K2022578692 South Africa (Pty) Ltd

Solar Photovoltaic (SPV) Facility, Rhino SPV on the Remainder of Farm Rhenosterkop and Sunnyside SPV on Farm 400 near Beaufort West, Western Cape Province

Visual Impact Assessment Report

Report Prepared by: SRK Consulting (South Africa) (Pty) Ltd
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EXECUTIVE SUMMARY

K2022578692 South Africa (Pty) Ltd propose to develop a Solar Energy Facility (SEF) comprising, Rhino SEF on the Remainder of Farm Rhenosterkop 155 and Sunnyside SEF on Farm 400, located approximately 27 and 30 km north-east and east of Beaufort West respectively, situated in the Beaufort West Local Municipality, in the Central Karoo District Municipality, Western Cape (the project). The SEF will have a combined maximum export capacity of up to 500 MW and occupy 563 ha (Rhino SEF) and 525 ha (Sunnyside SEF).

SiVEST SA (Pty) Ltd (SiVEST) has been appointed to undertake a single Basic Assessment (BA) process required in terms of the National Environmental Management Act 107 of 1998 (NEMA) and the Environmental Impact Assessment (EIA) Regulations, 2014, for the project. SRK Consulting (South Africa) (Pty) Ltd (SRK) has been appointed by SiVEST to undertake a single Visual Impact Assessment (VIA) to inform the BA process.

The sites are generally flat with elevated areas to the north-west and east of the Rhino SEF site and to the north of the Sunnyside SEF site. Further to the west and north-west of the sites, prominent mountain ranges are visible in the background. To the south-east and south of the sites fewer ridges exist, and isolated koppies and wide flat plains, typical of the Karoo, are more common. Ephemeral watercourses drain the relatively higher altitudes. The Platdoring River traverses the Remainder of Farm Rhenosterkop 155. The vegetation on the sites include dwarf spiny shrubland, few low growing trees, drought-resistant grasses cover and thicket.

The area around the project is predominantly characterised by grazing lands (natural vegetation), with supporting infrastructure (roads, powerlines and a railway line [Rhino SEF]). A mining permit has been issued for a dolerite quarry ~2.5 km to the east of the Rhino SEF. The sites are located 27 to 30 km from the nearest town of Beaufort West. The Karoo National Park is located about 30 km to the east of the sites.

The basis for the visual character is provided by the topography, vegetation and land use of the area, which is a rugged rural environment characterised by the sparsely vegetated ridgelines (often) separated by wide flat expanses interspersed with farmsteads and some infrastructure (i.e., the N1, powerlines, substations, railway line routed adjacent to the north-western boundary of the Remainder of Farm Rhenosterkop 155). The visual character of the region rapidly transitions from developed areas such as towns (e.g., Beaufort West, modified rural landscapes) to a rural, undeveloped and fairly inhospitable environment, typical of the Karoo. The project area can therefore be defined as a natural transition landscape.

The visual quality of the area can be experienced through long closed views across plains of low growing vegetation and prominences and ridgelines defining the horizon and occasional pockets of development such as farmsteads and small towns, such as Beaufort West. The visual quality of the sites is consistent with the visual quality of the region: natural, visually untransformed environment that can be experienced by receptors as barren and harsh due to the desolate nature of the landscape. Both sites are used for sheep grazing.

Based on the surrounding land uses, the receptors have been identified; *viz.* farmstead residents, railway personnel and passengers, and motorists and tourists.

The region has scenic value in terms of the rugged natural landscape and large portions of agricultural land. The sense of place of the surrounding area is strongly influenced by the surrounding land use, which can generally be described as a natural agricultural area, on natural grazing land, i.e., not managed (irrigated) pastures.

The viewshed of both SEF sites show that the SEFs will be visible to the north, north-east and south up to 5 km from their boundary. The visual exposure of Rhino SEF is considered high as the SEF will also be visible to the west. The visual exposure of Sunnyside SEF is considered moderate.

The Visual Absorption Capacity (VAC) is generally low in rural areas due to the lack of development and the open spaces in these areas. The low vertical profile of the PV array and the ability of low growing vegetation (and taller thicket) to screen portions of the proposed SEFs marginally increases the VAC. Overall, the study area has a low VAC for the proposed SEF sites.

The sensitivities of the identified receptors are as follows:

- Farmstead receptors: There are limited farmsteads around the SEF sites, the closest of which are the landowners of the respective farms. These are not considered sensitive receptors as they have reached a negotiated agreement with the Applicant and will receive financial remuneration in compensation for development on their property;
- Railway personnel and passengers (Rhino SEF only): These receptors are considered to have low sensitivity due to their temporary exposure to the site; and
- Motorists and tourists:
    - Rhino SEF: The N1 national road is routed to the north-west of the Rhino SEF property and experiences high vehicle volumes, of which a large portion are cargo trucks.
    - Sunnyside SEF: A gravel road transects Farm 400 and leads to farms located to the east of Beaufort West.

    These motorists are considered to have relatively low sensitivity as they are transient receptors with fleeting views of the respective SEF sites. Transiting tourists may have higher sensitivity.

Both Rhino and Sunnyside SEF range from not visible to marginally visible from various viewpoints around the SEF sites. As such, the visibility of these SEF sites is considered low.

PV arrays will introduce a large, uniform anthropogenic artefact into the landscape discordant with scale, texture and current land use around the SEF sites. The discordant nature of the SEF will result in the SEF being experienced as a visual intrusion in the landscape. As such, the project is considered to have low integrity with the surrounding landscape.

Glare modelling was conducted for the proposed PV arrays. Notable findings of the modelling are as follows:

- No glare emanating from Rhino SEF will be experienced by receptors; and
- Motorists will experience short durations of yellow category glare from Sunnyside SEF while travelling on the gravel road. Less than 2.5 hours of yellow category glare will be experienced per year along the gravel road.

Overall the glare is rated as none for Rhino SEF and low for Sunnyside SEF.

The potential impacts of the proposed project on the surrounding visual environment during the construction, operational and decommissioning phases were identified and assessed. The cumulative impacts of the project have also been assessed. The impacts of altered sense of place and visual intrusion caused by construction and decommissioning activities associated with both Rhino and Sunnyside SEFs has been assessed to be of ***low*** significance after mitigation. The impacts associated with the operational phase of the SEFs has been assessed to be of ***low*** significance after mitigation. The cumulative impact of the SEFs and the existing and proposed infrastructure (including the quarry) is assessed to be of ***low*** significance after mitigation. These impacts are deemed to be acceptable on the assumption that the mitigation measures listed in this VIA are implemented for both Rhino and Sunnyside SEF.

NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) AND ENVIRONMENTAL IMPACT REGULATIONS, 2014 (AS AMENDED) - REQUIREMENTS FOR SPECIALIST REPORTS (APPENDIX 6)

EIA Regulation of 2014, as amended, Appendix 6	Section of Report
1. (1) A specialist report prepared in terms of the EIA Regulations must contain- a) details of- i. the specialist who prepared the report; and ii. the expertise of that specialist to compile a specialist report including a CV;	1.3
b) a declaration that the specialist is independent in a form as may be specified by the CA;	Attached
c) an indication of the scope of, and the purpose for which, the report was prepared;	1
(cA) an indication of the quality and age of base data used for the specialist report;	1.4.1
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	4
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	1.4.1
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	1.4
f) 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 alternatives;	6
g) an identification of any areas to be avoided, including buffers;	N/A
h) 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;	N/A
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	2
j) a description of the findings and potential implications of such findings on the impact of the proposed activity, (including identified alternatives on the environment) or activities;	8
k) any mitigation measures for inclusion in the EMPr;	7.6

EIA Regulation of 2014, as amended, Appendix 6	Section of Report
l) any conditions for inclusion in the EA;	8.1
m) any monitoring requirements for inclusion in the EMPr or EA;	7.6
n) a reasoned opinion- i. (as to) whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities 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;	8.1
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	N/A
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/A
q) any other information requested by the CA.	N/A
2) Where a government notice *gazetted* by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	N/A

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Visual Impact Assessment Report

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Glossary of Terms

This list contains definitions of symbols, units, abbreviations, and terminology that may be unfamiliar to the reader.

After-image	Visual illusion that refers to an image continuing to appear after exposure to the original image as ceased.
Azimuth Angle	Direction (in degrees) measures clockwise from true north.
Glint	A momentary flash of bright light caused by a reflection of light off a surface.
Glare	A continuous source of bright light generally associated with a stationary object.
Landscape Integrity	The compatibility of the development/visual intrusion with the existing landscape.
Sense of Place	The identity of a place related to uniqueness and/or distinctiveness. Sometimes referred to as genius loci meaning 'spirit of the place'.
Viewshed	The topographically defined area from which the project could be visible.
Visibility	The area from which the project components would actually be visible and which depends upon topography, vegetation cover, built structures and distance.
Visual Absorption Capacity	The potential for the area to conceal the proposed development.
Visual Character	The elements that make up the landscape including geology, vegetation and land-use of the area.
Visual Exposure	The zone of visual influence or viewshed. Visual exposure tends to diminish exponentially with distance.
Visual Impact	A change to the existing visual, aesthetic or scenic environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.
Visual Intrusion	The effect of the artificial insertion (construction) of an object into a landscape, typically – but not always - reducing the visual quality of the environment, and sense of place.
Visual Obtrusion (or Obstruction)	The effect of the artificial insertion (construction) of an object into a landscape, typically blocking and/or foreshortening views.
Visual Quality	The experience of the environment with its particular natural and cultural attributes.
Visual Receptors	Potential viewers (individuals or communities) who are subjected to the visual influence of a project.

List of Abbreviations

BA	Basic Assessment
BESS	Battery Energy Storage System
DEA&DP	Department of Environmental Affairs and Development Planning
DFFE	Department of Forestry, Fisheries and the Environment
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
K2022	K2022578692 South Africa (Pty) Ltd
LILO	Loop-in Loop-out
MTS	Main Transmission Substation
NEMA	National Environmental Management Act 107 of 1998
PV	Photovoltaic
REDZ	Renewable Energy Development Zone
SEF	Solar Energy Facility
SiVEST	SiVEST SA (Pty) Ltd
SRK	SRK Consulting (South Africa) (Pty) Ltd
ToR	Terms of Reference
VAC	Visual Absorption Capacity
VIA	Visual Impact Assessment
WEF	Wind Energy Facility

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Visual Impact Assessment Report

1. INTRODUCTION

K2022578692 South Africa (Pty) Ltd, the Applicant, proposes to develop a Solar Energy Facility (SEF) comprising, Rhino SEF on the Remainder of Farm Rhenosterkop and Sunnyside SEF on Farm 400. These SEFs will be located approximately 27 and 30 kilometres (km) north-east and east of Beaufort West respectively, in the Beaufort West Local Municipality situated in the Central Karoo District Municipality, Western Cape (the project - Figure 1-1). The Sunnyside SEF comprises two portions (East and West), both located on Farm 400. The SEFs will have a (combined) maximum export capacity of up to 500 megawatts (MW) alternating current and occupy 563 hectares (ha) (Rhino SEF) and 525 ha (Sunnyside SEF).

The Applicant has appointed SiVEST SA (Pty) Ltd (SiVEST) to undertake a single Basic Assessment (BA) process required in terms of the National Environmental Management Act 107 of 1998) as amended (NEMA) and the Environmental Impact Assessment (EIA) Regulations, 2014, for the project. SRK Consulting (South Africa) (Pty) Ltd (SRK) has been appointed by SiVEST, on behalf of the Applicant, to undertake a single Visual Impact Assessment (VIA) to inform the BA process.

1.1 Scope and Objectives

The primary aims of the study are to describe the visual baseline, assess the potential visual impacts of the project and identify effective and practicable mitigation measures. The VIA informs the BA process required in terms of NEMA EIA Regulations and conducted by SiVEST.

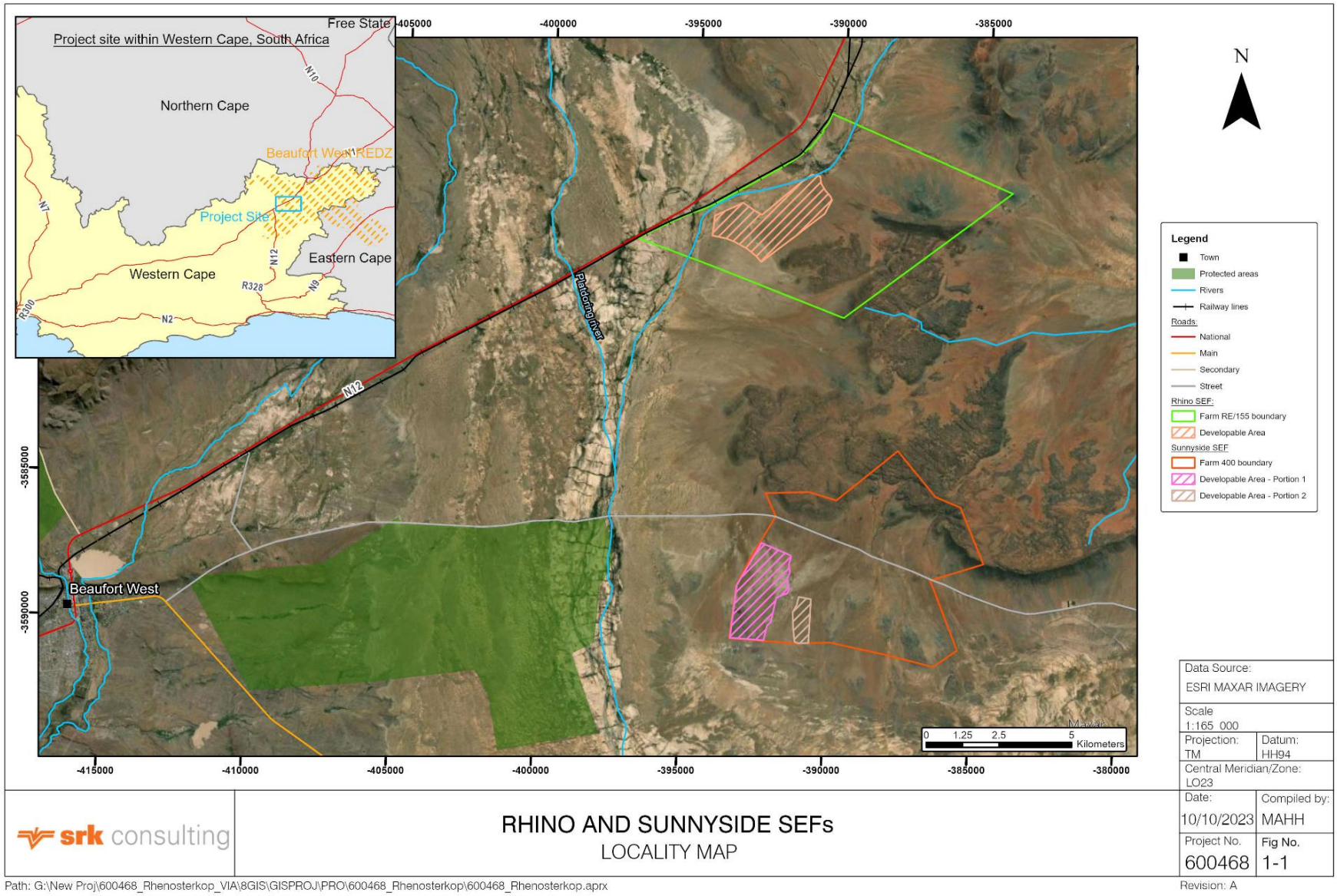


Figure 1-1: Locality map

1.2 Terms of Reference

The Terms of Reference (ToR) for the VIA are as follows:

- Describe the baseline visual characteristics of the study area, including landform, visual character and sense of place, and place this in a regional context;
- Identify potential impacts of the project on the visual environment through analysis and synthesis of the following factors:
    - Visual exposure;
    - Visual absorption capacity (VAC);
    - Sensitivity of viewers (visual receptors);
    - Viewing distance and visibility;
    - Landscape integrity; and
    - Solar reflection;
- Map visually sensitive areas to inform the location of the SEFs;
- Conduct glare modelling and associated analysis for the proposed SEFs;
- Assess the potential impacts of the project on the visual environment and sense of place using SiVEST's impact assessment methodology;
- Identify and assess the direct, indirect and cumulative impacts (pre- and post-mitigation) of the proposed project (and alternatives, if applicable) on visual resources in relation to other proposed and existing developments in the surrounding area;
- Compile a report compliant with Appendix 6 of the EIA Regulations and any relevant legislation and guidelines; and
- Recommend practicable mitigation measures to avoid and/or minimise impacts and/or optimise benefits.

1.3 Specialist Credentials

The VIA was conducted by professional personnel listed in Table 1-1.

Table 1-1: VIA personnel

Staff	Role	Qualification
Christopher Dalgliesh	Project Review and Director	Chris Dalgliesh is a Partner and Principal Environmental Consultant with over 37 years' experience, primarily in South Africa, Southern Africa, West Africa and South America (Suriname). Chris has worked on a wide range of projects, notably in the natural resources, Oil and Gas, waste, infrastructure (including rail and ports) and industrial sectors. He has managed and regularly reviews VIAs. He has directed and managed numerous Environmental and Social Impact Assessments (ESIAs) and associated management plans, in accordance with international

Staff	Role	Qualification
		standards. He regularly provides high level review of ESIAs, frequently directs Environmental and Social Due Diligence studies for lenders, and also has a depth of experience in Strategic Environmental Assessment, State of Environment Reporting and Resource Economics. He holds a BBusSci (Hons) and M Phil (Env) and is a registered Environmental Assessment Practitioner (Reg. EAP) with the Environmental Assessment Practitioners of South African (EAPASA), Registration Number 2019/413.
Kelly Armstrong	Specialist Consultant	Kelly Armstrong is an Environmental Consultant at SRK Consulting. She has five years' experience in managing BA, Environmental Impact Assessment and Water Use Authorisation processes and acting as an Environmental Control Officer (ECO) in the renewable energy, residential, aquaculture, marine and mining sectors. She also conducts VIAs (including Glint and Glare, and flicker modelling) for infrastructure, renewable energy and mining projects. Kelly holds a BSocSc (Hons) in Environmental and Geographical Studies from the University of Cape Town and is a Reg. EAP with EAPASA, Reference Number 2019/1167.

1.4 Methodology

Visual impacts are a function of the physical transformation of a landscape on account of the introduced structures and the experiential perceptions of viewers. The following method was used to assess the visual context (baseline) and preliminary impacts for the project:

1. Describe the project using information supplied by the Applicant and SiVEST;
2. Collect and review visual data, including data on topography, vegetation cover, land-use and other background information;
3. Undertake a mapping exercise to define the visual character of the study area;
4. Undertake fieldwork, comprising a reconnaissance of the study area, particularly the project site and key viewpoints. The objectives of the fieldwork are to:
    - Familiarise the specialist with the site and its surroundings;
    - Identify key viewpoints / corridors; and
    - Determine and groundtruth the existing visual character and quality in order to understand the sensitivity of the landscape;

    Visual 'sampling' using photography will be undertaken to illustrate the likely zone of influence and visibility. The locations of the viewpoints will be recorded with a GPS device;
5. At key viewpoints determine the likely distance at which visual impacts will become indistinguishable;
6. Identify sensitive receptors; and

7. Determine the visual zone of influence or exposure by superimposing the proposed upgrades on aerial imagery, and as verified during the site visit.

The following method will be used to assess the visual impact of the project in the VIA Report:

1. Conduct glare modelling to simulate receptors' potential exposure to (and duration of) glare from the PV panels, if any;
2. Rate impacts on the visual environment and sense of place based on professional judgment and the prescribed impact rating methodology;
3. Recommend practicable mitigation measures to avoid and/or minimise impacts; and
4. Recommend environmental management measures to be included in the Environmental Management Programme (EMPr) for the project.

Although one project, due to the distance between the Rhino and Sunnyside SEF (approximately 10 km apart), the impacts of these SEFs have been rated separately in this VIA.

1.4.1 Glare Analysis Methodology

Glare can be modelled geometrically to accurately predict whether reflection will be experienced by receptors using the following parameters:

- The earth's orbit around the sun;
- The earth's rotation and orientation;
- The location of the PV array;
- The orientation of the PV panels and the azimuth angle[1]; and,
- Local topography including (comparative) receptor and PV array heights above mean sea level.

The glare model provides a quantified assessment of:

- When and where glare will occur throughout the year for a prescribed PV installation; and
- Intensity of the effects on the human eye at those locations where glare occurs.

ForgeSolar's GlareGauge modelling software will be used to model the anticipated intensity and duration of glare from the PV array. The results of the glare modelling will be reported on in the VIA report.

1.4.2 Site Visit and Data Acquisition

A site visit was undertaken on 13 September 2023. The site visit duration and timing were appropriate to provide the specialist with a representative impression of the site and surroundings.

The following information sources were used to inform the baseline and sensitivities identified:

- Maps indicating the location and layout of the project;
- Topographic data, including spatial files with 5 m contours obtained from the Department of Rural Development and Land Reform;

[1] Direction (in degrees) measures clockwise from true north.

- Aerial images; and
- Other available data on geology, vegetation, land use, receptors etc..

The information is sufficiently recent and detailed for the purposes of this VIA.

2. ASSUMPTIONS AND LIMITATIONS

As is standard practice, the VIA is based on a number of assumptions and is subject to certain limitations, which should be borne in mind when considering information presented in this report. These assumptions and limitations include:

- VIA is not, by nature, a purely objective, quantitative process, and depends to some extent on subjective judgments. Where subjective judgments are required, appropriate criteria and motivations for these have been clearly stated;
- The study is based on technical information supplied to SRK, which is assumed to be accurate. This includes the proposed site and project components;
- The study area is defined as the area within a 5 km around the SEF properties, as the visual impact beyond this distance is considered negligible; and
- This study does not provide motivation for or against the project.

The findings of the VIA are not expected to be affected by these assumptions and limitations.

3. TECHNICAL DESCRIPTION

This section provides a concise description of the proposed project as provided at the time of assessment, focusing on elements relevant to the VIA. A more detailed description is provided in the BA Report for the project.

3.1 Project Location

The Applicant, proposes to develop a SEF comprising, Rhino SEF on the Remainder of Farm Rhenosterkop and Sunnyside SEF on Farm 400. These SEFs will be located approximately 27 and 30 km north-east and east of Beaufort West respectively, in the Beaufort West Local Municipality situated in the Central Karoo District Municipality, Western Cape. The Sunnyside SEF comprises two portions (East and West), both located on Farm 400. The SEFs will occupy 563 hectares (ha) (Rhino SEF) and 525 ha (Sunnyside SEF).

The Rhino SEF and Sunnyside SEF (the subject of this VIA) form part of the larger Rhenosterkop Renewable Energy Cluster which includes the planned Rhino Wind Energy Facility (WEF). An environmental screening process undertaken between September 2022 and January 2023 informed the location of the SEFs and WEF, from an environmental and social perspective. The proposed SEF locations on Remainder of Farm Rhenosterkop 155 and Farm 400 considered the agricultural preferences and the potential visual impact on the residents of the affected farms.

Within 35 km of the proposed Rhino and Sunnyside SEF sites, there are 18 approved renewable energy projects are listed on the National Department of Forestry, Fisheries and the Environment (DFFE) South African Renewable Energy EIA Application Database (DFFE, 2023). Of the 18, 13 are SEFs and five are WEFs. These approved projects are largely located to the north-east and south-west of Rhino and Sunnyside

SEFs (Figure 3-1). In addition to these renewable energy facilities, there are four approved additional associated infrastructure projects, comprising either radio masts, substations and/or powerlines.

This project is located in the Beaufort West Renewable Energy Development Zone (REDZ); one of the 11 REDZ in South Africa. The REDZ are geographically defined areas in which the South African Government has encouraged the development of SEFs and WEFs by promulgating a streamlined authorisation approach. As such, the REDZ have become areas in which the development of PV projects is considered more acceptable.

3.1.1 Location Alternatives

Other alternative location alternatives were identified and assessed from a development perspective, but were found to be less desirable due to increased distance from the rest of the Rhenosterkop Cluster projects, and therefore have been screened out.

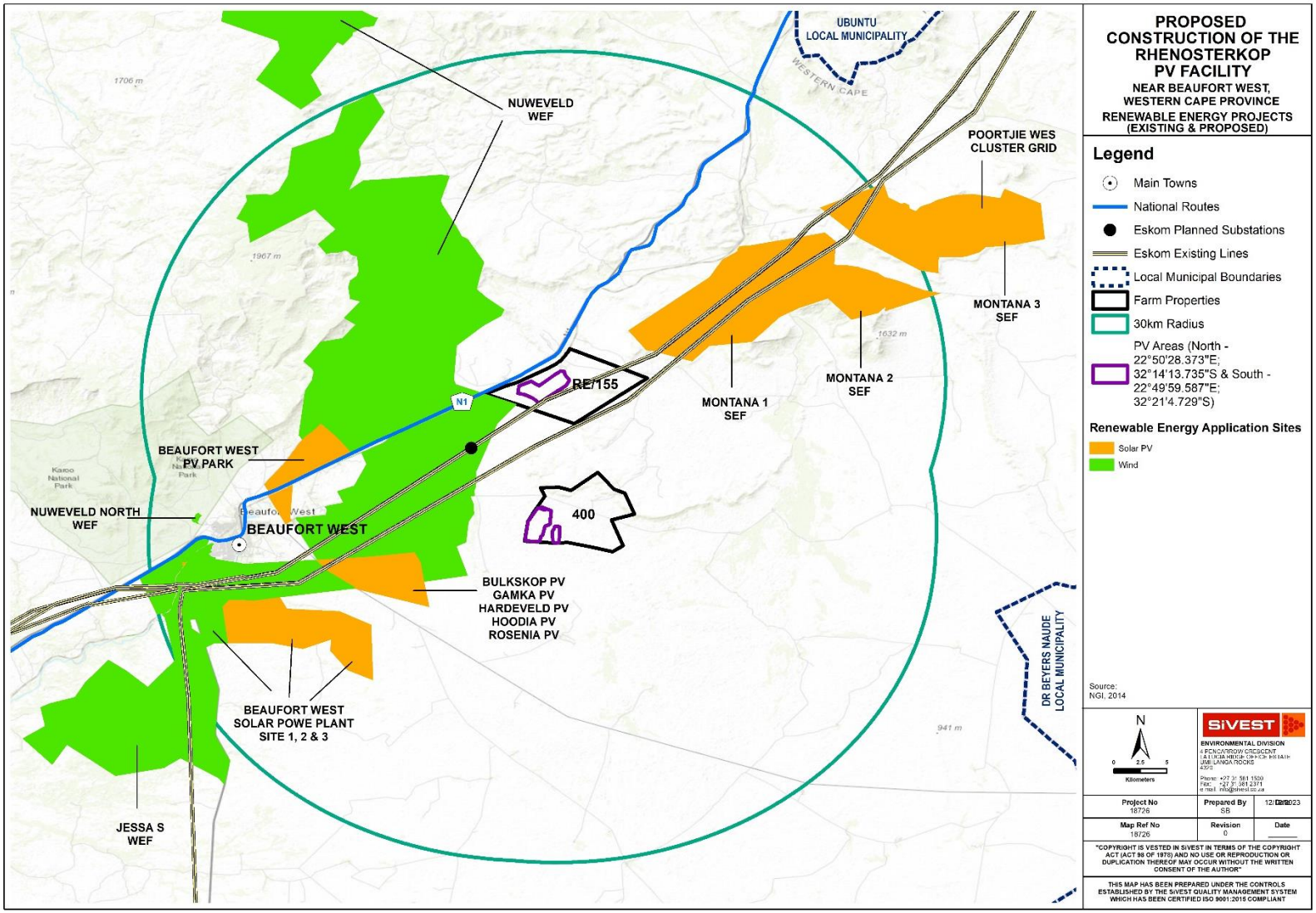


Figure 3-1: Approved renewable energy projects within 35 km of the site

3.2 Project Description

Rhino and Sunnyside SEFs will **each** comprise the following components (Figure 3-2 and Figure 3-3):

- PV modules (monofacial or bifacial) mounted on single-axis tracking structures;
- On-site substation occupying 1ha;
- Battery Energy Storage System (BESS), (with a footprint of up to 6 ha);
- Associated stormwater management infrastructure;
- Site and internal access roads (up to 8 m wide);
- Temporary construction camp and lay down area (with a footprint of approximately 2 ha) for use during the construction phase and which will be the site of the operational site camp during the operational phase;
- Grid connection infrastructure including medium-voltage cabling between the project components and the facility substation (underground cabling will be used where practical [up to 33 kV]); and
- Perimeter fencing.

The substations will step up power from 33 kV to 132 kV which will then be evacuated to the national grid, via a 132 kV overhead powerline connecting the substation to a new Main Transmission Substation (MTS) that will be established near to the project sites. The MTS will be connected to the existing Droerivier/Hydra 400 kV overhead powerline through a loop-in loop-out (LILO) connection. Alternatively, the project will connect to the existing Droerivier MTS via a 132 kV powerline. The 132 kV powerline is the subject of a separate Environmental Authorisation (EA) Application to DFFE. It should be noted that the electrical grid connection infrastructure is not part of the scope of this VIA.

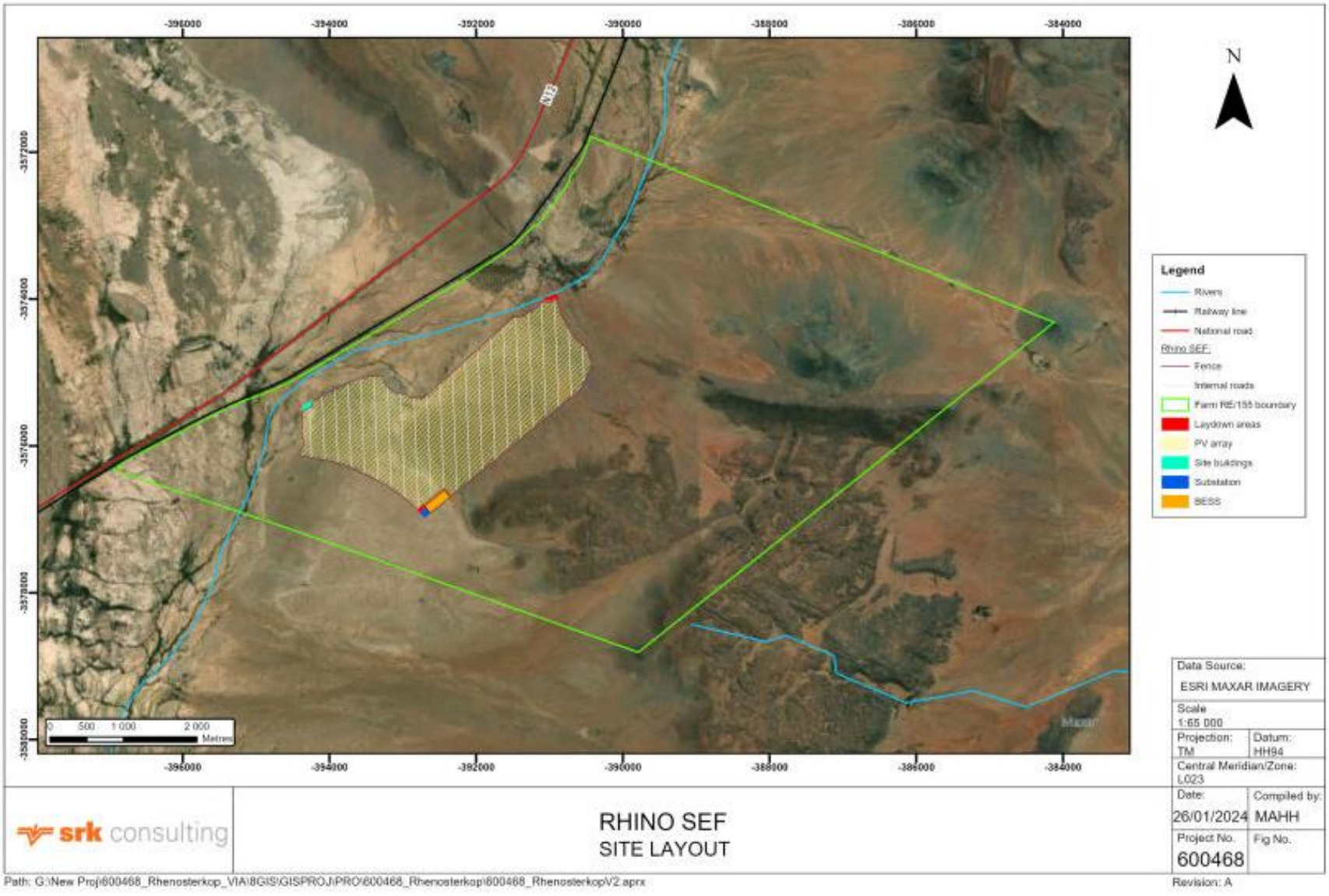


Figure 3-2: Site layout map: Rhino SEF

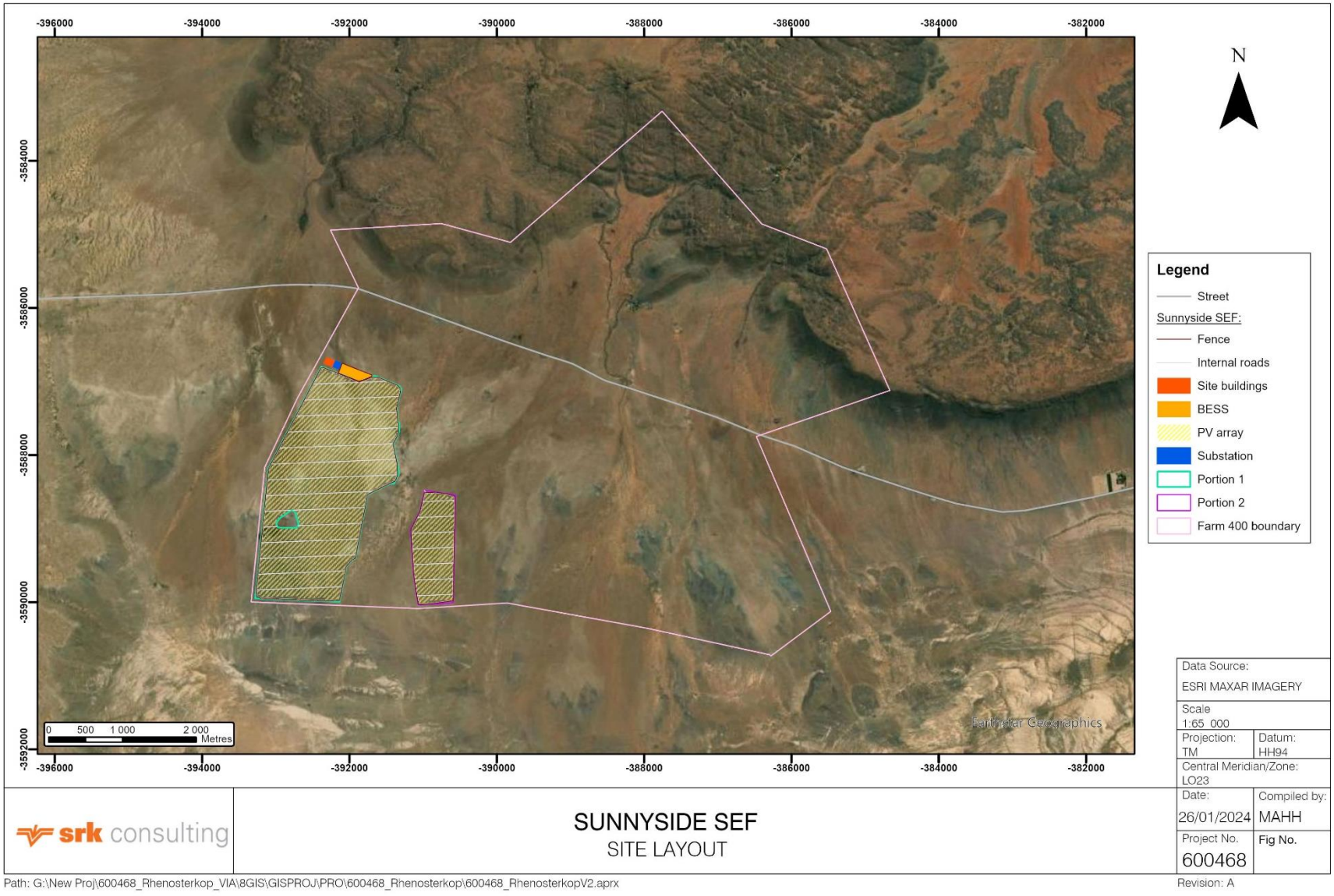


Figure 3-3: Site layout map: Sunnyside SEF

3.2.1 No Go Alternative

The ‘no-go’ alternative is the option of not undertaking the development of the proposed SEFs. Hence, if the ‘no-go’ option is implemented, there would be no development. This alternative would result in no environmental impacts from the proposed SEFs on the sites or the surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the report.

4. LEGAL REQUIREMENTS AND GUIDELINES

Relevant guidelines that provide direction for visual assessment include the Department of Environmental Affairs and Development Planning’s (DEA&DP) “Guideline for Involving Visual and Aesthetic Specialists in EIA Processes” (DEA&DP, 2005), the Landscape Institute’s “Guidelines for Landscape and Visual Impact Assessments” (2013), and Germany’s Federal Ministry of the Environment’s Light Guidelines (Licht-Leitlinie) (2014), which have been considered in this VIA.

DEA&DP’s Guideline (2005) identifies typical components of a visual study:

- Identification of issues and values relating to visual, aesthetic and scenic resources through involvement of stakeholders;
- Identification of landscape types, landscape character and sense of place, generally based on geology, landforms, vegetation cover and land use patterns;
- Identification of viewsheds, view catchment area and the zone of visual influence, generally based on topography;
- Identification of important viewpoints and view corridors within the affected environment, including sensitive receptors;
- Indication of distance radii from the proposed project to the various viewpoints and receptors;
- Determination of the VAC of the landscape, usually based on topography, vegetation cover or urban fabric in the area;
- Determination of the relative visibility, or visual intrusion, of the proposed project;
- Determination of the relative compatibility or conflict of the project with the surroundings; and
- A comparison of the existing situation with the probable effect of the proposed project.

Projects that warrant a visual specialist study include those:

- Located in a receiving environment with:
    - Protection status, such as national parks or nature reserves;
    - Proclaimed heritage sites or scenic routes;
    - Intact wilderness qualities, or pristine ecosystems;
    - Intact or outstanding rural or townscape qualities;
    - A recognized special character or sense of place;
    - Outside a defined urban edge line;
    - Sites of cultural or religious significance;

- Important tourism or recreation value;
- Important vistas or scenic corridors;
- Visually prominent ridgelines or skylines; and/or

- Where the project is:
  - High intensity, including large-scale infrastructure;
  - A change in land use from the prevailing use;
  - In conflict with an adopted plan or vision;
  - A significant change to the fabric and character of the area;
  - A significant change to the townscape or streetscape;
  - A possible visual intrusion in the landscape; or
  - Obstructing views of others in the area.

In terms of the guideline the proposed SEFs and associated infrastructure can be classified as a Category 5 development, i.e. large-scale infrastructure and situated in an environment of medium scenic, cultural, and historical value. Based on the site visit it became evident that the high visual impact expected in terms of the guideline (see Table 4-1) can be reduced to a moderate visual impact, which introduces:

- A potential effect on protected landscapes or scenic resources;
- Some change in the visual character of the area; and
- A new development or adds to existing development in the area.

Table 4-1: Expected visual impact significance

Type of environment	**Type of development**				
	Cat 1	**Cat 2**	**Cat 3**	**Cat 4**	**Cat 5**
Protected / wild areas	Moderate	High	High	Very high	Very high
High scenic, cultural, historical value	Minimal	Moderate	High	High	Very high
Medium scenic, cultural, historical value	Little or none	Minimal	**Moderate**	High	High
Low scenic, cultural, historical value / disturbed	Little or none Possible benefits	Little or none	Minimal	Moderate	High
Disturbed or degraded sites	Little or none Possible benefits	Little or none Possible benefits	Little or none	Minimal	Moderate

Such a project typically warrants a Level 3 assessment (see Table 4-2), which includes the following generic steps:

- Identification of issues and site visit;
- Description of receiving environment and proposed project;
- Establishment of view catchment area, view corridors, viewpoints and receptors;
- Indication of potential visual impacts using established criteria;
- Inclusion of potential lighting impacts at night; and

- Description of alternatives, mitigation measures and monitoring programmes.

Table 4-2: Recommended approach for visual assessment

Approach	Type of issue expected				
	Little or no visual impact	**Minimal visual impact**	**Moderate visual impact**	**High visual impact**	**Very high visual impact**
Level of visual impact recommended	Level 1 visual input	Level 2 visual input	**Level 3 visual assessment**	Level 4 visual assessment	

4.1 Glint and Glare Guidelines

Glint and glare (also referred to as solar reflection) analyses are required for projects anticipated to cause visual discomfort to surrounding receptors (particularly aviation activity, motorists and residents). PV panels vary in their reflectivity with none absorbing 100% of the incoming light, thus leading to solar reflection which may be experienced by receptors (and/or affect sense of place). Glint and/or glare can only be experienced by receptors with a direct line of sight to the PV array. Whether a receptor experiences glint or glare depends on the receptor's location and movement in relation to the PV panels.

Several countries, including South Africa, require Glint and Glare Impact Assessments for certain projects, *inter alia,* PV projects located in close proximity to aircraft approach and take-off centrelines, an aerodrome or helistop[2]. However, few authorities have released content requirements or associated guidelines relating to thresholds of glare that are considered acceptable. The German Federal Ministry of the Environment has defined acceptable levels of glare as being less than 30 minutes per day or 30 hours per year (Federal Ministry of the Environment, 2014). The German guidelines will be used as a guideline for the Glint and Glare analysis in the VIA.

5. DESCRIPTION OF THE RECEIVING ENVIRONMENT – VISUAL CONTEXT

The following description of the affected environment focuses on the Visual Character of the area surrounding and including the project (the study area) and discusses the Visual Quality and Sense of Place[3]. This baseline information provides the context for the visual analysis.

5.1 Landscape Character

Landscape character is the description of the pattern of the landscape, resulting from particular combinations of natural (physical and biological) and cultural (land use) characteristics. It focuses on the inherent nature of the land rather than the response of a viewer (Young, 2000).

5.1.1 Geology and Topography

The geology and topography of the area, together with the semi-arid climate, provide the framework for the basic landscape features and visual elements of the study area.

[2] South African Civil Aviation Authority Obstacle Notice 3/2020: Additional Requirements for Solar Project Applications.

[3] These terms are explained in the relevant sections below.

Both sites are largely underlain by alluvium, gravel, scree, sand and debris at the base of inselbergs comprising the Karoo Dolerite Suite. The sites are generally flat with elevated areas to the north-west and east of the Rhino SEF site and to the north of the Sunnyside SEF site (see Figure 5-1 and Figure 5-3). Further to the west and north-west of the sites, prominent mountain ranges are visible in the background (see Figure 5-2). To the south-east and south of the sites fewer ridges exist, and isolated koppies and wide flat plains, typical of the Karoo, are more common. Ephemeral watercourses drain the relatively higher altitudes. The Platdoring River traverses the remainder of Farm Rhenosterkop 155 (see Figure 5-3).

Figure 5-1: Rhino SEF site with inselbergs and ridges beyond the site to the east

Figure 5-2: Sunnyside SEF site with mountain range in the distance to the west

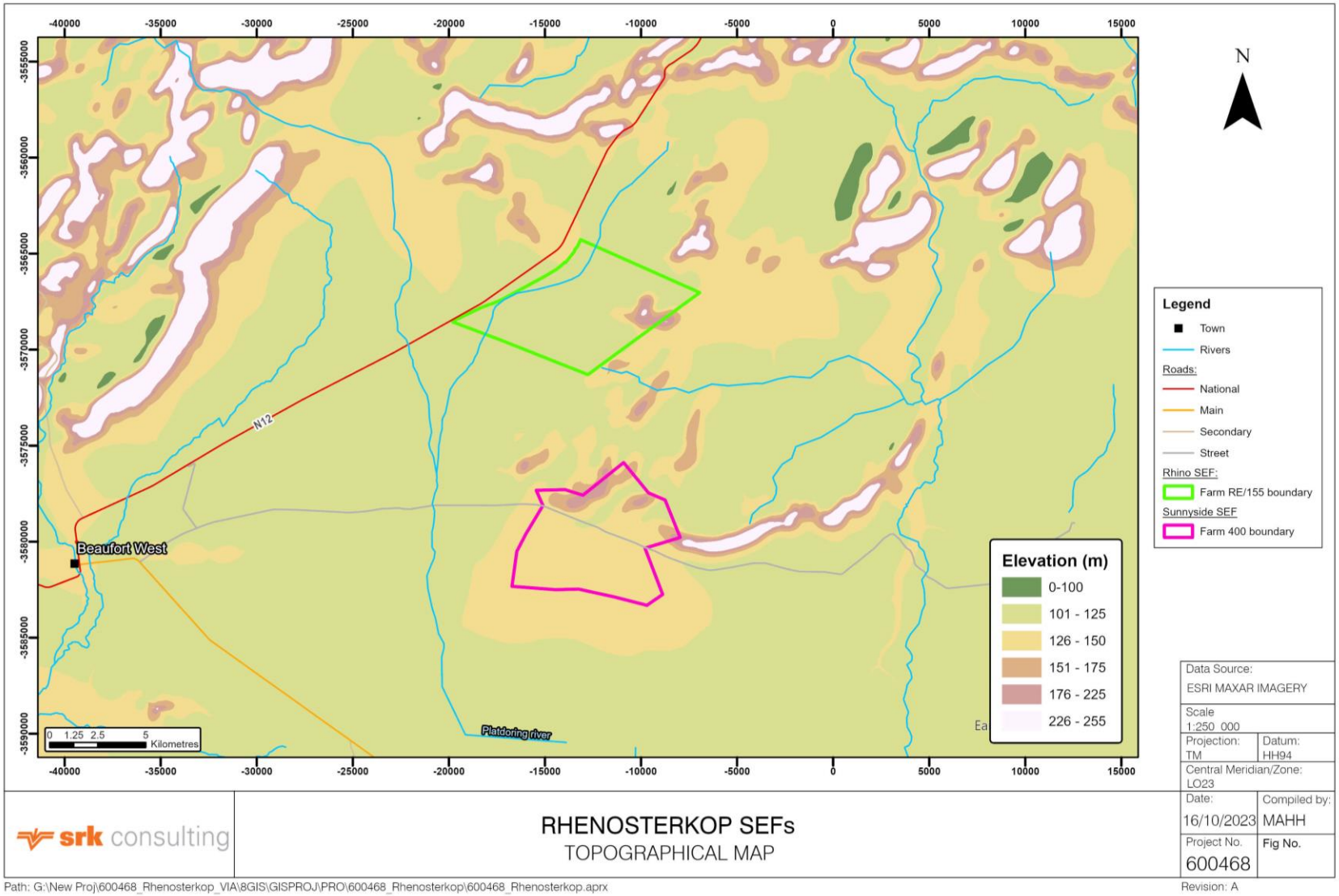


Figure 5-3: Topography map

5.1.2 Vegetation

Most of the Rhino and Sunnyside SEF are located within the Gamka Karoo vegetation type. Part of the Rhino SEF also falls within the Southern Karoo Riviere vegetation type that flanks the Platdoring River on the Remainder of Farm Rhenosterkop 155. The Gamka Karoo vegetation type occurs on irregular to slightly undulating plains vegetated with dwarf spiny shrubland and few low growing trees. Drought-resistant grasses cover the low-lying lands, particularly after periods of rainfall (Figure 5-4). The Southern Karoo Riviere vegetation type typically includes thickets up to 5 m tall, fringed by shrubland reaching up to 1.5 m high (Figure 5-5).

The region experiences hot summers and cold, dry winters.

Figure 5-4: Vegetation on Farm 400

Figure 5-5: Vegetation on Remainder of Farm Rhenosterkop 155

Source: Google Earth

5.1.3 Land Use

Beaufort West, located in the Beaufort West Local Municipality, is the closest town to both sites. The main economic sectors in the Beaufort West Local Municipality are agriculture, transport and logistical support and tourism. Agriculture is largely confined to livestock (sheep) farming. The proximity of the N1 (transecting the Municipality) and distance from Cape Town has resulted in the area becoming a logistical support hub. The Karoo National Park is also situated within the Beaufort West Local Municipality, well to the west of the sites.

5.1.3.1 Rhino SEF

The Rhino SEF is located approximately 30 km north-east of Beaufort West. The area surrounding the property is predominantly characterised by grazing lands (natural vegetation) with support infrastructure (roads, powerlines and a railway line) adjacent to Remainder of Farm Rhenosterkop 155. Opposite the southern portion of the Rhino SEF, located on the N1 is a farmstall. To the north of the Rhino SEF and adjacent to the property is the Rhenosterkop Train Station and dwellings. The Karoo Gateway (Beaufort West) Airport is located approximately 15 km south-west of the Rhino SEF site.

Remainder of Farm Rhenosterkop 155 comprises farmsteads, grazing lands, orchards (potentially olives) and farm dam(s). In 2023, a mining permit was issued for a 5 ha dolerite quarry to the east of the Rhino SEF on the same property (remainder of Farm Rhenosterkop 155). The dolerite quarry will supply road infrastructure, renewable energy and building projects around Beaufort West.

5.1.3.2 Sunnyside SEF

The Sunnyside SEF is located 27 km to the east of Beaufort West. The area surrounding the property is predominantly characterised by grazing lands (natural vegetation) with support infrastructure (powerlines). The approximately 7 000 ha Steenbokkie Private Nature Reserve is located roughly 5 km west of the Sunnyside SEF. A gravel road bisects Farm 400. The Karoo Gateway (Beaufort West) Airport is located 16 km west of Sunnyside SEF site.

Remainder of Farm 400 comprises farmsteads, farm dam(s) and grazing lands.

5.2 Visual Character

Visual character is descriptive and non-evaluative, which implies that it is based on defined attributes that are neither positive nor negative. It refers to the overall experience and impression of the landscape, such as natural or transformed.

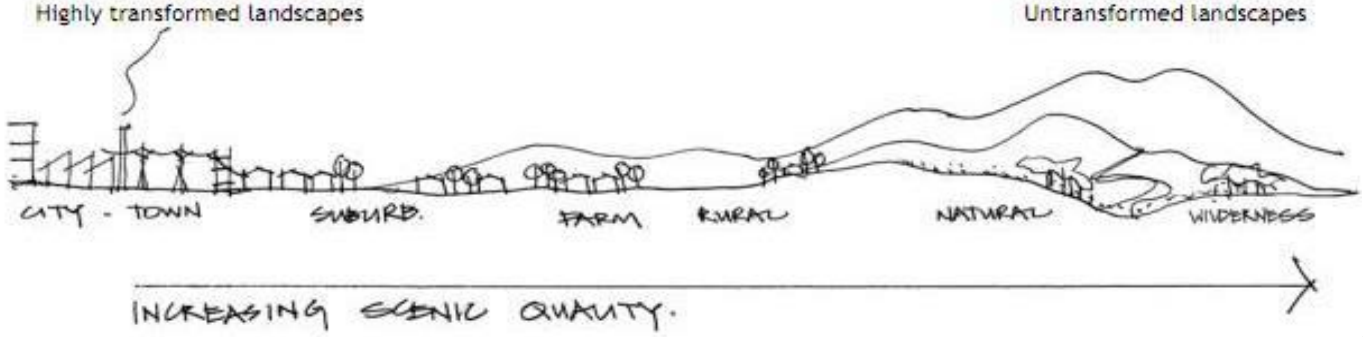
A change in visual character cannot be described as having positive or negative attributes until the viewer's response to that change has been taken into consideration. The probable change caused by the project is assessed against the existing degree of change caused by previous development.

The basis for the visual character is provided by the topography, vegetation and land use of the area, which is a rugged rural environment characterised by the sparsely vegetated ridgelines (often) separated by wide flat expanses interspersed with farmsteads and some infrastructure (i.e., the N1, powerlines, substations, railway line routed adjacent to the north-western boundary of the Remainder of Farm Rhenosterkop 155). The visual character of the region rapidly transitions from developed areas such as towns (e.g., Beaufort West, modified rural landscapes) to a rural, undeveloped and fairly inhospitable environment, typical of the Karoo

(Figure 5-6). The project area can therefore be defined as a *natural transition landscape* as it is mostly rural with few isolated farmsteads and some powerlines, roads and a railway line visible in the landscape (Figure 5-7).

Figure 5-6: Visual character of the area surrounding the Rhino SEF

Highly Transformed Landscape – Urban/Industrial	Transition Landscape	Modified Rural Landscape	Natural Transition Landscape	Untransformed Landscape – Natural
Substantially developed landscape. High levels of visual impact associated with buildings, factories, roads and other related infrastructure (e.g. powerlines).	Transitional landscape associated with the interface between, rural, agricultural area and more developed suburban or urban zones.	Typical character is rural landscape, defined by field patterns, forestry plantations and agricultural areas and associated small-scale roads and buildings.	A changing landscape character associated with the interface between natural areas and modified rural / pastoral or agricultural zones.	No / minimal impact associated with the actions of man. National parks, coastlines, pristine forest areas.



Source: (CNDV, 2006)

(Shan Ding Lu, 2009)

(Night Jar Travel South Africa, 2012)

(Boschkloof, 2012)

Figure 5-7: Typical visual character attributes

5.3 Visual Quality

Aesthetic value is an emotional response derived from our experience and perceptions. As such, it is subjective and difficult to quantify in absolute terms. Studies in perceptual psychology have shown that humans prefer landscapes with higher complexity (Crawford, 1994). Landscape quality can be said to increase when:

- Topographic ruggedness and relative relief increases;
- Water forms are present;
- Diverse patterns of grasslands, shrubs and trees occur;
- Natural landscape increases and man-made landscape decreases; and
- Where land use compatibility increases.

The visual quality of the area can be experienced through long closed views across plains of low growing vegetation and prominences and ridgelines defining the horizon and occasional pockets of development such as farmsteads and small towns, such as Beaufort West (Figure 5-8). Elevated areas across the landscape add somewhat to visual quality; however, the absence of water forms and diverse vegetation detract from the visual quality and evoke a fairly desolate environment, especially in winter when the muted grey and brown hues of vegetation impart a barren aspect to the landscape.

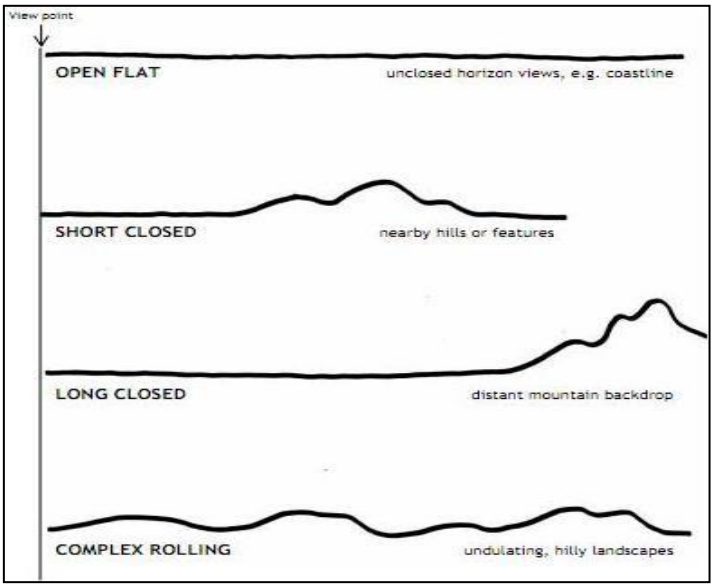


Figure 5-8: Typical views in the landscape

Sources: (CNDV, 2006)

The visual quality of the sites is consistent with the visual quality of the region: natural, visually untransformed environment that can be experienced by receptors as barren and harsh due to the desolate nature of the landscape. Both sites are used for sheep grazing.

The remainder of Farm Rhenosterkop 155 is a relatively intact and undisturbed landscape, apart from farmsteads and transmission powerlines that extend from the north-east to the south-west, one bisecting the property and the other routed adjacent to the eastern boundary of the property (Figure 3-1 and Figure 5-9). These powerlines detract from the visual quality of the site.

The landscape of Farm 400 is also relatively intact and undisturbed. The site generally feels more remote, being accessed by a gravel farm road, and set back from major infrastructure and development (e.g., Beaufort West) (see Figure 5-10).

Figure 5-9: Illustration of visual quality of the Rhino SEF site

Figure 5-10: Illustration of visual quality of the Sunnyside SEF site

5.4 Visual Receptors

Visual receptors have been identified based on surrounding land uses, including isolated farmsteads and motorists. The visual receptors are briefly described below:

- **Farmstead residents:** Isolated farmsteads are interspersed throughout the area surrounding the Rhino and Sunnyside SEF sites;
- **Railway personnel and passengers (Rhino SEF only):** The railway is routed to adjacent to the north-west of the Remainder of Farm Rhenosterkop 155 property; and
- **Motorists and tourists:** The N1 national road connecting Cape Town to Johannesburg is routed to the north-west of Remainder of Farm Rhenosterkop 155 property. Smaller farm roads bisect and route around both Remainder of Farm Rhenosterkop 155 and Farm 400.

5.5 Sense of Place

Our sense of a place depends not only on spatial form and quality, but also on culture, temperament, status, experience and the current purpose of the observer (Lynch, 1992). Central to the idea of 'sense of place' or Genius Loci is identity. An area will have a stronger sense of place if it can easily be identified, that is to say if it is unique and distinct from other places. Lynch defines 'sense of place' as "the extent to which a person can recognise or recall a place as being distinct from other places – as having a vivid or unique, or at least a particular, character of its own" (Lynch, 1992).

It is often the case that sense of place is linked directly to visual quality and that areas / spaces with high visual quality have a strong sense of place. However, this is not an inviolate relationship, and it is plausible that areas of low visual quality may have a strong sense of place or – more commonly – that areas of high visual quality have a weak sense of place. The defining feature of sense of place is uniqueness, generally real or biophysical (e.g. trees in an otherwise treeless expanse), but sometimes perceived (e.g., visible but unspectacular sacred sites and places which evoke defined responses in receptors). In this context Cross (2001) identified six categories of relationships with place: biographical, spiritual, ideological, narrative, cognitive and dependent (Table 5-1).

The region has scenic value in terms of the rugged natural landscape and large portions of agricultural land.

Table 5-1: Relationship to place

Type of Relationship	Process
Biographical (historical and familial)	Being born in and living in a place. Develops over time
Spiritual (emotional, intangible)	Feeling a sense of belonging
Ideological (moral and ethical)	Living according to moral guidelines for human responsibility to place Guidelines may be religious or secular
Narrative (mythical)	Learning about a place through stories, family histories, political accounts and fictional accounts
Cognitive (based on choice and desirability)	Choosing a place based on a list of desirable traits and lifestyle preferences

Type of Relationship	Process
Dependent (material)	Constrained by lack of choice, dependency on another person or economic opportunity

Sources: Adapted from Cross (2001)

The sense of place of the surrounding area is strongly influenced by the surrounding land use, which can generally be described as a natural agricultural area, on natural grazing land, i.e., not managed (irrigated) pastures. The sense of place is not particularly distinct from the rest of the wider region and is not overly memorable, but with its wide-open space, gravel roads and somewhat rudimentary, ubiquitous fencelines, is evocative of the Karoo.

The relationship of receptors in the study area (Section 5.4) to place may be predominantly *biographical*, *cognitive*, *dependent* and in some instances, *spiritual*. A family, for example, whose has farmed in this area for a few generations will have a *biographical, dependent and spiritual* (sense of belonging) and in some cases *cognitive* attachment to the area. A farm worker living on a farm in the area will likely have a *dependent* relationship with the area. Motorists on the N1 comprise, *inter alia*, truck drivers hauling goods across the country and tourists en route to destinations. While many of the motorists share the *dependent* relationship with the study area, the tourists in transit are may have *cognitive* relationship with the place.

6. ANALYSIS OF THE MAGNITUDE OF THE VISUAL IMPACT

The following section outlines the analysis that was undertaken to determine the **magnitude or intensity** of the overall visual impact resulting from the project. Various factors were considered in the assessment, including:

- Visual exposure;
- Visual absorption capacity;
- Sensitivity of visual receptors;
- Visibility and viewing distance;
- Integrity with existing landscape / townscape; and
- Solar reflection.

The analysis of the magnitude or intensity of the visual impact, as described in this section, is summarized and integrated in Table 6-8 and forms the basis for the assessment and rating of the impact as documented Section 7.

6.1 Visual Exposure

Visual exposure is determined by the zone of visual influence or viewshed. The viewshed is the topographically defined area that includes all the major observation sites from which the project *could* be visible; it is a function of topography and the dimensions of the project *only*, but not the location of visual receptors. The viewshed analysis assumes maximum visibility of the project in an environment stripped bare of vegetation and structures. The viewshed indicates the visibility of the project, accounting for the decrease in visibility as distance from the project increases.

6.1.1 Rhino SEF

The viewshed indicates that the Rhino SEF is visible up to 5 km from the site boundary to the north, north-east, south, west and north-west (Figure 6-1). Therefore, the site will be visible from the N1 routed to the north-west of the site. The SEF cluster will also be visible to railway passengers travelling to the north-west of the site. Beyond 5 km, the SEF will not be visible to receptors due to distance.

The visual exposure of Rhino SEF is deemed ***high***.

6.1.2 Sunnyside SEF

The viewshed indicates that the site is visible up to 5 km to the south, north-east and north of the site (Figure 6-2). To the east and north-west of the SEF, the project is visible up to approximately 2 km from the boundary. The site will be visible to motorists travelling along a short section of the gravel road to the north of the site.

The visual exposure of Sunnyside SEF is deemed ***moderate.***

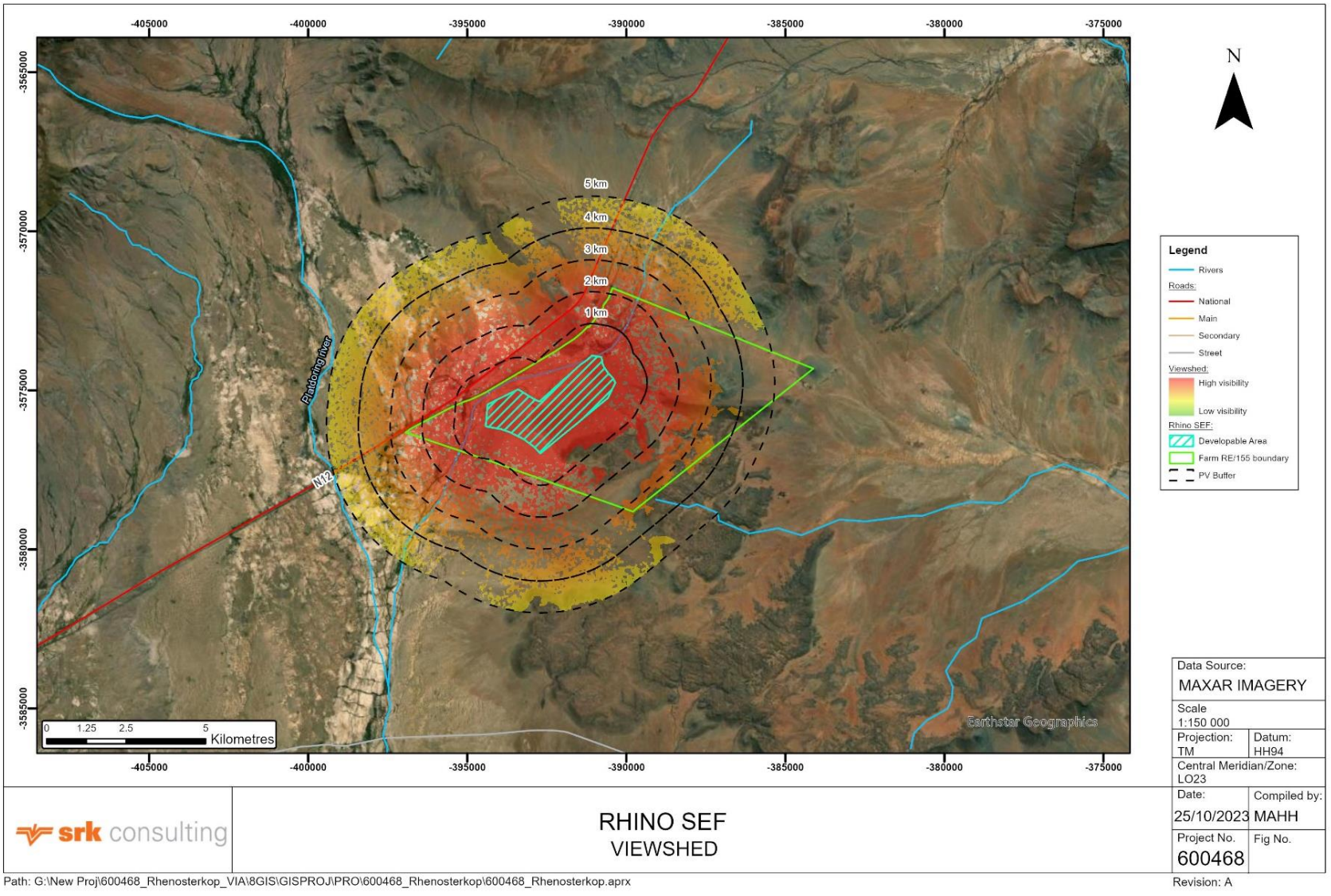


Figure 6-1: Viewshed of the Rhino SEF

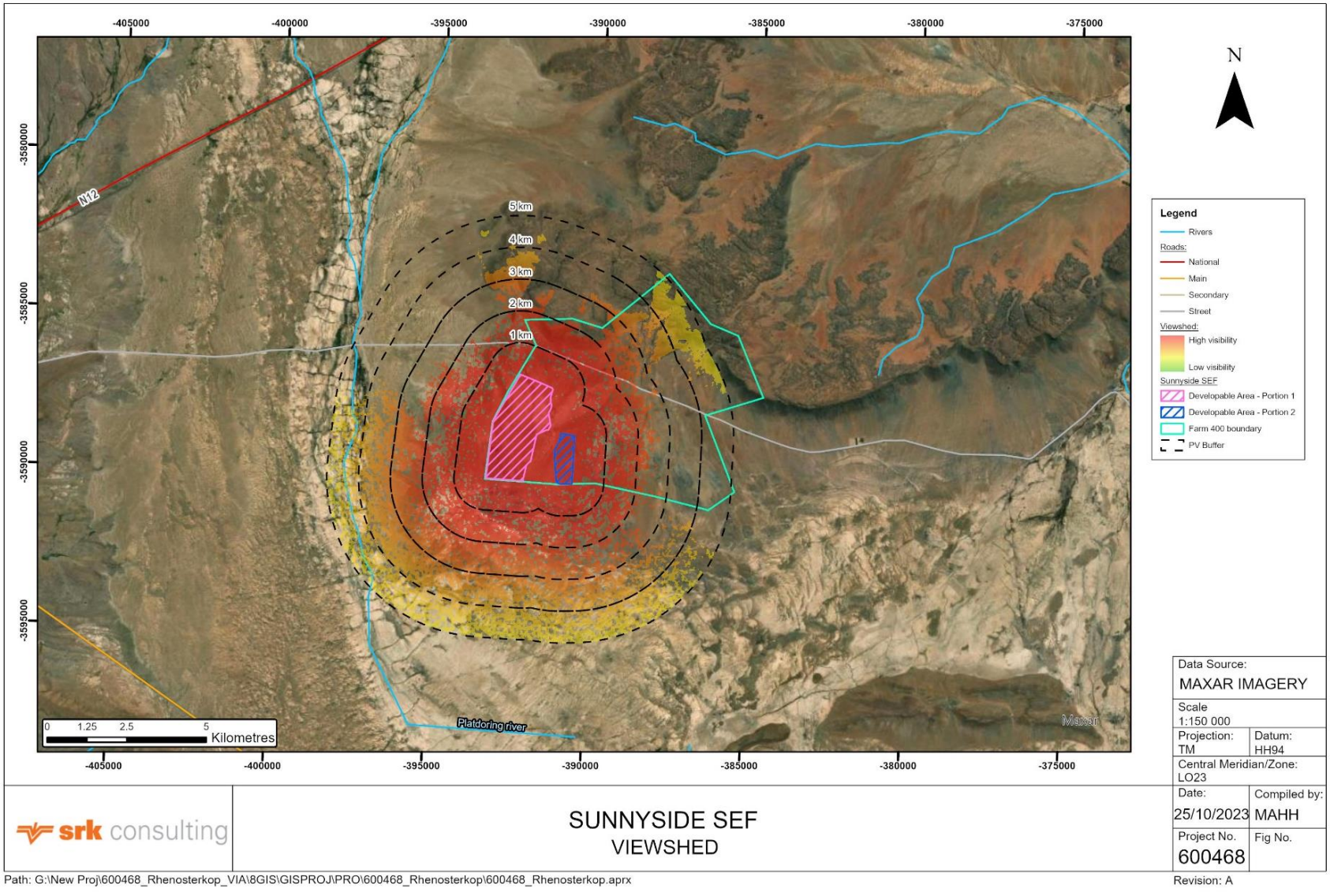


Figure 6-2: Viewshed of Sunnyside SEF

6.2 Visual Absorption Capacity

The VAC is the potential for an area to conceal and assimilate the proposed project. Criteria used to determine the VAC of the affected area are defined in Table 6-1. The VAC of an area is increased by:

1. Topography and vegetation that is able to provide screening and increase the VAC of a landscape;
2. The degree of urbanisation compared to open space. A highly urbanised landscape is better able to absorb the visual impacts of similar developments, whereas an undeveloped rural landscape will have a lower VAC; and
3. The scale and density of surrounding development.

These factors frequently apply at different scales, by influencing the VAC in the foreground (e.g., dense bush, existing roads and bridges, small structures), middleground and background (e.g., tall forests, hills, cityscapes).

Rural areas generally have a low VAC due to the lack of development and the open spaces in these areas. The low growing vegetation characteristic of the Karoo has only limited potential to screen developments, and therefore further reduces the VAC of the sites. The wide expanses / plains between the ridges, reducing the VAC, is moderated by the ridges, mountains, koppies and prominences in the landscape.

The low vertical profile of the PV array and the ability of low growing vegetation (and taller thicket) to screen portions of the proposed SEFs marginally increases the VAC.

The study area has a ***low*** VAC for the proposed SEFs.

Table 6-1: Visual absorption capacity criteria

High	Moderate	Low
The area is able to absorb the visual impact as it has: ▪ Undulating topography and relief ▪ Good screening vegetation (high and dense) ▪ Is highly urbanised in character (existing development is of a scale and density to absorb the visual impact).	The area is moderately able to absorb the visual impact, as it has: ▪ Moderately undulating topography and relief ▪ Some or partial screening vegetation ▪ A relatively urbanised character (existing development is of a scale and density to absorb the visual impact to some extent.	The area is not able to absorb the visual impact as it has: ▪ Flat topography ▪ Low growing or sparse vegetation ▪ Is not urbanised (existing development is not of a scale and density to absorb the visual impact to some extent.)
 http://www.franschhoek.co.za	 http://wikipedia.org	 http://www.butbn.cas.cz
 http://commons.wikimedia.org	 http://blogs.agu.org	 http://fortheinterim.com

6.3 Sensitivity of Visual Receptors

Receptors are important insofar as they inform visual sensitivity. The sensitivity of viewers is determined by the number and nature of viewers.

Viewers can be deemed to have:

1. High sensitivity if they view the project from, e.g., residential areas, nature reserves and scenic routes or trails;
2. Moderate sensitivity if they view the project from, e.g., sporting or recreational areas or places of work; and
3. Low sensitivity if they view the project from or within, e.g., industrial, mining or degraded areas, or motorists with fleeting views.

The sensitivity of potential viewers identified in Section 5.4 is described below:

- **Farmstead receptors:** There are a limited number of isolated farmsteads surrounding the site. The farmsteads located closest to the SEF are on the same property as the SEF. The respective owners of the Remainder of Farm Rhenosterkop 155 and Farm 400, on which the Rhino and Sunnyside SEFs will be located are ostensibly considered receptors; however, these owners have reached a negotiated agreement with the Applicant and will receive financial remuneration in compensation for development on their property. As such, they are not deemed to be sensitive receptors. Farmsteads beyond these are not considered highly sensitive receptors, since they are some distance from the project, therefore have limited visibility.
- **Railway personnel and passengers (Rhino SEF only):** A railway line is routed adjacent to the north-western boundary of the Rhino SEF property. This railway line is both a freight and passenger route. Only few of the individuals travelling on the train are likely to be tourists or visitors to the area. They are considered to have a low sensitivity due to their temporary exposure to the site.
- **Motorists and tourists:**
    - Rhino SEF: The N1 national road is routed to the north-west of the Rhino SEF property. Heavy traffic volumes are common, a large portion being cargo trucks travelling between Cape Town and Gauteng.
    - Sunnyside SEF: A gravel road from Beaufort West transects Farm 400 and leads to farms located further east.

  Motorists are considered to have relatively low sensitivity as they are transient receptors with fleeting views of the project. Transiting tourists may have higher sensitivity.

The limited number of highly sensitive visual receptors is further moderated by the large number of motorists with fleeting views. The sensitivity of the viewers or visual receptors potentially affected by the visual impact of the project is considered to be ***low.***

6.4 Viewing Distance and Visibility

The distance of a viewer from an object is an important determinant of the magnitude of the visual impact. This is because the visual impact of an object diminishes / attenuates as the distance between the viewer and the object increases. Thus, the visual impact at 1 000 m would, nominally, be 25% of the impact as viewed from 500 m (Figure 6-3). At 2 000 m it would be 10% of the impact at 500 m (Hull and Bishop, 1988 in (Young, 2000)).

Three basic distance categories can be defined for a project of this scale (as discussed and represented in Table 6-2): foreground, middleground and background.

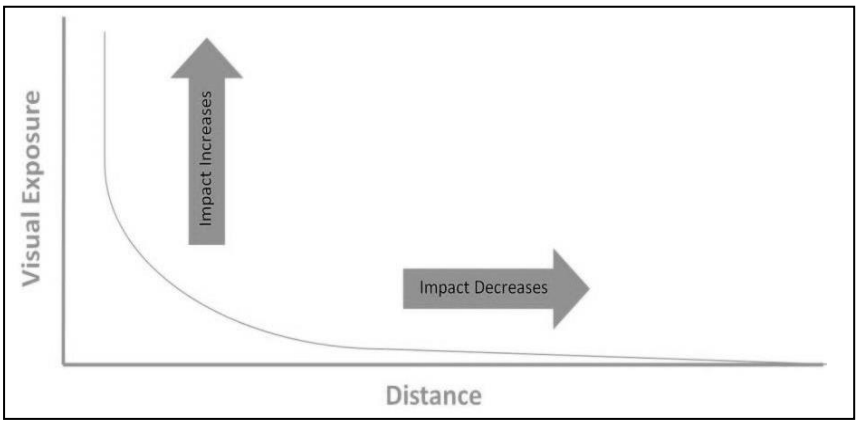


Figure 6-3: Visual exposure vis-à-vis distance

Table 6-2: Distance categories

FOREGROUND (0 – 1 km)	The zone where the proposed project will dominate the frame of view. The project will be *highly visible* unless obscured.
MIDDLEGROUND (1 - 2 km)	The zone where colour and line are still readily discernible. The project will be *moderately visible* but will still be easily recognisable.
BACKGROUND (2 - 5 km)	This zone stretches from 2 km to 5 km. Objects in this zone can be classified as *marginally visible* to *not visible*.

A number of viewpoints were selected to indicate locations from where receptors may (or may not) view the project. The viewpoints are listed in Table 6-4 and shown in Figure 6-4 and Figure 6-5. Current views from these points are shown in Appendix B.

The predicted visibility of (any element of the project) from each viewpoint is described in Table 6-4, based on the visibility categories in Table 6-2. Note that unlike visual exposure (Section 6.1) which describes areas from which the project may be visible without taking local screening into account (i.e., the viewshed), visibility describes predicted, actual visibility. The visibility of the projects can be summarised as follows:

- Rhino SEF: Receptors will have limited visibility of the Rhino SEF in general, with the site only being marginally visible to receptors travelling along the railway line and the gravel road approaching the site (VP 3A). The limited visibility of the site is largely related to the distance of the site from receptors and screening of the site by existing vegetation; and

- Sunnyside SEF: The Sunnyside SEF will only be marginally visible from sections of the gravel road directly to the north of the site (e.g. VP 1B and 2B). The site is not visible to receptors and viewpoints located to the north, north-east and east of the site due to screening of the site by intervening topography and vegetation as well as distance from the site.

Overall, the proposed SEFs are marginally visible in the background to receptors and are therefore their visibility is considered ***low***.

Table 6-3: Visibility criteria

NOT VISIBLE	Project cannot be seen	
MARGINALLY VISIBLE	Project is only just visible / partially visible (usually in the background zone)	
VISIBLE	Project is visible although parts may be partially obscured (usually in middleground zone)	
HIGHLY VISIBLE	Project is clearly visible (usually in foreground or middleground zone)	

Table 6-4: Visibility from viewpoints

Viewpoint #	Location	Co-ordinates	Direction of view	Potential Receptors	Visibility
Rhino SEF					
VP 1A	N1 & Farmstall	32°13'51.75"S 22°48'23.71"E	Looking east	Motorists travelling on the N1 and patrons to the farmstall.	**Not Visible** The SEF is not visible due to distance and screening by vegetation.
VP 2A	N1 & Farm Road	32°12'41.58"S 22°50'25.51"E	Looking south-east	Motorists travelling on the N1 and the Farm Road.	**Not Visible** The SEF is not visible due to distance and screening by vegetation.
VP 3A	Railway & Farm Road	32°12'56.87"S 22°50'48.61"E	Looking south	Motorists travelling on the farm road and rail passengers.	**Marginally Visible** The SEF will be marginally visible due to screening by vegetation.
VP 4A	Farm Road & dwellings	32°12'35.85"S 22°51'15.41"E	Looking south	Motorists travelling on the farm road and residents of the farm dwellings.	**Not Visible** The SEF is not visible due to distance and screening by intervening topography and vegetation.
VP 5A	N1 & Farm Road	32°12'18.62"S 22°50'55.13"E	Looking south	Residents of farmstead and motorist travelling on the N1.	**Not Visible** The SEF is not visible due to distance and screening by intervening topography and vegetation.
VP 6A	Farmstead North	32°12'18.62"S 22°50'55.13"E	Looking south	Residents of farmstead and motorist travelling on the N1.	**Not Visible** The SEF is not visible due to distance and screening by intervening topography and vegetation.
Sunnyside SEF					
VP 1B	Gravel road North	32°19'35.48"S 22°50'9.27"E	Looking south	Motorists travelling on the gravel road.	**Marginally Visible** The SEF will be marginally visible due to screening by vegetation.
VP 2B	Gravel road North-East	32°20'14.66"S 22°52'13.65"E	Looking south-west	Motorists travelling on the gravel road.	**Marginally Visible** The SEF will be marginally visible due to screening by vegetation.
VP 3B	Farmstead Road	32°20'27.44"S 22°52'48.10"E	Looking south-west	Motorists travelling on the gravel road.	**Not Visible** The SEF will not be visible due to screening by intervening topography.
VP 4B	Gravel road East	32°20'45.29"S 22°53'38.96"E	Looking west	Motorists travelling on the gravel road.	**Not Visible** The SEF will not be visible due to screening by intervening topography.

Viewpoint #	Location	Co-ordinates	Direction of view	Potential Receptors	Visibility
VP 5B	Farmstead East	32°21'18.84"S 22°56'56.88"E	Looking west	Residents and motorists travelling on the gravel road.	**Not Visible** The SEF will not be visible due to distance and screening by intervening topography.

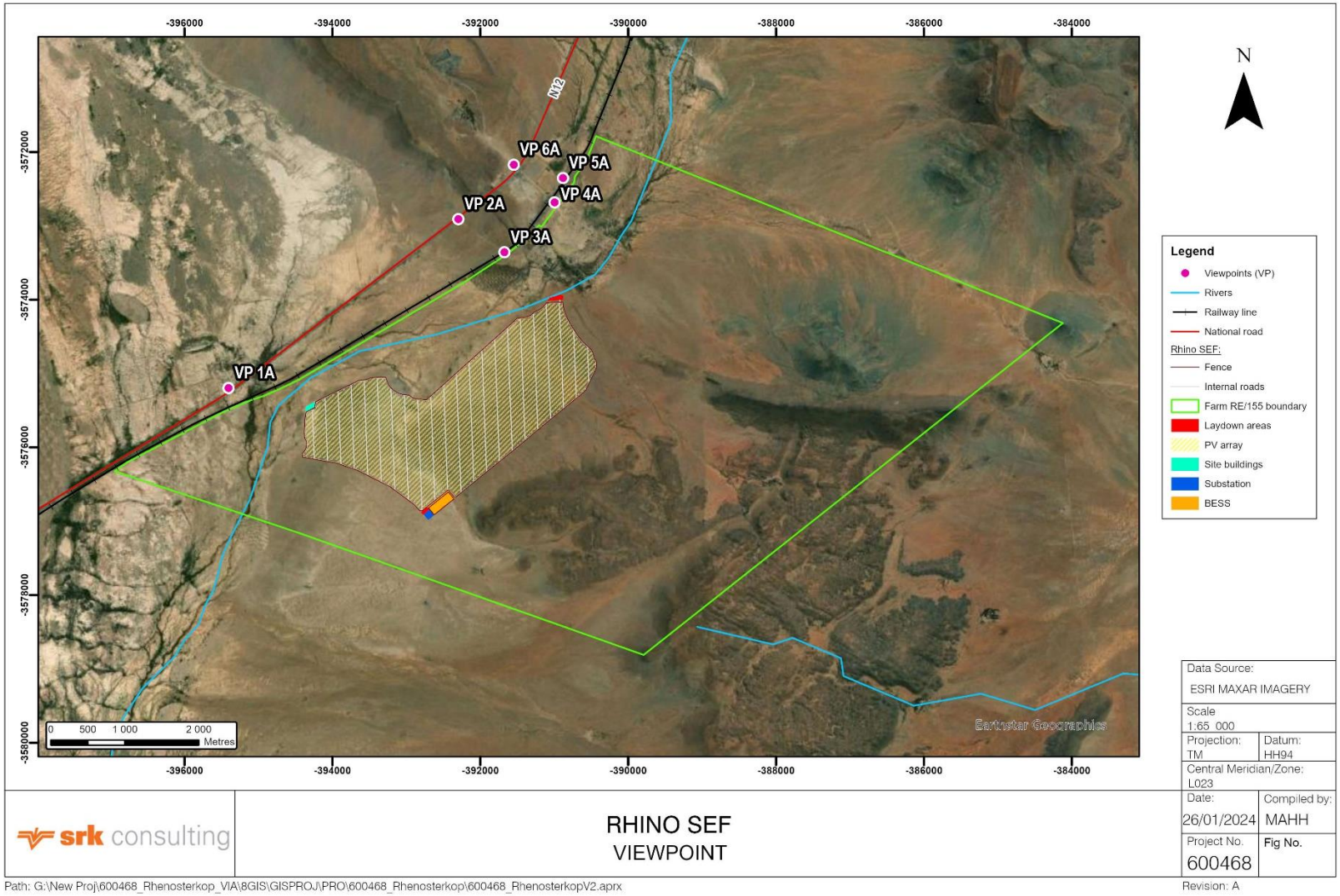


Figure 6-4: Rhino SEF viewpoints

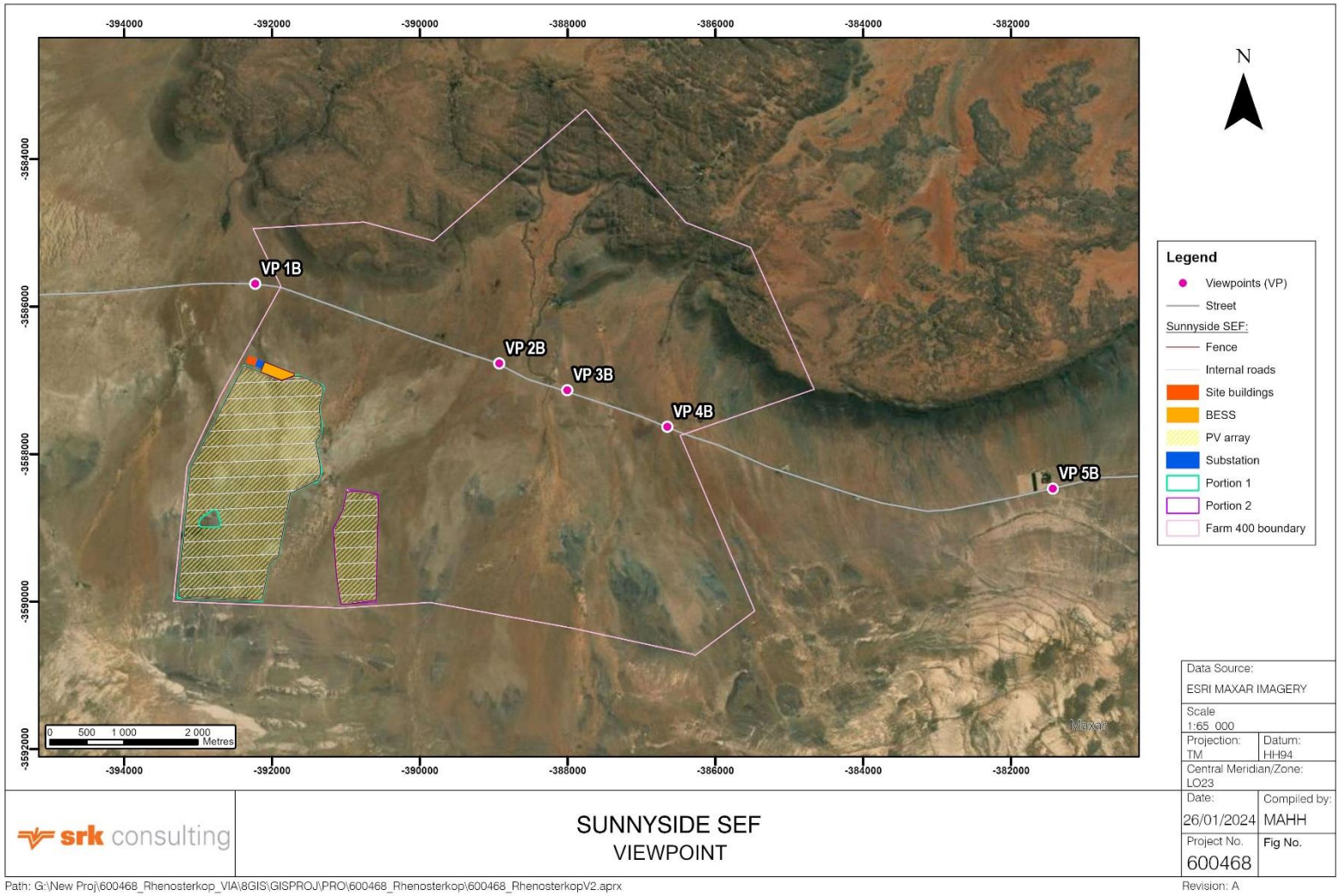


Figure 6-5: Sunnyside SEF viewpoints

6.5 Compatibility with Landscape Integrity

Landscape (or townscape) integrity refers to the compatibility of the development / visual intrusion with the existing landscape. The landscape integrity of the project is rated based on the relevant criteria listed in Table 6-5.

Table 6-5: Landscape integrity criteria

Criterion	Landscape integrity		
	High	**Moderate**	**Low**
	The project is:		
Consistency with existing land use of the area	Consistent	Moderately consistent	Not consistent / very different
Sensitivity to natural environment	Highly sensitive	Moderately sensitive	Not sensitive
Consistency with urban texture and layout	Consistent	Moderately consistent	Not consistent / very different
Congruence of buildings / structures with / sensitivity to existing architecture / buildings	Congruent / sensitive	Moderately congruent / sensitive	Not congruent / sensitive
Scale and size relative to nearby existing development	Similar	Moderately similar	Different

The proposed project is located within a rural area comprising large, undeveloped farms with natural vegetation predominantly used for grazing. The vast, undeveloped expanse of arid landscape can be experienced by receptors as desolate. The Rhino SEF is bisected and bordered by two transmission powerlines. No other renewable facilities are visible from the SEF sites.

PV arrays will introduce a large, uniform anthropogenic artefact into the landscape discordant with scale, texture and current land use around the SEFs (Figure 6-6). The discordant nature of the SEF will result in the SEF being experienced as a visual intrusion in the landscape. Where the SEF is visible in the foreground, the rows of panels and the vertical dimensions may be discernible to receptors. When visible in the middle- or background from various elevated viewpoints in the surrounding area, the array will appear as a dark, uniform two-dimensional geometric unit.

The project is deemed to have a ***low*** integrity with the surrounding landscape.

Figure 6-6: Example of a SEF in an arid environment

6.6 Solar Reflection

The suite of visual receptors that may (in theory) be impacted by glint and glare caused by any new development may include:

- Residents;
- Motorists;
- Train drivers; and
- Pilots and air traffic controllers.

Visual receptors potentially exposed to solar reflection by this project are residents, motorists and train personnel and passengers (see Section 6.4).

6.6.1 Glare Thresholds

The ocular (or visual) impact of glare has been categorised into the following three categories (Ho, Ghanbari, & Diver, 2011):

- Green: low potential to cause after-image;
- Yellow: potential to cause temporary after-image; and
- Red: potential to cause retinal burn (permanent eye damage)[4].

The Glare Hazard Plot (Figure 6-7) illustrates the ocular impact of solar glare as a function of the intensity of the glare source on the retina (retinal irradiance) and the portion of a viewer's field of vision that the glare occupies (subtended source angle).

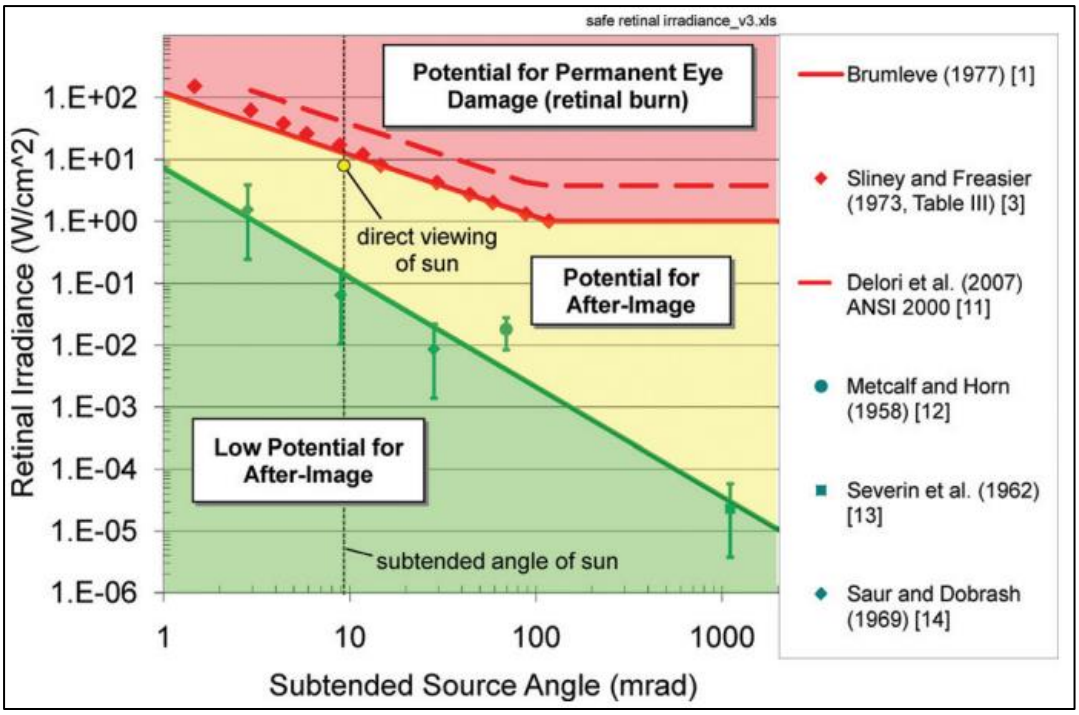


Figure 6-7: Potential impacts of retinal irradiance as a function of subtended source angle

[4] Retinal burn is typically not possible from SPV glare as the SPV panels do not focus the reflected sunlight.

As discussed in Section 4.1, no content requirements or guidelines relating to glint and glare thresholds or reporting have been released by South African authorities. German guidelines on acceptable glare thresholds have been defined as less than 30 minutes per day or 30 hours per year (Federal Ministry of the Environment, 2014). When glare exceeds this threshold, glare is considered significant, and mitigation is required.

SRK's framework for assessing the magnitude of glare is based on the two categories of glare applicable to PV facilities (Green glare and Yellow glare) in the Glare Hazard Plot (Ho, Ghanbari, & Diver, 2011) and the German guidelines (Federal Ministry of the Environment, 2014). The framework is presented in Table 6-6 below.

Table 6-6: Magnitude of glare impacts for PV facilities

Impact	Category of Glare[5]	Duration of Glare
High[6]	Yellow	> 30 minutes per day and >30 hours per year
Moderate	Yellow	> 30 minutes per day or > 30 hours per year
Low	Yellow or Green	< 30 minutes per day and < 30 hours per year

6.6.2 Modelling Glare

Glare modelling was conducted for the proposed layouts for the PV arrays using ForgeSolar's GlareGauge. The parameter inputs used to model glare for the proposed project are included in Table 6-7 and the GlareGauge report included in Appendix C.

Table 6-7: Solar reflection model parameters

Parameter	Input
Panel height (centroid)	1.55 m
Axis tracking	Single
Tracking axis orientation	North – South
Tracking axis tilt	0°
Tracking axis panel offset	0°
Maximum tracking angle	60°
Resting angle	0°
Panel material	Smooth glass without anti-reflection coating
Receptor height – Residents[7]	1.5 m
Receptor height - Motorists	1.5 m
Receptor height – Railway	2 m

[5] Category of glare in terms of the Glare Hazard Plot; Red Glare, Yellow Glare and Green Glare (Ho, Ghanbari, & Diver, 2011).

[6] Exceeds the German glare guideline

[7] Assumption that average eye level standing is 1.5m.

A total of 12 Observation Points (OPs), comprising one Air Traffic Control Tower (ATCT), two OPs around Sunnyside SEF and nine OPs around Rhino SEF, were modelled to ascertain whether glare would be experienced by receptors (e.g. residents and ATCT) surrounding the site (Figure 6-8 and Figure 6-9). The viewshed and the visibility recorded during the site visit was reviewed during the selection of OPs, as glare can only be experienced if the PV array is visible to the receptor.

Potential glare experienced by motorists on the N1 and the gravel road from Rhino and Sunnyside SEFs were also modelled in both directions (two-way road) (Figure 6-8 and Figure 6-9). Glare from Rhino SEF, experienced by railway personnel and passengers, was also modelled in both directions (Figure 6-8).

The Karoo Gateway (Beaufort West) Airport is located approximately 15 km to the south-west of Rhino SEF and approximately 16 km west of Sunnyside SEF. The flight approach paths for the single runway were also modelled (Figure 6-8 and Figure 6-9).

Based on the input parameters (Table 6-7), the glare analysis demonstrated that glare from only Sunnyside SEF will be experienced by motorists on the gravel road. The full glare modelling report is included in Appendix D.

Modelling of glare from Rhino SEF shows that no visual receptors at the OPs, routes and flight paths will experience glare from Rhino SEF.

Principal findings from the modelling of glare from Sunnyside SEF are summarised below:

- None of the OPs (OP1, OP2 or ATCT) will experience yellow category glare from the Sunnyside SEF;
- Motorists will experience short durations of glare while travelling on the gravel road. Less than 2.5 hours of yellow category glare will be experienced per year along the gravel road; and
- No glare will be experienced by pilots as they approach the runway at the Karoo Gateway Airport.

Glint is not modelled. However, if the PV panels are visible to moving receptors, then glint and an after-image may be experienced.

No OP or route will be exposed to glare originating from Rhino SEF, as such exposure to glare is anticipated to be ***low / none***.

None of the OPs (including airports and motorists) will be exposed to glare originating from Sunnyside SEF for a duration > 30 minutes per day **and** > 30 hours per year: as such exposure to glare is anticipated to be ***low***.

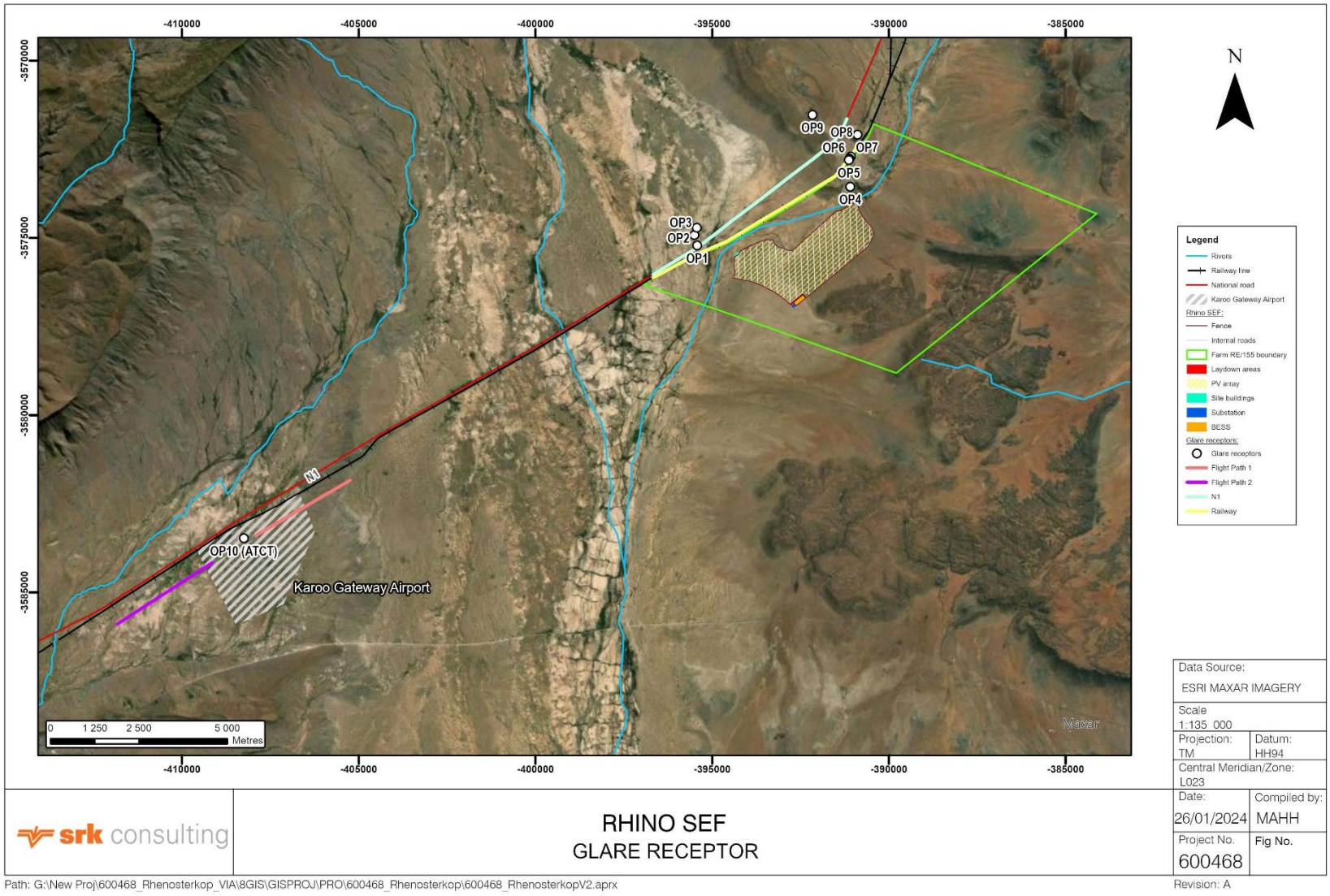


Figure 6-8: Rhino SEF glare receptors

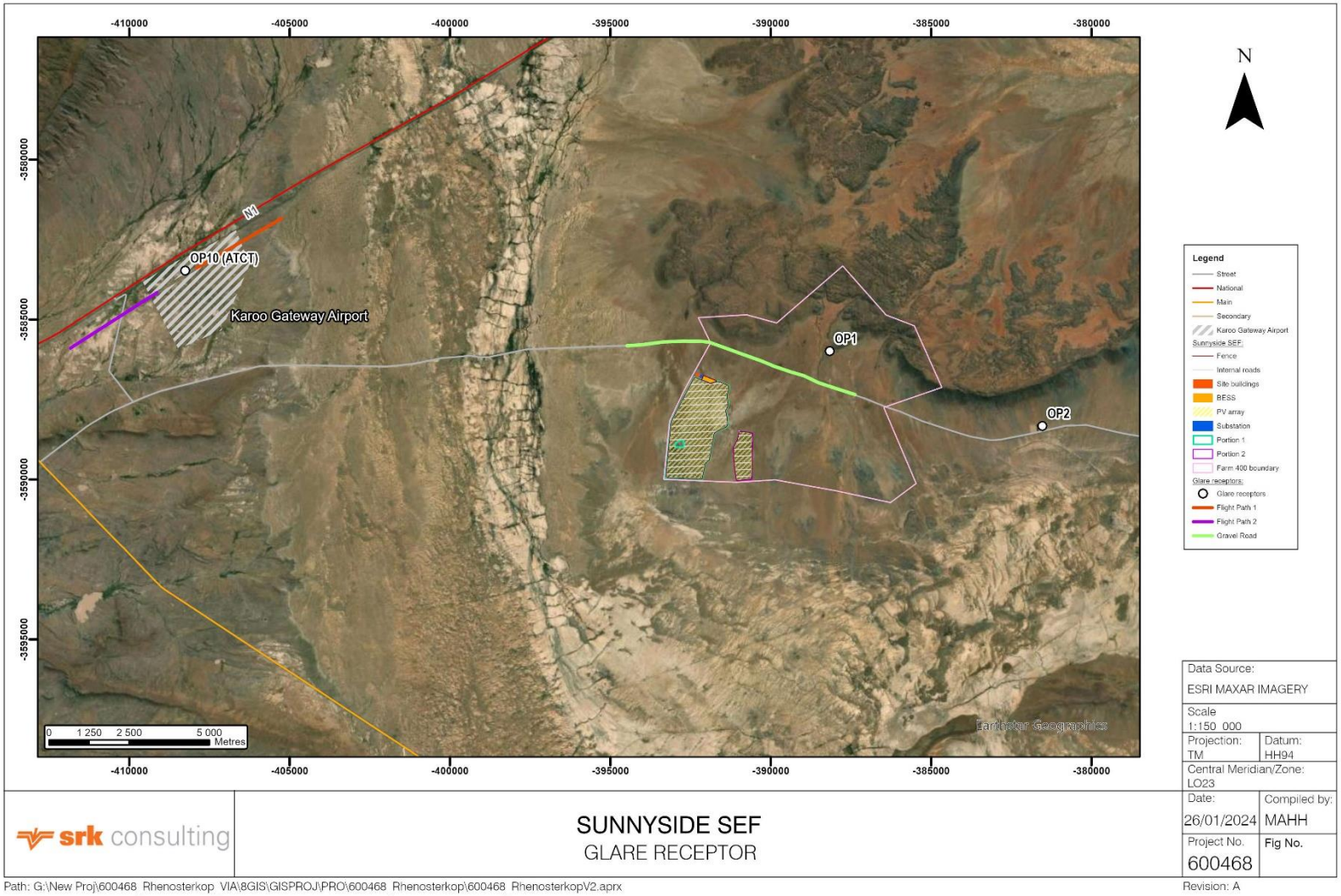


Figure 6-9: Sunnyside SEF glare receptors

6.7 Magnitude of Overall Visual Impact

Based on the above criteria, the magnitude or intensity of the overall visual impact that is expected to result from the project has been rated. Table 6-8 provides a summary of the criteria, a descriptor summarising the status of the criteria and projected impact magnitude ratings.

The overall magnitude of visual impact from Rhino SEF is rated as ***moderate***. The high visual exposure, low landscape integrity and VAC is moderated by the low viewer sensitivity, visibility, and low exposure to solar reflection (glare).

The overall magnitude of visual impact from Sunnyside SEF is rated as ***moderate***. The low landscape integrity and VAC is moderated by the low viewer sensitivity, visibility, and low exposure to solar reflection (glare).

Table 6-8: Magnitude of overall visual impact

Criteria	**Rhino SEF**		**Sunnyside SEF**	
	Rating	Comments	Rating	Comments
Visual Exposure (Viewshed)	High	The viewshed indicates that Rhino SEF is visible up to 5 km from the site boundary to the north, north-east, south, west and north-west. The SEF will be visible from the N1 to the north-west of the site. The SEF cluster will also be visible to railway passengers on the railway line to the north-west of the site.	Moderate	The viewshed indicates that the SEF is visible up to 5 km to the south, north-east and north of the site. To the east and north-west of the SEF, the project is visible up to 2 km from the boundary. The site will be visible to motorists travelling along a short section of the gravel road to the north of the site.
Visual Absorption Capacity	Low	Rural areas generally have a low VAC. The low VAC of the surrounding area is further reduced by absence of development, open space and low growing vegetation. The low vertical profile of the PV arrays, and the ridges, koppies and prominences in the landscape marginally increase the VAC.	Low	Rural areas generally have a low VAC. The low VAC of the surrounding area is reduced by absence of development, open space and low growing vegetation. The low vertical profile of the PV arrays and the ridges, koppies and prominences in the landscape marginally increase the VAC.
Viewer Sensitivity (Receptors)	Low	The limited number of highly sensitive visual receptors is further moderated by the large number of motorists with fleeting views.	Low	The limited number of highly sensitive visual receptors is further moderated by the large number of motorists with fleeting views.
Viewing Distance and Visibility	Low	The proposed SEF is marginally visible in the background to receptors from only one viewpoint.	Low	The proposed SEF is marginally visible in the background to receptors travelling past (or stationary at) VP 1B and 2B.
Landscape Integrity	Low	The PV array will introduce a large, uniform anthropogenic artefact into the landscape discordant with scale, texture and current land use around the SEFs.	Low	The PV array will introduce a large, uniform anthropogenic artefact into the landscape discordant with scale, texture and current land use around the SEFs.
Solar Reflection	Low / none	No OP or route will be exposed to glare originating from Rhino SEF.	Low	No OP (including airports and motorists) will be exposed to glare originating from Sunnyside SEF for a duration > 30 minutes per day **and** > 30 hours per year.

7. IDENTIFICATION AND ASSESSMENT OF IMPACTS

The following section describes the visual impacts anticipated during the construction, operational and decommissioning phases, and assesses the significance of these impacts utilizing the impact rating methodology presented in Appendix D.

Possible measures to avoid, mitigate or compensate visual impacts will be considered and recommended, depending on the severity of the impacts and the feasibility of measures. The mitigation hierarchy and sample measures are provided below below (DEA&DP, 2005):

- Avoid, e.g., by re-examining the need for the proposed project, relocating the project or re-designing the project;
- Mitigate (reduce), e.g., through adjustments to the siting and design of the project, careful selection of finishes and colours, use of earthworks (such as berms) and planting to provide visual screening and dust control where required;
- Rehabilitate and restore, e.g., through on-site and off-site landscape rehabilitation of areas affected by the project, which may include re-instating landforms and natural vegetation, provision of landscaped open space etc.;
- Compensate and offset, where avoidance or mitigation cannot achieve the desired effect; and
- Enhance, where the proposed project is located in run-down areas or degraded landscapes.

The project relates to the greenfield development of a SEF and associated infrastructure (i.e., on-site substation and BESS) and the range of potential visual impacts is thus larger than it would be for a brownfield project (e.g., rooftop or urban SEF).

Direct visual and aesthetic impacts are likely to result from the following project interventions and/or activities:

- Earthworks and construction activities (including clearing of vegetation and associated generation of dust);
- Glint and glare originating from the PV array causing visual discomfort and impairing visibility to receptors;
- Change in the character of the area caused by the project;
- Visual intrusion compromising vistas across the project area; and
- Increased light pollution.

The visual and aesthetic impacts generated by the project are likely to be associated with visual intrusion and visual quality.

7.1 Construction Phase

7.1.1 Altered Sense of Place and Visual Intrusion caused by Construction Activities associated with the Rhino and Sunnyside SEF

Visual impacts will be generated by construction activities such as earthworks, which can generate dust, and from construction infrastructure, plant and materials on each of the sites (e.g., site camp, plant and machinery, and stockpiles of excavated material). Dust generated during construction will be visually unappealing and may detract from the visual quality (and sense of place) of the area. These impacts are typically limited to the immediate area surrounding the construction sites and development footprints, during the construction periods.

Construction activities will have a greater impact within the foreground (< 200 m) as sensitive receptors in close proximity to these activities will be particularly exposed to these visual impacts. However, very few farmsteads (other than the landowner's dwelling – see Section 5.4) are evident from aerial imagery and the site visit, and none were identified to be within the foreground.

The impact relating to Rhino SEF is assessed to be of ***medium*** significance and with the implementation of mitigation is reduced to ***low*** (Table 7-2).

The impact relating to Sunnyside SEF is assessed to be of ***medium*** significance and with the implementation of mitigation is reduced to ***low*** (Table 7-3).

7.2 Operational Phase

7.2.1 Altered Sense of Place and Visual Intrusion caused by the SEFs

The Rhino and Sunnyside SEF have a development footprint of 563 ha and 525 ha, respectively. The development of the respective PV arrays may be perceived as conflicting with the current undeveloped, agricultural landscape. Although, a number of renewable energy projects are proposed in the area directly adjacent to the sites, many of them have not yet been constructed. Therefore, within the current landscape the proposed projects are considered incongruent in scale, size and form.

Furthermore, although modelling shows that receptors will not be exposed to glare from Rhino SEF, while only motorists on the gravel road will be exposed to glare from Sunnyside SEF for a short duration (see Section 6.6), the glint/glare emanating from the PV arrays may be seen and experienced as an unobtrusive twinkle across the landscape. The glare, though not affecting permanent receptors in a significant manner, will be generated and therefore contributes to the altered sense of place.

Each of the SEFs will also include a BESS, on-site substation. Where possible, the medium voltage powerlines (up to 33 kV) will be installed underground. Although existing transmission powerlines are visible to the Rhino and Sunnyside SEF receptors, the BESS, on-site substation and grid connections are not congruent with the current landscape integrity, and will contribute to visual clutter, present as visual intrusion and negatively impact the sense of place: however, few receptors are expected to be exposed.

Receptors, identified through examination of aerial imagery and during the site visit are few and are largely located to the north and west of the Rhino SEF and north-west, north and east of the Sunnyside SEF. Due to

their distance from the property and screening by vegetation and topography, receptors are not expected to experience the SEF as a significant transformation in the landscape.

Motorists on the N1 are located some distance from the Rhino SEF and are not expected to be exposed to the Rhino SEF project. Motorists on the gravel road bisecting Farm 400, to the north of the Sunnyside SEF, may view the Sunnyside SEF in the background. Due to their fleeting views and transient exposure to the area, motorists are not considered sensitive receptors.

The railway line located to the north-west of the Rhino SEF serves freight and passenger trains. Thus, the personnel and passengers are considered visual receptors, particularly the passengers who may be travelling the route through the Karoo (e.g., on the Blue Train). Nevertheless, their exposure to the Rhino SEF is transient.

Possibly offsetting this (and many other) operational impacts is the widely held public perception that renewable energy projects are inherently laudable, are an essential component of the energy transition and serve an honourable purpose, notably to mitigate climate change impacts. There is a degree of subjectivity in determining receptors' responses, and PV arrays may be perceived as negative or positive, majestic or dominant, depending on the receptors' perception of the landscape and the value they ascribe to renewable green energy. It is quite plausible that many (less directly affected) stakeholders may be more forgiving of associated project impacts.

The impact relating to Rhino SEF is assessed to be of ***medium*** significance and with the implementation of mitigation is reduced to ***low*** (Table 7-2).

The impact relating to Sunnyside SEF is assessed to be of ***medium*** significance and with the implementation of mitigation is reduced to ***low*** (Table 7-3).

7.2.2 Impaired Visibility and/or Visual Discomfort caused by Glint and Glare from the PV Arrays

Due to the proximity of the SEF to (primarily) roads, but also a railway and dwellings, the potential glare impact was modelled.

The glare analysis for Rhino SEF indicated that no glare will be experienced at any of the modelled OPs, by pilots on the approach to the Karoo Gateway Airport or motorists on the N1 (see Section 6.6.2).

The glare analysis for Sunnyside SEF indicated that no glare will be experienced at the modelled OPs or by pilots on the approach the Karoo Gateway Airport. However, motorists on the gravel road will experience glare along short sections of the road adjacent to the site, for a short duration (see Section 6.6.2).

In theory, it is possible that moving receptors, notably motorists or rail personnel/passengers, may experience glint from the PV panels, however considering that only the gravel road will be exposed to glare from Sunnyside SEF, it is only this routes that may experience glint.

As no glare is expected from Rhino SEF, the impact associated with visual discomfort or impaired visibility is considered insignificant.

The impact relating to Sunnyside SEF is assessed to be of ***low*** significance with and without the implementation of mitigation (Table 7-3).

7.2.3 Altered Visual Quality caused by Light Pollution at Night

It is anticipated that lighting will be installed along the site perimeter and / or around the BESS and on-site substation.

The installation of lighting on the site perimeter and / or around the BESS will generate nightglow that currently does not emanate from the natural, undeveloped property or surrounds. As such, the introduction of lighting on each of the sites alters the sense of place and visual quality to surrounding receptors.

The distance between the two SEF sites reduces the likelihood that the visual impact from both SEF sites will be experienced by the same receptor.

Lighting is not easily screened by vegetation or topography, and the proposed lighting will contribute to any existing nightglow from the surrounding areas and significantly alter visual quality of the surrounding area.

The impact relating to Rhino SEF is assessed to be of ***low*** significance with and without the implementation of mitigation (Table 7-2).

The impact relating to Sunnyside SEF is assessed to be of ***low*** significance with and without the implementation of mitigation (Table 7-3).

7.3 Decommissioning Phase – SEF Components

7.3.1 Altered Sense of Place caused by the Decommissioning Activities for each SEF

While the PV arrays and associated infrastructure are anticipated to operate in the long-term, when decommissioning is required visual impacts will be generated.

Decommissioning will include earthworks, the presence and movement of plant and equipment on the sites, and stockpiles of excavated material. Dust generated during decommissioning will be visually unappealing and may detract from the visual quality and sense of place of the area. These impacts are typically limited to the immediate area surrounding the sites, during the decommissioning period.

Decommissioning activities will have a greater impact within the foreground (< 200 m) as sensitive receptors in close proximity to these activities will be particularly exposed to these visual impacts. However, very few farmsteads are evident from aerial imagery, and none were identified to be within the foreground of the sites.

The impact relating to Rhino SEF is assessed to be of ***medium*** significance and with the implementation of mitigation is reduced to ***low*** (Table 7-2).

The impact relating to Sunnyside SEF is assessed to be of ***medium*** significance and with the implementation of mitigation is reduced to ***low*** (Table 7-3).

7.4 Cumulative Impacts

7.4.1 Introduction

For the purposes of this report, cumulative impacts are defined as 'direct and indirect impacts that act together with existing or future potential impacts of other activities or proposed activities in the area / region that affect the same resources and / or receptors'.

For the most part, cumulative effects or aspects thereof are too uncertain to be quantifiable, due mainly to a lack of data availability and accuracy. This is particularly true of cumulative effects arising from potential or future projects, the design or details of which may not be finalised or available and the direct and indirect impacts of which have not yet been assessed.

For practical reasons, the identification and management of cumulative impacts are limited to those effects generally recognised as important on the basis of scientific concerns and/or concerns of affected communities, in this case effects of other renewable energy facilities and large-scale infrastructure projects.

7.4.2 Cumulative Impacts Analysis

In addition to the project, other past, present and future activities have taken place or are proposed within a 35 km radius of the project site that might have caused or may cause impacts and may interact with impacts caused by the project. These are briefly discussed in this section.

There are 18 approved renewable energy projects within 35 km of Rhino and Sunnyside SEFs listed on DFFE South African Renewable Energy EIA Application Database (DFFE, 2023). Of the 18, 13 are SEFs and five are WEFs. These approved projects are largely located to the north-east and south-west of Rhino and Sunnyside SEFs. In addition to these renewable energy facilities, there are four approved additional associated infrastructure projects, comprising either radio masts, substations and/or powerlines. These projects are listed in Table 7-1 and their location shown in Figure 3-1.

Table 7-1: Related projects within a 35 km radius of the project site

	Facility Name / Description	**Status**	**MW**
	Renewable energy facilities		
1	Nuweveld WEF and 132/400 kV Powerline	Approved	Unknown
2	Montana 1 SEF	Approved	Unknown
3	Montana 2 SEF	Approved	Unknown
4	Montana 3 SEF	Approved	Unknown
5	120 MW Bulkskop PV	Approved	120
6	120 MW Gamka PV	Approved	120
7	120 MW Hardeveld PV	Approved	120
8	120MW Hoodia PV	Approved	120
9	120 MW Rosenia PV	Approved	120
10	19MW SEF by Lurama 214 Pty Ltd	Approved	19
11	85MW Beaufort West Photovoltaic Park	Approved	85
12	75MW Beaufort West PV	Approved	75
13	Beaufort West Solar Power Plant Site 1	Approved	90

	Facility Name / Description	Status	MW
14	Beaufort West Solar Power Plant Site 2	Approved	90
15	Beaufort West Solar Power Plant Site 3	Approved	90
16	220MW Jessa M WEF	Approved	220
17	220MW Jessa Z WEF	Approved	220
18	204MW Jessa S WEF	Approved	204
	Associated infrastructure		
19	400 kV Powerline from Blanco Substation (George) to Droerivier Substation (Beaufort West)	Unknown	N/A
20	Genelania 132/400 kV Main Transmission Substation and 400 kV Overhead Line associated with Beaufort West Wind Farm	Unknown	N/A
21	132/400 kV Main Transmission Substation and 400 kV Overhead Line associated with Beaufort West Wind Farm	Unknown	N/A
22	Proposed development of a radio mast	Approved	
			1 693 MW

WEFs are generally more visually intrusive structures within the landscape due to their height and form. SEFs have a lower visual impact to the surrounding region due to their low vertical profile and therefore, lower visibility across vistas in the landscape, when compared to projects such as WEFs or power stations. Nevertheless, both WEFs and SEFs result in change to the visual character of a large area, and therefore can alter the sense of place to visual receptors in the broader vicinity. From aerial imagery, none of the facilities appear to be operational. As these facilities are constructed and enter their operational phase, the visual landscape is expected to be significantly transformed detracting from the visual quality of the region. As SEFs and WEFs proliferate, impacts will accumulate towards an unknowable threshold, beyond which they may no longer be tolerable, occasioning more widespread stakeholder resistance.

Until then, as mentioned, the widely held public perception that renewable energy projects are inherently laudable and are an essential component of the energy transition and serve an honourable purpose, can offset the impacts.

The power generated by the projects will be evacuated to the national grid via a 132 kV overhead powerline connecting the on-site substation to the MTS. The MTS will either connect to an existing powerline with a LILO or connect to the existing Droerivier MTS. This infrastructure will be the subject of a separate application but has been considered in the cumulative impact assessment. Powerlines, BESS's and substations are typical components of renewable energy facilities. Despite the rural location of the project and surrounding area, the region has a high concentration of approved renewable energy projects likely due to the positioning within a REDZ.

In addition to the infrastructure associated with the approved renewable energy facilities, a mining permit for a 5 ha dolerite quarry approximately 2.5 km east of Rhino SEF was granted in 2023. The site of the quarry is located on the slope of the ridgeline extending along the eastern boundary of remainder of Farm Rhenosterkop 155. This quarry may be visible in the background to receptors and appear as a scar tarnishing the ridgeline.

SiVEST's Impact Assessment methodology has been used to evaluate the cumulative visual impacts of the project on the sense of place within a 35 km radius. Mitigation measures have been recommended, however the majority cannot be implemented by the Applicant as they relate to activities beyond the boundaries of the project, over which the Applicant has no jurisdiction, influence or right to impose mitigation. Impact ratings *with mitigation* thus assume only the implementation of project related mitigation measures. For each impact,

additional mitigation measures applicable to other activities or facilities in the area are identified which could reduce the significance of the cumulative impact assuming the relevant authorities are able to enforce implementation. The cumulative impact of the SEF and associated infrastructure is assessed to be of ***medium*** significance and with the implementation of mitigation is reduced to ***low*** (Table 7-4).

7.5 Overall Impact Rating

The impact assessment and ratings are summarised for Rhino SEF in Table 7-2, for Sunnyside SEF in Table 7-3 and for cumulative impacts in Table 7-4.

Table 7-2: Rating of impacts – Rhino SEF

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ /-)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ / -)	S
Construction Phase																				
Altered Sense of Place and Visual Intrusion caused by Construction Activities	Dust generated during construction will be visually unappealing and may detract from the visual quality (and sense of place) of the area. These impacts are typically limited to the immediate area surrounding the construction site, during the construction period.	2	4	1	1	1	3	27	-	Medium	• Limit vegetation clearance and the footprint of construction to what is absolutely essential. • Consolidate the footprint of the construction camp to a functional minimum. • Avoid excavation, handling and transport of materials which may generate dust under very windy conditions. • Keep stockpiled aggregate and sand covered to minimise dust generation. • Keep construction site tidy.	2	3	1	1	1	2	16	-	Low
Operational Phase																				
Altered Sense of Place and Visual Intrusion caused by the SEF	The development of this PV array may be perceived as conflicting with the current undeveloped, largely deserted inhospitable agricultural landscape. The proposed SEF is anticipated to interrupt and/or degrade views, affecting the sense of place and presenting as a visual intrusion across the landscape.	2	3	1	1	3	3	30	-	Medium	• Ensure that the roof colour of the proposed buildings blends into the landscape. • Install the powerlines underground, where possible. • Fence the perimeter of the site with green or black fencing.	2	3	1	1	3	2	20	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ /-)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ / -)	S
Altered Visual Quality caused by Light Pollution at Night	The installation of lighting on the site perimeter and / or around the BESS is anticipated to generate nightglow which currently does not emanate from the natural, undeveloped site. The introduction of lighting on the site will alter the sense of place and visual quality to surrounding receptors.	2	4	1	1	3	2	22	-	Low	• Reduce the height of lighting masts to a workable minimum. • Direct lighting inwards and downwards to limit light pollution.	2	3	1	1	3	2	20	-	Low
Decommissioning Phase																				
Altered Sense of Place caused by the decommissioning activities	Dust generated during decommissioning activities will be visually unappealing and may detract from the visual quality (and sense of place) of the area. These impacts are typically limited to the immediate area surrounding the site, during the decommissioning period.	2	4	1	1	1	3	27	-	Medium	• Limit vegetation clearance and the footprint of decommissioning to what is absolutely essential. • Avoid excavation, handling and transport of materials which may generate dust under very windy conditions. • Keep stockpiled aggregate and sand covered to minimise dust generation. • Keep site tidy.	2	3	1	1	1	2	16	-	Low

Table 7-3: Rating of impacts – Sunnyside SEF

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ /-)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ / -)	S
Construction Phase																				
Altered Sense of Place and Visual Intrusion caused by Construction Activities	Dust generated during construction will be visually unappealing and may detract from the visual quality (and sense of place) of the area. These impacts are typically limited to the immediate area surrounding the construction site, during the construction period.	2	4	1	1	1	3	27	-	Medium	• Limit vegetation clearance and the footprint of construction to what is absolutely essential. • Consolidate the footprint of the construction camp to a functional minimum. • Avoid excavation, handling and transport of materials which may generate dust under very windy conditions. • Keep stockpiled aggregate and sand covered to minimise dust generation. • Keep construction site tidy.	2	3	1	1	1	2	16	-	Low
Operational Phase																				
Altered Sense of Place and Visual Intrusion caused by the SEF	The development of this PV array may be perceived as conflicting with the current undeveloped, largely deserted inhospitable agricultural landscape. The proposed SEF is anticipated to interrupt and/or degrade views, affecting the sense of place and presenting as a visual intrusion across the landscape.	2	3	1	1	3	3	30	-	Medium	• Ensure that the roof colour of the proposed buildings blends into the landscape. • Install the powerlines underground, where possible. • Fence the perimeter of the site with green or black fencing. • Retain vegetation and copses of trees between the PV array and the (main) gravel road.	2	3	1	1	3	2	20	-	Low
Visual Discomfort and Impaired Visibility caused by Glint and Glare	The glare analysis indicated that no glare will be experienced at the OPs modelled, however a short duration of glare will be	2	3	1	1	3	2	20	-	Low	• Retain vegetation and copses of trees between the PV array and the (main) gravel road.	2	2	1	1	3	1	9	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ / -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ / -)	S
	experienced along the gravel road route.																			
Altered Visual Quality caused by Light Pollution at Night	The installation of lighting on the site perimeter and / or around the BESS is anticipated to generate nightglow which currently does not emanate from the natural, undeveloped site. The introduction of lighting on the site will alter the sense of place and visual quality to surrounding receptors.	2	4	1	1	3	2	22	-	Low	• Reduce the height of lighting masts to a workable minimum. • Direct lighting inwards and downwards to limit light pollution.	2	3	1	1	3	2	20	-	Low
Decommissioning Phase																				
Altered Sense of Place caused by the decommissioning activities	Dust generated during decommissioning activities will be visually unappealing and may detract from the visual quality (and sense of place) of the area. These impacts are typically limited to the immediate area surrounding the site, during the decommissioning period.	2	4	1	1	1	3	27	-	Medium	• Limit vegetation clearance and the footprint of decommissioning to what is absolutely essential. • Avoid excavation, handling and transport of materials which may generate dust under very windy conditions. • Keep stockpiled aggregate and sand covered to minimise dust generation. • Keep site tidy.	2	3	1	1	1	2	16	-	Low

Table 7-4: Rating of impacts – Cumulative impact

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ /-)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ / -)	S
Cumulative Impact																				
Altered sense of place caused by the SEF and associated infrastructure	The site and surrounds are rural in character, there is a high concentration of approved renewable energy projects and associated grid infrastructure located around the project sites. While none of these facilities appear to be operational, as more of are constructed, the visual landscape is expected to be significantly transformed detracting from the visual quality of the region. As SEFs and WEFs proliferate, impacts will accumulate towards an unknowable threshold.	2	4	1	2	3	2	24	-	Medium	• Ensure that all other project owners implement measures to mitigate the impact of these projects on visual intrusion and altered sense of place, such as screening (vegetation), limit the light pollution generated by these facilities and adhere to the rehabilitation measures.[8]	2	3	1	2	3	2	22	-	Low

[8] Note that this mitigation measure cannot be implemented by the Applicant as they have no jurisdiction, influence or right to impose mitigation beyond the borders of their project. Nevertheless, this mitigation measure could reduce the significance of the cumulative impact assuming the relevant authorities are able to enforce implementation.

7.6 Input into the EMPr

Table 7-5 provides a description of the key monitoring recommendations for each mitigation measure identified for each phase of the project for inclusion in the EMPr or EA.

Table 7-5: EMPr measures for Rhino and Sunnyside SEF

Impact / Aspect	Mitigation / Management Actions	Responsibility	Methodology	Mitigation / Management Objectives and Outcomes	Frequency
Construction Phase					
Visual Quality	• Limit vegetation clearance and the footprint of construction to what is absolutely essential.	Contractor	• Plan which areas require the clearance of vegetation. • Only clear vegetation when works in the area will be undertaken.	• Limited dust generation.	Throughout construction
	• Consolidate the footprint of the construction camp to a functional minimum.		• Ensure that the construction camp is consolidated (in size) during the design phase	• Small construction camp footprint.	
	• Avoid excavation, handling and transport of materials which may generate dust under very windy conditions.		• During very windy conditions cease excavation, handling and transportation of materials which may generate dust.	• No dust generated by activities undertaken during very windy conditions.	
	• Keep stockpiled aggregates and sand covered to minimise dust generation.		• Stockpile all aggregate and sand. • Keep stockpiles covered when not in use.	• No airborne dust entrained from stockpiles.	
	• Keep construction site tidy.		• Implement measures to keep the site tidy.	• No wind-blown litter originating from the site.	

Impact / Aspect	Mitigation / Management Actions	Responsibility	Methodology	Mitigation / Management Objectives and Outcomes	Frequency
Operational Phase					
Altered Sense of Place and Visual Intrusion	• Install the powerlines underground, where possible.	Developer	• Incorporate underground powerlines in the design.	• Reduced visual clutter interrupting views.	On completion of construction activities. Throughout operation.
	• Fence the perimeter of the site with green or black fencing.	Developer	• Install a perimeter fence.	• The site is screened by the fence.	
	• Ensure that the roof colour of the proposed buildings blends into the landscape.	Developer	• Incorporate colour requirements in the design.	• The roof visibly blends into the landscape.	
	• Retain vegetation and copses of trees between the PV array and the (main) gravel road.	Developer	• Retain vegetation	• Screen the PV array.	Throughout operation.
Visual discomfort and impaired visibility **(Sunnyside SEF only)**	• Retain vegetation and copses of trees between PV array and the grave road.	Developer	• Retain vegetation	• Screen the PV array.	Throughout operation.
Altered Visual Quality	• Reduce the height of lighting masts to a workable minimum.	Developer and Contractor	• Incorporate lighting requirements in the design.	• Limited light pollution caused by the SEF.	Once construction activities have concluded. Throughout operation
	• Direct lighting inwards and downwards to limit light pollution.				

Impact / Aspect	Mitigation / Management Actions	Responsibility	Methodology	Mitigation / Management Objectives and Outcomes	Frequency
Decommissioning Phase					
Visual Quality	• Limit vegetation clearance and the footprint of decommissioning to what is absolutely essential.	Contractor	• Plan which areas require the clearance of vegetation. • Only clear the vegetation when works in the area will be undertaken.	• Limited clearance of exposed ground.	Throughout decommissioning
	• Avoid excavation, handling and transport of materials which may generate dust under very windy conditions.		• During very windy conditions cease excavation, handling and transportation of materials which may generate dust.	• No dust generated by activities during very windy conditions.	
	• Keep stockpiled aggregates and sand covered to minimise dust generation.		• Stockpile all aggregates and sand. • Keep stockpiles covered when not in use.	• No airborne dust entrained from stockpiles.	
	• Keep site tidy.		• Implement measures to keep the site tidy.	• No wind-blown litter originating from the site.	

7.7 No-Go Alternative

The No Go alternative entails no change to the status quo, in other words, no development of the SEFs (see Section 3.2.1).

Should the application for the Rhino and Sunnyside SEFs be refused the visual impacts will not be realised.

8. CONCLUSION

The VIA describes and interprets the visual context or affected environment in which the project is located: this provides a visual baseline or template and aims to ascertain the aesthetic uniqueness of the project area.

The following findings are pertinent:

- K2022578692 South Africa (Pty) Ltd propose to develop a Cluster of renewable energy facilities, including*, inter alia,* a SEF on Remainder of Farm Rhenosterkop 155 and Farm 400, located 27 to 30 km north-east and east of Beaufort West respectively. Each SEF comprises PV array(s), a BESS, an on-site substation and internal grid infrastructure;
- The basis for the visual character of the region is provided by the topography, vegetation and land use, which is predominantly a rural environment characterised by ridgelines separated by wide, flat plains, vegetated with low-growing shrubs, grasses and few trees. Farmsteads and some infrastructure is evident across the landscape. The project is defined as a *natural transition landscape*;
- The visual quality of the sites is consistent with the visual quality of the region: natural, visually untransformed environment that can be experienced by receptors as barren and harsh due to the desolate nature of the landscape. The sites are both used for sheep grazing;
- Visual receptors have been identified and include; residents of isolated farmsteads, railway personnel and passengers (Rhino SEF only), and motorists and tourists (Rhino SEF only) on the N1 and gravel road that are routed adjacent to Rhino and Sunnyside SEFs respectively;
- The sense of place is not particularly distinct from the rest of the wider region and is not overly memorable, but with its wide open space, gravel roads and somewhat rudimentary, ubiquitous fencelines, is evocative of the Karoo;
- The Rhino SEF is visible for up to 5 km from the site boundary to the north, north-east, south, west and north-west. The SEF will be visible from the N1 routed to the north-west of the site and from the railway line. The visual exposure of Rhino SEF is deemed ***high***;
- The Sunnyside SEF is visible for up to 5 km from the site boundary to the south, north-east and north of the site. The SEF will be visible to motorists on a short section of the gravel road to the north of the site. The visual exposure of Sunnyside SEF is deemed ***moderate;***
- The VAC of the surrounding area is reduced by the absence of development, open space and low growing vegetation. Although the low vertical profile of the PV arrays and the presence of ridges, koppies and prominences in the landscape increase the VAC of the area, the overall VAC remains ***low***;

- The limited number of highly sensitive visual receptors (i.e., the farmstead residents) is further moderate by motorists with only fleeting views, including railway personnel and passengers (Rhino SEF only) and motorists. The sensitivity of the visual receptors is considered to be ***low***;
- Receptors will have limited visibility of Rhino SEF in general, with the site only being marginally visible to receptors on the railway line and the gravel road approaching the site. Visibility from other areas is low generally due to distance and screening by intervening topography and vegetation. The visibility of Rhino SEF is ***low***;
- Sunnyside SEF is only marginally visible from receptors travelling past (or stationary at) VP 1B and 2B. The site is not visible to receptors located to the north, north-east and east of the SEF due to screening of the site by intervening topography and vegetation. The visibility of Sunnyside SEF is ***low***;
- The SEFs will introduce a large, uniform anthropogenic artefact into the landscape discordant with scale, texture and current land use, and will likely present as a visual instruction in the landscape. The project is deemed to have a ***low*** integrity with the surrounding landscape;
- The glare analysis demonstrated that no glare from Rhino SEF would be experienced by motorists on the N1, OPs or pilots on the approach to the Karoo Gateway Airport;
- The glare analysis demonstrated that glare from Sunnyside SEF would only be experienced by motorists while travelling in certain sections of the gravel road to the north of the SEF. Neither the OPs nor the pilots on the approach to the Karoo Gateway Airport Runway will experience glare from the SEF. The exposure to glare from Sunnyside SEF is considered to be ***low***;
- Construction activities associated with the SEFs will generate visual impacts related to earthworks and construction infrastructure, plant and materials on site. These activities are visually intrusive and will have a greater impact within the foreground (<200 m); however, very few farmsteads (other than the landowner's dwelling – see Section 5.4) were identified around the site, and none were identified in the foreground. These impacts as they relate to Rhino SEF and Sunnyside SEF are both assessed to be of ***medium*** significance and with the implementation of mitigation are reduced to low;
- The development of the respective PV arrays may be perceived as conflicting with the current undeveloped, natural agricultural (grazing land) landscape. The PV array may also degrade views and result in glare and, therefore, negatively impact the sense of place and present as a visual intrusion across the landscape. These impacts as they relate to Rhino SEF and Sunnyside SEF are both assessed to be of ***medium*** significance and with the implementation of mitigation are reduced to ***low***;
- As no glare is expected to be experienced from Rhino SEF, the impact associated with glint and glare is considered insignificant.
- Glare analysis demonstrates that glare from Sunnyside SEF will be experienced along portions of the gravel road only. The impact is assessed to be of ***low*** significance with and without the implementation of mitigation;
- Installation of lighting along the perimeter of the PV array and / or the BESS and on-site substation will expose sensitive receptors (e.g., residents) to light pollution, i.e. nightglow, that currently does not emanate from the natural, undeveloped property. These impacts as they relate to Rhino SEF and Sunnyside SEF are both assessed to be of ***low*** significance with and without the implementation of mitigation;

- Decommissioning activities associated with the SEF and associated infrastructure will generate visual impacts related to earthworks and construction infrastructure, plant and materials on site. These activities are visually intrusive and would mostly impact receptors in the foreground (<200 m), of which there are few. These impacts as they relate to Rhino and Sunnyside SEFs are assessed to be of ***medium*** significance and with the implementation of mitigation are reduced to ***low***; and
- In addition to this project, there are 18 approved renewable energy projects (13 SEFs and five WEFs) listed on DFFE's list of renewable energy projects, four approved associated infrastructure projects (e.g., radio masts, substations and/or powerlines) and an authorised dolerite quarry within a 35 km radius of the project. If constructed / operated, these facilities and infrastructure would significantly alter the visual character, and therefore, alter the sense of place within the surrounding area. The cumulative impact is assessed to be of ***medium*** significance and with the implementation of mitigation is reduced to ***low***.

8.1 Impact Statement

The proposed project comprises the development of the Rhino and Sunnyside SEFs. These SEFs are discordant with the scale, texture and use of the current land use. Furthermore, the region has a low VAC due to the absence of development around the site, open space and low growing vegetation. These considerations are moderated by the low overall view sensitivity, visibility and exposure to solar reflection for the SEFs. Therefore, the SEFs are anticipated to result in a moderate visual impact.

These SEFs will alter visual quality during the construction and decommissioning phases, as well as alter sense of place, visual quality and result in visual intrusion during the operational phase. The impact of altered sense of place and visual intrusion caused by construction and decommissioning activities associated with both Rhino and Sunnyside SEFs has been assessed to be of ***low*** to ***medium*** significance. The impacts associated with the operational phase of the SEFs have been assessed to be of ***medium*** or ***low*** significance and with the implementation of mitigation are reduced to ***low***. The cumulative impact of the SEFs and the existing and proposed infrastructure is assessed to be of ***low*** significance after mitigation. These impacts are deemed to be acceptable on the assumption that the mitigation measures listed in Section 7.6 are implemented for both Rhino and Sunnyside SEF.

Based on the assessment and the assumption that the mitigation measures will be implemented, the specialist is of the opinion that the visual impacts of the Rhino and Sunnyside SEFs are acceptable and there is no reason not to authorise the project.

9. REFERENCES

Boschkloof. (2012). *Cederberg Farm Experience*. Retrieved October 2012, from http://www.boschkloof.com/cederberg-guest-farm-citrusdal.htm

CNDV. (2006). *Strategic Initiative to Introduce Commercial Land Based Wind Energy Development to the Western Cape: Towards a Regional Methodology for Wind Energsanbiy Site Selection. Reports 1 – 6.*

Crawford, D. (1994). Using remotely sensed data in landscape visual quality assessment. *Landscape and Urban Planning 30*, 17-81.

Cross, J. E. (2001). What is Sense of Place? *Prepared for the 12th Headwaters Conference, November 2-4, 2001.* Retrieved July 2020, from https://www.researchgate.net/publication/282980896_What_is_Sense_of_Place/link/56256fbf08aeabddac91cd62/download

DEA&DP. (2005). *Guideline for Involving Visual and Aesthetic Specialists in EIA Processes.* Retrieved June 2020, from http://asapa.co.za/wp-content/uploads/2016/06/5_deadp_visual_guideline_june05.pdf

DFFE. (2023). *Department of Forestry, Fisheries and the Environment: egis* . Retrieved from https://egis.environment.gov.za/gis_data_downloads

Federal Ministry of the Environment. (2014). *Gesundheit und Verbraucherschutz zur Messung und Beurteilung von Lichtimmissionen (Licht-Leitlinie) (Light Guidelines).* Retrieved from https://bravors.brandenburg.de/sixcms/media.php/66/Amtsblatt%2021_14%20%28S.%20691-704%29.pdf#:~:text=Diese%20Leitlinie%20ist%20von%20den,Beurteilung%20von%20Lichtimmissionen%20zu%20beachten.

Ho, C. K., Ghanbari, C. M., & Diver, R. B. (2011). Methodology to Assess Potential Glint and Glare Hazards from Concentrating Solar Power Plans: Analytical Models and Experimental Validation. *Journal of Solar Energy Engineering*, 031021-1 - 031021-9.

Landscape Institute. (2013). *Guideline for Landscape and Visual Impact Assessment.* Routledge.

Lynch, K. (1992). *Good City Form.* London: The MIT Press.

Night Jar Travel South Africa. (2012). Retrieved August 2012, from http://www.nightjartravel.com

Pager Power. (2018). *Solar Photovoltaic Development - Glint and Glare Guidance.*

Shan Ding Lu. (2009). Retrieved August 2012, from http://www.shandinglu.org

Young, G. (2000). *First Draft Gamsberg Zinc Project: Specialist Study Report: Visual Environment. Newtown Landscape Architects, 10 March 2000.*

Appendix A: Specialist CV

Appendix B: Views from viewpoints

Appendix C: GlareGauge Report

Appendix D: Impact Rating Methodology

1. Environmental Impact Assessment Methodology

The Environmental Impact Assessment (EIA) Methodology assists in evaluating the overall effect of a proposed activity on the environment. Determining of the significance of an environmental impact on an environmental parameter is determined through a systematic analysis.

1.1. Determination of Significance of Impacts

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale (i.e. site, local, national or global), whereas intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in Table 1.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

1.2. Impact Rating System

The impact assessment must take account of the nature, scale and duration of effects on the environment and whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the various project stages, as follows:

- Planning;
- Construction;
- Operation; and
- Decommissioning.

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

1.2.1. Rating System Used to Classify Impacts

The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the possible mitigation of the impact. Impacts have been consolidated into one (1) rating. In assessing the significance of each issue the criteria (including an allocated point system) below is used.

Table 1: Impact assessment rating methodology

ENVIRONMENTAL PARAMETER		
A brief description of the environmental aspect likely to be affected by the proposed activity (e.g. Surface Water).		
ISSUE / IMPACT / ENVIRONMENTAL EFFECT / NATURE		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity (e.g. oil spill in surface water).		
EXTENT (E)		
This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined.		
1	Site	The impact will only affect the site
2	Local/district	Will affect the local area or district
3	Province/region	Will affect the entire province or region
4	International and National	Will affect the entire country
PROBABILITY (P)		
This describes the chance of occurrence of an impact		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
REVERSIBILITY (R)		
This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES (L)		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource.	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
DURATION (D)		
This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity.		

1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).
INTENSITY / MAGNITUDE (I / M)		
Describes the severity of an impact (i.e. whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily).		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.

SIGNIFICANCE (S)		
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula: **Significance = (Extent + probability + reversibility + irreplaceability + duration) x magnitude/intensity.** The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.		
Points	**Impact Significance Rating**	**Description**
5 to 23	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
5 to 23	Positive Low impact	The anticipated impact will have minor positive effects.
24 to 42	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
24 to 42	Positive Medium impact	The anticipated impact will have moderate positive effects.
43 to 61	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
43 to 61	Positive High impact	The anticipated impact will have significant positive effects.
62 to 80	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
62 to 80	Positive Very high impact	The anticipated impact will have highly significant positive effects.