Appendix 6J
Visual Assessment

Stephan Jacobs

From: Liandra Scott-Shaw
Sent: Sunday, 02 August 2020 6:50 PM
To: Stephan Jacobs
Subject: FW: 16343 Oya Amended PV Layout

From: Kerry Schwartz
Sent: Friday, 31 July 2020 7:57 AM
To: Liandra Scott-Shaw
Subject: RE: 16343 Oya Amended PV Layout

Hi Liandra,

This serves to confirm that the amended location of alternatives, as per your email below, are acceptable from a Visual perspective.

Kind regards
Kerry Schwartz
Senior GIS Consultant
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From: Liandra Scott-Shaw <LiandraS@sivest.co.za>
Sent: Thursday, 30 July 2020 15:44
Cc: Stephan Jacobs <StephanJ@sivest.co.za>; Veronique Fyfe <veronique@g7energies.com>; Justin Muhl <justin@g7energies.com>; Kerry Schwartz <KerryS@sivest.co.za>
Subject: 16343 Oya Amended PV Layout

Dear all

Please find the amended layout for the PV based on collective specialist input:

The Construction Camp, Substation and BESS alternatives have been amended.

Apologies for the is last minute input required, but please urgently interrogate and confirm if you agree via email at this stage, so that we may submit of DBAR in the interim on Monday.

You can submit a formal letter during the upcoming comment period.

Kind regards

Liandra Scott-Shaw *(Pr.Sci.Nat)*
Environmental Scientist
SiVEST Environmental Division

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OYA ENERGY (PTY) LTD

Proposed Development of the 800MW Oya Solar Photovoltaic (PV) Facility and Associated Infrastructure near Matjiesfontein, Western Cape Province

Visual Impact Assessment Report – Basic Assessment

DEFF Reference: To be Allocated
Issue Date: 29 July 2020
Version No.: 1
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Date:	29 07 20
Document Title:	Proposed Development of the 800MW Oya Solar Photovoltaic (PV) Facility and Associated Infrastructure near Matjiesfontein, Western Cape Province
Version Number:	1
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Signature:	
Client:	Oya Energy (Pty) Ltd

Confidentiality Statement

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PROPOSED DEVELOPMENT OF THE 800MW OYA SOLAR PHOTOVOLTAIC (PV) FACILITY AND ASSOCIATED INFRASTRUCTURE NEAR MATJIESFONTEIN, WESTERN CAPE PROVINCE

VISUAL IMPACT ASSESSMENT REPORT – BASIC ASSESSMENT

Executive Summary

Although the study area has a largely natural, untransformed visual character with some elements of rural / pastoral infrastructure, it is not typically valued or utilised for its tourism significance. The study area has however seen very limited transformation or disturbance and is considered to be largely natural. As such the proposed Oya Solar Photovoltaic (PV) Facility (hereafter "proposed development") is expected to alter the visual character of the area and contrast with the typical land use and / or pattern and form of human elements present.

A broad-scale assessment of landscape sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a **low to moderate** visual sensitivity. However, an important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs.

No formal protected areas or leisure-based tourism activities were identified and there are no recognised tourism or scenic routes in the study area. In addition, there is limited human habitation resulting in relatively few sensitive or potentially sensitive receptors in the area.

The Visual Impact Assessment (VIA) identified eleven (11) potentially sensitive receptors in the study area, ie within 5kms of the boundary of the application site. Two (2) of these receptors are considered to be sensitive receptors as they are linked to leisure/nature-based tourism activities in the area. The remaining nine (9) receptors are all farmsteads which are regarded as potentially sensitive visual receptors as they are located within a mostly natural setting and the proposed development will likely alter natural vistas experienced from these dwellings. Most of the potentially sensitive receptor locations were however found to be outside the viewshed of the proposed PV arrays and thus are not expected to experience any visual impacts as a result of the proposed development.

The VIA determined that the proposed development will have a high level of impact on one (1) of the sensitive receptors (Remainder of the Farm Baakens Rivier No 155). This impact is a result of the fact that the receptor is located on the PV development site. It is believed that the owner of this farm portion has a vested interest in the proposed development and would therefore not perceive it in a negative light. The remaining two (2) receptor locations in the viewshed, (one sensitive receptor and one potentially sensitive receptor) which are located on

the Remainder of the Farm Gats Rivier No 156 and the Remainder of the Farm Klipfontein No 154 respectively, are only expected to experience moderate impacts from the proposed Oya Solar PV Facility.

The overall impact rating revealed that the proposed development is expected to have a negative low visual impact rating during both construction and decommissioning phases. During operation, visual impacts from the solar PV facility arrays would be of medium significance with relatively few mitigation measures available to reduce the visual impact Impacts from the associated infrastructure would however be of low significance during operation.

Several renewable energy developments are being proposed within a 35 km radius of the proposed development's application site. These renewable energy developments have the potential to cause large scale visual impacts and the location of several such developments in close proximity to each other could significantly alter the sense of place and visual character in the broader region. It was however determined that only one (1) of these would have any significant impact on the landscape within the study area, this being Kudusberg WEF. This project is in close proximity to the proposed Oya Solar PV Facility development area and it is anticipated that this concentration of facilities could potentially alter the inherent sense of place and introduce an increasingly industrial character into a largely rural area. This will result in significant cumulative impacts, although these impacts will be reduced by the fact that the proposed solar PV facility is only likely to be visible from very few receptor locations. In light of this, cumulative impacts have been rated as negative medium during both construction and operation phases of the project. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists. It is important to note, however, that the study area is located within the Renewable Energy Development Zone (REDZ) 2, namely the Komsberg REDZ[1], and thus the relevant authorities support the concentration of renewable energy developments in this area.

A comparative assessment of alternatives for the proposed on-site substation site was undertaken in order to determine which of the alternatives would be preferred from a visual perspective. No fatal flaws were identified for any of the proposed site alternatives for construction camps and BESS, O&M and substation alternatives for the PV project. A summary of the preference ratings for each infrastructural element is provided below.

- Construction Camp Site Alternatives: No preference was determined for any of the construction camp site alternatives and all, but one site was found to be favourable. Construction Camp Alternative 5 was found to be the least preferred due to its proximity to a potentially sensitive receptor, and also due the fact that the site is relatively far from other infrastructure elements on the site.
- BESS Alternatives: No preference was determined for any of the BESS alternatives and all but one site was found to be favourable. Alternative 3 was found to be the least preferred due to its proximity to a potentially sensitive receptor.

[1] formally gazetted (Gazette Number 41445) on 16 February 2018 by the Minister of Environmental Affairs (GN 114)

- O & M and Substation Alternatives: No preference was determined for any of the BESS alternatives and all but one site was found to be favourable. Alternative 3 was found to be the least preferred due to its proximity to a potentially sensitive receptor.

From a visual perspective therefore, the proposed Oya Solar PV Facility project is deemed acceptable and the Environmental Authorization (EA) should be granted. SiVEST is of the opinion that the visual impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

National Environmental Management Act, 1998 (Act No. 107 of 1998) and Environmental Impact Regulations, 2014 (as amended) - Requirements for Specialist Reports (Appendix 6)

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	**Section of Report**
(a) details of the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a *curriculum vitae*;	**Section 1.5.** Specialist CV's are included in **Appendix B**
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	**Appendix B**
(c) an indication of the scope of, and the purpose for which, the report was prepared;	**Section 1.** **Appendix A**
(cA) an indication of the quality and age of base data used for the specialist report;	**Section 1.6.** **Section 3.**
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	**Section 3.** **Section 4.** **Section 5.**
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	**Section 1.4** **Section 1.6.**
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	**Section 1.6. Appendix C**
(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;	**Section 3.** **Section 5.**
(g) an identification of any areas to be avoided, including buffers;	**Section 3.3.** **Section 3.5.** **Section 5.**
(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;	**Section 3.5.**
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	**Section 1.4.**
(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;	**Section 5.5**
(k) any mitigation measures for inclusion in the EMPr;	**Section 5.5.**
(l) any conditions for inclusion in the environmental authorisation;	No specific conditions relating to the visual environment need to be included in the

	environmental authorisation (EA)
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	**Section 5.5.**
(n) a reasoned opinion— i. 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 or Environmental Authorization, and where applicable, the closure plan;	**Section 7.1.**
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	**N/A** -No feedback has yet been received from the public participation process regarding the visual environment
(p) any other information requested by the competent authority	**N/A**. No information regarding the visual study has been requested from the competent authority to date.
(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 – BASIC ASSESSMENT

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GLOSSARY OF TERMS

ABBREVIATIONS

BA	Basic Assessment
BESS	Battery Energy Storage System
DBAR	Draft Basic Assessment Report
DM	District Municipality
DoE	Department of Mineral Resources and Energy
DTM	Digital Terrain Model
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EMP	Environmental Management Plan
FBAR	Final Basic Assessment Report
GIS	Geographic Information System
HA	Hectares
I&AP	Interested and/or Affected Party
IPP	Independent Power Producer
LM	Local Municipality
kV	Kilovolt
MW	Megawatt
NEMA	National Environmental Management Act
NGI	National Geo-Spatial Information
O&M	Operation and Maintenance
PPA	Power Purchase Agreement
PV	Photovoltaic
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
SACAA	South African Civil Aviation Authority
SANBI	South African National Biodiversity Institute
SPEF	Solar Photovoltaic Energy Facility
VIA	Visual Impact Assessment
VR	Visual Receptor
WEF	Wind Energy Facility

DEFINITIONS

Anthropogenic feature: An unnatural feature resulting from human activity.

Cultural landscape: A representation of the combined worlds of nature and of man illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal (World Heritage Committee, 1992).

Sense of place: The unique quality or character of a place, whether natural, rural or urban. It relates to uniqueness, distinctiveness or strong identity.

Scenic route: A linear movement route, usually in the form of a scenic drive, but which could also be a railway, hiking trail, horse-riding trail or 4x4 trail.

Sensitive visual receptors: An individual, group or community that is subject to the visual influence of the proposed development and is adversely impacted by it. They will typically include locations of human habitation and tourism activities.

Slope Aspect: Direction in which a hill or mountain slope faces.

Study area / Visual assessment zone; The study area or visual assessment zone is assumed to encompass a zone of 5km from the outer boundary of the proposed Solar PV Facility application site.

Viewpoint: A point in the landscape from where a particular project or feature can be viewed.

Viewshed / Visual Envelope: The geographical area which is visible from a particular location.

Visual character: The pattern of physical elements, landforms and land use characteristics that occur consistently in the landscape to form a distinctive visual quality or character.

Visual contrast: The degree to which the development would be congruent with the surrounding environment. It is based on whether or not the development would conform with the land use, settlement density, forms and patterns of elements that define the structure of the surrounding landscape.

Visual exposure: The relative visibility of a project or feature in the landscape.

Visual impact: The effect of an aspect of the proposed development on a specified component of the visual, aesthetic or scenic environment within a defined time and space.

Visual receptors: An individual, group or community that is subject to the visual influence of the proposed development but is not necessarily adversely impacted by it. They will typically

include commercial activities, residents and motorists travelling along routes that are not regarded as scenic.

Visual sensitivity: The inherent sensitivity of an area to potential visual impacts associated with a proposed development. It is based on the physical characteristics of the area (visual character), spatial distribution of potential receptors, and the likely value judgements of these receptors towards the new development, which are usually based on the perceived aesthetic appeal of the area.

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VISUAL IMPACT ASSESSMENT REPORT – BASIC ASSESSMENT

1 INTRODUCTION

Oya Energy (Pty) Ltd, (hereafter referred to as “Oya") propose to construct and operate the Oya Solar Photovoltaic (PV) Facility (hereafter the “proposed development”) near Matjiesfontein in the Western Cape Province.

The proposed development site is located within the Renewable Energy Development Zone (REDZ) 2, known as Komsberg REDZ[2], which was published in terms of Section 24(5) of the National Environmental Management Act, 1998 (NEMA) in GN R114 of 16 February 2018. Accordingly, a Basic Assessment (BA) process as contemplated in terms of regulation 19 and 20 of the Environmental Impact Assessment Regulations, 2014, is required for the authorisation of this large-scale solar energy facility (SEF).

Although a 132kV overhead power line is also being proposed to feed the electricity generated by the proposed development into the national grid, this associated electrical infrastructure will require a separate EA and is subject to a separate BA process to be undertaken in future.

In light of this, SiVEST has been appointed to undertake the required BA for the proposed development. This visual impact assessment (VIA) is being undertaken as part of the BA process. The aim of the VIA is to identify potential visual issues associated with the proposed development, as well as to determine the potential extent of visual impacts. This is done by characterising the visual environment of the area and identifying areas of potential visual sensitivity that may be subject to visual impacts. This visual assessment focuses on the potential sensitive visual receptor locations and provides an assessment of the magnitude and significance of the visual impacts associated with the proposed development.

[2] formally gazetted (Gazette Number 41445) on 16 February 2018 by the Minister of Environmental Affairs (GN 114)

1.1 Project Location and Description

The proposed Oya Solar PV Facility is approximately 52 km north-west of the town of Matjiesfontein in the Western Cape Province **(Figure 1)**. The proposed development which will be owned and operated by Oya Energy (Pty) Ltd will have a maximum export capacity of up to 800MW. The overall objective of the development is to generate electricity by means of renewable energy technology, capturing solar energy to feed into the National Grid, which will be procured under either the Renewable Energy Independent Power Producer Procurement Program (REIPPPP), other government run procurement programmes or for sale to private entities if required.

The proposed PV facility will be located on the following two (2) properties (**Figure 2**):

- The Remainder of farm 155 Baakens Rivier; and
- Portion 1 of farm 156 Gats Rivier

The proposed PV facility is located in the Witzenberg Local Municipality and the Cape Winelands District Municipality. The properties are currently zoned for agricultural land use and due to the low agricultural potential of the land, it was previously used for low intensity grazing however the properties are no longer actively used for agricultural activities. The above-mentioned properties are ~5070 ha in extent. The total area of the application site assessed as part of this BA is approximately 3777 ha.

The proposed project falls entirely within the REDZ 2 (i.e. Komsberg REDZ), that was Gazetted on 16 February 2018 by the Minister of Environmental Affairs (GN 114). In terms of NEMA and the 2014 NEMA Environmental Impact Assessment (EIA) Regulations promulgated in Government Gazette 40772 and Government Notice (GN) R326, R327, R325 and R324 on 7 April 2017, wind and solar PV projects located within a REDZs are subject to a BA and reduced decision-making period by the authorities. A BA process in terms of Appendix 1 of the EIA Regulations (2014, as amended) has therefore been undertaken for the proposed project. The competent authority for this BA is the national Department of Environment, Forestry and Fisheries (DEFF).

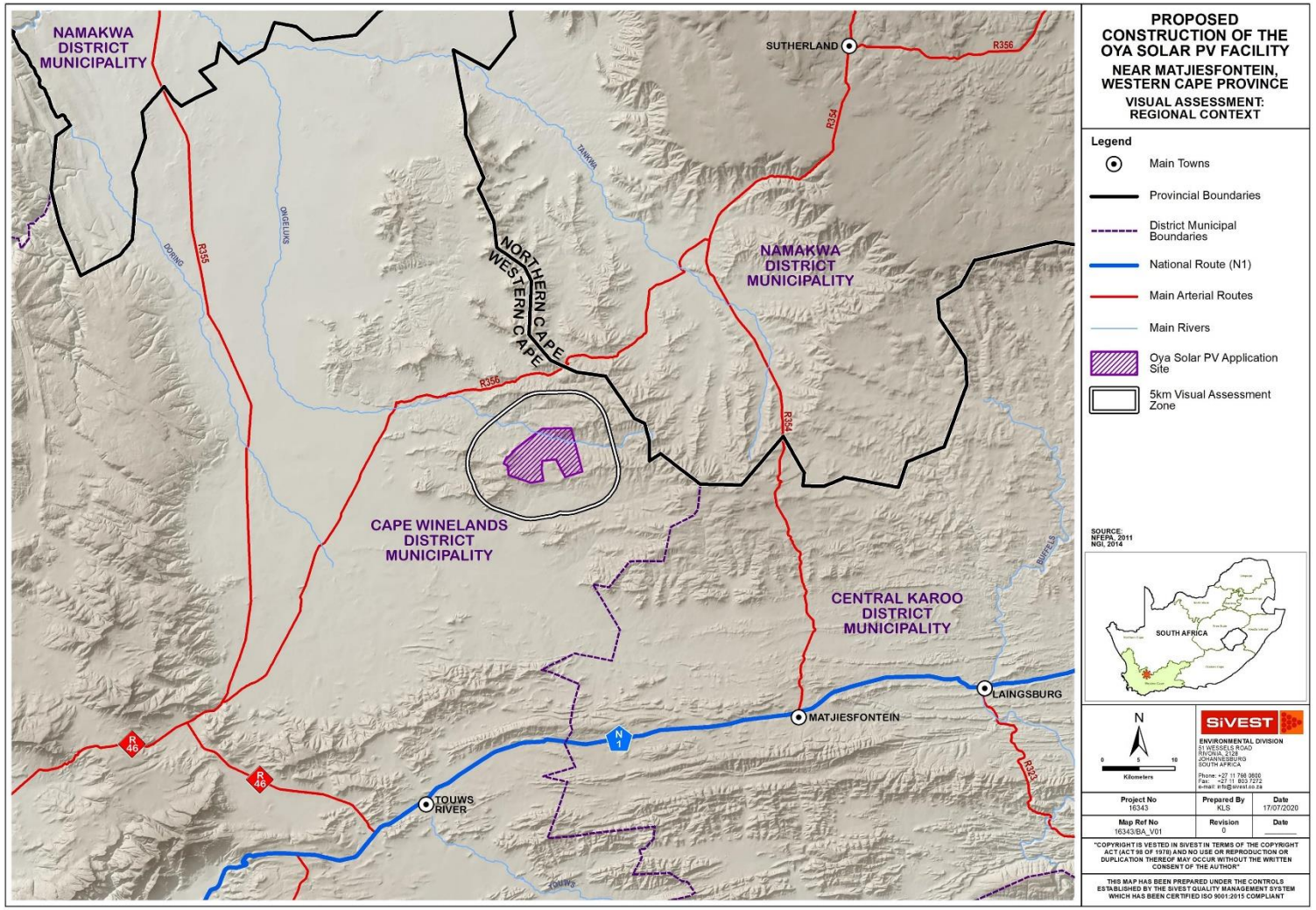


Figure 1: Regional context of proposed development showing the visual assessment zone

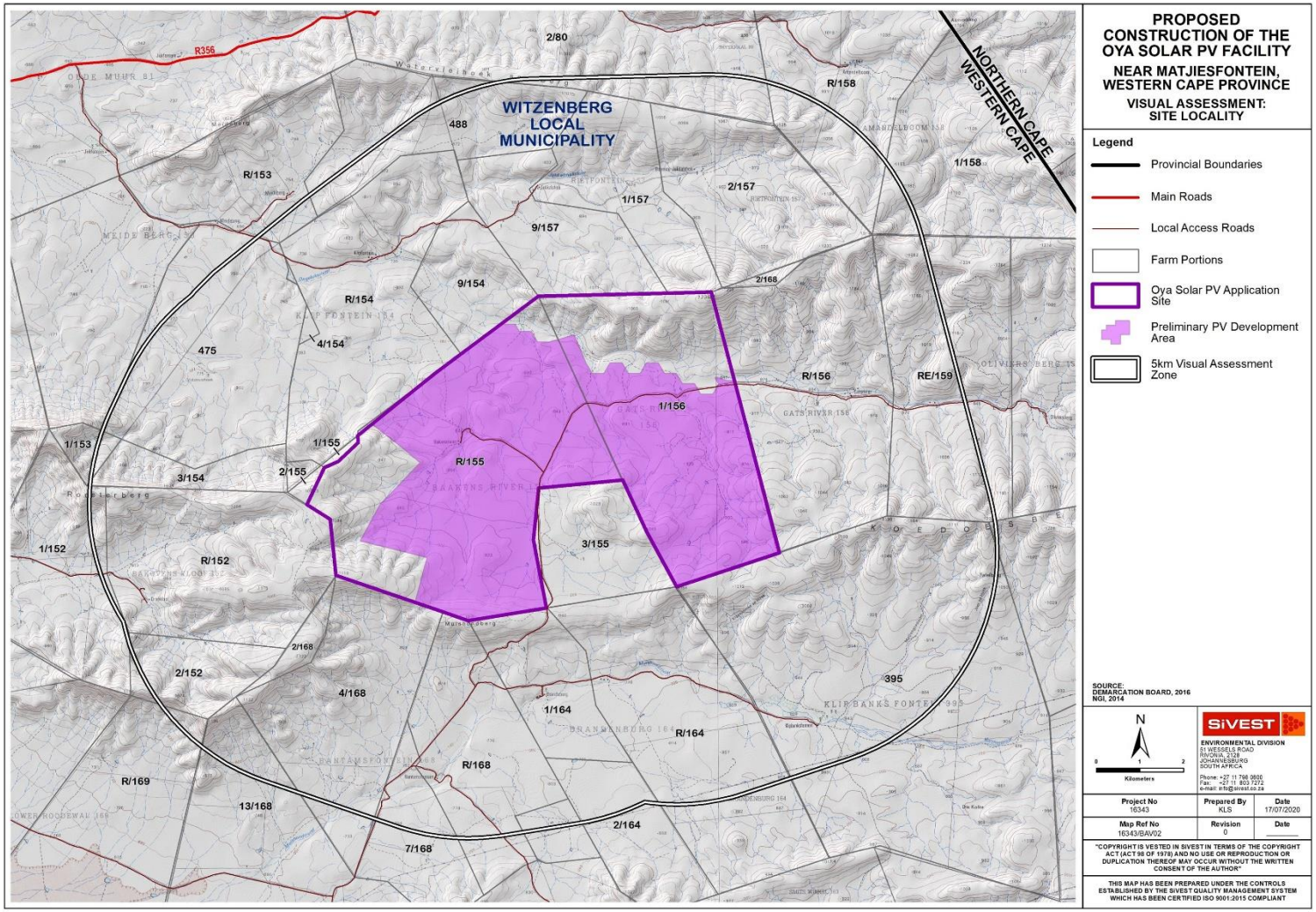


Figure 2: Site locality of proposed development

The PV facility will consist of the following:

- **Solar Photovoltaic (PV) arrays:**
  - At this stage, it is anticipated that the proposed Solar PV energy facility will include PV fields (arrays) comprising multiple PV modules. The PV modules are arranged in rows and columns, some of which may require levelling of the terrain and associated slope stabilisation measures.
  - Each PV module will be approximately 2.5m long and 1.2m wide and mounted on supporting structures above ground (**Figure 3**). The final design details along with the structure orientation will become available during the detailed design phase of the proposed development prior to the start of construction.
  - The foundations will most likely be either concrete or rammed piles. The final foundation design will be determined at the detailed design phase of the proposed development.

- **Onsite 33/132kV substation and a battery energy storage system (BESS)**
  - The on-site and collector substation will contain transformer(s) for voltage step-up from medium voltage to high voltage. Direct Current (DC) power from the modules will be converted into Alternating Current (AC) power in the inverters and the voltage will be stepped up to medium voltage in the inverter transformers. Medium voltage cabling will link the various PV arrays to an on-site substation. These cables will be laid underground wherever technically feasible. The proposed development will include the construction of one (1) new on-site substation occupying an area of up to approximately 4ha.
  - An 132kV overhead power line is also being proposed to feed the electricity generated by the proposed solar PV energy facility into the national grid. The associated electrical infrastructure will however require a separate EA and is subject to a separate BA process to be undertaken in future.
  - A BESS will be located next to the onsite 33/132kV substation or in-between the PV modules. The BESS would cover an area of up to 7.8ha. The storage capacity and type of technology would be determined at a later stage during the development phase, but will most likely comprise an array of containers, outdoor cabinets and/or storage tanks. Although a BESS does not require environmental authorisation in terms of NEMA, the facility is included in the project description to assess the impact of the footprint on the environment in terms of vegetation removal.
  - Medium voltage cabling will link the proposed PV facility to the grid connection infrastructure (on-site substation). Cables to be buried along access roads, where feasible, with overhead 33kV lines grouping PV panels to crossing valleys and ridges outside of the road footprints to get to the substation;
  - Construction laydown area to house construction equipment, components, offices and material. The construction laydown area will be up to 6.4ha in extent.

- **Operation and Maintenance (O&M) buildings:**

  The O&M building will be used throughout the operational phase of the PV facility and will be a single storey building, included in the footprint of the substation.

- **Temporary infrastructure:**

  New or existing boreholes, including a potential temporary above ground pipeline (approximately 50cm in diameter), to feed water to the on-site batching plant are being proposed. Water will potentially be stored in temporary water storage tanks. The necessary approvals from the Department of Water and Sanitation (DWS) will be applied for separately (should this be required).

- **Access roads:**

  - Access to the PV facility will be via the existing public gravel road which bisects the proposed PV facility.
  - During construction the project site would be accessed via the existing public road network with minor road strengthening taking place within the existing road reserves.
  - New roads of 4 to 8m wide would be constructed between some of the PV arrays to facilitate access throughout the PV facility. The footprint of these is included in the overall PV array.

- **Fencing:**

  - Fencing will be approximately 2m high surrounding the entire PV facility for security purposes.

Once fully developed, the intention is to 'bid' the proposed solar PV energy facility in either a government procurement round for new generation capacity from renewable energy (such as REIPPPP) or for private power purchase agreement (PPA). Therefore, the maximum total generation capacity is not limited to the standard required under the REIPPPP.

The construction phase will be between 12 and 24 months and the operational lifespan will be approximately 20 years, depending on the length of the power purchase agreement with the relevant offtaker.

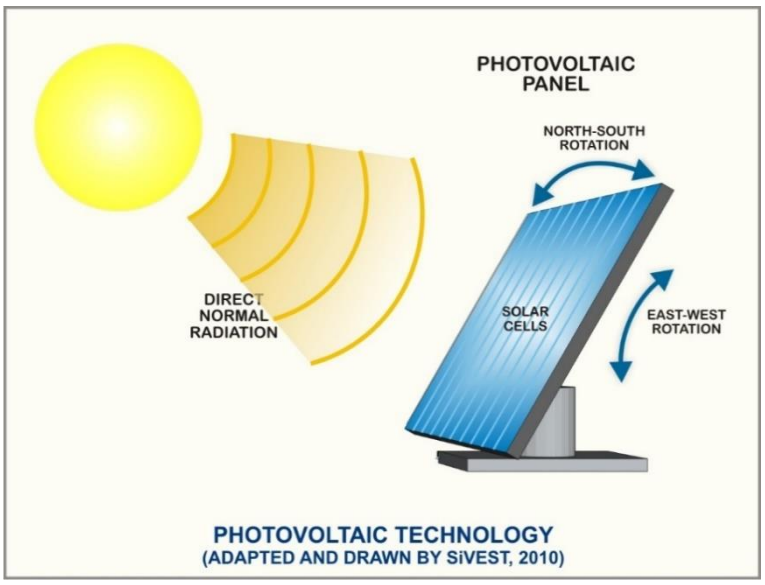


Figure 3: Typical components of a solar PV Panel

1.1.1 Layout Alternatives

Design and layout alternatives were considered and assessed as part of VIA. These include alternatives for the Construction Camp, the O&M buildings and Substation/BESS locations. The various alternatives, as shown in **Figure 4** below, are described below.

Construction Camp and Laydown Area

Six (6) construction camp alternatives were considered as follows:

- Construction camp alternative 1: is located to the north of the public road on the property 1/156 Gats Rivier, west of construction camp alternative 2
- Construction camp alternative 2: is located to the north of the public road on the property 1/156 Gats Rivier, east of construction camp alternative 2, and west of construction camp alternative 3
- Construction camp alternative 3: is located to the north of the public road on the property 1/156 Gats Rivier, east of construction camp alternative 2
- Construction camp alternative 4: is located west of the public road next to the BESS alternative 4 on RE/155 Baakens Rivier;
- Construction camp alternative 5: is located west of the public road next to BESS alternative 3 on RE/155 Baakens Rivier; and
- Construction camp alternative 6: is located north of the public road on Re/155 Baakens Rivier.

BESS

To reduce electrical losses, the BESS must be in close proximity to the onsite 33/132kV substation. Flat areas are preferred as it reduces the amount of levelising or stability improvements required.

Four (4) BESS area alternatives were considered by the EAP and specialists as follows:

- BESS alternative 1: Alternative 1 is located to the north of the public road on 1/156 Gats Rivier
- BESS alternative 2: Alternative 2 is located to the south of the public road on 1/156 Gats Rivier
- BESS alternative 3: Alternative 3 is located to the west of the public road on re/155 Baakens Rivier
- BESS alternative 4: Alternative 4 is located to the west of the public road on re/155 Baakens Rivier, south of alternative 3

O&M Building and Substation

Four (4) O&M building and substation area alternatives were considered by the EAP and specialists as follows:

- O&M and substation alternative 1: Alternative 1 is located to the north of the public road on 1/156 Gats Rivier
- O&M and substation alternative 2: Alternative 2 is located to the south of the public road on 1/156 Gats Rivier
- O&M and substation alternative 3: Alternative 3 is located to the west of the public road on re/155 Baakens Rivier
- O&M and substation alternative 4: Alternative 4 is located to the west of the public road on re/155 Baakens Rivier, south of alternative 3

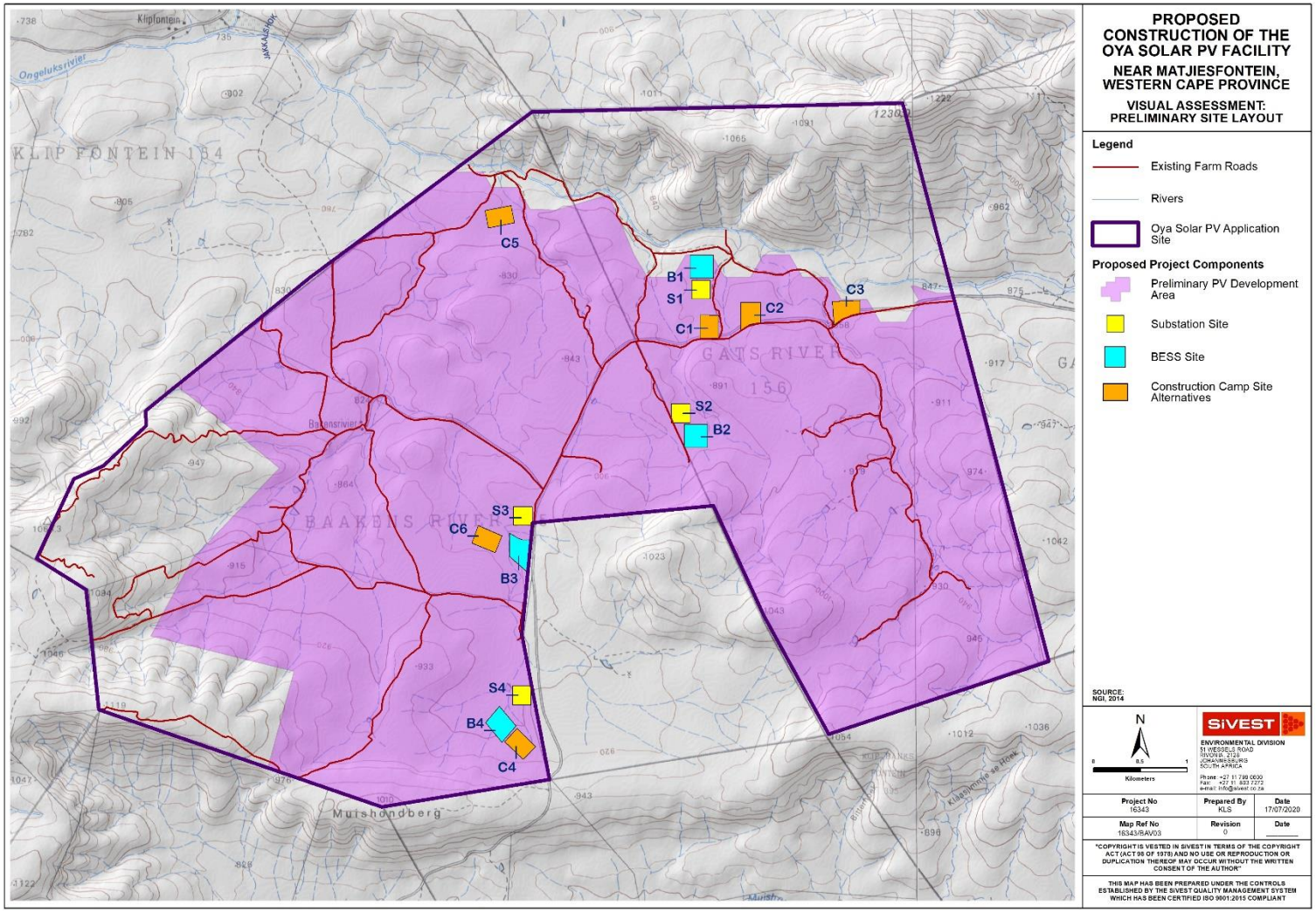


Figure 4: Preliminary Site Layout and alternatives

1.2 Terms of Reference

The terms of reference for this VIA are included in **Appendix A**.

1.3 Legal Requirements and Guidelines

Key legal requirements pertaining to the proposed development are as follows:

In terms of the NEMA and the EIA Regulations 2014 (as amended), the proposed development includes listed activities which require a full EIAto be undertaken. As part of this EIA process, the need for a VIA to be undertaken has been identified in order to assess the visual impact of the proposed development.

As previously stated, the proposed development falls entirely within the REDZ 2 (i.e. Komsberg REDZ), that was Gazetted on 16 February 2018 by the Minister of Environmental Affairs (GN 114). In terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) and the 2014 NEMA EIA Regulations promulgated in Government Gazette 40772 and Government Notice (GN) R326, R327, R325 and R324 on 7 April 2017, wind and solar PV projects located within a REDZs are subject to a BA and reduced decision-making period by the authorities. A BA process in terms of Appendix 1 of the EIA Regulations (2014, as amended) has therefore been undertaken for the proposed project. As part of this BA process, the need for a VIA to be undertaken has been identified in order to assess the visual impact of the proposed development.

There is currently no legislation within South Africa that explicitly pertains to the assessment of visual impacts, however in addition to NEMA the following legislation has relevance to the protection of scenic resources:

- National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)
- National Heritage Resources Act, 1999 (Act No. 25 of 1999)

Based on these Acts, protected or conservation areas and sites or routes with cultural or symbolic value have been taken into consideration when identifying sensitive and potentially sensitive receptor locations and rating the sensitivity of the study area.

1.4 Assumptions and Limitations

- Given the nature of the receiving environment and the height of the proposed PV panels and associated infrastructure elements, the study area or visual assessment zone is assumed to encompass an area of 5km from the boundary of the application site. This limit on the visual assessment zone relates to the fact that visual impacts decrease exponentially over distance. Thus, although the proposed development may still be visible beyond 5km, the degree of visual impact would diminish considerably. As such, the need to assess the impact on potential receptors beyond this distance would not be warranted.

- The identification of visual receptors involved a combination of desktop assessment as well as field-based observation undertaken during the scoping phase of the project. Initially Google Earth imagery was used to identify potential receptors within the study area. Where possible, these receptor locations were verified and assessed during a site visit which was undertaken between the 9th and the 12th of July 2020. Due to the extent of the study area and the nature of the terrain however, it was not possible to visit or verify every potentially sensitive visual receptor location. As such, several broad assumptions have been made in terms of the likely sensitivity of the receptors to the proposed development. It should be noted that not all receptor locations would necessarily perceive the proposed development in a negative way. This is usually dependent on the use of the facility, the economic dependency of the occupants on the scenic quality of views from the facility and on people's perceptions of the value of "Green Energy". Sensitive receptor locations typically include sites such as tourism facilities and scenic locations within natural settings which are likely to be adversely affected by the visual intrusion of the proposed development. Thus, the presence of a receptor in an area potentially affected by the proposed development does not necessarily mean that any visual impact will be experienced.

- For the purposes of the VIA, all analysis is based on a worst-case scenario where PV panel heights are assumed to be 4m.

- Due to the varying scales and sources of information; maps may have minor inaccuracies. Terrain data for the study area derived from the National Geo-Spatial Information (NGI)'s 25m DEM is fairly coarse and somewhat inconsistent and as such, localised topographic variations in the landscape may not be reflected on the Digital Elevation Model (DEM) used to generate the viewsheds.

- In addition, the viewshed analysis did not take into account any existing vegetation cover or built infrastructure which may screen views of the proposed development. This analysis should therefore be seen as a conceptual representation or a worst-case scenario.

- The potential visual impact at each visual receptor location was assessed using a matrix developed for this purpose. The matrix is based on three main parameters relating to visual impact and, although relatively simplistic, it provides a reasonably accurate indicative assessment of the degree of visual impact likely to be experienced at each receptor location as a result of the proposed development. It is however important to note the limitations of quantitatively assessing a largely subjective or qualitative type of impact and as such the matrix should be seen merely as a representation of the likely visual impact at a receptor location.

- No feedback regarding the visual environment has been received from the public participation process to date. Any feedback from the public during the review period of the Draft Basic Assessment Report (DBAR) will however be incorporated into further drafts of this report, if relevant.

- At the time of undertaking the visual study no information was available regarding the type and intensity of lighting that will be required for the proposed development and therefore the potential impact of lighting at night has not been assessed at a detailed level. However, lighting requirements are relatively similar for all Solar PV Energy Facilities (SPEFs) and as such, general measures to mitigate the impact of additional light sources on the ambiance of the nightscape have been provided.

- This study includes an assessment of the potential cumulative impacts of other renewable energy developments on the existing landscape character and on the identified sensitive receptors. This assessment is based on the information available at the time of writing the report and where information has not been available, broad assumptions have been made as to the likely impacts of these developments.

- At the time of writing this report, the proposed PV layout was still in the preliminary design phase and as such, no visualisation modelling was undertaken for the proposed development. This can however be provided should the Public Participation process identify the need for this exercise.

- SiVEST made every effort to obtain information for the surrounding planned renewable energy developments (including specialist studies, assessment reports and Environmental Management Programmes), however some of the documents are not currently publicly available for download. The available information was factored into the cumulative impact assessment (**Section 5.4**).

- It should be noted that the site visit was undertaken in the first week of July 2020 (9^{th} – 12^{th}), during winter. The study area is however typically characterised by low levels of rainfall all year round and therefore the season is not expected to affect the significance of the visual impact of the proposed development

- Clear weather conditions tend to prevail throughout most of the year in this area, and in these clear conditions, PV panels would present a greater contrast with the surrounding landscape than they would on a cloudy overcast day. Weather conditions were initially clear during the site visit but cloudy, overcast conditions occurred later in the week. The weather conditions during the time of the study were therefore taken into consideration when undertaking this VIA.

1.5 Specialist Credentials

This VIA was undertaken by Kerry Schwartz, a GIS specialist with more than 20 years' experience in the application of GIS technology in various environmental, regional planning and infrastructural projects undertaken by SiVEST. Kerry's GIS skills have been extensively utilised in projects throughout South Africa and in other Southern African countries. Kerry has also been involved in the compilation of VIA reports. Kerry's relevant VIA project experience is listed in the table below.

Environmental Practitioner	SiVEST (Pty) Ltd – Kerry Schwartz
Contact Details	kerrys@sivest.co.za
Qualifications	BA (Geography), University of Leeds 1982
Expertise to carry out the Visual Impact Assessment.	**Visual Impact Assessments:** ▪ VIAs (Scoping and Impact Phase) for the proposed Mooi Plaats, Wonderheuvel and Paarde Valley solar PV plants near Noupoort in the Northern and Eastern Cape Provinces. ▪ VIAs (Scoping and Impact Phase) for the proposed Sendawo 1, 2 and 3 solar PV energy facilities near Vryburg, North West Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Tlisitseng 1 and 2 solar PV energy facilities near Lichtenburg, North West Province. ▪ VIA for the proposed Nokukhanya 75MW Solar PV Power Plant near Dennilton, Limpopo Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Helena 1, 2 and 3 75MW Solar PV Energy Facilities near Copperton, Northern Cape Province. ▪ VIA (EIA) for the proposed Paulputs WEF near Pofadder in the Northern Cape Province. ▪ VIA (EIA) for the proposed development of the Rondekop WEF near Sutherland in the Northern Cape Province. ▪ VIA (BA) for the proposed development of the Tooverberg WEF near Touws Rivier in the Western Cape Province. ▪ VIA (BA) for the proposed development of the Kudusberg WEF near Sutherland, Northern and Western Cape Provinces. ▪ VIA (Scoping and Impact Phase) for the proposed development of the Kuruman Wind Energy Facility near Kuruman, Northern Cape Province. ▪ VIA (Scoping and Impact Phase) for the proposed development of the Phezukomoya Wind Energy Facility near Noupoort, Northern Cape Province. ▪ VIA (Scoping and Impact Phase) for the proposed development of the San Kraal Wind Energy Facility near Noupoort, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Graskoppies Wind Farm near Loeriesfontein, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Hartebeest Leegte Wind Farm near Loeriesfontein, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Ithemba Wind Farm near Loeriesfontein, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Xha! Boom Wind Farm near Loeriesfontein, Northern Cape Province ▪ Visual Impact Assessments for 5 Solar Power Plants in the Northern Cape ▪ Visual Impact Assessments for 2 Wind Farms in the Northern Cape

	▪ Visual Impact Assessment for Mookodi Integration Project (132kV distribution lines) ▪ Landscape Character Assessment for Mogale City Environmental Management Framework

A full CV is attached as **Appendix B**.

1.6 Assessment Methodology

As mentioned above, this VIA has been based on a desktop-level assessment supported by field-based observation.

1.6.1 Physical landscape characteristics

Physical landscape characteristics such as topography, vegetation and land use are important factors influencing the visual character and visual sensitivity of the study area. Baseline information about the physical characteristics of the study area was initially sourced from spatial databases provided by NGI, the South African National Biodiversity Institute (SANBI) and the South African National Land Cover Dataset (Geoterraimage – 2018). The characteristics identified via desktop analysis were later verified during the site visit.

1.6.2 Identification of sensitive receptors

Visual receptor locations and routes that are sensitive and / or potentially sensitive to the visual intrusion of the proposed development was assessed in order to determine the impact of the proposed development on each of the identified receptor locations.

1.6.3 Fieldwork and photographic review

Fieldwork undertaken during the initial phase of the VIA involved a three (3) day site visit undertaken between the 9th and the 12th of July 2020 (mid-winter). The purpose of the site visit was to:

- verify the landscape characteristics identified via desktop means;
- conduct a photographic survey of the study area;
- verify, where possible, the sensitivity of visual receptor locations identified via desktop means;
- eliminate receptor locations that are unlikely to be influenced by the proposed development;
- identify any additional visually sensitive receptor locations within the study area; and
- inform the impact rating assessment of visually sensitive receptor locations (where possible).

1.6.4 Visual Sensitivity

Areas of visual sensitivity on the application site were demarcated, these being areas where the establishment of PV panels or other associated infrastructure would result in the greatest probability of visual impacts on potentially sensitive visual receptors. GIS-based visibility analysis was used to determine which sectors of the application site would be visible to the highest numbers of receptors in the study area and exclusion zones were created around any identified receptors located on the application site.

In addition, the Landscape Theme of the National Environmental Screening Tool was used to determine the relative landscape sensitivity for the proposed development.

1.6.5 Impact Assessment

A rating matrix was used to objectively evaluate the significance of the visual impacts associated with the proposed development, both before and after implementing mitigation measures. Mitigation measures were identified (where possible) to minimise the visual impact of the proposed development. The rating matrix made use of several different factors including geographical extent, probability, reversibility, irreplaceable loss of resources, duration and intensity, in order to assign a level of significance to the visual impact of the project.

A separate rating matrix was used to assess the visual impact of the proposed development on each visual receptor location (both sensitive and potentially sensitive), as identified. This matrix is based on three (3) parameters, namely the distance of an identified visual receptor from the proposed development, the presence of screening factors and the degree to which the proposed development would contrast with the surrounding environment.

1.6.6 Consultation with I&APs

Continuous consultation with Interested and Affected Parties (I&APs) undertaken during the public participation process will be used (where available) to help establish how the proposed development will be perceived by the various receptor locations and the degree to which the impact will be regarded as negative. Although I&APs have not yet provided any feedback in this regard, the report will be updated to include relevant information as and when it becomes available. If no relevant comments are received requiring the report to be updated, the report will automatically inform the final BA report.

2 FACTORS INFLUENCING VISUAL IMPACT

2.1 Subjective experience of the viewer

The perception of the viewer/receptor toward an impact is highly subjective and involves 'value judgements' on behalf of the receptor. It is largely based on the viewer's perception and is usually dependent on the age, gender, activity preferences, time spent within the landscape and traditions of the viewer (Barthwal, 2002). Thus, certain receptors may not consider a Solar PV Facility to be a negative visual impact as it is often associated with employment creation, social upliftment and the general growth and progression of an area, and thus the development could even have positive connotations.

2.2 Visual environment

Solar PV facilities are not features of the natural environment but are rather a representation of human (anthropogenic) alteration. As such, these developments are likely to be perceived as visually intrusive when placed in largely undeveloped landscapes that have a natural scenic quality and where tourism activities, based upon the enjoyment of (or exposure to) the scenic or aesthetic character of the area, are practiced. Residents and visitors to these areas could perceive the PV panels and associated infrastructure to be highly incongruous in this context and may regard these features as an unwelcome intrusion which degrade the natural character and scenic beauty of the area, and which could potentially even compromise the practising of tourism activities in the area. The experience of the viewer is however highly subjective and there are those who may not perceive features such as PV panels as a visual intrusion.

The presence of other anthropogenic features associated with the built environment may not only obstruct views but also influence the perception of whether a development is a visual impact. In industrial areas for example, where other infrastructure and built form already exists, the visual environment could be considered to be 'degraded' and thus the introduction of a Solar PV facility into this setting may be considered to be less visually intrusive than if there was no existing built infrastructure visible.

2.3 Type of visual receptor

Visual impacts can be experienced by different types of receptors, including people living, working or driving along roads within the viewshed of the proposed development. The receptor type in turn affects the nature of the typical 'view', with views being permanent in the case of a residence or other places of human habitation, or transient in the case of vehicles moving along a road. The nature of the view experienced affects the intensity of the visual impact experienced.

It is important to note that visual impacts are only experienced when there are receptors present to experience this impact. Thus, where there are no human receptors or viewers present there are not likely to be any visual impacts experienced.

2.4 Viewing distance

Viewing distance is a critical factor in the experiencing of visual impacts, as beyond a certain distance, even large developments tend to be much less visible, and difficult to differentiate from the surrounding landscape. The visibility of an object is likely to decrease exponentially as one moves away from the source of impact, with the impact at 1 000m being considerably less than the impact at a distance of 500m **(Figure 5)**.

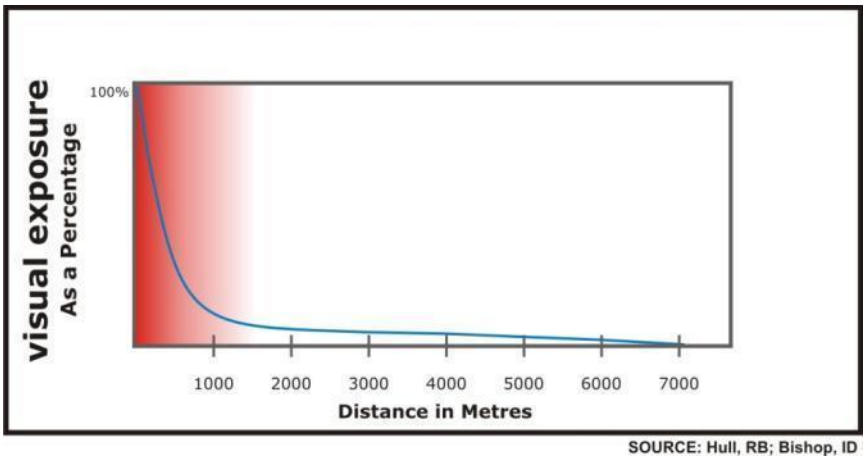


Figure 5: Conceptual representation of diminishing visual exposure over distance

3 VISUAL CHARACTER AND SENSITIVITY OF THE STUDY AREA

Defining the visual character of an area is an important factor in the assessment of visual impacts as it establishes the visual baseline or existing visual environment in which the development would be constructed. The visual impact of a development is measured by establishing the degree to which the development would contrast with, or conform to, the visual character of the surrounding area. The inherent sensitivity of the area to visual impacts or visual sensitivity is thereafter determined, based on the visual character, the economic importance of the scenic quality of the area, inherent cultural value of the area and the presence of visual receptors.

Physical and land use related characteristics, as outlined below, are important factors contributing to the visual character of an area.

3.1 Physical and Land Use Characteristics

3.1.1 Topography

The site proposed for the Oya Solar PV Facility development is located in the scenic Karoo region of the Western Cape which is generally associated with wide vistas and mountainous landscapes. The topography in the broader study area is largely dominated by the mountains/hills at the southern end of the Klein Roggeveld range. Much of the study area is therefore dominated by the steep slopes and broad ridges of these mountains and escarpments, although some flatter land occurs in the western and southern sections of the study area, in the basins of the Ongeluks and Muishond Rivers respectively (**Figure 6**).

Maps showing the topography and slopes within and in the immediate vicinity of the combined assessment area are provided in **Figure 8** and **Figure 9** below**.**

Figure 6: View (NE), across the study area from Portion 1 of the Farm Brandenburg No 164 (-32.950424S; 20.2035E) showing the relatively flat terrain on the application site, with more mountainous terrain to the north.

The proposed development application site is however largely characterised by flatter, gently undulating plains with areas of greater relief effectively bounding the site to the north and south. (**Figure 7**).

Figure 7: View (NNE) from the Gats Rivier Farm gate (-32.892180S; 20.217748E) showing the relatively flat terrain of the application site, with more mountainous terrain to the north.

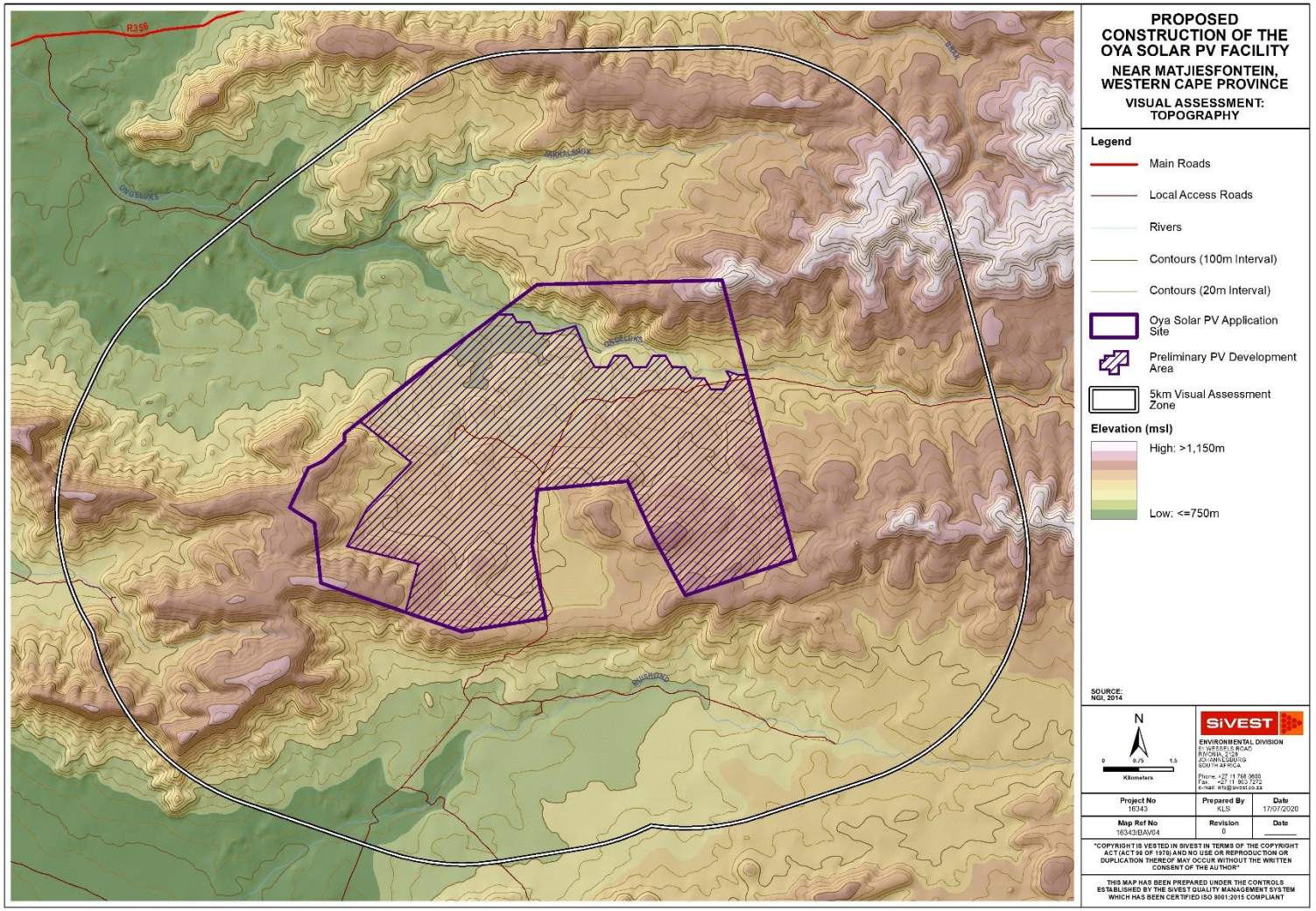


Figure 8: Topography of the study area

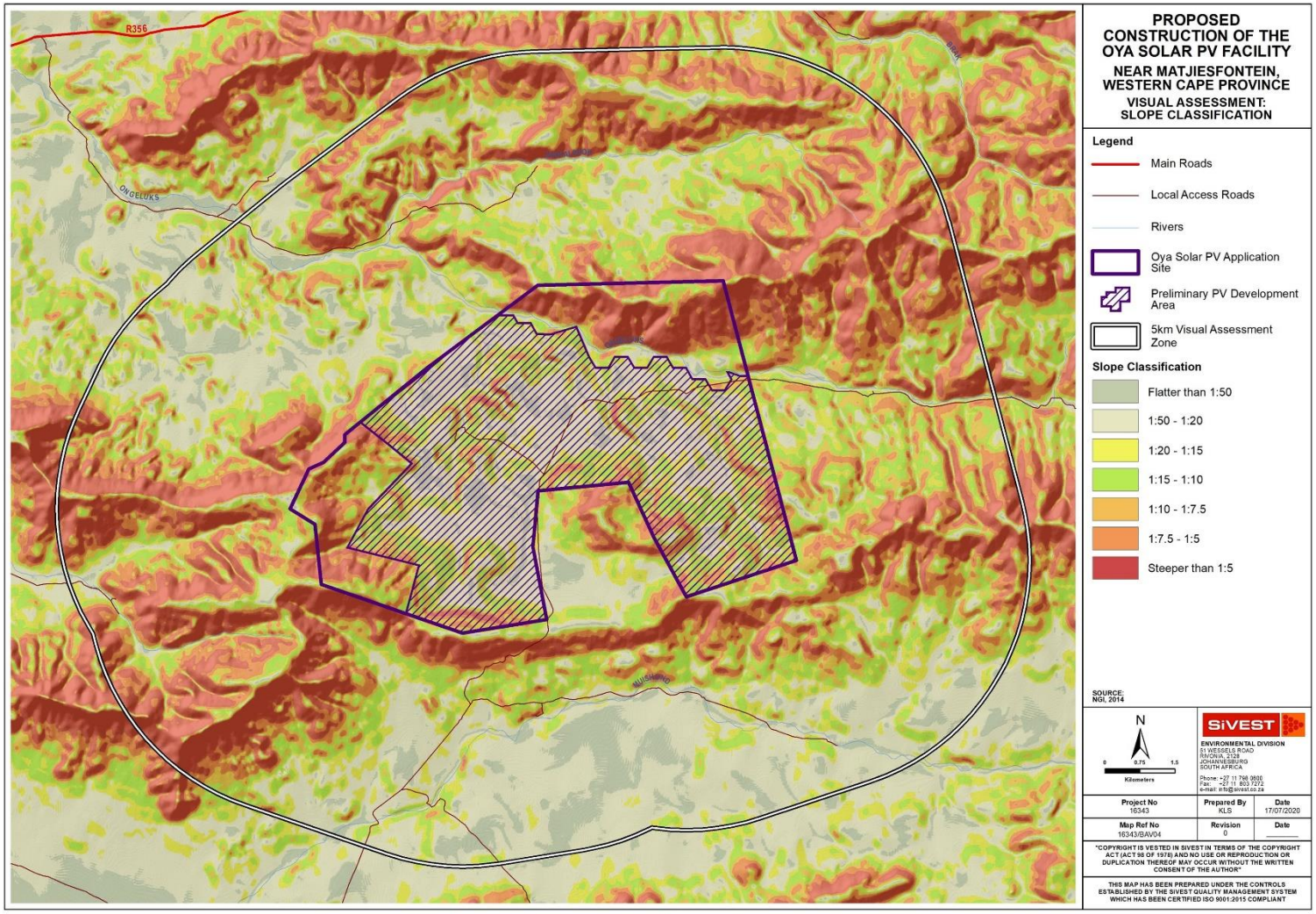


Figure 9: Slope classification of the study area

Visual Implications

Areas of flatter relief, including the plains and the higher-lying plateaus, are characterised by wide ranging vistas (**Figure 10**), although views to the north and south will be somewhat constrained by the hilly terrain in these sectors of the study area which enclose the visual envelope. In the hillier and higher-lying terrain, the vistas will depend on the position of the viewer. Viewers located within some of the more incised valleys for example, would have limited vistas, whereas a much wider vista would be experienced by viewers on higher-lying ridge tops or slopes. Importantly in the context of this study, the same is true of objects placed at different elevations and within different landscape settings. Objects placed on high-elevation slopes or ridge tops would be highly visible, while those placed in valleys or enclosed plateaus would be far less visible.

The PV arrays will not however be located on high elevation slopes or on ridgelines and as such there will be minimal impact on the skyline. In addition, there is significant topographic shielding to reduce the visibility of the steel structures of the proposed substations from many of the locally occurring receptor locations.

Figure 10: View across the southern section of the study area **(**-32.937595S**;** 20.207194**E)** showing wide-ranging vistas experienced from higher elevations.

GIS technology was used to undertake a preliminary visibility analysis for the proposed PV arrays. A worst-case scenario was assumed when undertaking the analysis, in which the viewshed is calculated from points at 500m intervals across the PV Development Area and the panel height is set at 4m. Other infrastructure associated with the proposed development was not factored into the visibility analysis as the visual impact of the associated infrastructure is generally not regarded as a significant factor when compared to the visual impact associated

with PV arrays. The resulting viewshed indicates the geographical area from where the PV arrays would be visible, i.e. the zone of visual influence. This analysis is based entirely on topography (relative elevation and aspect) which is an important factor to be considered when determining the area of visual influence for a Solar PV Facility. The viewshed analysis does not consider any existing vegetation cover or built infrastructure which may screen views of the proposed development. This is, again, to assess the worst-case scenario.

In addition, detailed topographic data was not available for the broader study area and as such the visibility analysis does not take into account any localised topographic variations which may constrain views. This analysis should therefore be seen as a conceptual representation or a worst-case scenario.

The results of this analysis, as per **Figure 11** below, show that much of the broader study area falls outside the preliminary viewshed for the proposed PV arrays.

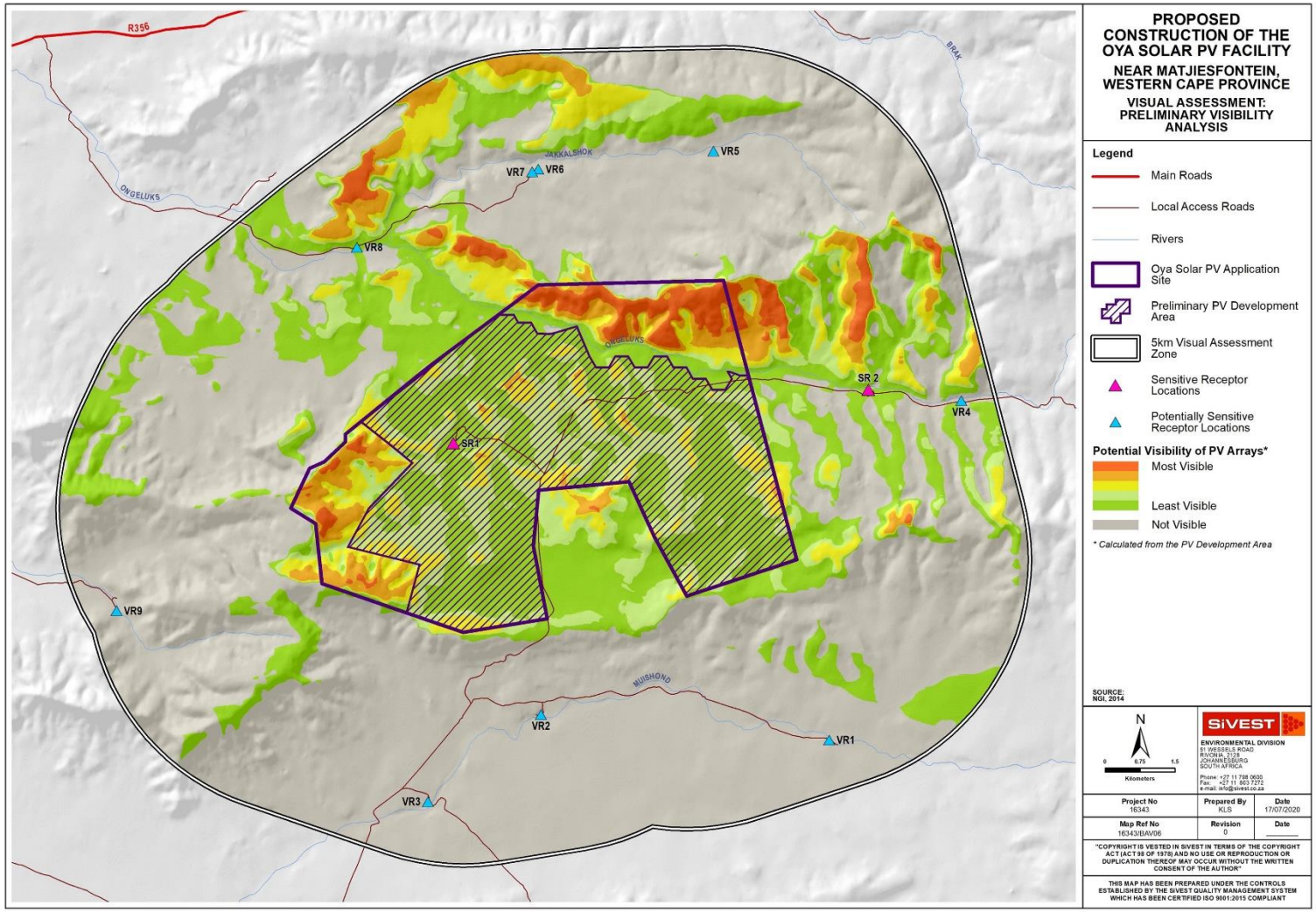


Figure 11: Preliminary visibility analysis of proposed development

3.1.2 Vegetation

According to Mucina and Rutherford (2012), much of the study area is covered by the Koedoesberge – Moordenaars Karoo vegetation type, which tends to occur on slightly undulating hills to hilly landscapes. This vegetation type comprises low succulent scrubs, scattered tall shrubs and patches of “white” grass visible on plains **(Figure 12)**. The dwarf shrubs include Pteronia, Drosanthemum and Galenia.

Figure 12: Typical vegetation cover prevalent across the study area

The northern and eastern sections of the study area, which are dominated by high mountains / hills, are however classified as Central Mountain Shale Renosterveld. This vegetation type is typically found on slopes and broad ridges of low mountains and escarpments, with taller shrubland dominated by renosterbos and large areas of mainly non-succulent karoo shrubs and with a rich geophytic flora in the undergrowth or in more open, wetter or rocky habitats (**Figure 13**).

Figure 13: Typical vegetation cover found on slopes and broad ridges of the mountains / hills

Much of the study area however is still characterised by natural low shrubland with transformation limited to patches of cultivation and a few isolated areas where pastoral activities such as livestock rearing are taking place.

Vegetation classifications across the study area are shown in **Figure 16** below.

Visual Implications

Vegetation cover across the study area is predominantly short and sparse and thus will not provide any visual screening (**Figure 14)**. In some instances however, taller trees have been planted around farmhouses, possibly restricting views from these receptor locations to some degree (**Figure 15**).

Figure 14: Short, sparse vegetation cover in the area does not provide any visual screening

Figure 15: Trees planted around a farmstead in the south-eastern sector of the study area

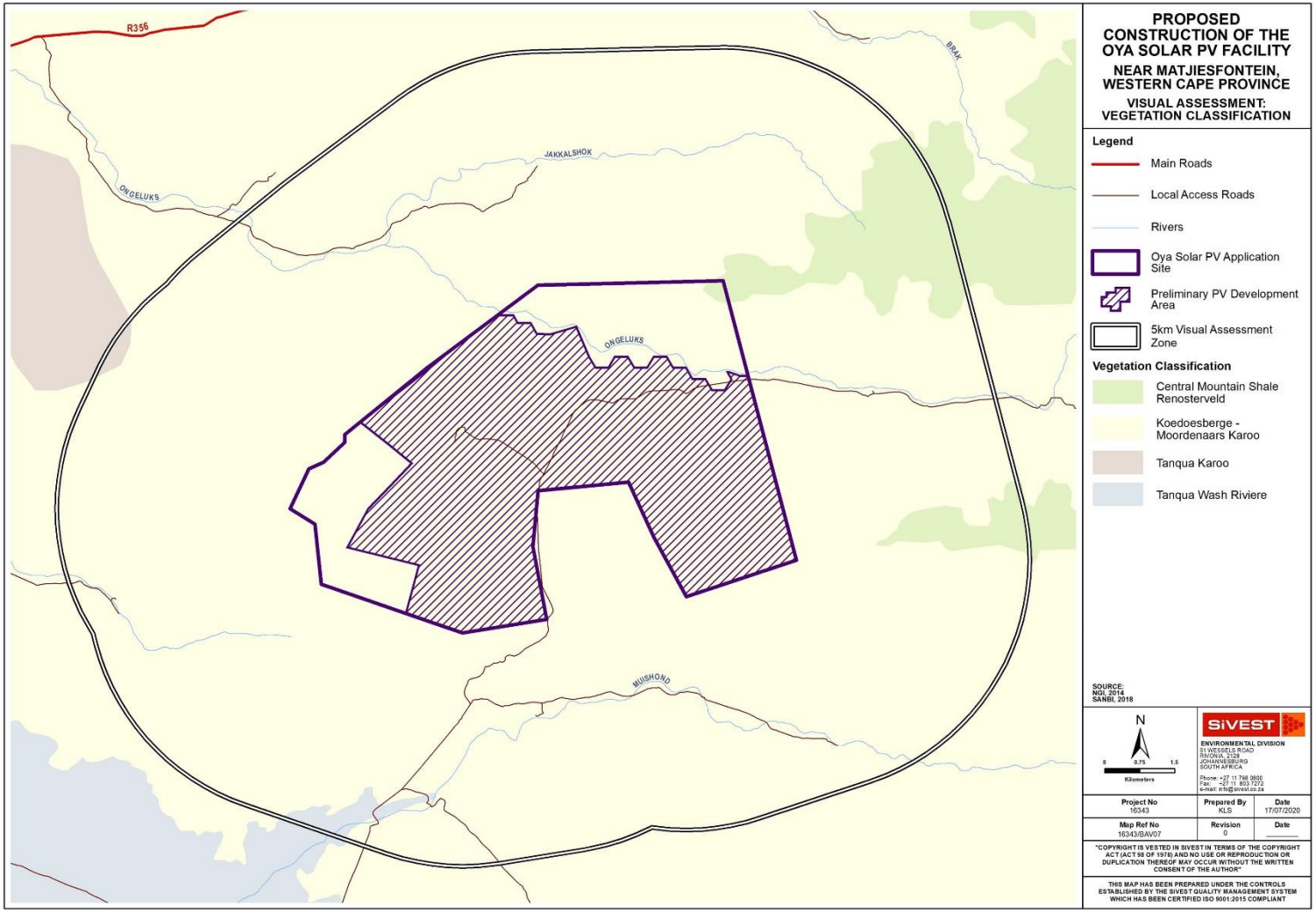


Figure 16: Vegetation Classification in the Study Area

3.1.3 Land Use

According to the South African National Land Cover dataset (GeoTerra Image 2018), much of the visual assessment area is characterised by natural vegetation which is dominated by Karoo and Fynbos shrubland interspersed with natural grassland (**Figure 17**).

Agricultural activity in the area is restricted by the arid nature of the local climate and areas of cultivation are largely confined to relatively limited areas distributed along drainage lines. As such, the natural vegetation has been retained across much of the study area. Livestock farming (mostly sheep) is the dominant activity (**Figure 18**), although the climatic and soil conditions have resulted in low densities of livestock and relatively large farm properties across the area. Thus, the area has a very low density of rural settlement, with relatively few scattered farmsteads in evidence (**Figure 19**). Built form in much of the study area is limited to isolated farmsteads, including farm worker's dwellings and ancillary farm buildings, gravel access roads, telephone lines, fences and windmills (**Figure 20**).

The closest built-up area is the town of Matjiesfontein which is situated approximately 52km south-east of the Oya Solar PV Facility application site. This small town is well outside the study area for the proposed development and is thus not expected to have an impact on the visual character of the study area.

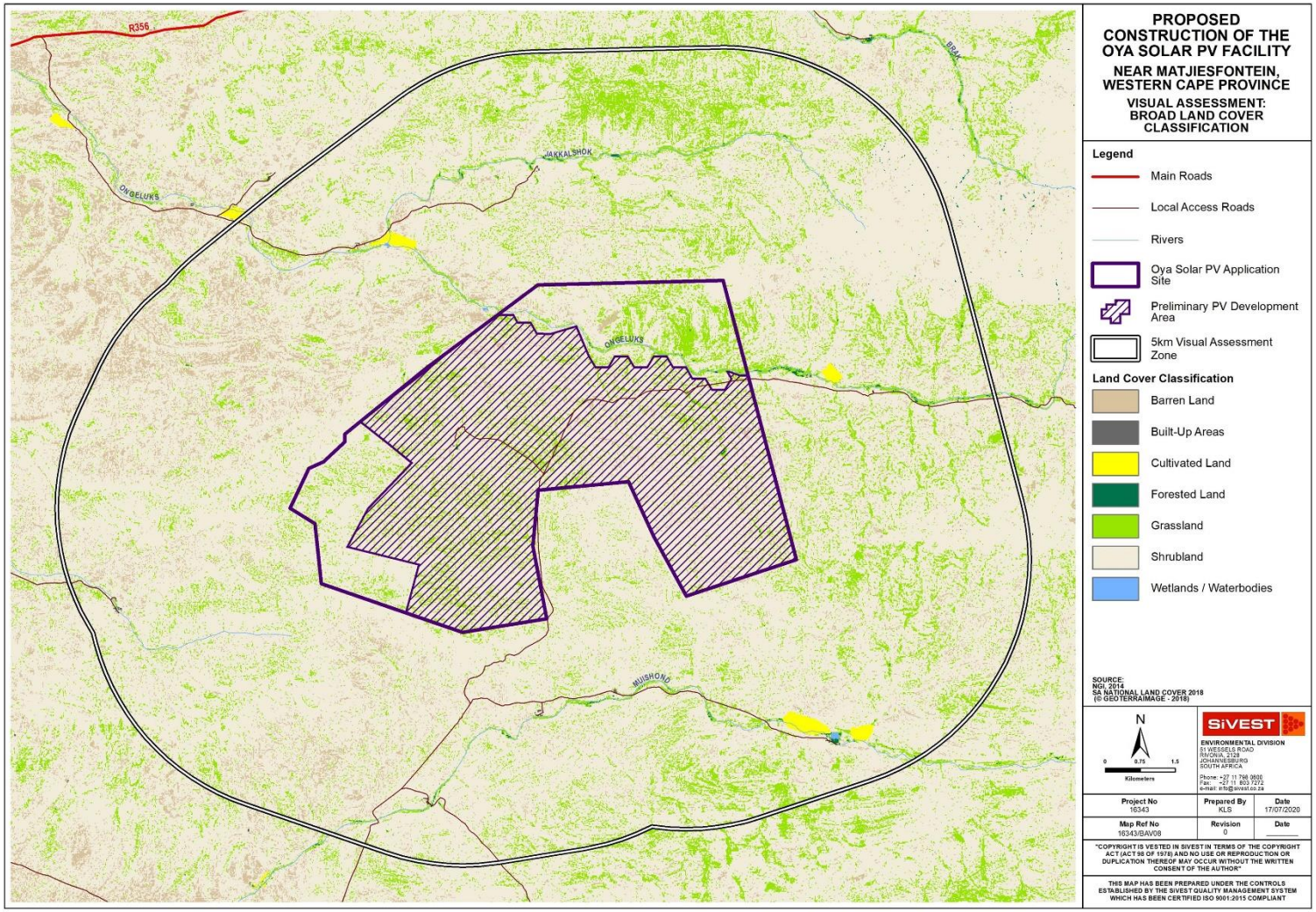


Figure 17: Land Cover Classification of the study area

Figure 18: Evidence of sheep rearing in the assessment zone

Figure 19: Isolated farmstead on Portion 1 of the Farm Brandenburg No 164

Figure 20: Gravel access roads, telephone lines and fences typically found in the study area.

Visual Implications

Sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements. In addition, there are no towns or settlements in the study area and thus, there are very low levels of human transformation and visual degradation across much of the study area.

The short, shrubby or grassy vegetation that occurs over the entire study area offers no visual screening in itself, and thus terrain / topography is the most important factor in limiting vistas. Exceptions to this situation occur at some local farmsteads where trees and shrubs have been established around the farmstead, providing effective screening from the surrounding areas.

The influence of the level of human transformation on the visual character of the area is described in more detail below.

3.2 Visual Character and Cultural Value

The above physical and land use-related characteristics of the study area contribute to its overall visual character. Visual character largely depends on the level of change or transformation from a natural baseline in which there is little evidence of human transformation of the landscape. Varying degrees of human transformation of a landscape would engender differing visual characteristics to that landscape, with a highly modified urban or industrial landscape being at the opposite end of the scale to a largely natural undisturbed landscape. Visual character is also influenced by the presence of built infrastructure such as buildings, roads and other objects such as telephone or electrical infrastructure. The visual character of an area largely determines the **sense of place** relevant to the area. This is the unique quality or character of a place, whether natural, rural or urban which results in a uniqueness, distinctiveness or strong identity.

As mentioned above, much of the study area is characterised by natural landscapes with some pastoral elements and low densities of human settlement. Livestock grazing is the dominant land use. These activities have not transformed the natural landscape to any significant degree and as such a large portion of the study area has retained its natural character and is dominated by largely natural views.

There are no towns or built-up areas in the study area influencing the overall visual character and thus there are very low levels of human transformation and visual degradation across much of the study area. Built form is largely dominated by isolated farmsteads, gravel access roads, telephone lines, low voltage power lines, fences and windmills. The presence of this infrastructure is an important factor in this context, as the introduction of the proposed development would result in less visual contrast where other anthropogenic elements are already present. The above-mentioned anthropogenic elements are not however considered to have caused any significant degradation of the visual character of the study.

The greater area surrounding the development site is an important component when assessing visual character. The area can be considered to be typical of a Karoo or “platteland” landscape that would characteristically be encountered across the high-lying dry western and central interior of South Africa. Much of South Africa’s dry Karoo interior consists of wide open, uninhabited spaces sparsely punctuated by scattered farmsteads and small towns. Over the last couple of decades an increasing number of tourism routes have been established in the Karoo and in a context of increasing urbanisation in South Africa’s major centres, the Karoo is being marketed as an undisturbed getaway. Examples of this may be found in the “Getaway Guide to Karoo, Namaqualand and Kalahari” (Moseley and Naude-Moseley, 2008).

The typical Karoo landscape can be considered a valuable ‘cultural landscape’ in the South African context. Although the cultural landscape concept is relatively new, it is becoming an increasingly important concept in terms of the preservation and management of rural and urban settings across the world (Breedlove, 2002).

The Karoo landscape, consisting of wide-open plains, and isolated relief, interspersed with isolated farmsteads, windmills and stock holding pens, is an important part of the cultural matrix of the South African environment. The Karoo farmstead is also a representation of how the harsh arid nature of the environment in this part of the country has shaped the predominant land use and economic activity practiced in the area, as well as the patterns of human habitation and interaction. The presence of small towns, such as Matjiesfontein, engulfed by an otherwise rural, almost barren environment, form an integral part of the wider Karoo landscape. As such, the Karoo landscape as it exists today has value as a cultural landscape in the South African context.

In light of this, it is important to assess whether the introduction of a solar PV facility with associated infrastructure into the study area would be a degrading factor in the context of the natural Karoo character of the landscape. Broadly speaking, visual impacts on the cultural landscape in the area around the proposed development would be reduced by the fact that the area is very remote and there are no significant tourism enterprises attracting visitors into the study area. In addition, the nearest major scenic route, the R354, is outside the 5 km visual assessment zone and is not expected to experience any visual impacts from the proposed development.

A detailed assessment of the potential impacts of the proposed Oya Solar PV Facility on the cultural landscape has been undertaken by Cultural Landscape Specialist Emmy Lou Rabe Bailey (*Cultural Landscape Assessment, 22 July 2020*). This study concluded that, as there are no resident local communities or agricultural activities currently on the site and the fact that the nature of an RE facility such as the Oya Solar PV can be considered as the next cultural layer significant for representing the “combined works of nature and man”, the impacts of the development will be reduced with the implementation of mitigation measures as set out in the Cultural Landscape Assessment. Thus the negative impact of the development on the cultural landscape with recommended mitigation will be low.

3.3 Visual Sensitivity

Visual sensitivity can be defined as the inherent sensitivity of an area to potential visual impacts associated with a proposed development. It is based on the physical characteristics of the area (i.e. topography, landform and land cover), the spatial distribution of potential receptors, and the likely value judgements of these receptors towards a new development (Oberholzer: 2005). A viewer's perception is usually based on the perceived aesthetic appeal of an area and on the presence of economic activities (such as recreational tourism) which may be based on this aesthetic appeal.

In order to assess the visual sensitivity of the area, SiVEST has developed a matrix based on the characteristics of the receiving environment which, according to the Guidelines for Involving Visual and Aesthetic Specialists in the EIA Processes, indicate that visibility and aesthetics are likely to be 'key issues' (Oberholzer: 2005).

Based on the criteria in the matrix (**Table 1**), the visual sensitivity of the area is broken up into a number of categories, as described below:

i) **High** - The introduction of a new development such as a solar PV facility would be likely to be perceived negatively by receptors in this area; it would be considered to be a visual intrusion and may elicit opposition from these receptors.
ii) **Moderate** – Receptors are present, but due to the nature of the existing visual character of the area and likely value judgements of receptors, there would be limited negative perception towards the new development as a source of visual impact.
iii) **Low** - The introduction of a new development would not be perceived to be negative, there would be little opposition or negative perception towards it.

The table below outlines the factors used to rate the visual sensitivity of the study area. The ratings are specific to the visual context of the receiving environment within the study area.

Table 1: Environmental factors used to define visual sensitivity of the study area

FACTORS	DESCRIPTION	RATING									
		LOW									*HIGH*
		1	2	3	4	5	6	7	8	9	10
Pristine / natural / scenic character of the environment	Study area is largely natural with areas of scenic value and some pastoral elements.										
Presence of sensitive visual receptors	Relatively few sensitive receptors have been identified in the study area.										
Aesthetic sense of place / visual character	Visual character is typical of Karoo Cultural landscape.										
Irreplaceability / uniqueness / scarcity value	Although there are areas of scenic value within the study area, these are not rated as highly unique.										
Cultural or symbolic meaning	Much of the area is typical of a Karoo Cultural landscape.										
Protected / conservation areas in the study area	No protected or conservation areas were identified in the study area.										
Sites of special interest present in the study area	No sites of special interest were identified in the study area.										
Economic dependency on scenic quality	Few tourism/leisure-based facilities in the area										
International / regional / local status of the environment	Study area is typical of Karoo landscapes										
**Scenic quality under threat / at risk of change	Introduction of a Solar PV facility will alter the visual character and sense of place. In addition, the development of other renewable energy facilities in the broader area as planned or under construction will introduce an increasingly industrial character, giving rise to significant cumulative impacts										

**Any rating above '5' for this specific aspect will trigger the need to undertake an assessment of cumulative visual impacts.

Low				Moderate					High
10	20	30	40	50	60	70	80	90	100

Based on the above factors, the total score for the study area is 44, which according to the scale above, would result in the area being rated as having a low to moderate visual sensitivity. It should be stressed however that the concept of visual sensitivity has been utilised indicatively to provide a broad-scale indication of whether the landscape is likely to be sensitive to visual impacts, and is based on the physical characteristics of the study area, economic activities and land use that predominates. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs.

No formal protected areas were identified in the study area and relatively few sensitive or potentially sensitive receptors were found to be present.

3.4 Visual Absorption Capacity

Visual absorption capacity is the ability of the landscape to absorb a new development without any significant change in the visual character and quality of the landscape. The level of absorption capacity is largely based on the physical characteristics of the landscape (topography and vegetation cover) and the level of transformation present in the landscape.

Although the undulating topography in the study would increase the visual absorption capacity, this would be offset by the lack of screening provided by the dominant shrubland vegetation. In addition, there is little built form in the area and as such the area is largely natural in character.

Visual absorption capacity in the study area is therefore rated as low.

3.5 Visually Sensitive Areas on the Site

During the early phase of the BA, all project specialists were requested to indicate environmentally sensitive areas within the application sites. The aim of this exercise was to demarcate those areas of the application site which should be precluded from the solar PV development footprint. From a visual perspective, these would be areas where the establishment of PV panels or other associated infrastructure would result in the greatest probability of visual impacts on potentially sensitive visual receptors.

Using GIS-based visibility analysis, it was possible to determine which sectors of the application site would be visible to the highest numbers of receptors in the study area (**Figure 21**). This analysis considered all the sensitive and potentially sensitive receptor locations identified. Due to the relatively low number of receptors in the area, and the fact that many of these receptors

lie outside the viewshed for the PV arrays, very few areas on the site were found to be visible to more than one (1) receptor. These areas were rated as areas of 'high sensitivity' which should preferably be precluded from the proposed development in order to reduce the potential visual impact on the identified sensitive and potentially sensitive receptor locations. However, as the study area as a whole is rated as having a moderate visual sensitivity (refer to **Section 3.3**), these zones are **not** considered to be areas of high visual sensitivity or no go areas, but rather should be viewed as zones where development should be limited, as the PV panels will still be visible.

It should be noted that this sensitivity rating applies to PV fields only. The visual impacts resulting from the associated infrastructure are considered to have far less significance when viewed in the context of multiple PV panels and as such the infrastructure has been excluded from the sensitivity analysis.

It should be further noted that the visibility analysis is based purely on topographic data available for the broader study area and does not take into account any localised topographic variations or any existing infrastructure and / or vegetation which may constrain views. In addition, the analysis does not consider differing perceptions of the viewer which largely determine the degree of visual impact being experienced.

The visual sensitivity analysis should therefore be seen as a conceptual representation or a worst-case scenario which rates the visibility of the site in relation to potentially sensitive receptors.

In addition to the sensitivity ratings, a 500 m exclusion zone has been delineated around the existing residence on the application site. It was recommended that PV arrays should not be developed within these buffer zones so as to reduce visual impacts and prevent significantly adverse impacts of glint and glare on the local residents.

These areas of visual sensitivity as identified above have been taken into account in the preliminary layout of the proposed development as shown in **Figure 21** below.

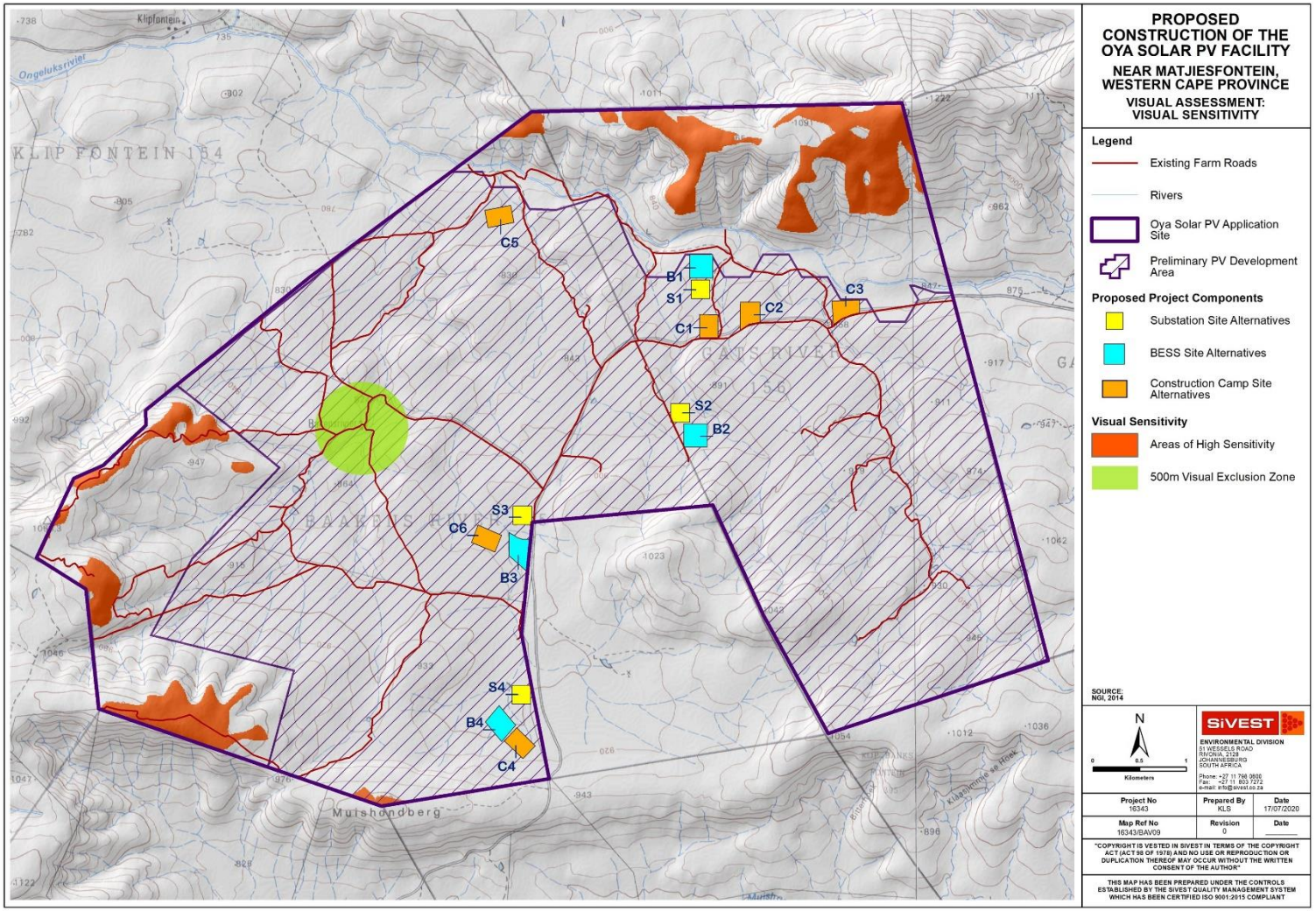
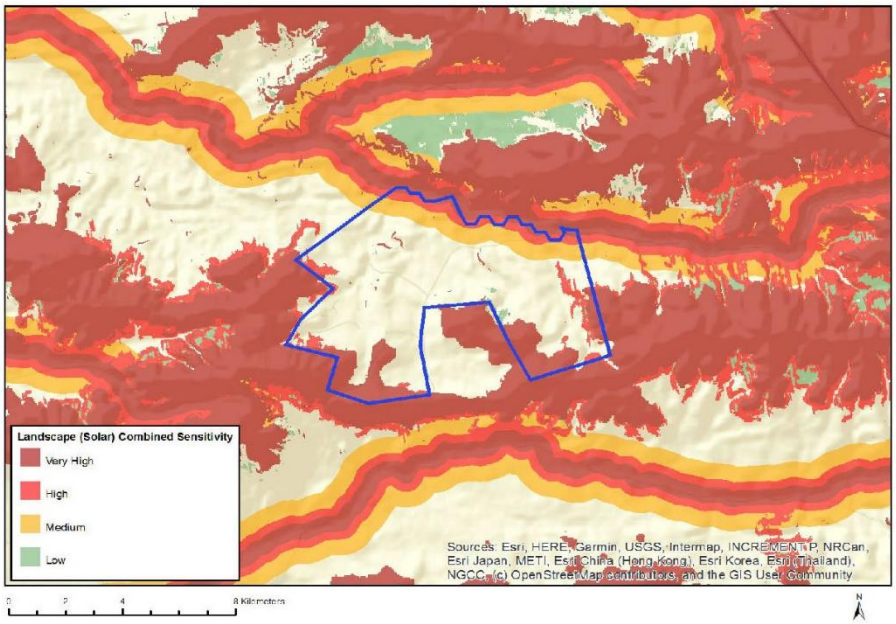


Figure 21: Preliminary visual sensitivity analysis of proposed development**.**

In assessing visual sensitivity, the Landscape Theme of the National Environmental Screening Tool was used to determine the relative landscape sensitivity for the proposed development. This tool identifies areas of Very High, High and Medium sensitivity in respect of solar PV development on the Oya Solar PV Facility site. The identification of areas of "Very High" landscape sensitivity in this instance is largely based on natural features such as mountain tops, high ridges, steep slopes and wetlands / watercourses. Figure 22 below is an extract from the Screening Tool Report generated for the Oya Solar PV Facility.

MAP OF RELATIVE LANDSCAPE (SOLAR) THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
High	Slope between 1:4 and 1:10
High	Within 500 m of a river
Low	Slope less than 1:10
Medium	Within 1000 m of a wetland
Very High	Mountain tops and high ridges
Very High	Slope more than 1:4
Very High	Within 250 m of a river

Figure 22: Relative Landscape Sensitivity for the Oya Solar PV Application Site

The areas of Very High and High Sensitivity on the Oya Solar PV Facility application site largely align with the steeper, more hilly areas on the boundaries of the site which have been excluded from the preliminary PV development area.

The Screening Tool is however a very high level, desktop study and as such the results of the study must be viewed against factors affecting visual impact, such as:

- the presence of visual receptors;
- the distance of those receptors from the proposed development; and
- the likely visibility of the development from the receptor locations.

In addition, the recommendation in the Landscape Section of the Strategic Environmental Assessment for Wind and Solar Photovoltaic Energy in South Africa (CSIR, 2015) is that, where areas of ***very high*** or ***high*** sensitivity have been identified, further assessment would be required before development can take place.

Hence the “High” and “Very High” Sensitivity ratings do not preclude development but rather should be viewed as zones where development should be limited.

4 GENERIC VISUAL IMPACTS ASSOCIATED WITH THE SOLAR PV ENERGY FACILITES

In this section, the typical visual issues related to the establishment of solar PV facilities and associated infrastructure as proposed are discussed. It is important to note that the renewable energy industry is still relatively new in South Africa and as such this report draws on international literature and web material (of which there is significant material available) to describe the generic impacts associated with solar energy facilities.

4.1 Solar Energy Facilities

4.1.1 Solar PV Fields

The solar power component of the proposed energy generation facility consists of PV panels, which grouped together form a 'solar field'. As mentioned above, each PV panel is a large structure that is typically between 1 and 4m high. The height of these objects will make them visible, especially in the context of a relatively flat landscape.

More importantly, the concentration of these panels will make them highly visible, depending on the number of panels in each solar field. Solar fields with a large spatial extent (footprint) will become distinctly visible features that contrast with the landscape, especially where the landscape is natural in character or undeveloped. In this context the solar field could be considered a visual intrusion, potentially altering the visual environment towards a more industrial character.

The establishment of PV facilities generally requires some levelling of the terrain and the clearance of taller shrubs and vegetation. This will intensify the visual prominence of the solar energy facility, particularly in natural locations where little transformation has taken place (**Figure 23**).

Figure 23: Kathu Solar Power Plant (photo courtesy of "visits to the park"), near Kathu, Northern Cape Province.

4.1.2 Associated On-Site Infrastructure

The infrastructure associated with the proposed Oya Solar PV Facility (in addition to the PV arrays) will include the following:

- Onsite 33/132kV substation;
- Medium voltage cabling linking the various PV arrays to the on-site substation. These cables will be buried along access roads, where feasible, with overhead 33kV lines grouping PV panels to crossing valleys and ridges outside of the road footprints to get to the substation.
- A BESS will be located next to the onsite 33/132kV substation or in between the PV modules. The BESS would most likely comprise an array of containers, outdoor cabinets and/or storage tanks.
- Construction laydown area to house construction equipment, components, offices and material.
- Operation and Maintenance (O&M) buildings for use during the operational phase. The O&M building will be used throughout the operational phase of the PV facility and will be a single storey building, included in the footprint of the substation.
- Temporary infrastructure to obtain water from available local sources, possibly including new or existing boreholes, a temporary above ground pipeline (approximately 50cm in diameter), and temporary water storage tanks.
- New roads of 4 to 8m wide would be constructed between some of the PV arrays to facilitate access throughout the PV facility.
- Fencing will be approximately 2m high surrounding the entire PV facility for security purposes.
- Lighting for safety.

Substations are generally large, highly visible structures which are relatively industrial in character. As they are not features of the natural environment, but are representative of human (anthropogenic) alteration, substations will be perceived to be incongruous when placed in largely natural landscapes. In this instance, the substation is intended to serve the proposed solar PV project and as such, the substation is likely to be perceived as part of the greater PV facility. Thus, the visual impact of the substation will be relatively minor when compared to the visual impact associated with the development as a whole.

Surface clearance for cable trenches, access roads and laydown areas may result in the increased visual prominence of these features, thus increasing the level of contrast with the surrounding landscape. Buildings, BESS containers and associated infrastructure placed in prominent positions such as on ridge tops may break the natural skyline, drawing the attention of the viewer. In addition, security lighting on the site may impact on the nightscape (**Section 5.3**).

The visual impact of infrastructure associated with the proposed development is generally not regarded as a significant factor when compared to the visual impact associated with large PV arrays. The infrastructure would however, increase the visual "clutter" of the proposed development and magnify the visual prominence of the development if located on ridge tops or flat sites in natural settings where there is limited tall wooded vegetation to conceal the impact.

5 SENSITIVE VISUAL RECEPTORS

A sensitive visual receptor location is defined as a location from where receptors would potentially be impacted by a proposed development. Adverse impacts often arise where a new development is seen as an intrusion which alters the visual character of the area and affects the 'sense of place'. The degree of visual impact experienced will however vary from one receptor to another, as it is largely based on the viewer's perception.

A distinction must be made between a receptor location and a sensitive receptor location. A receptor location is a site from where the proposed development may be visible, but the receptor may not necessarily be adversely affected by any visual intrusion associated with the development. Less sensitive receptor locations include locations of commercial activities and certain movement corridors, such as roads that are not tourism routes. More sensitive receptor locations typically include sites that are likely to be adversely affected by the visual intrusion of the proposed development. They include tourism facilities, scenic sites and residential dwellings in natural settings.

The identification of sensitive receptors is typically based on a number of factors which include:

- the visual character of the area, especially taking into account visually scenic areas and areas of visual sensitivity;
- the presence of leisure-based (especially nature-based) tourism in an area;

- the presence of sites or routes that are valued for their scenic quality and sense of place;
- the presence of homesteads / farmsteads in a largely natural setting where the development may influence the typical character of their views; and
- feedback from interested and affected parties, as raised during the public participation process conducted as part of the EIA study.

Viewing distance is also a critical factor in the experiencing of visual impacts. As the visibility of the development would diminish exponentially over distance (refer to **section 2.4** above), receptor locations which are closer to the proposed development would experience greater adverse visual impacts than those located further away.

The degree of visual impact experienced will however vary from one inhabitant to another, as it is largely based on the viewer's perception. Factors influencing the degree of visual impact experienced by the viewer include the following:

- Value placed by the viewer on the natural scenic characteristics of the area.
- The viewer's sentiments toward the proposed structures. These may be positive (a symbol of progression toward a less polluted future) or negative (foreign objects degrading the natural landscape).
- Degree to which the viewer will accept a change in the typical Karoo character of the surrounding area.

5.1 Receptor Identification

Preliminary desktop assessment of the study area identified eleven (11) potentially sensitive visual receptor locations, most of which appear to be existing farmsteads (**Figure 24**). These farmsteads are regarded as potentially sensitive visual receptors as they are located within a mostly rural setting and the proposed development will likely alter natural vistas experienced from these locations, although the residents' sentiments toward the proposed development are unknown.

The findings of the desktop assessment were largely confirmed during the field assessment although it was not possible to confirm the presence of farmsteads at all the identified locations due to access restrictions. Notwithstanding this limitation, all the identified receptor locations were assessed as part of the VIA as they are still regarded as being potentially sensitive to the visual impacts associated with the proposed.

Two (2) of the identified receptor locations were confirmed to be sensitive receptors, these being tourism / accommodation facilities at the Gats Rivier Holiday Farm and Baakens Rivier. It was established that Baakens River comprises accommodation facilities that are part of the Gats Rivier Holiday Farm facility, even though these facilities are located on a different farm some distance from the main Gats Rivier farm.

One (1) identified receptor was found to be more than 5km from the PV development area, and a further seven (7) were found to be outside the viewshed for the PV development area.

In many cases, roads along which people travel, are regarded as sensitive receptors. The primary thoroughfare in the broader area is the R356 main road which connects the R46 near Ceres with Loxton by way of Sutherland and Fraserburg. This is a gravel road, primarily used as an access route by the local farmers and is not valued or utilised for its scenic or tourism potential. As a result, this road is not considered to be visually sensitive. In addition, the road is more than 7kms from the PV development area and largely outside the viewshed. Motorists travelling along this road will therefore not experience any adverse visual impacts as a result of the proposed development.

Other thoroughfares in the study area are primarily used as local access roads and do not form part of any scenic tourist routes. These roads are not specifically valued or utilised for their scenic or tourism potential and are therefore not regarded as visually sensitive.

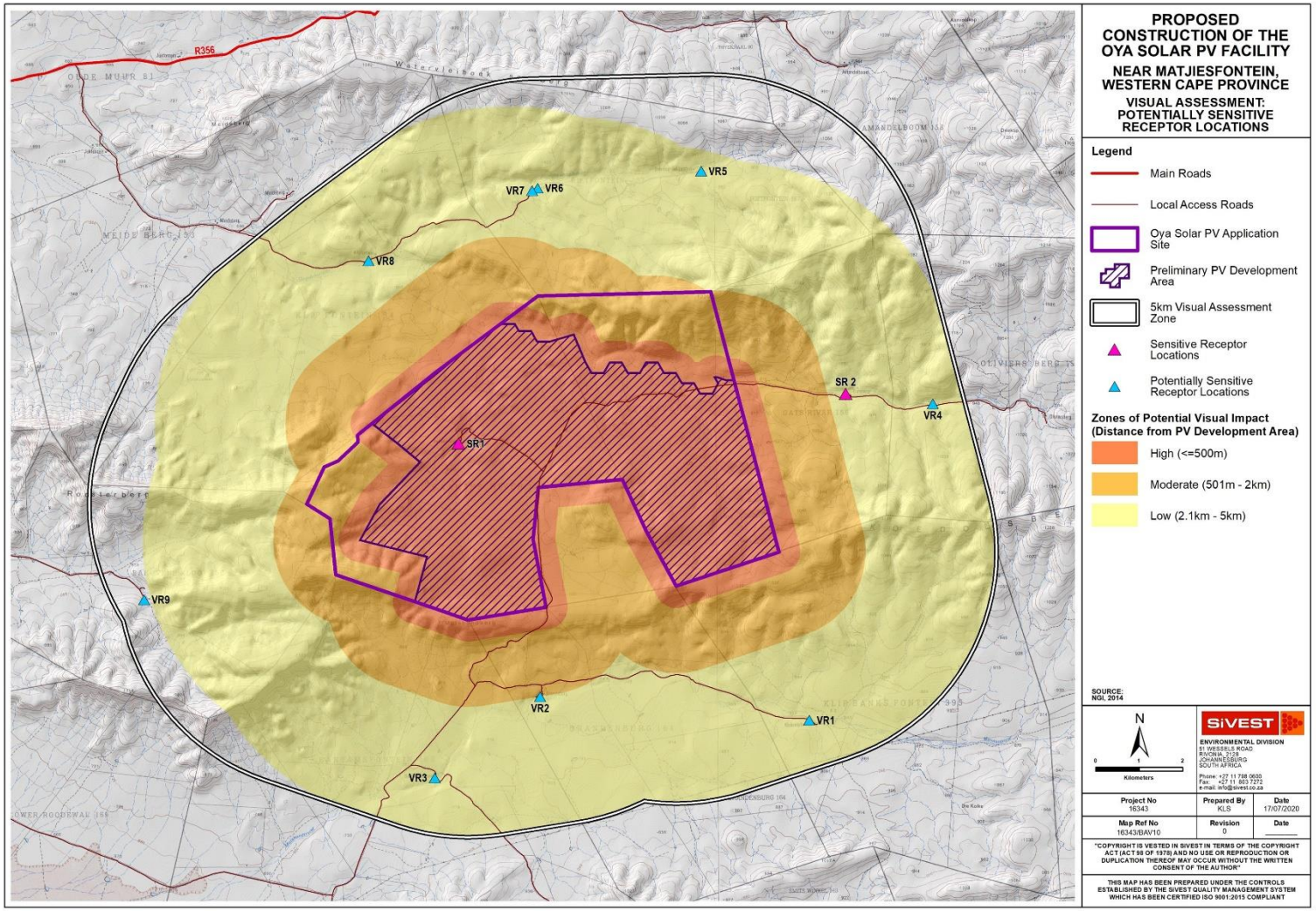


Figure 24: Potentially sensitive receptor locations within 5kms of the Oya Solar PV Facility application site.

5.2 Receptor Impact Rating

In order to assess the impact of the proposed facilities on the identified potentially sensitive receptor locations, a matrix that takes into account a number of factors has been developed and is applied to each receptor location.

The matrix is based on a number of factors as listed below:

- Distance of a receptor location away from the proposed development (zones of visual impact)
- Presence of screening elements (topography, vegetation etc.)
- Visual contrast of the development with the landscape pattern and form

These factors are considered to be the most important factors when assessing the visual impact of a proposed development on a potentially sensitive receptor location in this context. It should be noted that this rating matrix is a relatively simplified way of assigning a likely representative visual impact, which allows a number of factors to be considered. Experiencing visual impacts is however a complex and qualitative phenomenon and is thus difficult to quantify accurately. The matrix should therefore be seen as a representation of the likely visual impact at a receptor location. Part of its limitation lies in the quantitative assessment of what is largely a qualitative or subjective impact.

As described above, the distance of the viewer / receptor location from the development is an important factor in the context of experiencing visual impacts which will have a strong bearing on mitigating the potential visual impact. A high impact rating has been assigned to receptor locations that are located within 500m of the proposed solar PV facility. Beyond 5km, the visual impact of a solar PV facility and the associated infrastructure diminishes considerably, as the development would appear to merge with the elements on the horizon. Hence, any receptor location beyond this distance has been assigned an overriding nil impact rating. As such, despite the impact rating assigned to the other visual factors, the overall impact rating would remain negligible, as the proposed development is unlikely to visually influence any receptors located more than 5km from the development.

Zones of visual impact for the solar PV facility were therefore delineated according to distance from the proposed PV development area. Based on the height and scale of the solar PV project, the distance intervals chosen for the zones of visual impact are as follows:

- 0 - 500m (high impact zone)
- 500m – 2km (moderate impact zone)
- 2km - 5km (low impact zone)

The presence of screening elements is an equally important factor in this context. Screening elements can be vegetation, buildings and topographic features. For example, a grove of trees

or a series of low hills located between a receptor location and an object could completely shield the object from the receptor. As such, where views of the proposed development are completely screened, or where the receptor is outside the viewshed for the proposed development, the receptor has been assigned an overriding nil impact rating, as the development would not impose any impact on the receptor.

The visual contrast of a development refers to the degree to which the development would be congruent with the surrounding environment. This is based on whether or not the development would conform to the land use, settlement density, structural scale, form and pattern of natural elements that define the structure of the surrounding landscape. Visual compatibility is an important factor to be considered when assessing the impact of the development on receptors within a specific context. A development that is incongruent with the surrounding area could have a significant visual impact on sensitive receptors as it may change the visual character of the landscape.

As previously stated, however, the study area is located within REDZ 2, i.e. Komsberg REDZ[3], and as such the concentration of renewable energy developments is supported in this area. This could result in an incremental change in the visual character of the area and in the typical land use patterns over time towards a less rural environment within which a Solar PV Facility would be less incongruous.

The matrix returns a score which in turn determines the visual impact rating assigned to each receptor location (**Table 2**) below.

Table 2: Rating scores

Rating	Overall Score
High Visual Impact	8-9
Moderate Visual Impact	5-7
Low Visual Impact	3-4
Negligible Visual Impact	(overriding factor)

An explanation of the matrix is provided in **Table 3** below.

[3] formally gazetted (Gazette Number 41445) on 16 February 2018 by the Minister of Environmental Affairs (GN 114)

Table 3: Visual assessment matrix used to rate the impact of the proposed development on potentially sensitive receptors

	VISUAL IMPACT RATING			
VISUAL FACTOR	**HIGH**	**MODERATE**	**LOW**	**<u>OVERRIDING FACTOR</u>: NEGLIGIBLE**
Distance of receptor away from proposed development	<= 500m **Score 3**	500m < 2km **Score 2**	2km < 5km **Score 1**	>5km
Presence of screening factors	No / almost no screening factors – development highly visible **Score 3**	Screening factors partially obscure the development **Score 2**	Screening factors obscure most of the development **Score 1**	Screening factors completely block any views towards the development, i.e. the development is not within the viewshed
Visual Contrast	**High contrast** with the pattern and form of the natural landscape elements (vegetation and land form), typical land use and/or human elements (infrastructural form) **Score 3**	**Moderate contrast** with the pattern and form of the natural landscape elements (vegetation and land form), typical land use and/or human elements (infrastructural form) **Score 2**	**Corresponds** with the pattern and form of the natural landscape elements (vegetation and land form), typical land use and/or human elements (infrastructural form) **Score 1**	

Table 4 below presents a summary of the overall visual impact of the proposed Oya Solar PV Facility on each of the potentially sensitive visual receptor locations identified within 5kms of the proposed development.

Table 4: Summary Receptor Impact Rating

Receptor Number	Distance to nearest PV Array area		Screening	Contrast	OVERALL IMPACT RATING
SR1 – Baakens Rivier[1]	High (3)	--	High (3)	High (3)	**HIGH (9)**
SR2 – Gats Rivier[1]	Low (1)	2.4km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 1 – Farmstead[2]	*Low (1)*	*3.9km*	***NIL***		
VR 2 – Farmstead[2]	*Low (1)*	*2.1km*	***NIL***		
VR 3 – Farmstead[2]	*Low (1)*	*3.7km*	***NIL***		
VR 4 – Farmstead[2]	*Low (1)*	*4.3km*	***NIL***		
VR 5 – Farmstead[2]	*Low (1)*	*4.5km*	***NIL***		
VR 6 – Farmstead[2]	*Low (1)*	*3.2km*	***NIL***		
VR 7 – Farmstead[2]	*Low (1)*	*3.1km*	***NIL***		
VR 8 - Farmstead	Low (1)	2.9km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 9 – Farmstead[3]	*Low (1)*	*3.1km*	***Nil***		

[1]Baakens Rivier is located within the proposed Oya Solar PV Facility development area. It is known that the occupants have a vested interest in the development and would therefore not perceive the proposed development in a negative light.

*[2]Receptor is outside the preliminary viewshed and as such the overall impact rating is "**NIL**"*

*[#] Receptor is more than 5kms from the nearest PV Array area and outside the viewshed. As such the overall impact rating is "**Nil**"*

The table above shows that one (1) of the sensitive receptors would experience high levels of visual impact as a result of the proposed development, this being the farmstead on Baakens Rivier. As previously mentioned, this property forms part of the Oya Solar PV Facility application site, and as such the owner has a vested interest in the development. The other sensitive receptor, Gats Rivier Holiday Farm, will be subjected to moderate levels of visual impact, and as the property is under the same ownership as Baakens Rivier, it is unlikely that the owners will perceive the proposed development in a negative light.

One (1) potentially sensitive receptor, located on Remainder of the Farm Klipfontein No 154, will be subjected to moderate levels of visual impact as a result of the proposed solar PV development, while the remaining receptors are outside the viewshed and / or more than 5kms from the PV development area.

5.3 Night-time Impacts

The visual impact of lighting on the nightscape is largely dependent on the existing lighting present in the surrounding area at night. The night scene in areas where there are numerous light sources will be visually degraded by the existing light pollution and therefore additional light sources are unlikely to have a significant impact on the nightscape. In contrast, introducing new light sources into a relatively dark night sky will impact on the visual quality of the area at night. It is thus important to identify a night-time visual baseline before exploring the potential visual impact of the proposed development at night.

Much of the study area is characterised by natural areas with pastoral elements and low densities of human settlement. As a result, relatively few light sources are present in the broader area surrounding the proposed development site. The closest built-up area is the town of Matjiesfontein which is more than 50kms from the application site and thus too far away to have significant impacts on the night scene. At night, the general study area is therefore characterised by a picturesque dark starry sky and the visual character of the night environment across the broader area is largely 'unpolluted' and pristine. Sources of light in the area are largely limited to isolated lighting from surrounding farmsteads and transient light from the passing cars travelling along the gravel access roads.

Given the scale of the proposed solar PV facility, the operational and security lighting required for the proposed development is likely to intrude on the nightscape and create glare, which will contrast with the dark backdrop of the surrounding area.

5.4 Cumulative Impacts

Although it is important to assess the visual impacts of the proposed solar PV facility specifically, it is equally important to assess the cumulative visual impact that could materialise if other renewable energy facilities (both wind and solar facilities) and associated infrastructure projects are developed in the broader area. Cumulative impacts occur where existing or planned developments, in conjunction with the proposed development, result in significant incremental changes in the broader study area. In this instance, such developments would include renewable energy facilities and associated infrastructure development.

Renewable energy facilities have the potential to cause large scale visual impacts and the location of several such developments in close proximity to each other could significantly alter the sense of place and visual character in the broader region. Although power lines and substations are relatively small developments when compared to renewable energy facilities, they may still introduce a more industrial character into the landscape, thus altering the sense of place.

Eleven (11) renewable energy projects were identified within a 35 km radius of the proposed development as shown in **Figure 25** below. These projects, as listed in **Table 5** below, were

identified using the DEFF's Renewable Energy EIA Application Database for SA in conjunction with information provided by Independent Power Producers operating in the broader region. It is assumed that all of these renewable energy developments include grid connection infrastructure, although few details of this infrastructure were available at the time of writing this report.

The relatively large number of renewable energy facilities within the surrounding area and their potential for large-scale visual impacts could significantly alter the sense of place and visual character in the broader region, as well as exacerbate the visual impacts on surrounding visual receptors, once constructed.

Table 5: Renewable energy developments proposed within a 35km radius of the Oya Solar PV Facility

Applicant	Project	Technology	Capacity	Status of Application / Development
Brandvalley Wind Farm (Pty) Ltd	Brandvalley WEF	Wind	140MW	Approved
Biotherm Energy (Pty) Ltd	Esizayo WEF	Wind	140MW	Approved
African Clean Energy Developments Renewables	Hidden Valley (Karusa & Soetwater) WEF	Wind	140MW	Under Construction
Karreebosch Wind Farm (Pty) Ltd	Kareebosch WEF	Wind	140W	Approved
Rondekop Wind Farm (Pty) Ltd	Rondekop WEF	Wind	325MW	Approved
Kudusberg Wind Farm (Pty) Ltd	Kudusberg WEF	Wind	325W	Approved
South Africa Mainstream Renewable Power Perdekraal West (Pty) Ltd	Perdekraal East WEF	Wind	110M	Approved
South Africa Mainstream Renewable Power Perdekraal East (Pty) Ltd	Perdekraal West WEF	Wind	150MW	Under Construction
Rietkloof Wind Farm (Pty) Ltd	Rietkloof WEF	Wind	186MW	Approved
Roggeveld Wind Power (Pty) Ltd	Roggeveld WEF	Wind	140MW	Under Construction
ENERTRAG SA (Pty) Ltd	Tooverberg WEF	Wind	140MW	Approved

As can be seen from **Table 5**above, all of these projects are Wind Energy Facilities (WEFs). Although WEFs are expected to have different impacts when compared to solar PV projects, these renewable energy developments are still relevant as they influence the cumulative visual impact of the proposed development.

Figure 25 below shows a concentration of sites proposed for WEF development to the north-east of the application site, and also to the south-west, with most of these being located outside the 5 km visual assessment zone. Given the distance from the study area and the hilly topography in the broader area, it is not anticipated that the WEF developments beyond the 5 km study area will result in any significant cumulative impacts affecting the landscape or the visual receptors within the Oya Solar PV Facility visual assessment zone.

Only one (1) project is partially in the 5km assessment zone, this being Kudusberg WEF. It is understood that most of the proposed turbines on the WEF development site will be located on high-lying plateaus and ridges and as such they will be visible to many of the visual receptors in the combined assessment area. This proposed WEF, in conjunction with the proposed Oya Solar PV Facility and associated infrastructure, will inevitably introduce significant changes into a largely natural, pastoral landscape, thus giving rise to significant cumulative impacts over time.

It should be noted however that PV panels, at an approximate height of between 1 and 4m, are considerably less visible than wind turbines and as such the proposed solar PV facilities would be outside the viewshed of most of the potentially sensitive receptor locations identified in the study area. Cumulative impacts affecting these receptors would therefore be reduced and the severity of these impacts would depend on the perceptions of the receptors.

A cursory examination of the literature available for the environmental assessments undertaken for many of these renewable energy applications showed that the visual impacts identified and the recommendations and mitigation measures provided are largely consistent with those identified in this report. Where additional, relevant mitigation measures were provided in respect of the other renewable energy applications, these have been incorporated into this report where relevant.

From a visual perspective, the further concentration of renewable energy facilities as proposed will inevitably change the visual character of the area and alter the inherent sense of place, introducing an increasingly industrial character into the broader area, and resulting in significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures put forward by the visual specialists in their respective reports.

It is important to note however that the study area is located within the REDZ 2, known as Komsberg REDZ, and thus the relevant authorities support the concentration of renewable energy developments in this area.

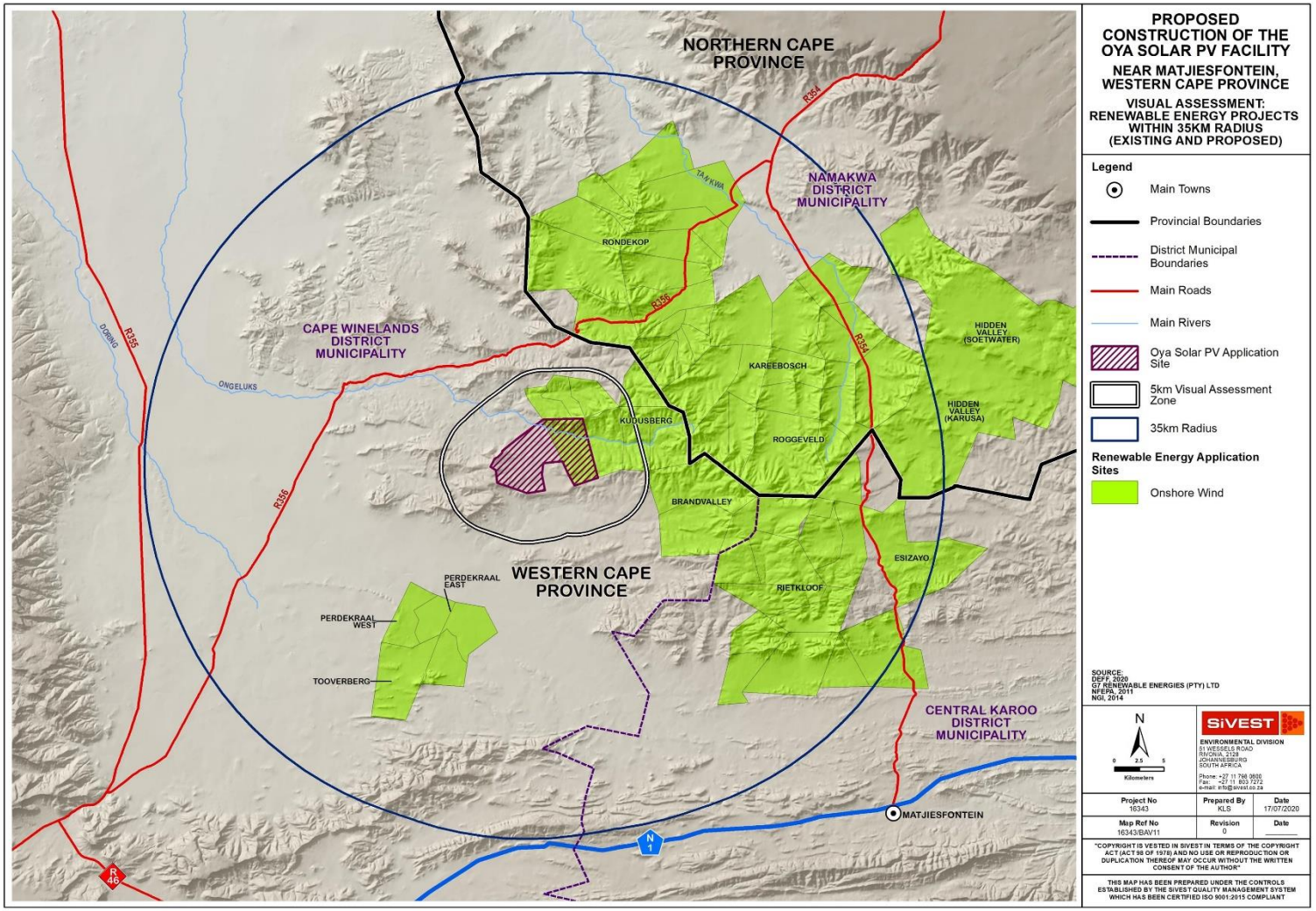


Figure 25: Renewable energy facilities proposed within a 35km radius of the Oya Solar PV Facility application site.

5.5 Overall Visual Impact Rating

The EIA Regulations, 2014 (as amended) require that an overall rating for visual impact be provided to allow the visual impact to be assessed alongside other environmental parameters. **Table 6 and 7** below present the impact matrix for visual impacts associated with the proposed construction and operation of the Oya Solar PV Facility and associated infrastructure. Preliminary mitigation measures have been determined based on best practice and literature reviews.

Please refer to **Appendix D** for an explanation of the impact rating methodology.

Table 6: Impact Rating for Oya Solar PV Facility

OYA SOLAR PV FACILITY																					
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 (+ OR -)**	**S**		**E**	**P**	**R**	**L**	**D**	**I / M**	**TOTAL**	**STATUS (+ OR -)**	**S**
Construction Phase																					
▪ Potential alteration of the visual character and sense of place ▪ Potential visual impact on receptors in the study area	▪ Large construction vehicles and equipment will alter the natural character of the study area and expose visual receptors to impacts associated with construction. ▪ Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during construction would expose bare soil (scarring) which could visually contrast with the surrounding environment. ▪ Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	2	3	1	2	1	2	18	-	Low	▪ Carefully plan to mimimise the construction period and avoid construction delays. ▪ Inform receptors of the construction programme and schedules. ▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ▪ Vegetation clearing should take place in a phased manner. ▪ Suitable buffers of intact natural vegetation should be provided along the perimeter of the development area. ▪ Maintain a neat construction site by removing rubble and waste materials regularly. ▪ Where possible, underground cabling should be utilised. ▪ Make use of existing gravel access roads where possible. ▪ Limit the number of vehicles and trucks travelling to and from the construction site, where possible. ▪ Ensure that dust suppression techniques are implemented: ▪ on all access roads; ▪ in all areas where vegetation clearing has taken place; ▪ on all soil stockpiles.	2	2	1	2	1	2	16	-	Low

Operational Phase																					
▪ Potential alteration of the visual character and sense of place. ▪ Potential visual impact on receptors in the study area. ▪ Potential visual impact on the night time visual environment.	▪ The PV arrays may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ The proposed solar PV facility will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts. ▪ Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers. ▪ The night time visual environment will be altered as a result of operational and security lighting at the proposed PV facility.	2	3	3	3	3	2	28	-	Medium	▪ Restrict vegetation clearance on the site to that which is required for the correct operation of the facility. ▪ Ensure that the PV arrays are not located within 500m of any farmhouses in order to minimise visual impacts on these dwellings. ▪ As far as possible, limit the number of maintenance vehicles which are allowed to access the site. ▪ Ensure that dust suppression techniques are implemented on all gravel access roads. ▪ As far as possible, limit the amount of security and operational lighting present on site. ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill. ▪ Lighting fixtures should make use of minimum lumen or wattage. ▪ Mounting heights of lighting fixtures should be limited, or alternatively, foot-light or bollard level lights should be used. ▪ If economically and technically feasible e, make use of motion detectors on security lighting.	2	3	3	2	2	2	24	-	Medium
Decommissioning Phase																					
▪ Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process; ▪ Potential visual impacts of increased dust emissions from decommissioning activities and related traffic; and ▪ Potential visual intrusion of any remaining infrastructure on the site.	▪ Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts. ▪ Decommissioning activities may be perceived as an unwelcome visual intrusion. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during decommissioning would expose bare soil (scarring) which could visually	2	3	1	2	1	2	18	-	Low	▪ All infrastructure that is not required for post-decommissioning use should be removed. ▪ Carefully plan to minimize the decommissioning period and avoid delays. ▪ Maintain a neat decommissioning site by removing rubble and waste materials regularly. ▪ Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase. ▪ All cleared areas should be rehabilitated as soon as possible.	2	2	1	2	1	2	16	-	Low

	contrast with the surrounding environment. ▪ Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.									▪ Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required.										
Cumulative																					
▪ Potential alteration of the visual character and sense of place in the broader area. ▪ Potential visual impact on receptors in the study area. ▪ Potential visual impact on the night time visual environment.	▪ Additional renewable energy developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts. ▪ Visual intrusion of multiple renewable energy developments may be exacerbated, particularly in more natural undisturbed settings. ▪ Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes. ▪ The night time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area.	3	3	2	3	3	2	28	-	Medium	▪ Restrict vegetation clearance on development sites to that which is required for the correct operation of the facility. ▪ Ensure that the PV arrays are not located within 500m of any farmhouses in order to minimise visual impacts on these dwellings. ▪ Where possible, the operation and maintenance buildings should be consolidated to reduce visual clutter. ▪ As far as possible, limit the number of maintenance vehicles which are allowed to access the facility. ▪ Ensure that dust suppression techniques are implemented on all gravel access roads. ▪ As far as possible, limit the amount of security and operational lighting present on site. ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill. ▪ Lighting fixtures should make use of minimum lumen or wattage. ▪ Mounting heights of lighting fixtures should be limited, or alternatively foot-light or bollard level lights should be used. ▪ If possible, make use of motion detectors on security lighting. ▪ The operations and maintenance (O&M) buildings should not be illuminated at night, unless for safety purposes. ▪ The O&M buildings should be painted in natural tones that fit with the surrounding environment. ▪	3	3	2	2	2	2	24	-	Medium

Table 7: Impact Rating for Infrastructure associated with Oya Solar PV Facility

ASSOCIATED INFRASTRUCTURE (road network, construction camp, substation and cabling).																				
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 (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Construction Phase																				
▪ Potential alteration of the visual character and sense of place ▪ Potential visual impact on receptors in the study area	▪ Large construction vehicles and equipment will alter the natural character of the study area and expose visual receptors to impacts associated with construction. ▪ Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during construction would expose bare soil (scarring) which could visually contrast with the surrounding environment. ▪ Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	2	3	1	2	1	2	18	-	Low	▪ Carefully plan to mimimise the construction period and avoid construction delays. ▪ Inform receptors of the construction programme and schedules. ▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ▪ Vegetation clearing should take place in a phased manner. ▪ Maintain a neat construction site by removing rubble and waste materials regularly. ▪ Where possible, the operation and maintenance buildings and laydown areas should be consolidated to reduce visual clutter. ▪ Where possible, underground cabling should be utilised. ▪ Make use of existing gravel access roads where possible. ▪ Limit the number of vehicles and trucks travelling to and from the	2	2	1	1	1	2	14	-	Low

											construction site, where possible. ▪ Ensure that dust suppression techniques are implemented: ▪ on all access roads; ▪ in all areas where vegetation clearing has taken place; ▪ on all soil stockpiles.									
Operational Phase																				
▪ Potential alteration of the visual character and sense of place. ▪ Potential visual impact on receptors in the study area. ▪ Potential visual impact on the night time visual environment.	▪ The on-site infrastructure may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ The proposed solar PV facility will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts. ▪ Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers. ▪ The night time visual environment will be altered as a result of operational and security lighting at the proposed PV facility.	2	4	2	2	3	1	13	-	Low	▪ Restrict vegetation clearance on the site to that which is required for the correct operation of the facility. ▪ Where possible, the operation and maintenance buildings should be consolidated to reduce visual clutter. ▪ As far as possible, limit the number of maintenance vehicles which are allowed to access the site. ▪ Ensure that dust suppression techniques are implemented on all gravel access roads. ▪ As far as possible, limit the amount of security and operational lighting present on site. ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill. ▪ Lighting fixtures should make use of minimum lumen or wattage. ▪ Mounting heights of lighting fixtures should be limited, or alternatively, foot-light or bollard level lights should be used. ▪ If possible, make use of motion detectors on security lighting. ▪ The operations and maintenance (O&M) buildings should not be	2	4	2	2	3	1	24	-	Low

											illuminated at night unless for security measures. ▪ The O&M buildings should be painted in natural tones that fit with the surrounding environment.									
Decommissioning Phase																				
▪ Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process; ▪ Potential visual impacts of increased dust emissions from decommissioning activities and related traffic; and ▪ Potential visual intrusion of any remaining infrastructure on the site.	▪ Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts. ▪ Decommissioning activities may be perceived as an unwelcome visual intrusion. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during decommissioning would expose bare soil (scarring) which could visually contrast with the surrounding environment. ▪ Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	2	3	1	2	1	2	18	-	Low	▪ All infrastructure that is not required for post-decommissioning use should be removed. ▪ Carefully plan to minimize the decommissioning period and avoid delays. ▪ Maintain a neat decommissioning site by removing rubble and waste materials regularly. ▪ Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase. ▪ All cleared areas should be rehabilitated as soon as possible. ▪ Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required.	2	2	1	1	1	2	14	-	Low

Table 8: Impact Rating for No-Go Alternative

NO-GO ALTERNATIVE																				
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 (+ OR -)**	**S**		**E**	**P**	**R**	**L**	**D**	**I / M**	**TOTAL**	**STATUS (+ OR -)**	**S**
▪ Potential alteration of the visual character and sense of place in the broader area. ▪ Potential visual impact on receptors in the study area. ▪ Potential visual impact on the night time visual environment.	▪ If the Solar PV Facility is not developed in this area, there will be no change in the visual character or the sense of place. There will be no visual impacts on receptors or on the night-time visual environment.	NIL	NIL	NIL	NIL	NIL	NIL	NIL	-	NIL	▪ N / A	NIL	NIL	NIL	NIL	NIL	NIL	NIL	-	Low

6 COMPARATIVE ASSESSMENT OF ALTERNATIVES

The layout alternatives for the proposed substation site, BESS and construction camps (as shown in **Figure 21**,) are comparatively assessed in **Table 9** below.

The aim of the comparative assessment is to determine which of the alternatives would be preferred from a visual perspective. Preference ratings for each alternative are provided in the tables below. The alternatives are rated as preferred; favourable, least-preferred or no-preference.

The degree of visual impact and the preference rating has been determined based on the following factors:

- The location of each alternative in relation to areas of high elevation, especially ridges, koppies or hills;
- The location of each alternative in relation to sensitive visual receptor locations; and
- The location of each alternative in relation to areas of natural vegetation (clearing site for the development worsens the visibility).

Key

PREFERRED	The alternative will result in a low impact / reduce the impact
FAVOURABLE	The impact will be relatively insignificant
LEAST PREFERRED	The alternative will result in a high impact / increase the impact
NO PREFERENCE	The alternative will result in equal impacts

Table 9: Comparative Assessment of Alternatives: PV Infrastructure

Alternative	Preference	Reasons (incl. potential issues)
CONSTRUCTION CAMPS		
Construction Camp Alternative 1	Favourable	▪ Alternative 1 is located on relatively flat terrain and as such would only be moderately exposed on the skyline. ▪ The closest potentially sensitive receptor to this alternative is approximately 3.8kms away, this being SR1. The visual impacts from Alternative 1 affecting this receptor are therefore rated as low. As SR1 is located on the Oya Solar PV Facility application site, it is however assumed that the owner has a vested interest in the proposed development and thus the associated construction camp would not be perceived in a negative light. The remaining receptors are all more than

Alternative	Preference	Reasons (incl. potential issues)
		5kms away and, would only be subjected to low or negligible levels of impact. ▪ This alternative is located in close proximity to other proposed infrastructure elements, thus reducing the level of visual clutter. ▪ In light of the above, there are no fatal flaws associated with Alternative 1 and this alternative is considered favourable from a visual perspective.
Construction Camp Alternative 2	Favourable	▪ Alternative 2 is located on relatively flat terrain and as such would only be moderately exposed on the skyline. ▪ The closest potentially sensitive receptor to this alternative is approximately 4.2kms away, this being SR1. The visual impacts from Alternative 2 affecting this receptor are therefore rated as low. As SR1 is located on the Oya Solar PV Facility application site, it is however assumed that the owner has a vested interest in the proposed development and thus the associated construction camp would not be perceived in a negative light. The remaining receptors are all more than 5kms away and, would only be subjected to low or negligible levels of impact. ▪ This alternative is located relatively close to other proposed infrastructure elements, thus reducing the level of visual clutter. ▪ In light of the above, there are no fatal flaws associated with Alternative 2 and this alternative is considered favourable from a visual perspective.
Construction Camp Alternative 3	Favourable	▪ Alternative 3 is located on relatively flat terrain and as such would only be moderately exposed on the skyline. ▪ The closest potentially sensitive receptor to this alternative is approximately 3.7kms away, this being SR2. The visual impacts from Alternative 3 affecting this receptor are therefore rated as low. It is however believed that the owner of this establishment has a vested interest in the proposed development and thus the associated construction camp would not be perceived in a negative light. The remaining receptors are all more than 5kms away and, would only be subjected to low or negligible levels of impact.

Alternative	Preference	Reasons (incl. potential issues)
		▪ This alternative is located relatively close to other proposed infrastructure elements, thus reducing the level of visual clutter. ▪ In light of the above, there are no fatal flaws associated with Alternative 3 and this alternative is considered favorable from a visual perspective.
Construction Camp Alternative 4	Favourable	▪ Alternative 4 is located on relatively flat terrain and as such would only be moderately exposed on the skyline. ▪ The closest potentially sensitive receptor to this alternative is approximately 3.7kms away, this being SR1. The visual impacts from alternative 4 affecting this receptor are therefore rated as low. As SR1 is located on the Oya Solar PV Facility application site, it is however assumed that the owner has a vested interest in the proposed development and thus the associated construction camp would not be perceived in a negative light. The remaining receptors (in the viewshed) are all more than 8kms away and, would only be subjected to low or negligible levels of impact. ▪ This alternative is located in close proximity to other proposed infrastructure elements, thus reducing the level of visual clutter. ▪ In light of the above, there are no fatal flaws associated with Alternative 4 and this alternative is considered favourable from a visual perspective.
Construction Camp Alternative 5	Least Favourable (although not fatally flawed)	▪ Alternative 5 is located on relatively flat terrain and as such would only be moderately exposed on the skyline. ▪ The closest potentially sensitive receptor to this alternative is approximately 2.7kms away, this being SR1. The visual impacts from Alternative 5 affecting this receptor are therefore rated as low. As SR1 is located on the Oya Solar PV Facility application site, it is however assumed that the owner has a vested interest in the proposed development and thus the associated construction camp would not be perceived in a negative light. The remaining receptors (inside the viewshed) are all more than 3kms away and, would only be subjected to low or negligible levels of impact

Alternative	Preference	Reasons (incl. potential issues)
		▪ This alternative is however **not** located in close proximity to other proposed infrastructure elements, thus potentially magnifying visual clutter. ▪ In light of the above, although there are no fatal flaws associated with Alternative 5, this alternative is considered least favourable from a visual perspective.
Construction Camp Alternative 6	Favourable	▪ Alternative 6 is located on relatively flat terrain and as such would only be moderately exposed on the skyline. ▪ The closest potentially sensitive receptor to this alternative is approximately 1.7kms away, this being SR1. The visual impacts from Alternative 6 affecting this receptor are therefore rated as low. As SR1 is located on the Oya Solar PV Facility application site, it is however assumed that the owner has a vested interest in the proposed development and thus the associated construction camp would not be perceived in a negative light. The remaining receptors (inside the viewshed) are all more than 7kms away and, would only be subjected to negligible levels of impact ▪ This alternative is located in close proximity to other proposed infrastructure elements, thus reducing the level of visual clutter. ▪ In light of the above, there are no fatal flaws associated with Alternative 6 and this alternative is considered favourable from a visual perspective.
BATTERY ENERGY STORAGE SYSTEM		
BESS Alternative 1	Favourable	▪ Alternative 1 is located on relatively flat terrain and as such would only be moderately exposed on the skyline. ▪ The closest potentially sensitive receptor to this alternative is approximately 4kms away, this being SR1. The visual impacts from Alternative 1 affecting this receptor are therefore rated as low. As SR1 is located on the Oya Solar PV Facility application site, it is however assumed that the owner has a vested interest in the proposed development and thus the associated construction camp would not be perceived in a negative light. The remaining receptors are all more than

Alternative	Preference	Reasons (incl. potential issues)
		5kms away and, would only be subjected to low or negligible levels of impact. ▪ This alternative is located in close proximity to other proposed infrastructure elements, thus reducing the level of visual clutter. ▪ In light of the above, there are no fatal flaws associated with Alternative 1 and this alternative is considered favourable from a visual perspective.
BESS Alternative 2	Favourable	▪ Alternative 2 is located on relatively flat terrain and as such would only be moderately exposed on the skyline. ▪ The closest potentially sensitive receptor to this alternative is approximately 3.5kms away, this being SR1. The visual impacts from Alternative 2 affecting this receptor are therefore rated as low. As SR1 is located on the Oya Solar PV Facility application site, it is however assumed that the owner has a vested interest in the proposed development and thus the associated construction camp would not be perceived in a negative light. The remaining receptors are all more than 5kms away and, would only be subjected to low or negligible levels of impact. ▪ In light of the above, there are no fatal flaws associated with Alternative 2 and this alternative is considered favourable from a visual perspective.
BESS Alternative 3	Least Favourable, (although not fatally flawed)	▪ Alternative 3 is located on relatively flat terrain and as such would only be moderately exposed on the skyline. ▪ The closest potentially sensitive receptor to this alternative is approximately 2.1kms away, this being SR1. The visual impacts from Alternative 3 affecting this receptor are therefore rated as low. As SR1 is located on the Oya Solar PV Facility application site, it is however assumed that the owner has a vested interest in the proposed development and thus the associated construction camp would not be perceived in a negative light. The remaining receptors are all more than 7kms away and, would only be subjected to negligible levels of impact. ▪ This alternative is located in close proximity to other proposed infrastructure elements, thus reducing the level of visual clutter

Alternative	Preference	Reasons (incl. potential issues)
		▪ In light of the above, there are no fatal flaws associated with Alternative 3. Given the proximity to the Sensitive Receptor however, this alternative is considered least favorable from a visual perspective.
BESS Alternative 4	Favourable	▪ Alternative 4 is located on relatively flat terrain and as such would only be moderately exposed on the skyline. ▪ The closest potentially sensitive receptor to this alternative is approximately 3.5kms away, this being SR1. The visual impacts from alternative 4 affecting this receptor are therefore rated as low. As SR1 is located on the Oya Solar PV Facility application site, it is however assumed that the owner has a vested interest in the proposed development and thus the associated construction camp would not be perceived in a negative light. The remaining receptors (in the viewshed) are all more than 8kms away and, would only be subjected to low or negligible levels of impact. ▪ This alternative is located in close proximity to other proposed infrastructure elements, thus reducing the level of visual clutter. ▪ In light of the above, there are no fatal flaws associated with Alternative 4 and this alternative is considered favourable from a visual perspective.
O&M AND SUBSTATION		
O & M and Substation Alternative 1	Favourable	▪ Alternative 1 is located on relatively flat terrain and as such would only be moderately exposed on the skyline. ▪ The closest potentially sensitive receptor to this alternative is approximately 3.6kms away, this being SR1. The visual impacts from Alternative 1 affecting this receptor are therefore rated as low. As SR1 is located on the Oya Solar PV Facility application site, it is however assumed that the owner has a vested interest in the proposed development and thus the associated construction camp would not be perceived in a negative light. The remaining receptors are all more than 5kms away and, would only be subjected to low or negligible levels of impact.

Alternative	Preference	Reasons (incl. potential issues)
		▪ This alternative is located in close proximity to other proposed infrastructure elements, thus reducing the level of visual clutter. ▪ In light of the above, there are no fatal flaws associated with Alternative 1 and this alternative is considered favourable from a visual perspective.
O & M and Substation Alternative 2	Favourable	▪ Alternative 2 is located on relatively flat terrain and as such would only be moderately exposed on the skyline. ▪ The closest potentially sensitive receptor to this alternative is approximately 3.4kms away, this being SR1. The visual impacts from Alternative 2 affecting this receptor are therefore rated as low. As SR1 is located on the Oya Solar PV Facility application site, it is however assumed that the owner has a vested interest in the proposed development and thus the associated construction camp would not be perceived in a negative light. The remaining receptors are all more than 5kms away and, would only be subjected to low or negligible levels of impact. ▪ This alternative is located in close proximity to other proposed infrastructure elements, thus reducing the level of visual clutter. ▪ In light of the above, there are no fatal flaws associated with Alternative 2 and this alternative is considered favourable from a visual perspective.
O & M and Substation Alternative 3	Least Favourable, (although not fatally flawed)	▪ Alternative 3 is located on relatively flat terrain and as such would only be moderately exposed on the skyline. ▪ The closest potentially sensitive receptor to this alternative is approximately 1.9kms away, this being SR1. The visual impacts from Alternative 3 affecting this receptor are therefore rated as moderate. As SR1 is located on the Oya Solar PV Facility application site, it is however assumed that the owner has a vested interest in the proposed development and thus the associated construction camp would not be perceived in a negative light. The remaining receptors are all more than 7kms away and, would only be subjected to negligible levels of impact.

Alternative	Preference	Reasons (incl. potential issues)
		▪ This alternative is located in close proximity to other proposed infrastructure elements, thus reducing the level of visual clutter ▪ In light of the above, there are no fatal flaws associated with Alternative 3. Given the proximity to the Sensitive Receptor however, this alternative is considered least favorable from a visual perspective.
O & M and Substation Alternative 4		▪ Alternative 4 is located on relatively flat terrain and as such would only be moderately exposed on the skyline. ▪ The closest potentially sensitive receptor to this alternative is approximately 3.3kms away, this being SR1. The visual impacts from alternative 4 affecting this receptor are therefore rated as low. As SR1 is located on the Oya Solar PV Facility application site, it is however assumed that the owner has a vested interest in the proposed development and thus the associated construction camp would not be perceived in a negative light. The remaining receptors (in the viewshed) are all more than 8kms away and, would only be subjected to low or negligible levels of impact. ▪ This alternative is located in close proximity to other proposed infrastructure elements, thus reducing the level of visual clutter. ▪ In light of the above, there are no fatal flaws associated with Alternative 4 and this alternative is considered favourable from a visual perspective.

6.1 No Go Alternative

The 'No Go' alternative is essentially the option of not developing a Solar PV Facility in this area. The area would thus retain its visual character and sense of place and no visual impacts would be experienced by any locally occurring receptors.

7 CONCLUSION

A VIA has been conducted to assess the magnitude and significance of the visual impacts associated with the development of the proposed Oya Solar PV Facility and associated infrastructure near Matjiesfontein in the Western Cape Province. Overall, sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements. As such, a solar PV development would alter the visual character and contrast significantly with the typical land use and/or pattern and form of human elements present across the broader study area.

The area is not however typically valued for its tourism significance and there is limited human habitation resulting in relatively few potentially sensitive receptors in the area. A total of eleven (11) potentially sensitive receptors were identified in the study area, two (2) of which are considered to be sensitive receptors as they are linked to leisure/nature-based tourism activities in the area. Most of the remaining identified receptor locations were found to be outside the viewshed of the proposed PV arrays and thus are not expected to experience any visual impacts as a result of the proposed development.

One (1) of the sensitive receptors (Remainder of the Farm Baakens Rivier No 155) is however expected to experience high levels of visual impact from the proposed PV facilities. As this receptor is located on the proposed PV development site, it is believed that the owner has a vested interest in the proposed development and would therefore not perceive it in a negative light. The remaining two (2) potentially sensitive receptors in the viewshed which are located on the Remainder of the Farm Gats Rivier No 156 and the Remainder of the Farm Klipfontein No 154, are only expected to experience moderate impacts from the proposed development.

An overall impact rating was also conducted in order to allow the visual impact to be assessed alongside other environmental parameters. The assessment revealed that impacts associated with the proposed Oya Solar PV Facility and associated infrastructure will be of low significance during both construction and decommissioning phases.

During operation, visual impacts from the solar PV facility arrays would be of medium significance with relatively few mitigation measures available to reduce the visual impact. Impacts from the associated infrastructure would however be of low significance during operation.

Although other renewable energy developments and infrastructure projects, either proposed or in operation, were identified within a 35km radius of the proposed Oya Solar PV Facility. It was determined that only one of these would have any significant impact on the landscape within the visual assessment zone, namely Kudusberg WEF. This proposed WEF, in conjunction with the proposed Oya Solar PV Facility and associated infrastructure, will alter the inherent sense of place and introduce an increasingly industrial character into a largely natural, pastoral

landscape, thus giving rise to significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists. In light of this and the relatively low level of human habitation in the study area however, cumulative impacts have been rated as medium.

It is important to note that the study area is located within the REDZ 2, known as Komsberg REDZ, and thus the relevant authorities support the concentration of renewable energy developments in this area.

No fatal flaws were identified for any of the proposed site alternatives for construction camps and BESS, O&M and substation alternatives for the PV project. A summary of the preference ratings for each infrastructural element is provided below.

- Construction Camp Site Alternatives: No preference was determined for any of the construction camp site alternatives and all, but one site was found to be favourable. Construction Camp Alternative 5 was found to be the least preferred due to its proximity to a potentially sensitive receptor, and also due the fact that the site is relatively far from other infrastructure elements on the site.
- BESS Alternatives: No preference was determined for any of the BESS alternatives and all but one site was found to be favourable. Alternative 3 was found to be the least preferred due to its proximity to a potentially sensitive receptor.
- O & M and Substation Alternatives: No preference was determined for any of the BESS alternatives and all but one site was found to be favourable. Alternative 3 was found to be the least preferred due to its proximity to a potentially sensitive receptor.

7.1 Visual Impact Statement

It is SiVEST's opinion that the visual impacts associated with the proposed Oya Solar PV Facility and associated infrastructure are of moderate significance. Given the low level of human habitation and the relative absence of sensitive receptors, the project is deemed acceptable from a visual impact perspective and the EA should be granted for the BA application. SiVEST is of the opinion that the visual impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

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Appendix A:

Specialist Terms of Reference

BASIC ASSESSMENT (BA) FOR THE PROPOSED BLACK MOUNTAIN 800MW SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY BETWEEN MATJIESFONTEIN AND SUTHERLAND, WESTERN CAPE PROVINCE

TERMS OF REFERENCE (ToR) FOR SPECIALIST STUDIES

1 INTRODUCTION

The purpose of the Terms of Reference (ToR) is to provide the specialist team with a consistent approach to the specialist studies that are required as part of the Basic Assessment (BA) process being conducted in respect of the proposed solar photovoltaic (PV) energy facility development. This will enable comparison of environmental impacts, efficient review, and collation of the specialist studies into the BA report, in accordance with the latest requirements of the EIA Regulations, 2014 (as amended).

2 PROCESS

The proposed Black Mountain 800MW Solar PV Energy Facility, situated between Matjiesfontein and Sutherland, is located within one (1) of the Renewable Energy Development Zones (REDZs) formally gazetted[1] in South Africa for the purpose of development of solar and wind energy generation facilities, namely the Komsberg REDZ. As the proposed solar PV energy facility is located within a REDZ, it will be subject to a Basic Assessment (BA) process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) (as amended) and EIA Regulations, 2014 promulgated in Government Gazette 40772 and Government Notice (GN) R326, R327, R325 and R324 on 7 April 2017. A BA process in terms of Appendix 1 of the Environmental Impact Assessment (EIA) Regulations (2014, as amended) has therefore been undertaken for the proposed project. The competent authority for this BA is the national Department of Environment, Forestry and Fisheries (DEFF).

[1] Formally gazetted on 16 February 2018 (government notice 114)

3 PROJECT DESCRIPTION

3.1 Project location

Black Mountain Renewable Energy (Pty) Ltd (hereafter referred to as “Black Mountain") propose to construct and operate a the Black Mounting solar photovoltaic (PV) facility (hereafter referred to as “the proposed development”) approximately 52 km northwest of the town of Matjiesfontein, Western Cape Province. The proposed development will have a maximum export capacity of up to 800MW. The overall objective of the development is to generate electricity by means of renewable energy technology capturing solar energy to feed into the National Grid and for sale to private entities if required.

The proposed PV facility will be located on the following two properties:

- The Remainder of farm 155 Baakens Rivier; and
- Portion 1 of farm 156 Gats Rivier

The proposed PV facility is in the Witzenberg Local Municipality and the Cape Winelands District Municipality. The properties are currently zoned for agricultural land use and due to the low agricultural potential of the land, it was previously used for low intensity grazing however the properties are no longer actively used for agricultural activities. The above-mentioned properties are ~5070 ha in extent. The total area of the application site assessed as part of this Basic Assessment (BA) is approximately 3777 ha.

3.2 Solar PV Energy Facility Components

The PV facility will consist of the following:

- Solar Photovoltaic (PV) array
    - At this stage, it is anticipated that the proposed Solar PV energy facility will include PV fields (arrays) comprising multiple PV modules. The PV modules are arranged in rows and columns, some of which may require levelling of the terrain and associated slope stabilisation measures.
    - Each PV module will be approximately 2.5m long and 1.2m wide and mounted on supporting structures above ground. The final design details along with the structure orientation will become available during the detailed design phase of the proposed development prior to the start of construction.
    - The foundations will most likely be either concrete or rammed piles. The final foundation design will be determined at the detailed design phase of the proposed development.
- Onsite 33/132kV substation and a battery energy storage system (BESS)

    - The on-site and collector substation will contain transformer(s) for voltage step-up from medium voltage to high voltage. Direct Current (DC) power from the modules will be converted into Alternating Current (AC) power in the inverters and the voltage will be stepped up to medium voltage in the inverter transformers. Medium voltage cabling will link the various PV arrays to an on-site substation. These cables will be laid underground wherever technically feasible. The proposed development will include the construction of one (1) new on-site substation occupying an area of up to approximately 4ha.
    - An 132kV overhead powerline is also being proposed to feed the electricity generated by the proposed solar PV energy facility into the national grid. The associated electrical infrastructure will however require a separate EA and is subject to a separate BA process to be undertaken in future.
    - A BESS will be located next to the onsite 33/132kV substation. The BESS would cover a flat area of up to 7.8ha. The storage capacity and type of technology would be determined at a later stage during the development phase, but most likely comprise an array of containers, outdoor cabinets and/or storage tanks. Although a BESS does not require environmental authorisation in terms of NEMA, the facility is included in the description to assess the impact of the footprint on the environment in terms of vegetation removal.
    - Medium voltage cabling will link the proposed PV facility to the grid connection infrastructure (on-site substation). Cables to be buried along access roads, where feasible, with overhead 33kV lines grouping PV panels to crossing valleys and ridges outside of the road footprints to get to the substation.
    - Construction laydown area to house construction equipment, components, offices and material. The construction laydown area will be up to 6.4ha in extent.
- Operation and Maintenance (O&M) building for use during the operational phase. The O&M building will be used throughout the operational phase of the PV facility and will be a single-story building, included in the footprint of the substation.
- Temporary infrastructure to obtain water from available local sources. New or existing boreholes, including a potential temporary above ground pipeline (approximately 50cm in diameter), to feed water to the on-site batching plant are being proposed. Water will potentially be stored in temporary water storage tanks. The necessary approvals from the Department of Water and Sanitation (DWS) will be applied for separately (should this be required).
- Access roads:
    - Access to the PV facility will be via the existing public gravel road which bisects the proposed PV facility.
    - During construction, the project site would be accessed via the existing public road network with minor road strengthening taking place within the existing road reserves.

    - New roads of 4 to 8m wide would be constructed between some of the PV arrays to facilitate access throughout the PV facility. The footprint of these is included in the overall PV array.
- Fencing and lighting for safety
    - Fencing will be approximately 2m high surrounding the entire PV facility for security purposes.

Once fully developed, the intention is to bid the proposed PV facility in either a government procurement round for new generation capacity from renewable energy or for private power purchase agreements. Therefore, the capacity of the site is not limited to the standard 75MW, but rather what would be suitable for several opportunities.

The construction phase will be between 12 and 24 months and the operational lifespan will be approximately 20 years, depending on the length of the power purchase agreement with the relevant off taker.

A map showing the proposed solar PV Energy Facility (including all associated infrastructure) will be sent to the specialists, once this is available.

4 BA ALTERNATIVES

Various feasible alternatives have however been identified and will be assessed as part of the BA process. These will be informed by the identified environmental sensitive and 'No-go' areas). In addition, all alternatives must be assessed against the 'no-go' alternative (i.e. *status quo*).

1. Location alternatives

No site alternatives for this proposed development are being considered as the placement of solar PV installations is dependent on several factors, all of which are favorable at the proposed site location. This included land availability and topography, environmental sensitivities, distance to the national grid, solar resource site accessibility and current land use.

However, the major consideration for the site selection was the ability to co-locate the solar PV facility with an existing Wind Energy Facility (WEF). Black Mountain PV will be co-located with the Kudusberg WEF (EA ref number: 14/12/16/3/3/1/1976/AM1) to allow for infrastructure sharing thereby reducing environmental impacts. When taking this requirement into consideration the available land not occupied by the authorised WEF and secured by Kudusberg WEF, the majority of the properties did not have sufficient area with the suitable topography and north facing slopes with the required solar intensity to

support a PV facility. However, two properties secured by Kudusberg as part of the authorised WEF met the criteria best suited for solar PV co-located within a WEF.

The project site has been identified through a pre-feasibility desktop analysis based on the estimation of the solar energy resource as well as weather, dust and dirt affect. The above-mentioned initial pre-feasibility assessments and site criteria assisted the applicant with the best suited site for a hybrid WEF and solar PV facility. As such the applicant decided to proceed with the all of the development infrastructure in the Black Mountain PV proposed on the site extending over farm portions Re/155 Baakens Rivier and 1/156 Gats Rivier.

2. Technology alternatives

Renewable energy development in South Africa is highly desirable from a social, environmental and development point of view. The project site is particularly well supported for large scale wind and solar development. The project site is already authorised for the development of the Kudusberg WEF (EA ref number: 14/12/16/3/3/1/1976/AM1). The proposed site was selected due to the terrain being in the lower flat areas, which has sufficient solar resources for a viable PV generation facility but does not have sufficient wind resources to support WEF infrastructure which is located on the adjacent mountainous areas. By co-locating the Black Mountain PV facility with the wind farm, it allows for infrastructure sharing in terms of grid connection thereby reducing the environmental impact.

Therefore, only one type of technology alternative is being considered i.e. Solar PV technology.

3. Layout alternatives

Design and layout alternatives are being considered and assessed as part of this BA process. These include alternatives for the Construction Camp, the O&M buildings and Substation/BESS locations. The various alternatives are described below.

a. Construction camp and laydown area

Four construction camp alternatives were considered by the EAP and specialists as follows:

1. Construction camp alternative 1: is located to the north of the public road on the property 1/156 Gats Rivier, west of construction camp alternative 2
2. Construction camp alternative 2: is located to the north of the public road on the property 1/156 Gats Rivier, east of construction camp alternative 2, and west of construction camp alternative 3
3. Construction camp alternative 3: is located to the north of the public road on the property 1/156 Gats Rivier, east of construction camp alternative 2

4. Construction camp alternative 4: is located west of the public road next to the BESS alternative 4 on Re/155 Baakens Rivier
5. Construction camp alternative 5: is located west of the public road next to BESS alternative 3 on Re/155 Baakens Rivier
6. Construction camp alternative 6: is located north of the public road on Re/155 Baakens Rivier

b. BESS, O&M building and substation:

To reduce electrical losses, the BESS must be in close proximity to the onsite 33/132kV substation. Flat areas are preferred as it reduces the amount of levelising or stability improvements required.

Four BESS, O&M building and substation area alternatives were considered by the EAP and specialists as follows:

1. BESS, O&M and substation alternative 1: Alternative 1 is located to the north of the public road on 1/156 Gatsrivier
2. BESS, O&M and substation alternative 2: Alternative 2 is located to the south of the public road on 1/156 Gatsrivier
3. BESS, O&M and substation alternative 3: Alternative 3 is located to the west of the public road on re/155 Baakens Rivier
4. BESS, O&M and substation alternative 4: Alternative 4 is located to the west of the public road on re/155 Baakens Rivier, south of alternative 3

4. The operational aspects of the activity

No operational alternatives were assessed in the BA, as none are available for solar PV installations.

5. No-go alternative

The 'no-go' alternative is the option of not fulfilling the proposed project. This alternative would result in no environmental impacts from the proposed project on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the report. Implementing the no-go option would entail no development. The land is currently not used for agricultural activities although it is suitable for very low level grazing.

The no-go option is a feasible option; however, this would prevent Black Mountain PV Facility from contributing to the environmental, social and economic benefits associated with the development of the renewables sector.

5 SPECIALIST REPORT REQUIREMENTS

The specialist assessments should include the following sections:

5.1 Project Description

The specialist report must include the project description as provided above.

5.2 Terms of Reference (ToR)

The specialist report must include an explanation of the Terms of Reference (ToR) applicable to the specialist study. In addition, a table must be provided at the beginning of the specialist report listing the requirements for specialist reports in accordance with Appendix 6 of the EIA Regulations, 2014 (as amended) and cross referencing these requirements with the relevant sections in the report. An MS Word version of this table will be provided by SiVEST.

5.3 Legal Requirements and Guidelines

The specialist report must include a thorough overview of all applicable best practice guidelines, relevant legislation and authority requirements.

5.4 Methodology

The report must include a description of the methodology applied in carrying out the specialist assessment.

5.5 Specialist Findings / Identification of Impacts

The report must present the findings of the specialist studies and explain the implications of these findings for the proposed development (e.g. permits, licenses etc.). This section of the report should also identify any sensitive and/or 'no-go' areas on the development site which should be avoided.

The reports should be accompanied with spatial datasets (shapefiles, KML) and accompanying text documents if required.

5.6 Impact Rating Methodology

The impacts of the proposed solar PV energy facility (during the Construction, Operation and Decommissioning phases) are to be assessed and rated according to the methodology developed by SiVEST. Specialists will be required to make use of the impact rating matrix provided (in Excel format) for this purpose. Please note that the significance of Cumulative Impacts should also be rated in this section. Both the methodology and the rating matrix will be provided by SiVEST.

Please be advised that this section must include mitigation measures aimed at minimising the impact of the proposed development.

5.7 Input to The Environmental Management Program (EMPr)

The report must include a description of the key monitoring recommendations for each applicable mitigation measure identified for each phase of the proposed development for inclusion in the Environmental Management Program (EMPr) or Environmental Authorisation (EA).

Please make use the Impact Rating Table (in Excel format) provided for each of the phases (i.e. Design, Construction, Operation and Decommissioning).

5.8 Cumulative Impact Assessment

Cumulative impact assessments must be undertaken for the proposed solar PV energy facility in order to determine the cumulative impact that will materialise should other Renewable Energy Facilities (REFs) and large scale industrial developments be constructed within 35km of the proposed development.

The cumulative impact assessment must contain the following:

- A cumulative environmental impact statement noting whether the overall impact is acceptable; and
- A review of the specialist reports undertaken for other REFs and an indication of how the recommendations, mitigation measures and conclusion of the studies have been considered.

In order to assist the specialists in this regard, SiVEST will provide the following documentation / data:

- A summary table listing all REFs identified within 35km of the proposed solar PV facility;
- A map showing the location of the identified REFs;
- KML files; and
- Relevant EIA / BA reports, that could be obtained.

The list of renewable energy facilities that must be assessed as part of the cumulative impact will be provided.

5.9 No Go Alternative

Consideration must be given to the 'no-go' option in the BA process. The "no-go" option assumes that the site remains in its current state, i.e. there is no construction of a Solar PV and associated infrastructure in the proposed project area and the status quo would proceed.

5.10 Comparative Assessment of Alternatives

As mentioned, no layout alternatives for the proposed PV panels have been identified or will be comparatively assessed as the position of these (and ultimately the layout of the proposed solar PV energy facility) will be determined taking the identified environmental sensitive and/or 'no-go' areas into consideration. These areas will subsequently be used to inform the area for the potential erection of PV panels within the application site (referred to as the proposed PV array / development area).

Various feasible location alternatives have however been identified and will be assessed as part of the BA process. These will be informed by the identified environmental sensitive and 'No-go' areas). In addition, all alternatives must be assessed against the 'no-go' alternative (i.e. *status quo*).

The respective alternatives being considered as part of the BA process for the proposed development must be comparatively assessed as per the table provided by SiVEST.

5.11 Conclusion / Impact Statement

The conclusion section of the specialist reports must include an **Impact Statement**, indicating whether any fatal flaws have been identified and ultimately whether the proposed development can be authorised or not (i.e. whether EA should be granted / issued or not).

5.12 Executive Summary

Specialists must provide an Executive Summary which summarises the findings of their report to allow for easy inclusion in the BA reports.

6 DELIVERABLES

All specialists will need to submit the following deliverables:

- 1 x Draft Specialist Report for inclusion in DBAR no later than 22 July 2020 and updated version based on EAP and applicant review no later than 27 July 2020;
- 1 x Final Specialist Report for inclusion in FBAR (should updates and/or revisions be required);
- A copy of the Specialist Declaration of Interest (DoI) form, containing original signatures. This form will be provided to the specialists. ***Please note that the undertaking / affirmation under oath section of the report must be signed by a Commissioner of Oaths***; and
- All data relating to the studies, such as shape files, photos and maps (see **Section 8** below).

7 GENERAL SUBMISSION REQUIREMENTS

Please ensure that your specialist report includes the following:

- A table at the beginning of your report cross referencing how the requirements for specialist reports in accordance with Appendix 6 of the EIA Regulations, 2014 (as amended) has been adhered to. An MS Word version will be provided;
- A thorough overview of all applicable legislation, policies, guidelines. etc.;
- Identification of sensitive and/or 'no-go' areas to be avoided;
- Recommend mitigation measures in order to minimise the impact of the proposed development;

- Provide implications of specialist findings for the proposed development (e.g. permits, licenses etc.);
- Specify if any further assessment will be required;
- Include an Impact Statement, concluding whether any fatal flaws have been identified and ultimately whether the proposed development can be authorised or not (i.e. whether EA should be granted / issued or not); and
- A copy of the Specialist Declaration of Interest (DoI) form, containing original signatures, must be appended to all Draft and Final Reports. This form will be provided to the specialists. ***Please note that the undertaking / affirmation under oath section of the report must be signed by a Commissioner of Oaths.***

8 DEADLINES AND REPORT SUBMISSION

- Draft Specialist Report for inclusion in DBAR no later than 22 July 2020 and updated version based on EAP and applicant review no later than 27 July 2020.

9 ANY CHANGES ARISING BASED ON STAKEHOLDER ENGAGEMENT NO LATER THAN 7 SEPTEMBER 2020REPORT / DATA FORMATS

- All specialist reports must be provided in MS Word format;
- Where maps have been inserted into the report, SiVEST will require a separate map set in PDF format for inclusion in our submission;
- Where figures and/or photos have been inserted into the report, SiVEST will require the original graphic in .jpg format for inclusion in our submission; and
- Delineated areas of sensitivity must be provided in either ESRI shape file format or Google Earth KML format. Sensitivity classes must be included in the attribute tables with a clear indication of which areas are 'No-Go' areas.

10 SPECIALIST SPECIFIC ISSUES

Visual

- Describe the visual character of the local area. Any significant visual features or visual disturbances should be identified and mapped, as well as any sensitive visual receptors within the proposed project area or within viewsheds of the proposed development;
- Visual character and visual absorption capacity should be described;
- Viewsheds for various elements of the proposed development should be calculated, defined and presented, and the varying sensitivities of these viewsheds must be highlighted;

- Mapping of visual sensitivity of the site will require consideration of visual receptors outside the site, and sensitivity to development on the site for potentially affected visual receptors of ‘very high’ sensitivity;
- Assessment to be based on findings of the site visit , and a photographic survey of the surrounding region from which the landscape and visual baselines can be prepared;
- Identify and assess potential impacts from the project on the receiving environment. All impacts should be considered under varying conditions as appropriate to the study i.e. day, night, clear weather, cloudy weather etc. Provide mitigation measures to include in the EMPr;
- Maps depicting viewsheds / line of sight across the site should be generated and included in the reports. These maps should indicate current viewsheds / visual landscape / obstructions as well as expected visual impacts during the construction, operational and decommissioning phases of the proposed development;
- Provide specific mitigation on light management and
- Provide photomontages from accessible locations if this proves to be necessary.

Appendix B:

Specialist CV & Declaration of Independence

CURRICULUM VITAE

Name	Kerry Lianne Schwartz
Profession	GIS Specialist
Name of Firm	SiVEST SA (Pty) Ltd
Present Appointment	Senior GIS Consultant: Environmental Division
Years with Firm	32 Years
Date of Birth	21 October 1960
ID No.	6010210231083
Nationality	South African

Professional Qualifications

BA (Geography), University of Leeds 1982

Membership to Professional Societies

South African Geomatics Council – GTc GISc 1187

Employment Record

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1994 – Present	SiVEST SA (Pty) Ltd - Environmental Division: GIS/Database Specialist.
1988 - 1994	SiVEST (formerly Scott Wilson Kirkpatrick): Town Planning Technician.
1984 – 1988	Development and Services Board, Pietermaritzburg: Town Planning Technician.

Language Proficiency

LANGUAGE	SPEAK	READ	WRITE
English	Fluent	Fluent	Fluent

Key Experience

Kerry is a GIS specialist with more than 20 years' experience in the application of GIS technology in various environmental, regional planning and infrastructural projects undertaken by SiVEST.

Kerry's GIS skills have been extensively utilised in projects throughout South Africa in other Southern African Countries. These projects have involved a range of GIS work, including:

- Design, compilation and management of a spatial databases in support of projects.
- Collection, collation and integration of data from a variety of sources for use on specific projects.
- Manipulation and interpretation of both spatial and alphanumeric data to provide meaningful inputs for a variety of projects.
- Production of thematic maps and graphics.
- Spatial analysis and 3D modelling.

Kerry further specialises in visual impact assessments (VIAs) and landscape assessments.

Projects Experience

STRATEGIC PLANNING PROJECTS

Provision of database, analysis and GIS mapping support for the following:

- Database development for socio-economic and health indicators arising from Social Impact Assessments conducted for the Lesotho Highlands Development Association – Lesotho.
- Development Plan for the adjacent towns of Kasane and Kazungula - Ministry of Local Government, Land and Housing (Botswana).
- Development Plan for the rural village of Hukuntsi - Ministry of Local Government, Land and Housing (Botswana).
- Integrated Development Plans for various District and Local Municipalities including:
  - Nquthu Local Municipality (KwaZulu-Natal)
  - Newcastle Local Municipality (KwaZulu-Natal)
  - Amajuba District Municipality (KwaZulu-Natal)
  - Jozini Local Municipality (KwaZulu-Natal)
  - Umhlabuyalingana Local Municipality (KwaZulu-Natal)
- uMhlathuze Rural Development Initiative – uMhlathuze Local Municipality (KwaZulu-Natal).
- Rural roads identification – uMhlathuze Local Municipality (KwaZulu-Natal).
- Mapungubwe Tourism Initiative – Development Bank (Limpopo Province).
- Northern Cape Tourism Master Plan – Department of Economic Affairs and Tourism (Northern Cape Province).
- Spatial Development Framework for Gert Sibande District Municipality (Mpumalanga) in conjunction with more detailed spatial development frameworks for the 7 Local Municipalities in the District, namely:
  - Albert Luthuli Local Municipality
  - Msukaligwa Local Municipality
  - Mkhondo Local Municpality
  - Pixley Ka Seme Local Municipality
  - Dipaleseng Local Municipality
  - Govan Mbeki Local Municipality
  - Lekwa Local Municipality
- Land Use Management Plans/Systems (LUMS) for various Local Municipalities including:
  - Nkandla Local Municipality (KwaZulu-Natal)
  - Hlabisa Local Municipality (KwaZulu-Natal)
  - uPhongolo Local Municipality (KwaZulu-Natal)
  - uMshwathi Local Municipality
- Spatial Development Framework for uMhlathuze Local Municipality (KwaZulu-Natal).
- Spatial Development Framework for Greater Clarens – Maloti-Drakensberg Transfrontier Park (Free State).
- Land use study for the Johannesburg Inner City Summit and Charter – City of Johannesburg (Gauteng).
- Port of Richards Bay Due Diligence Investigation – Transnet
- Jozini Sustainable Development Plan – Jozini Local Municipality (KwaZulu-Natal)
- Spatial Development Framework for Umhlabuyalingana Local Municipality (KwaZulu-Natal)

BUILT INFRASTRUCTURE

- EIA and EMP for a 9km railway line and water pipeline for manganese mine – Kalagadi Manganese (Northern Cape Province).
- EIA and EMP for 5x 440kV Transmission Lines between Thyspunt (proposed nuclear power station site) and several substations in the Port Elizabeth area – Eskom (Eastern Cape Province).
- Initial Scoping for the proposed 750km multi petroleum products pipeline from Durban to Gauteng/Mpumalanga – Transnet Pipelines.
- Detailed EIA for multi petroleum products pipeline from Kendall Waltloo, and from Jameson Park to Langlaagte Tanks farms –Transnet Pipelines.
- Environmental Management Plan for copper and cobalt mine (Democratic Republic of Congo).
- EIA and Agricultural Feasibility study for Miwani Sugar Mill (Kenya).
- EIAs for Concentrated Solar and Photovoltaic power plants and associated infrastructure (Northern Cape, Free State, Limpopo and North West Province).
- EIAs for Wind Farms and associated infrastructure (Northern Cape and Western Cape).
- Basic Assessments for 132kV Distribution Lines (Free State, KwaZulu-Natal, Mpumalanga and North West Province).
- Environmental Assessment for the proposed Moloto Development Corridor (Limpopo).
- Environmental Advisory Services for the Gauteng Rapid Rail Extensions Feasibility Project.
- Environmental Screening for the Strategic Logistics and Industrial Corridor Plan for Strategic Infrastructure Project 2, Durban-Free State-Gauteng Development Region.

STATE OF THE ENVIRONMENT REPORTING

- 2008 State of the Environment Report for City of Johannesburg.
- Biodiversity Assessment – City of Johannesburg.

STRATEGIC ENVIRONMENTAL ASSESSMENTS AND ENVIRONMENTAL MANAGEMENT FRAMEWORKS

- SEA for Greater Clarens – Maloti-Drakensberg Transfrontier Park (Free State).
- SEA for the Marula Region of the Kruger National Park, SANParks.
- SEA for Thanda Private Game Reserve (KwaZulu-Natal).
- SEA for KwaDukuza Local Municipality (KwaZulu-Natal).
- EMF for proposed Renishaw Estate (KwaZulu-Natal).
- EMF for Mogale City Local Municipality, Mogale City Local Municipality (Gauteng).
- SEA for Molemole Local Municipality, Capricorn District Municipality (Limpopo).
- SEA for Blouberg Local Municipality, Capricorn District Municipality (Limpopo).
- SEA for the Bishopstowe study area in the Msunduzi Local Municipality (KwaZulu-Natal).

WETLAND STUDIES

- Rehabilitation Planning for the Upper Klip River and Klipspruit Catchments, City of Johannesburg (Gauteng).
- Wetland assessments for various Concentrated Solar and Photovoltaic power plants and associated infrastructure (Limpopo, Northern Cape, North West Province and Western Cape).
- Wetland assessments for Wind Farms and associated infrastructure (Northern Cape and Western Cape).

- Wetland assessments for various 132kV Distribution Lines (Free State, KwaZulu-Natal, Mpumalanga and North West Province).

VISUAL IMPACT ASSESSMENTS

- VIA for the Thyspunt Transmission Lines Integration Project (Eatern Cape).
- VIA s for various Solar Power Plants and associated grid connection infrastructure (Northern Cape, Free State, Limpopo and North West Province) the most recent project being:
  - Mooi Plaats, Wonderheuvel and Paarde Valley Solar PV facilities near Nouport (Northern Cape).
- VIAs for various Wind Farms and associated grid connection infrastructure (Northern Cape and Western Cape), the most recent projects including:
  - Graskoppies, Hartebeest Leegte, Ithemba and !Xha Boom Wind Farms near Loeriesfontein (Northern Cape);
  - Kuruman 1 and 2 WEFs near Kuruman (Northern Cape);
  - San Kraal and Phezukomoya WEFs near Noupoort (Northern Cape);
  - Paulputs WEF near Pofadder (Northern Cape)
  - Kudusberg WEF near Matjiesfontein (Western Cape);
  - Tooverberg WEF, near Touws River (Western Cape);
  - Rondekop WEF, near Sutherland (Northern Cape).
- VIAs for various 132kV Distribution Lines (Free State, KwaZulu-Natal, Mpumalanga and North West Province).
- VIA for the proposed Rorqual Estate Development near Park Rynie on the South-Coast of KwaZulu-Natal Province.
- VIA for the proposed Assagay Valley Mixed Use Development (KwaZulu-Natal).
- VIA for the proposed Kassier Road North Mixed Use Development (KwaZulu-Natal).
- VIA for the proposed Tinley Manor South Banks Development (KwaZulu-Natal).
- VIA for the proposed Tinley Manor South Banks Beach Enhancement Solution, (KwaZulu-Natal).
- VIAs for the proposed Mlonzi Hotel and Golf Estate Development (Eastern Cape Province).
- Visual sensitivity mapping exercise for the proposed Mogale's Gate Lodge Expansion (Gauteng).
- Analysis phase visual assessment for the proposed Renishaw Estate Environmental Management Framework in the Scottburgh Area (KwaZulu-Natal).
- Landscape Character Assessment for Mogale City Environmental Management Framework (Gauteng).

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Proposed Development of the 800MW Oya Solar Photovoltaic (PV) Energy Facility and Associated Infrastructure near Matjiesfontein, Western Cape Province

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	SiVEST SA (Pty) Ltd			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	2	Percentage Procurement recognition	110
Specialist name:	Kerry Schwartz			
Specialist Qualifications:	BA			
Professional affiliation/registration:	SAGC (GISc Technician)			
Physical address:	51 Wessels Road, Rivonia			
Postal address:	PO Box 2921, Rivonia			
Postal code:	2128	Cell:	0824695850	
Telephone:	011 798 0632	Fax:	011 803 7272	
E-mail:	Kerrys@sivest.co.za			

2. DECLARATION BY THE SPECIALIST

I, Kerry Schwartz, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

K Schwartz

Signature of the Specialist

SiVEST

Name of Company:

21 July 2020

Date

Appendix C:

Impact Rating Methodology

1 ENVIRONMENTAL IMPACT ASSESSMENT (EIA) 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.

The significance of Cumulative Impacts should also be rated (As per the Excel Spreadsheet Template).

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 following criteria (including an allocated point system) is used:

Table 1: Rating of impacts criteria

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.

The table below is to be represented in the Impact Assessment section of the report. The excel spreadsheet template can be used to complete the Impact Assessment.

Table 2: Rating of impacts template and example

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 (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Construction Phase																				
Vegetation and protected plant species	Vegetation clearing for access roads, turbines and their service areas and other infrastructure will impact on vegetation and protected plant species.	2	4	2	2	3	3	39	-	Medium	**Outline/explain the mitigation measures to be undertaken to ameliorate the impacts that are likely to arise from the proposed activity. These measures will be detailed in the EMPr.**	2	4	2	1	3	2	24	-	Low

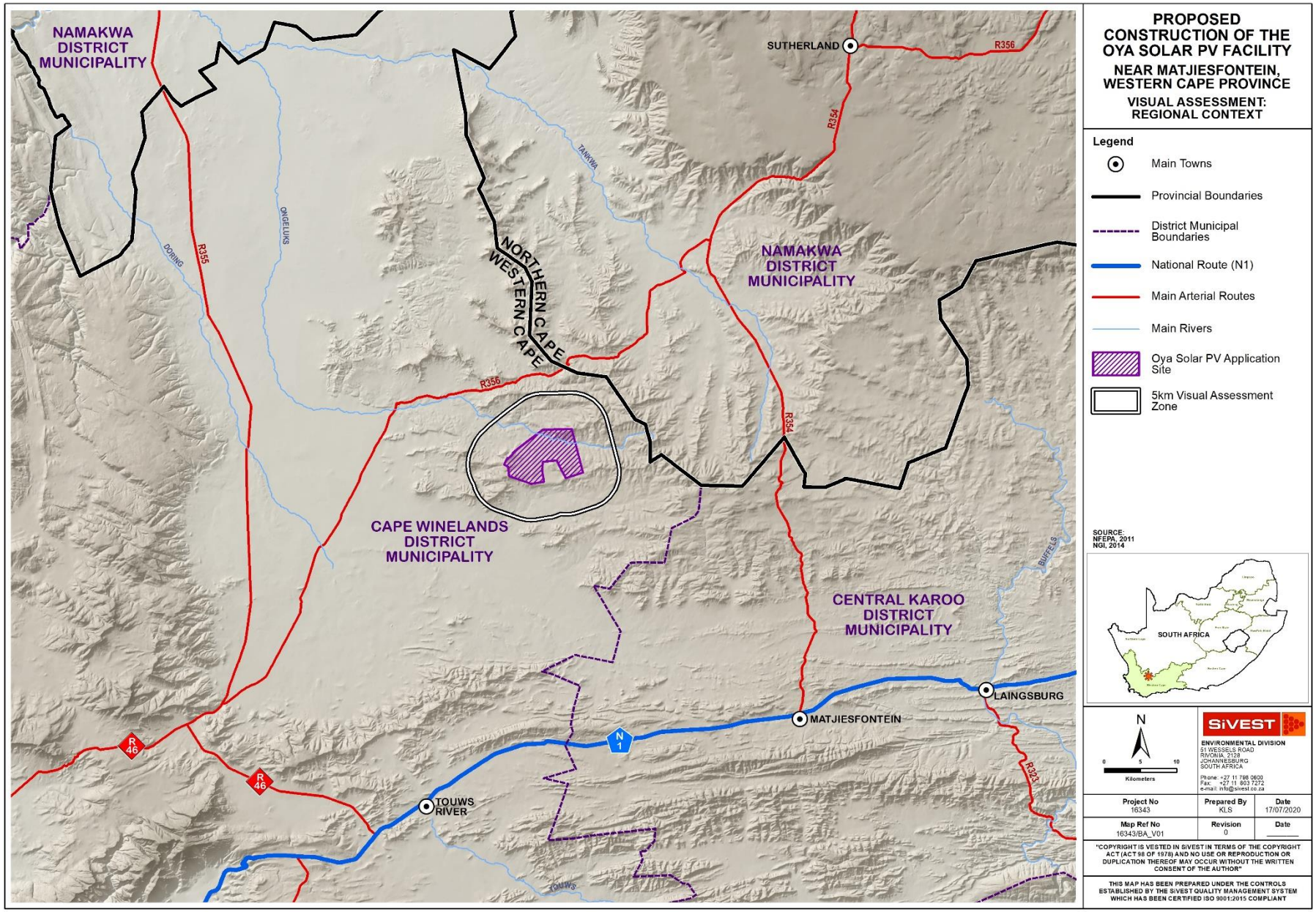
Operational Phase																				
Fauna	Fauna will be negatively affected by the operation of the wind farm due to the human disturbance, the presence of vehicles on the site and possibly by noise generated by the wind turbines as well.	2	3	2	1	4	3	36	-	Medium	**Outline/explain the mitigation measures to be undertaken to ameliorate the impacts that are likely to arise from the proposed activity. These measures will be detailed in the EMPr.**	2	2	2	1	4	2	22	-	Low
Decommissioning Phase																				
Fauna	Fauna will be negatively affected by the decommissioning of the wind farm due to the human disturbance, the presence and operation of vehicles and heavy machinery on the site and the noise generated.	2	3	2	1	2	3	30	-	Medium	**Outline/explain the mitigation measures to be undertaken to ameliorate the impacts that are likely to arise from the proposed activity. These measures will be detailed in the EMPr.**	2	2	2	1	2	2	18	-	Low

Cumulative																				
Broad-scale ecological processes	Transformation and presence of the facility will contribute to cumulative habitat loss and impacts on broad-scale ecological processes such as fragmentation.	2	4	2	2	3	2	26	-	Medium	**Outline/explain the mitigation measures to be undertaken to ameliorate the impacts that are likely to arise from the proposed activity. These measures will be detailed in the EMPr.**	2	3	2	1	3	2	22	-	Low

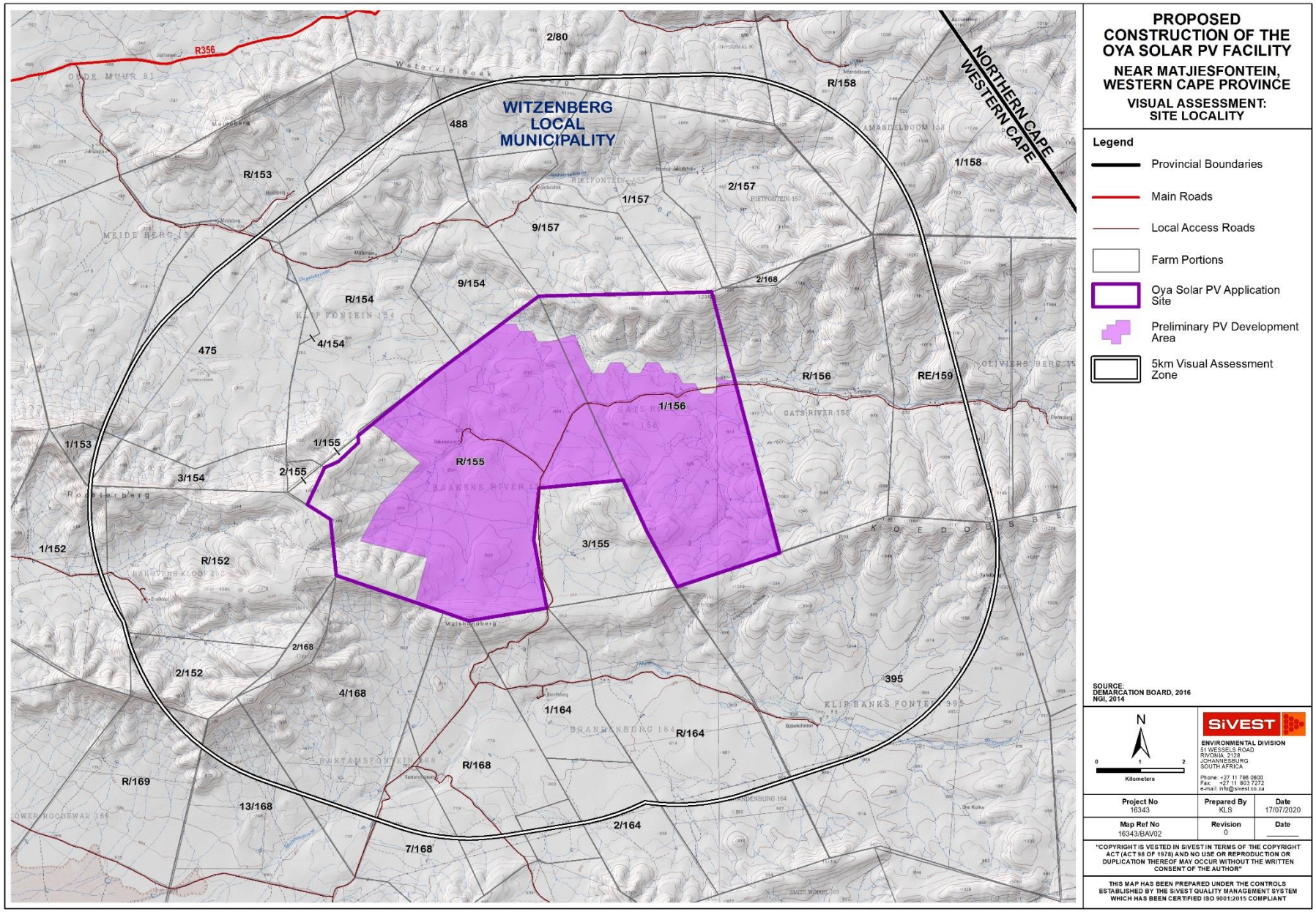
Appendix D:

Maps

MAP 1: Regional Context



MAP 2: Site Locality



PROPOSED CONSTRUCTION OF THE OYA SOLAR PV FACILITY

NEAR MATJIESFONTEIN, WESTERN CAPE PROVINCE

VISUAL ASSESSMENT: SITE LOCALITY

Legend

- Provincial Boundaries
- Main Roads
- Local Access Roads
- Farm Portions
- Oya Solar PV Application Site
- Preliminary PV Development Area
- 5km Visual Assessment Zone

SOURCE:
DEMARCATION BOARD, 2016
NGI, 2014

N

0 1 2
Kilometers

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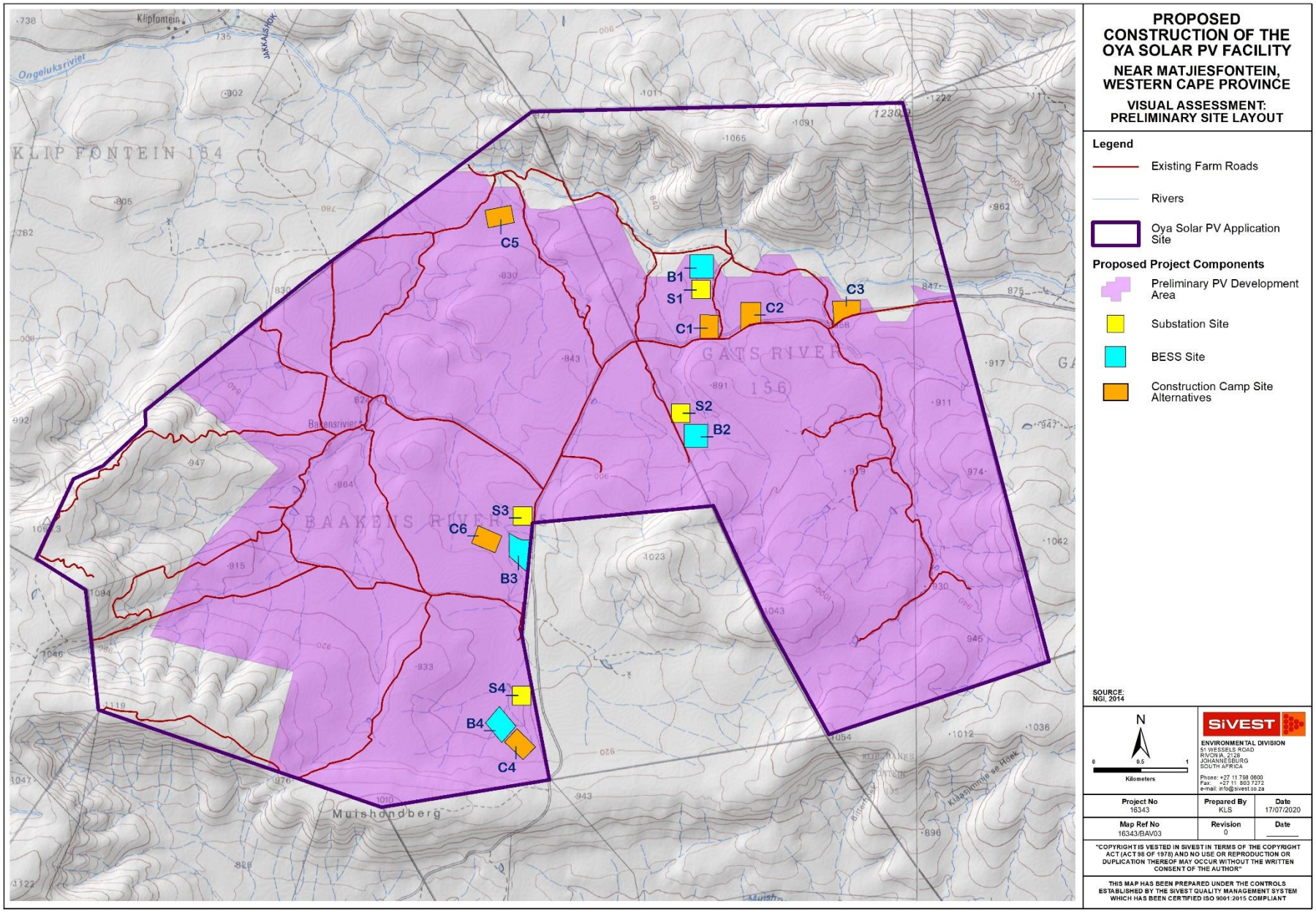
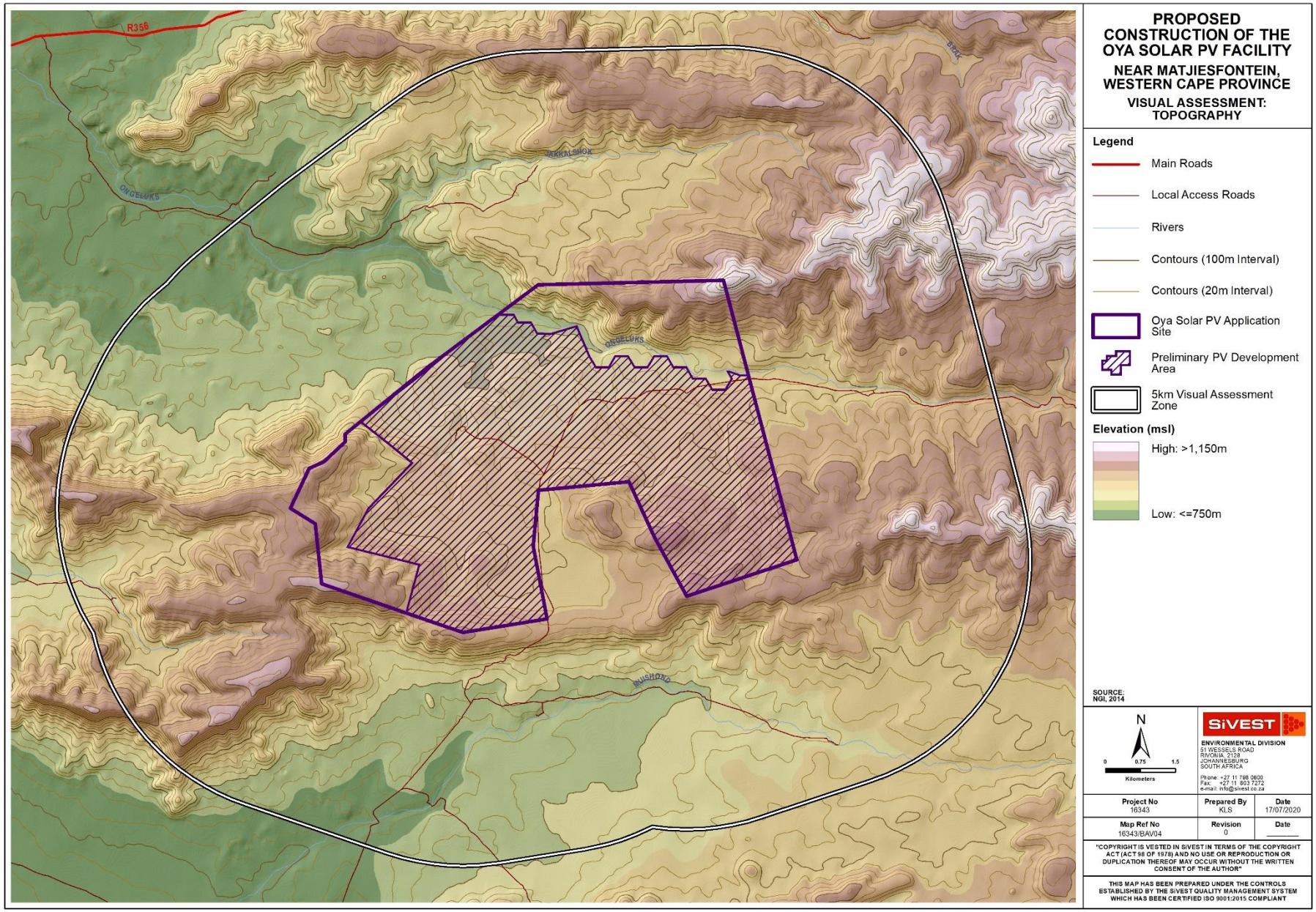
Project No	Prepared By	Date
16343	KLS	17/07/2020
Map Ref No	**Revision**	**Date**
16343/BAV02	0	

MAP 3: Preliminary Site Layout



MAP 4: Topography



PROPOSED CONSTRUCTION OF THE OYA SOLAR PV FACILITY

NEAR MATJIESFONTEIN, WESTERN CAPE PROVINCE

VISUAL ASSESSMENT: TOPOGRAPHY

Legend

- Main Roads
- Local Access Roads
- Rivers
- Contours (100m Interval)
- Contours (20m Interval)
- Oya Solar PV Application Site
- Preliminary PV Development Area
- 5km Visual Assessment Zone

Elevation (msl)

- High: >1,150m
- Low: <=750m

SOURCE: NGI, 2014

N

0 0.75 1.5

Kilometers

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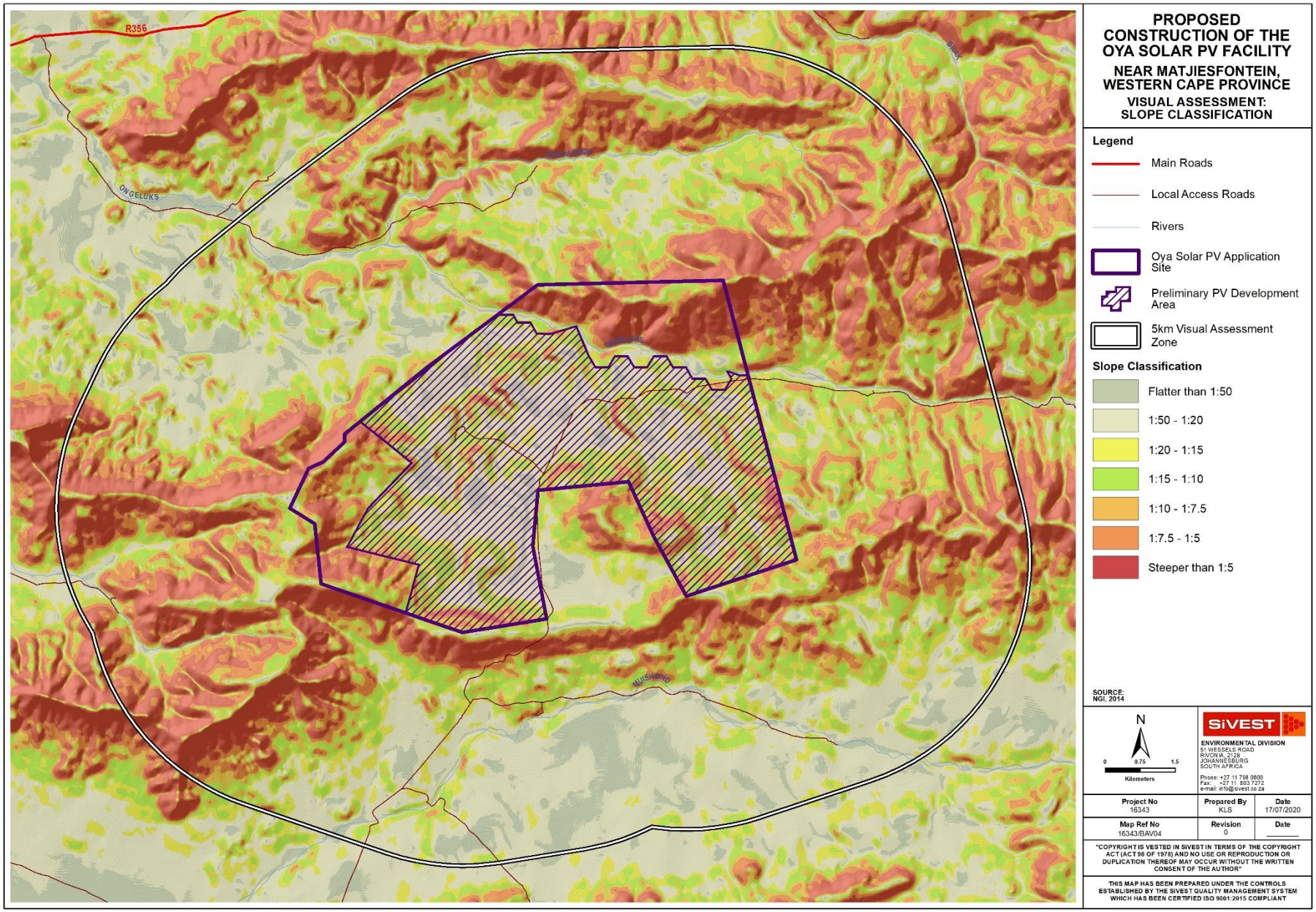
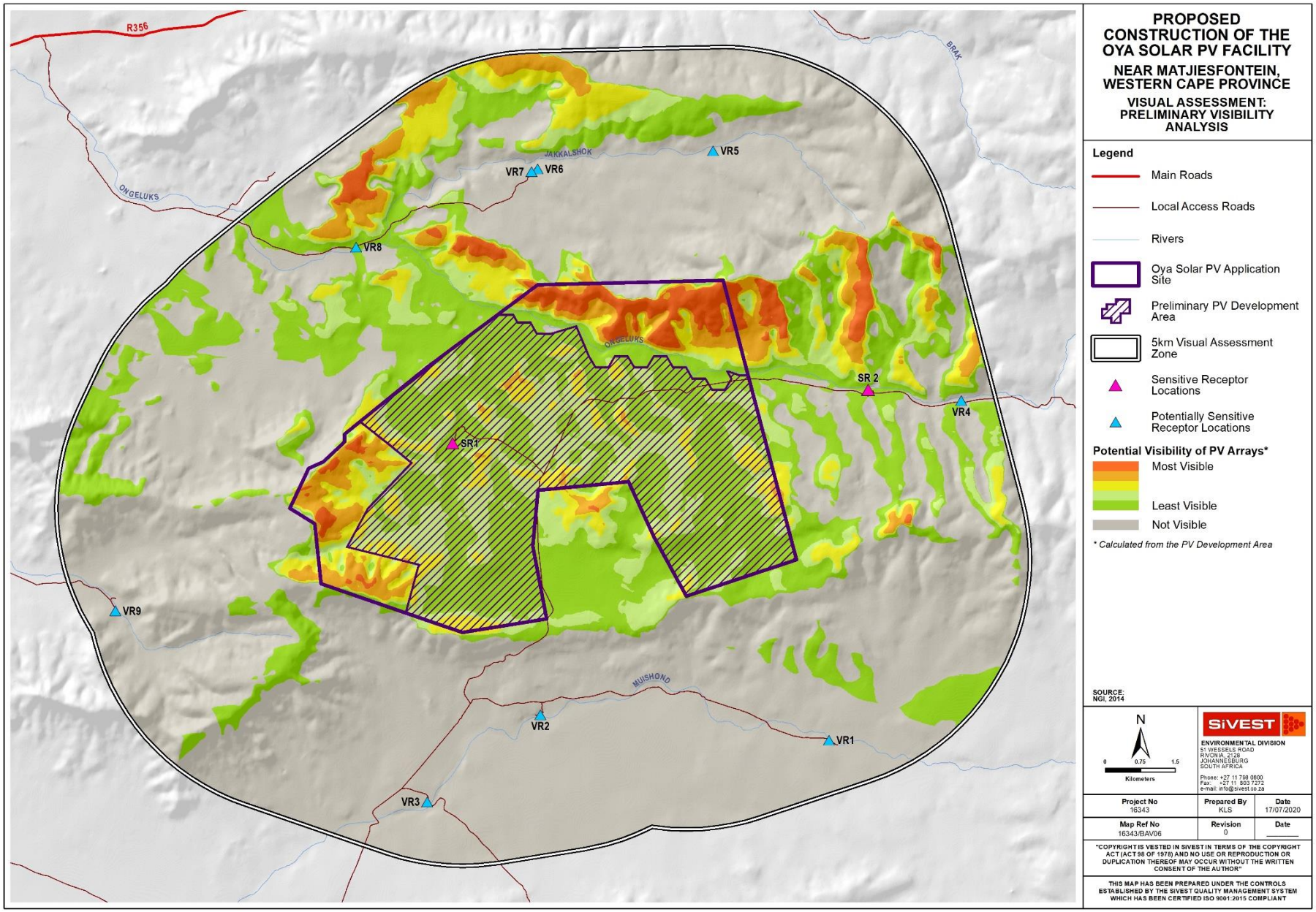
Project No	Prepared By	Date
16343	KLS	17/07/2020
Map Ref No	**Revision**	**Date**
16343/BAV04	0	

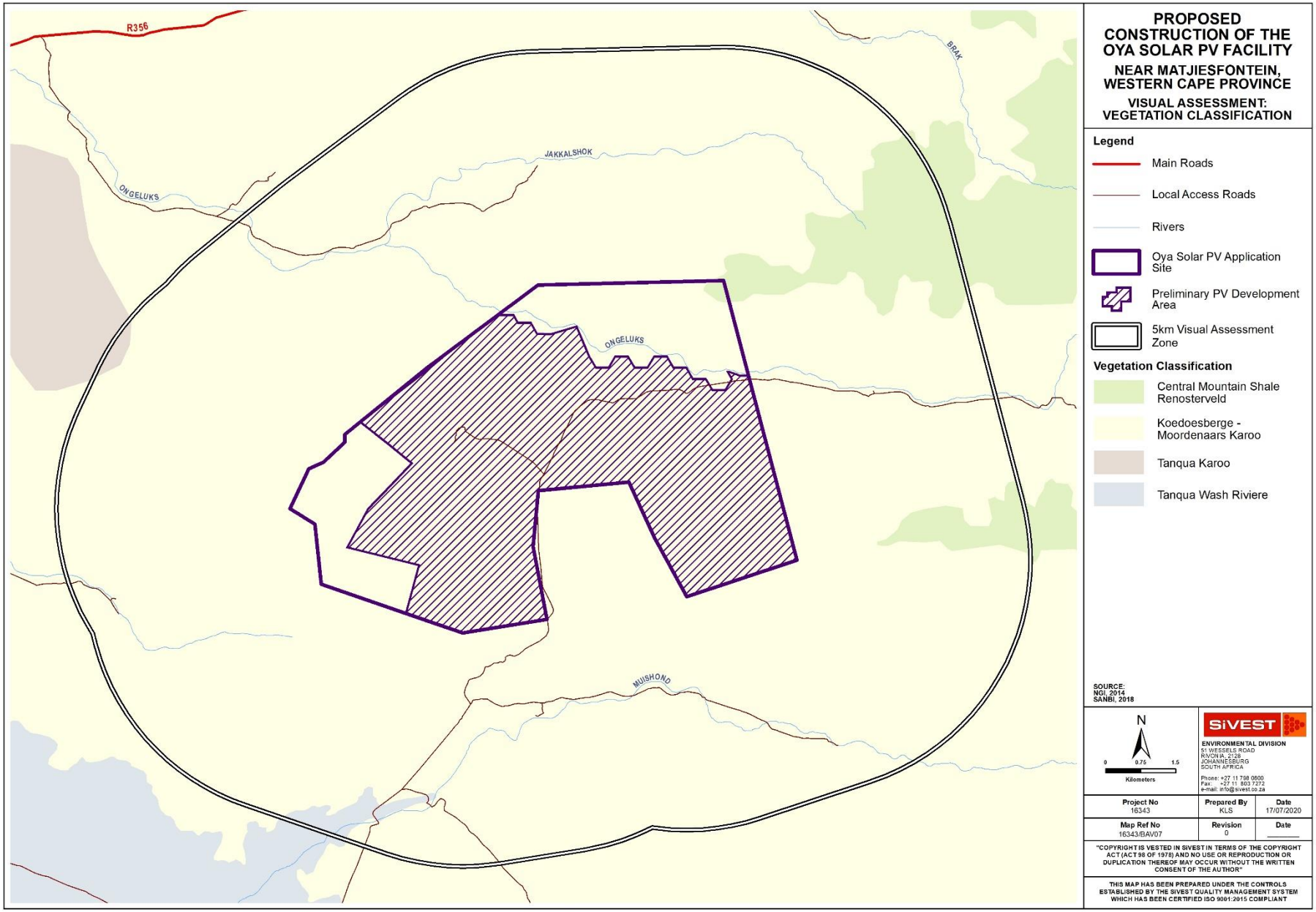
MAP 5: Slope Classification



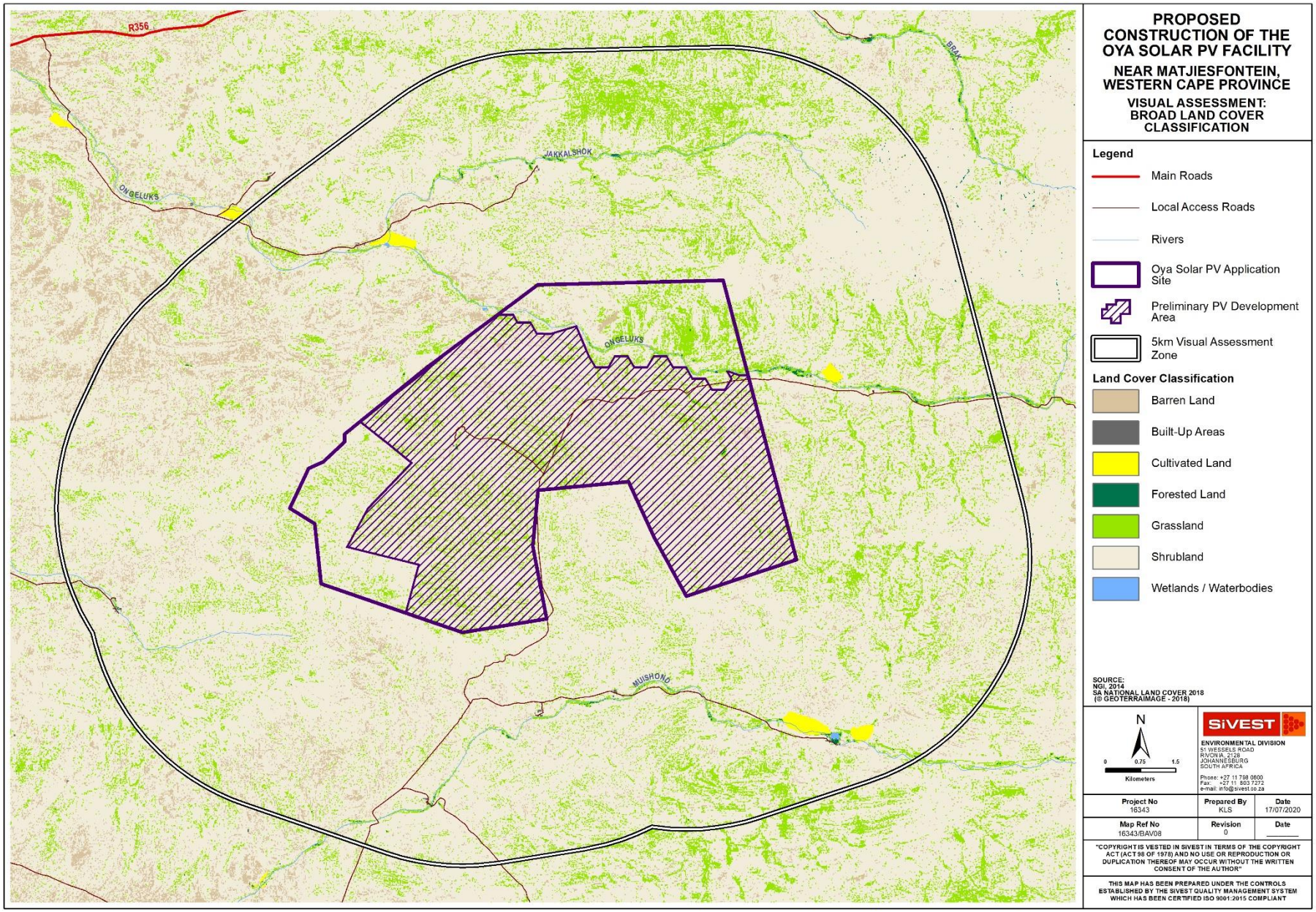
MAP 6: Preliminary Visibility Analysis



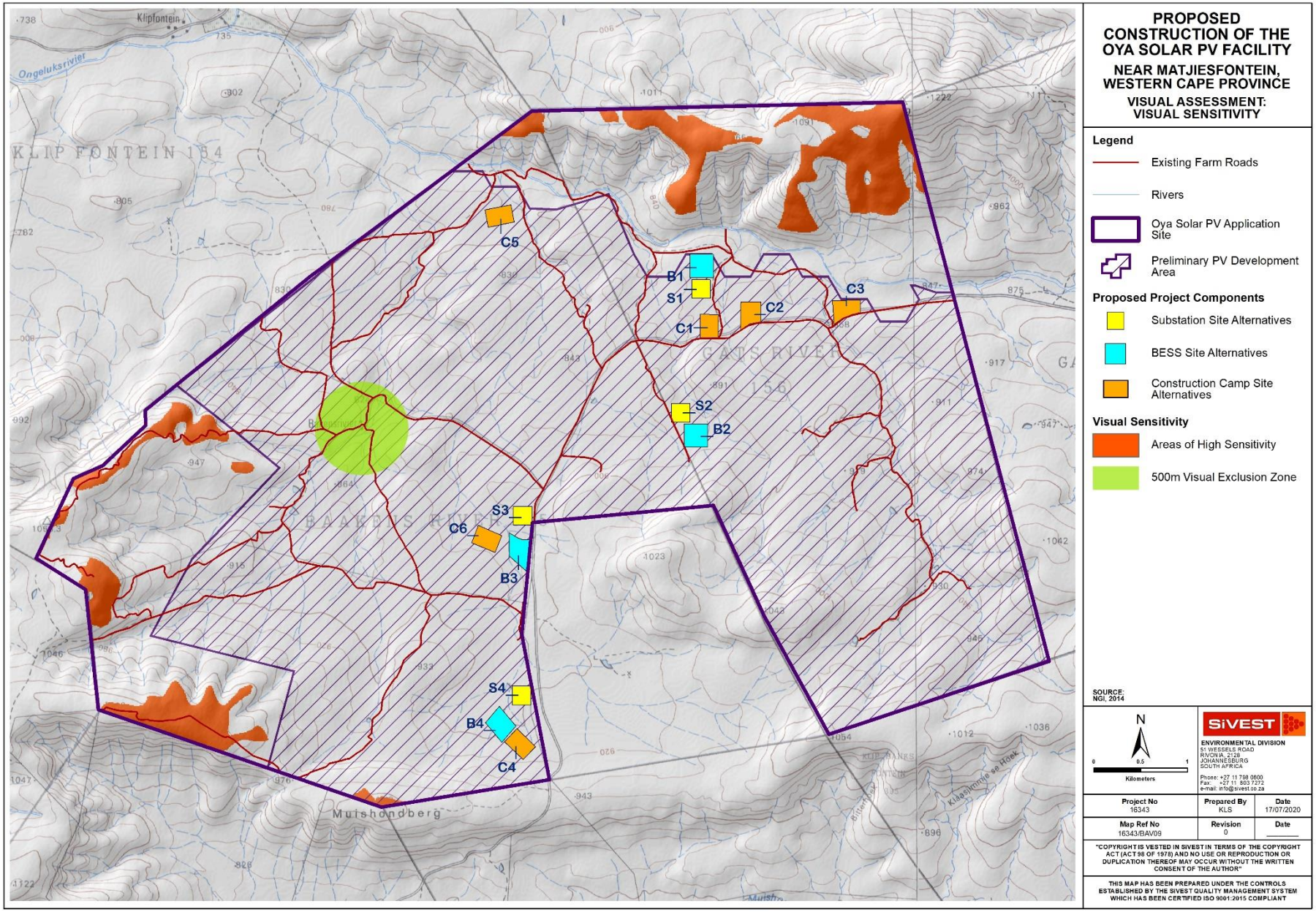
MAP 7: Vegetation Classification



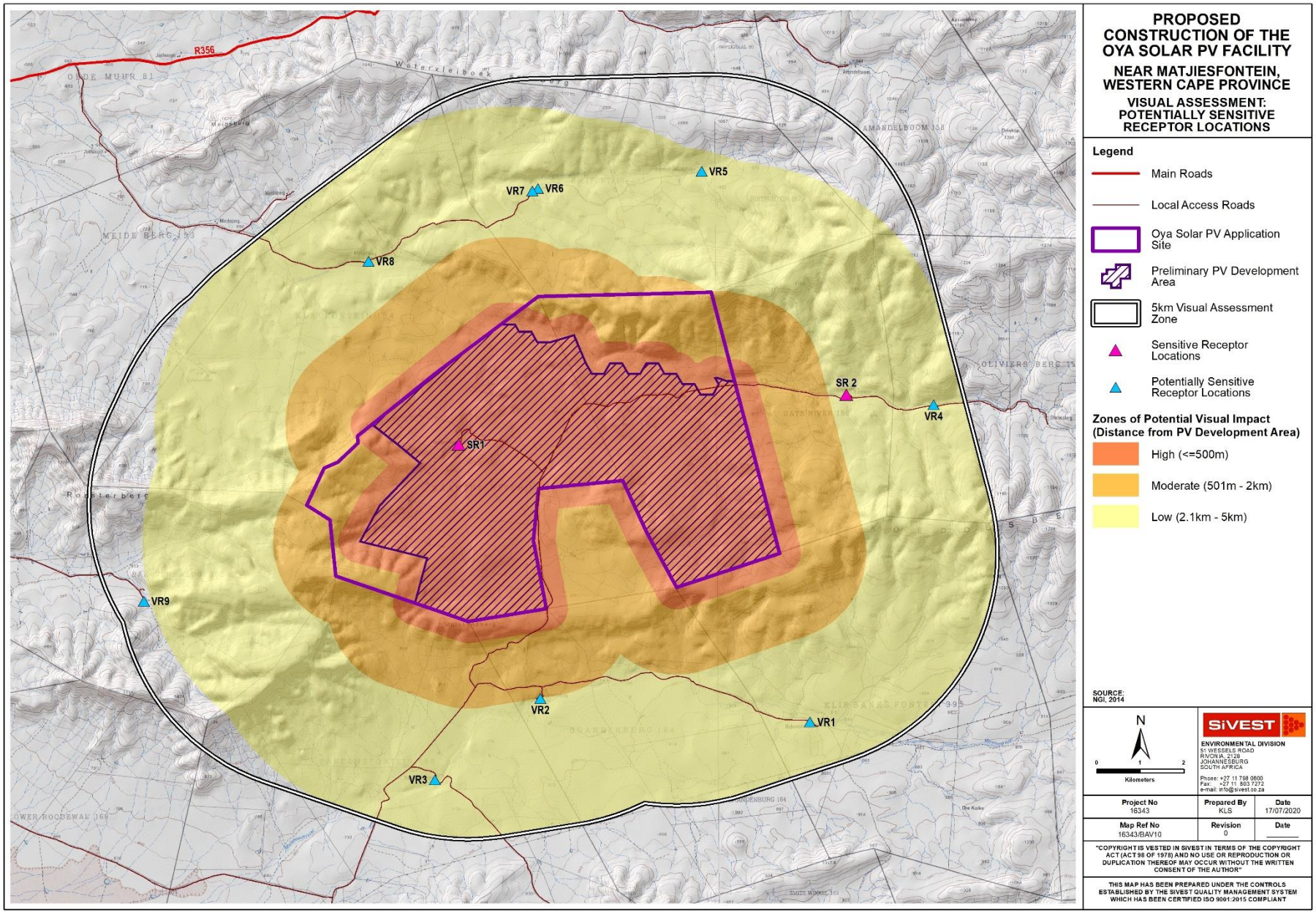
MAP 8: Broad Land Cover Classification



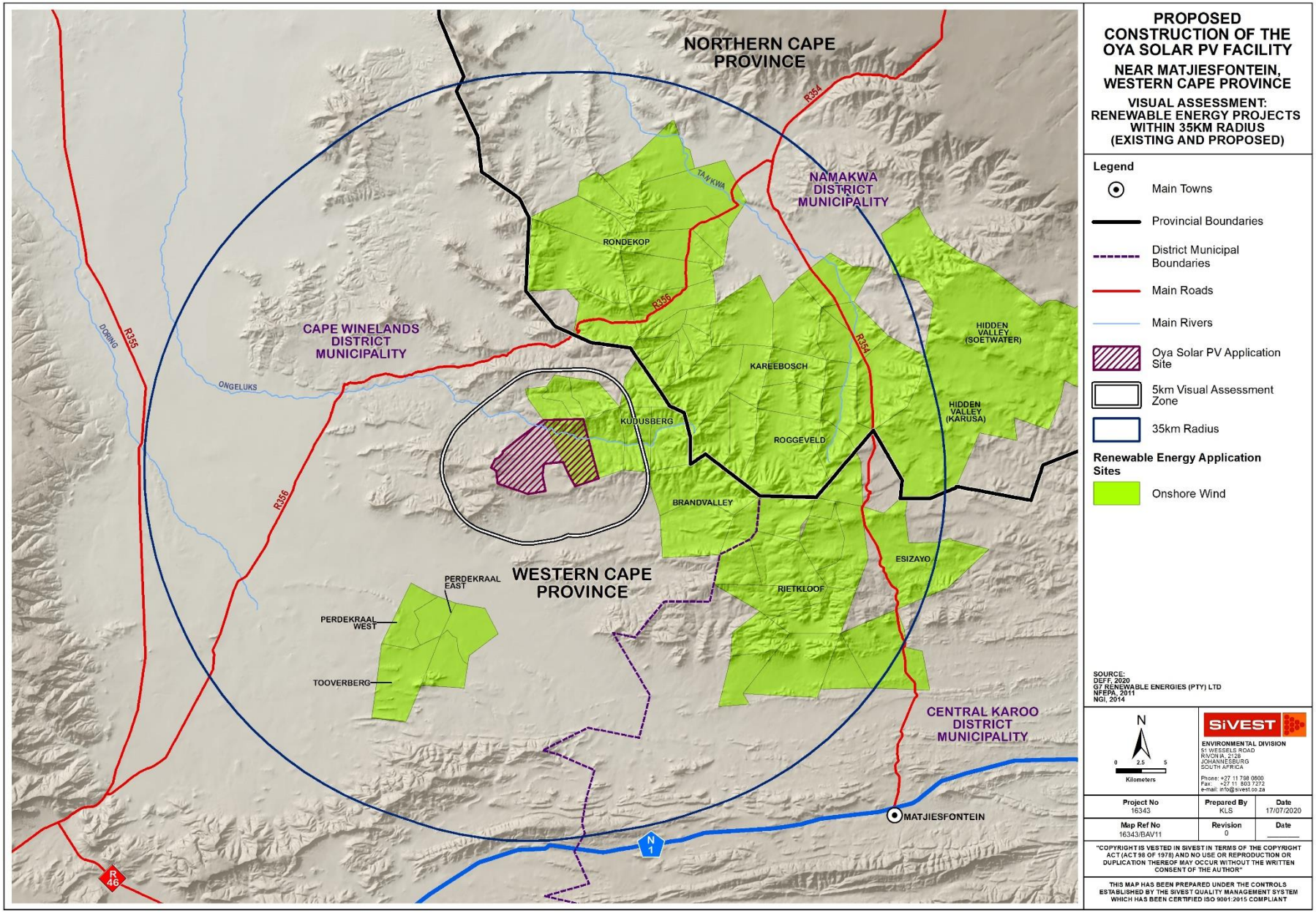
MAP 9: Visual Sensitivity



MAP 10: Potentially Sensitive Receptor Locations



MAP 11: Renewable Energy Projects within 35kms



Appendix 6K
Transportation Assessment

Stephan Jacobs

From: Liandra Scott-Shaw
Sent: Friday, 31 July 2020 11:39 AM
To: Adrian Johnson
Cc: Iris Wink; Veronique Fyfe; Justin Muhl; Stephan Jacobs
Subject: RE: 16343 Oya Amended PV Layout

Dear Adrian

Thank you for the prompt response.

Kind regards

Liandra Scott-Shaw *(Pr.Sci.Nat)*
Environmental Scientist
SiVEST Environmental Division

T +27 31 347 1600 | **M** +27 73 658 7955 **E** liandras@sivest.co.za | **W** www.sivest.co.za

From: Adrian Johnson [mailto:JohnsonA@jgafrika.com]
Sent: Friday, 31 July 2020 10:27 AM
To: Liandra Scott-Shaw
Cc: Iris Wink
Subject: RE: 16343 Oya Amended PV Layout

Dear Liandra,

We hereby confirm that the proposed amendments to the Construction Camp, Substation and BESS alternatives will not affect the Traffic Study issued in respect of the proposed Oya Solar PV Facility.
As stated in the report, there is no difference between the proposed alternatives from a traffic perspective. All alternatives are deemed acceptable.

Kind regards

From: Liandra Scott-Shaw <LiandraS@sivest.co.za>
Sent: 31 July 2020 09:55
Cc: Stephan Jacobs <StephanJ@sivest.co.za>; Veronique Fyfe <veronique@g7energies.com>; Justin Muhl <justin@g7energies.com>; Kerry Schwartz <KerryS@sivest.co.za>
Subject: RE: 16343 Oya Amended PV Layout

Dear all

Please see the KML attached in the meantime:

Please urgently interrogate and confirm if you agree via email at this stage, so that we may submit of DBAR in the interim on Monday.

Kind regards

Liandra Scott-Shaw ***(Pr.Sci.Nat)***
Environmental Scientist
SiVEST Environmental Division

T +27 31 347 1600 | **M** +27 73 658 7955 **E** liandras@sivest.co.za | **W** www.sivest.co.za

From: Liandra Scott-Shaw
Sent: Thursday, 30 July 2020 4:00 PM
Cc: Stephan Jacobs; 'Veronique Fyfe'; 'Justin Muhl'; Kerry Schwartz
Subject: RE: 16343 Oya Amended PV Layout

Dear Specialist

We will send KML/Shapes and a map for your convenience.

To follow shortly.

Kind regards

Liandra Scott-Shaw ***(Pr.Sci.Nat)***
Environmental Scientist
SiVEST Environmental Division

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Mauritius: SiVEST Mauritius Ltd: Port Louis | Daniel Wong Chung Co. Ltd: Curepipe
United Kingdom: MBM Consulting: London, England | Tunbridge Wells, England www.mbmconsult.com

From: Liandra Scott-Shaw
Sent: Thursday, 30 July 2020 3:44 PM
Cc: Stephan Jacobs; 'Veronique Fyfe'; 'Justin Muhl'; Kerry Schwartz
Subject: 16343 Oya Amended PV Layout

Dear all

Please find the amended layout for the PV based on collective specialist input:

The Construction Camp, Substation and BESS alternatives have been amended.

Apologies for the is last minute input required, but please urgently interrogate and confirm if you agree via email at this stage, so that we may submit of DBAR in the interim on Monday.

You can submit a formal letter during the upcoming comment period.

Kind regards

Liandra Scott-Shaw ***(Pr.Sci.Nat)***
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Mauritius: SiVEST Mauritius Ltd: Port Louis | Daniel Wong Chung Co. Ltd: Curepipe
United Kingdom: MBM Consulting: London, England | Tunbridge Wells, England www.mbmconsult.com

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TRANSPORT STUDY:

Basic Assessment for the Proposed Development of the 800MW Oya Solar Photovoltaic (PV) Facility and Associated Infrastructure near Matjiesfontein, Western Cape

Report prepared for:

SiVEST SA (PTY) LTD

PO Box 2921

Rivonia, 2126

South Africa

Report prepared by:

JG AFRIKA (PTY) LTD

Branch: Cape Town

PO Box 38561

7430

27 July 2020

VERIFICATION PAGE	Qual-frm-026
	Rev 14

TITLE:
BASIC ASSESSMENT FOR THE PROPOSED DEVELOPMENT OF THE 800MW OYA SOLAR PHOTOVOLTAIC (PV) FACILITY AND ASSOCIATED INFRASTRUCTURE NEAR MATJIESFONTEIN, WESTERN CAPE

JGA REF. NO.	DATE:	REPORT STATUS
5395	27/07/2020	Final

CARRIED OUT BY:	COMMISSIONED BY:
JG AFRIKA (PTY) LTD **Cape Town** PO Box 38651 Pinelands 7430 Tel.: 021 530 1800 Email: Wink@jgafrika.com	**OYA ENERGY (PTY) LTD** **Cape Town** 5th Floor, 125 Buitengracht Street Cape Town Tel: 021 300 0610 Email: oya@g7energies.com
AUTHOR	**CLIENT CONTACT PERSON**
Adrian Johnson *PrTechEng*	Veronique Fyfe

SYNOPSIS

Preparation of a Transport Study for the Basic Assessment for the proposed development of the 800MW Oya Solar Photovoltaic (PV) Facility and Associated Infrastructure near Matjiesfontein, Western Cape, pertaining to all relevant traffic and transportation engineering aspects.

KEY WORDS:

Solar Energy Facility, Transport Study, Photovoltaic (PV)

QUALITY VERIFICATION

This report has been prepared under the controls established by a quality management system that meets the requirements of ISO 9001: 2015 which has been independently certified by DEKRA Certification.

Verification	Capacity	Name	Signature	Date
By Author	Senior Technologist	Adrian Johnson		27/07/2020
Checked by:	Associate	Iris Wink		27/07/2020
Authorised by:	Director	Harold Tiganis		27/07/2020

Filename:	X\5395\JG_Transport Study_OYA PV_27072020.docx

Report template version: 2017-10-30

SPECIALIST EXPERTISE

IRIS SIGRID WINK

Profession	Civil Engineer (Traffic & Transportation)
Position in Firm	Associate
Area of Specialisation	Manager: Traffic & Transportation Engineering
Qualifications	PrEng, MSc Eng (Civil & Transportation)
Years of Experience	17 Years
Years with Firm	7 Years

SUMMARY OF EXPERIENCE

Iris is a Professional Engineer registered with ECSA (20110156). She joined JG Afrika (Pty) Ltd. in 2012. Iris obtained a Master of Science degree in Civil Engineering in Germany and has more than 17 years of experience in a wide field of traffic and transport engineering projects. Iris left Germany in 2003 and has worked as a traffic and transport engineer in South Africa and Germany. She has technical and professional skills in traffic impact studies, public transport planning, non- motorised transport planning and design, design and development of transport systems, project planning and implementation for residential, commercial and industrial projects and providing conceptual designs for the abovementioned. She has also been involved with transport assessments for renewable energy projects and traffic safety audits.

PROFESSIONAL REGISTRATIONS & INSTITUTE MEMBERSHIPS

PrEng - Registered with the Engineering Council of South Africa No. 20110156
Registered Mentor with ECSA for the Cape Town Office of JG Afrika
MSAICE - Member of the South African Institution of Civil Engineers
ITSSA - Member of ITS SA (Intelligent Transport Systems South Africa)
SAWEA - Member of the South African Wind Energy Association
SARF - South African Road Federation: Committee Member of Council

EDUCATION

1996 - Matric – Matric (Abitur) – Carl Friedrich Gauss Schule, Hemmingen, Germany
1998 - Diploma as Draughtsperson – Lower Saxonian State Office for Road and Bridge Engineering
2003 - MSc Eng (Civil and Transportation) – Leibniz Technical University of Hanover, Germany

SPECIFIC EXPERIENCE

JG Afrika (Pty) Ltd (Previously Jeffares & Green (Pty) Ltd)
2016 – Date
Position – Associate

- **Kudusberg Windfarm** – Transport study for the proposed Kudusberg Windfarm near Sutherland, Northern Cape – Client: G7 Renewable Energies
- **Rondekop Windfarm** – Transport study for the proposed Kudusberg Windfarm near Sutherland, Northern Cape – Client: G7 Renewable Energies

- **Multiple Traffic Impact and Route Assessment** for the proposed Solar PV Facilities in the Northern Cape – Client: Private Developer
- **Kuruman Windfarm –** Transport study for the proposed Kuruman Windfarm in Kuruman, Northern Cape – Client: Mulilo Renewable Project Developments
- **Coega West Windfarm** – Transportation and Traffic Management Plan for the proposed Coega Windfarm in Coega, Port Elizabeth – Client: Electrawinds Coega
- **Traffic and Parking Audits** for the Suburb of Groenvallei in Cape Town – Client: City of Cape Town Department of Property Management.
- **Road Safety Audit** for the Upgrade of N1 Section 4 Monument River – Client: Aurecon on behalf of SANRAL
- **Sonop Windfarm** – Traffic Impact Assessment for the proposed Sonop Windfarm, Coega, Port Elizabeth – Client: Founders Engineering
- **Universal Windfarm** - Traffic Impact Assessment for the proposed Universal Windfarm, Coega, Port Elizabeth – Client: Founders Engineering
- **Road Safety Audit** for the Upgrade of N2 Section 8 Knysna to Wittedrift – Client: SMEC on behalf of SANRAL
- **Road Safety Audit** for the Upgrade of N1 Section 16 Zandkraal to Winburg South – Client: SMEC on behalf of SANRAL
- **Traffic and Road Safety Studies** for the Improvement of N7 Section 2 and Section 3 (Rooidraai and Piekenierskloof Pass) – Client: SANRAL
- **Road Safety Appraisal**s for Northern Region of Cape Town – Client: Aurecon on behalf of City of Cape Town (TCT)
- **Traffic Engineering Services** for the Enkanini Informal Settlement, Kayamandi - Client: Stellenbosch Municipality
- **Lead Traffic Engineer** for the Upgrade of a 150km Section of the National Route N2 from Kangela to Pongola in KwaZulu-Natal, Client: SANRAL
- **Traffic Engineering Services** for the Kosovo Informal Settlement (which is part of the Southern Corridor Upgrade Programme), Client: Western Cape Government
- **Traffic and Road Safety Studies** for the proposed Kosovo Informal Housing Development (part of the Southern Corridor Upgrade Program), Client: Western Cape Government.
- **Road Safety Audit** Stage 3 – Upgrade of the R573 Section 2 between Mpumalanga/Gauteng and Mpumalanga/Limpopo, Client: AECOM on behalf of SANRAL
- **Road Safety Audit** Stage 1 and 3 – Upgrade of the N2 Section 5 between Lizmore and Heidelberg, Client: Aurecon on behalf of SANRAL
- **Traffic Safety Studies** for Roads Upgrades in Cofimvaba, Eastern Cape – Client: Cofimvaba Municipality
- **Road Safety Audit** Stage 1 and 3 – Improvement of Intersections between Olifantshoek and Kathu, Northern Cape, Client: Nadeson/Gibb on behalf of SANRAL
- **Road Safety Audit** Stage 3 – Upgrade of the Beacon Way Intersection on the N2 at Plettenberg Bay, Client: AECOM on behalf of SANRAL
- **Traffic Impact Assessment** for a proposed Primary School at Die Bos in Strand, Somerset West, Client: Edifice Consulting Engineers
- **Road Safety Audit** Stage 1 and 3 – Improvement of R75 between Port Elizabeth and Uitenhage, Eastern Cape, Client: SMEC on behalf of SANRAL

SPECIALIST DECLARATION

I, **IRIS WINK**, as the appointed independent specialist, in terms of the 2014 EIA Regulations, hereby declare that I:

- I act as the independent specialist in this application;
- I perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I have no vested interest in the proposed activity proceeding;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- I have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- all the particulars furnished by me in this specialist input/study are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist: _____

Name of Specialist: IRIS WINK

Date: 27 July 2020

EXECUTIVE SUMMARY

This transport study was commissioned to assess the potential impact of activities related to the delivery of the components and associated supporting infrastructure to site for the construction, operation and decommissioning phases of the proposed Oya Solar PV Facility.

It is assumed that the components will be imported to South Africa via the Port of Saldanha, although the Port of Ngqura is a viable alternative. The preferred route from the Port of Saldanha utilizes existing National and Provincial Roads as far as possible. Alternative routes between the Port and the proposed development site were assessed but these routes have geometrical constraints and includes large sections of gravel roads that will require upgrading.

The existing gravel road, linked to the R356, is the preferred access road to the site as it is an existing road and it allows direct access to the site. It should be noted that there is no preference between the construction camp and substation alternatives presented as these do not affect or have any impact on the traffic on the surrounding road network.

The main transport impacts will be during the construction and decommissioning phases where the delivery of the infrastructure will generate significant traffic. The duration of these phases is short term i.e. the impact of the traffic on the surrounding road network is temporary and when the facility is operational, do not add any significant traffic to the road network. The traffic impact on the surrounding network is therefore deemed low.

Table 1: Comparison of summarised impacts on environmental parameters

Environmental parameter	Issues	Rating prior to mitigation	Average	Rating post mitigation	Average
CONSTRUCTION PHASE					
Traffic Congestion	Increased traffic	-18		-5	
Noise pollution	Increased traffic	-18		-5	
Dust pollution	Increased traffic	-18		-5	
OPERATIONAL PHASE					
The traffic generated during this phase will be negligible and will not have any impact on the surrounding road network.					
DECOMMISSIONING PHASE					
Traffic Congestion	Increased traffic	-18		-5	
Noise pollution	Increased traffic	-18		-5	
Dust pollution	Increased traffic	-18		-5	
CUMULATIVE ASSESSMENT					
Cumulative effect	Increased traffic	-39		-24	

Traffic generated by the construction activities will have a significant impact on the road infrastructure, albeit of a short-term nature. Additionally, the construction of the facility will create dust and noise pollution that will have a low (short term) impact during the construction and decommissioning phases. Proposed mitigation measures include:

- Staggered delivery and trips can be scheduled to occur outside of peak traffic periods in line with the prevailing legislation for transportation of abnormal loads
- Dust suppression during the construction and decommissioning phases, as required
- Regular maintenance of gravel roads during the construction and decommissioning phases by the Contractor
- The use of mobile batching plants, or a batching plant in close proximity to the site and quarries in close proximity to the site would decrease the impact on the surrounding road network.
- Staff and general trips should occur outside of peak traffic periods as far as possible.

The proposed development is supported from a transport perspective provided that the recommendations and mitigations contained in this report are adhered to.

COMPLIANCE WITH THE APPENDIX 6 OF THE 2014 EIA REGULATIONS

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	**Addressed in the Specialist Report**
1. (1) A specialist report prepared in terms of these 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 curriculum vitae;	Yes. See attached CV
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Yes. See attached declaration
c) an indication of the scope of, and the purpose for which, the report was prepared;	Yes. See section 1.1
(cA) an indication of the quality and age of base data used for the specialist report;	n/a
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Yes. See section 1.6 and 1.9
d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	n/a
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Yes. See section 1.1
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;	Yes. Section 1.3
g) an identification of any areas to be avoided, including buffers;	Yes. Section 1.3
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;	Yes. Section 1.1
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;	Yes. Section 1.5
k) any mitigation measures for inclusion in the EMPr;	Yes. Section 1.8
l) any conditions for inclusion in the environmental authorisation;	n/a
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Yes. Section 1.8
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;	Yes. Sections 1.3, 1.7, 1.12
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 competent authority.	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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TRANSPORT STUDY

1.1. INTRODUCTION AND METHODOLOGY

1.1.1. *Scope and Objectives*

Oya Energy (Pty) Ltd (hereafter referred to as “Oya") propose to construct and operate the Oya Solar Photovoltaic (PV) Facility (hereafter referred to as “the proposed development”) approximately 52 km northwest of the town of Matjiesfontein, Western Cape Province. The proposed development will have a maximum export capacity of up to 800MW. The overall objective of the development is to generate electricity by means of renewable energy technology capturing solar energy to feed into the National Grid, which will be procured under either the Renewable Energy Independent Power Producer Procurement Program (REIPPPP), other government run procurement programmes or for sale to private entities if required.

As part of the Basic Assessment (BA) undertaken by the SiVEST SA (Pty) Ltd (SiVEST), the services of a Transportation Specialist are required to conduct a Transport Study.

The main objective of this report is to undertake the Transport Study (including the traffic and transport risk assessments and a route investigation) for the proposed site.

The following two main transportation activities will be investigated:

- Abnormal load vehicles transporting components to the site.
- The transportation of construction materials, equipment and people to and from the site/facility.

The transport study will aim to provide the following objectives:

- Activities related to traffic movement for the construction, operation (maintenance) and decommissioning phases of the facility.
- Provide a main route for the transportation of components point to the proposed site.
- Provide a preliminary transportation route for the transportation of materials, equipment and people to site.
- Recommend alternative or secondary routes where possible.

1.1.2. *Terms of Reference*

The Terms of Reference for this Transport Study include the following:

General:

- Adherence to the content requirements for specialist reports in accordance with Appendix 6 of the EIA Regulations 2014, as amended;
- Adherence to all appropriate best practice guidelines, relevant legislation and authority requirements;
- Provide a thorough overview of all applicable legislation, guidelines
- Cumulative impact identification and assessment as a result of other renewable energy (RE) developments in the area (including; a cumulative environmental impact table(s) and statement, review of the specialist reports undertaken for other Renewable Energy developments and an indication of how the recommendations, mitigation measures and conclusion of the studies have been considered);

- Identification sensitive areas to be avoided (including providing shapefiles/kmls);
- Assessment of the significance of the proposed development during the Pre-construction, Construction, Operation, Decommissioning Phases and Cumulative impacts. Potential impacts should be rated in terms of the direct, indirect and cumulative:
    - Direct impacts are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.
    - Indirect impacts of an activity are indirect or induced changes that may occur as a result of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken, or which occur at a different place as a result of the activity.
    - Cumulative impacts are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.
- Comparative assessment of alternatives;
- Recommend mitigation measures in order to minimise the impact of the proposed development; and
- Implications of specialist findings for the proposed development (e.g. permits, licenses etc).

Specific:

- Extent of the transport study and study area;
- The proposed development;
- Trip generation for the facility during construction and operation;
- Traffic impact on external road network;
- Accessibility and turning requirements;
- National and local haulage routes;
- Assessment of internal roads and site access;
- Assessment of freight requirements and permitting needed for abnormal loads; and
- Traffic accommodation during construction.

1.1.3. *Approach and Methodology*

The report deals with the traffic impact on the surrounding road network in the vicinity of the site:

- during the construction of the access roads;
- construction of the facility;
- maintenance in the operational phase; and
- the decommissioning phase.

This transport study was informed by the following:

<u>Project Assessment</u>

- Overview of project background information including location maps, component specs and any possible resulting abnormal loads to be transported;
- Site assessment between 10 and 13 July 2020, and
- Research of all available documentation and information relevant to the proposed facility.

The transport study considered and assessed the following:

Traffic and Haul Route Assessment

- Estimation of trip generation;
- Discussion on potential traffic impacts;
- Assessment of possible haul routes; and
- Construction and operational (maintenance) vehicle trips.

Site layout, Access Points and Internal Roads Assessment per Site

- Description of the surrounding road network;
- Description of site layout;
- Assessment of the proposed access points; and
- Assessment of the proposed internal roads on site.

The findings of the transport assessment are detailed in this report prepared as part of the basic assessment process for the proposed development.

1.1.4. *Assumptions and Limitations*

The following assumptions and limitations apply:

- This study is based on the project information provided by SiVEST.
- According to the Eskom Specifications for Power Transformers (Eskom Power Series, Volume 5: Theory, Design, Maintenance and Life Management of Power Transformers), the following dimensional limitations need to be kept when transporting the transformer – total maximum height 5 000mm, total maximum width 4 300 mm and total maximum length 10 500 mm.
- Maximum vertical height clearances along the haulage route is 5.2 m for abnormal loads.
- The imported elements will be transported from the most feasible port of entry, which is deemed to be Port of Saldanha. It is expected that the inverter will be imported and shipped.
- If any elements are manufactured within South Africa, these will be transported from their respective manufacturing centers, which would be either in the greater Johannesburg, Pinetown/Durban or Cape Town for the transformer, inverter and the support structures.
- All haulage trips will occur on either surfaced national and provincial roads or existing gravel roads.
- Material for the construction of internal access roads will be sourced locally as far as possible.

1.1.5. *Source of Information*

Information used in a transport study includes:

- Project Information provided by SiVEST
- Google Earth.kmz provided by SiVEST
- Google Earth Satellite Imagery
- Project research of all available information
- Correspondence with authorities

1.2. DESCRIPTION OF PROJECT ASPECTS RELEVANT TO THE TRANSPORT STUDY

1.2.1. *Port of Entry*

It is assumed that components will be imported to South Africa via the Port of Saldanha, which is located in the Western Cape. The Port of Saldanha is the largest and deepest natural port in the Southern Hemisphere able to accommodate vessels with a draft of up to 21.5 meters. The port covers a land and sea surface of just over 19,300 hectares within a circumference of 91 kilometer with maximum water depths of 23.7 meters. Unique to the port is a purpose-built rail link directly connected to a jetty bulk loading facility for the shipment of iron ore. The Port is operated by Transnet National Ports Authority.

Alternatively, components could be imported via the Port of Ngqura in Coega, Port Elizabeth. The Port of Ngqura is a world-class deep-water transshipment hub offering an integrated, efficient and competitive port service for containers on transit. The Port forms part of the Coega Industrial Development Zone (CIDZ) and is operated by Transnet National Ports Authority.

1.2.2. *Transportation requirements*

It is anticipated that the following vehicles will access the site during construction:

- Conventional trucks within the freight limitations to transport building material to the site;
- 40ft container trucks transporting solar panels, frames and the inverter, which are within freight limitations;
- Flatbed trucks transporting the solar panels and frames, which are within the freight limitations;
- Light Differential Vehicle (LDV) type vehicles transporting workers from surrounding areas to site;
- Drilling machines and other required construction machinery being transported by conventional trucks or via self-drive to site; and
- The transformers will be transported as abnormal loads.

1.2.3. *Abnormal Load Considerations*

It is expected that the transformers will be transported with an abnormal load vehicle. Abnormal permits are required for vehicles exceeding the following permissible maximum dimensions on road freight transport in terms of the Road Safety Act (Act No. 93 of 1996) and the National Road Traffic Regulations, 2000:

- Length: 22 m for an interlink, 18.5 m for truck and trailer and 13.5 m for a single unit truck
- Width: 2.6 m
- Height: 4.3 m measured from the ground. Possible height of load – 2.7 m.
- Weight: Gross vehicle mass of 56 t resulting in a payload of approximately 30t
- Axle unit limitations: 18 t for dual and 24 t for triple-axle units
- Axle load limitation: 7.7 t on the front axle and 9 t on the single or rear axles

Any dimension / mass outside the above will be classified as an Abnormal Load and will necessitate an application to the Department of Transport and Public Works for a permit that will give authorisation for the conveyance of said load. A permit is required for each Province that the haulage route traverses.

1.2.4. *Further Guideline Documentation*

The Technical Recommendations for Highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outlines the rules and conditions that apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges and culverts.

The general conditions, limitations and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power / mass ratio, mass distribution and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the Road Traffic Act and the relevant regulations.

1.2.5. *Permitting – General Rules*

The limits recommended in TRH 11 are intended to serve as a guide to the Permit Issuing Authorities. It must be noted that each Administration has the right to refuse a permit application or to modify the conditions under which a permit is granted. It is understood that:

a) A permit is issued at the sole discretion of the Issuing Authority. The permit may be refused because of the condition of the road, the culverts and bridges, the nature of other traffic on the road, abnormally heavy traffic during certain periods or for any other reason.
b) A permit can be withdrawn if the vehicle upon inspection is found in any way not fit to be operated.
c) During certain periods, such as school holidays or long weekends an embargo may be placed on the issuing or permits. Embargo lists are compiled annually and are obtainable from the Issuing Authorities.

1.2.6. *Load Limitations*

The maximum load that a road vehicle or combination of vehicles will be allowed to carry legally under permit on a public road is limited by:

- the capacity of the vehicles as rated by the manufacturer;
- the load which may be carried by the tyres;
- the damaging effect on pavements;
- the structural capacity on bridges and culverts;
- the power of the prime mover(s);
- the load imposed by the driving axles; and
- the load imposed by the steering axles.

1.2.7. *Dimensional Limitations*

A load of abnormal dimensions may cause an obstruction and danger to other traffic. For this reason, all loads must, as far as possible, conform to the legal dimensions. Permits will only be considered for indivisible loads, i.e. loads that cannot, without disproportionate effort, expense or risk of damage, be divided into two or more loads for the purpose of transport on public roads. For each of the characteristics below there is a legally permissible limit and what is allowed under permit:

- Width;
- Height;

- Length;
- Front Overhang;
- Rear Overhang;
- Front Load Projection;
- Rear Load Projection;
- Wheelbase;
- Turning Radius; and
- Stability of Loaded Vehicles.

1.2.8. *Transporting Other Plant, Material and Equipment*

In addition to transporting the specialised equipment, the normal Civil Engineering construction materials, plant and equipment will need to be transported to the site (e.g. sand, stone, cement, gravel, water, compaction equipment, concrete mixers, etc.). Other components, such as electrical cables, battery energy storage compartments, pylons and substation transformers, will also be transported to site during construction. The transport of these items will generally be conducted with normal heavy loads vehicles, except for the transformers which require an abnormal load vehicle.

1.3. DESCRIPTION OF THE AFFECTED ENVIRONMENT

1.3.1. *Description of the site*

The proposed PV facility is located in the Witzenberg Local Municipality and the Cape Winelands District Municipality. The proposed site is bounded by the R356, located do the west and north of the proposed site, and the R354, located to the east of the proposed site, as shown in **Figure 1**.

The proposed PV facility will be located on the following two properties:

- The Remainder of farm 155 Baakens Rivier; and
- Portion 1 of farm 156 Gats Rivier

The properties are currently zoned for agricultural land use and due to the low agricultural potential of the land, it was previously used for low intensity grazing however the properties are no longer actively used for agricultural activities. The above-mentioned properties are ~5070 ha in extent. The total area of the application site assessed as part of this Basic Assessment (BA) is approximately 3777 ha.

The proposed project falls entirely within the Renewable Energy Zone (REDZ) 2 (i.e. Komsberg REDZ), that was Gazetted on 16 February 2018 by the Minister of Environmental Affairs (GN 114). In terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) and the 2014 NEMA EIA Regulations promulgated in Government Gazette 40772 and Government Notice (GN) R326, R327, R325 and R324 on 7 April 2017, wind and solar PV projects located within a REDZs are subject to a BA and reduced decision-making period by the authorities. A BA process in terms of Appendix 1 of the Environmental Impact Assessment (EIA) Regulations (2014, as amended) has therefore been undertaken for the proposed project. The competent authority for this BA is the national Department of Environment, Forestry and Fisheries (DEFF).

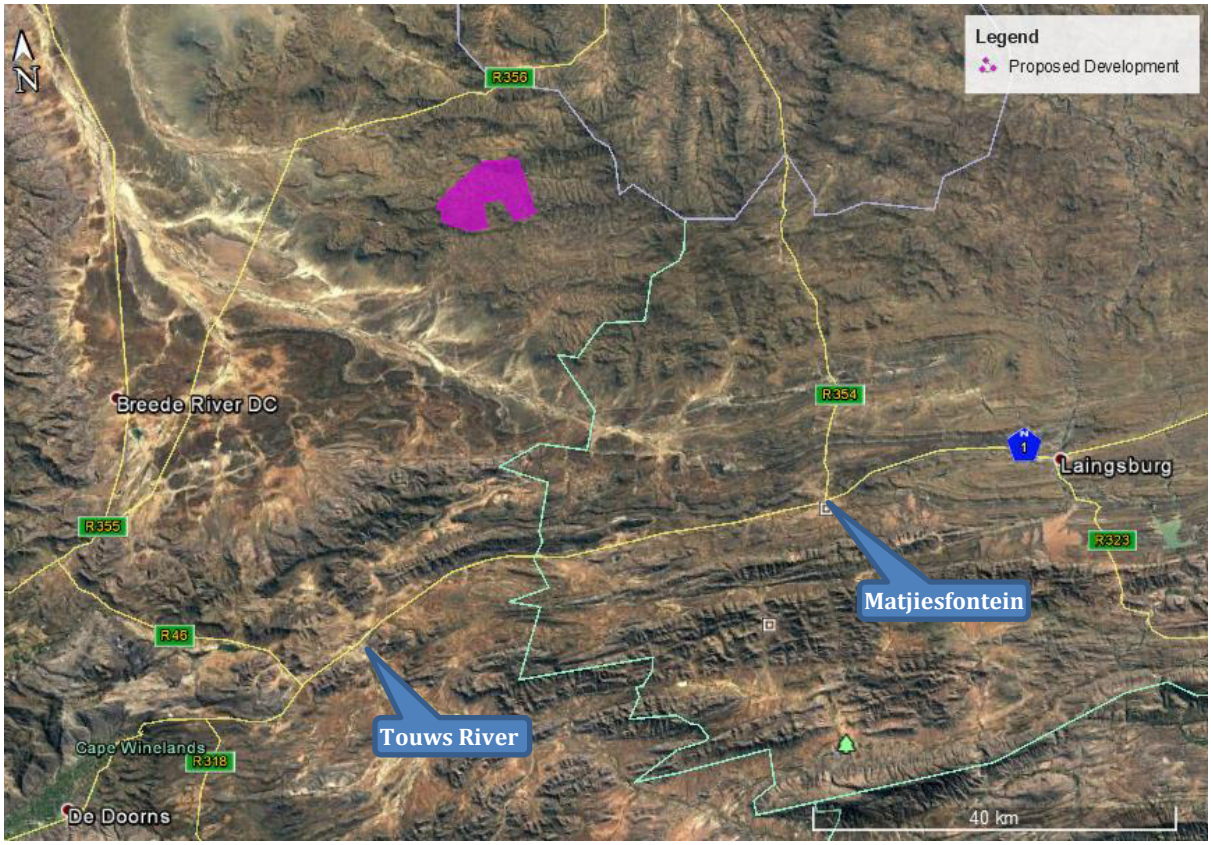

Figure 1: Aerial View of Proposed Development Site

The PV facility will consist of the following:

- Solar Photovoltaic (PV) array
    - At this stage, it is anticipated that the proposed Solar PV energy facility will include PV fields (arrays) comprising multiple PV modules. The PV modules are arranged in rows and columns, some of which may require levelling of the terrain and associated slope stabilisation measures.
    - Each PV module will be approximately 2.5m long and 1.2m wide and mounted on supporting structures above ground. The final design details along with the structure orientation will become available during the detailed design phase of the proposed development prior to the start of construction.
    - The foundations will most likely be either concrete or rammed piles. The final foundation design will be determined at the detailed design phase of the proposed development.
- Onsite 33/132kV substation and a battery energy storage system (BESS)
    - The on-site and collector substation will contain transformer(s) for voltage step-up from medium voltage to high voltage. Direct Current (DC) power from the modules will be converted into Alternating Current (AC) power in the inverters and the voltage will be stepped up to medium voltage in the inverter transformers. Medium voltage cabling will link the various PV arrays to an on-site substation. These cables will be laid underground wherever technically feasible. The proposed development will include the construction of one (1) new on-site substation occupying an area of up to approximately 4ha.
    - An 132kV overhead powerline is also being proposed to feed the electricity generated by the proposed solar PV energy facility into the national grid. The

associated electrical infrastructure will however require a separate EA and is subject to a separate BA process to be undertaken in future.
    - A BESS will be located next to the onsite 33/132kV substation or in between the PV modules. The BESS would cover an area of up to 7.8ha. The storage capacity and type of technology would be determined at a later stage during the development phase, but most likely comprise an array of containers, outdoor cabinets and/or storage tanks. Although a BESS does not require environmental authorisation in terms of NEMA, the facility is included in the description to assess the impact of the footprint on the environment in terms of vegetation removal.
    - Medium voltage cabling will link the proposed PV facility to the grid connection infrastructure (on-site substation). Cables to be buried along access roads, where feasible, with overhead 33kV lines grouping PV panels to crossing valleys and ridges outside of the road footprints to get to the substation;
    - Construction laydown area to house construction equipment, components, offices and material. The construction laydown area will be up to 6.4ha in extent.
- Operation and Maintenance (O&M) buildings for use during the operational phase. The O&M building will be used throughout the operational phase of the PV facility and will be a single storey building, included in the footprint of the substation.
- Temporary infrastructure to obtain water from available local sources. New or existing boreholes, including a potential temporary above ground pipeline (approximately 50cm in diameter), to feed water to the on-site batching plant are being proposed. Water will potentially be stored in temporary water storage tanks. The necessary approvals from the Department of Water and Sanitation (DWS) will be applied for separately (should this be required).
- Access roads:
    - Access to the PV facility will be via the existing public gravel road which bisects the proposed PV facility.
    - During construction the project site would be accessed via the existing public road network with minor road strengthening taking place within the existing road reserves.
    - New roads of 4 to 8m wide would be constructed between some of the PV arrays to facilitate access throughout the PV facility. The footprint of these is included in the overall PV array.
- Fencing and lighting for safety
    - Fencing will be approximately 2m high surrounding the entire PV facility for security purposes.

Once fully developed, the intention is to bid the proposed PV facility in either a government procurement round for new generation capacity from renewable energy or for private power purchase agreements. Therefore, the maximum total generation capacity is not limited to the standard required under the REIPPPP.

The construction phase will be between 12 and 24 months and the operational lifespan will be approximately 20 years, depending on the length of the power purchase agreement with the relevant offtaker.

1.3.2. *National Route to Site for Imported Components*

The most suitable port is the Port of Saldanha, which is located 290km travel distance from the proposed development site. However, the Port of Ngqura in Coega, Port Elizabeth can also be considered as an alternative. The Port of Ngqura is located approximately 670km travel distance from the proposed development site.

The preferred route for abnormal load vehicles will be from the port, heading east on the R45 to Hopefield and onto the R311 at Moorreesburg (see **Figure 2**). At Hermon, the vehicle will travel on the R46 to Ceres, passing Gouda and Tulbagh. The vehicle will continue on the R46, which becomes the R355 after the R355/R46 intersection. The vehicle will continue on the R355, turning right onto the R356 at the intersection of the R355/R356. After approximately 8km, the vehicle will turn left onto a gravel road at the intersection of the R356/Gravel Road. The vehicle will continue on this gravel road until it reaches the proposed development.

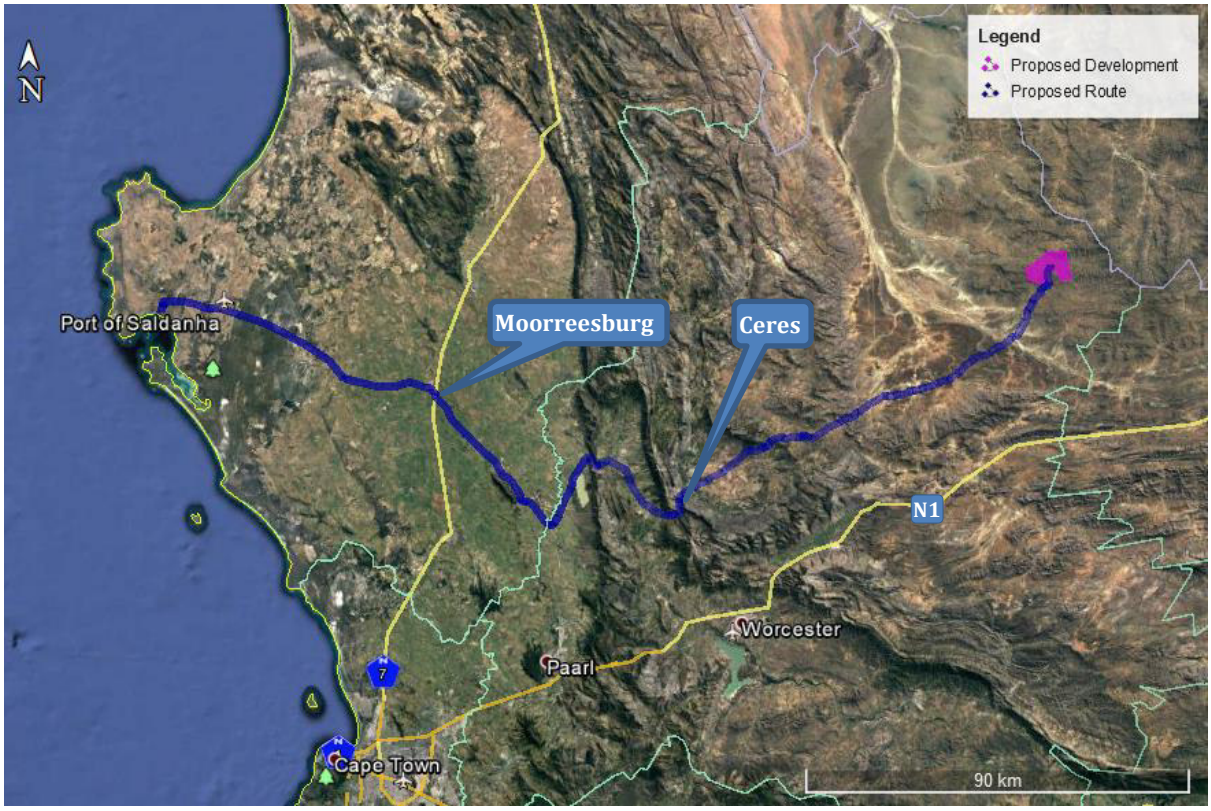

Figure 2: Preferred route from Port to the Proposed Development Site

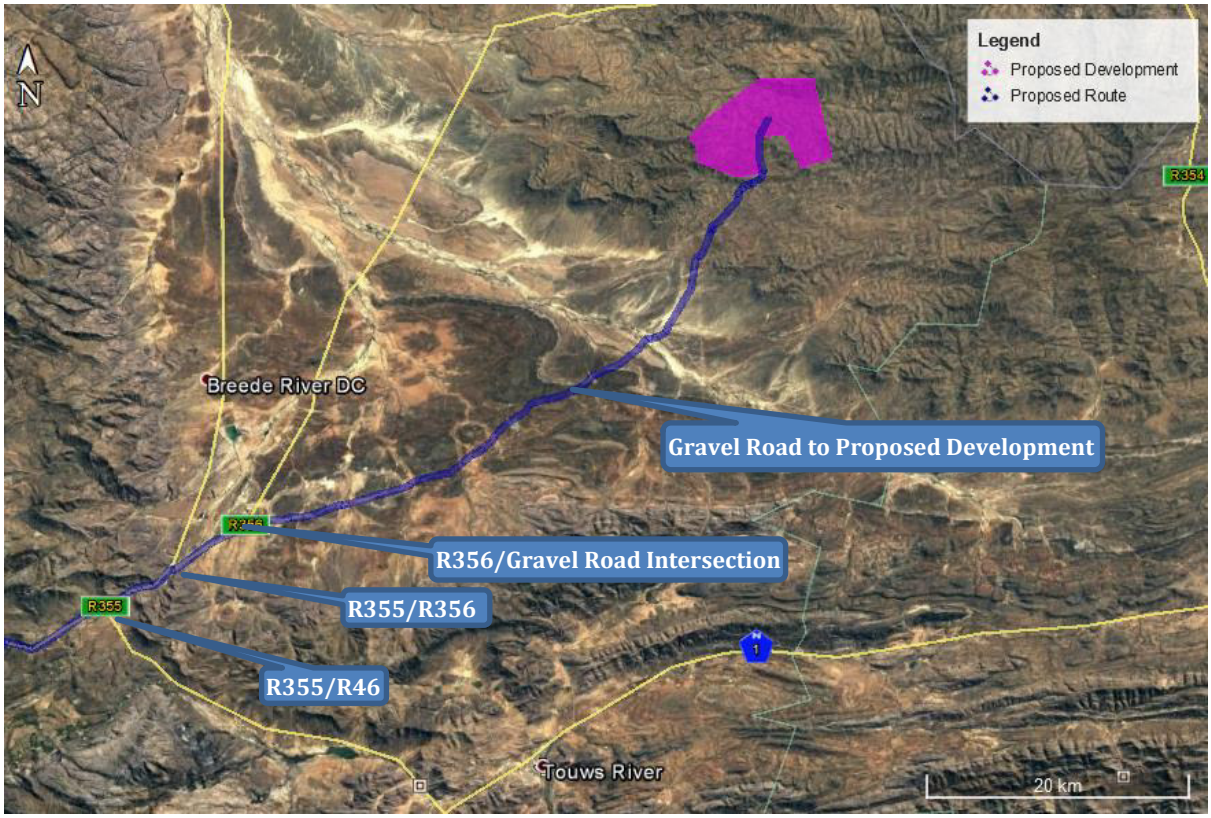

Figure 3: Gravel Road to the Proposed Site

An alternative option exists to access the proposed site via the R46, the N1 highway and a gravel road, as shown in the **Figure 4** below. This route follows the same alignment as the Preferred Route to the R46, turning right onto the R46 at the R46/R355 intersection and then heading south towards the N1.On the N1, the vehicle will turn left at the N1/Matjiesfontein intersection and take the first left turn onto a gravel road. This gravel road terminates at the proposed development.

For both options, the gravel roads leading to the proposed developments would require upgrading and an assessment of the drainage structures along the route. Although the upgrade work would be extensive, both options are viable. The preferred option, however, is shorter and does not require accessing the N1 highway.

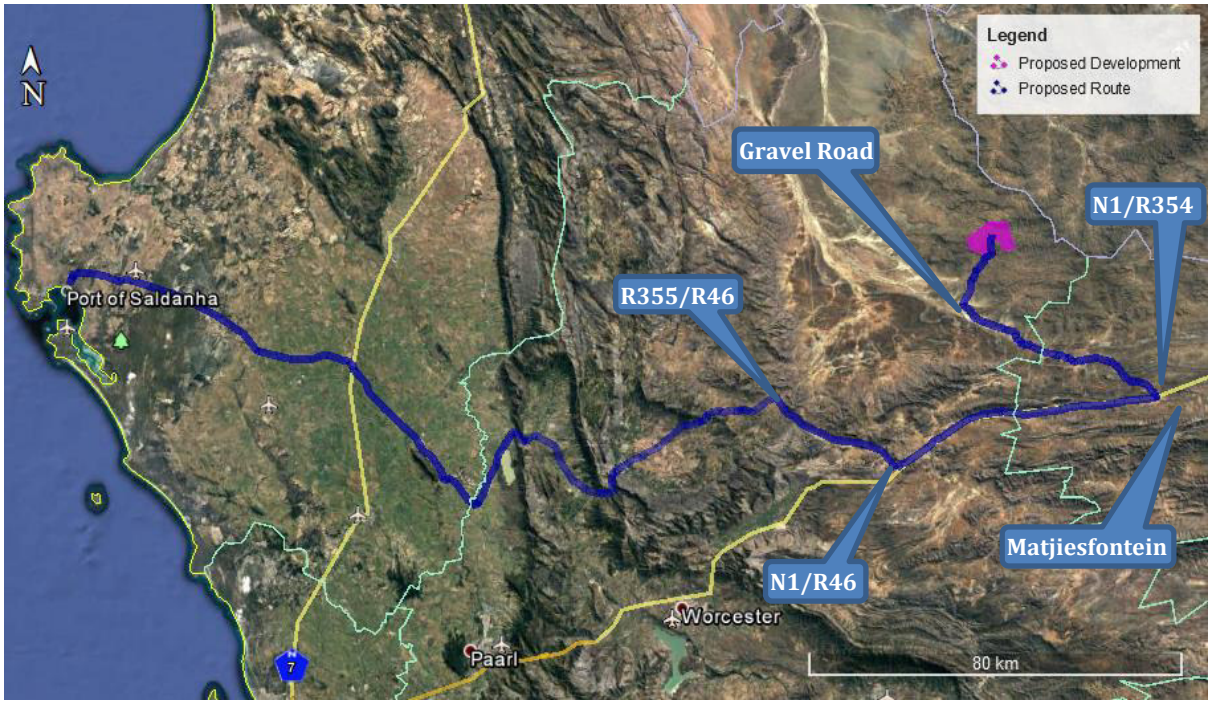

Figure 4: Alternative Route 1

It is critical to ensure that the abnormal load vehicle will be able to move safely and without obstruction along the preferred routes. The preferred route should be surveyed to identify problem areas e.g. intersections with limited turning radii and sections of the road with sharp horizontal curves or steep gradients, that may require modification. After the road modifications have been implemented, it is recommended to undertake a "dry-run" with the largest abnormal load vehicle, prior to the transportation of any components, to ensure that the delivery will occur without disruptions.

It needs to be ensured that the gravel sections of the haulage routes remain in good condition and will need to be maintained during the additional loading of the construction phase and reinstated after construction is completed.

1.3.3. *Route for Components manufactured within South Africa*

It is anticipated that elements manufactured within South Africa will be transported to the site from the Cape Town, Johannesburg and/or Pinetown/Durban areas.

The transformer will be transported with an abnormal load vehicle and therefore it needs to be verified that the route from the manufacturer to the site does not have any load limitations for abnormal vehicles. At this stage, only a high-level assessment can be undertaken as no information of the exact location of the manufacturer is known and all road structures (such as bridges and culverts) need to be confirmed for their load bearing by SANRAL or the respective Roads Authority.

It is critical to ensure that an abnormal load vehicle will be able to move safely and without obstruction along the preferred route. The preferred route should be surveyed prior to construction to identify any problem areas, e.g. intersections with limited turning radii and sections of the road with sharp horizontal curves or steep gradients, that may require modification. After the road modifications have been implemented, it is recommended to undertake a "dry-run" with the largest abnormal load vehicle, prior to the transportation of any components, to ensure that the delivery will occur without disruptions.

1.3.4. *Route from Johannesburg Area to Site – Normal Loads*

With the haulage distance being the minimal haulage distance to site, it is assumed that the inverter and support structure will be manufactured in the Johannesburg area and transported to site via road. The general route distance is around 1240km and no road limitations are expected on this route for normal loads vehicles as it will mainly follow national and provincial roads. The haulage route is shown in the **Figure 5** below.

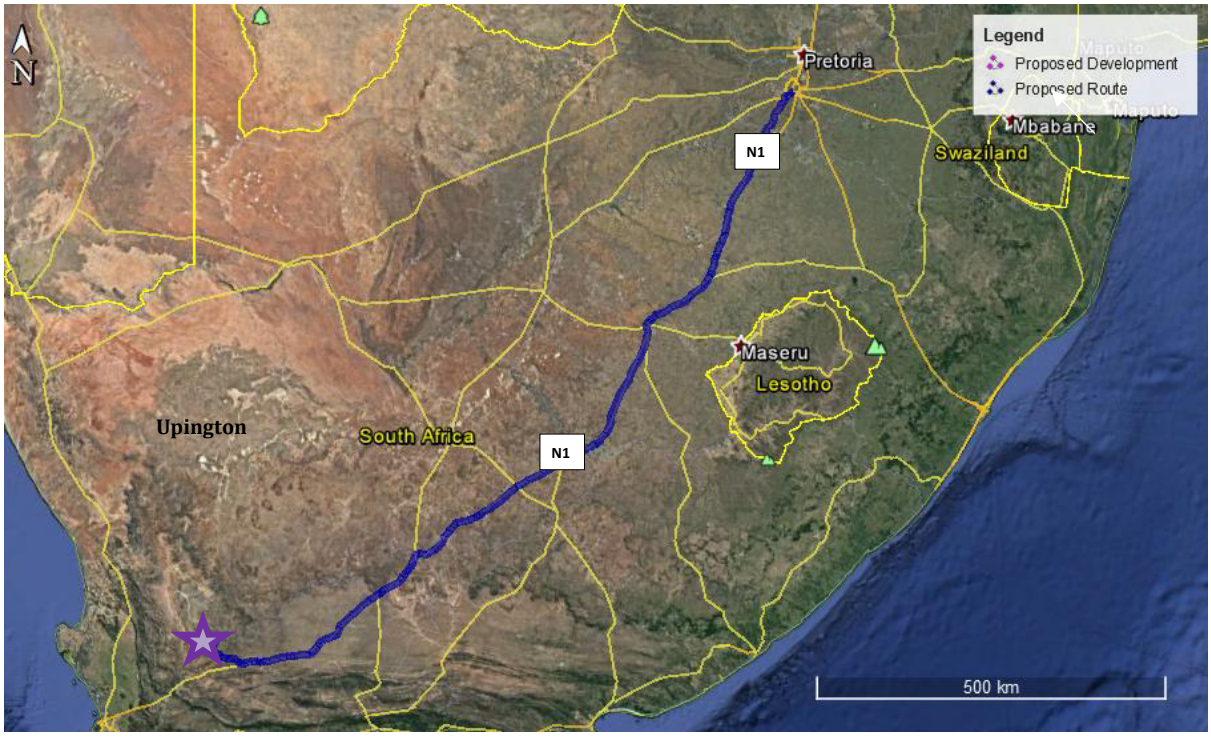

Figure 5: Haulage Route from Johannesburg Area to Site for Normal Loads

1.3.5. *Route from Pinetown / Durban to Site - Normal load*

As a manufacturing centre, Pinetown/Durban can manufacture the inverter and support structures which will then be transported to site via road transportation.

The inverter and support structures elements are typically transported as normal loads and no road limitations are envisaged along the route for normal load freight, shown in **Figure 6** below. Haulage vehicles will mainly travel on national and provincial roads and the total distance is approximately 1 450km. This distance is however approximately 210km longer than the Johannesburg haulage route.

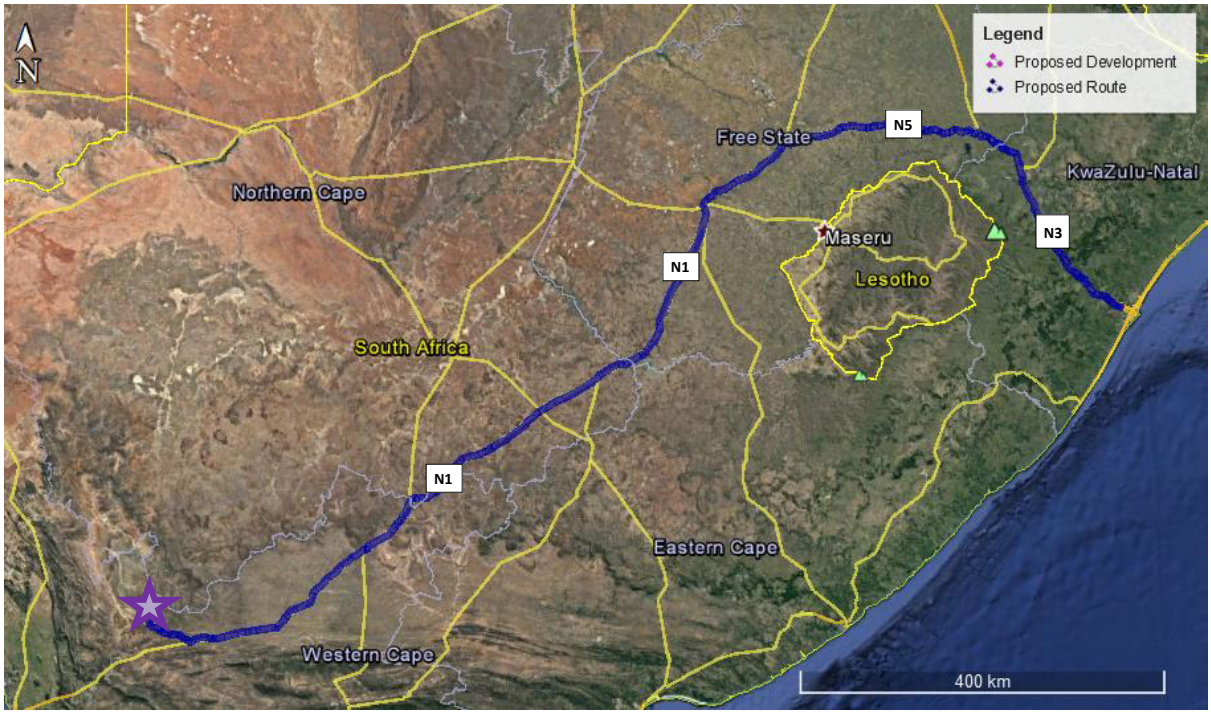

Figure 6: Haulage Route from Pinetown Area to Site

1.3.6. *Route from Cape Town Area to Site – Normal Load*

The inverter and support structures can also alternatively be manufactured in Cape Town and transported to site. The recommended haulage route for this option will follow National Road N7 from Cape Town to Moorreesburg. From Moorreesburg it will follow the same route proposed for the imported components, shown in **Figure 2**. The general route distance is around 320km and no road limitations are expected on this route for normal loads vehicles as it will mainly follow national and provincial roads.

1.3.7. *Route from Johannesburg Area to Site – Abnormal Load*

It is understood that the transformer will be manufactured locally in South Africa and be transported from the Johannesburg area to site. As the transformer will be transported with an abnormal load vehicle, the route planning needs a more detailed investigation of the feasible routes taking into account any limitations due to existing road structures. Furthermore, a load of abnormal dimensions may cause an obstruction and danger to other traffic and therefore the transformer needs to be transported as far as possible on roads that are wide enough for general traffic to pass. It is expected that the transformer can be transported to site via the same route used for normal loads.

There are several bridges and culverts along this route, which need to be confirmed for load bearing and height clearances. According to the desktop study, all turning movements along the route are manageable for the abnormal vehicle.

However, there are a number of alternative routes which can be investigated if the above route or sections of the route should not be feasible.

1.3.8. *Proposed main access road to the Proposed Development*

The gravel road shown in **Figure 7** will be the proposed main access route to the proposed development. This road is currently used as an access route to renewable energy facilities on neighbouring farms.

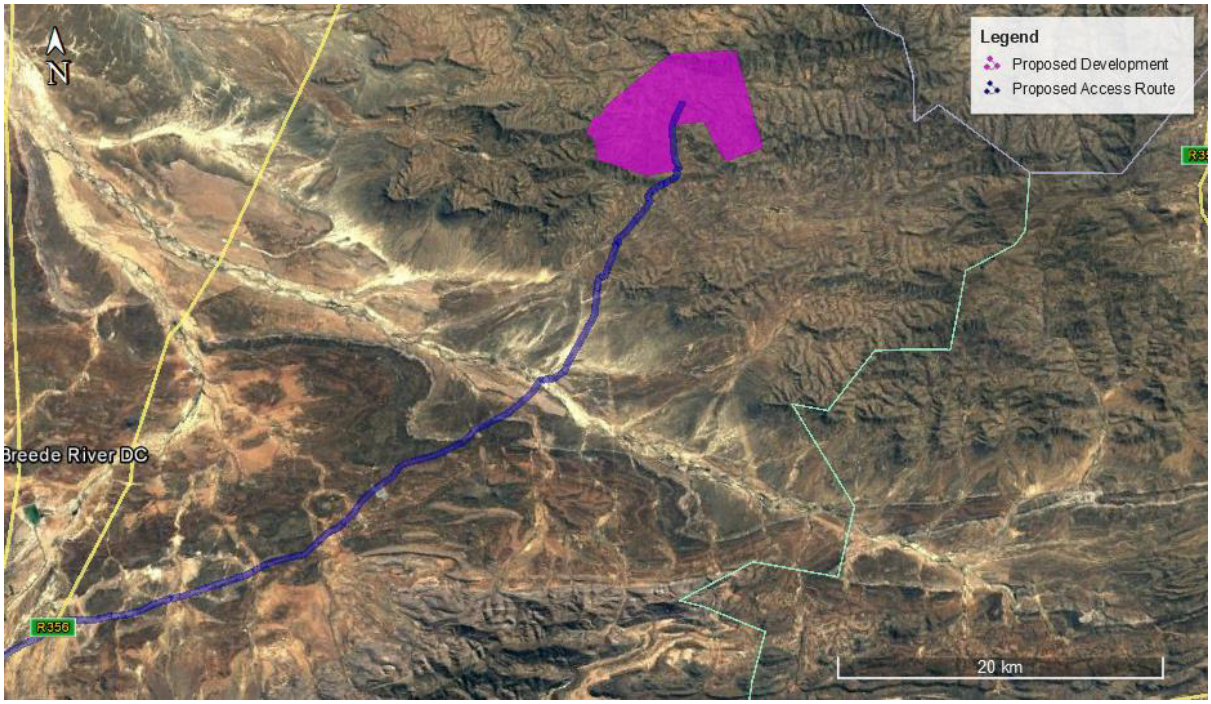

Figure 7: Proposed Main Access Road

Figure 8: Gravel Road

Figure 9: Gravel Road

Figure 8 and **Figure 9** shows the existing gravel road. Portions of the gravel road are wide enough to accommodate a large construction vehicle whilst other sections (see **Figure 10**) will need to be upgraded to cater for the construction vehicles navigating the road to the proposed development site.

Figure 10: Narrow Road

Generally, the road width at the access point to the proposed development needs to be a minimum of 6m and the access roads on site a minimum of 5m. The radius at the access point to the proposed development needs to be large enough to allow for all construction vehicles to turn safely. It is recommended that the access point shall be surfaced and the internal roads on site can remain gravel.

The exact location and design of the internal access road needs to be established at detailed design stage. Existing structures and services such as drainage structures and pipelines will need to be evaluated if impacting on the access road.

It is recommended that the site access be controlled via a boom and gatehouse. It is also recommended that security staff be stationed on site at the access booms during construction and that an electronic number plate reader will be implemented once the solar farm is in operation. A minimum stacking distance of 25m should be provided between the road edge of the external road and the boom.

The Gravel Road is deemed the preferred access route as it allows direct access to the proposed site. It furthermore makes sense from an access management point of view that the proposed neighbouring facilities share an access route.

It needs to be ensured that the gravel sections of the haulage routes remain in good condition and will hence need to be maintained during the additional loading of the construction phase and then reinstated after construction is completed. The gravel roads will require grading with a grader to obtain a flat even surface and the geometric design of these gravel roads needs to be confirmed at detailed design stage.

1.3.9. *Main Route for the Transportation of Materials, Plant and People to the proposed site*

The nearest towns in relation to the proposed development site Sutherland, Matjiesfontein and Laingsburg. It is envisaged that most of the materials, plant and labour will be sourced from these towns.

Concrete batch plants and quarries in the vicinity could be contracted to supply materials and concrete during the construction phase, which would reduce the impact on traffic on the surrounding road network. Alternatively, mobile concrete batch plants and temporary construction material stockpile yards could be commissioned on vacant land near the proposed site. Delivery of materials to the mobile batch plant and the stockpile yard could be staggered to minimise traffic disruptions.

It is envisaged that most materials, water, plant, services and people will be procured within a 60 km radius from the proposed development site; however, this would be informed by the REIPPPP or other government / private procurement process requirements.

1.4. APPLICABLE LEGISLATION AND PERMIT REQUIREMENTS

Key legal requirements pertaining to the transport requirements for the proposed development are:

- Abnormal load permits, (Section 81 of the National Road Traffic Act)
- Port permit (Guidelines for Agreements, Licenses and Permits in terms of the National Ports Act No. 12 of 2005), and
- Authorisation from Road Authorities to modify the road reserve to accommodate turning movements of abnormal loads at intersections.

1.5. TRIP GENERATION

Traffic generated by the construction of the facility will have a significant impact on the surrounding road network, increasing dust and noise pollution as traffic volumes increase. The exact number of trips generated during construction will be determined by the haulage company transporting the components to site, the staff requirements and where equipment is sourced from.

From experience on other projects of similar nature, the number of heavy vehicles per 7MW installation is estimated to range between 200 and 300 trips depending on the site conditions and requirements. For the 800MW, the total trips can therefore be estimated to be between 22 858 and 34 286 heavy vehicle trips, which will generally be made over a 24-month construction period. Choosing the worst-case scenario of 34 286 heavy vehicles over a 24-month period travelling on an average of 22 working days per month, the resulting daily number of vehicle trips is approximately 65. Considering that the number of vehicle trips during peak hour traffic in a rural environment can roughly be estimated at around 20-40% of the average daily traffic, the resulting vehicle trips for the construction phase are approximately 13-26 trips. The impact on general traffic is therefore deemed nominal.

If the PV panels are to be imported instead of manufactured within South Africa, the respective shipping company will be able to indicate how the panels can be packed (for example using 2MW packages and 40ft containers). These can then be stored at the port and repacked onto flatbed trucks.

During operation, approximately 30 full-time employees will be stationed on site and hence vehicle trips generated will be low and will have a negligible impact on the external road network.

The developer may investigate the use of borehole water for the cleaning of the PV panels. Should rainwater or borehole water not be available or suitable, water bowsers can be used for transporting the water. It is expected that these trips will not have a significant impact on external traffic. However, to limit the impact, it is recommended to schedule these trips outside of peak traffic periods. Additionally, the provision of rainwater tanks at the site is expected to decrease the number of trips.

The above information was used in conjunction with the impacts identified in section 1.7 and the impact rating methodology to determine the impact rating of each impact.

1.6. IDENTIFICATION OF IMPACTS

1.6.1. *Identification of Potential Impacts*

The potential transport related impacts are described below.

1.6.2. *Construction Phase*

- *Potential impact 1*
  - Construction related traffic
  - The construction traffic would also lead to noise and dust pollution.
  - This phase also includes the construction of roads, excavation, trenching for electrical cables and other ancillary construction works that will temporarily generate the most traffic.

1.6.3. *Operational Phase*

It is assumed that approximately thirty (30) full-time employees will be stationed on site. The traffic generated during this phase will be minimal and will not have an impact on the surrounding road network.

1.6.4. *Decommissioning Phase*

This phase will result in the same impact as the Construction Phase as similar trips are expected.

- *Potential Impact 2*
  - Construction related traffic
  - Noise and dust pollution

1.6.5. *Cumulative impacts*

- Traffic congestion/delays on the surrounding road network.
- Noise and dust pollution.

1.7. IMPACT RATING SYSTEM

The assessment of impacts and recommendation of mitigation measures as discussed above are collated in the tables below.

Table 2: Impact Rating – Construction Phase

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 (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Construction Phase																				
Traffic Congestion	Transport of equipment, material and staff to site will lead to congestion.	2	4	1	1	1	2	18	-	Low	•Stagger component delivery to site •Reduce the construction period •The use of mobile batch plants and quarries in close proximity to the site •Staff and general trips should occur outside of peak traffic periods. •Regular maintenance of gravel roads by the Contractor during the construction phase and by Client/Facility Manager during operation phase.	1	1	1	1	1	1	5	-	Low
Dust Pollution will affect air quality.	Traffic on roads will generate dust.	2	4	1	1	1	2	18	-	Low	•Dust Suppression of gravel roads during the construction phase, as required. •Regular maintenance of gravel roads by the Contractor during the construction phase and by Client/Facility Manager during operation phase. •Staff and general trips should occur outside of peak traffic periods	1	1	1	1	1	1	5	-	Low
Noise pollution due to increased traffic.	Traffic on roads will generate noise.	2	4	1	1	1	2	18	-	Low	•Stagger component delivery to site •Reduce the construction period as far as possible •The use of mobile batch plants and quarries in close proximity to the site •Staff and general trips should occur outside of peak traffic periods	1	1	1	1	1	1	5	-	Low

Table 3: Impact Rating – Operational Phase

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 (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Operational Phase																				
The traffic generated during this phase will be negligible and will not have any impact on the surrounding road network.																				

Table 4: Impact Rating – Decommissioning Phase

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 (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Decommissioning Phase																				
This phase will have the same impact as the Construction Phase i.e. traffic congestion, air pollution and noise pollution, as similar trips/movements are expected.																				
Traffic Congestion	Transport of equipment, material and staff to site will lead to congestion.	2	4	1	1	1	2	18	-	Low	•Stagger component removal from site •Reduce the decommissioning period •Staff and general trips should occur outside of peak traffic periods. •Regular maintenance of gravel roads .	1	1	1	1	1	1	5	-	Low
Dust Pollution will affect air quality.	Traffic on roads will generate dust.	2	4	1	1	1	2	18	-	Low	•Dust Suppression of gravel roads, as required. •Regular maintenance of gravel roads □ •Staff and general trips should occur outside of peak traffic periods	1	1	1	1	1	1	5	-	Low
Noise pollution due to increased traffic.	Traffic on roads will generate noise.	2	4	1	1	1	2	18	-	Low	•Stagger component removal from site •Reduce the decommissioning period as far as possible •Staff and general trips should occur outside of peak traffic periods	1	1	1	1	1	1	5	-	Low

1.8. INPUT TO THE ENVIRONMENTAL MANAGEMENT PROGRAM

It is recommended that dust suppression and maintenance of gravel roads form part of the EMPr. This would be required during the Construction and Decommissioning phases where an increase is vehicle trips can be expected. No traffic related mitigation measures are envisaged during the Operation phase due to the negligible traffic volume generated during this phase.

Table 5: EMPr Input – Construction Phase

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	***Frequency***	***Responsibility***
A. CONSTRUCTION PHASE					
A.1. TRAFFIC IMPACTS					
Dust and noise pollution Transportation of material, components, equipment and staff to site	Minimize impacts on road network.	▪ Stagger component delivery to site ▪ The use of mobile batch plants and quarries near the site would decrease the impact on the surrounding road network ▪ Dust suppression ▪ Reduce the construction period ▪ Maintenance of gravel roads ▪ Apply for abnormal load permits prior to commencement of delivery via abnormal loads ▪ Assess the preferred route and undertake a 'dry run' to test	▪ Regular monitoring of road surface quality. ▪ Apply for required permits prior to commencement of construction	▪ Before construction commences and regularly during construction phase.	▪ Holder of the EA

		▪ Staff and general trips should occur outside of peak traffic periods as far as possible. ▪ Any low hanging overhead lines (lower than 5.1m) e.g. Eskom and Telkom lines, along the proposed routes will have to be moved to accommodate the abnormal load vehicles.			

Table 6: EMPr Input – Decommissioning Phase

Impact	**Mitigation/Management Objectives**	**Mitigation/Management Actions**	**Monitoring**		
			Methodology	***Frequency***	***Responsibility***
B. DECOMMISIONING PHASE					
A.1. TRAFFIC IMPACTS					
Dust and noise pollution	Avoid or minimize impacts on road network.	▪ Dust suppression ▪ Maintenance of gravel roads ▪ Stagger component removal from site ▪ Reduce the construction period ▪ Apply for abnormal load permits prior to commencement of work ▪ Staff and general trips should occur outside of	▪ Regular monitoring of road surface quality.	▪ Before and during the decommissioning phase.	▪ Contractor

		peak traffic periods as far as possible. ▪ Any low hanging overhead lines (lower than 5.1m) e.g. Eskom and Telkom lines, along the proposed routes will have to be moved to accommodate the abnormal load vehicles.			

1.9. CUMULATIVE IMPACT ASSESSMENT

The area has seen a notable interest from developers of various renewable energy projects, which could be associated with the wind and solar energy resource potential found in the region, as well as other factors. Such developments, whether already approved or only proposed, need to be considered together as they have the potential to create numerous cumulative impacts, whether positive or negative, if all are implemented.

To assess the cumulative impact, it was assumed that all renewable energy projects within 35km currently authorized, would be constructed at the same time. The projects are listed in the table below.

Table 7: Developments under construction and approved near the proposed development

Applicant	Project	Technology	Capacity	Status of Application / Development
Brandvalley Wind Farm (Pty Ltd	Brandvalley WEF	Wind	140MW	Approved
Biotherm Energy (Pty) Ltd	Esizayo WEF	Wind	140MW	Approved
African Clean Energy Developments Renewables	Hidden Valley (Karusa & Soetwater) WEF	Wind	140MW	Under Construction
Karreebosch Wind Farm (Pty Ltd	Kareebosch WEF	Wind	140W	Approved
Rondekop Wind Farm (Pty Ltd	Rondekop WEF	Wind	325MW	Approved
Kudusberg Wind Farm (Pty Ltd	Kudusberg WEF	Wind	325W	Approved
South Africa Mainstream Renewable Power Perdekraa West (Pty) Ltd	Perdekraal East WEF	Wind	110M	Approved
South Africa Mainstream Renewable Power Perdekraa East (Pty) Ltd	Perdekraal West WEF	Wind	150MW	Under Construction
Rietkloof Wind Farm (Pty) Ltd	Rietkloof WEF	Wind	186MW	Approved
Roggeveld Wind Power (Pty Ltd	Roggeveld WEF	Wind	140MW	Under Construction
ENERTRAG SA (Pty) Ltd	Tooverberg WEF	Wind	140MW	Approved

This is the precautionary approach as in reality these projects would be subject to a highly competitive bidding process. Only a handful of projects would be selected to enter into a power purchase agreement with Eskom, its successor or private entities and construction is likely to be staggered depending on project-specific issues.

The construction and decommissioning phases are the only significant traffic generators for renewable energy projects. The duration of these phases is short term (i.e. the impact of the generated traffic on the surrounding road network is temporary and renewable energy facilities, when operational, do not add any significant traffic to the road network). Even if all renewable energy projects within the area are constructed at the same time, the roads authority will consider all applications for abnormal loads and work with all project companies to ensure that loads on the public roads are staggered and staged to ensure that the impact will be acceptable.

The assessments of cumulative impacts are collated in the table below.

Table 8: Impact Rating – 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 (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Cumulative																				
Cumulativ effect of multiple renewable energy project constructed simultaneously	Traffic generated by the proposed development and the associated noise and dust pollution.	2	4	2	2	3	3	39	-	Medium	•Stagger component delivery to site •Dust suppression •Reduce the construction period •The use of mobile batch plants and quarries in close proximity to the site •Staff and general trips should occur outside of peak traffic periods •Even if all renewable energy projects within the area are constructed at the same time, the roads authority will consider all applications for abnormal loads and work with all project companies to ensure that loads on the public roads are staggered and staged to ensure that the impact will be acceptable.	2	3	2	2	3	2	24	-	Medium

1.10. NO-GO ALTERNATIVE

The no-go alternative implies that the proposed development does not proceed. This would mean that there will be no negative environmental impacts and no traffic impact on the surrounding network. However, this would also mean that there would be no socio-economic benefits to the surrounding communities, and it will not assist government in meeting the targets for renewable energy. **Hence, the no-go alternative is not a preferred alternative.**

On a regional scale, the no-go alternative is also not preferred. Renewable energy facilities are key to the success of South Africa's plan to build resilience against climate change. South Africa currently relies almost completely on fossil fuels as a primary energy source (approximately 72%). Coal combustion in South Africa is the main contributor to carbon dioxide emissions, which is one (1) of the main greenhouse gasses that has been linked to climate change.

An emphasis has been placed on securing South Africa's future power supply through alternative power generation sources and to honour its commitments made under the Copenhagen Accord and subsequent Paris Agreement (ratified during November 2016) to mitigate climate change challenges.

DEFF acknowledges the risks posed to South Africa by climate change confirming that "*South Africa has been experiencing the severe effects of drought conditions catalysed by the worst El Nino event in decades. The rising sea temperatures in the Pacific Ocean that resulted in increased temperatures and reduced rainfall in many parts of the world, was exacerbated by rising global temperatures associated with climate change. South African scientists and weather forecasters warn that this is what can be expected in the decades to come, if ambitious global action is not taken urgently to reduce the concentration of greenhouse gases in the atmosphere*" (DEA, 2016b).

With an increasing demand in energy predicted and growing environmental concerns about fossil fuel-based energy systems, the development of large-scale renewable energy supply schemes is important for increasing the diversity of domestic energy supplies and avoiding energy imports in the country.

Table 9: No-Go Impact Rating

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 (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
No-Go																				
None	None	1	1	1	1	1	1	5	+	Low										

1.11. COMPARATIVE ASSESSMENT OF ALTERNATIVES

1.11.1. *Comparative Assessment of Layout Alternatives*

Key

PREFERRED	The alternative will result in a low impact / reduce the impact / result in a positive impact
FAVOURABLE	The impact will be relatively insignificant
LEAST PREFERRED	The alternative will result in a high impact / increase the impact
NO PREFERENCE	The alternative will result in equal impacts

The comparative assessment of the proposed access roads has been assessed in Section 1.3. above. The construction camp, BESS, O&M building and substation alternatives have been assessed below, with the layout of the alternatives shown in **Figure 11**. All the alternatives may proceed as none are fatally flawed.

Table 10: Comparative Assessment of Construction Camp, BESS, O&M and Substation Alternatives

CONSTRUCTION CAMPS		
Six (6) construction camp alternatives were considered as follows:		
Construction Camp Alternative 1 is located to the north of the public road on the property 1/156 Gatsrivier, west of construction camp alternative 2	**NO PREFERENCE**	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable.
Construction Camp Alternative 2 is located to the north of the public road on the property 1/156 Gatsrivier, east of construction camp alternative 2, and west of construction camp alternative 3	**NO PREFERENCE**	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable.
Construction Camp Alternative 3 is located to the north of the public road on the property 1/156 Gatsrivier, east of construction camp alternative 2	**NO PREFERENCE**	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable.
Construction Camp Alternative 4 is located west of the public road next to the BESS alternative 4 on RE/155 Baakens Rivier;	**NO PREFERENCE**	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable.
Construction Camp Alternative 5 is located west of the public road next to BESS alternative 3 on RE/155 Baakens Rivier	**NO PREFERENCE**	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable.
Construction Camp Alternative 6 is located north of the public road on Re/155 Baakens Rivier.	**NO PREFERENCE**	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable.

BESS		
To reduce electrical losses, the BESS must be in close proximity to the onsite 33/132kV substation. Flat areas are preferred as it reduces the amount of levelising or stability improvements required. Four (4) BESS area alternatives were considered by the EAP and specialists as follows:		
BESS Alternative 1 is located to the north of the public road on 1/156 Gatsrivier	**NO PREFERENCE**	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable.
BESS Alternative 2 is located to the south of the public road on 1/156 Gatsrivier	**NO PREFERENCE**	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable.
BESS Alternative 3 is located to the west of the public road on re/155 Baakens Rivier	**NO PREFERENCE**	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable.
BESS Alternative 4 is located to the west of the public road on re/155 Baakens Rivier, south of alternative 3	**NO PREFERENCE**	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable.
O&M BUILDING AND SUBSTATION		
Four (4) O&M building and substation area alternatives were considered by the EAP and specialists as follows:		
O&M Building and substation Alternative 1 is located to the north of the public road on 1/156 Gatsrivier	**NO PREFERENCE**	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable.
O&M Building and substation Alternative 2 is located to the south of the public road on 1/156 Gatsrivier	**NO PREFERENCE**	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable.
O&M Building and substation Alternative 3 is located to the west of the public road on re/155 Baakens Rivier	**NO PREFERENCE**	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable.
O&M Building and substation Alternative 4 is located to the west of the public road on re/155 Baakens Rivier, south of alternative 3	**NO PREFERENCE**	There is no difference between the proposed alternatives from a Traffic perspective. All alternatives are acceptable.

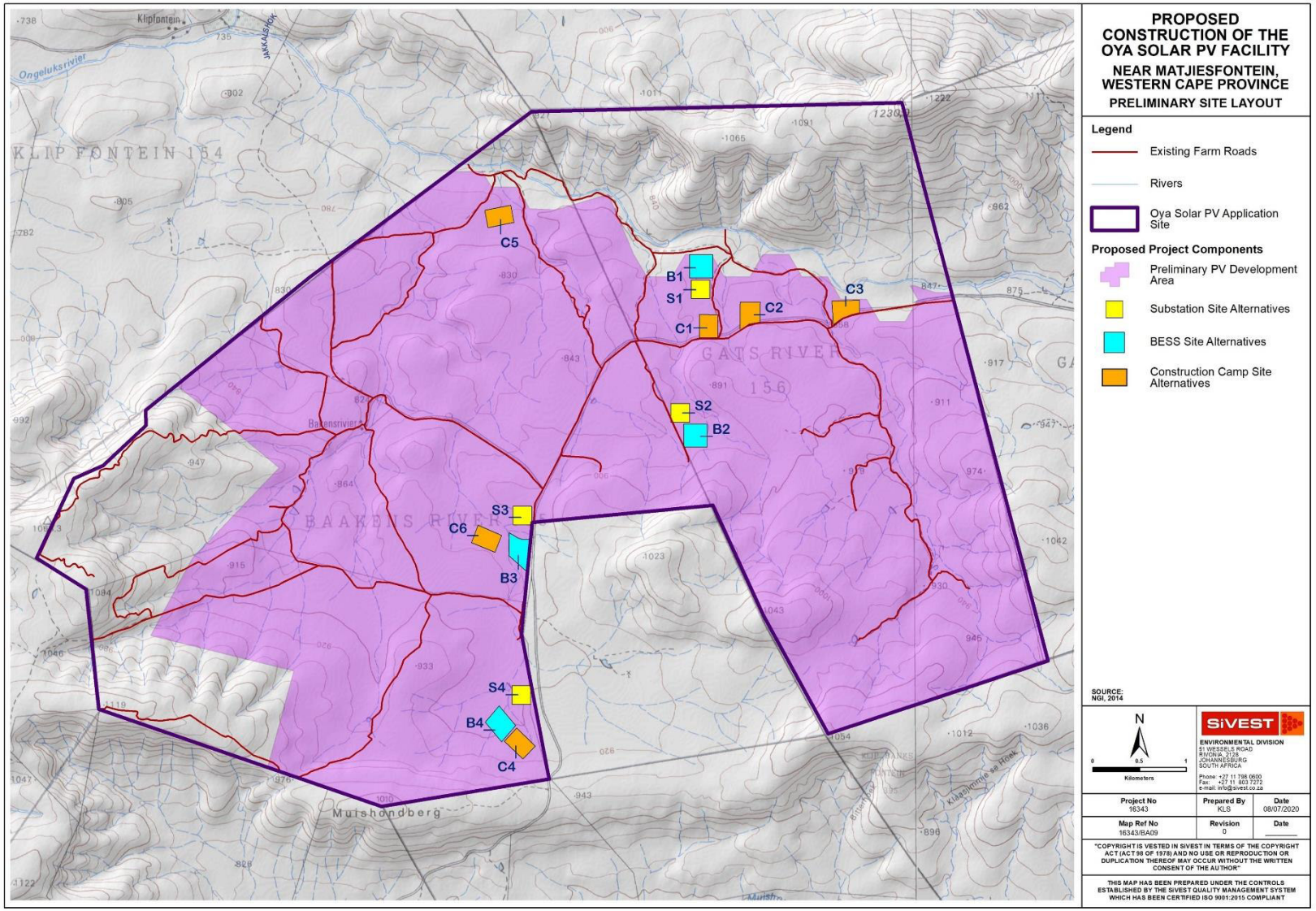

Figure 11: Construction Camp, BESS, O&M and Substation Alternatives

1.12. CONCLUSION AND RECOMMENDATIONS

As it had not been decided at the time of undertaking the transport study which manufacturers will be contracted for the solar PV components, all possible haulage routes were included into this study.

The potential transport related impacts for the construction and operation phases for the proposed development were assessed.

- The construction phase traffic, although significant, will be temporary and impacts are considered to have a **low significance**.
- During operation, it is expected that staff and security will periodically visit the facility. Approximately 30 full-time employees will be stationed on site. The traffic generated during this phase will be minimal and will not have an impact on the surrounding road network.

The potential mitigation measures mentioned in the construction phase are:

- Dust suppression
- Component delivery to/ removal from the site can be staggered and trips can be scheduled to occur outside of peak traffic periods.
- The use of mobile batch plants and quarries near the site would decrease the impact on the surrounding road network.
- Staff and general trips should occur outside of peak traffic periods.
- A “dry run” of the preferred route.
- Design and maintenance of internal roads.
- If required, any low hanging overhead lines (lower than 5.1m) e.g. Eskom and Telkom lines, along the proposed routes will have to be moved to accommodate the abnormal load vehicles.

The construction and decommissioning phases of a development are the only significant traffic generators and therefore noise and dust pollution will be higher during these phases. The duration of the phases is short term, i.e. the impact of the traffic on the surrounding road network is temporary and solar energy facilities, when operational, do not add any significant traffic to the road network.

The gravel road linking to the R356 is deemed the preferred access route as it is an existing gravel road and allows direct access to the proposed site. It furthermore makes sense, from an access management point of view, that the proposed neighbouring facilities share an access route to limit the number of accesses along the gravel road.

The development is supported from a transport perspective provided that the recommendations and mitigations contained in this report are adhered to.

The impacts associated with the proposed development are acceptable with the implementation of the recommended mitigation measures and can therefore be authorised.

1.13. REFERENCES

- Google Earth Pro
- SANS 10280/NRS 041-1:2008 - Overhead Power Lines for Conditions Prevailing in South Africa
- Road Safety Act (Act No. 93 of 1996)
- The Technical Recommendations for Highways (TRH 11): “Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads
- S Gouws: “Concrete Towers – a business case for sustained local investment”, Concrete growth, www.slideshare.net/SantieGouws/concrete-towers-a-business-case-for-sustained-investmentrev-5