

THE PROPOSED HOUTHAALBOOMEN PV CLUSTER GRID INFRASTRUCTURE, NORTH WEST PROVINCE, SOUTH AFRICA

Visual Impact Assessment Report

Final V_1

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Document prepared for Cape EAPrac (Pty) Ltd
On behalf of Euphorbia PV (Pty) Ltd



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LIST OF ACRONYMS

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

GLOSSARY OF TECHNICAL TERMS

Technical Terms Definition (Oberholzer, 2005)

Degree of Contrast	of	The measure in terms of the form, line, colour and texture of the existing landscape in relation to the proposed landscape modification in relation to the defined visual resource management objectives.
Visual intrusion		Issues are concerns related to the proposed development, generally phrased as questions, taking the form of “what will the impact of some activity be on some element of the visual, aesthetic or scenic environment”.

Receptors	Individuals, groups or communities who would be subject to the visual influence of a particular project.
Sense of place	The unique quality or character of a place, whether natural, rural or urban.
Scenic corridor	A linear geographic area that contains scenic resources, usually, but not necessarily, defined by a route.
Viewshed	The outer boundary defining a view catchment area, usually along crests and ridgelines. Similar to a watershed. This reflects the area, or the extent thereof, where the landscape modification would probably be seen.
Visual Absorption Capacity	The potential of the landscape to conceal the proposed project.

Technical Term Definition (USDI., 2004)

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

1 DFFE SPECIALIST REPORTING REQUIREMENTS

1.1 Specialist declaration of independence

Table 1. Specialist declaration of independence.

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

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

Table 2: Specialist report requirements 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
The expertise of that person to compile a specialist report including a curriculum vitae	14 Registration with Association of Professional Heritage Practitioners
A declaration that the person is independent in a form as may be specified by the competent authority	Table 1. Specialist declaration of independence.
An indication of the scope of, and the purpose for which, the report was prepared	3.1 Terms of Reference
A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Table 24 Impact Assessment Tables
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;	3.4 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;	6 Baseline Visual Inventory
An identification of any areas to be avoided, including buffers	10 Development Constraints
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

A specialist report prepared in terms of the Environmental Impact Regulations of 2014 (as amended in 2017) must contain:	Relevant section in report
A description of any assumptions made and any uncertainties or gaps in knowledge;	3.3 Assumptions and Limitations
A description of the findings and potential implications of such findings on the impact of the proposed activity or activities	7.4 Visual Resource Management Classes
Any mitigation measures for inclusion in the EMPr	9 Environmental Management Plan
Any conditions for inclusion in the environmental authorisation	NA
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	NA
A reasoned opinion as to whether the proposed activity or portions thereof should be authorised	10 Opportunities and Constraints
Regarding the acceptability of the proposed activity or activities; and	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	9 Environmental Management Plan
A description of any consultation process that was undertaken during the course of carrying out the study	NA
A summary and copies if any comments that were received during any consultation process	NA
Any other information requested by the competent authority.	NA

1.3 DEFF Screening Tool Site Sensitivity Verification

In terms of Part A of the Assessment Protocols published in GN 320 on 20 March 2020, site sensitivity verification is required relevant to the DEFF Screening Tool. The SSV mapping does not make reference to Landscape Risks for power lines. **As such, the associated PV SSV is utilised to inform DFFE identified potential landscape risks.** The Map of Relative Landscape (Solar) Theme Sensitivity is rated Very High for the eastern portion of the property. The issue identified was Mountain Tops and High Ridgelines.

As indicated in the photographs taken during the site visit (Annexure A), the study area is not associated with mountain top landscape features. This is a higher elevation area within the regional landscape, but with the area predominantly flat. Vegetation on the surrounding area would reduce the visibility of the landscape change to some degree, retaining the Zone of Visual Influence on the local region. The following table outlines the relevance of the risks raised in the SSV as informed by the site visit.

Table 3. DEFF SSV PV and Landscape Risk table.

DFFE Feature	DFFE Sensitivity	Risk Verification	Motivation
Mountain Tops and High Ridgelines	<i>Very High</i>	Low	No mountain tops or high ridgelines were identified during the site visit.

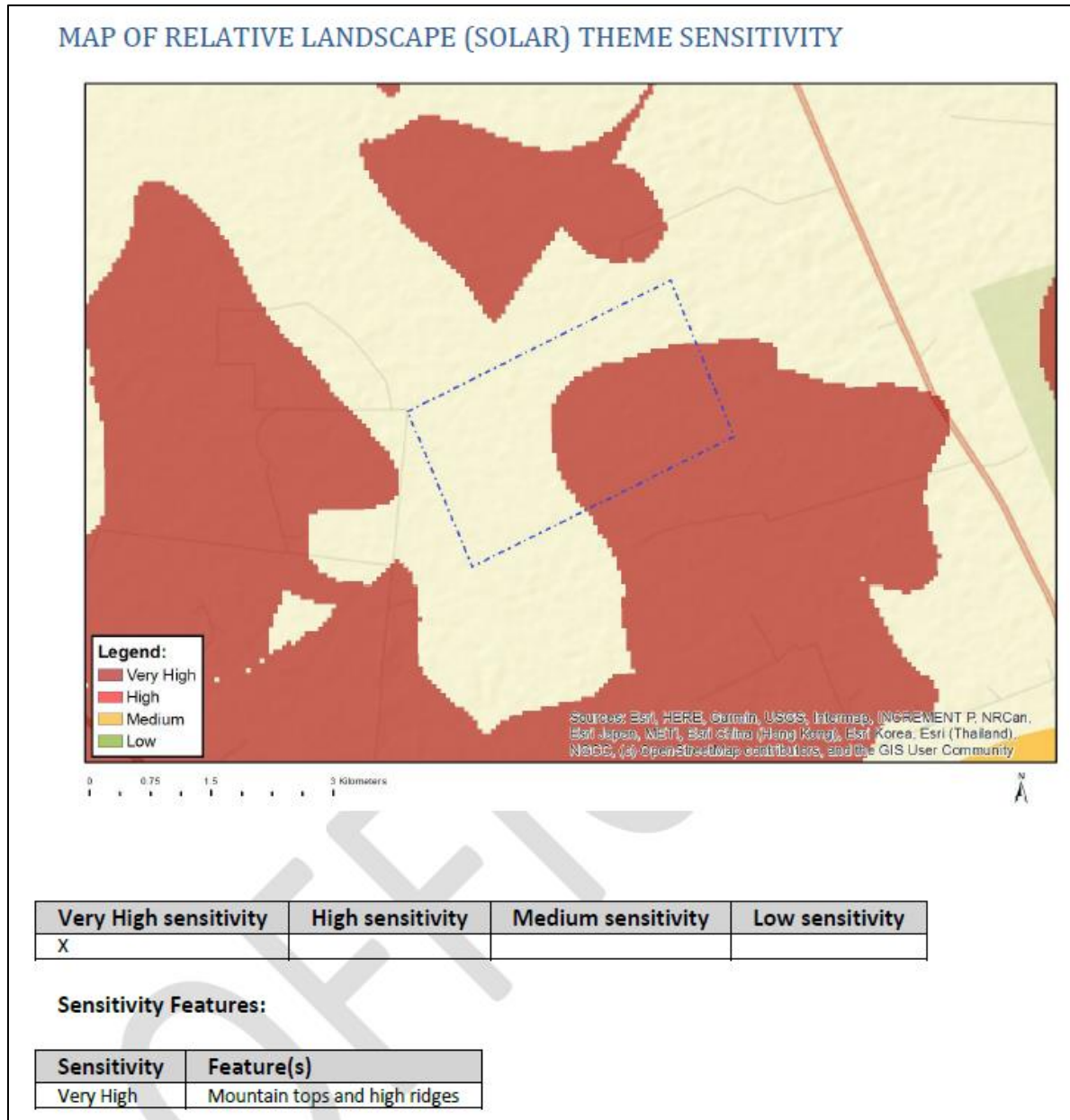


Figure 1. DEFF Screening Tool for Landscape and PV.

2 EXECUTIVE SUMMARY

Visual Resource Management Africa CC (VRMA) was appointed by Cape EAPrac to undertake a **Visual Impact Assessment** for the proposed Houthaalboomen Grid VIA on behalf of Euphorbia PV (Pty) Ltd.

CONCLUSION

It is the recommendation that the proposed development should be authorised WITH MITIGATION for the following key reasons:

- The identified benefits from the proposed landscape outweigh the limited loss of the landscape resources along the routing.
- No tourism related activities making use of visual resources were identified within the project ZVI.
- While there are receptors in the High Exposure distance zone, the potential for mitigation within the corridor is available such that the placement of the monopoles will be 200m from the residential receptors. This would effectively reduce the visual intrusion as only partial views are likely to take place.

POLICY FIT

Medium to High

In terms of the local planning, there is a clear emphasis in support of renewable energy that aligns with the project planning. There is also a focus on tourism and growth of tourist related resources. As there are no significant landscape resources being utilised for tourism within the project zone of visual influence, the ***expected visual/ landscape policy fit of the landscape change is rated Medium to High.***

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

Medium to Low

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

to be moderated across the region extending mainly to the northeast and southwest beyond the High Exposure distance area. This is due to the flat terrain with slight elevation, the viewshed is widespread around the power line corridor and extends into the Foreground/ Mid Ground distance region where the landscape change is clearly visible. However, given the thin nature of the monopole as seen from beyond 1km, it is likely that the ZVI would be contained within the 3km distance

RECEPTORS AND KEY OBSERVATION POINTS **18 receptor locations and 5 Key Observation 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. Eighteen receptors were identified within the High and Very High Viewshed. The majority of these were rural residential farmsteads, or peri-urban dwellings located within a peri-urban/ small holding type landscape. Four KOPs were rural residential dwellings, with one road receptors (R505).

SCENIC QUALITY **Medium to Low**

This is due to the flat terrain that has no water features, limited vegetation and associated colours, is not a scarce visual resource and is partially degraded by agricultural practice. The only value element is the Adjacent Scenery which includes the agricultural grasslands of the region that do add value. The overall sense of place is that of a rural, grassland agricultural landscape that does not offer much in terms of scenic resources. Man made modifications include numerous existing Eskom power lines that do degrade the landscape character at these locations.

RECEPTOR SENSITIVITY TO LANDSCAPE CHANGE **Medium**

This is mainly due to the close proximity of the surrounding farmsteads. However, the area has limited visual resources and the strong presence of the adjacent Eskom power line does reduce the likelihood of the receptors being sensitive to landscape change on the site. The exception is the rural residential dwellings located in close proximity to the power line corridor, as well as the road receptors making use of the R505. Due to the importance of maintaining property value, receptor change to landscape in close proximity to the houses is likely to be High. As the R505 could include tourist traffic, some receptor sensitivity to landscape change is likely to be expected.

VISUAL RESOURCE MANAGEMENT ASSESSMENT

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

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

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.

Class II (Not recommended)

- Visual sensitivity buffers (200 m rural residential/ 25 m R505)

Class III (suitable with mitigation)

- Transformed agricultural grasslands.

Class IV (not applicable)

- Areas in close proximity to the existing Eskom power lines, and other degraded areas.

EXPECTED IMPACT SIGNIFICANCE

Medium -ve
(without mitigation)

The existing Eskom power lines already defines the landscape along the eastern portions of the routing. While four rural residential receptors are located in Very High Exposure, these dwellings are fairly well screened by local trees, and there are many existing trees in the landscape.

Minor -ve
(with mitigation)

Mitigation is recommended with a 200m exclusion buffer around the dwellings, that would allow the existing higher VAC levels of the mainly woodlands landscape to offer partial screening of the monopole landscape change.

CUMULATIVE EFFECTS

Medium (-ve)
(without mitigation)

Intervisibility with existing Eskom power lines in close proximity to the proposed monopole line does increase the risk of massing effects and landscape degradation. However, the area has a higher VAC levels due to the said power lines and many trees along the portion of the corridor in close proximity to the rural-residential receptors.

Low (-ve)
(with mitigation)

With mitigation, the increased buffer would allow for more effective tree screening, reducing intervisibility and visual massing risks.

PRELIMINARY MITIGATIONS MEASURES

Landscape Element	Mitigation	Motivation
-------------------	------------	------------

Proximity to ridgelines features and areas of prominence	NA	No ridgelines were located along the routing.
Neighbours who are sensitivity to landscape change.	200 m buffer	A 200m buffer is proposed around the four High Exposure dwellings.
Risks to rural landscape character of important roads.	25 m buffer	For the monopole structures, a 25m buffer on the R505 is proposed to reduce visual intrusion from monopole placement from passing road receptors.

3 INTRODUCTION

Visual Resource Management Africa CC (VRMA) was appointed by Cape EAPrac to undertake a **Visual Impact Assessment** for the proposed Houthaalboomen Grid VIA on behalf of Euphorbia PV (Pty) Ltd. A site visit was undertaken on the 21st January 2022. The proposed development site is located in the Northwest Province, Ditsobotla Local Municipality and within the Ngaka Modiri Molema District Municipality (NMMDM) as mapped in Figure 2.

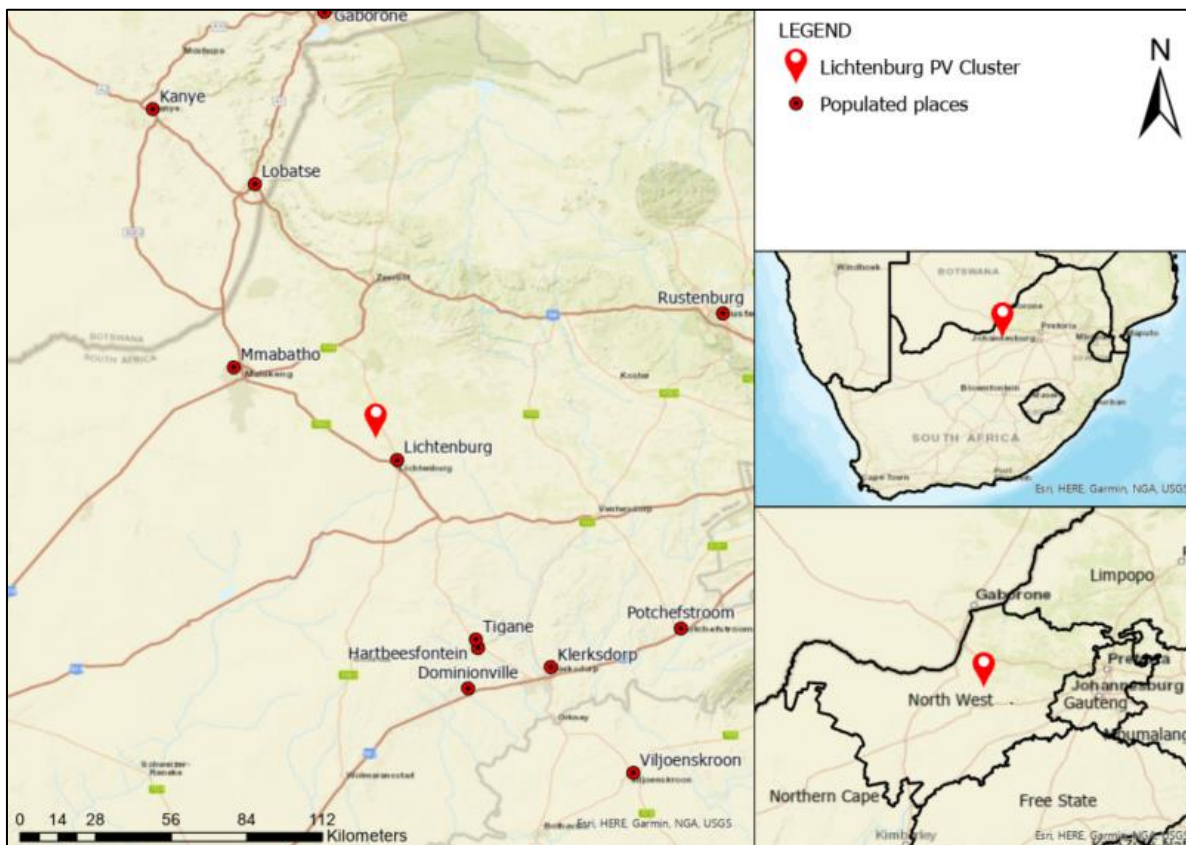


Figure 2. Project locality map within South Africa.

The Proponent proposes the construction and operation of grid connection infrastructure for the proposed Houthaalboomen North PV Cluster. This VIA assesses the grid connection

infrastructure that is required to facilitate the generated electricity from the PV project to the Watershed Main Transmission Substation (MTS). (The PV Developments are subject to a separate environmental process). In order to ensure that cumulative visual impacts are assessed, mapping does include the three PV projects proposed on the property.

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.
- Impact Assessment Phase will include:
 - 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 (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	<ul style="list-style-type: none"> • Accredited with the Association of Professional Heritage Practitioner and • 16 years of experience in visual assessments including renewable energy, powerlines, roads, dams across southern Africa. • Registered with the Association of Professional Heritage Practitioners since 2014.

3.3 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 took 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.

3.4 Visual Assessment Approach

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

Table 5: Methodology Summary Table

Action	Description
Site Survey	The identification of existing scenic resources and sensitive receptors in and around the study area to understand the context of the proposed development within its surroundings to ensure that the intactness of the landscape and the prevailing sense of place are taken into consideration.
Project Description	Provide a description of the expected project, and the components that will make up the landscape modification.
Reviewing the Legal Framework	The legal, policy and planning framework may have implications for visual aspects of the proposed development. The heritage legislation tends to be pertinent in relation to natural and cultural landscapes, while Strategic Environmental Assessments (SEAs) for renewable energy provide a guideline at the regional scale.
Determining the Zone of Visual Influence	This includes mapping of viewsheds and view corridors in relation to the proposed project elements, in order to assess the zone of visual influence of the proposed project. Based on the topography of the landscape as represented by a Digital Elevation Model, an approximate area is defined which provides an expected area where the landscape modification has the potential to influence landscapes (or landscape processes) or receptor viewpoints.

Identifying Visual Issues and Visual Resources	Visual issues are identified during the public participation process, which is being carried out by others. The visual, social or heritage specialists may also identify visual issues. The significance and proposed mitigation of the visual issues are addressed as part of the visual assessment.
Assessing Potential Visual Impacts	An assessment is made of the significance of potential visual impacts resulting from the proposed project for the construction, operational and decommissioning phases of the project. The rating of visual significance 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 (EMPr) and the authorisation conditions.

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 6: 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, 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, mitigations and recommendations are 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.

Assessment Approach

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 7: Approach Summary Table

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

3.5 Impact Assessment Criteria

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

Criteria	Definition
<u>Extent</u>	The spatial or geographic area of influence of the visual impact, i.e.: <ul style="list-style-type: none"> • <i>site-related</i>: extending only as far as the activity. • <i>local</i>: limited to the immediate surroundings.

	<ul style="list-style-type: none"> • <i>regional</i>: affecting a larger metropolitan or regional area. • <i>national</i>: affecting large parts of the country. • <i>international</i>: affecting areas across international boundaries.
<u>Duration</u>	<p>The predicted life-span of the visual impact:</p> <ul style="list-style-type: none"> • <i>short term</i>, (e.g., duration of the construction phase). • <i>medium term</i>, (e.g., duration for screening vegetation to mature). • <i>long term</i>, (e.g., lifespan of the project). • <i>permanent</i>, where time will not mitigate the visual impact.
<u>Intensity</u>	<p>The magnitude of the impact on views, scenic or cultural resources.</p> <ul style="list-style-type: none"> • <i>low</i>, where visual and scenic resources are not affected. • <i>medium</i>, where visual and scenic resources are affected to a limited extent. • <i>high</i>, where scenic and cultural resources are significantly affected.
<u>Probability</u>	<p>The degree of possibility of the visual impact occurring:</p> <ul style="list-style-type: none"> • <i>improbable</i>, where the possibility of the impact occurring is very low. • <i>probable</i>, where there is a distinct possibility that the impact will occur. • <i>highly probable</i>, where it is most likely that the impact will occur. • <i>definite</i>, where the impact will occur regardless of any prevention measures.
<u>Significance</u>	<p>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:</p> <ul style="list-style-type: none"> • <i>low</i>, where it will not have an influence on the decision. • <i>medium</i>, where it should have an influence on the decision unless it is mitigated. • <i>high</i>, where it would influence the decision regardless of any possible mitigation.

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 would include:

The Applicant proposes the construction of grid connection infrastructure for the proposed Houthaalboomen North PV cluster photovoltaic (PV) solar energy facilities (Three proposed PV solar facilities collectively referred to as the Houthaalboomen North PV cluster) located on a site approximately 10 km north west of the town of Lichtenburg in the North West Province.

The proposed solar facility intends to connect to the National Grid via the Watershed Main Transmission Substation (MTS) (approximately 5 km south east of the facility) and the connection infrastructure associated with this grid solution will be assessed as part of this VIA (In a separate Environmental Application to the PV Developments).

Each solar PV facility will comprise several arrays of PV panels and associated infrastructure and will have a contracted capacity of up to 100 MW. The development area is situated within the Ditsobotla Local Municipality within the Ngaka Modiri Molema District Municipality and is accessible via the R505, located east of the development area.

A grid connection corridor of approximately 100 m wide and 1.5 km long is being assessed to allow for the optimisation of the grid connection and associated infrastructure., The grid connection infrastructure will be developed within the connection corridor, which will allow for the avoidance of identified environmental sensitivities. The grid corridor will connect the proposed Euphorbia, Hillardia and Verbena PV projects to the Watershed Main Transmission Substation (MTS).

Project Description: Euphorbia PV (Pty) Ltd proposes the construction and operation of grid connection infrastructure for the proposed Houthaalboomen North PV cluster of three facilities near Lichtenburg in the North West Province. The grid connection infrastructure comprises the following:

- One Eskom collector substation/ switching station.
- One single or double circuit 132 kV power line from the Houthaalboomen North collector substation/ switching station to the Watershed Main Transmission Substation (MTS).

Additional associated infrastructure will also be required for the grid connection solution, including access roads, feeder bays (inclusive of line bays, busbars, bussection and protection equipment), a fibre and optical ground wire (OPGW) layout, insulation and assembly structures.

A grid connection corridor varying from 100 - 200 m wide and ~9 km long is being assessed to allow for the optimisation of the grid connection and associated infrastructure. The grid connection infrastructure will be developed within the grid connection corridor, which will allow for the avoidance of identified environmental sensitivities.

The area being assessed as part of this EIA process and the infrastructure associated with the Grid infrastructure is included in Table 10 below.

Table 9: Property Name for grid infrastructure within the Houthaalboomen North PV Cluster

Houthaalboomen North Cluster		
<u>Name</u>	<u>Site</u>	<u>Land Owner</u>
Houthaalboomen Grid		

Table 10: Project Components Information Table

Grid connection solution, including:	
132 kV power line	100 m – 200 m wide and 9 km in length corridor
Monopoles and associated substation infrastructure	32m high



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

Figure 3: Monopole photographic examples

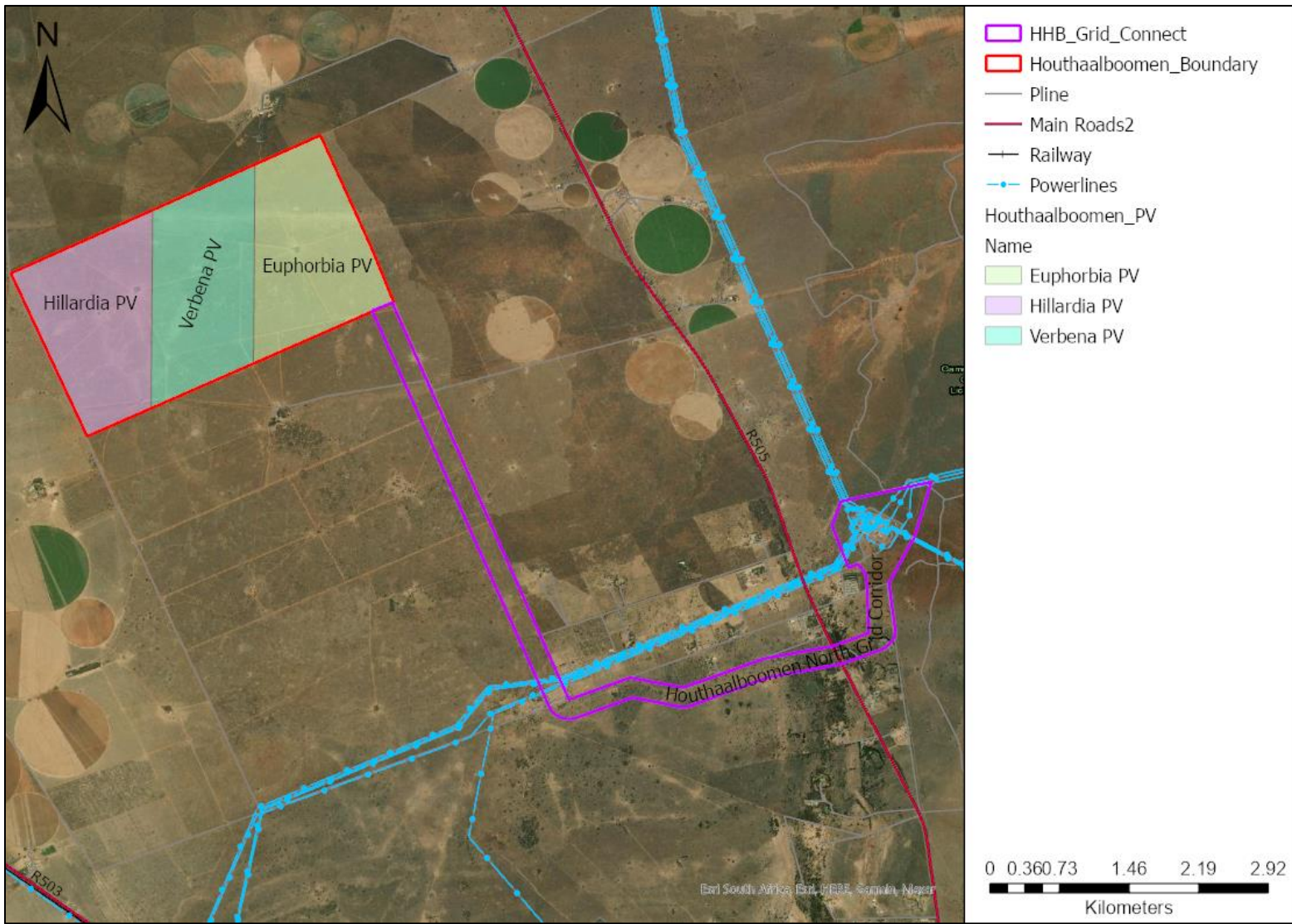


Figure 4: Proposed locality of the Houthaalboomen grid connection corridor and associated PV projects.

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 National and Regional 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 and National 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).
- World Bank Group.
- 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 reports define 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.

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

The map below indicates the administrative locality of the proposed development area.

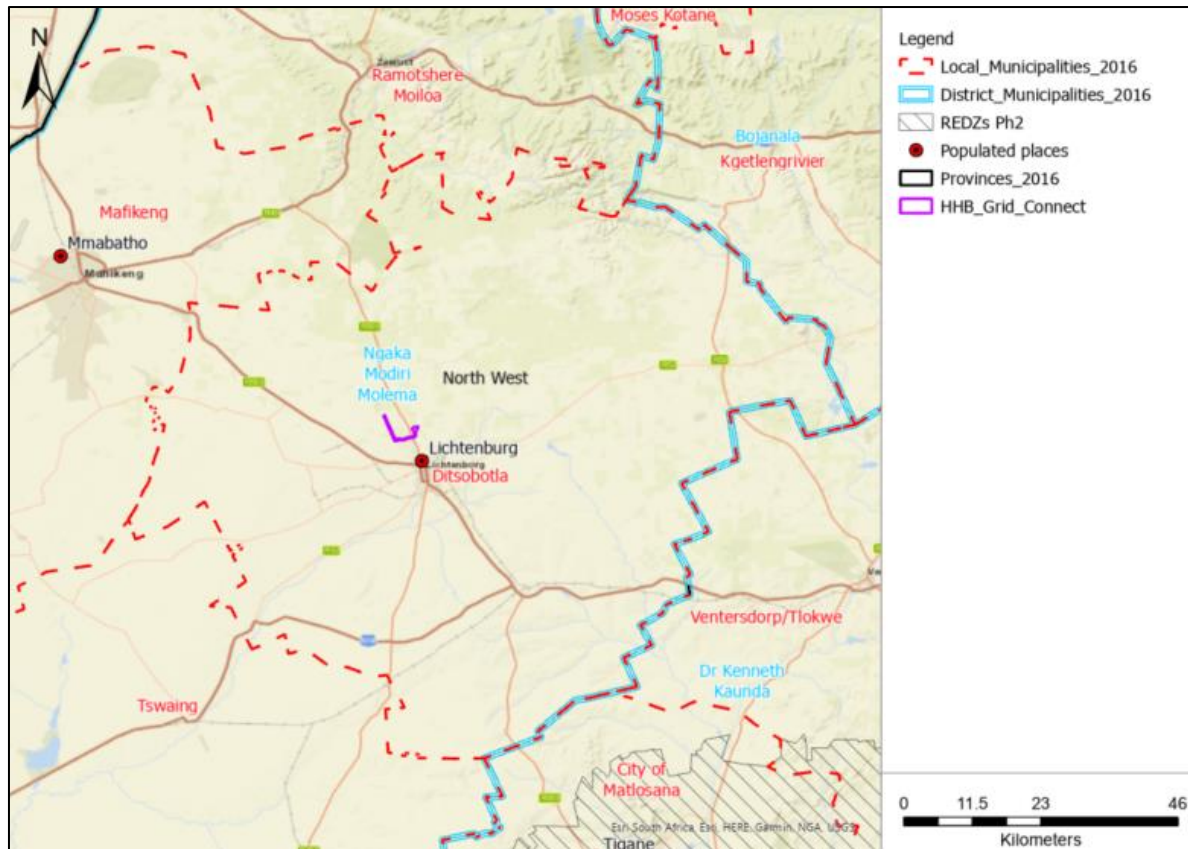


Figure 5. Governance Planning Locality Map.

5.2.1 DEA&DP Visual and Aesthetic Guidelines

Although not located within the Western Cape, 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 Renewable Energy Development Zone Status

The study area does not fall within a REDZ area.

5.2.3 Local and Regional Planning.

As indicated in the Figure 5 administrative map on the previous page, the following Table lists the local and regional planning institutions that govern land use change.

Table 11: Governance administrative table

Theme	Name
REDZ	Not applicable
Province	North West Province
District Municipality	Ngaka Modiri Molema District Municipality
Local Municipality	Ditsobotla Local Municipality

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

Table 12: Ngaka Modiri Molema (NMMDM) District Municipality Integrated Development Plan 2017-2022 (Ngaka Modiri Molema District Municipality, 2017)

Theme	Requirements	Page
Economic Development 2022	NMMDM underpinned by various development corridors namely: <ul style="list-style-type: none"> Platinum Corridor (N4), which stretches from the east to the west of NMMDM connecting Republic of South Africa with Republic of Botswana and Republic of Mozambique. The N18 Western Frontier Corridor N18; and N14 	19
Environment	Ngaka Modiri Molema District Municipality is well-endowed with natural resources; therefore, environmental conservation is of high importance to the municipality.	31
Economic Development	The Agriculture, Culture and Tourism have been identified as the anchor of Economic Growth especially where poverty, unemployment and inequality are rampant. All other sectors such as mining, manufacturing and retail would serve as offshoot to Agriculture, Culture and Tourism	22
	<ul style="list-style-type: none"> The District has an important role to play in setting the framework for growth and outlining the necessary actions to stimulate growth in areas such as innovation, research and development, skills, exports and entrepreneurship. This also means identifying and supporting business growth in areas where there is the greatest potential, whilst ensuring that the necessary economic infrastructure is in place to capitalize on the existing strength and opportunities. 	22
	To facilitate economic development by creating a conducive environment for business development	49

Table 13: Ditsobotla Local Municipality Final Integrated Development Plan 2015/2016 (Ditsobotla Local Municipality, 2015)

Theme	Requirements	Page
Critical Natural Areas	Designating and protecting areas of critical natural capital such as recreational areas, water resource and mineral resources.	64
Open Spaces	<ul style="list-style-type: none"> The development of an open space system for the Ditsobotla Local Municipality is aimed at linking all natural elements of value and the "High Environmental Control Zones" through a continuous open space system. 	88

Theme	Requirements	Page
	<ul style="list-style-type: none"> An isolated open space surrounded by urban settlements or other types of development has little chance of sustaining its biodiversity and it is only when the areas are linked into an integrated system that it increases its ability to sustain biodiversity. Elements which could be included in such an open space system include ridges and mountains, proclaimed nature reserves, protected areas, river environments and other potential environmentally sustainable areas. This open space system area could consist of a number of main components: A corridor along the northern boundary of the municipality from Molopo Eye conservancy, including the northern parts of the municipality up to the intersection of R53 and the R52 in the eastern parts of the municipality. The possible further westward extension of this open space system to link up with the Malmanies Eye Natural Reserve in the Mafikeng area could be considered. 	
	<ul style="list-style-type: none"> The upper catchments of the Hartsriver are located in the area southwest of Lichtenburg (between Lichtenburg and Itekeng/Biesiesvlei). This area is important from the point of view that it is the origin of Hartsriver that traverses a number of other municipalities in the western parts of the North West Province. The Hartsriver also feeds Barberspan which is an international RAMSAR site. It is thus necessary to protect the river and the adjacent area within this catchment area from inappropriate forms of development. 	89
Mining	There are two important types of mining and quarrying activities which impacts on the spatial development of the Ditsobotla Local Municipality. These are: The quarrying of limestone deposits associated with the manufacturing activities of Lafarge and AfriSam	89
Environmental Protection	The management and monitoring of future spatial development within the Ditsobotla Local Municipality should protect the identified high environmental control zones within the municipality. Development applicants should also be appropriately informed of location of high environmental control zones and the management guidelines for these areas	91

Table 14: Ditsobotla Local Municipality Integrated Development Plan 2020/2021 (Ditsobotla Local Municipality, 2020)

Theme	Requirements	Page
Development	Ditsobotla Local Municipality is categorised by the North West Province as a Priority 1 Investment Areas based on its potential for high economic growth (relative to the rest of the Municipalities) and the high level of needs.	34
Lichtenburg Economy	The North West Spatial Development Framework identified a new Provincial Development Corridor that links Potchefstroom via Coligny and Lichtenburg towards Mafikeng. It is therefore important that local urban planning make provision for the proper alignment of the corridor, and in so-doing, to take full advantage of what the	57

Theme	Requirements	Page
	corridor has to offer. In principle the identification of a corridor on Provincial level implies that such a route will be prioritised as an important link and transport corridor. Therefore, it could be expected that such a corridor will also be prioritized from a maintenance and upgrade point of view.	
Electricity	Government has committed to universal access to electricity by 2014. Although the White Paper on Energy acknowledges that the municipalities have a limited role in energy management, it argues that they are responsible for economic and physical planning, and as such, are concerned with the supply and use of energy. Similarly, because all energy-related policy programmes and projects are implemented in urban areas, municipal government will have to coordinate its development activities with those of energy stakeholders and role-players, to ensure alignment and integrated development.	90
Vegetation	The vegetation of Ditsobotla is mostly Vaal-Vet Sandy Grassland (46%), Western Highveld Sandy Grassland (21%), Rand Highveld Grassland (11%), Highveld Alluvial Vegetation especially along the Groot Hartsriver. On the northern part of Ditsobotla municipal area, as well as Moot Plains Bushveld (6%) is found.	25
	The Ditsobotla local municipality is located within the Grassland biome. The topography of this biome is mainly flat and rolling but includes the escarpment itself with altitudes varying from near sea level to 2 850m above sea level.	24
Rivers	The Hartsrivier and Groot Hartsrivier draining in a south western direction of Itsoseng and Biesiesvlei. This river has its origin in the areas east and south of Lichtenburg. An important tributary of the Hartsrivier is Tweelingspruit, which north of Biesiesvlei.	23

5.3 Planning Policy for Landscape and Tourism 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 and management of significant landscapes, there is a good policy fit as no significant landscape features are located within the project Zone of Visual Influence (ZVI).

In terms of regional and local planning, there is mention of the importance of the Lichtenberg Game Breeding area to the east of the proposed site, with reference to creating an ecological corridor. However, due to the flat terrain and the surrounding thornveld vegetation, the project ZVI does not extent into the game breeding areas. There are also PV projects proposed between the site and the breeding ground. As such, the policy fit at a local and regional level is rated **Medium to High +VE**.

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 identifies 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 Site Investigation

A field survey undertaken was on the 21 February 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 will be 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.

Table 15: List of Sampling Sites where Landscape and Aesthetic Survey was Conducted

ID	NAME	Context	Direct	REMARKS	REC_TIME	LAT	LONG
6	Grid connect	Receptor	N	Proposed power lines crossing of the R505	01/21/2022 15:11:32.91 0 SAST	- 26.102 8	26.1404 4
7	Grid connect	Receptor	SW	Close proximity to small holding residence but with local vegetation screening restricting views from the residence.	01/21/2022 15:16:14.04 1 SAST	- 26.106 8	26.1264 2
8	Grid connect	Landscape Character	SE	Existing power lines along the proposed corridor increasing the VAC levels and degrading local landscape character.	01/21/2022 15:24:47.54 2 SAST	- 26.104 1	26.1120 5
9	Grid Connect Receptor	Receptor	E	Photograph of the farmstead located to the east of the proposed grid connect with no residential dwellings visible.		0	0
10	R505	Receptor	W	View west from the R505 with medium sized trees screening clear views of the proposed Euphorbia PV site.	01/21/2022 15:43:19.50 6 SAST	- 26.064 4	26.1145 7
12	Hillardia PV Site	Landscape Character	NEE	View down the fence line located on the southern boundary of Hillardia PV characterised by flat, grass covered terrain with small, scattered trees.	01/21/2022 16:17:48.77 4 SAST	- 26.077 8	26.0693
13	Verbena PV Site	Landscape Character	NE	View down the wooden 88kV power line with small trees re emphasising the aesthetic nature of the rural agricultural landscape.	01/21/2022 16:27:29.32 9 SAST	- 26.075 3	26.0778 1

14	Farmstead 10	Receptor	NW	Views from the Euphorbia PV site towards the farmstead located 500m to the north of the project.	01/21/2022 16:28:52.86 7 SAST	-26.051	26.0863 3
15	Euphorbia PV Site	Landscape Character	N	View of the flat terrain and fenced grassland paddocks offering limited visual appeal.	01/21/2022 16:33:37.89 5 SAST	- 26.070 1	26.0892 8

The site investigation also 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:

- Rural agricultural sense of place.
- Limited scenic resources.
- Close proximity to small holdings that are developing into a semi-industrial landscape context.

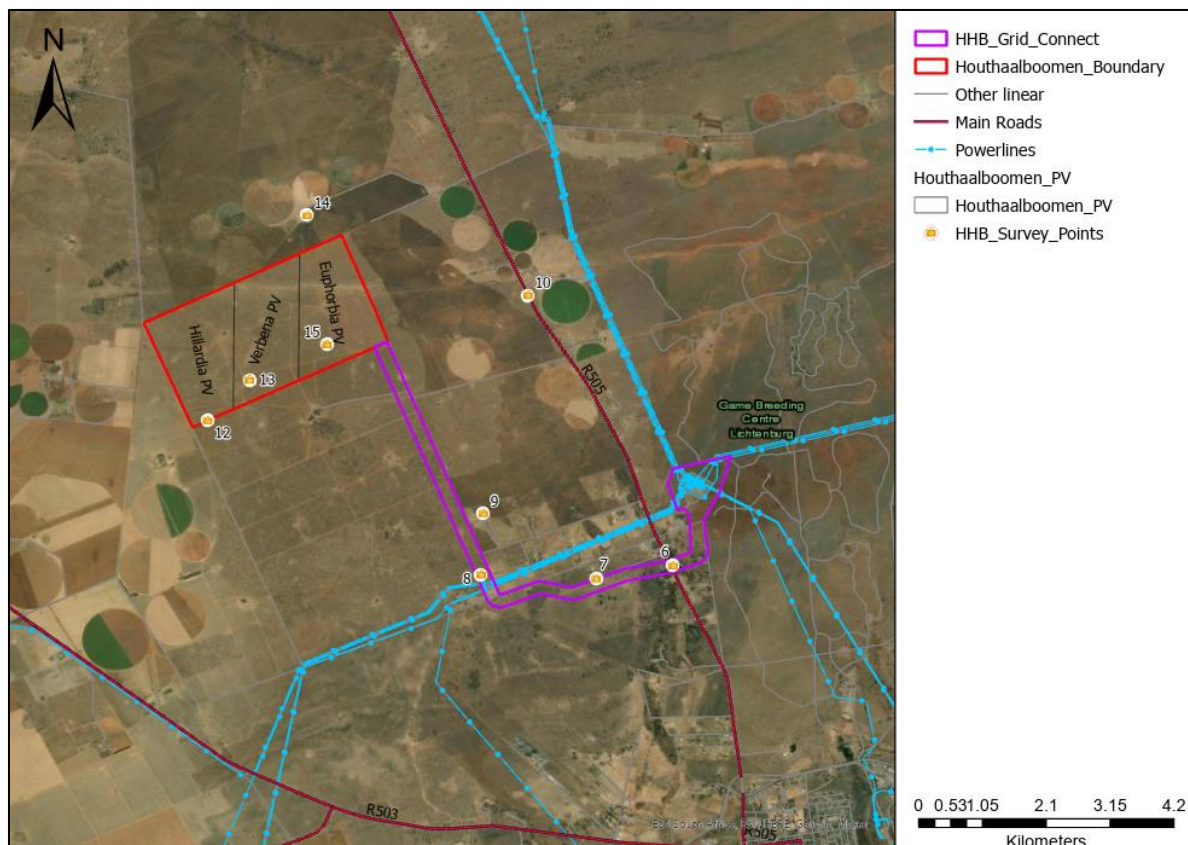


Figure 6: Survey Point Locality Map

6.2 Landscape Context

6.2.1 Regional Locality

Lichtenburg town is today the centre of a huge farming district where maize, groundnuts and sunflower seeds are the main crops. The biggest pure red diamond ("pigeon blood red") in the world was found here. From 1925 to 1935 diamonds were discovered, and over 7 million carats of diamonds have been found in the region. Lichtenburg Game Breeding Centre outside town provides a good network of roads facilitate the viewing of animals. (Places.co.za, n.d.)

The study area is located within the visual influence of the town industry, namely the Lichtenburg LaFarge Cement Factory that is a large industrial structure and is clearly visible feature in the regional landscape.



Figure 7. Photograph of the Lichtenburg LaFarge Cement Factory that forms a clearly visible feature in the regional landscape.

6.2.2 *Land use and Main Infrastructure*

Land use is a crucial factor in determining landscape character, especially regarding the Visual Absorption Capacity (VAC) of the landscapes. Oberholzer defines VAC as the potential of the landscape to conceal the proposed project (Oberholzer, 2005). General land uses of the area are described making use of Open-Street Mapping vector data, overlaid onto ArcGIS World Satellite Imagery. Infrastructure is often a by-product of land use with the main road, rail and power lines a result of the historical development of the region. The current land use of the proposed properties is cattle and maize farming. Multiple centre pivots are visible in the landscape emphasising the intensive farming nature of the area. Within the regional landscape context are small-holding type properties to the northeast of the town of Lichtenburg (south of the study area). This increases the number of receptors but is also manifesting in a semi-industrial land use where many of these properties are being used for business activities.

As can be seen in the map below, the area is also strongly characterised by power line infrastructure routed to the Eskom Watershed Substation, as well as a well established rural agricultural landscape with some intensive irrigation near to the project area.



Figure 8. Photograph on site depicting the cattle farming activities currently taking place within the project area.

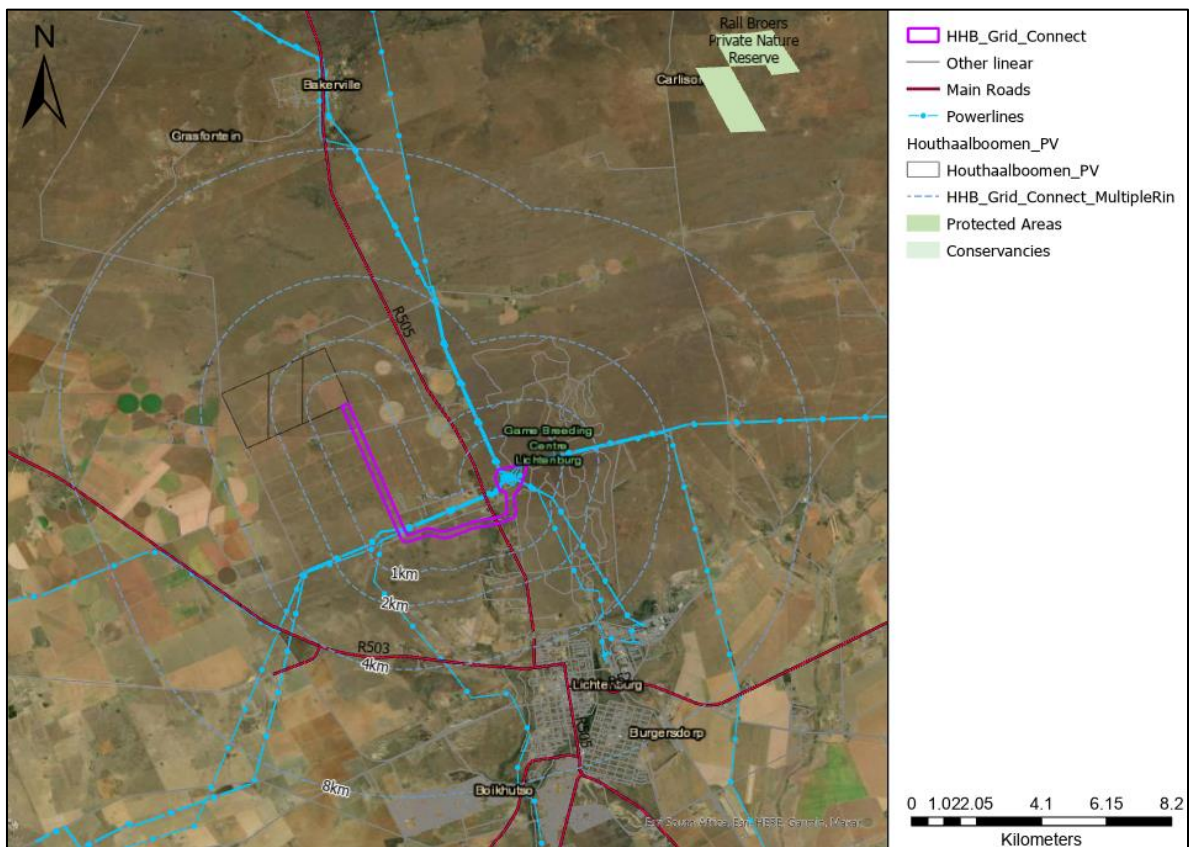


Figure 9. Land use map depicting Open-Street spatial data overlay onto ESRI satellite imagery.

6.2.3 Conservation

A regional planning map was generated and included conservation protection areas as a layer. As can be seen on the map in Figure 9, the only protected conservation area in the region was the Rall Broers Private Nature Reserve located approximately 10km to the North-east an outside of the project ZVI.

6.2.4 Renewable Energy Projects

Although not located within a REDZ area, there are numerous proposed PV projects located within the expected project ZVI. The site does, however, fall within a strategic transmission corridor associated with the REDZ. The site visit found that none of the authorised projects and their associated electrical infrastructure were yet to be constructed. The close proximity of the other proposed PV projects to the proposed development area does raise an issue in terms of cumulative visual massing effect should all the PV projects be constructed. This issue is flagged as a low probability risk but would need to be addressed in the impact assessment phase to ensure that the existing rural agricultural landscape sense of place is retained as these agrarian features do add to the regional scenic quality and sense of place.

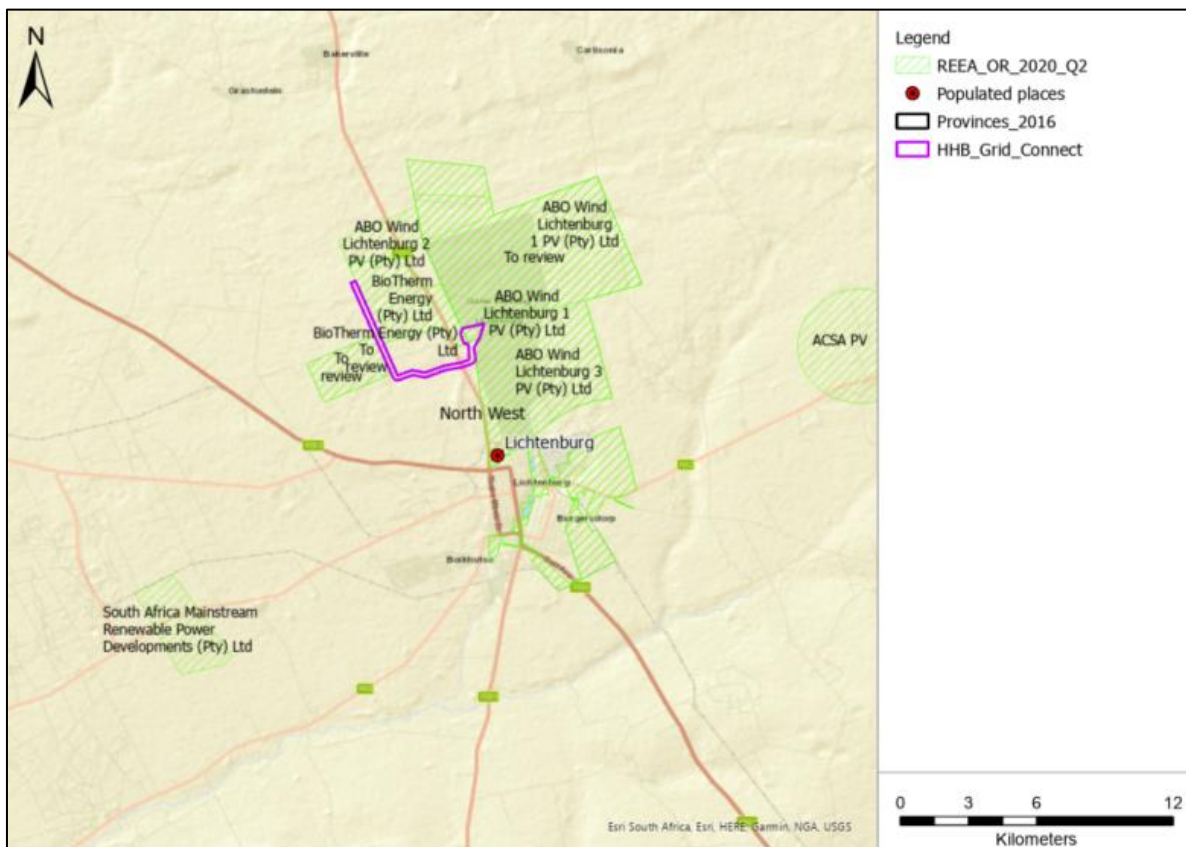


Figure 10. DEA REEA 2021 Renewable Energy Mapping depicting the proposed RE projects surrounding the study area.

6.2.5 Vegetation

Making use of the SANBI information sources, the main vegetation type was identified as Carltonville Dolomite Grasslands located within a Grassland Biome and the Dry Highveld Grassland Bioregion. This is reflected in the site survey where grassland was the dominant vegetation type, but also applicable to the landscape character where the Thornveld type trees, that are small to medium in size, do also add to the local landscape character. This

indicates that planting of similar trees can be effective in screening from receptors sensitive to landscape change should this be a requirement.



Figure 11. Acacia thorn trees adding to the local sense of place.

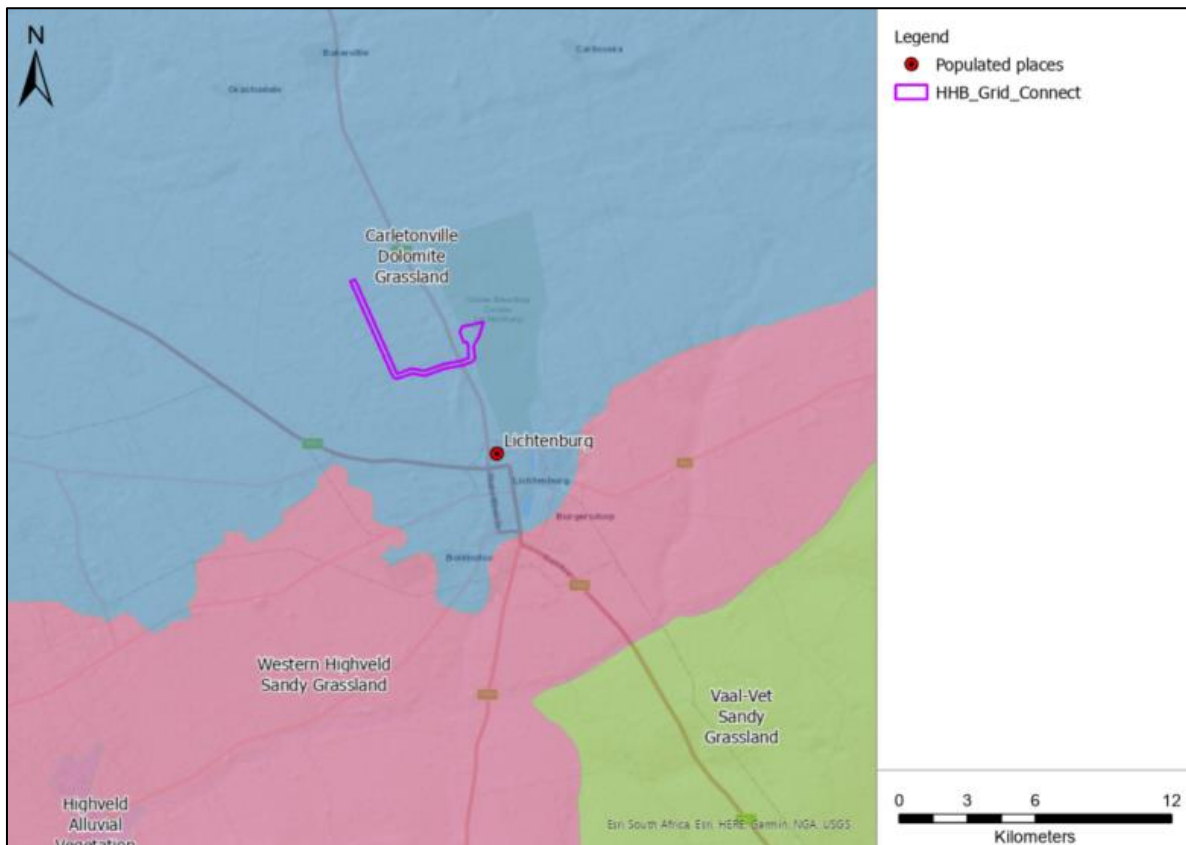
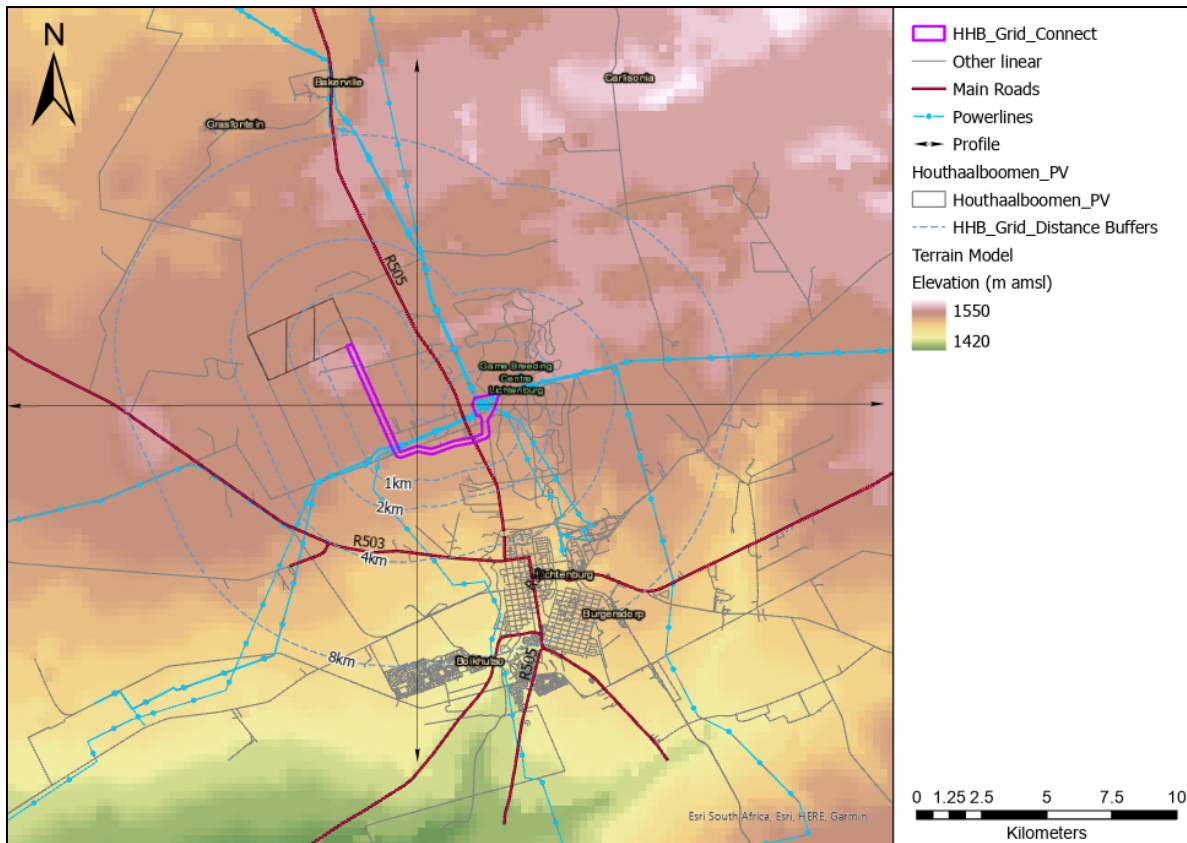
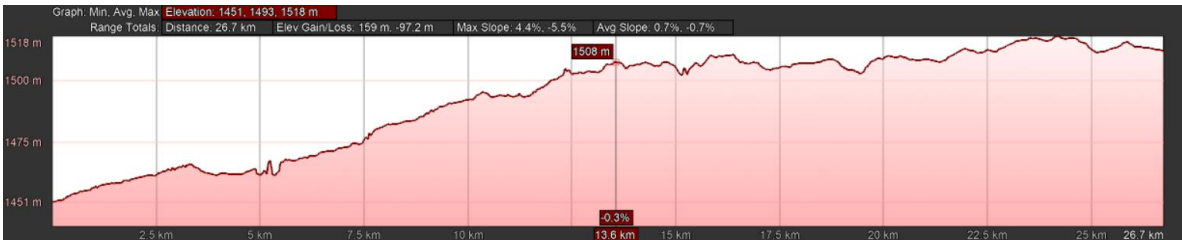


Figure 12: Vegetation Maps of satellite imagery and lower SANBI vegetation classification map.



South to North Profile



West to East Profile

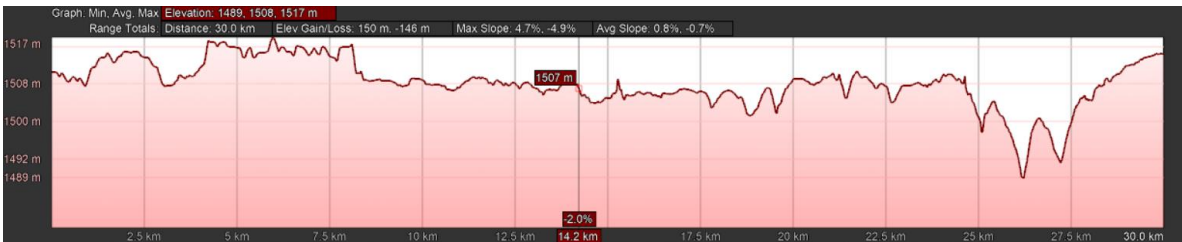


Figure 13. Regional terrain model depicting distance buffers around the study area and the profile lines locality.

6.2.6 Regional Topography

Regional and local topography has the potential to strongly influence landscape character, as well as the extent of the Zone of Visual Influence. In order to better understand these aspects of the study, a Digital Elevation Model was generated making use of the NASA STRM digital elevation model as mapped in Figure 13.

Due to the relatively flatter nature of the terrain, the zone of visual influence is likely to be contained to some degree as slight regional undulation and local vegetation screening is likely to reduce the regional ZVI. In terms of the South to North Profile, the elevation range

is from approximately 1400mamsl in the south at the location of the Grootharts River, to a high of approximately 1500mamsl in the north. The relative 100m spread over a distance of 30km re-emphasises the flat nature of the terrain. The slight reduction in elevation to the south is likely to increase the viewshed in this direction and could thus include some of the more urban and peri-urban receptors in this locality. The West to East Profile also reflects a similar elevation range, with no significant landforms and the regional terrain predominantly flat, with some lower lying areas associated with hydrological drainage lines of the Grootharts River to the south.

6.2.7 Site Topography

As slopes have a strong influence on landscape character and can also result in large cut and fills from the development of linear features such as roads, and platforms, a slope analysis was undertaken as seen in Figure 14 below. The mapping analysis found no indication of steep terrain that could influence landscape character or would need to inform the project development. This landform context was confirmed during the site visit.

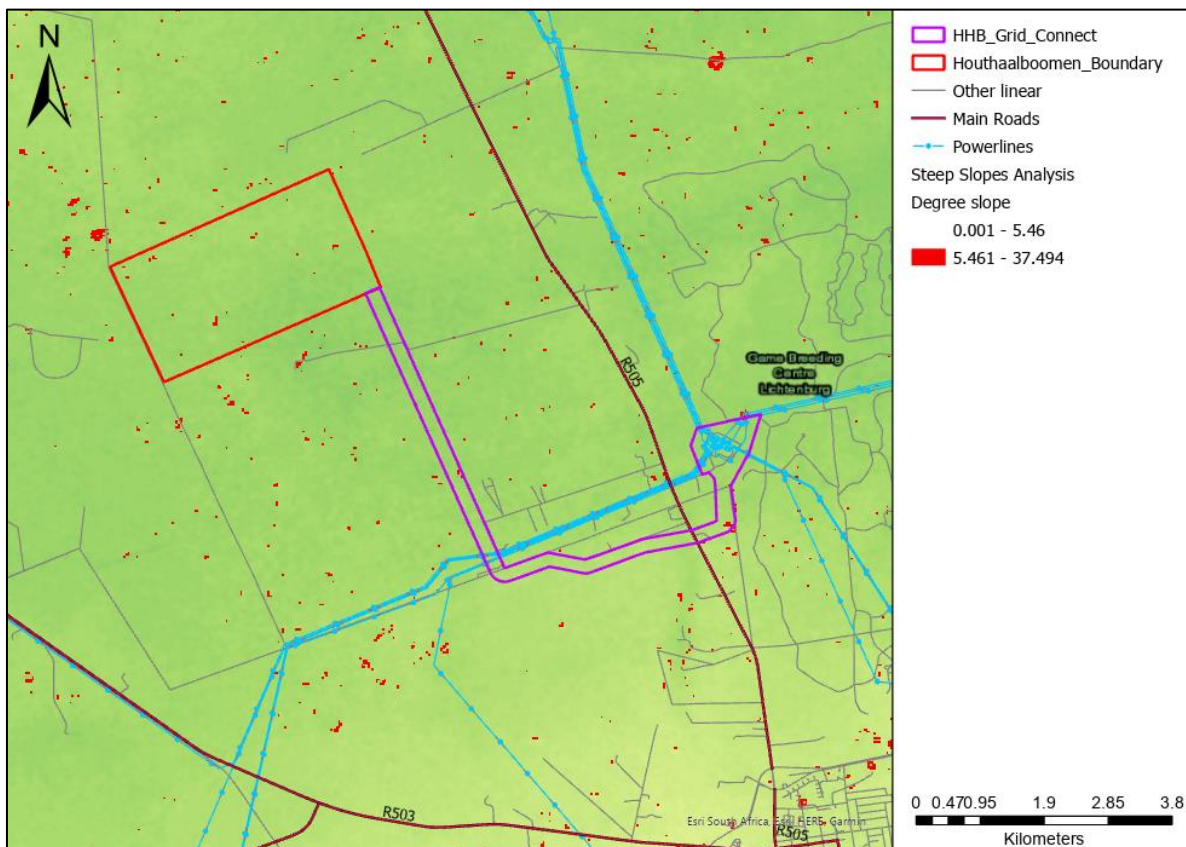


Figure 14. Steeper slopes (1 in 10m) mapping where landscape scarring or erosion could take place.

6.3 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 1 below, making 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).

6.3.1 Viewshed Analysis

A viewshed analysis was undertaken for the site making use of NASA SRTM 30m Digital Elevation Model data. The Offset Height reflects the height value representing the project height (worst case scenario) of the respective project component. The Capped Extent refers to the limitation placed on the outside extent of the viewshed taking into consideration the expected distance when the proposed landscape change would not be clearly noticeable.

Table 16: Proposed Project Heights Table

Project Component	Offset Height (m)	Capped extent
Monopoles	32m	6km

As can be seen in the approximate viewshed depicted in Figure 15 on the following page, the viewshed extent is likely to be moderated across the region extending mainly to the northeast and southwest beyond the High Exposure distance area. This is due to the flat terrain with slight elevation, the viewshed is widespread around the power line corridor and extends into the Foreground/ Mid Ground distance region where the landscape change is clearly visible. However, given the thin nature of the monopole as seen from beyond 1km, it is likely that the ZVI would be contained within the 3 km distance. For these reasons, the ZVI is rated as **Medium to Low**. There will, however, be localised pockets within the 6km distance zone, where the visual impacts are Probable. Outside of this distance zone, visual impacts are possible but unlikely to take place. Within the ZVI, receptors were digitised and categorised. The majority of the receptors are related to small-holding type residential areas in a peri-urban landscape setting. Also included in the ZVI are the R505 road receptors, as well as a farmstead.

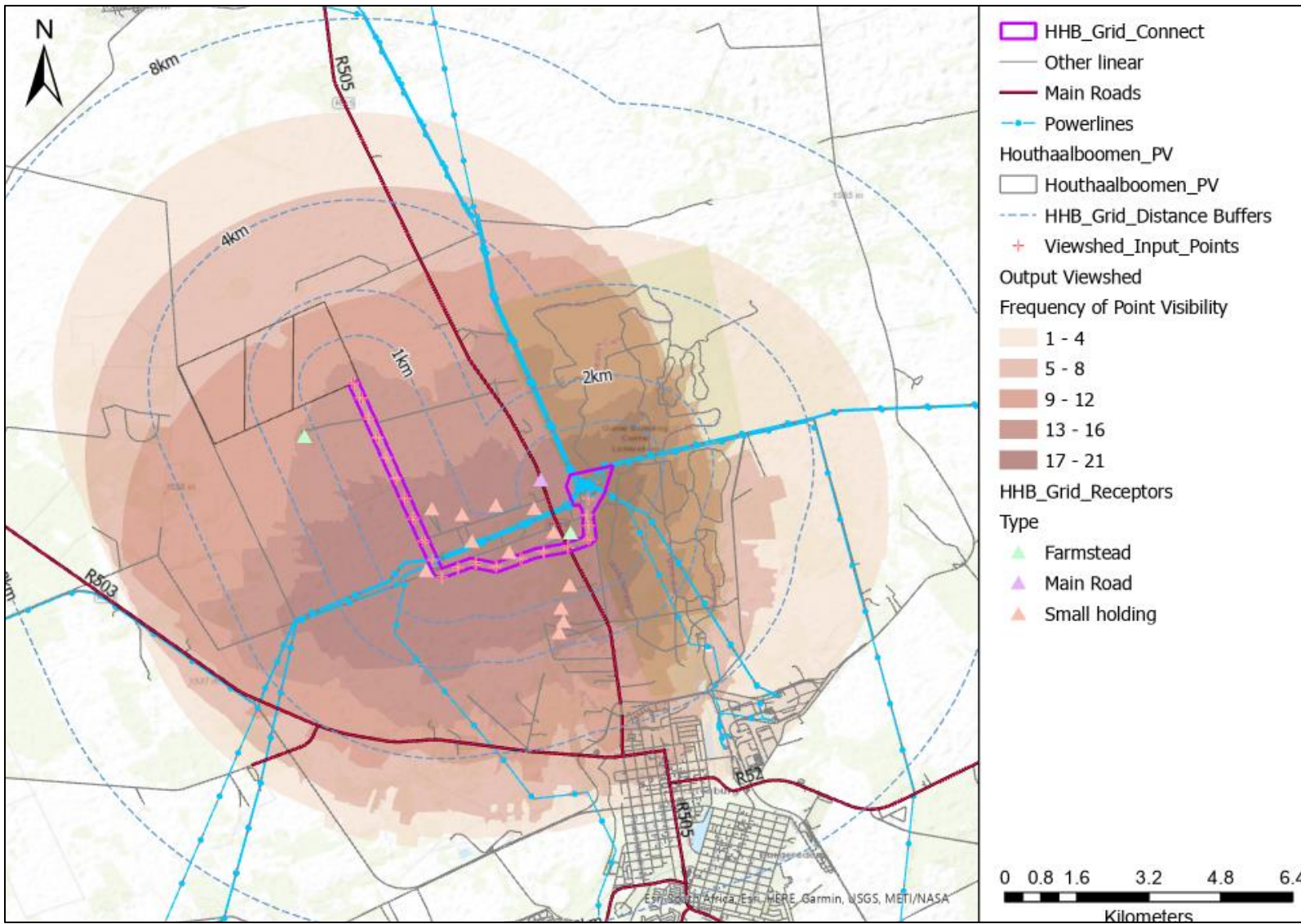


Figure 15. Expected combined project viewshed and exposure generated from 30 m height above ground from the corridor.

6.4 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 lists the receptors identified within the ZVI and motivates if they have significance and should be defined as KOP for further evaluation in the impact assessment phase. The receptors located within the ZVI and KOPs view lines are mapped on the following page in Figure 16.

Table 17: Receptor and KOP Motivation Table.

ID	Name	Type	Exposure	KOP	Motivation
1	Farm 7	Farmstead	Medium	No	Well screened by low tree vegetation.
2	Farm 8	Farmstead	Very High	No	High Visual Exposure but tree screening.
3	R505	Main Road	Very High	Yes	Road receptors and high exposure.
4	Rural Res. 1	Small holding	Very High	Yes	Very High Exposure
5	Rural Res. 6	Small holding	High	No	Local vegetation screening
6	Rural Res. 7	Small holding	Medium	No	Flat terrain and limited visibility.
7	Rural Res. 8	Small holding	Medium	No	Flat terrain and limited visibility.
8	Rural Res. 9	Small holding	Medium	No	Flat terrain and limited visibility.
9	Rural Res. 10	Small holding	High	Yes	Local vegetation screening but High Visual Exposure
10	Rural Res. 11	Small holding	High	No	Local vegetation screening
11	Rural Res. 12	Small holding	High	No	Local vegetation screening
12	Rural Res. 13	Small holding	High	No	Local vegetation screening
13	Rural Res. 14	Small holding	High	No	Local vegetation screening
14	Rural Res. 15	Small holding	Medium	No	Flat terrain and limited visibility.
15	Rural Res. 16	Small holding	Medium	No	Tree screening.
16	Rural Res. 17	Small holding	Very High	Yes	High Exposure.
17	Rural Res. 18	Small holding	Very High	Yes	Very High Exposure.
18	Rural Res. 19	Small holding	High	No	Tree screening
19	Rural Res. 20	Small holding	High	No	Tree screening

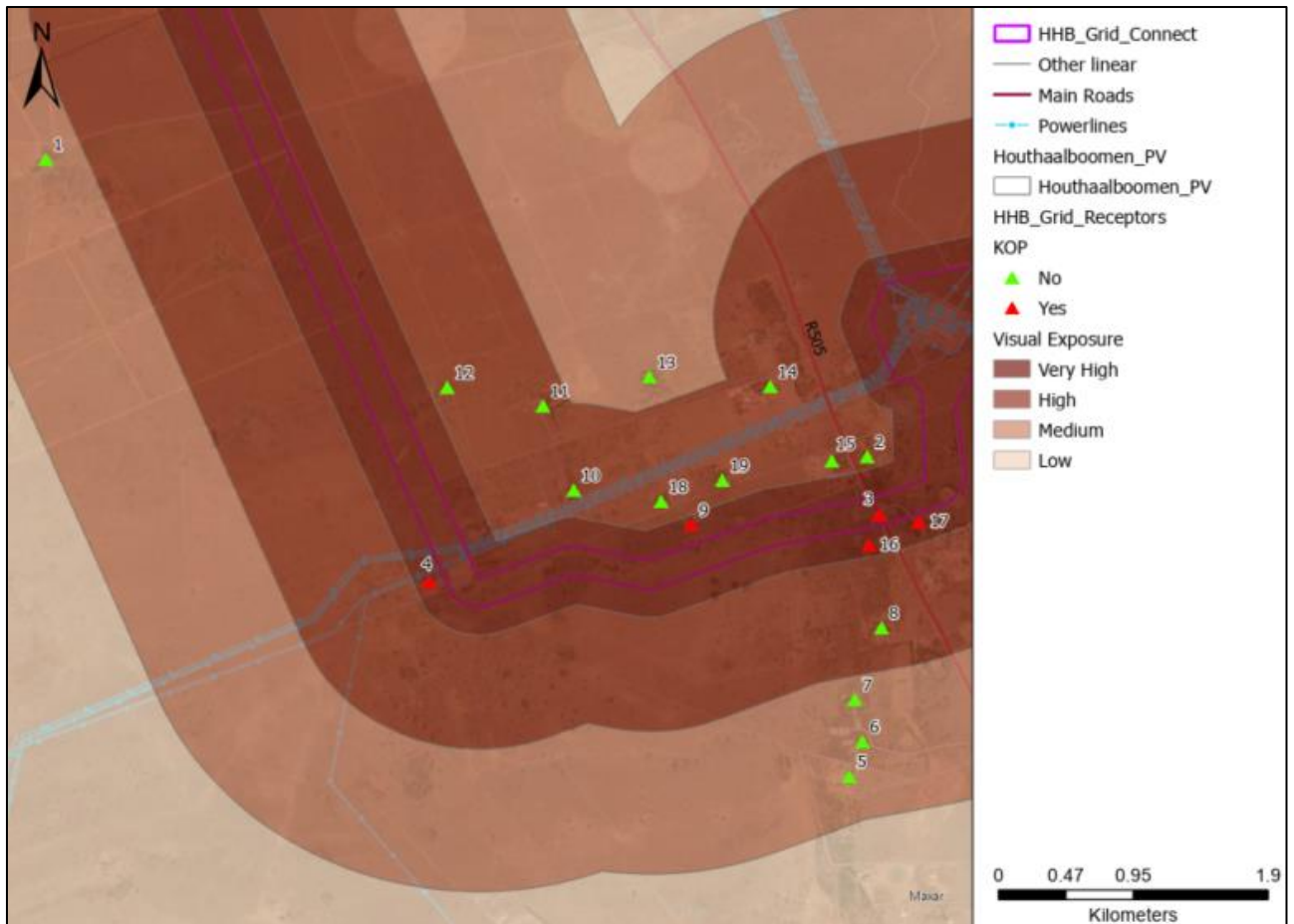


Figure 16: Receptor and KOP locality map

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 Grid Infrastructure 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 vegetation were tabled.

The Site Locality Map with a satellite image underlay, is located in Figure 17 on the following page. The Physiographic Rating Units identified within the study area are listed with motivation in Table 18 below.

Table 18: Physiographic Landscape Rating Units.

Landscapes	Motivation
Flat terrain grasslands	Flat terrain with agricultural related changes to the grassland vegetation that is being used for low intensity cattle grazing.
R505 Road transformed	A portion of the R505 passes through the corridor. This section has been transformed by hard surfacing of the road.
Old quarry transformed	The north-eastern portion of the corridor includes an old quarry that has been transformed.
Existing power line transformed	Numerous, multiple line, power line corridors are located in the region. The landscape character of these areas has been significantly degraded by the power lines.
R505 Road receptor view corridor buffer 25 m	The R505 could carry tourist traffic and as such the road is buffered by 25 m to ensure that the High Exposure placement of monopoles directly adjacent to the road does not take place.
High Exposure Receptor buffer 200 m	A number of rural residential dwellings are located along the proposed corridor routing. To ensure that the property owners' sense of place is not degraded, a buffer of 200 m from the dwellings is proposed.

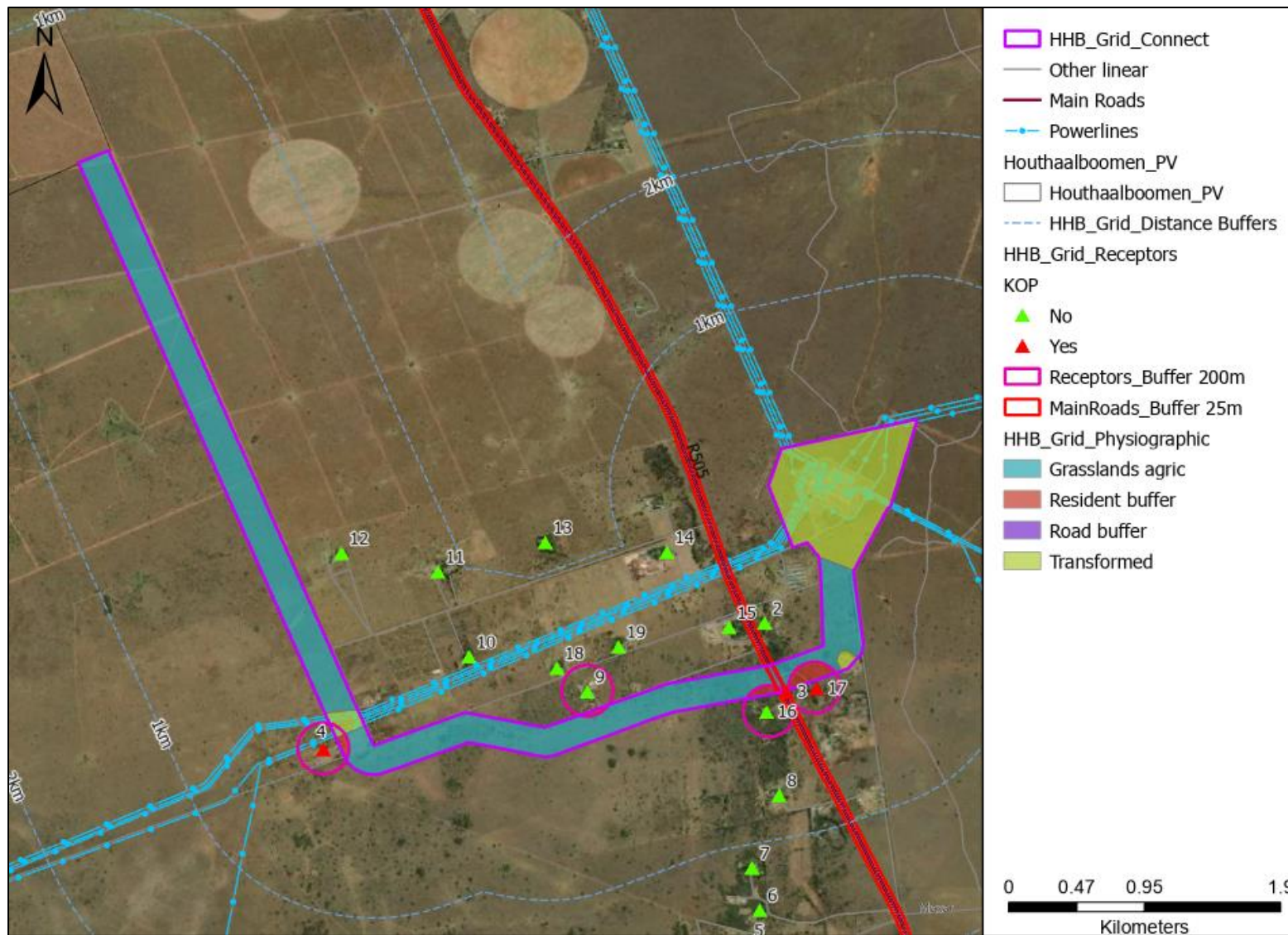


Figure 17: Physiographic Rating Units map depicting uniform terrain and vegetation overlay onto satellite imagery.

Proposed Houthaalboomen Grid VIA

Table 19: 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
Ecologically Sensitive	(Class I is not rated)															I	I
Agriculturally transformed Grasslands	1	1	1	2	1	2	0	8	C	M	L	L	H	L	M	IV	III
Visual sensitivity buffers for road and residence	1	1	1	2	1	2	0	8	C	H	H	M	H	L	H	IV	II
Transformed	1	1	1	2	1	2	-2	6	C	M	L	L	H	L	M	IV	IV

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 (USDl., 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.

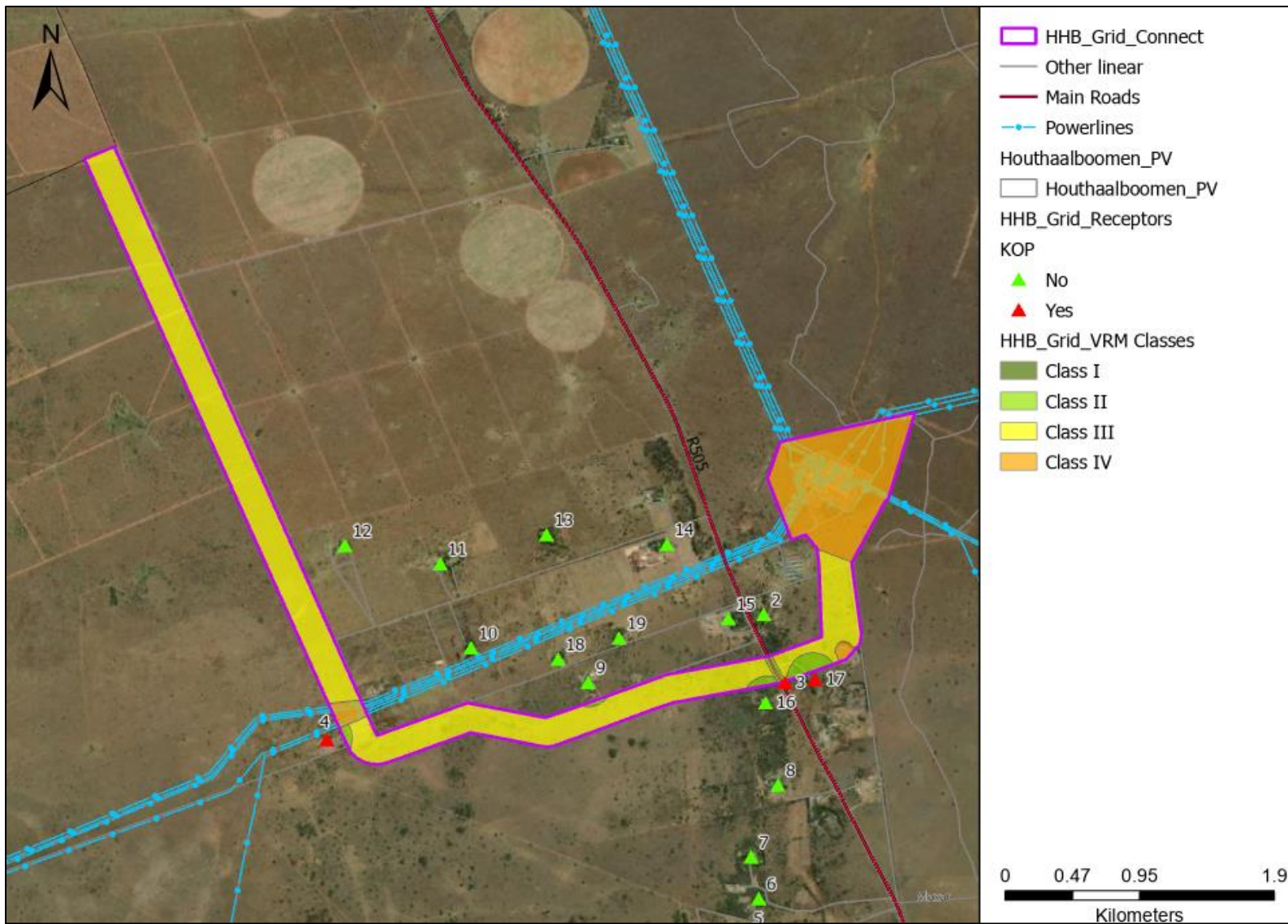


Figure 18: Visual Resource Management Class Map.

7.2 Scenic Quality Assessment

The overall scenic quality of the corridor is rated **Medium to Low**. This is due to the flat terrain that has no water features, limited vegetation and associated colours, is not a scarce visual resource and is partially degraded by agricultural practice. The only value element is the Adjacent Scenery which includes the agricultural grasslands of the region that do add value. The overall sense of place is that of a rural, grassland agricultural landscape that does not offer much in terms of scenic resources. Man-made modifications include numerous existing Eskom power lines that do degrade the landscape character at these locations.

7.3 Receptor Sensitivity Assessment

Receptor sensitivity to landscape changes is likely to be **Medium**. This is mainly due to the close proximity of the surrounding farmsteads. However, the area has limited visual resources and the strong presence of the adjacent Eskom power line does reduce the likelihood of the receptors being sensitive to landscape change on the site. The exception is the rural residential dwellings located in close proximity to the power line corridor, as well as the road receptors making use of the R505. Due to the importance of maintaining property value, receptor change to landscape in close proximity to the houses is likely to be High. As the R505 could include tourist traffic, some receptor sensitivity to landscape change is likely to be expected.

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 making use of the VRM Matrix below:

- 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 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 (NA)
- 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 recommendation for these areas is that they are **excluded from the development footprint**. (No Class I areas were identified).

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.

- Road buffer 25 m for pylon/ monopole structures.
- Rural residential buffer 200 m

The recommendation for these areas is that they are **excluded from the development footprint**.

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:

- Agricultural Grasslands.

Although the Visual Inventory was assigned a Class IV due to Low Scenic Quality and Medium Receptor Sensitivity, a Visual Management Class III was assigned to the Grasslands areas as the current zoning of the property is Agricultural and the setting is rural where scenic resource should be maintained in surrounding landscapes to some degree.

The recommendation for these areas is that they are **suitable for development**.

7.4.4 VRM Class IV

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

- Transformed lands associated with power line, quarry pits and the existing substation.

The recommendation for these areas is that they are **suitable for development**.

8 VISUAL IMPACT ASSESSMENT

Impacts are defined in terms of the standardised impact assessment criteria provided by the environmental practitioner. Using the EAP 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 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 following table identified the KOP that would need to be used to assess the suitability of the landscape change.

Table 20: Contrast Rating Key Observation Points Table

Key Observation Point	Exposure			Landscape Elements					Visual Objectives Met?
	Distance	Exposure	Mitigation	Form	Line	Colour	Texture	Degree of Contrast	
R505 Road	25m	Very High	W/Out	W	M	S	S	S	No
			With	W	W	M	M	M	Yes
Rural Res. 1	100m	High	W/Out	W	S	S	S	S	No
			With	W	M	M	M	M	Yes
Rural Res. 10	140m	High	W/Out	W	M	M	S	S	No
			With	W	M	M	M	M	Yes
Rural Res. 17	100m	High	W/Out	W	S	S	S	S	No
			With	W	M	M	M	M	Yes
Rural Res. 18	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

R505 Road, Rural Res. 17 & 18

The R505 is located in close proximity to the proposed power line corridor. Within the corridor, numerous trees are apparent that do increase the VAC levels. Without mitigation, the placement of monopoles in close proximity to the road, stronger levels of visual contrast are likely to take place for Colour and Texture (especially when the monopoles are recently installed). With mitigation and the incorporation of buffering from the road, the adjacent trees are likely to visually screen the monopoles to some degree, resulting in a moderation of the visual intensity of the landscape change.

Rural Res. 17 & 18 are both located to the south of the proposed power line corridor in High and Very High Visual Exposure respectively. Close proximity routing of the power line could

detract from the property value without mitigation as visual contrast would be Strong for Line, Colour and Texture. However, as the area is wooded with medium sized trees, the VAC levels are higher. With mitigation and the placement of the monopoles outside of the 200m buffer zone, the trees would be able to visually screen the monopoles to some degree.



Figure 19. R505, Rural Res 17 & Rural Res. 18 Contrast Rating Map.

Rural Res.1

The property is located to the south-west of the proposed power line. The VAC levels of the site are higher with the location of existing Eskom power lines to the north of the property. However, without mitigation, visual contrast is likely to be Strong, generating a massing effect with the combined views of the existing power lines. With mitigation and the location outside of the 200 m buffer from the main dwelling, the visual intrusion would be reduced, allowing the existing medium sized trees in the vista to visually screen some of the Line, Colour and Texture contrast generated by the Monopoles.

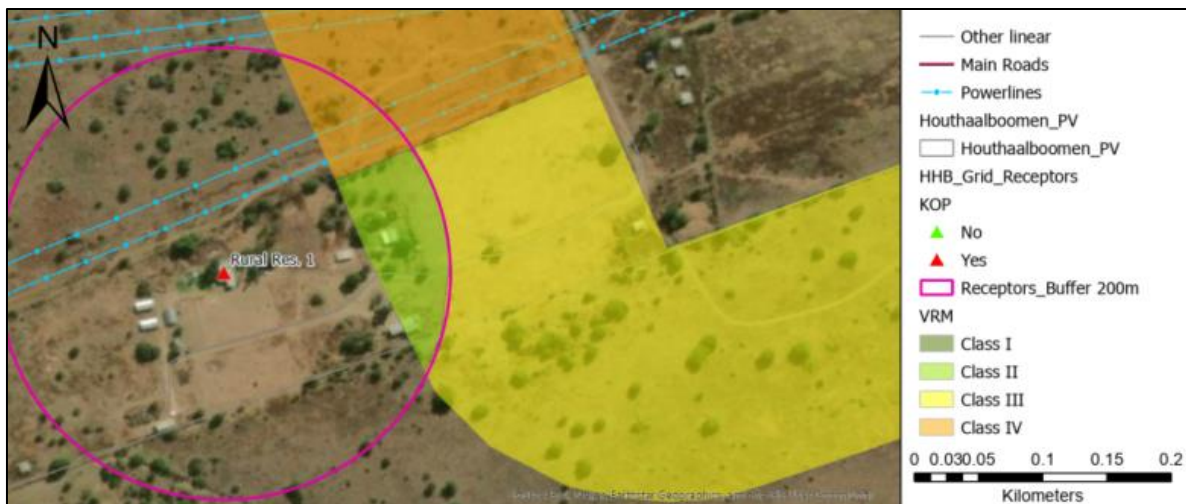


Figure 20. Rural Res 1 Contrast Rating Map.

Rural Res. 10

The proposed rural residential structure is located to the north of the power line corridor. Without mitigation, Moderate levels of visual contrast are likely due to the existing tree

screening and the 140 m distance. With mitigation and the location of the power line outside of the 200 m buffer, visual contrast is likely to be reduced to moderate levels, acceptable to the Class III Visual Objectives.



Figure 21. Rural Res 10 Contrast Rating Map.

8.2 Project Impact Ratings and Motivation

Construction Phase impacts include the use of large vehicles and a crane to raise the power line monopoles. Small maintenance access routes would be created along the proposed power line route which could result in soil erosion if not adequately managed. Due to the small footprint of the monopole and small track, windblown dust is likely to be limited. **Operation Phase** impacts will include the occasional maintenance vehicle travelling down the access track to check on possible soil erosion and the power lines. **Decommissioning Phase** impacts include the movement of large vehicles and cranes for the removal of the monopoles as well as the rehabilitation of the access track.

Potential visual **cumulative impacts** are caused mainly by multiple power lines being routed adjacent to each other, or converging on a specific area, resulting in a massing effect and subsequent landscape degradation.

The impact considered below is therefore the visual obstruction of the landscape to sensitive receptors (-).

Due to the mitigation potential being limited to routing alignment, no post mitigation ratings are defined for this Basic Assessment. Best practice environmental mitigations are defined which are recommended. There is very little difference between construction and operation phases, as it is likely that cranes could also be used during operation for maintenance, but on a very infrequent basis. Due to the small footprint of the monopoles, the landscape modification can be effectively reversed should deconstruction be required.

The impacts considered below therefore include:

- Change to the landscape sense of place due to the presence of the monopoles that result in excessive levels of visual intrusion as seen from the adjacent rural-residential receptors.

8.2.1 Visual Impact Assessment

Table 21: Construction Phase Visual Impacts

Project phase	Construction			
Impact	Loss of landscape character due to the replacement of the existing lattice structure with a similar sized monopole.			
Description of impact	Change in sense of place to rural landscape character from the placement of monopoles and associated cabling using large vehicles and cranes.			
Mitigability	Medium	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential mitigation	Management of dust from moving vehicles. Utilisation of the existing roads for maintenance and 200m buffering from High Exposure rural-residential receptors.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Minor – negative		Minor - negative	
Comment on significance	Due to the Low Magnitude, Local Extent, and shorter time periods, the Visual Significance is rated Minor - negative.			
Cumulative impacts	The area reflects higher VAC levels as a result of the numerous existing Eskom power lines, as well as the fairly prolific thornveld type trees located in the vicinity. With mitigation the visual intrusion is likely to be reduced, and the landscape change is unlikely to result in undue intervisibility impacts to the receptors.			

Table 22: Operation Phase Visual Impacts

Project phase	Operation
Impact	Loss of landscape character due to the operation of the transmission line.

Description of impact	Change in sense of place to rural landscape character from the long-term monopoles and associated cabling in the landscape.			
Mitigability	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential mitigation	Soil erosion needs to be adequately monitored on a Bi-Annual basis.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Minor	Natural and/ or social functions and/ or processes are minimally altered.
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	Medium	Substantive supportive data exists to verify the assessment, but a site visit was not undertaken to the individual dwellings where access was barred.
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Moderate - negative		Minor - negative	
Comment on significance	The existing Eskom power lines already defines the landscape along the eastern portions of the routing. While four rural residential receptors are located in Very High Exposure, these dwellings are fairly well screened by local trees, and there are many existing trees in the landscape. Mitigation is recommended with a 200 m exclusion buffer around the dwellings, that would allow the existing higher VAC levels of the mainly woodlands landscape to offer partial screening of the monopole landscape change.			
Cumulative impacts	The existing landscape is already defined as a power line corridor to some degree. This will be moderately enhanced with the addition of the new power line. However, intervisibility is likely to be reduce to some degree by the many trees around the houses and along the corridor.			

Table 23: Decommissioning Phase Visual Impacts

Project phase	Decommissioning			
Impact	Loss of landscape character due to the deconstruction of the transmission line (UNLIKLEY TO TAKE PLACE)			
Description of impact	Movement of large vehicles in the landscape to take down the monopoles and restore vegetation on the impacted areas.			
Mitigability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> • All structures should be removed and where possible, re-used or recycled. • 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 ripped and then rehabilitated according to a rehabilitation specialist. • Monitoring for soil erosion should be undertaken on a bi-annual basis for a year following the completion of closure phase. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Minor – negative		Minor - negative	
Comment on significance	The small footprint of the impacted area and the shorter time period of the phase reduces the visual significance of the landscape change.			
Cumulative impacts	The shorter time period for this phase reduces the intensity of the landscape change, following which the landscape would be restored to an un-modified version of the previous agricultural sense of place.			

9 PRELIMINARY ENVIRONMENTAL MANAGEMENT PLAN

9.1 Design Phase

- Design of the routing such that a minimum of 200 m is retained as a no-go area between the four identified High Exposure rural-residential receptors.
- Design the placement of the monopoles such that approximately 25m on either side of the R505 is retained as a No-go area.

9.2 Construction Phase

- Windblown dust during construction should be monitored by the ECO. 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.
- Soil erosion measures along the construction roads need to be adequately implemented and routinely monitored by the ECO (monthly).
- Littering should be a finable offence.
- Any impacted areas used in the laydown for the construction, not incorporated into the development footprint, would need to be rehabilitated and restored to natural vegetation.
- Topsoil from the footprints of the structures should be dealt with in accordance with EMP.
- The substation buildings should be painted a grey-brown colour.
- Fencing should be simple, diamond shaped (to catch wind-blown litter) and appear transparent from a distance. The fences should be checked on a monthly basis for the collection of litter caught on the fence.
- Signage on the main access roads should be moderated.
- Lights at night have the potential to significantly increase the visual exposure of the proposed project. It is recommended that mitigations be implemented to reduce light spillage (refer to appendix for general guidelines). No overhead lighting to be used for security purposes.

9.3 Operation Phase

- Soil erosion along the maintenance road needs to be adequately monitored on a Bi-Annual basis.
- Continuation of monitoring to ensure that the rehabilitated areas are restored.
-

9.4 Closure Phase

- Structures should be taken down and removed (including foundations).
- The rubble should be managed according to the National Environmental Management: Waste Act (Act 59 of 2008) (NEMWA) and deposited at a registered landfill if it cannot be recycled or reused.
- All compacted areas should be ripped and then rehabilitated according to a rehabilitation specialist specification.
- Shaping of all impacted areas to ensure natural hydrological drainage occurs and the terrain appears natural.

- Monitoring for soil erosion should be undertaken on a bi-annual basis for a year following the completion of closure phase.

10 PRELIMINARY OPPORTUNITIES AND CONSTRAINTS

10.1 Grid Connect

10.1.1 Opportunities

- The ZVI is contained to the local area with immediate locality distancing due to thornveld vegetation and topographic screening to the south. This would result in a contained zone of visual influence.
- National energy objectives for renewable energy and job creation will be met.
- No significant landscape features located within the ZVI with the numerous existing Eskom power lines degrading the local landscape character.
- Short section of power line.
- Existing vegetation around the rural-residential dwellings and along the corridor, would likely result in partial views of the monopoles.
- No tourism related activities making use of visual resources were identified within the project ZVI.

10.1.2 Constraints

- High Exposure views from four rural-residential receptors.

10.2 No-Go Option

10.2.1 Opportunities

- The current rural agricultural land uses of the property do add to the regional sense of place to some degree (excluding the areas where the Eskom power lines are located).

10.2.2 Constraints

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

11 CONCLUSION

It is the recommendation that the proposed grid infrastructure development should be authorised WITH MITIGATION for the following key reasons:

- The identified benefits from the proposed landscape outweigh the limited loss of the landscape resources along the routing.
- No tourism related activities making use of visual resources were identified within the project ZVI.
- While there are receptors in the High Exposure distance zone, the potential for mitigation within the corridor is available such that the placement of the monopoles will be 200m from the residential receptors. This would effectively reduce the visual intrusion as only partial views are likely to take place.

Mitigation required to ensure that the landscape change remains congruent with the rural agricultural landscape character:

- 25 m buffer restriction from R505 for placement of the monopoles.

- 200m buffer restriction from the High Exposure rural-residential receptors.

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13 ANNEXURE A: FIELD SURVEY PHOTOGRAPHS

ID	8
NAME	Grid connect
REMARKS	Existing power lines along the proposed corridor increasing the VAC levels and degrading local landscape character.
Context	Landscape Character
Direction	SE
REC_TIME	01/21/2022 15:24:47.542 SAST
LATITUDE	-26.1040925
LONGITUDE	26.11205142



ID	9
NAME	Grid Connect Receptor
REMARKS	Photograph of the farmstead located to the east of the proposed grid connect with no residential dwellings visible.
Context	Receptor
Direction	E
REC_TIME	01/21/2022 15:24:47.542 SAST
LATITUDE	-26.1040925
LONGITUDE	26.11205142





ID	10
NAME	R505
REMARKS	View west from the R505 with medium sized trees screening clear views of the proposed Euphorbia PV site.
Project	HHB
Context	Receptor
Direction	W
REC_TIME	01/21/2022 15:43:19.506 SAST
LATITUDE	-26.0644135
LONGITUDE	26.1145737



ID	12
NAME	Hillardia PV Site
REMARKS	View down the fenceline located on the southern boundary of Hillardia PV characterised by flat, grass covered terrain with scattered small trees.
Project	HHB
Context	Landscape Character
Direction	NEE
REC_TIME	01/21/2022 16:17:48.774 SAST
LATITUDE	-26.07782573
LONGITUDE	26.06930405



ID	13
NAME	Verbena PV Site
REMARKS	View down the wooden 88kV power line with small trees re emphasising the aesthetic nature of the rural agricultural landscape.
Project	HHB
Context	Landscape Character
Direction	NE
REC_TIME	01/21/2022 16:27:29.329 SAST
LATITUDE	-26.07531536
LONGITUDE	26.07780799
	

ID	14
NAME	Farmstead 10
REMARKS	Views from the Euphoria PV site towards the farmstead located 500 m to the north of the project.
Project	HHB
Context	Receptor
Direction	NW
REC_TIME	01/21/2022 16:28:52.867 SAST
LATITUDE	-26.05101148
LONGITUDE	26.08633239
	

ID	15
NAME	Euphoria PV Site
REMARKS	View of the flat terrain and fenced grassland paddocks offering limited visual appeal.
Project	HHB
Context	Landscape Character
Direction	N
REC_TIME	01/21/2022 16:33:37.895 SAST
LATITUDE	-26.07009239
LONGITUDE	26.08927779



ID	18
NAME	Lafarge Cement Plant
REMARKS	A zoomed view of the Lafarge Cement Plant visible in the background that reemphasises the built nature of areas around Lichtenberg Town.
Context	Landscape Character
Direction	E
REC_TIME	01/21/2022 17:30:59.856 SAST
LATITUDE	-26.1340509
LONGITUDE	26.18291974



14 ANNEXURE B: SPECIALIST INFORMATION

14.1 Professional Registration Certificate



Association of Professional Heritage Practitioners

MEMBERSHIP CERTIFICATE

THIS CERTIFIES THAT

STEPHEN STEAD
MEMBERSHIP NUMBER: 0063

has been accredited as a
PROFESSIONAL HERITAGE PRACTITIONER (PHP)

The background features a detailed architectural drawing of several traditional corbelled huts. The drawing includes various parts labeled with text such as 'Type A hut', 'Section across Type A hut', 'Roof structure', 'Entrance', 'Types of roof closure', 'Type B hut', 'Section across Type B hut', 'Type C hut', 'Section across Type C hut', 'Plans', and 'Walls'. The drawing is rendered in a technical, line-art style.

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 2020 – 1 JULY 2021

A handwritten signature in black ink, appearing to read 'Stead', is written over the background illustration of the huts.

CHAIRPERSON

[Issued by the Association of Professional Heritage Practitioners Executive Committee]
Image Source: *Drawing of corbelled huts*, James Walton Collection, Stellenbosch University.
<https://digital.lib.sun.ac.za/handle/10019.2/490>

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 others, Rio Tinto (Pty) Ltd, Bannerman (Pty) Ltd, Anglo Coal (Pty) Ltd, Eskom (Pty) Ltd, NamPower 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 24: VRM Africa Projects Assessments Table

YEAR	NAME	DESCRIPTION	LOCATION
2020	Dysanklip & Re Capital 3C BESS	Battery Storage	Northern Cape (SA)
2020	Hotazel PV 2	Solar Energy	Northern Cape (SA)
2020	Hotazel PV Amend	Solar Energy	Northern Cape (SA)
2020	Penhill Water Reservoir	Infrastructure	Western Cape (SA)
2020	Kenhardt BESS x 6	Battery Storage	Northern Cape (SA)
2020	Humansdorp BESS	Battery Storage	Northern Cape (SA)
2020	Bloemsmond PV BESS x 5	Battery Storage	Northern Cape (SA)
2020	Mulilo Prieska BESS x 5	Battery Storage	Northern Cape (SA)
2020	Mulilo De Arr BESS x 3	Battery Storage	Northern Cape (SA)
2020	Sandpiper Estate	Residential	Western Cape (SA)
2020	Obetsebi Lampley Interchange	Infrastructure	Ghana
2019	Port Barry Residential	Settlement	Western Cape (SA)
2019	Gamsberg Smelter	Plant	Northern Cape (SA)
2019	Sandpiper Nature Reserve Lodge	Residential	Western Cape (SA)
2019	Bloemsmond PV 4 - 5	Solar Energy	Northern Cape (SA)
2019	Mphepo Wind (Scoping Phase)	Wind Energy	Zambia
2018	Mogara PV	Solar Energy	Northern Cape (SA)
2018	Gaetsewe PV	Solar Energy	Northern Cape (SA)
2017	Kalungwishi Hydroelectric (2) and power line	Hydroelectric	Zambia
2017	Mossel Bay UISP (Kwanoqaba)	Settlement	Western Cape (SA)
2017	Pavua Dam and HEP	Hydroelectric	Mozambique (SA)

2017	Penhill UISP Settlement (Cape Town)	Settlement	Western Cape (SA)
2016	Kokerboom WEF * 3	Wind Energy	Northern Cape (SA)
2016	Hotazel PV	Solar Energy	Northern Cape (SA)
2016	Eskom Sekgame Bulkop Power Line	Infrastructure	Northern Cape (SA)
2016	Ngonye Hydroelectric	Hydroelectric	Zambia
2016	Levensdal Infill	Settlement	Western Cape (SA)
2016	Arandis CSP	Solar Energy	Namibia
2016	Bonnievale PV	Solar Energy	Western Cape (SA)
2015	Noblesfontein 2 & 3 WEF (Scoping)	Wind Energy	Eastern Cape (SA)
2015	Ephraim Sun SEF	Solar Energy	Northern Cape (SA)
2015	Dyasonsklip and Sirius Grid TX	Solar Energy	Northern Cape (SA)
2015	Dyasonsklip PV	Solar Energy	Northern Cape (SA)
2015	Zeerust PV and transmission line	Solar Energy	North West (SA)
2015	Bloemsmond SEF	Solar Energy	Northern Cape (SA)
2015	Juwi Copperton PV	Solar Energy	Northern Cape (SA)
2015	Humansrus Capital 14 PV	Solar Energy	Northern Cape (SA)
2015	Humansrus Capital 13 PV	Solar Energy	Northern Cape (SA)
2015	Spitzkop East WEF (Scoping)	Solar Energy	Western Cape (SA)
2015	Lofdal Rare Earth Mine and Infrastructure	Mining	Namibia
2015	AEP Kathu PV	Solar Energy	Northern Cape (SA)
2014	AEP Mogobe SEF	Solar Energy	Northern Cape (SA)
2014	Bonnievale SEF	Solar Energy	Western Cape (SA)
2014	AEP Legoko SEF	Solar Energy	Northern Cape (SA)
2014	Postmasburg PV	Solar Energy	Northern Cape (SA)
2014	Joram Solar	Solar Energy	Northern Cape (SA)
2014	RERE PV Postmasberg	Solar Energy	Northern Cape (SA)
2014	RERE CPV Upington	Solar Energy	Northern Cape (SA)
2014	Rio Tinto RUL Desalination Plant	Industrial	Namibia
2014	NamPower PV * 3	Solar Energy	Namibia
2014	Pemba Oil and Gas Port Expansion	Industrial	Mozambique
2014	Brightsource CSP Upington	Solar Energy	Northern Cape (SA)
2014	Witsand WEF (Scoping)	Wind Energy	Western Cape (SA)
2014	Kangnas WEF	Wind Energy	Western Cape (SA)
2013	Cape Winelands DM Regional Landfill	Industrial	Western Cape (SA)
2013	Drennan PV Solar Park	Solar Energy	Eastern Cape (SA)
2013	Eastern Cape Mari-culture	Mari-culture	Eastern Cape (SA)
2013	Eskom Phantom Pass Substation	Substation /Tx lines	Western Cape (SA)
2013	Frankfort Paper Mill	Plant	Free State (SA)
2013	Gibson Bay PV Facility Transmission lines	Transmission lines	Eastern Cape (SA)
2013	Houhoek Eskom Substation	Substation /Tx lines	Western Cape (SA)
2013	Mulilo PV Solar Energy Sites (x4)	Solar Energy	Northern Cape (SA)

2013	Namies Wind Farm	Wind Energy	Northern Cape (SA)
2013	Rossing Z20 Pit and WRD	Mining	Namibia
2013	SAPPI Boiler Upgrade	Plant	Mpumalanga (SA)
2013	Tumela WRD	Mine	North West (SA)
2013	Weskusfleur Substation (Koeburg)	Substation /Tx lines	Western Cape (SA)
2013	Yzermyn coal mine	Mining	Mpumalanga (SA)
2012	Afrisam	Mining	Western Cape (SA)
2012	Bitterfontein	Solar Energy	Northern Cape (SA)
2012	Kangnas PV	Solar Energy	Northern Cape (SA)
2012	Kangnas Wind	Solar Energy	Northern Cape (SA)
2012	Kathu CSP Tower	Solar Energy	Northern Cape (SA)
2012	Kobong Hydro	Hydro & Powerline	Lesotho
2012	Letseng Diamond Mine Upgrade	Mining	Lesotho
2012	Lunsklip Windfarm	Wind Energy	Western Cape (SA)
2012	Mozambique Gas Engine Power Plant	Plant	Mozambique
2012	Ncondezi Thermal Power Station	Substation /Tx lines	Mozambique
2012	Sasol CSP Tower	Solar Power	Free State (SA)
2012	Sasol Upington CSP Tower	Solar Power	Northern Cape (SA)
2011	Beaufort West PV Solar Power Station	Solar Energy	Western Cape (SA)
2011	Beaufort West Wind Farm	Wind Energy	Western Cape (SA)
2011	De Bakke Cell Phone Mast	Structure	Western Cape (SA)
2011	ERF 7288 PV	Solar Energy	Western Cape (SA)
2011	Gecko Industrial park	Industrial	Namibia
2011	Green View Estates	Residential	Western Cape (SA)
2011	Hoodia Solar	Solar Energy	Western Cape (SA)
2011	Kalahari Solar Power Project	Solar Energy	Northern Cape (SA)
2011	Khanyisa Power Station	Power Station	Western Cape (SA)
2011	Olvyn Kolk PV	Solar Energy	Northern Cape (SA)
2011	Otjikoto Gold Mine	Mining	Namibia
2011	PPC Rheebeek West Upgrade	Industrial	Western Cape (SA)
2011	George Southern Arterial	Road	Western Cape (SA)
2010	Bannerman Etango Uranium Mine	Mining	Namibia
2010	Bantamsklip Transmission	Transmission	Eastern Cape (SA)
2010	Beaufort West Urban Edge	Mapping	Western Cape (SA)
2010	Bon Accord Nickel Mine	Mining	Mapumalanga (SA)
2010	Etosha National Park Infrastructure	Housing	Namibia
2010	Herolds Bay N2 Development Baseline	Residential	Western Cape (SA)
2010	MET Housing Etosha	Residential	Namibia
2010	MET Housing Etosha Amended MCDM	Residential	Namibia
2010	MTN Lattice Hub Tower	Structure	Western Cape (SA)
2010	N2 Herolds Bay Residential	Residential	Western Cape (SA)

2010	Onifin(Pty) Ltd Hartenbos Quarry Extension	Mining	Western Cape (SA)
2010	Still Bay East	GIS Mapping	Western Cape (SA)
2010	Vale Moatize Coal Mine and Railway	Mining / Rail	Mozambique
2010	Vodacom Mast	Structure	Western Cape (SA)
2010	Wadrif Dam	Dam	Western Cape (SA)
2009	Asazani Zinyoka UISP Housing	Residential Infill	Western Cape (SA)
2009	Eden Telecommunication Tower	Structure	Western Cape (SA)
2009	George SDF Landscape Characterisation	GIS Mapping	Western Cape (SA)
2009	George SDF Visual Resource Management	GIS Mapping	Western Cape (SA)
2009	George Western Bypass	Road	Western Cape (SA)
2009	Knysna Affordable Housing Heidevallei	Residential Infill	Western Cape (SA)
2009	Knysna Affordable Housing Hornlee Project	Residential Infill	Western Cape (SA)
2009	Rossing Uranium Mine Phase 2	Mining	Namibia
2009	Sun Ray Wind Farm	Wind Energy	Western Cape (SA)
2008	Bantamsklip Transmission Lines Scoping	Transmission	Western Cape (SA)
2008	Erf 251 Damage Assessment	Residential	Western Cape (SA)
2008	Erongo Uranium Rush SEA	GIS Mapping	Namibia
2008	Evander South Gold Mine Preliminary VIA	Mining	Mpumalanga (SA)
2008	George SDF Open Spaces System	GIS Mapping	Western Cape (SA)
2008	Hartenbos River Park	Residential	Western Cape (SA)
2008	Kaaimans Project	Residential	Western Cape (SA)
2008	Lagoon Garden Estate	Residential	Western Cape (SA)
2008	Moquini Beach Hotel	Resort	Western Cape (SA)
2008	NamPower Coal fired Power Station	Power Station	Namibia
2008	Oasis Development	Residential	Western Cape (SA)
2008	RUL Sulphur Handling Facility Walvis Bay	Mining	Namibia
2008	Walvis Bay Power Station	Structure	Namibia
2007	Calitzdorp Retirement Village	Residential	Western Cape (SA)
2007	Calitzdorp Visualisation	Visualisation	Western Cape (SA)
2007	Camdeboo Estate	Residential	Western Cape (SA)
2007	Destiny Africa	Residential	Western Cape (SA)
2007	Droogfontein Farm 245	Residential	Western Cape (SA)
2007	Floating Liquefied Natural Gas Facility	Structure tanker	Western Cape (SA)
2007	George SDF Municipality Densification	GIS Mapping	Western Cape (SA)
2007	Kloofsig Development	Residential	Western Cape (SA)
2007	OCGT Power Plant Extension	Structure Power Plant	Western Cape (SA)
2007	Oudtshoorn Municipality SDF	GIS Mapping	Western Cape (SA)
2007	Oudtshoorn Shopping Complex	Structure	Western Cape (SA)
2007	Pezula Infill (Noetzie)	Residential	Western Cape (SA)
2007	Pierpoint Nature Reserve	Residential	Western Cape (SA)
2007	Pinnacle Point Golf Estate	Golf/Residential	Western Cape (SA)

2007	Rheebok Development Erf 252 Appeal	Residential	Western Cape (SA)
2007	Rossing Uranium Mine Phase 1	Mining	Namibia
2007	Ryst Kuil/Riet Kuil Uranium Mine	Mining	Western Cape (SA)
2007	Sedgefield Water Works	Structure	Western Cape (SA)
2007	Sulphur Handling Station Walvis Bay Port	Industrial	Namibia
2007	Trekopje Uranium Mine	Mining	Namibia
2007	Weldon Kaya	Residential	Western Cape (SA)
2006	Farm Dwarsweg 260	Residential	Western Cape (SA)
2006	Fynboskruin Extension	Residential	Western Cape (SA)
2006	Hanglip Golf and Residential Estate	Residential	Western Cape (SA)
2006	Hansmoeskraal	Slopes Analysis	Western Cape (SA)
2006	Hartenbos Landgoed Phase 2	Residential	Western Cape (SA)
2006	Hersham Security Village	Residential	Western Cape (SA)
2006	Ladywood Farm 437	Residential	Western Cape (SA)
2006	Le Grand Golf and Residential Estate	Residential	Western Cape (SA)
2006	Paradise Coast	Residential	Western Cape (SA)
2006	Paradyskloof Residential Estate	Residential	Western Cape (SA)
2006	Riverhill Residential Estate	Residential	Western Cape (SA)
2006	Wolwe Eiland Access Route	Road	Western Cape (SA)
2005	Harmony Gold Mine	Mining	Mpumalanga (SA)
2005	Knysna River Reserve	Residential	Western Cape (SA)
2005	Lagoon Bay Lifestyle Estate	Residential	Western Cape (SA)
2005	Outeniquabosch Safari Park	Residential	Western Cape (SA)
2005	Proposed Hotel Farm Gansevallei	Resort	Western Cape (SA)
2005	Uitzicht Development	Residential	Western Cape (SA)
2005	West Dunes	Residential	Western Cape (SA)
2005	Wilderness Erf 2278	Residential	Western Cape (SA)
2005	Wolwe Eiland Eco & Nature Estate	Residential	Western Cape (SA)
2005	Zebra Clay Mine	Mining	Western Cape (SA)
2004	Gansevallei Hotel	Residential	Western Cape (SA)
2004	Lakes Eco and Golf Estate	Residential	Western Cape (SA)
2004	Trekopje Desalination Plant	Structure Plant	Namibia (SA)
1995	Greater Durban Informal Housing Analysis	Photogrammetry	KwaZulu-Natal (SA)

15 ANNEXURE C: METHODOLOGY DETAIL

15.1 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.

15.1.1 Scenic Quality

The scenic quality is determined making use of the VRM Scenic Quality Checklist (refer to Table 25). The checklist 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.

15.1.2 Receptor Sensitivity

Receptor Sensitivity levels are a measure of public concern for scenic quality and assessed making use of the Sensitivity Checklist in **Error! Reference source not found.** . 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.

15.1.3 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, because of no receptors, are not viewed or are seldom viewed.

15.1.4 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.

15.2 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.

15.2.1 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.

15.2.2 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).

15.3 VRM Checklists and Terminology

Table 25: Scenic Quality Checklist

KEY FACTORS	RATING CRITERIA AND SCORE		
SCORE	5	3	1

Land Form	High vertical relief as expressed in prominent cliffs, spires or massive rock outcrops, or severe surface variation or highly eroded formations or detail features that are dominating and exceptionally striking and intriguing.	Steep-sided river valleys, or interesting erosion patterns or variety in size and shape of landforms; or detail features that are interesting, though not dominant or exceptional.	Low rolling hills, foothills or flat valley bottoms; few or no interesting landscape features.
Vegetation	A variety of vegetative types as expressed in interesting forms, textures and patterns.	Some variety of vegetation, but only one or two major types.	Little or no variety or contrast in vegetation.
Water	Clear and clean appearing, still or cascading white water, any of which are a dominant factor in the landscape.	Flowing, or still, but not dominant in the landscape.	Absent, or present but not noticeable.
Colour	Rich colour combinations, variety or vivid colour: or pleasing contrasts in the soil, rock, vegetation, water.	Some intensity or variety in colours and contrast of the soil, rock and vegetation, but not a dominant scenic element.	Subtle colour variations contrast or interest: generally mute tones.
Adjacent Scenery	Adjacent scenery greatly enhances visual quality.	Adjacent scenery moderately enhances overall visual quality.	Adjacent scenery has little or no influence on overall visual quality.
Scarcity	One of a kind: unusually memorable, or very rare within region. Consistent chance for exceptional wildlife or wildflower viewing etc.	Distinctive, though somewhat similar to others within the region.	Interesting within its setting, but fairly common within the region.
SCORE	2	0	-4
Cultural Modification	Modifications add favourably to visual variety, while promoting visual harmony.	Modifications add little or no visual variety to the area and introduce no discordant elements.	Modifications add variety but are very discordant and promote strong disharmony.

Table 26: Sensitivity Level Rating Checklist

FACTORS	QUESTIONS
Type of Users	Maintenance of visual quality is:
	A major concern for most users High
	A moderate concern for most users Moderate
	A low concern for most users Low
Amount of use	Maintenance of visual quality becomes more important as the level of use increases:
	A high level of use High
	Moderately level of use Moderate
	Low level of use Low
Public interest	Maintenance of visual quality:

	A major concern for most users	High
	A moderate concern for most users	Moderate
	A low concern for most users	Low
Adjacent land Users	Maintenance of visual quality to sustain adjacent land use objectives is:	
	Very important	High
	Moderately important	Moderate
	Slightly important	Low
Special Areas	Maintenance of visual quality to sustain Special Area management objectives is:	
	Very important	High
	Moderately important	Moderate
	Slightly important	Low

Table 27: VRM Terminology Table

FORM		LINE	COLOUR		TEXTURE																																													
Simple	Weak	Strong	Dominant	Flat	Rolling	Undulating	Complex	Plateau	Ridge	Valley	Plain	Steep	Shallow	Organic	Structured	Horizontal	Vertical	Geometric	Angular	Acute	Parallel	Curved	Wavy	Strong	Weak	Crisp	Feathered	Indistinct	Clean	Prominent	Solid	Dark	Light	Mottled	Smooth	Rough	Fine	Coarse	Patchy	Even	Uneven	Complex	Simple	Stark	Clustered	Diffuse	Dense	Scattered	Sporadic	Consistent
Simple	Basic, composed of few elements		Organic	Derived from nature; occurring or developing gradually and naturally																																														
Complex	Complicated; made up of many interrelated parts		Structure	Organised; planned and controlled; with definite shape, form, or pattern																																														
Weak	Lacking strength of character		Regular	Repeatedly occurring in an ordered fashion																																														
Strong	Bold, definite, having prominence		Horizontal	Parallel to the horizon																																														
Dominant	Controlling, influencing the surrounding environment		Vertical	Perpendicular to the horizon; upright																																														
Flat	Level and horizontal without any slope; even and smooth without any bumps or hollows		Geometric	Consisting of straight lines and simple shapes																																														

Rolling	Progressive and consistent in form, usually rounded	Angular	Sharply defined; used to describe an object identified by angles
Undulating	Moving sinuously like waves; wavy in appearance	Acute	Less than 90°; used to describe a sharp angle
Plateau	Uniformly elevated flat to gently undulating land bounded on one or more sides by steep slopes	Parallel	Relating to or being lines, planes, or curved surfaces that are always the same distance apart and therefore never meet
Ridge	A narrow landform typical of a highpoint or apex; a long narrow hilltop or range of hills	Curved	Rounded or bending in shape
Valley	Low-lying area; a long low area of land, often with a river or stream running through it, that is surrounded by higher ground	Wavy	Repeatedly curving forming a series of smooth curves that go in one direction and then another
Plain	A flat expanse of land; fairly flat dry land, usually with few trees	Feathered	Layered; consisting of many fine parallel strands
Steep	Sloping sharply often to the extent of being almost vertical	Indistinct	Vague; lacking clarity or form
Prominent	Noticeable; distinguished, eminent, or well-known	Patchy	Irregular and inconsistent;
Solid	Unadulterated or unmixed; made of the same material throughout; uninterrupted	Even	Consistent and equal; lacking slope, roughness, and irregularity
Broken	Lacking continuity; having an uneven surface	Uneven	Inconsistent and unequal in measurement irregular
Smooth	Consistent in line and form; even textured	Stark	Bare and plain; lacking ornament or relieving features
Rough	Bumpy; knobbly; or uneven, coarse in texture	Clustered	Densely grouped
Fine	Intricate and refined in nature	Diffuse	Spread through; scattered over an area
Coarse	Harsh or rough to the touch; lacking detail	Diffuse	To make something less bright or intense

16 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 proposed project, without jeopardising 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” light (more blue and green), 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 Center. New York. 2008)

‘Good Neighbour – Outdoor Lighting’

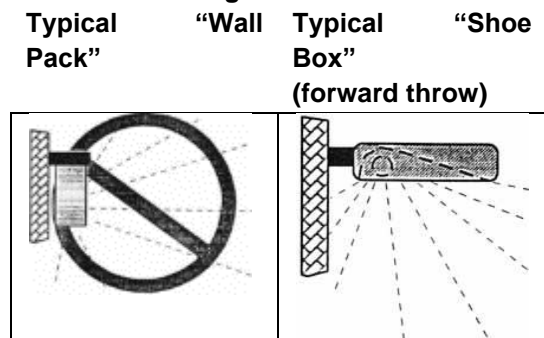
Presented by the New England Light Pollution Advisory Group (NELPAG) (<http://cfa/www.harvard.edu/cfa/ps/nelpag.html>) and Sky & Telescope (<http://SkyandTelescope.com/>). NELPAG and Sky & Telescope support the International Dark-Sky Association (IDA) (<http://www.darksky.org/>). (NELPAG)

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

Good and Bad Light Fixtures



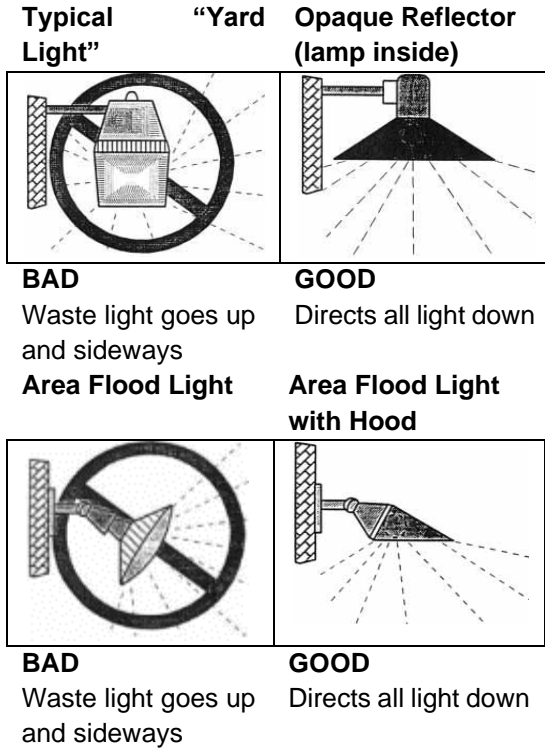
<p>BAD Waste light goes up and sideways</p>	<p>GOOD Directs all light down</p>
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instead of the dazzling bulb. “Glare” is light that beams directly from a bulb into your eye. It hampers the vision of pedestrians, cyclists, and drivers.

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.

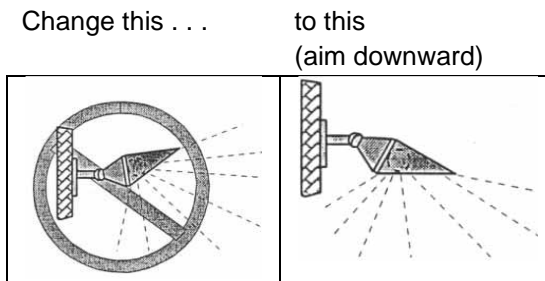


How do I switch to good lighting?

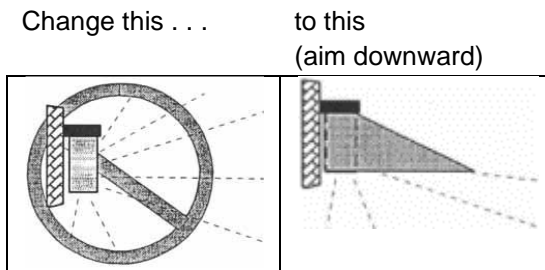
Provide only enough light for the task at hand; don’t over-light, and don’t spill light off your property. Specifying enough light for a job is sometimes hard to do on paper. Remember that a full Moon can make an area quite bright. Some lighting systems illuminate areas 100 times more brightly than the 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-cutoff shielded” fixtures that keep light from going uselessly up or sideways. Full-cutoff 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

What You Can Do To Modify Existing Fixtures



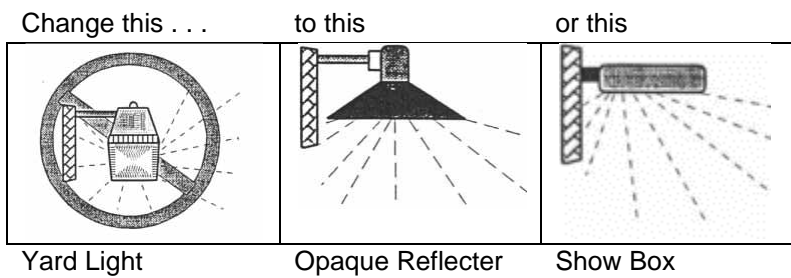
Floodlight:



Wall Pack

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!



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.