgeline creating skyline intrusion.

ID	11
PHOTO	Receptor Bosworth Stud Farm (possibly project developer)
DIRECTION	East
COMMENT	View down the Boswoth farm road. While this property is likely related to the development, surrounding receptors located on small-holdings are likely to have higher sensitivity to landscape change that could result in local change to regional sense of place. If not a proponent, this receptor would need to be scoped by the social impact assessment for views regarding impacts to local scenic quality.

ID	12
PHOTO	Site power line landscape context on site
DIRECTION	West
COMMENT	Existing powerline traversing the three PV sites. Lattice structure reduces visual intrusion with localised landscape degradation.

ID	13
PHOTO	Transmission line road crossing
DIRECTION	Southeast
COMMENT	Proposed Transmission line crossing aligned with existing Eskom powerline. Skyline intrusion would take place.

ID	15
PHOTO	Road receptor northbound
DIRECTION	Northwest
COMMENT	View from road receptor northbound with PV Development on left on slightly raised ground forming potential skyline intrusion.

ID	22
PHOTO	Urban receptor
DIRECTION	South
COMMENT	Urban receptors located on elevated ground with views towards the site but would see a combined massing effect of PV in current rural agricultural landscape. Low intensity views of the proposed PV landscape would take place in background locations.

ID	24
PHOTO	Road receptor
DIRECTION	Northeast
COMMENT	Photograph depicting the view as seen from the road. Views of the slightly raised property are only visible in the background. The area to the North where there is high ground will increase the visual extent of the Landscape change. Higher levels of scenic quality of this rural agricultural area will increase sensitivity to landscape change that is not agricultural in nature.

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: 0063

has been accredited as a

PROFESSIONAL HERITAGE PRACTITIONER (PHP)

This membership is subject to the *Standards for Accreditation* and *Code of Conduct*, referred to in Sections 2 and 3 of the APHP Constitution respectively. The definition of a PHP 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 2021 – 1 JULY 2022

CHAIRPERSON

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

Image Source: Salvage of Materials at the UCT Jagger Library, *https://photos.google.com/share/AF1QipMBrU-Vqzrp-laS7WBzr_amP6IkH6QJvzkx6P6PLNT16wAiuyyRvIE46sI47NQdg?key=VEZ2ZUZtdmpQcDFjRG6yc1h3TlNqVXlNdzNHSjF3*

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

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 20: VRM Africa Projects Assessments Table

15 ANNEXURE D: 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 mine, 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.
- If possible, the existing overhead lighting method utilised at the mine should be phased out and replaced with an alternative lighting using closer to source, directed LED technology.

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.

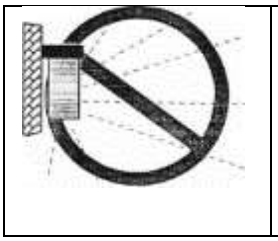
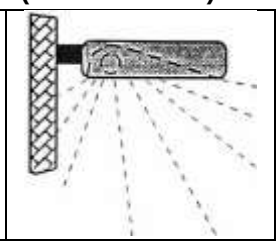
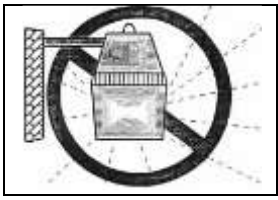
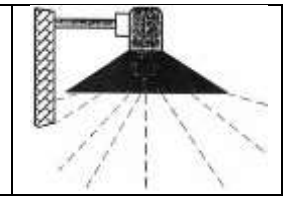
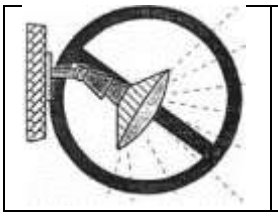
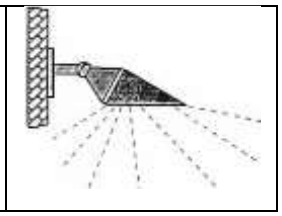
Glare Here's the basic rule of thumb: If you can see the bright bulb from a distance, it's a bad light. With a good light, you see lit ground instead of the dazzling bulb. "Glare" is light that beams directly from a bulb into your eye. It hampers the vision of pedestrians, cyclists, and drivers.

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

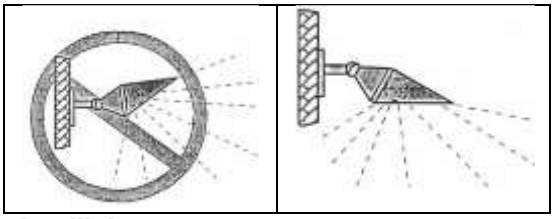
How do I switch to good lighting?

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!

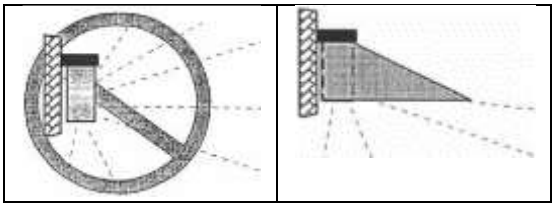
What You Can Do To Modify Existing Fixtures

Change this . . . to this (aim downward)



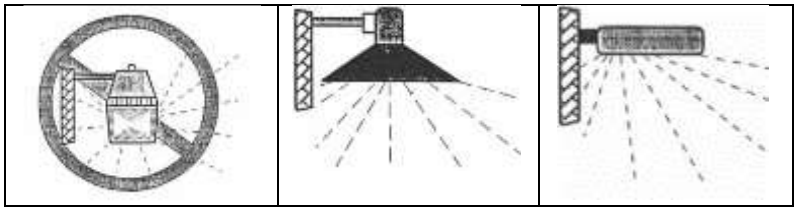
Floodlight:

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 B: 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).