

THE PROPOSED BULSKOP GRID CONNECTION INFRASTRUCTURE, WESTERN CAPE PROVINCE, SOUTH AFRICA

Visual Impact: Basic Assessment Report

Draft v_2

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Document prepared for Bulskop Grid (Pty) Ltd
On behalf of Cape EAPrac (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> | Environmental Impact Assessment |
| <i>EMPr</i> | Environmental Management Plan |
| <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>PNR</i> | Private Nature Reserve |
| <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 | The measure in terms of the form, line, colour and texture of the existing landscape in relation to the proposed landscape modification in relation to the defined visual resource management objectives. |
| Visual intrusion | Issues are concerns related to the proposed development, generally phrased as questions, taking the form of “what will the impact of some activity be on some element of the visual, aesthetic or scenic environment”. |
| Receptors | Individuals, groups or communities who would be subject to the visual influence of a particular project. |
| Sense of place | The unique quality or character of a place, whether natural, rural or urban. |
| Scenic corridor | A linear geographic area that contains scenic resources, usually, but not necessarily, defined by a route. |
| Viewshed | The outer boundary defining a view catchment area, usually along crests and ridgelines. Similar to a watershed. This reflects the area, or the extent thereof, where the landscape modification would probably be seen. |
| Visual Absorption Capacity | The potential of the landscape to conceal the proposed project. |

Technical Term Definition (USDI., 2004)

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

Table 1. Specialist declaration of independence.


| |
|--|
| <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 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>  <p>Stephen Stead APHP accredited VIA Specialist</p> |
|--|

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 | 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 | Terms of Reference |
| A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change | Visual Resource Management (VRM) Classes |
| The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment | NA |
| A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used; | Methodology |
| Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternative; | Baseline Visual Inventory |
| An identification of any areas to be avoided, including buffers | NA |
| 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 description of any assumptions made and any uncertainties or gaps in knowledge; | Assumptions and Limitations |
| A description of the findings and potential implications of such findings on the impact of the proposed activity or activities | Visual Resource Management Classes |
| Any mitigation measures for inclusion in the EMPr | 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 specialist report prepared in terms of the Environmental Impact Regulations of 2014 (as amended in 2017) must contain: | Relevant section in report |
|--|--|
| A reasoned opinion as to whether the proposed activity or portions thereof should be authorised | Conclusion |
| Regarding the acceptability of the proposed activity or activities; and | Conclusion |
| If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan | The proposed project should be authorised with mitigation. The visual resources are very low with existing precedent for Eskom Transmission lines within the Zone of Visual Influence. |
| A description of any consultation process that was undertaken during the course of carrying out the study | A Draft Basic Assessment Report containing this VIA will be subjected to a consultative process as required in terms of regulation 56 of the NEMA 2014 EIA Regulations. |
| A summary and copies if any comments that were received during any consultation process | NA |
| Any other information requested by the competent authority. | NA |

1 INTRODUCTION

Visual Resource Management Africa CC (VRMA) was appointed by Cape EAPrac (Pty) Ltd to undertake the **Visual Impact Assessment** on behalf of Bulskop Grid (Pty) Ltd. (Proponent). The site visit was undertaken on the 21st of September 2021. The proposed development site is located in the Western Cape Province, Central Karoo District Municipality and within the Beaufort West Local Municipality. The Proponent proposes the construction and operation of grid connection infrastructure for the proposed Bulskop PV cluster of six facilities near Beaufort West. This VIA assesses the grid connection that is required to distribute the generated electricity from the PV project to the Eskom Droerivier Substation.



Figure 1. National locality map with the project location identified.

1.1 Terms of Reference

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

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

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

1.2 Study Team

Contributors to this study are summarised in the table below.

Table 3: Authors and Contributors to this Report.

| Aspect | Person | Organisation / Company | Qualifications |
|---|---|------------------------|---|
| Landscape and Visual Assessment (author of this report) | Stephen Stead 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. |

1.3 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 (USDl., 2004). This mapping and GIS-based method of assessing landscape modifications allows for increased objectivity and consistency by using standard assessment criteria.

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 4: 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. |

1.4 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.

2 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:

Bulskop Grid (Pty) Ltd proposes the construction and operation of grid connection infrastructure for the proposed Bulskop PV cluster of six facilities near Beaufort West in the Western Cape Province. The grid connection infrastructure comprises the following:

- One Eskom collector substation/ switching station.
- One double circuit 132 kV power line from the Bulskop collector substation/ switching station to the Droerivier 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 of approximately 300 m wide and 17.5 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 300m wide grid connection corridor, which will allow for the avoidance of identified environmental sensitivities. The grid corridor will connect the 6 PV projects to the Droerivier MTS.

Table 5: Property Information Table

| PROJECT SPECIFICATIONS: SITE BULSKOP PV | |
|---|---|
| Applicant Details | Description |
| Applicant Name: | Bulskop Grid (Pty) Ltd Bulskop Grid (Pty) Ltd is a Special Purpose Vehicle (SPV) incorporated for the sole purpose of developing, constructing, and operating the proposed grid connection infrastructure on the remaining Extent of Farm 423, Portion 5 of Farm No.169 Hans Rivier, Portion 4 of Farm No.169 Hans Rivier, Portion 1 of Farm No.168 Steenrotsfontain and Portion 10 of Farm No. 170 Weltevreden. |
| Company Registration Number: | 2021/885350/07 |
| BBBEE Status: | n/a |
| Project Name: | Bulskop Grid Connection Infrastructure |

| Site Details | Description |
|--------------|--|
| Site | <p>The grid connection crosses the following properties:</p> <ul style="list-style-type: none"> • Remaining Extent of Farm 423 • Hans Rivier being Portion 5 of Farm No.169 • Hans Rivier being Portion 4 of Farm No.169 • Steenrotsfontain being Portion 1 of Farm No.168 • Weltevreden being Portion 10 of Farm No. 170 |

| TECHNOLOGY DETAILS | | |
|-----------------------------|---|--|
| Grid connection | Substation to which project will connect. | The Bulskop grid connection infrastructure will facilitate the connection of six facility substations to a collector substation/ switching station, and then a single or double circuit 132 kV overhead powerline will connect the collector substation/ switching station to the National Grid via the Droerivier Main Transmission Substation (MTS). |
| | Capacity of substations to connect facilities | One Eskom collector substation/ switching station which is referred to as the Bulskop collector substation/ switching station is required for the Bulskop Grid Connection Infrastructure. |
| Power line/s | Number of overhead power lines required | A single or double circuit 132 kV overhead powerline from the Bulskop collector substation/ switching station to the Droerivier MTS is required for the Bulskop Grid Connection Infrastructure. |
| | Voltage of overhead power lines | 132 kV |
| | Height of the Power Line | < 32 m |
| | Servitude Width | Maximum of 31 m – 36 m. |
| Auxiliary Infrastructure | | |
| Other infrastructure | Additional Infrastructure | <ul style="list-style-type: none"> • Access tracks/ roads • Laydown areas |
| | Details of access roads | <p>The access roads will not exceed 8 m in width. Access to the grid connection infrastructure will be possible via existing roads in close vicinity to the infrastructure. Apart from these existing roads, the proposed Bulskop solar PV facilities will contain access roads that can also be used to access the infrastructure.</p> <p>Formal roads will not be constructed underneath the power lines for maintenance purposes; access for maintenance purposes will be limited to jeep tracks.</p> |
| | Extent of areas required for laydown of materials and equipment | Approximately 1- 2 ha of laydown areas will be required (Laydown areas will not exceed 2 ha). |

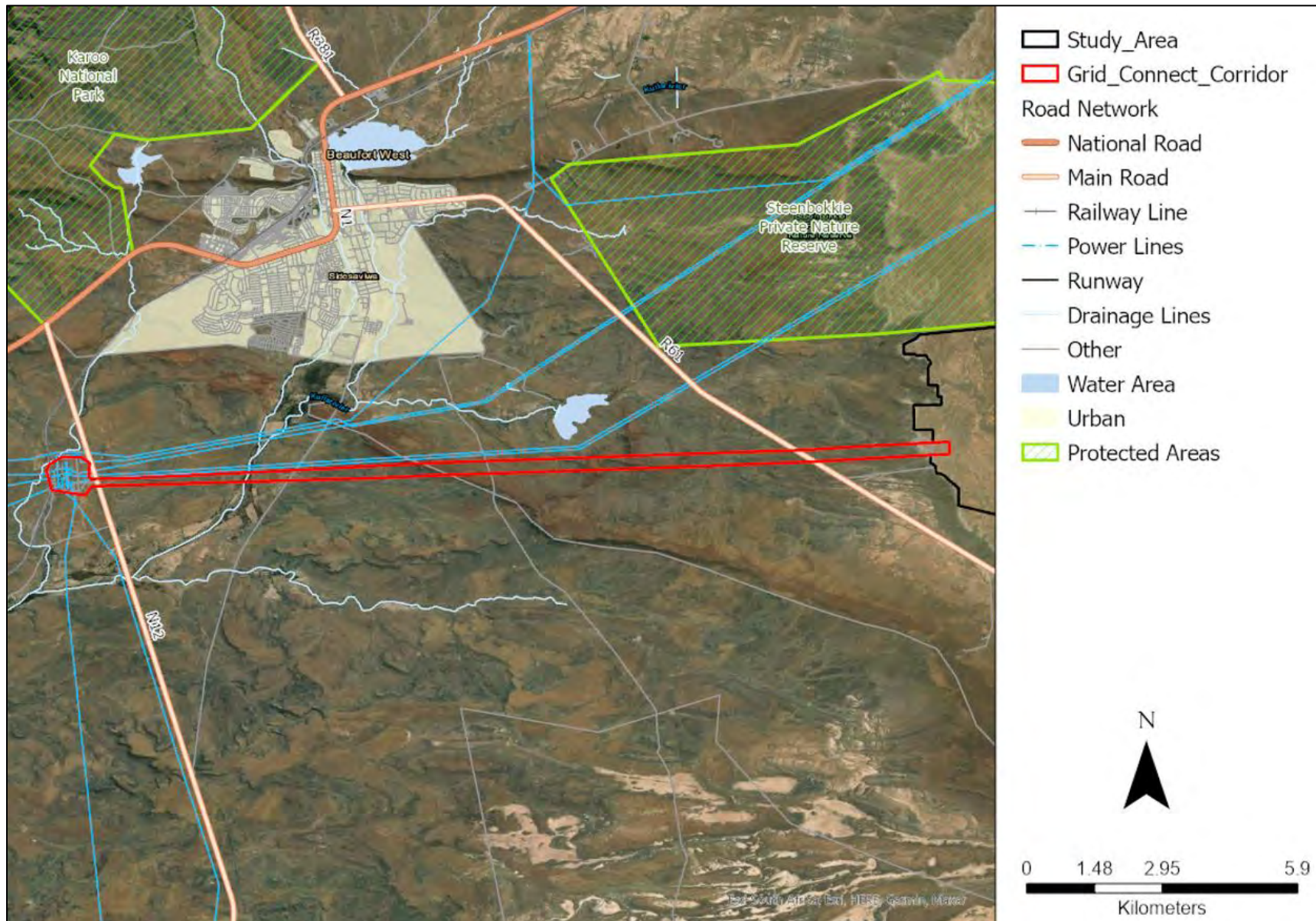


Figure 2: Proposed layout map depicting the proposed grid connect corridor from the PV cluster to the Eskom Droerivier Substation.

3 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.

3.1 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).
- Millennium Ecosystem Assessment (MEA).
- United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Convention (WHC).

3.1.1 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).

3.1.2 International Finance Corporation (IFC)

The IFC Performance Standards (IFC, 2012) do not explicitly cover visual impacts or assessment thereof. Under IFC PS 6, ecosystem services are organized into four categories, with the third category related to cultural services which are defined as "the non-material benefits people obtain from ecosystems" and "may include natural areas that are sacred sites and areas of importance for recreation and aesthetic enjoyment" (IFC, 2012).

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

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

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

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

3.1.3 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)

3.2 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.
- Regional and Local Municipality Planning and Guidelines.

3.2.1 DEA&DP Visual and Aesthetic Guidelines

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

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

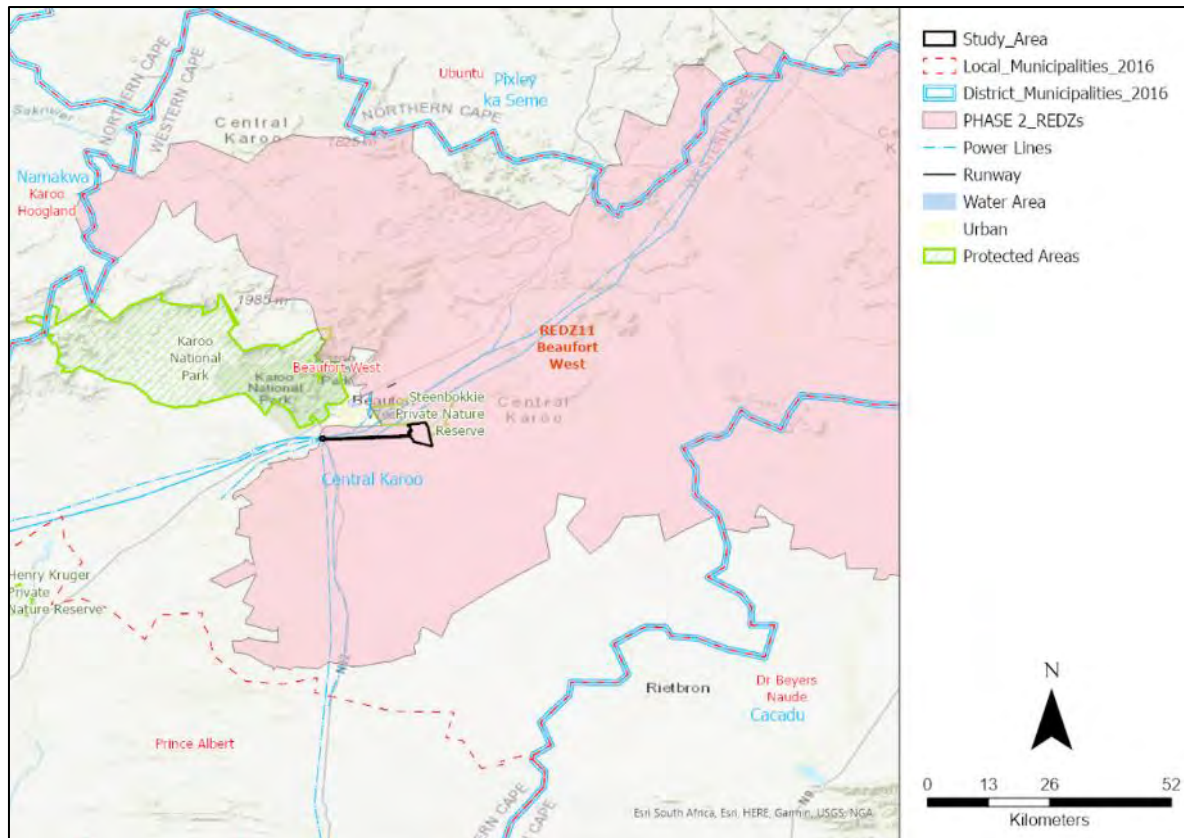


Figure 3. Planning locality map.

3.2.2 Local and Regional Planning

As indicated in the administrative map Figure 3 above, the property falls within the following administrative jurisdiction:

Table 6: Governance administrative table

| Theme | Requirements |
|------------------------------|----------------------|
| Province | Western Cape |
| District Municipality | Central Karoo |
| Local Municipality | Beaufort West |
| REDZ Phase 2 | Beaufort West REDZ11 |

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 7: Central Karoo District Municipality Integrated Development Plan (2012 – 2017)

| Theme | Requirements | Page |
|-------------------------|--|------|
| General | Non-rural development in rural areas in the Central Karoo can be found in Beaufort West, Laingsburg and Prince Albert. These areas are changing from purist agricultural areas to eco-tourism and game farming areas | 56 |
| Renewable Energy | Given the harmful environmental impacts of certain identifiable energy sources, as well as growing energy demand and needs, the use of clean and sustainable energy is becoming increasingly important | 49 |

| Theme | Requirements | Page |
|----------------|--|------|
| | Move to a less carbon-intensive electricity production with a focus on renewable energy and solar water heating | 144 |
| Tourism | To establish an inclusive tourism industry through sustainable development and marketing which is public sector led, private sector driven, and community based. | 77 |

Table 8: Beaufort West Local Municipality Spatial Development Plan Framework (Beaufort West Municipality, 2004)

| Theme | Requirements | Page |
|----------------------------|---|------|
| Landscape Character | Promoting the visual quality of the environment | 12 |
| | The scale of development relates to the size of the site the development is planned for. The rural character of the rural areas in the Beaufort West Municipal area should be maintained in all instances – scale should therefore not be too large, compared to the rural character of the area. | 16 |
| | The character of the rural nodes forms an integral part of the general rural character. It is therefore important to protect the inherent visual, aesthetic and location qualities of the rural nodes | 49 |

Table 9: Beaufort West Local Municipality Integrated Development Plan (Beaufort West Municipality)

| Theme | Requirements | Page |
|-------------------------|---|------|
| Renewable Energy | To make sure that everyone has significant access to electricity, the following is important: | 43 |
| | Establish an investment vehicle to attract funding for the provision of electricity by means of alternative energy sources. | 43 |

3.3 Policy Fit

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

In terms of international best practice, the proposed landscape modification will not trigger any issues as there are no significant landscape/ cultural landscape features within the project area. The escarpment is a significant feature element in the regional landscape, and a portion of this visual resource is proclaimed a natural area within the Karoo National Park. However, the park is well set back from the proposed PV site and Grid routing with the approximately 17km creating a suitable visual buffer for the protection of this significant feature. A possible risk to the local and regional planning, is the proximity to the Steenbokkie Private Nature which is located to the north-east of the corridor. While views of the proposed grid connection landscape modification will be partially visible from the reserve, the main camp area will be topographic screened, with not direct views from accommodation and general camp facilities. The southern portion of the reserve includes two Eskom power line corridors, with a further routing planned. The numerous power lines and pylons in this transmission corridor significantly reduce the local sense of place of the portion of the reserve adjacent to the PV site. Views from the reserve hiking routes also have the power lines in the foreground. As such, the southern portions of the reserve are not associated with significant landscape resources and are more associated with stocking of game for viewing

from vehicles. Although the Beaufort West PV project is currently unbuilt, once developed the PV sense of place will become the status quo, given the REDZ planning for the area.

In terms of regional and local planning, there is clear mention of the economic value that the renewable energy will add to the local and regional economy. While there is a strong emphasis on tourism, the site does fall within the REDZ 11 area, mainly follows an existing Eskom Transmission line, and as such the policy fit at a local and regional level is also rated **High-Positive**.

4 METHODOLOGY

The process that VRMA followed when determining landscape significance is based on the United States Bureau of Land Management's (BLM) Visual Resource Management method (USDI., 2004). This mapping and Geographic Information System (GIS) based method of assessing landscape modifications allows for increased objectivity and consistency by using standard assessment criteria. The following key factors determine the suitability of landscape change:

- *"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).*

The assessment comprises two main sections: firstly, the **Baseline Stage** to identify the visual resources and key observation locations within the project zone of visual influence; and secondly, the **Assessment Stage** which determines the visual impacts and significance of the proposed landscape modifications.

4.1 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.

4.1.1 Scenic Quality

The scenic quality is determined making use of the VRM Scenic Quality Checklist (refer to Annexure D). 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.

4.1.2 Receptor Sensitivity

Receptor Sensitivity levels are a measure of public concern for scenic quality and assessed making use of the Sensitivity Checklist in Annexure D. 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.

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

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

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

4.1.4 Visual Resource Management Classes

These findings are then submitted to a VRM Matrix below. 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 10: 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.

4.1.5 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.

4.2 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.

4.2.1 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.

4.2.2 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).

4.3 Impact Methodology

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

Table 11. 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. • <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> | The predicted life-span of the visual impact: <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> | The magnitude of the impact on views, scenic or cultural resources. <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> | The degree of possibility of the visual impact occurring: <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. |

| | |
|---------------------|--|
| | <ul style="list-style-type: none"> • <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. |

5 BASELINE VISUAL INVENTORY ASSESSMENT

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

5.1 Site Investigation

A field survey was undertaken to inform the landscape and visual impact assessment. During the site visit, photographs were taken from each viewpoint, and the view direction and GPS location captured. The main land-use was documented as well as the nature of the dominant landscape in the vista. In order to represent views of the proposed landscape modification by means of photomontages for assessment purposes, panoramic photographs were also taken from key viewpoints. The site survey locations mapped on the following page in Figure 4. The photographs are located in Annexure A.

Table 12: List of Sampling Sites where Landscape and Aesthetic Survey was Conducted

| ID | Name | Date Time | Bearing | X | Y | Landscape |
|----|---|--------------------|---------|----------|----------|-----------|
| 1 | Eskom powerlines crossing over the N12 National Road | 2021-09-21 8:43:07 | 350 | 22.53722 | -32.4084 | Medium |
| 2 | Droerivier Substation as seen from the N12 National Road | 2021-09-21 8:43:45 | 270 | 22.53728 | -32.4084 | Low |
| 3 | Eskom powerlines crossing the district road linking the N12 to Beaufort West. | 2021-09-21 9:04:34 | 90 | 22.57534 | -32.4055 | Low |
| 5 | Existing Eskom 400kV power line. | 2021-09-21 9:29:05 | 300 | 22.61334 | -32.4041 | Medium |
| 8 | Eskom powerlines crossing the R61 district road. | 2021-09-21 9:49:09 | 110 | 22.6753 | -32.4019 | Medium |

| | | | | | | |
|----|---|---------------------|-----|----------|----------|----------------|
| 9 | View of the escarpment at the Karoo National Park that add landscape character to the region. | 2021-09-21 9:49:14 | 290 | 22.6753 | -32.4019 | Medium to High |
| 11 | PV3 view of flat terrain with sparse vegetation. | 2021-09-21 10:00:41 | 270 | 22.70746 | -32.4011 | Medium to Low |
| 12 | PV3 view of similar flat terrain to the east. | 2021-09-21 10:01:00 | 90 | 22.70748 | -32.4011 | Medium to Low |
| 13 | PV4 site view northeast of flat terrain and escarpment in the background. | 2021-09-21 10:04:58 | 45 | 22.72184 | -32.4003 | Medium to Low |
| 14 | PV4 site view northwest of escarpment in the background that does add some landscape value to the site. | 2021-09-21 10:05:02 | 320 | 22.72179 | -32.4003 | Medium to Low |
| 15 | PV5 site view west of flat terrain and no proximate receptors. | 2021-09-21 10:07:29 | 80 | 22.7328 | -32.3997 | Low |
| 17 | PV2 site view north of the Steenbokkie Private Nature Reserve game fence. | 2021-09-21 10:18:15 | 350 | 22.72394 | -32.375 | Medium |
| 18 | PV2 Site view east along the SBPNR boundary. | 2021-09-21 10:18:23 | 35 | 22.72397 | -32.3751 | Medium |
| 19 | PV1 Site view south at the flat terrain with few landscape features. | 2021-09-21 10:21:29 | 180 | 22.71431 | -32.3801 | Low |
| 20 | PV1 Site view north to the low ridgeline located in the background on SPNR property. Clear views of multiple power lines detract from the sense of place. | 2021-09-21 10:21:33 | 320 | 22.71431 | -32.3801 | Medium to Low |
| 21 | Zoomed view of adjacent traffic travelling on the R61 in the background. | 2021-09-21 10:31:23 | 270 | 22.69922 | -32.3984 | Low |
| 22 | Zoomed view of Beaufort West in background as seen from Site. | 2021-09-21 10:31:34 | 320 | 22.69929 | -32.3984 | Medium to Low |
| 24 | View towards PV project from R61 receptors. | 2021-09-21 10:39:40 | 15 | 22.70037 | -32.4172 | Medium |
| 26 | Photograph of the accommodation at the Steenbokkie Priv. Nat Res. (PNR) | 2021-09-21 11:01:20 | 340 | 22.65803 | -32.3399 | Medium to High |
| 29 | View from Steenbokkie PNR ridgeline towards the proposed PV site with clear views of the 3 Eskom power lines in the foreground. | 2021-09-21 11:21:30 | 120 | 22.6673 | -32.3467 | Medium to Low |

| | | | | | | |
|----|--|------------------------|-----|----------|----------|-----|
| 30 | Close up view of the Eskom power lines located within the Steenbokkie PNV that do detract from the local sense of place. | 2021-09-21 11:21:47 | 120 | 22.66718 | -32.3468 | Low |
|----|--|------------------------|-----|----------|----------|-----|

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:

- No significant landscape features on the proposed development sites with the majority of the site viewed rated Medium to Low for scenic appeal.
- The background views of the great Escarpment do add to the regional scenic quality.
- Landscape resources are being used for tourism, including the Karoo National Park landscapes (Very Low Exposure), and the Steenbokkie Private Nature Reserve (High Exposure)
- Eskom power line infrastructure to the north of the site degrades the local scenic quality (including this portion of the Steenbokkie Private Nature Reserve).
- There are limited High Exposure Receptors due to the rural agricultural context.

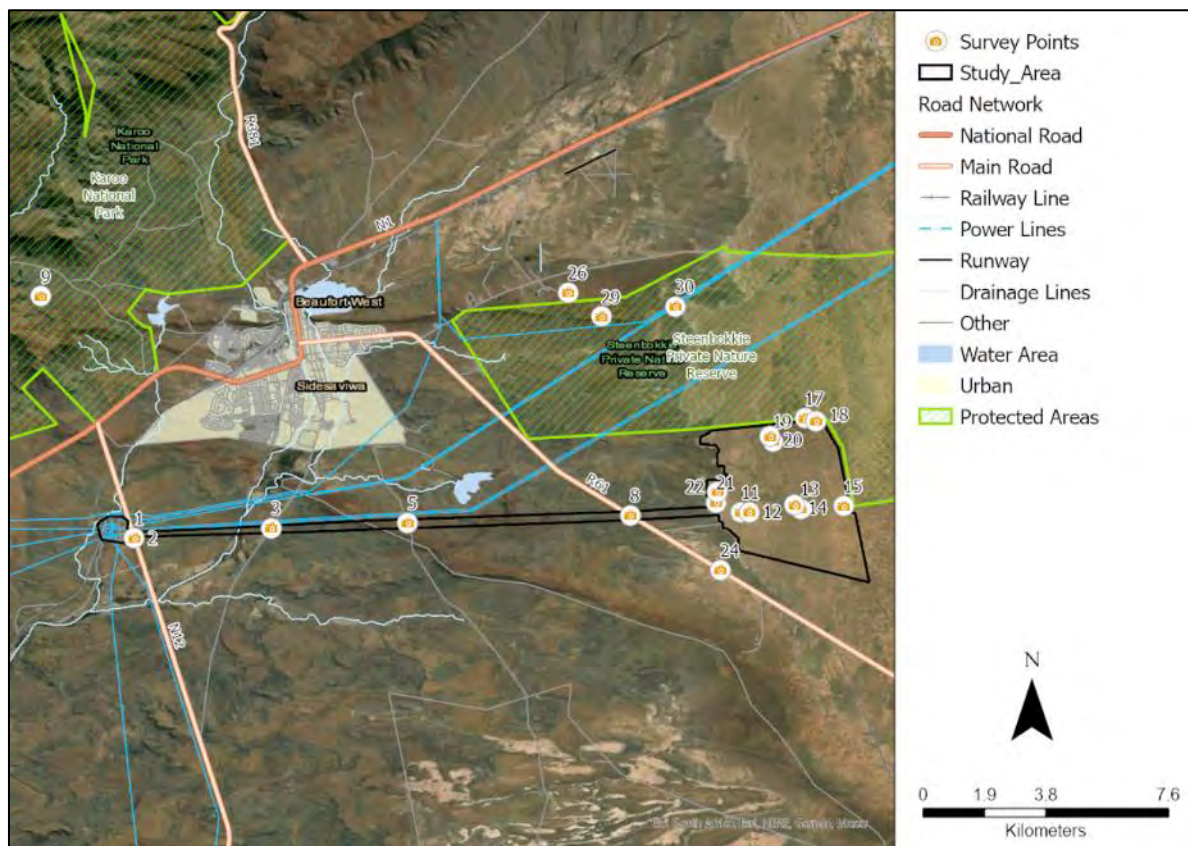


Figure 4: Survey Point Locality Map

5.2 Landscape Context

5.2.1 Regional Locality

The proposed Beaufort West Photovoltaic Solar Power Station is located 11 km east of the town Beaufort West in the Western Cape of South Africa. Within the regional context, the property is located in the Great Karoo stretching 600 km from Calvinia in the west to Cradock in the east, and approximately 600 km from Marydale to the north to Calitzdorp in the south. Beaufort West is the oldest Municipality in South Africa with settlement of the area beginning in the 1740's and extending rapidly in an easterly direction. The Karoo is a vast and diverse arid area which straddles four provinces. The vegetation falls within the Nama Karoo Biome. This consists of Montane Karoo grassy shrublands, Karoo grassy dwarf shrublands, Karoo succulent dwarf shrublands, and riparian thicket. (SanParks, n.d.) The economy in the Karoo has been largely based on extensive sheep and goat farming. Irrigation based agriculture is concentrated along the rivers. The arid areas are sparsely populated, and in some areas, the population density is less than 1 or 2 people per km². During the last fifty years, extensive stock farms have grown even larger. The recent advent of game farming has contributed to this trend, although opportunities in agri-tourism and eco-tourism have created scope for new and more sophisticated types of employment. (<http://www.aridareas.co.za/characteristics.htm>, n.d.)

Existing development has been historically restricted to settlement nodes located close to water resources. The town of Beaufort West lies south of the Nuweveld Mountains range which forms part of the Great Escarpment which divides South Africa into two distinct basins. The town lies between the Gamka and Kuils Rivers (normally dry) and on the outskirts of Beaufort West lies the 75 000 ha Karoo National Park. Here two of South Africa's most highly endangered species, the riverine rabbit and the black rhinoceros have been successfully resettled. (<http://www.beaufortwest.com/>, n.d.) Significant features in the landscape are the escarpment, the inselbergs and the vast open spaces with minimal man-made modifications.

5.2.2 Vegetation

Vegetation type has a large factor in determining the scenic quality or the site in terms of colour and texture, as well as influencing the local ability of the landscape to absorb the landscape change. The following paragraph and mapping outline the broad vegetation biome and type.

According to the South African National Biodiversity Institute 2012 Vegetation Map of South Africa, Lesotho and Swaziland in Figure 5, the Bioregion where the development is proposed is Lower Karoo Bioregion with the Biome described as Nama-Karoo. The SANBI vegetation data reflects two vegetation types, the Southern Karoo Riveriere, and the Gamka Karoo.

It is important to note that the area is arid, with high summer temperature averages. The low rainfall of the region results in vegetation being low in profile, which in relation to the flat terrain creates a uniform vegetated landscape that has a low visual absorption capacity for flatter terrain areas. However, the Sothorn Karoo Riviere is likely to have more vegetation, located to drainage lines. There are areas that are also transformed, such as the N12 road and the existing Droerivier Substation.

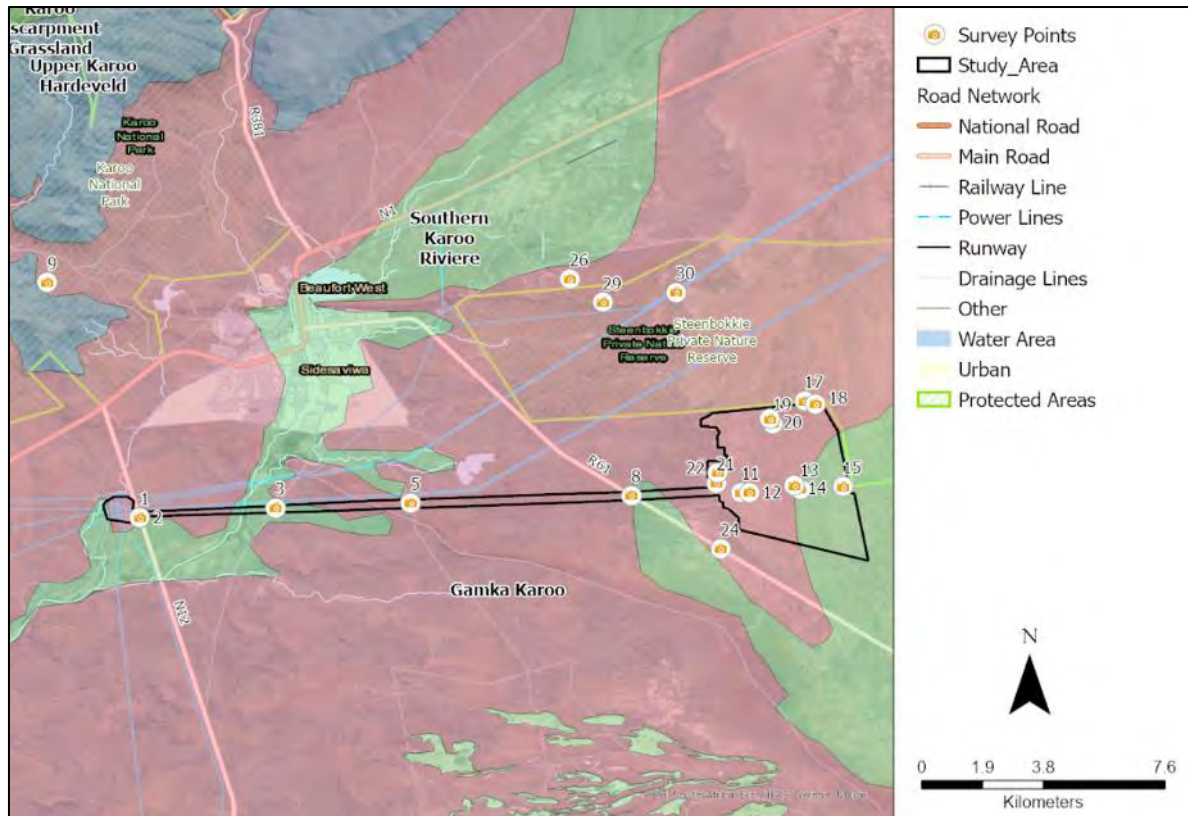


Figure 5. BGIS Vegetation Type Map (South African National Biodiversity Institute, 2018)

5.2.3 Mountain and Hill Features

As depicted in the photograph below, the Great Escarpment of the Great Karoo is visible to the north and reaches approximately 1000m above sea level above the plains to the south of the town of Beaufort West. This creates a significant visual resource which is located in 17km to the north of the corridor.



Figure 6: View of the Great Escarpment as seen from the N1 National Highway.

5.2.4 Infrastructure and Road Access

The N12, the main transport route from George to Beaufort West, runs along the southern Cape coast, linking with the N1 at Beaufort West. This route passes through some of the scenic areas of South Africa and is well used by tourists accessing the southern Cape and Little Karoo. While views that are devoid of man-made structure allow for higher levels of scenic quality, there are areas that are degraded by close proximity to Eskom transmission lines and substations. The section of the road that is crossed by the proposed grid connect,

is in close proximity to the Droerivier Substation, and as such the views are strongly dominated by transmission line infrastructure.



Figure 7: Photograph of N12 scenic route.

With the location of the Eskom Droerivier Substation in the vicinity, a significant number of Transmission Power Lines are located in the area. On the western boundary of the proposed corridor, the routing is along a double 400kV power line corridor. The lattice type structures do assist in reduce the visual intrusion, but the size and scale of the pylons clearly dominate the attention of the casual observer and degrade the local sense of place.



Figure 8: Eskom Droerivier substation and transmission power line corridors.

The other road that the proposed corridor crosses, is the R61, connecting Aberdeen in the east to the regional town of Beaufort West. This is a minor route but is likely to carry some tourist traffic.

5.2.5 Other Renewable Energy Projects

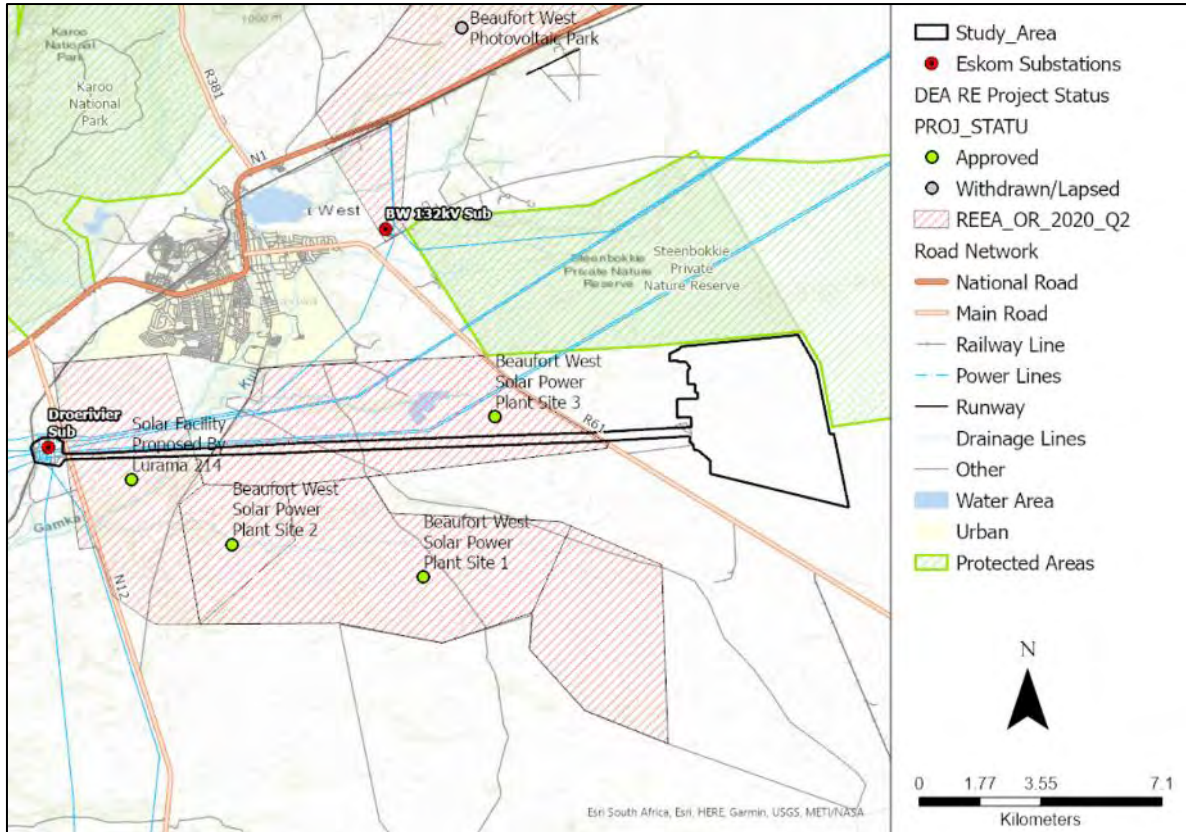


Figure 9: Map depicting DEA REEA Renewable Energy project status.

As identified in Figure 10 above the map above, numerous other projects have been attracted to the site due to the solar energy potential of the region. The Beaufort West Solar Park is indicated on the map with the status lapsed. There are four other solar energy projects located around the town of Beaufort West that have been approved and none of them have been constructed. None are located within the proposed solar park zone of visual influence which reduced the potential for cumulative visual effects from combined views. Located further to the north is the proposed Beaufort West Wind Farm. As this wind farm is located more than 15km to the north, the combined views of the wind farm and the proposed grid connection are unlikely to result in visual clutter. None of the proposed developments that were authorised have been constructed. However, once these projects are developed, it is likely that the existing arid Karoo agricultural landscape will change to one more associated with renewable energy. This change is aligned with National RE policy planning, with the area falling within the Beaufort West REDZ. Care would need to be taken to ensure that areas also used for landscape-based tourism are also protected, where these activities make use of significant visual resources.

5.2.6 Nature and Tourism Activities

As depicted in the map above, two conservation areas are located around the proposed solar park site. The Karoo National Park (KNP) is located approximately 17km to the west, with the Steenbokkie Private Nature Reserve located adjacent to the north. While the Steenbokkie Private Nature Reserve is a minor conservation area, the KNP is a large national protection area and a major tourist attraction for the area. As depicted in the photographs below, the scenic vistas of the park have aesthetic value. However, the transmission line landscape change is well set back from the park and would be viewed with the urban landscape context of Beaufort West in the foreground, increasing the visual absorption capacity.



Figure 10: Karoo National Park (*Source: [www.panoramio.com/Dean Gous](http://www.panoramio.com/Dean_Gous)*)

Located directly to the northeast of the proposed corridor, is the Steenbokkie Private Nature Reserve. The area is a proclaimed conservation area and offers recreational facilities including overnight and caravan accommodation. The reserve also offer walking and trails are posted along the low ridgeline that runs through the site. There is some game enclosed which can be viewed by vehicle. As depicted in Figure 13 two 400kV power lines corridors, each with 2 routings, is located to the east of the conservation area. This does degrade the local sense of place, dominating the attention of the casual observer. The other key factor in protecting the western portion of the conservation area is the low ridgeline aligned north-south through the centre of the property. The accommodation areas are all located to the west of the ridgeline, screening the receptors from the power lines. The ridgeline would also obscure views of the proposed powerline. Views from the hiking path along the ridgeline would allow for clear, medium exposure views of the power line. However, the existing Eskom powerlines located within the foreground do reduce the scenic quality of this eastern vista. As this area does have conservation related receptors who could be sensitive to landscape change, this area would need to be included as a Key Observation Point.



Figure 11: Steenbokkie Private Nature Reserve accommodation area where views of the proposed power lines are topographically screened.



Figure 12: View from the Steenbokkie Private Nature Reserve ridgeline towards the proposed power line routing site with the multiple Eskom power lines in the foreground.

Figure 13 below depicts the location of the power lines in relation to the proposed PV and the Steenbokkie Private Nature Reserve. Also depicted is the boundary of the proposed Beaufort West PV3 development, authorised but not yet built, that will also influence the sense of place of the reserve.

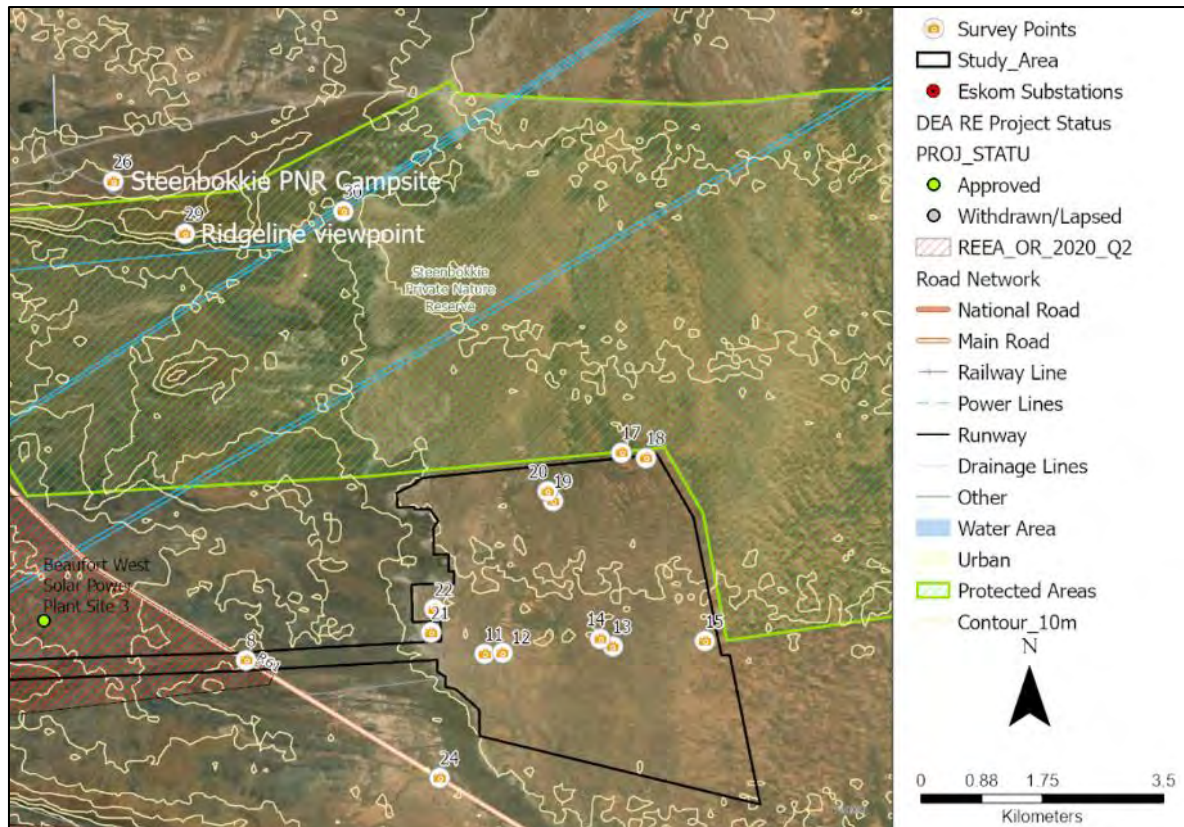


Figure 13: Steenbokkie Private Nature Reserve accommodation centre (Point 26), ridgeline (Point 28), Eskom power lines (Point 30) and other proposed PV developments that could influence the nature reserve sense of place.

5.3 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 below, table 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). The viewshed is strongly associated with the regional topography and as such this topic is address before the viewshed analysis.

5.3.1 Regional Landscape Topography

Making use of the NASA STRM digital elevation model, profile lines were generated for the area within 12km on either side of the project area. The map depicting the terrain model and the profile lines can be view in Figure 14 below. As can be seen in elevation profile drawings on the following page, the terrain is predominantly flat with the zone of visual influence excluding the escarpment located 15 to the northwest. The North to South Profile ranges from 950mamsl in the north, to 875mamsl in the south, a drop in elevation of 75 over 31km. The proposed site is located in the mid-range. Elevated terrain to the south of the

site is likely to reduce the viewshed in this direction. The East to West Profile ranges from 764mamsl in the West to 890mamsl in the East, a change on 126m over the 45km. Elevated terrain to the west is likely to reduce the viewshed in this direction.

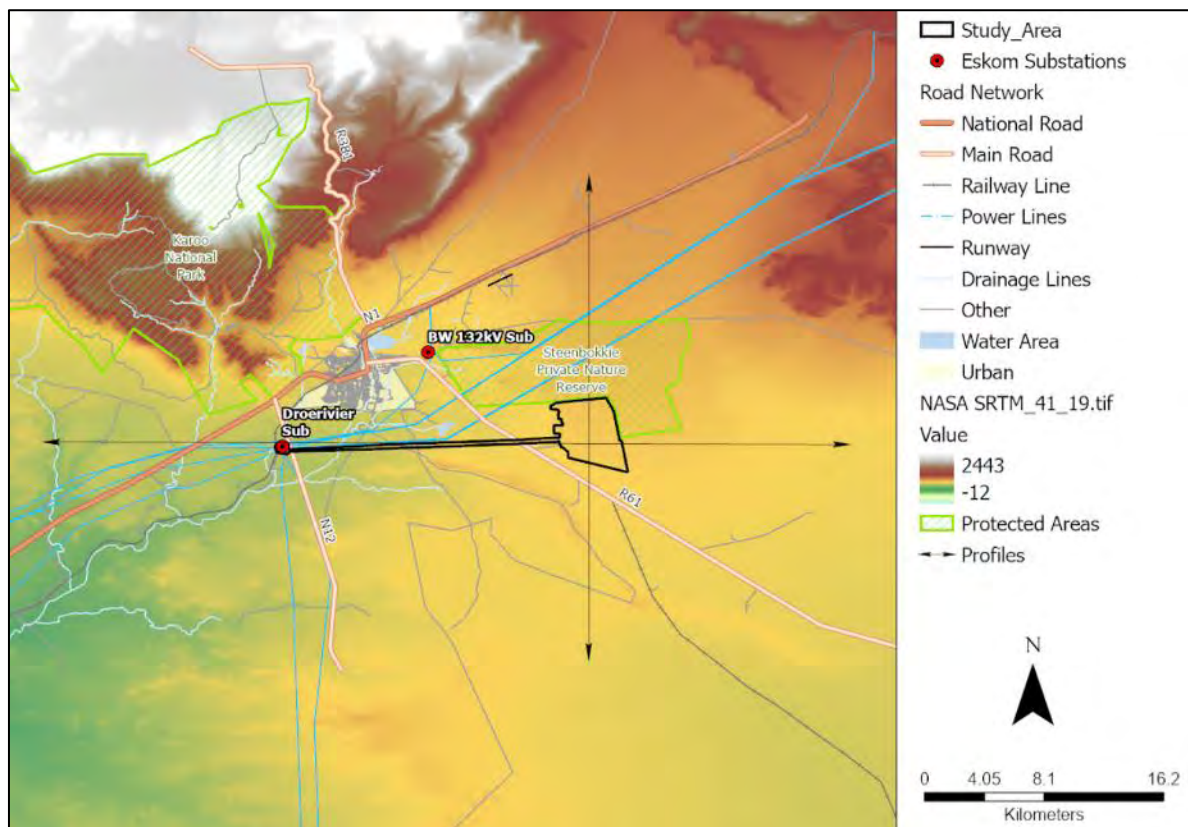


Figure 14: Regional Digital Elevation Model and Profile Line Locality Map

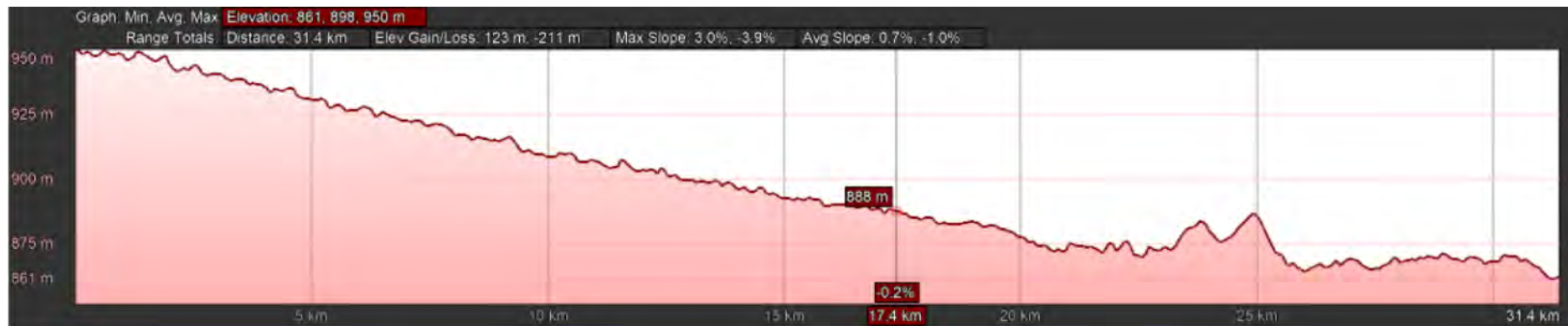


Figure 15: Google Earth North to South Terrain Profile Graph



Figure 16: Google Earth West to East Terrain Profile Graph

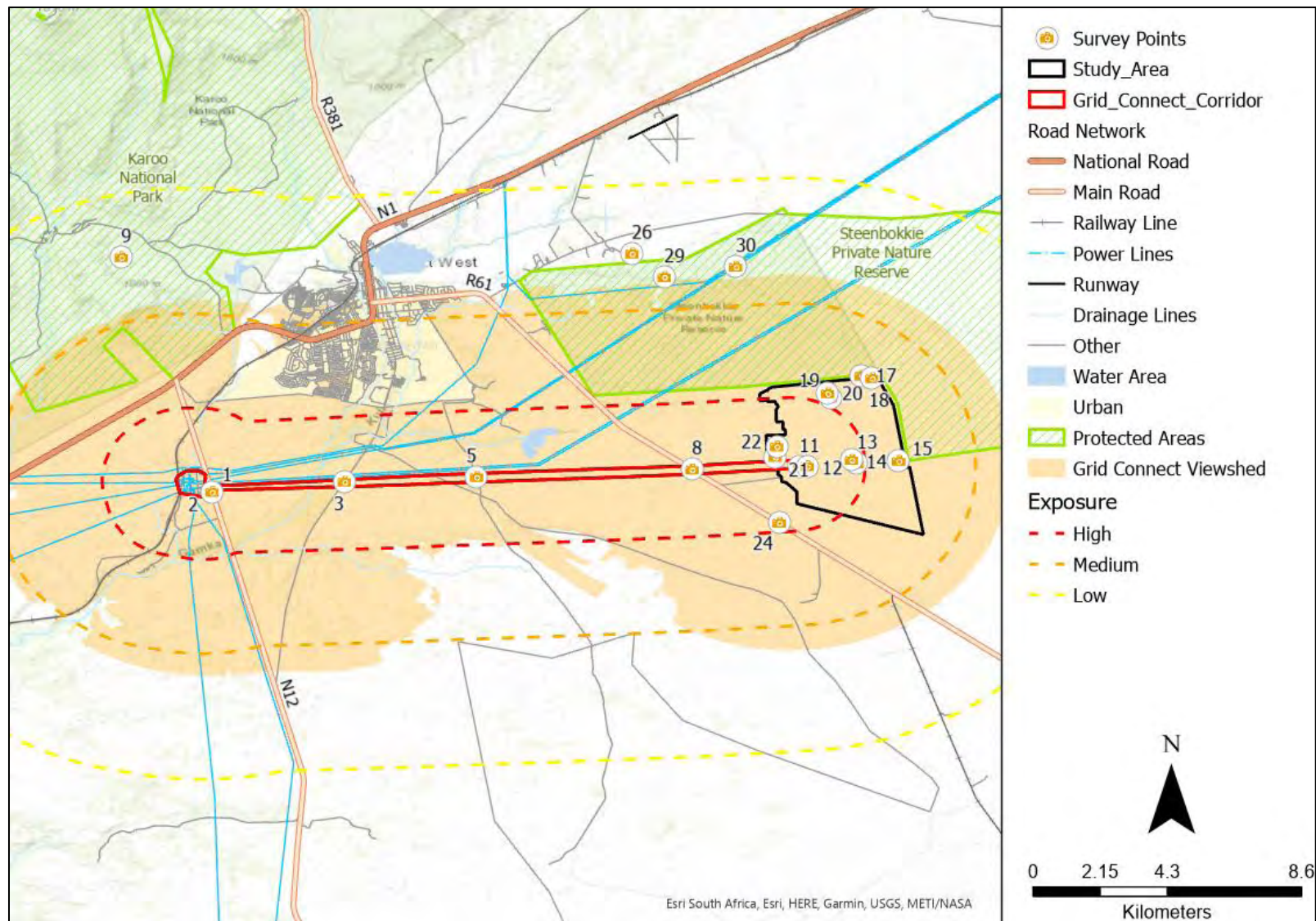


Figure 17: Grid Connect Viewshed with Offset 32m above ground capped at 6km.

5.3.2 Viewshed Analysis

A viewshed analysis was undertaken for the site making use of NASA SRTM 30m Digital Elevation Model data. The Offset value for the landscape modification was set above ground to represent the approximate height of the proposed as reflected in the table below.

Table 13: Proposed Project Heights Table

| Proposed Activity | Approx. Height (m) | Viewshed Cap |
|--------------------|--------------------|--------------|
| Monopole Structure | 32m | 6km |

As can be viewed in, the viewshed is unfragmented but localised in extent. Within the High Exposure 2km area, there are two receptors, namely the R61 to the west and the N12 national road to the east. Due to the fairly contained extent of the viewshed, as well as the higher Visual Absorption Capacity created by the existing Eskom power lines, the Zone of Visual Influence is rated as Medium to Low in extent.

5.4 Receptors and Key Observation Points

As defined in the methodology, KOPs are defined by the Bureau of Land Management as the people (receptors) located in strategic locations surrounding the property that make consistent use of the views associated with the site where the landscape modifications are proposed. The following table identifies the receptors identified within the ZVI, as well as motivates if they have significance and should be defined as KOP for further evaluation in the impact assessment phase. The receptors located within the ZVI, and KOPs view lines are indicated the map on the following page. As motivated below, and mapped in Figure 18 , the following receptors have been identified as Key Observation Points and should be used as locations to assess the suitability of the landscape change:

- N12 National Road (Photo Point 1).
- R61 District Road (Photo Point 8).

Table 14: Receptor and KOP Motivation Table.

| Name | KOP | Motivation |
|-------------------|-----|--|
| N12 National Road | Yes | This is a scenic route linking Beaufort West to the southern Cape tourism. The route has higher levels of scenic resources that would need to be maintained were that are still intact. |
| R61 road | Yes | The R61 is a district road that links the towns of Beaufort West in the west to Aberdeen in the east. While tourist related traffic is unlikely, tourism is important to the regional planning, and view from this route include that of the escarpment. |

6 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.

6.1 Physiographic Rating Units

The Physiographic Rating Units are the areas within the proposed development area that reflect specific physical and graphic elements that define a particular landscape character. These unique landscapes within the project development areas are rated to assess the scenic quality and receptor sensitivity to landscape change, which is then used to define a Visual Resource Management Class for each of the site's unique landscape/s. The exception is Class I, which is determined based on national and international policy / best practice and landscape significance and as such are not rated for scenic quality and receptor sensitivity to landscape change. Based on the SANBI 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 Figure 18 below . The property is currently zoned "Agriculture 1", and the current land use of the proposed properties is agricultural with low intensity sheep farming carried out in this arid environment. Due to the low stock carrying capacity of the karoo vegetation, the farms are large in size. Man-made modifications associated with the sheep farming are isolated farmsteads, farm tracks, fences and water reservoirs. These features are small in scale in the landscape and do not detract from the sense of place. Only a single physiographic region is thus defined.

Table 15: Physiographic Landscape Rating Units.

| Landscapes | Motivation |
|--------------------------------|--|
| Nama-Karoo | Flat terrain with no significant man-made changes to the Nama-Karoo shrubland vegetation. |
| Rivereire Karoo drainage lines | The proposed power line crosses the Gamka River, which is essentially a dry river bed. However, this riverine landscape needs to be excluded from development. |
| Transformed | These areas include the existing Droerivier Substation and sections of the N12 and R61 roads. |
| Road buffer | Portions adjacent to the above road view corridors where landscape change needs to be moderated to maintain the rural sense of place. |

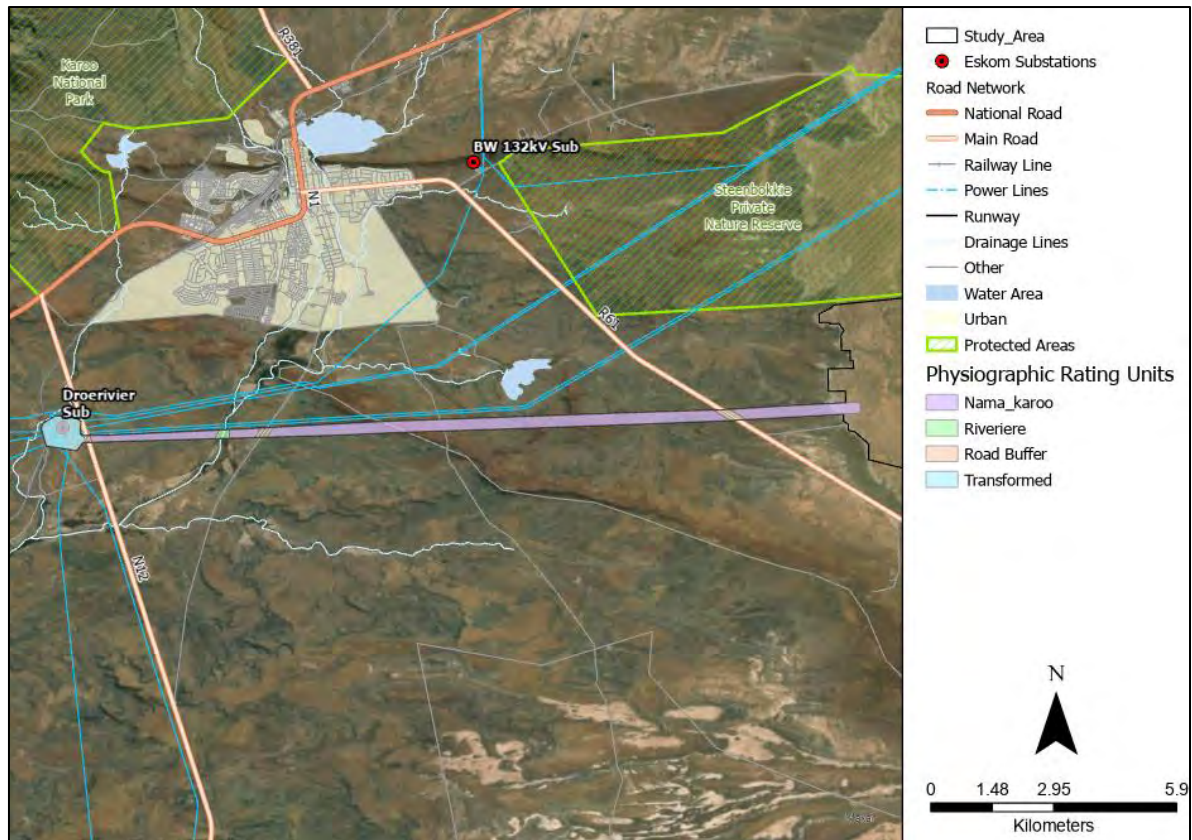


Figure 18: Site Satellite Image Map depicting the Physiographic Rating Units.

Table 16: Scenic Quality and Receptor Sensitivity Rating.

| Landscape Rating Units | Scenic Quality | | | | | | | | | Receptor Sensitivity | | | | | | VRM | |
|---------------------------------------|--|------------|-------|--------|----------|--------------------|------------------------|-----|--------|-------------------------------|---------------|-----------------|--------------------|---------------|--------|-----------------|------------------|
| | A= scenic quality rating of ≥19; B = rating of 12 – 18, C= rating of ≤11 | | | | | | | | | H = High; M = Medium; L = Low | | | | | | | |
| Attribute | Landform | Vegetation | Water | Colour | Scarcity | Adjacent Landscape | Cultural Modifications | Sum | Rating | Type of Users | Amount of Use | Public Interest | Adjacent Land Uses | Special Areas | Rating | Inventory Class | Management Class |
| Ecological Sensitive (Gamka River) | (Class I is not rated) | | | | | | | | | | | | | | | I | I |
| Agriculturally transformed Nama-Karoo | 1 | 1 | 1 | 2 | 1 | 2 | 0 | 8 | C | M | L | L | L | L | M | IV | III |
| Road View Corridor Buffers (50m) | 1 | 1 | 1 | 2 | 1 | 2 | 0 | 8 | C | M | H | M | L | H | M | IV | II |
| Substation Transformed | 1 | 1 | 1 | 1 | 0 | 2 | -2 | 4 | C | M | H | L | L | L | L | 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.

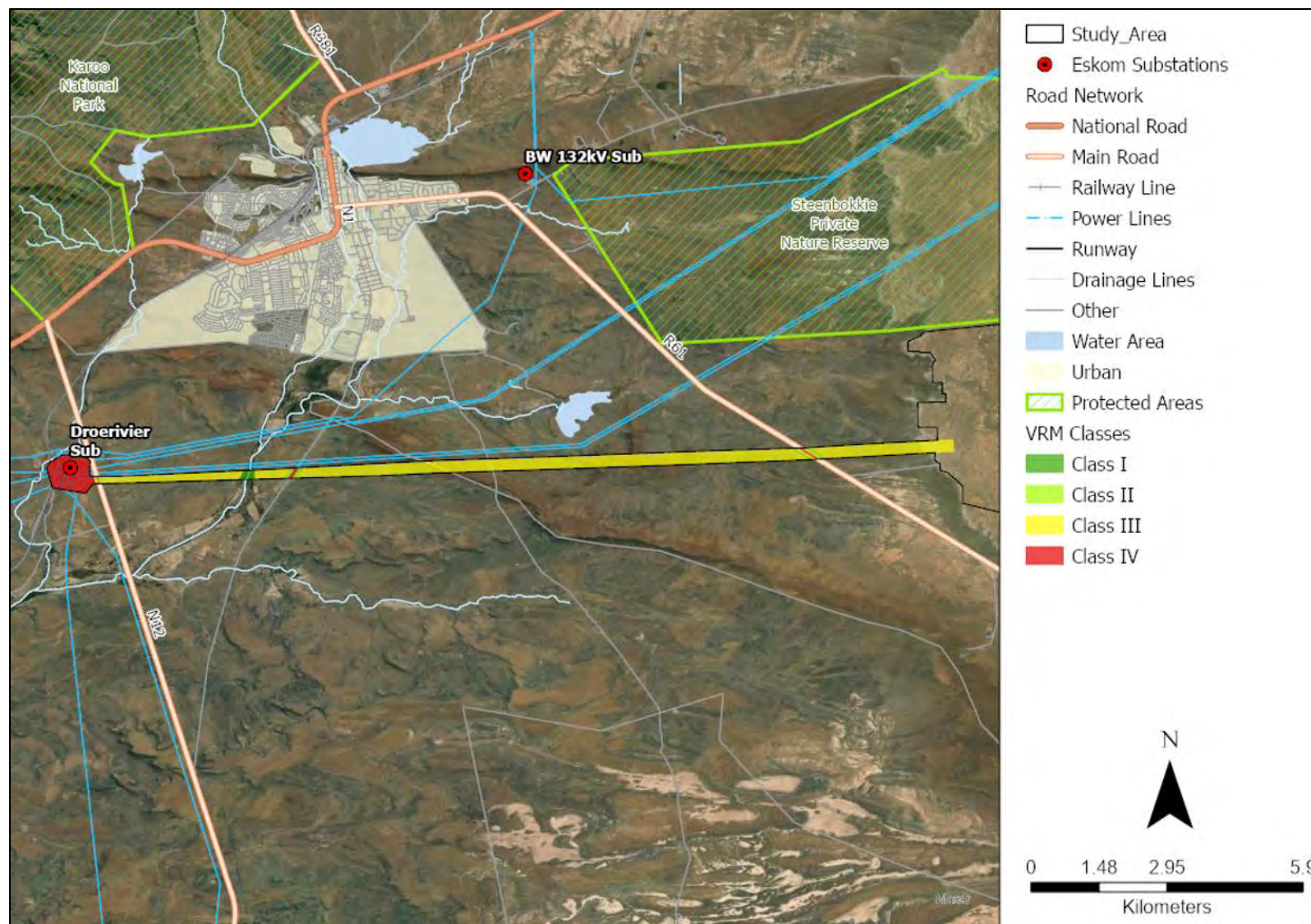


Figure 19: Visual Resource Management Class Map.

6.2 Scenic Quality Assessment

The scenic quality of the portions of the site transformed by agriculture is rated **Low**. This is due to the flat terrain that has limited water features, vegetation is limited and associated colours fairly uniform. With the exception of the Gamka River crossing, the landscape is not a scarce visual resource and is degraded by agricultural practice. The value elements is the Adjacent Scenery, which includes the escarpment that does have scenic value. The overall sense of place is that of a rural, arid agricultural landscape that does not offer much in terms of scenic resources. The close proximity to the existing Eskom power line and substation to the west of the routing, also significantly degrade the local scenic quality.

6.3 Receptor Sensitivity Assessment

Receptor sensitivity to landscape changes is rated **Low**. Due to the lower scenic quality and existing Eskom power line context, it is likely that receptor sensitivity to the proposed landscape change would be Low. While the Steenbokkie PNR does fall within the ZVI, the Exposure is Low, and the views already include the Eskom power line context. Other than the Gama River crossing, there are no areas that could be classified as having legislative protection as a Special Areas. However, the roads accessing Beaufort West should be considered a tourist view corridors, and as such have been assigned a higher ratings as a special area.

6.4 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

6.4.1 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. This includes the portions where the proposed routing crosses the Gamka River, which would need to be excluded from the development footprint as per the Surface Water Specialist recommendations.
- 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.

6.4.2 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.

- R61 Road Buffer (50m).
- Beaufort West Gravel Road Buffer (50m).
- N12 Road Buffer (50m).

As tourism has been highlighted in local and regional planning as important, the road access to Beaufort West should be protected as view corridors.

6.4.3 VRM Class III

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

- Nama Karoo.

As mapped in Figure 19 above, 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 Nama-Karoo 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. For this reason, care would need to be taken to protect the existing views as seen from the two road crossings, which could have tourist related traffic.

6.4.4 VRM Class IV

The Class IV objective is to provide for management activities that require major modifications of the existing character of the landscape. Due to the degraded sense of place, the following areas were rated Class IV:

- Droerivier Substation and direct surrounds.

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. While the roads have been identified as Class IV due to their transformed nature, these areas would not fall within the development area.

7 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.

7.1 Contrast Rating

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 in a landscape primarily defined by lower levels of scenic quality, no photomontages were generated for this Basic Assessment. . Photo depictions of the expected location of where the landscape change would take place are reflected on the following pages.

Table 17: Contrast Rating Key Observation Points for VRM Class IV areas.

| | Exposure | | | Landscape Elements | | | | | |
|-----------------------|----------|----------|------------|--------------------|------|--------|---------|--------------------|------------------------|
| Key Observation Point | Distance | Exposure | Mitigation | Form | Line | Colour | Texture | Degree of Contrast | Visual Objectives Met? |
| N12 National Road | 0m | High | W/Out | S | S | M | M | M | No |
| | | | With | M | M | W | M | M | Yes |
| R61 District Road | om | High | W/Out | S | S | M | M | W | No |
| | | | With | M | M | W | M | W | Yes |

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

The strong Degree of Contrast for Form and Line related to the monopoles that are solid and create a strong vertical form if they are located in close proximity to receptors. Over time, the texture and colour will grey out rendering these elements less dominating. In order to meet the Class II Visual Objective, set for the road buffers, a setback from the road needs to be implemented, to ensure that some distance is created between the road receptors and the

location of the proposed monopoles. With this mitigation, the Visual Objectives would be met for both the road receptors.



Figure 20: View west towards the proposed N12 road crossing with the Eskom power lines in the background.



Figure 21: View southeast towards the proposed R61 road crossing.

7.2 Nature of the visual impact

7.2.1 Grid Connect Infrastructure

The following visual impacts could take place during the lifetime of the **proposed grid connection** project:

Construction Phase:

- Loss of site landscape character due to the removal of vegetation and the construction of the grid connection infrastructure.
- Possible soil erosion from temporary roads crossing drainage lines.
- Windblown litter from the laydown and construction sites.

Operation Phase:

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

Decommissioning Phase:

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

Cumulative Effects:

- Change to local sense of place from cumulative inter-visibility of multiple power lines.

Reversibility

Due to the limited necessity for major earthworks in the construction of the grid connection, impacts associated with the proposed project are defined as **Reversible**. The existing agricultural landscape could be re-established to some degree with the removal of all the monopoles and substation. It is likely that natural vegetation would re-establish over time.

Confidence

The impact ratings were defined as **Sure** as sufficient information was provided regarding the nature of the landscape modification in relation to the main key observation points.

Table 18: Grid Connection Impact Table

| Phase | Mitigation | Nature | Extent | Duration | Magnitude | Probability | Significance without | Significance with |
|------------|------------|--------|--------|----------|-----------|-------------|----------------------|-------------------|
| Cons. | W/Out | -ve | Local | Short | Med | P | Med | |
| | With | -ve | Local | Short | Low | P | | Low |
| Ops. | W/Out | -ve | Local | Long | Med | P | Med | |
| | With | -ve | Local | Long | Low | P | | Low |
| Close | W/Out | -ve | Local | Short | Med | P | Med | |
| | With | -ve | Local | Short | Low | P | | Low |
| Cuml. Risk | W/Out | -ve | Local | Long | Low | P | Low | |
| | With | -ve | Local | Long | Low | P | | Low |

7.2.2 Nature of the Impact

The nature of the landscape change rated **Negative**. The proposed grid connection has the potential to generate higher levels of colour, form, texture and line contrast to the existing agricultural landscape. In the No-Go option the area is rated **Low Positive** as the agricultural landscape does add to the rural sense of place.

7.2.3 Extent of the Impact

Due to the flat terrain around the site, in relation to the height of the proposed Monopoles the Extent of the project is rated **Local**, pre and post mitigation. The Visual Extent of the status quo property is rated Local, as the properties are remote with limited views from surrounding areas.

7.2.4 Duration of the Impact

The Construction and Decommissioning Phases are rated Short Term the development/deconstruction is likely to be concluded within one years. Operation Phase is rated Long-Term as the project is likely to remain in the landscape for 20 years. Duration of the No-Go impacts of the rural landscape of the No-Go Option are expected to be Long-term as some active farm management is taking place on the properties.

7.2.5 Magnitude of the Impact

The Magnitude of the grid connection Construction and Decommissioning is rated Medium before mitigation, as dust generated from the removal of the vegetation has the potential to become a nuisance factor in the region. With management of wind blown and vehicle dust, the Magnitude of the impact would be reduced to Low for these phases. For Operational Phases, the Magnitude is rated Medium without mitigation, reducing to Low with mitigation. This is due to set back on the roads, where the placement of the monopoles would be outside the 50m buffer on either side of the road.

7.2.6 Probability of the Impact

Probability of the visual impacts taking place is defined as Probable. The proposed project is large in scale and will be noticeable to some degree within the local area, but with the intensity of the landscape change varying in relation to the mitigation applied.

7.2.7 Confidence of the Impact

The impact ratings for the Preferred Alternative were defined as Certain as sufficient information was provided regarding the nature of the landscape modification in relation to the main key observation points. Due to the lack of knowledge regarding the future changes to the status quo, the confidence was rated Unsure

7.2.8 Reversibility of the Impact

Due to the limited necessity for major earthworks in the construction of the grid connection, the landscape change was defined as Reversible, as the existing agricultural landscape could be re-established to some degree with the removal of all the panels. It is likely that natural Nama-Karoo vegetation would re-establish over time.

7.2.9 Resource Irreplaceability of the Impact

The existing property is not degraded but has no resource significance as the terrain is flat, there are no obvious drainage lines and vegetation is homogenous. The nearest visual resource is the escarpment which is located 17km and outside of the project ZVI.

7.2.10 Mitigability of the Impact

Retaining a 25m buffer area from the road would assist in reducing the intensity of the monopole's views to some degree. However, this is unlikely to significantly reduce the moderated intensity views as seen from the road receptors who are located in close proximity to the landscape change. Mitigability is thus defined as Medium.

7.2.11 Visual Significance of the Impact

The Significance of the Visual Impact for all Phases is rated Medium without mitigation, and Low with Mitigation. Dust and erosional impacts can be effectively mitigated, and the 50m setback from the roads would assist in reducing the intensity of the monopoles to some degree. The landscape change will be clearly noticed by the receptors with limited potential for screening. However, the Significance is moderated by the lower scenic quality of the site and immediate surrounding landscapes, that do include High Exposure Views of multiple Eskom power lines.

The Visual Impact Significance of the No-Go option is rated Low, as the visual resources of the existing area are low with limited influence on regional scenic quality.

7.2.12 Cumulative Impact Assessment

Negative cumulative effects are mainly related to the degradation of the surrounding landscapes due to higher visual contrast generated by structural intrusion and visual massing where large power lines are viewed from a single location. In these instances, the sense of place in the landscape can be dominating, degrading the surrounding visual resources. If these visual resources are utilised for eco-tourism activities, land use conflict can occur.

Within the proposed project zone of visual influence, the landscape character is mainly dominated by flat rural agricultural landscape with limited visual resources. The Cumulative visual risk to scenic resources was rated **Low negative** with little opportunity for mitigation. As the area is already defined as a power line corridor, the combined views of the multiple solar facilities, once constructed, are unlikely to create a strong, *local* visual massing effect within the agriculturally zoned area. The project is located within the REDZ11 area, where renewable energy projects of scale would be acceptable. With successful rehabilitation of the area back to an agricultural land use on closure, the cumulative visual risk could be reduced to **negligible in the long term**.

8 ENVIRONMENTAL MANAGEMENT PLAN

8.1 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.

8.2 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.

8.3 Closure Phase

- Structures should be taken down (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.

9 OPPORTUNITIES AND CONSTRAINTS

9.1 Grid Connect Project

9.1.1 Opportunities

- The relatively small size of the monopoles creates limited visual contrast outside of High Exposure Zones.
- The multiple Eskom power lines to the north of the site degrade the local sense of place to some degree, increasing the Visual Absorption Capacity of the landscape.
- Receptor sensitivity to landscape change is expected to be Low due to the limited visual resources of the site and surrounds, and the existing power line landscape context.
- Potential for Low magnitude visual impact.
- National energy objectives for renewable energy and job creation will be met with the site located within the REDZ11 area.
- Good alignment with regional and local planning.

9.1.2 Constraints

- The close proximity to the R61 and N12 roads that are likely to change the sense of place to some degree, recognising that the existing Eskom power line already dominate the site sense of place.

9.2 No-Go Option

9.2.1 Opportunities

- The current rural agricultural land uses of the property does add to the regional sense of place, due to the remoteness of the locality.
- Agricultural productivity from low intensity sheep farming requiring some employment opportunities.

9.2.2 Constraints

- The greater landscape is associated with Eskom power line landscape, limiting tourist-based activities.
- The property visual resources are limited with Low existing scenic resources.

- National energy objectives for renewable energy and job creation will not be met.
- Limited water resources in the could reduce the productivity of the agricultural landscapes.

10 CONCLUSION

It is the recommendation that the proposed grid connect project should be authorised WITH Mitigation. The following key reasons provide the motivation:

1. The site visual resources are limited with a Low rating for Scenic Quality and Low rating for Receptor Sensitivity to landscape change.
2. The ZVI is contained to some degree by elevated terrain to the north and south. This would result in a moderate zone of visual influence, with the small size of the monopoles creating limited visual contrast.
3. There are no landscape-based tourism activities located within the project ZVI.
4. National energy objectives for renewable energy and job creation will be met with the site located within the REDZ11 area and there is a good alignment with regional and local planning.

Mitigation is required and would need to be implemented. With mitigation, the benefits of the grid connect landscape change are likely to outweigh the landscape status quo, where scenic resources are limited. The area falls with the Beaufort West REDZ, and there is a strong alignment to the planning.

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12 ANNEXURE A: SITE VISIT PHOTOGRAPHS AND COMMENTS

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

OBJECTID 1

Name Grid crossing over the N12 National Road

Date/Time 9/21/2021 8:43:07 AM

Bearing 350

X 22.537223

Y -32.408383

Landscape Medium



OBJECTID 2

Name Droerivier Substation as seen from the N12 National Road

Date/Time 9/21/2021 8:43:45 AM

Direction 270

X 22.537275

Y -32.408367

Landscape Low



OBJECTID 3

Name Grid connect crossing over a district road linking the N12 to Beaufort West.

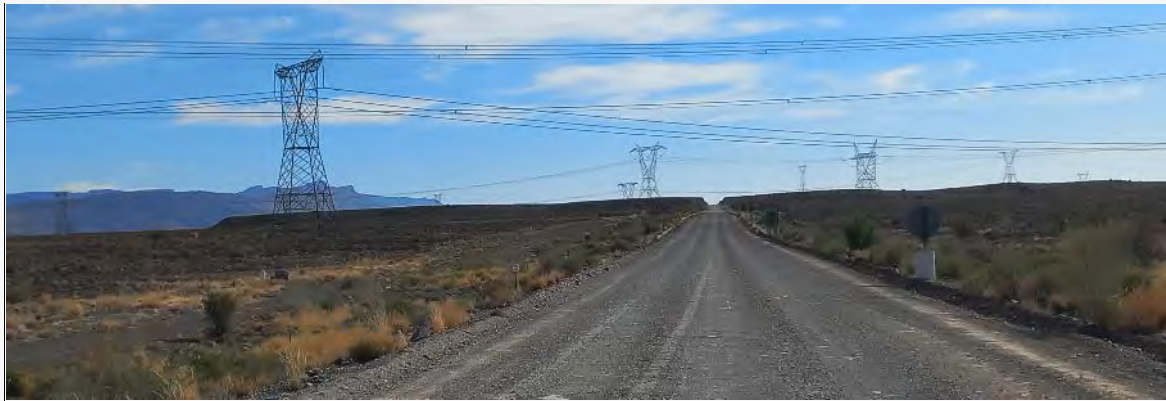
Date/Time 9/21/2021 9:04:34 AM

Direction 90

X 22.575335

Y -32.405477

Landscape Low



OBJECTID 5

Name Grid connect routed adjacent to existing Eskom 400kV power line.

Date/Time 9/21/2021 9:29:05 AM

Direction 300

X 22.613338

Y -32.404115

Landscape Medium



OBJECTID 8

Name Grid connect crossing the R61 district road.

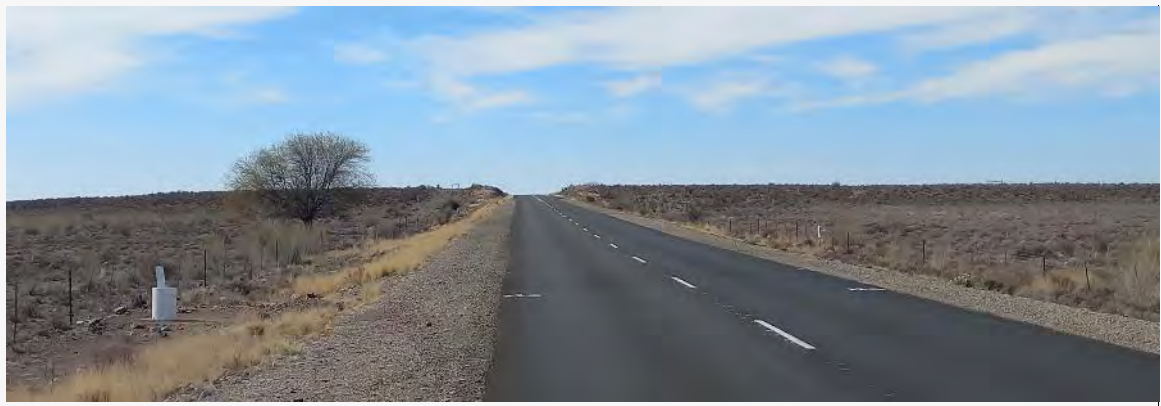
Date/Time 9/21/2021 9:49:09 AM

Direction 110

X 22.675301

Y -32.401916

Landscape Medium



OBJECTID 9

Name View of the escarpment from the Karoo National Park that adds landscape character to the region.

Date/Time 9/21/2021 9:49:14 AM

Direction 290

X 22.6753

Y -32.401918

Landscape Medium to High



OBJECTID 11

Name PV3 view of flat terrain with sparse vegetation.

Date/Time 9/21/2021 10:00:41 AM

Direction 270

X 22.707458

Y -32.401123

Landscape Medium to Low



OBJECTID 12

Name PV3 view of similar flat terrain to the east.

Date/Time 9/21/2021 10:01:00 AM

Direction 90

X 22.707477

Y -32.401115

Landscape Medium to Low



OBJECTID 13

Name PV4 site view northeast of flat terrain and escarpment in the background.

Date/Time 9/21/2021 10:04:58 AM

Direction 45

X 22.721838

Y -32.400288

Landscape Medium to Low



OBJECTID 14

Name PV4 site view northwest of escarpment in the background that does add some landscape value to the site.

Date/Time 9/21/2021 10:05:02 AM

Direction 320

X 22.721795

Y -32.400255

Landscape Medium to Low



OBJECTID 15

Name PV5 site view west of flat terrain and no proximate receptors.

Date/Time 9/21/2021 10:07:29 AM

Direction 80

X 22.732798

Y -32.399665

Landscape Low



OBJECTID 17

Name PV2 site view north of the Steenbokkie Private Nature Reserve game fence.

Date/Time 9/21/2021 10:18:15 AM

Direction 350

X 22.723943

Y -32.37501

Landscape Medium



OBJECTID 18

Name PV2 Site view east along the SBPNR boundary.

Date/Time 9/21/2021 10:18:23 AM

Direction 35

X 22.723973

Y -32.375065

Landscape Medium



OBJECTID 19

Name PV1 Site view south at the flat terrain with few landscape features.

Date/Time 9/21/2021 10:21:29 AM

Direction 180

X 22.714308

Y -32.380065

Landscape Low



OBJECTID 20

Name PV1 Site view north to the low ridgeline located in the background on SPNR property. Clear views of multiple power lines detract from the sense of place.

Date/Time 9/21/2021 10:21:33 AM

Direction 320

X 22.714305

Y -32.380072

Landscape Medium to Low



OBJECTID 21

Name Zoomed view of adjacent traffic travelling on the R61 in the background.

Date/Time 9/21/2021 10:31:23 AM

Direction 270

X 22.699223

Y -32.398396

Landscape Low



OBJECTID 22

Name Zoomed view of Beaufort West in background as seen from Site.

Date/Time 9/21/2021 10:31:34 AM

Direction 320

X 22.699292

Y -32.398388

Landscape Medium to Low



OBJECTID 24

Name View towards PV project from R61 receptors.

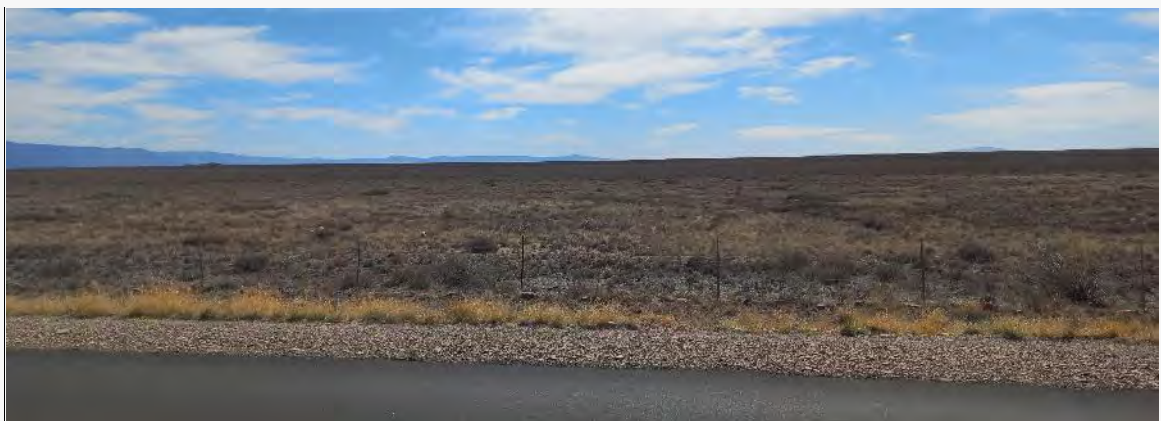
Date/Time 9/21/2021 10:39:40 AM

Direction 15

X 22.700371

Y -32.417229

Landscape Medium



OBJECTID 26

Name Photograph of the accommodation at the Steenbokkie Private Nature Reserve.

Date/Time 9/21/2021 11:01:20 AM

Direction 340

X 22.658028

Y -32.339893

Landscape Medium to High



OBJECTID 29

Name View from Steenbokkie PNR ridgeline towards the proposed PV site with clear views of the 3 Eskom power lines in the foreground.

Date/Time 9/21/2021 11:21:30 AM

Direction 120

X 22.667297

Y -32.346653

Landscape Medium to Low



OBJECTID 30

Name Close up view of the Eskom power lines located within the Steenbokkie PNV that do detract from the local sense of place.

Date/Time 9/21/2021 11:21:47 AM

Direction 120

X 22.667182

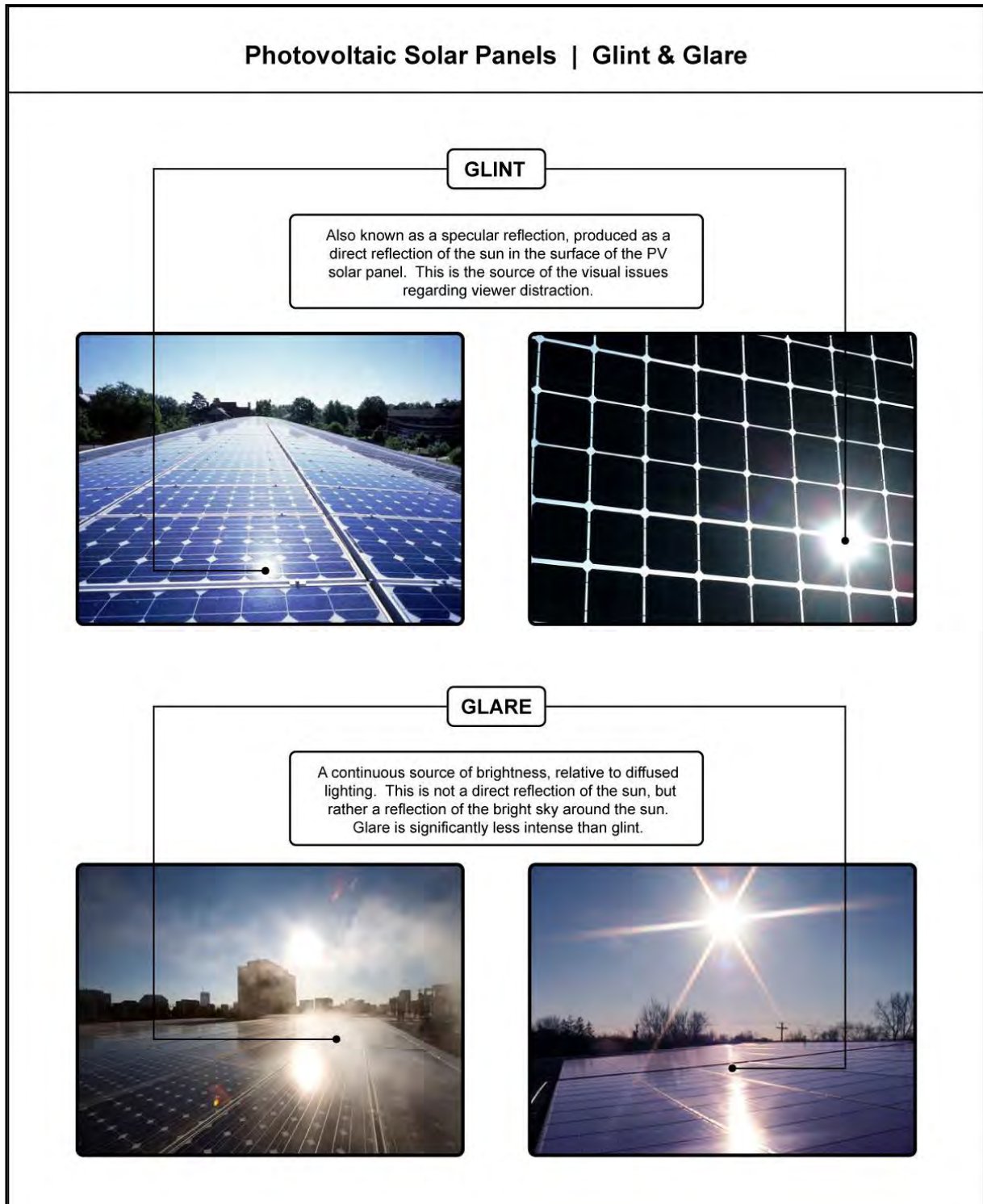
Y -32.346755

Landscape Low



13 ANNEXURE B: GLINT AND GLARE

This study does not include the impact of Glint and Glare. Diagram illustrating the potential effect of Glint and Glare from 'Sacramento Solar Highways Initial Study and Mitigated Negative Declaration.' (Sacramento Municipal Utility District)



14 ANNEXURE C: SPECIALIST INFORMATION

14.1 Professional Registration Certificate

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 eight years and has successfully established and retained a large client base throughout Southern Africa which include amongst other, Rio Tinto (Pty) Ltd, Bannerman (Pty) Ltd, Anglo Coal (Pty) Ltd, Eskom (Pty) Ltd, 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 19: VRM Africa Projects Assessments Table

| YEAR | NAME | DESCRIPTION | LOCATION |
|------|-------------------------------------|-----------------|--------------------|
| 2022 | Sea Vista St Francis Bay | Resort | Eastern Cape (SA) |
| 2022 | Hoekplaas Wind | Wind Energy | Western Cape (SA) |
| 2022 | Houthaalboomen PV | Solar Energy | North West (SA) |
| 2022 | Pofadder Wind x 3 | Wind Energy | Northern Cape (SA) |
| 2022 | Lunsklip Wind Amend | Wind Energy | Western Cape (SA) |
| 2022 | Lunsklip Wind Grid Connect | Power line | Western Cape (SA) |
| 2022 | Elandsfontein PV | Solar Energy | North West (SA) |
| 2022 | Erf 1713 1717 UISP | Settlement | Western Cape (SA) |
| 2022 | Roan PV x 2 | Solar Energy | North West (SA) |
| 2021 | Avondale Gordonias 132kV Power Line | Infrastructure | Northern Cape (SA) |
| 2021 | Maitland Mines Wedding Venue | Resort | Eastern 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 | Wolvedans Megadump Facility | Mining | Mpumalanga (SA) |
| 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 (Kwanogaba) | 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 | Dyassonsklip and Sirius Grid TX | Solar Energy | Northern Cape (SA) |
| 2015 | Dyassonsklip 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 Desalinisation 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 Pantom Pass Substation | Substation /Tx lines | Western Cape (SA) |
| 2013 | Frankfort Paper Mill | Plant | Free State (SA) |
| 2013 | Gibson Bay Wind Farm Transmission lines | Tranmission 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 | Stonehouse Development | Residential | Western Cape (SA) |
| 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 Liquified 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 Apeal | 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 | Trekkopje Uranium Mine | Mining | Namibia |
| 2007 | Weldon Kaya | Residential | Western Cape (SA) |
| 2006 | Farm Dwarsweg 260 | Residential | Western Cape (SA) |
| 2006 | Fynboskruin Extention | 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 | Trekkopje Desalination Plant | Structure Plant | Namibia (SA) |
| 1995 | Greater Durban Informal Housing Analysis | Photogrametry | KwaZulu-Natal (SA) |

15 ANNEXURE D: VRM CHECKLISTS AND TERMINOLOGY

Table 20: 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 21: 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 22: VRM Terminology Table

| FORM | LINE | COLOUR | TEXTURE |
|----------------|---|---------|--|
| Simple | Horizontal | | Smooth |
| Weak | Vertical | | Rough |
| Strong | Geometric | | Fine |
| Dominant | Angular | | Coarse |
| Flat | Acute | | Patchy |
| Rolling | Parallel | | Even |
| Undulating | Curved | Dark | Uneven |
| Complex | Wavy | Light | Complex |
| Plateau | Strong | Mottled | Simple |
| Ridge | Weak | | Stark |
| Valley | Crisp | | Clustered |
| Plain | Feathered | | Diffuse |
| Steep | Indistinct | | Dense |
| Shallow | Clean | | Scattered |
| Organic | Prominent | | Sporadic |
| Structured | Solid | | 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 E: GENERAL LIGHTS AT NIGHT MITIGATIONS

Mitigation:

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

Mesopic Lighting

Mesopic vision is a combination of photopic vision and scotopic vision in low, but not quite dark, lighting situations. The traditional method of measuring light assumes photopic vision and is often a poor predictor of how a person sees at night. The light spectrum optimized for

mesopic vision contains a relatively high amount of bluish light and is therefore effective for peripheral visual tasks at mesopic light levels. (CIE, 2012)

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

'Good Neighbour – Outdoor Lighting'

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

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

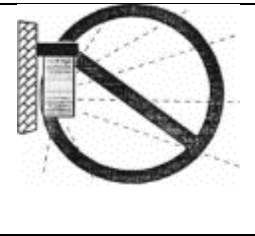
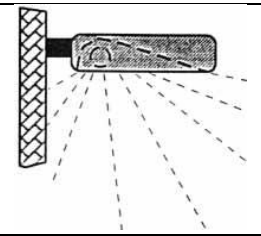
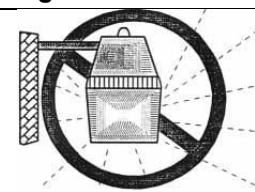
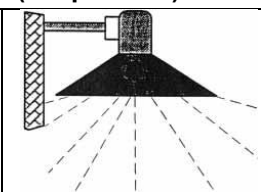
Why should we be concerned? Many outdoor lights are poorly designed or improperly aimed. Such lights are costly, wasteful, and distractingly glary. They harm the night-time environment and neighbours' property values. Light directed uselessly above the horizon creates murky skyglow — the "light pollution"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

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

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

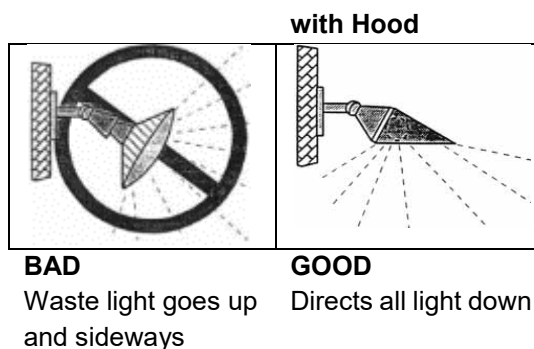
Energy Waste Many outdoor lights waste energy by spilling much of their light where it is

Good and Bad Light Fixtures

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

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.



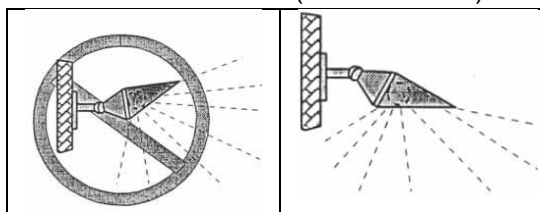
How do I switch to good lighting?

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-cut-off shielded" fixtures that keep light from going uselessly up or sideways. Full-cut-off fixtures produce minimum glare. They create a pleasant-looking environment. They increase safety because you see illuminated people, cars, and terrain, not dazzling bulbs.
- Install fixtures carefully to maximize their effectiveness on the targeted area and minimize their impact elsewhere. Proper aiming of fixtures is crucial. Most are aimed too high. Try to install them at night, when you can see where all the rays actually go. Properly aimed and shielded lights may cost more initially, but they save you far more in the long run. They can illuminate your target with a low-wattage bulb just as well as a wasteful light does with a high-wattage bulb.
- If colour discrimination is not important, choose energy-efficient fixtures utilising yellowish high-pressure sodium (HPS) bulbs. If "white" light is needed, fixtures using compact fluorescent or metal-halide (MH) bulbs are more energy-efficient than those using incandescent, halogen, or mercury-vapour bulbs.

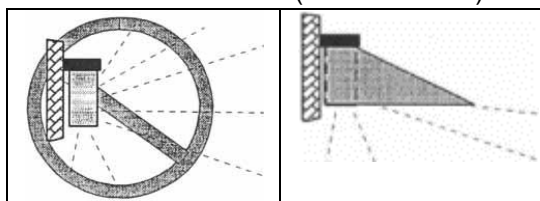
What You Can Do To Modify Existing Fixtures

Change this . . . to this
(aim downward)



Floodlight:

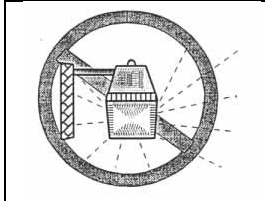
Change this . . . to this
(aim downward)



Wall Pack

- 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!

Change this . . .



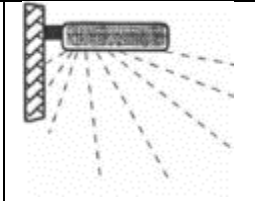
Yard Light

to this



Opaque Reflector

or this



Show Box

Replace bad lights with good lights.

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