Appendix 6I
Transportation Assessment

SiVEST SA (Pty) Ltd
P.O. Box 2921
Rivonia
Johannesburg
2128

Your reference: 15324_TIA_Rev 0
Our reference:
Date: 2nd December 2019

ATTENTION: MERCHANDT LE MAITRE

Dear Sir

PEER REVIEW OF THE PROPOSED CONSTRUCTION OF THREE (3) SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITIES NEAR NOUPOORT & MIDDELBURG IN THE NORTHERN & EASTERN CAPE PROVINCES – TRANSPORTATION IMPACT ASSESSMENT REPORT (15324-REV 0)

1. Introduction

SiVEST (Pty) Ltd. has been appointed to undertake the following:

- Three (3) separate Environmental Impact Assessments (EIA) for the proposed construction of the Umsobomvu Solar PV Energy Facilities.

As part of the Environmental Authorisation (EA) process, a Transportation Impact Assessment (TIA) is required. As SiVEST is the primary Environmental Assessment Practitioner (EAP) for the environmental assessments and the TIA, SiVEST requested Mr Arnold Bell to undertake an external peer review of the TIA.

This letter therefore constitutes the independent peer review conducted by the reviewer of the TIA prepared by SiVEST for the Umsobomvu Solar PV Energy Facilities.

The following reports were peer reviewed:

- Transportation Impact Assessment for the 'Proposed Construction of Three Energy Facilities near Noupoort & Middelburg in the Northern & Eastern Cape Provinces' (**SiVEST Report: 15324_ Umsobomvu Solar PV Energy Facilities _ Rev 3_Dated 19th March 2019)**

2. Summary of Review

The focus of the review is primarily on the content of the SiVEST TIA report and not on formatting or grammatical errors, although some recommendations for grammatical review were provided.

The peer reviewer addresses the following points:

2.1 The peer reviewer must be qualified to undertake the review, a CV must be provided;

(a) **Reviewer's Response – CV is attached as Appendix A.**

2.2 Determine if the 'Terms of Reference' is acceptable;

(a) **Reviewer's Response – The 'Terms of Reference' is considered acceptable.**

2.3 Determine if the methodology is clearly explained and acceptable;

(a) **Reviewer's Response – The methodology and assumptions are clearly outlined and are considered acceptable.**

2.4 Determine the findings and validity of these findings;

(a) **Reviewer's Response – The findings are considered valid.**

2.5 Determine if the mitigation measures described address the short comings;

(a) **Reviewer's Response – The mitigation measures described are acceptable. Additional mitigation measures have been recommended in the peer-reviewed text.**

2.6 Evaluate the appropriateness of the reference literature;

(a) **Reviewer's Response – The reference literature is considered appropriate.**

2.7 Indicate if a site-inspection was carried out; and

(a) **Reviewer's Response – No site visit was undertaken for the peer review.**

2.8 Indicate if the article was well-written and easy to understand.

(a) **Reviewer's Response – The report supplied to Reviewer (as specified in Section 1) are considered well written and easy to understand.**

The Reviewer's review was guided by the 'National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) EIA Regulations, 2014 (as amended) Government Notice (GN) R982 of 04 December 2014, whereby all specialist studies undertaken as part of an EIA, are required to comply with Appendix 6 of the Notice.

Table 1 overleaf summarises the legal requirements for specialist studies and provides an indication of the relevant section of the reviewed TIA reports which comply with the requirement.

The Reviewer is of the opinion that the TIA Reports compiled by SiVEST are fair and that the methodology used was transparent and well stated.

Table 1: Legal Requirements for Specialist Studies

National Environmental Management Act, 1998 (Act No. 107 of 1998) and Environmental Impact Regulations 2014 (as amended) Requirements for Specialist Reports (Appendix 6)			
Section in EIA Regulations 2014 (as amended)		**Clause**	**Section in Report**
Appendix 6	(1)	A specialist report prepared in terms of these Regulations must contain —	
	(a)	details of –	
		(i) the specialist who prepared the report; and	Section 4
		(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae.	Section 4
	(b)	A declaration that the person 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 3
	(cA)	An indication of the quality and age of base data used for the specialist report;	Section 6
	(cB)	A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 8, 9 & 11
	(d)	The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 3
	(e)	A description of the methodology adopted in preparing the report or carrying out the specialised process; inclusive of equipment and modelling used;	Section 3
	(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 6
	(g)	An indication of any areas to be avoided, including buffers;	Section 9
	(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;	Section 5

	(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 8 & 9
	(k)	Any mitigation measures for inclusion in the EMPr;	Section 11
	(l)	Any conditions for inclusion in the environmental authorization;	Section 11
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		(i) as to whether the proposed activity, activities or portions thereof should be authorized;	Section 14
		(iA) regarding the acceptability of the proposed activity or activities; and	Section 14
		(ii) if the opinion is that the proposed activity, activities or portions thereof should be authorized, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Section 14
	(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 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

Should you have any queries or comments regarding the peer review, please do not hesitate to contact Mr. Arnold Bell at 082 774 6216.

Yours faithfully,

Arnold Bell
Civil Engineer

APPENDIX A: PEER REVIEWER CV

CURRICULUM VITAE

Name	Robert Arnold Bell
Profession	Civil / Structural Engineer
Name of Firm	Bell Consulting
Present Appointment	Consultant Civil and Structural Engineer:
Years with Firm	2 Years
Date of Birth	29 August 1946
ID No.	4608295036103
Nationality	British

Professional Qualification

Pr. Eng. (760381), C Eng. BSc (Hons.) (UK)

Memberships to Professional Societies

Member of the South African Institute of Civil Engineers (MSAICE)
Member of the Institute of Civil Engineers (MICE)

Employment Record

2016 – 2018	Bell Consulting – Consultant Civil and Structural Engineer
2010 – 2016	SiVEST SA (Pty) Ltd – Consultant Civil and Structural Engineer
1998 – 2010	SiVEST SA (Pty) Ltd – Director
1992 – 1997	SBi (Formerly Shepherd & Shepherd) - Director
1973 – 1992	Shepherd & Shepherd Inc Consulting Engineers – Associate (1976) Director (1980)
1973	University of Strathclyde (Scotland) where he completed a BSc (Hons) degree in Civil Engineering in 1973.
1966	Lanarkshire County Council and later Glasgow City Engineers Department- Civil Engineering Technician

Language Proficiency

LANGUAGE	SPEAK	READ	WRITE
English	Fluent	Fluent	Fluent

Key Experience

Arnold is a registered professional engineer with over 40 years of experience in the engineering field. Arnold specialises in civil design, and project and construction management of extensive infrastructure installation for industrial and commercial facilities, as well as civil works associated with various types of process plants including extensive rail sidings pertaining thereto.

Projects undertaken have included roads and services to residential and industrial townships, rail designs, overland pressure pipelines handling slurry, thickener tanks, pump stations, retaining walls for mine surface operations, surface infrastructure and structures for gold and diamond mines (DK1 Diamond mine, Botswana and Vaal Reef Gold Mine), sugar factory and plantation facilities, sewage

treatment plants, mine hostel complexes, primary and secondary schools, industrial warehouses and factories.

Although retired as a Shareholder and Director of SiVEST in 2010, he is retained as an independent external Consultant to SiVEST and appointed on various assignments as they arise.

Arnold has in the past been an examiner for the professional examination for The Institution of Civil Engineers and, was involved in the examination of a number of candidates from 1985 to 1990.

Projects Experience

- From May 2012 to January 2014 Arnold was appointed as the Construction Manager on a new Seed Oil Plant in Standerton Mpumalanga. He was responsible for all aspects of the plant from civil works through mechanical, piping and electrical work. As such he had a team of 10 site staff consisting of civil, mechanical and electrical engineers as well as contracts administrator and quantity surveyors. The Oil Plant is a 2000 crushed tonnes/day soya and sunflower plant which was commissioned during September and October 2013.

- In March 2011 Arnold was appointed as the Project Leader on a new “green fields” Sugar Mill and Ethanol Plant for Illovo Sugar in Mali. The project not only consisted of a 320 tonnes cane per hour Sugar Mill and 50,000 litre per day Ethanol Plant but also the associated agricultural requirements consisting of the planting of 14153 hectares of cane with associated irrigation canals, pump stations and centre pivots.

- From February 2010 to August 2010 he has been a Project Manager on certain upgrades and new capital works necessary during the “Off Crop” at Hippo Valley Estates Sugar Mill, Chiredzi Zimbabwe where the emphasis was on timeous procurement to meet the project requirements. In addition the structural upgrade of Diffuser Number 1 was undertaken.

- From June 2008 to November 2008 he was also called upon to act as resident engineer for the structural work to a R1.4 Billion upgrade to a sugar mill at Mazabuka in Zambia for Zambia Sugar.

- Project Manager of a large "green fields" Ferrochrome Smelting Plant in the Eastern Transvaal responsible for all civil and structural aspects of the project.

- Project Civil Engineer on a multi million-rand Continuous Annealing Line for Iscor at Vanderbijlpark South Africa. Prior to commencement of design he was a member of the Civil Management Team, who visited Japan to inspect similar facilities with a view to effecting construction savings and improving the construction programme.

ON BEHALF OF SIVEST ENVIRONMENTAL DIVISION

UMSOBOMVU SOLAR PV ENERGY FACILITIES

Transportation Impact Assessment

Issue Date: 19th March 2019
Revision No: 4
Project No: 15324

Date:	7th November 2019	
Document Title:	UMSOBOMVU SOLAR PV ENERGY FACILITIES – Transportation Impact Assessment	
Revision Number:	4	
Author:	Merchandt Le Maitre (Pr Tech Eng.)	
Signature: Pr N°: 2018300094		Date: 7th November 2019
Reviewed:	Richard Hirst (Pr Tech Eng.)	
Signature: Pr N°: 2018300110		Date: 7th November 2019
External Review:	Arnold Bell (Pr Eng.)	
Signature:  Pr N°: 760831		Date: 7th November 2019
For:	SIVEST ENVIRONMENTAL DIVISION	
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LIST OF TABLES

LIST OF FIGURES

1 INTRODUCTION

SiVEST Environmental Division was appointed to complete three separate Environmental Impact Assessments (EIA) for each of their proposed developments. It is their intention to construct Solar PV facilities on the following farms: -

- Mooi Plaats Solar PV Facility
    - Portion 1 of the farm LEUWE KOP No. 120
    - Remainder of the farm MOOI PLAATS No. 121

- Wonder Heuvel Solar PV Facility
    - Remainder of the farm MOOI PLAATS No. 121
    - Portion 3 of the farm WONDER HEUVEL No. 140
    - Portion 5 of the farm HOLLE FONTEIN No. 133

- Paarde Valley Solar PV Facility
    - Portion 2 of the farm PAARDE VALLEY No. 62
    - Portion 7 of the Farm LEEUW HOEK No. 61

The locality of the study area is shown in Figure 1:1 below.

The proposed development on the above farms will form part of the South African Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) and will comprise a total of three new Solar Photovoltaic (PV) Energy Facilities with a total proposed generation capacity of up to 1 580MW. The project is not located within any pre-defined or approved 'Renewable Energy Development Zone', and therefore in terms of the National Environmental Management Act, 1998 (NEMA) an Environmental Impact Assessment (EIA) will need to be completed in order to understand the impact of the proposed development on the environment.

We note that subsequent to discussions with the Department of Environmental Affairs (DEA), it was confirmed that only one scoping report and one impact phasing report will be required from each specialist and hence must cover all three developments. Each development will however require a separate chapter / section within the report outlining the impact of each proposed development.

Therefore, forming part of the EIA will be a Transportation Impact Assessment outlining the impact /s, the additional Traffic generated on the environment as a result of each development.

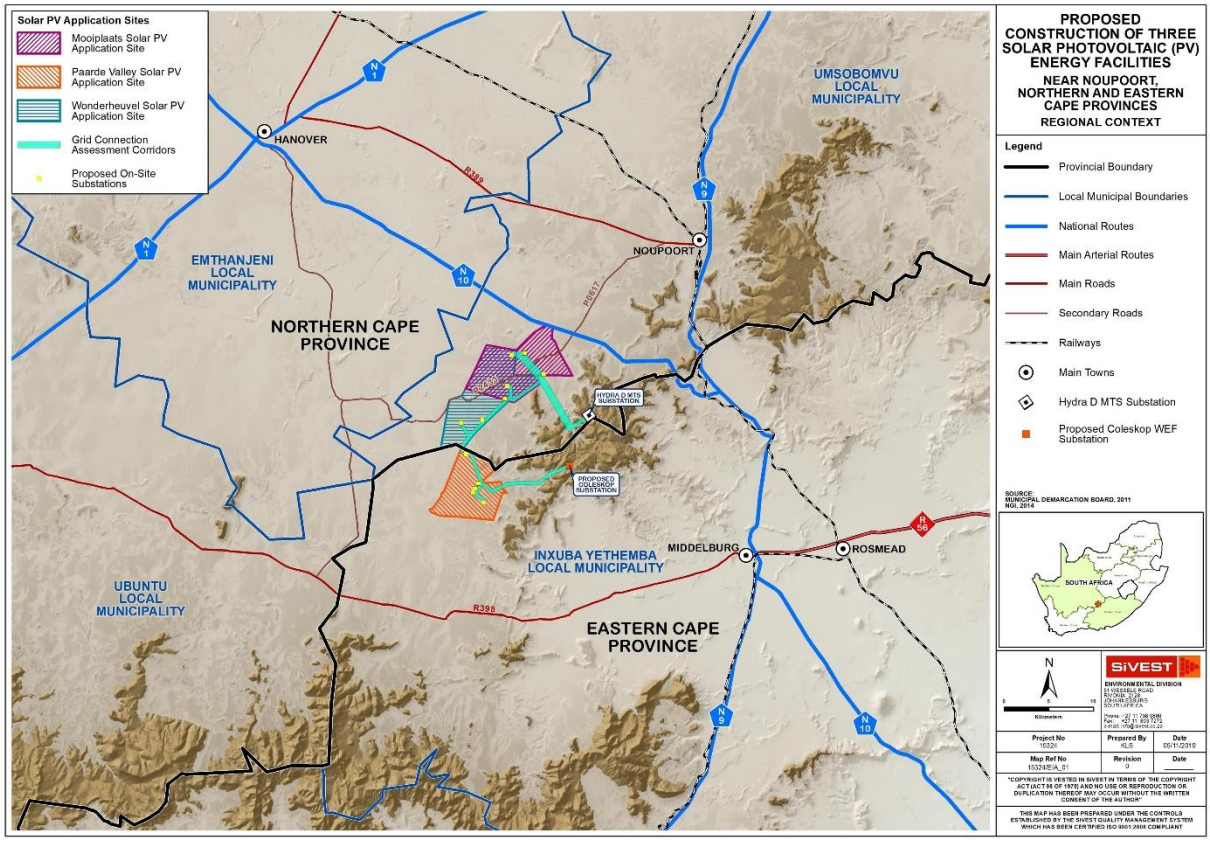

Figure 1:1 Locality Plan

2 PROJECT DESCRIPTION

The Mooi Plaats and Wonder Heuvel Solar PV Energy Facilities are located in the Northern Cape Province of South Africa, and more specifically in the Umsobomvu Local Municipality district, whilst the Paarde Valley Solar PV Energy Facility is located in the Eastern Cape Province and within the Inxuba Local Municipality district as shown in Figure 1:1 above. The development is located ±33km north west of Middelburg and ±30km south west of Noupoort and covers a combined area of ±10 629ha.

The three Solar PV facilities will include PV fields (arrays) comprising multiple PV modules. The number of modules, the generation capacity of each facility and the layout of the arrays will be dependent on the outcome of the specialist studies conducted during the EIA process.

Forming part of this assessment will be the respective Grid Connection Infrastructure for each of the PV Energy Facilities.

3 OBJECTIVES AND SCOPE OF WORK

The main objective of the 'Transportation Impact Assessment' is to determine the impact/s of the proposed development on the area with respect to transportation. The assessment will comprise of a desktop assessment and will include preliminary transportation related matters arising during the construction phase, through the Operation & Maintenance Phase, up to and

including the decommissioning phase of the development. The assessment of these phases, will take into account the transportation of normal and abnormal vehicles, which are made up of *inter alia*; - PV components, construction materials, equipment, construction workers and employees.

The scope of works consist of the following:

- A site investigation which was completed between the 6 – 8th February 2019
- Consultations with the relevant authorities and / or stakeholders which includes the collection of traffic data and information.
- Desktop analysis of traffic data and information from the various authorities and / or stakeholders. Analysis to include the evaluation of the capacity of the road network (if required)
- Evaluate the impact of the proposed development on the existing road network / traffic volumes and populating of a suitable 'Impact Rating System'
- Determine specific traffic needs during the different phases of implementation.
- Conclude & propose possible mitigation measures
- Identify the position and suitability of the preferred access road alternatives.
- Confirm the associated clearances required for the necessary equipment to be transported from the point of delivery to the various sites.
- Confirm freight and transport requirements during construction, operation and maintenance period.
- Propose origins and destinations of equipment
- Determine Abnormal load requirements (if any)
- Seasonal impacts do not affect the assessment.

4 SPECIALIST CREDENTIALS

We confirm this Transportation Impact Assessment has been compiled by Mr. Merchandt Le Maitre from SiVEST Consulting Engineers. He has a B Tech (Baccalaureus Technologiae) in Civil Engineering with over 13 years of experience in this field. He is registered as a Pr. Tech Eng (Professional Engineering Technician) with the Engineering Council of South (ECSA) and is a corporate member of the South African Institute of Civil Engineers (SAICE). A full Curriculum Vitae is included in 'Appendix A'

5 ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations are to be noted:

- Based on the information provided by the client for assessment purposes, a maximum number of 2 000 000 PV modules will be constructed on each of the Energy Facilities in a continuous sequence from the intended construction start date.
- PV modules will be either fixed tilt mounting or single access tracking mounting, while the modules will either be crystalline silicone or thin film technology. However, for this report it was assumed that 'fixed tilt axis' mounting systems would be used as it would have the greatest impact on the development.
- Individual PV modules dimension will be ±1m x ±2m, whilst each PV column will be ±2m wide and 1 - 4m high, dependent on the type of mounting system.

- A preliminary program of between 18 – 24 months is envisaged for the construction to be completed. Therefore, for the purpose of this assessment we have assumed the following;
    - Site Establishment & construction of Roads, Laydown Areas: 5 Months
    - Erection of PV frames and PV modules: 24 Months
    - Construction Operation & Maintenance Buildings: 24 Months
    - Electrical Cabling and Switching Stations: 24 Months
- Access road width: 8m
- Internal roads width: 4 – 10m
- 6 Day work week: Monday – Saturday
- PV Energy Facility Lifespan: 20 years
- Adjacent to this proposed development is the proposed Umsobomvu Wind Energy Farm (WEF) for which a route assessment report was completed by Messrs. AECOM SA (Pty) Ltd in 2016. We anticipate the adjacent WEF will in all likelihood use the same access point from the N10 freeway as this development and therefore extracts of their assessment report was used in this report.
  The WEF assessment report used the Port of Ngqura, ±20km north east of Port Elizabeth as the point of origin for the delivery of WEF components. The most suitable route identified was to travel north west on the N10 freeway towards Middelburg where it will continue north on the N9 freeway towards Noupoort and ultimately continue west again on the N10 towards Richmond where the access point is located at Km19.92. In addition, the report indicates Abnormal vehicles and WEF components of less than 4.8m in height will be able to use this route, they do however recommend that a formal route assessment report be completed by a reputable contractor prior to the works commencing.
- This assessment is limited to the impacts the development traffic will have on the network and not on the wider impacts known as background traffic. Such impacts can only be addressed in a detailed Traffic Impact Study which takes into account actual traffic counts undertaken during the peak periods.
- The information provided in this report is an informed estimate. Construction related traffic may however vary and be different to the information provided during construction phases as a result of supplier delivery schedule changes.

6 EXISTING TRAFFIC CONDITIONS

6.1 Roads affected by the Umsobomvu PV Energy Facility

Road Name	Road Number	Description	Distance (±km)
Umsobomvu			
Leeupoort Road	DR2433	N10 to Paarde Valley Access Rd	21
Paarde Valley Access Rd		Leeupoort Rd to Access	9

Noupoort Road	MR0617	N10 to R389 Jct.	14
Noupoort Road	MR0617	R389 Jct to Noupoort	6
N10 Freeway	N10	N1 (Hanover) Jct to N9 (Noupoort-Middelburg) Jct.	62
N9 Freeway	N10	Middelburg to Noupoort	40
		TOTAL	**152**

Table 6:1 Roads Affected by Umsobomvu PV Energy Facility

6.2 Traffic Counts (Pre-Development)

The South African National Roads Agency Limited (SANRAL) has vehicle counting stations in the area which can be used in this report.

Traffic Counting Stations			
Counting Station	**Road Name**	**Period**	**Permanent or Temporary**
Hanover East (1477)	N10	1st Jan 2018 – 31st Dec 2018	Permanent
NR00907 / NR01005 (2733)	N9	1st Jan 2008 – 31st Dec 2013	Temporary

Table 6:2 Traffic Counting Stations

In order to get a better understanding of when the peak periods are applicable in the area, the data obtained from counting station N° 1477 on the N10 in Table 6:2 was compared to manual counts complete on the 7th February 2019 at the Leeupoort / Noupoort intersection located at Km 19.92 on section N10-5.

The comparison is as follows;

Traffic Station Data / Counts								
	To N9 Middelburg				To N1 Hanover			
	Average Daily Traffic (ADT)	Average Hourly Traffic	Average Daily Truck Traffic (ADTT)	Average Hourly Truck Traffic	Average Daily Traffic (ADT)	Average Hourly Traffic	Average Daily Truck Traffic (ADTT)	Average Hourly Truck Traffic
N10 @ HANOVER EAST (No 1477)								
Average Daily	282	12	136	6	145	12	145	7
N10 @ LEEUPOORT / NOUPOORT INT.								
Morning 7:00-8:00		12		4		21		17
Afternoon 16:00-17:00		18		8		14		8

Table 6:3 Traffic Station Data / Counts

From the table above it is evidently that the average daily usage of the roads in the area is low. In addition, the morning and afternoon periods does have a slightly higher trip rate, compared to the average daily and therefore cognisance of this increase should be taken into account when additional traffic is generated and added to the existing road network.

7 ADDITIONAL TRAFFIC GENERATION

Please take note that each phase of the development indicated below is per Facility and in this development there are three separate Facilities. Each phase is therefore as follows:

7.1 Construction Phase

The construction phase will typically generate the highest number of trips for the proposed development. Construction will typically involve access roads, foundations, PV module, electrical cables / transformers / switch gears / substation installations and the delivery of these materials / equipment on the public road network. A table has therefore been populated, under each phase, which indicates the estimated traffic generated for each of these phases.

It is assumed that no staff or labour will reside on the construction site, other than security, and therefore all will reside in nearby towns of Noupoort or Middelburg or alternatively be accommodated in nearby hostels.

Therefore, in order to calculate the number of trips the Facility will generate, a table has been populated in which the estimated number of construction staff and labour will commute to each Facility. This table is as follows;

Labour Requirements per Facility				
Type of Construction	**Technical Staff**	**Skilled Labour**	**Unskilled Labour**	**TOTAL**
Site Establishment	5	5	24	**34**
Vehicle Trips / Day (Only Site Establishment)	**5**	**2**	**2**	**9**
Internal Access Roads	4	4	18	**26**
O & M Buildings	4	14	56	**74**
PV Module & Frame	4	38	135	**177**
Electrical Installation	4	28	63	**95**
Totals (Excl. Site Establishment)	**16**	**84**	**272**	**372**
Vehicle Trips / Day	**16**	**21**	**6**	**43**

Table 7:1 Construction Phase per Facility – Labour

The following assumptions were made when the table above was populated:

- Assume that all ‘Unskilled Labour’ will fit into 6 buses and commute to site. (50 Seater)
- Assumed that all ‘Skilled Labour’ will fit 4 people into a vehicle to site.
- Assumed that all ‘Technical Staff’ will commute singularly in their own vehicle to site.

From the table above, during the construction phase ±43 vehicle trips will commute at the peak of the construction phase transporting staff and labour. Typically, these trips will be in the morning between 6:00 – 7:00 and in the afternoons between 16:00 – 17:00.

7.1.1 Construction Traffic

The table below summarizes the different types of construction elements this project will typically involve. The trips were based on labour commuting as per Table 7:1 and the remainder of the construction traffic refers to the table in 'Appendix C'.

Vehicle Trips							
Type of Construction	**Month (Period)**						**Origin**
	1	**2-12**	**13-19**	**20-24**	**25**	**25-240**	
Site Establishment	10				10		Noupoort / Middelburg
Transportation of Plant	1				1		Gauteng / Cape Town
Labour Transport		43	31	31			Noupoort / Middelburg
Internal Access Roads		13					Local
O & M Buildings		1	1				Gauteng / Cape Town
PV Module & Frame		10	10				Ngqura Port
Electrical Systems		1					Gauteng / Ngqura / Cape Town
Trips/Day for period	**11**	**68**	**42**	**31**	**11**		

Table 7:2 Total Construction Traffic per Facility

Please take note that the vehicle trips above is excluding the trips generated from the delivery of abnormal loads and has therefore been included in Section 7.1.2.

From the table above it can be seen that an additional ±68 vehicle trips / day / facility will be added on the existing public road network in the study area during the peak of construction between months 2-12 of the construction program. Of the 68 vehicle trips / day / facility, 43 vehicle trips are for the transportation of labour as mentioned in the previous section. The remainder of the 25 vehicle trips / day will typically occur during the 'weekday midday' and equates to ±4 vehicle trips / hour.

7.1.2 Abnormal Loads

Abnormal loads are described as loads that for all practical purposes cannot be transported on a vehicle or vehicles without exceeding the limitations as described in the 'National Road Traffic Regulations' of 2000.These vehicles exceed the limitations as a result of one of the following;

- Dimension Abnormality
    - Length
    - Width
    - Height
    - Overhangs
    - Load Projections
    - Wheelbase
- Mass Abnormality

The transportation of abnormal loads from its origin to the proposed development has been assumed to be primarily from three areas; - Gauteng, Cape Town & the Port of Ngqura. Therefore, for the purpose of this assessment it has been assumed all electrical transformers and switch gear etc, will be from the ships berth at the Port of Ngqura. The other will be the transportation of site establishment equipment in the form of construction equipment and offices from Gauteng and Cape Town. Examples of the transportation methods for the offices (Figure 7:1) and construction equipment (Figure 7:2) have been included below.

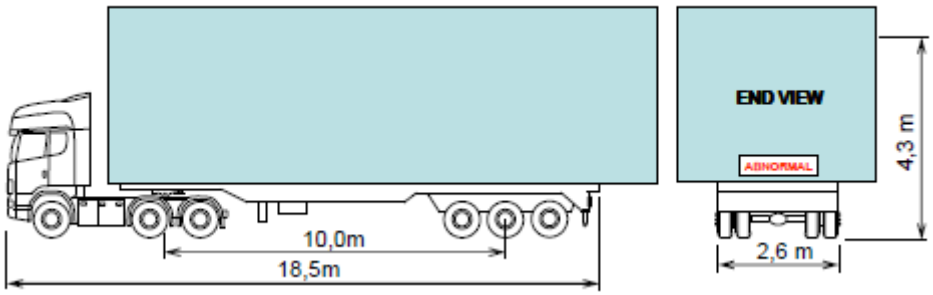

Figure 7:1 Abnormal Load on Legal Combination

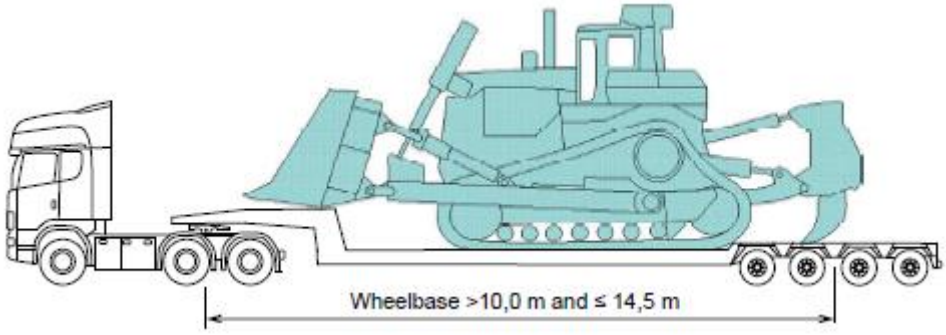

Figure 7:2 Abnormal Load on a Long Wheelbase Trailer

The Geometric clearance requirements, associated with these abnormal load transporting the equipment types are shown in Table 7:3.

Indicative dimensions of the abnormal loads will be as follows;

Abnormal Load Dimensions			
Load to be Transported	**Typical Dimensions (Max)**		
	Length (m)	**Width (m)**	**Height (m)**
Transformers & Switch Gear	27	4.5	4.5
Construction Equipment	13	4.0	4.5

Table 7:3 Abnormal Load Dimensions

Prior to any Abnormal Loads conveying equipment to the development, approval needs to be obtained in the form of a permit from the Department of Transport (DoT). The permit application will be completed by specialists in the transportation of Abnormal loads and will conform to 'The Road Traffic Act, 1996 (Act No 93 of 1996)'. The application includes route clearances from Telkom and Eskom after which the application is submitted to DoT who intern consults with the SANRAL, Provincial Authorities and Local Municipalities prior to issuing a permit.

7.2 Operation & Maintenance Phase (O & M)

The Umsobomvu PV Energy Facility has been designed for a 20 year lifespan and could possibly be increased if financially viable. The operation & maintenance during the 20 year period will typically be in the form of small general maintenance during the operational period. Any maintenance which will require inter alia new PV modules, cables, transformers or switch gear will classify as normal or abnormal loads dependant on the type of load, and the traffic generated by this will be negligible in the greater scheme of the development. The largest contributor of traffic in this phase will therefore only comprise of employees commuting to and from the site.

Based on the information provided, a maximum number of 42 employees will be employed during the 20 year life span of the project. It is therefore assumed that the employees will commute together and hence a total of an additional 11 trips / day will be generated during this period onto the existing road network. In addition to the staff commuting will be the collection of waste and sanitation. These are assumed to generate an additional 2 vehicles / week onto the existing road network.

7.3 Decommissioning Phase

Decommissioning of the Umsobomvu PV Energy Facility will generate considerably less trips than the construction phase. It is estimated that the decommissioning phase will generate an additional ± 10 vehicles / day over a period of 12 – 18 months. The material removed will be transported back to Gauteng or the Port of Ngqura for recycling.

8 ADDITIONAL TRAFFIC EVALUATION / ASSESSMENT

For the purposes of this assessment, we have assumed that the Umsobomvu PV Energy Facility will gain access from the existing intersection on the N10 freeway between Middelburg / Noupoort and Hanover. This intersection is located at Km19.92 on section N10-5 and consists of a priority controlled intersection. The roads at this intersection is as follows; north bound to Noupoort the P0617, east bound on the N10 towards Middleburg / Noupoort, south bound on the DR2433 towards Leeupoort and west bound the N10 towards Hanover.

The intersection consists of bitumen sealed surface with single lanes and surfaced shoulders in both directions. No turning lanes has been provided for each of the intersecting roads. Both the north and south bound roads of this intersection are gravel roads shortly after leaving the road reserve of the N10 freeway. A sketch of the existing intersection is indicated on Figure 8:1.

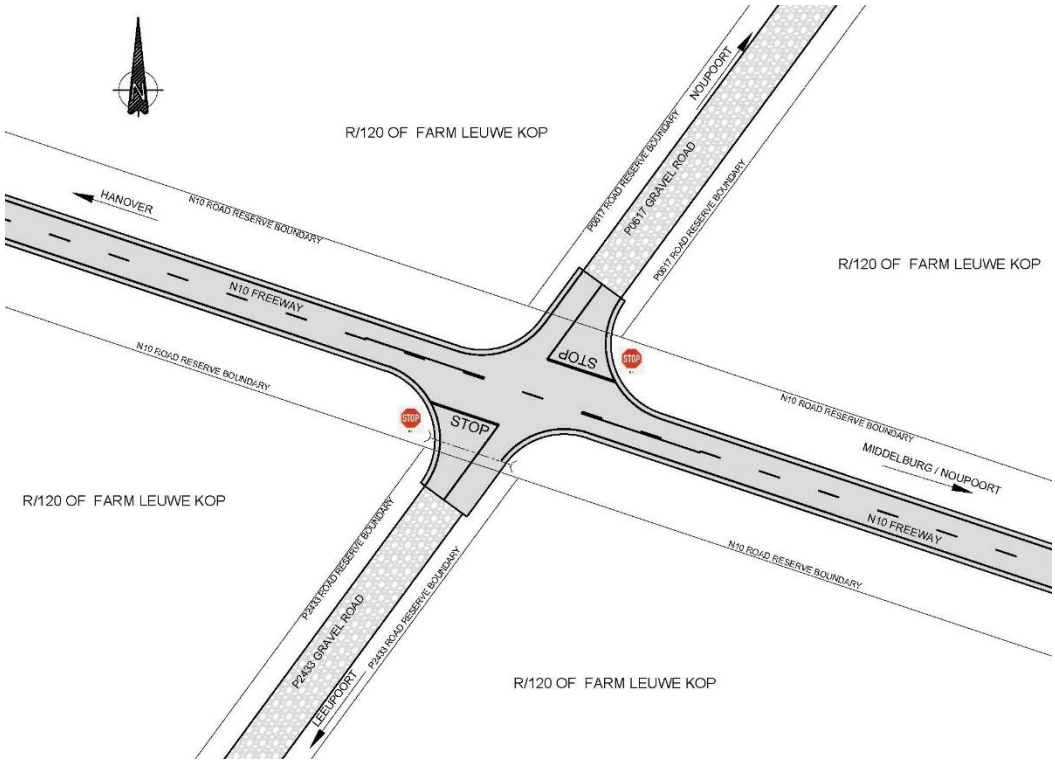

Figure 8:1 Current Access Configuration on the N10 Freeway

Please take note that each phase of the development indicated below is per Facility and in this development there are three separate Facilities. Each phase is therefore as follows:

8.1 Construction Phase

Based on the traffic generation calculated in Section 7 above, an additional ±68 vehicle trips / day will be added onto the existing public road network during the peak of construction between months 2-12 of the construction program. Of the 68 vehicle trips / day, 43 vehicle trips are for the transportation of labour and will typically be in the morning between 6:00 – 7:00 and in the afternoons between 16:00 – 17:00. The remainder of the 25 vehicle trips / day will typically occur during the 'weekday midday' and equates to ±4 vehicle trips / hour.

Therefore, in accordance with 'TMH 16 Volume 1' the warrant to complete a comprehensive 'Traffic Impact Assessment' will not be required due to the fact that the proposed development will generate less than 50 peak hour trips. We do however recommend that the intersection be discussed with SANRAL and the appropriate auxiliary lanes and speed reduction measures be implemented as per Figure 8:2 when the construction program of this development and its facilities, in addition to the adjacent developments are known.

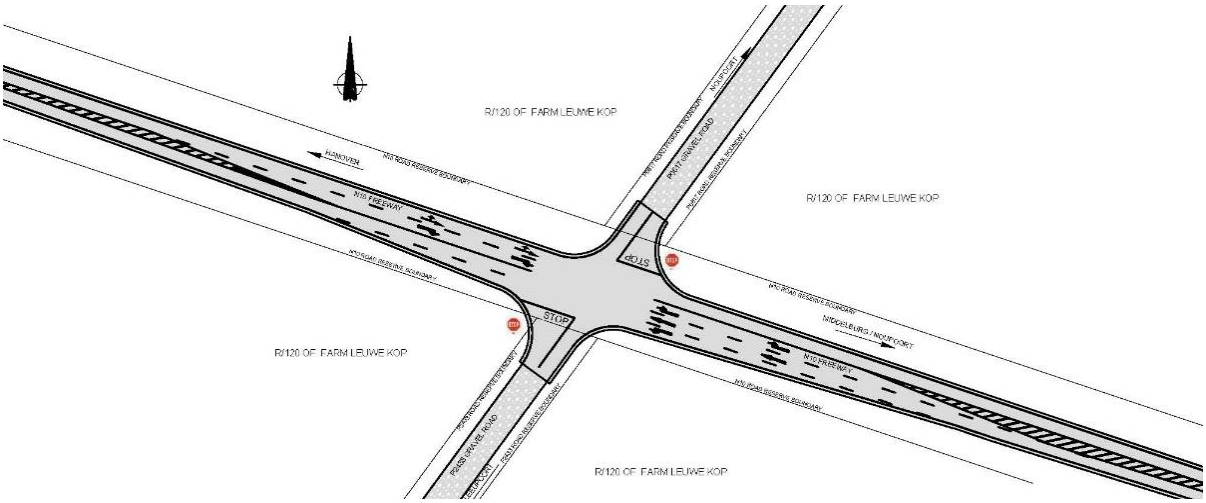

Figure 8:2 Proposed Upgrade of N10 Access

The specific traffic needs this phase of the development will have on the environment includes, inter alia; the following: -

- Upgrades of existing intersections
- Reduction in vehicle speed
- Adequate law enforcement
- Implementation of pedestrian safety initiatives
- Regular maintenance of farm fence, access cattle grids.
- Adequate road signage as per the South African Road Traffic Sign Manual (SARTSM) latest edition.
- Continuous engagement with SANRAL, Northern Cape Department of Roads and Public Works and the Eastern Cape Department of Roads and Public Works.

Each PV facilities development access will be covered under their respective heading in Section 9 below.

8.2 Operation & Maintenance Phase (O & M)

From the information above it is therefore assumed that the employees will commute together and hence a total of 11 trips / day additional will be generated during this period onto the existing road network. In addition to the staff commuting will be the collection of waste and sanitation. These are assumed to generate an additional 2 vehicles / week onto the existing road network and therefore the sum of this phase will have a low to negligible impact.

The specific traffic needs this phase of the development will have on the environment is inter alia;

- Reduction in vehicle speed
- Adequate law enforcement
- Implementation of pedestrian safety initiatives
- Regular maintenance of farm fence, access cattle grids.
- Adequate road signage as per the South African Road Traffic Sign Manual (SARTSM) latest edition.
- Continuous engagement with SANRAL, Northern Cape Department of Roads and Public Works and the Eastern Cape Department of Roads and Public Works.

8.3 Decommissioning Phase

An additional ± 10 vehicles / day over a period of 12 – 18 months will be generated. The material removed will be transported back to Gauteng or the Port of Ngqura for recycling. The impact of this phase will therefore be low.

The specific traffic needs this phase of the development will have on the environment is inter alia;

- Reduction in vehicle speed
- Adequate law enforcement
- Use of dust suppressant techniques.
- Implementation of pedestrian safety initiatives
- Adequate road signage as per the South African Road Traffic Sign Manual (SARTSM) latest edition.
- Continuous engagement with SANRAL, Northern Cape Department of Roads and Public Works and the Eastern Cape Department of Roads and Public Works.

9 ACCESS ROADS & INTERNAL ROADS

The ‘Umsobomvu Solar PV Energy Facility’ development will gain access from the N10 freeway via the district road DR2433 which is currently a gravel road. It is the intention for each respective PV Facility to have separate, individual access points to their respective developments from the DR2433.

The district road DR2433 is a ‘Proclaimed District Road’ extending from the N10 freeway up to and including the DR2424 district road. Each Solar PV Facility and their respective access points is highlighted below;

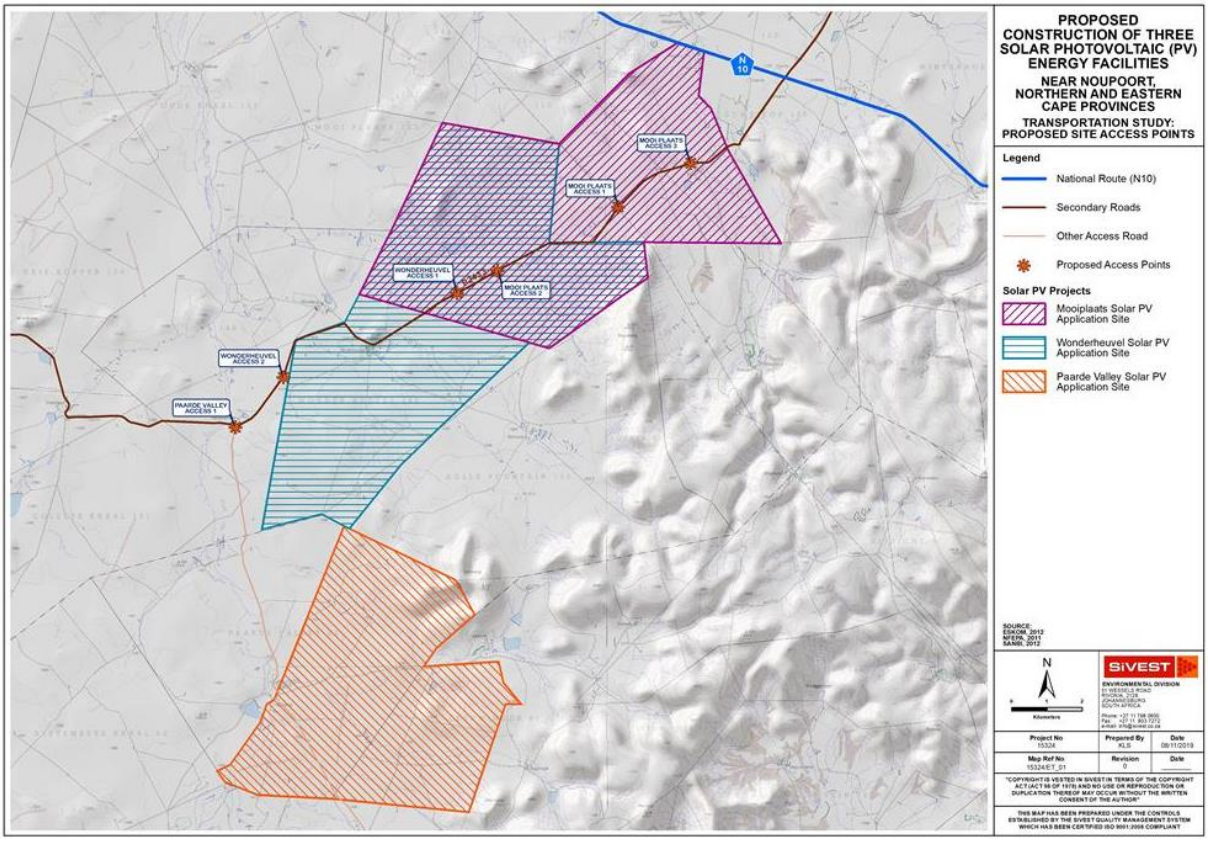

Figure 9:1 Proposed Development Access

9.1 Mooi Plaats Solar PV Facility - Development Access

Access to this facility will be via the existing gravel road (DR2433) which bisects the proposed PV Facility. The road bisects the development into two unequal quadrants, a north western and south eastern quadrant respectively. Three proposed access points have been identified for this facility, however, the final position selection will be dependent on the location of the PV fields in relation to the DR2433.

The proposed access points are as indicated on Figure 9:1 above and a summary of each proposed access point is as summarized in Table 9:1 below.

Mooi Plaats Solar PV Facility – Proposed Access Points	
Access Point	**Description**
1	• Gravel Road access point • Existing access point to the north of the farm where a PV field could be considered. • The area to the south of the point does not allow sufficient space available to place a PV field adjacent to the ridge line. • The prescribed sight distances of 300m can be achieved. • Priority controlled intersection is recommended with the District Road being priority.
2	• Gravel Road access point • Existing access point to both the north and south of the farm, where PV fields could be considered. • The prescribed sight distances of 300m can be achieved. • Floodlines could affect the position of the PV fields. • Priority controlled intersection is recommended with the District Road being priority.
3	• Gravel Road access point • Existing access point to both the north and south of the farm where PV fields could be considered. • The prescribed sight distances of 300m can be achieved • Priority controlled intersection is recommended with the District Road being priority. • Floodlines and ridges could affect the position of the PV fields • Solar Glare will need to be investigated adjacent to the N10 freeway. Refer Section 10 below.

Table 9:1 Mooi Plaats Solar PV Facility

9.2 Wonder Heuvel Solar PV Facility - Development Access

Access to this facility will be via the existing gravel road (DR2433) which bisects the proposed PV facility. The road bisects the development into two unequal quadrants, a north eastern and south western quadrant. Two access points have been identified and the final position of these access points will be dependent on the location of the PV fields in relation to the DR2433.

The proposed access points are as indicated on Figure 9:1 Proposed Development AccessFigure 9:1 above and a summary of each proposed access point is as summarized in Table 9:2 below.

Wonder Heuvel Solar PV Facility – Proposed Access Points	
Access Point	**Description**
1	• Gravel Road access point • Existing access point to the north of the farm where a PV field could be considered. • The prescribed sight distances of 300m can be achieved • Priority controlled intersection is recommended with the District Road being priority.

	• Floodlines could affect the position of the PV fields
2	• Gravel Road access point • Existing access point to the south of the farm, where a PV field could be considered. • The prescribed sight distances of 300m can be achieved • Priority controlled intersection is recommended with the District Road being priority. • Floodlines and ridge lines could affect the position of the PV fields

Table 9:2 Wonder Heuvel Solar PV Facility

9.3 Paarde Valley Solar PV Facility - Development Access

Access to this facility will be via the existing gravel road (DR2433) which is located ±4km north of the proposed PV Facility. Only one access point has been identified and the final position of this access point will be dependent on the location of the PV fields in relation to the DR2433. We note that this development is not located adjacent to the DR2433 and hence will require 'right of way' agreements with the following properties;

- REM of the farm WONDER HEUVEL No. 140
- REM of the farm COLLETS KRAAL No. 131
- REM of the farm PAARDE VALLEY No. 62

The proposed access points are as indicated on Figure 9:1 above and a summary of each proposed access point is as summarized in Table 9:3 below.

Paarde Valley Solar PV Facility – Proposed Access Points	
Access Point	**Description**
1	• Gravel Road access point • Existing access point to the north of the farm where a PV field could be considered. • The prescribed sight distances of 300m can be achieved • Priority controlled intersection is recommended with the District Road being priority. • Floodlines could affect the position of the PV fields

Table 9:3 Paarde Valley Solar PV Facility

9.4 Internal Roads Layout and Specifications

An internal network of roads has been assumed to be in a traditional grid pattern formation and will mainly consist of 4-10m wide gravel roads. These roads will have designed horizontal and vertical alignments to accommodate the normal and abnormal vehicles intended to be used for the delivery and maintenance of the PV equipment.

We would recommend that all internal access roads take into account where possible and applicable, the PV facility stormwater management plan so as to reduce the risks of possible erosion.

For the purpose of this assessment, we have assumed that the insitu material below the topsoil is of 'G7' quality and can be used as a suitable road subgrade material, followed by an imported 'G5' quality material as a gravel wearing course.

A suitable geotechnical study will however be required at pre design stage to better understand the design limitations on the development followed by a preliminary design to 'value' Engineer the project.

10 SOLAR GLINT & GLARE

The proximity of 'Umsobomvu Solar Energy Facility' and more specifically the proximity of the 'Mooi Plaats Solar PV Facility' to the existing N10 freeway between Hanover and Noupoort / Middelburg, increases the possibility of solar glint and glare affecting road users. In addition, the N10 freeways orientation in an east – west direction increases the possibility of the proposed development affecting road users.

We therefore recommend that further studies be completed to understand the extent of the solar glint and glare and ultimately plan the layout of the Facility in such a way that it does not affect road users negatively.

11 IMPACT RATING ASSESSMENT

The 'Impact Rating System' takes into account the nature, scale and duration of the effects on the environment whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the project stages:

- Planning
- Construction
- Operation
- Decommissioning

A rating system, based points system is applied to the potential impacts on the environment and includes objective evaluations of the mitigation of the impact. These impacts can be found in 'Annexure F'.

In summary, all impacts were classified as 'Low' to 'Medium' impacts with the 'Medium' impacts changing to a 'Low' impact after the implementation of suitable mitigation measures. We should however note that the cumulative impact of all the surrounding developments could possibly trigger a 'High' impact and therefore effective pre mitigation measures must be implemented.

12 CUMULATIVE IMPACT ASSESSMENT

SiVEST undertook every effort to obtain the information (including specialist studies, BA / EIA / Scoping and EMPr Reports) for the surrounding developments, however many of the documents are not currently publically available. To this extent, the information that could be obtained for the surrounding planned renewable energy developments was taken into account as part of the cumulative impact assessment.

The information obtained for other planned renewable energy developments in the surrounds is indicated in Figure 12:1 below.

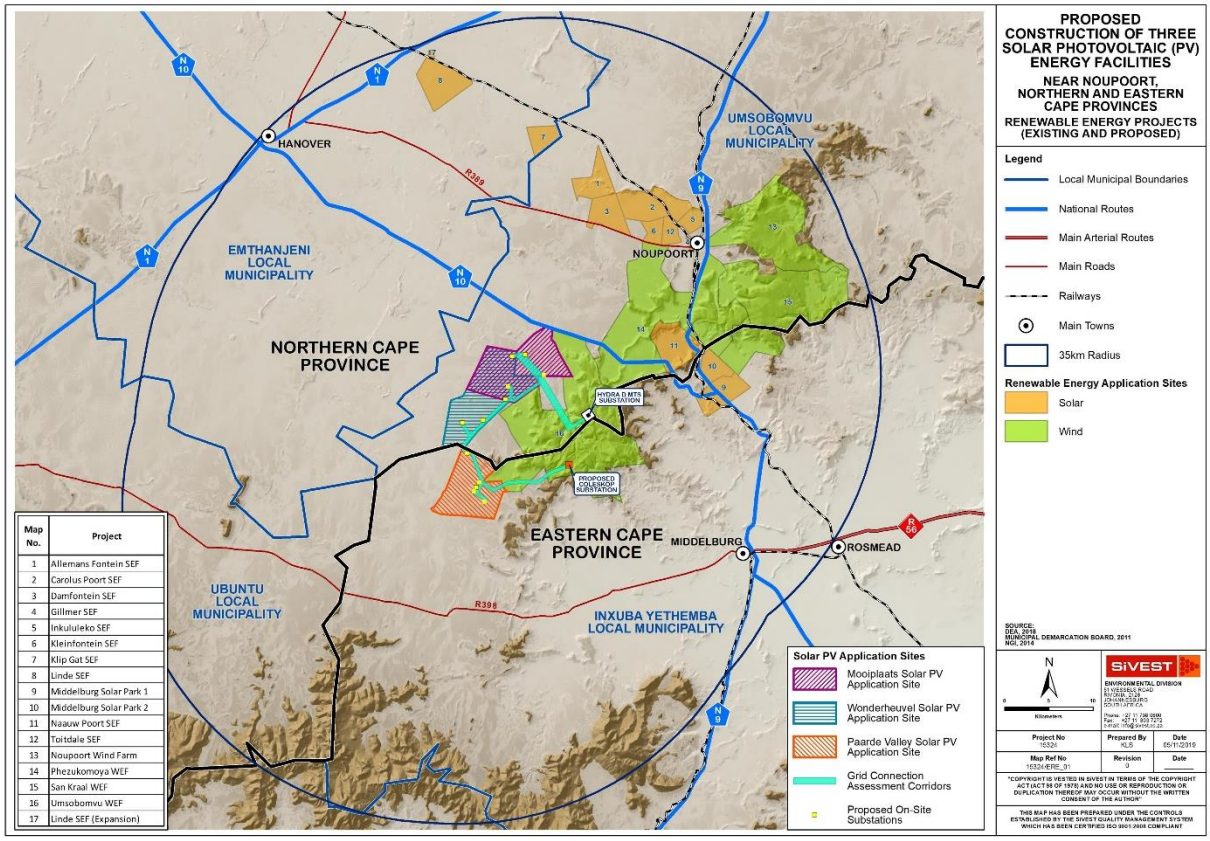

Figure 12:1 Proposed Renewable Energy Developments in the Area

You will note that a number of proposed renewable energy projects are located within a ±35km radius of the Umsobomvu PV Solar Energy development. However, for the purpose of this report, we have only assumed the two developments which are in close proximity to the Umsobomvu PV Solar Energy development as we believe they will have the greatest impact from a transportation perspective. The two development are therefore as follows;

UMSOBOMVU - Wind Energy Facility	
Developer	Umsobomvu Wind Power (Pty) Ltd
Renewable Energy Type	Wind Turbine Generators

Total Development Area	18 263ha
Wind Turbine Generators	84 Turbines
Infrastructure Area	108.8ha

Table 12:1 Umsobomvu WEF

PHEZUKOMOYA - Wind Energy Facility	
Developer	Phezukomoya Wind Power (Pty) Ltd
Renewable Energy Type	Wind Turbine Generators
Total Development Area	15 271ha
Wind Turbine Generators	63 Turbines
Infrastructure Area	74.25ha

Table 12:2 Phezukomoya WEF

Based on the information available, both developments have indicated that they will NOT use the Leeupoort / Noupoort intersection located on the N10 freeway at Km 19.92 on section N10-5. Therefore the cumulative impact on the proposed access point on the N10 freeway will only be applicable to the Umsobomvu PV Solar Energy Facility.

There will however be a cumulative impact on the background traffic between the Umsobomvu PV Energy Facility and Noupoort / Middleburg. This impact will however be difficult to simulate as the intended start dates and construction programs for each development will need to be clarified. We therefore recommend that this study be completed prior to the construction process with all Renewable Energy parties involved in the immediate area.

13 COMPARATIVE ASSESSMENT OF ALTERNATIVES

Two (2) power line route alternatives and two (2) substation site alternatives per Solar PV Facility has been identified for assessment during the EIA process. These alternatives are as follows:

- **Mooi Plaats Solar PV Grid Connection**
  - Option 1
    - Corridor Option 1a – Links Substation 2 and Substation 1a to Hydra D MTS
    - Corridor Option 1b – Links Substation 2 and Substation 1b to Hydra D MTS

- Option 2
    - Corridor Option 2a – Links Substation 2 and Substation 1a to Hydra D MTS via the proposed Central Collector substation located on Wonderheuvel PV project application site.
    - Corridor Option 2b – Links Substation 2 and Substation 1b to Hydra D MTS via the proposed Central Collector substation located on Wonderheuvel PV project application site.

- **Wonderheuvel Solar PV Grid Connection**

    - Option 1
        - Corridor Option 1a – Involves two (2) separate grid connections to serve the northern and southern sections of the application site.
            i. The *northern connection* links the Proposed Substation 3a to the Hydra D MTS via the proposed Northern Collector Substation located on the Mooi Plaats PV project application site.
            ii. The *southern connection* links the proposed Substation 4a to the Coleskop WEF Substation via the proposed Southern Collector Substation located on the Paarde Valley PV Project application site.
        - Corridor Option 1b – involves two (2) separate grid connections to serve the northern and southern sections of the application site.
            i. The northern connection links the Proposed Substation 3a to the Hydra D MTS via the proposed Northern Collector Substation located on the Mooi Plaats PV project application site.
            ii. The southern connection links the proposed Substation 4b to the Coleskop WEF Substation via the proposed Southern Collector Substation located on the Paarde Valley PV Project application site.
        - Corridor Option 1c – involves two (2) separate grid connections to serve the northern and southern sections of the application site.
            i. The northern connection links the Proposed Substation 3b to the Hydra D MTS via the proposed Northern Collector Substation located on the Mooi Plaats PV project application site.
            ii. The southern connection links the proposed Substation 4a to the Coleskop WEF Substation via the proposed Southern Collector Substation located on the Paarde Valley PV Project application site.
        - Corridor Option 1d – involves two (2) separate grid connections to serve the northern and southern sections of the application site.
            i. The northern connection links the Proposed Substation 3b to Hydra D MTS via the proposed Northern Collector Substation located on the Mooi Plaats PV project application site.
            ii. The southern connection links the proposed Substation 4b to the Coleskop WEF Substation via the proposed Southern Collector Substation located on the Paarde Valley PV Project application site.

- Option 2
    - Corridor Option 2a – Links Substation 3a to the Hydra D MTS via the proposed Central Collector Substation.
    - Corridor Option 2b - Option 2b links Substation 3b to Hydra D MTS via the proposed Central Collector Substation.
- Option 3
    - Corridor Option 3 links Substation 4b to Hydra D MTS via the proposed Central Collector Substation.

- **Paarde Valley Solar PV Grid Connection**
    - Option 1
        - Corridor Option 1a involves two (2) separate grid connections to serve the northern and southern sections of the application site.
            i. The northern connection links Substation 5 to Coleskop Substation via the proposed Southern Collector Sub (Substation 6a will act as Central Collector for this option).
            ii. The southern connection links Substation 7a to the Coleskop Substation via the proposed Southern Collector Substation (Substation 6a will act as Southern Collector for this option).
        - Corridor Option 1b involves two (2) separate grid connections to serve the northern and southern sections of the application site.
            i. The northern connection links Substation 5 to Coleskop Substation via the proposed Southern Collector Sub (Substation 6b will act as Southern Collector for this option).
            ii. The southern connection links Substation 7a to the Coleskop Substation via the proposed Southern Collector Substation (Substation 6b will act as Southern Collector for this option).
        - Corridor Option 1c involves two (2) separate grid connections to serve the northern and southern sections of the application site.
            i. The northern connection links Substation 5 to Coleskop Substation via the proposed Southern Collector Sub (Substation 6a will act as Southern Collector for this option).
            ii. The southern connection links Substation 7b to the Coleskop Substation via the proposed Southern Collector Substation (Substation 6a will act as Southern Collector for this option).
        - Corridor Option 1d involves two (2) separate grid connections to serve the northern and southern sections of the application site.
            i. The northern connection links Substation 5 to Coleskop Substation via the proposed Southern Collector Sub (Substation 6b will act as Southern Collector for this option).

ii. The southern connection links Substation 7b to the Coleskop Substation via the proposed Southern Collector Substation (Substation 6b will act as Southern Collector for this option).

- Option 2
    - Corridor Option 2a involves two (2) separate grid connections to serve the northern and southern sections of the application site.
        i. The northern connection links Substation 5 to Hydra D MTS via the proposed Central Collector Sub located on the Wonderheuvel PV Project application site.
        ii. The southern connection links Substation 6a and 7a to the Hydra D MTS via the proposed Central Collector Substation located on the Wonderheuvel PV Project application site.
    - Corridor Option 2b involves two (2) separate grid connections to serve the northern and southern sections of the application site.
        i. The northern connection links Substation 5 to Hydra D MTS via the proposed Central Collector Sub located on the Wonderheuvel PV Project application site.
        ii. The southern connection links Substation 6b and 7b to the Hydra D MTS via the proposed Central Collector Substation located on the Wonderheuvel PV Project application site.
    - Corridor Option 2c involves two (2) separate grid connections to serve the northern and southern sections of the application site.
        i. The northern connection links Substation 5 to Hydra D MTS via the proposed Central Collector Sub located on the Wonderheuvel PV Project application site.
        ii. The southern connection links Substation 6a and 7b to the Hydra D MTS via the proposed Central Collector Substation located on the Wonderheuvel PV Project application site.
    - Corridor Option 2d involves two (2) separate grid connections to serve the northern and southern sections of the application site.
        i. The northern connection links Substation 5 to Hydra D MTS via the proposed Central Collector Sub located on the Wonderheuvel PV Project application site.
        ii. The southern connection links Substation 6b and 7a to the Hydra D MTS via the proposed Central Collector Substation located on the Wonderheuvel PV Project application site.

A comparative assessment was completed to determine which of the above alternatives would be preferred from a Transportation Impact perspective. However, for the purpose of this study only the alternatives outlined in Table 13:1 were assessed.

The degree of preference for each alterative has been assigned a key from ‘preferred to ‘least preferred’ as follows;

Comparative Table - 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

Comparative Table of Assessments		
Alternative	**Preference**	**Reason (incl. potential issues)**
PV INFRASTRUCTURE ALTERNATIVES (LAYDOWN AREAS AND O&M BUILDINGS)		
MOOI PLAATS SOLAR PV FACILITY		
Laydown Area and O&M Building Site Option 1	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Laydown Area and O&M Building Site Option 2	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Laydown Area and O&M Building Site Option 3	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Laydown Area and O&M Building Site Option 4	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Laydown Area and O&M Building Site Option 5	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Laydown Area and O&M Building Site Option 6	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
WONDERHEUVEL SOLAR PV FACILITY		
Laydown Area and O&M Building Site Option 1	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Laydown Area and O&M Building Site Option 2	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.

Laydown Area and O&M Building Site Option 3	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Laydown Area and O&M Building Site Option 4	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Laydown Area and O&M Building Site Option 5	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Laydown Area and O&M Building Site Option 6	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Laydown Area and O&M Building Site Option 7	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Laydown Area and O&M Building Site Option 8	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
PAARDE VALLEY SOLAR PV GRID CONNECTION		
Laydown Area and O&M Building Site Option 1	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Laydown Area and O&M Building Site Option 2	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Laydown Area and O&M Building Site Option 3	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Laydown Area and O&M Building Site Option 4	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Laydown Area and O&M Building Site Option 5	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Laydown Area and O&M Building Site Option 6	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Laydown Area and O&M Building Site Option 7	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Laydown Area and O&M Building Site Option 8	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.

Laydown Area and O&M Building Site Option 9	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
GRID CONNECTION INFRASTRUCTURE ALTERNATIVES (POWER LINE CORRIDORS and ASSOCIATED SUBSTATIONS)		
MOOI PLAATS SOLAR PV FACILITY		
Grid Connection Option 1a	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Grid Connection Option 1b	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Grid Connection Option 2a	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Grid Connection Option 2a	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
WONDERHEUVEL SOLAR PV FACILITY		
Grid Connection Option 1a	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Grid Connection Option 1b	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Grid Connection Option 1c	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Grid Connection Option 1d	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Grid Connection Option 2a	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Grid Connection Option 2b	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Grid Connection Option 3	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
PAARDE VALLEY SOLAR PV FACILITY		
Grid Connection Option 1a	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.

Grid Connection Option 1b	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Grid Connection Option 1c	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Grid Connection Option 1d	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Grid Connection Option 2a	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Grid Connection Option 2b	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Grid Connection Option 2c	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.
Grid Connection Option 2d	NO PREFERENCE	Equal impacts are experienced from this Alternative, if compared with the other alternatives.

Table 13:1 Comparative Table of Assessments

14 CONCLUSIONS AND RECOMMENDATIONS

- In conclusion;
    - During the construction phase an additional ±43 vehicles trips will commute at the peak of the construction phase, transporting staff and labour. Typically, these trips will be in the morning between 6:00 – 7:00 and in the afternoons between 16:00 – 17:00.
    - The heavy construction vehicles and deliveries will contribute an additional ±25 vehicle trips / day, typically occurring during the 'weekday midday' which will equate to ±4 vehicle trips / hour. These additional vehicles will only contribute a small percentage to the existing road network.
    - The abnormal loads on this development will be negligible and therefore will have no major impact.
    - The cumulative impact of the area confirms that no significance rating change will be experienced during the construction period of the Umsobomvu PV development.
    - The existing road network can accommodate the proposed development, however the recommendations below must be considered to mitigate any possible negative impacts.

- We recommend a Traffic Management Plan be completed prior to construction in order to form part of the Final Environmental Management Plan (EMP). The plan must include inter alia the following;
    - The review of all intersections and routes prior to the project commencing in order to accommodate construction vehicles and staff commuting.
    - Further discussions with the SANRAL and the respective transport department on access points and route requirements.
    - The upgrades of intersections and the installation of road traffic signage as per the SARTSM (South African Road Traffic Sign Manual).
    - The implementation of pedestrian safety initiatives
    - The implementation of a road maintenance plan under the auspices of the respective transport department.
- We recommend that further studies be completed on the Mooi Plaats Solar PV Facility to understand the extent of the solar glint and glare and ultimately plan the layout of the Facility in such a way that it does not affect N10 freeway road users negatively.
- We recommended that one access point from the N10 freeway be used for all the proposed Facilities to reduce the impact to the area. This access point is located at Km19.92 on section N10-5 and the appropriate axillary lanes and speed reduction measures are to be implemented subsequent to discussions with SANRAL. This study and a revised study, with the all the renewable parties involved in the area at the time, must be submitted to SANRAL and more specifically Ms. Colene Runkel 021 957 4613 for review and comments.
- Development access points to each PV Facility is as per the recommendations in Section 9.
- The appropriate load permits be obtained from the Department of Transport prior to construction (if required).
- This assessment is limited to the impacts the development traffic will have on the network and not on the wider impacts known as background traffic. Background traffic includes the cumulative impacts other developments will have on the environment if their programs overlap. Such impacts can only be addressed in a detailed Traffic Impact Study which takes into account actual traffic counts undertaken during the peak periods. We therefore recommend that this study be completed prior to the construction process with all Renewable Energy parties involved in the immediate area.

15 REFERENCES

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South African National Roads Agency Ltd – *Traffic Highlights for Vehicle Counting Stations*

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Department of Transport – *TRH 11 – Dimensional and Mass Limitations and other Requirements for Abnormal Load Vehicles* (August 2009 - 8th Edition)

Environmental Impact Assessment Report – *The Proposed 315MW Phezukomoya Wind Energy Facility and Grid Connection, Northern and Eastern Cape Provinces* (March 2018, Ref N°: 14/12/16/3/3/3/2/1028)

Environmental Impact Assessment Report – *Proposed Umsobomvu Wind Energy Facility, Northern and Eastern Cape Provinces* (April 2016, Ref N°: 14/12/16/3/3/2/730)

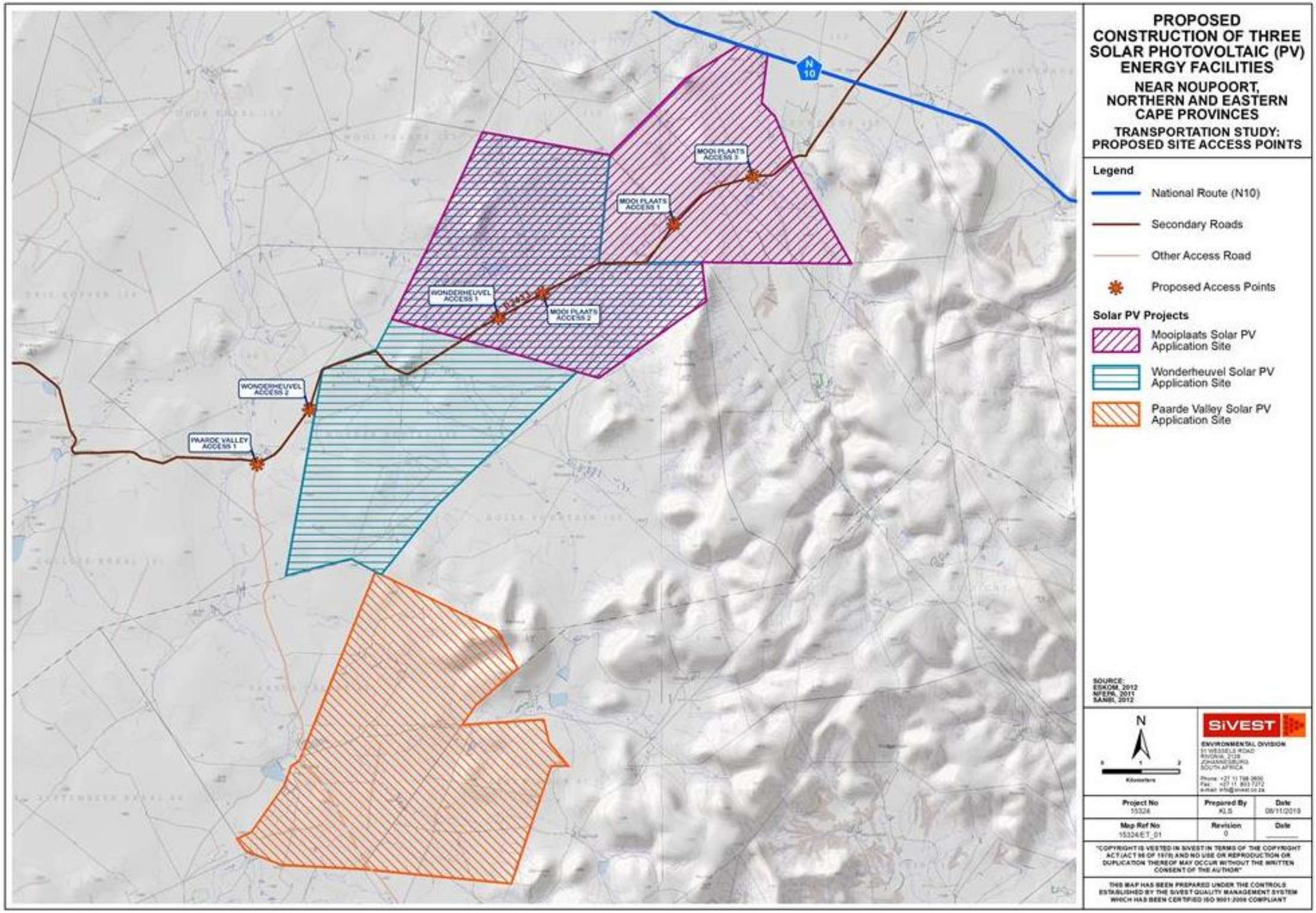
APPENDIX A: SPECIALIST CREDENTIALS

APPENDIX B: SPECIALIST DECLARATION

APPENDIX C: VEHICLE TRIP CALCULATIONS

Vehicle Trips - Transportation						
Type of Construction	**Description**	**Month Applicable**	**Light Vehicles**	**Heavy Vehicles**	**Total Vehicles / Day**	**Origin**
Site Establishment	Clearing & Grubbing Delivery & Construction of Site offices Setting Out of Works Erection of Perimeter Fence	1 & 25	7	3	**10**	Noupoort / Middelburg
Transportation of Plant	Excavator Grader Tipper Trucks Water Cart Roller TLB Small Front End Loader Hi Up Crane / Truck Small Equipment	1 & 25		2 2 5 2 1 (2 on lowbed) 3 (2 on lowbed) 2 4 4 (16 / 4)	**1**	Gauteng / Cape Town
Internal Access Roads	127m³ of Imported Sub Base per day on 10m³ tippers. Bulking factor has been included.	2 - 5		13	**13**	Local
Operation & Maintenance Buildings (O&M)	Delivery of Cement, stone, sand, reinforcement, shutters, roof trusses, sheeting.	2 - 19		1	**1**	Gauteng / Cape Town
PV Modules & Frame	Delivery of PV Modules Delivery of PV Frames	2 - 19		10	**5**	Ngqura Port
Electrical Systems	Substation Equipment, overhead cables, underground cables	2 - 12		1	**1**	Gauteng / Ngqura / Cape Town

APPENDIX D: PROPOSED DEVELOPMENT ACCESS & INTERNAL ROADS


PROPOSED CONSTRUCTION OF THREE SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITIES
NEAR NOUPOORT, NORTHERN AND EASTERN CAPE PROVINCES
TRANSPORTATION STUDY: PROPOSED SITE ACCESS POINTS
Legend
National Route (N10)
Secondary Roads
Other Access Road
Proposed Access Points
Solar PV Projects
Mooiplaats Solar PV Application Site
Wonderheuvel Solar PV Application Site
Paarde Valley Solar PV Application Site
N10
MOOI PLAATS ACCESS 2
MOOI PLAATS ACCESS 1
WONDERHEUVEL ACCESS 1
WONDERHEUVEL ACCESS 2
PAARDE VALLEY ACCESS 1
SOURCE:
ESKOM, 2012
NFEPA, 2011
SANBI, 2012
N
Kilometers
SiVEST
ENVIRONMENTAL DIVISION
Project No
15324
Prepared By
KLS
Date
09/11/2019
Map Ref No
15324/ET_01
Revision
0
Date
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APPENDIX E: IMPACT RATING SYSTEM

MOOI PLAATS 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																					
Additional Traffic Generation	Increase in Traffic	2	3	1	2	1	2	18	-	Low	• Ensure a large portion of vehicles traveling to and from the proposed development travels in the 'off peak' periods or by bus. • Construction of an on-site concrete batching plant to reduce trips.	2	3	1	2	1	2	18	-	Low
	Increase of Incidents with pedestrians and livestock	2	4	2	4	1	2	26	-	Medium	• Reduction in speed of vehicles • Adequate enforcement of the law • Implementation of pedestrian safety initiatives • Regular maintenance of farm fences, access cattle grids • Construction of an on-site concrete batching plant to reduce trips.	2	3	2	4	1	1	12	-	Low
	Increase in Dust from gravel roads	2	3	2	2	1	2	20	-	Low	• Reduction in speed of the vehicles • Use of dust suppressant techniques • Implement a road maintenance program under the auspices of the respective transport department. • Construction of an on-site concrete batching plant to reduce trips.	2	3	2	2	1	2	20	-	Low
	Increase in Road Maintenance	2	3	2	2	2	2	22	-	Low	• Implement a road maintenance program under the auspices of the respective transport department. • Construction of an on-site batching plant to reduce trips.	2	3	2	2	2	2	22	-	Low
Abnormal Loads	Additional Abnormal Loads	3	2	1	2	1	1	9	-	Low	• Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods. • Adequate enforcement of the law	3	2	1	2	1	1	9	-	Low
Internal Access Roads	Increase in Dust from gravel roads	1	4	1	1	1	2	16	-	Low	• Enforce a maximum speed limit on the development • Use of dust suppressant techniques • Adequate watering by means of water bowser	1	3	1	1	1	2	14	-	Low
	New / Larger Access points	1	4	1	2	1	1	9	-	Low	• Adequate road signage according to the SARTSM • Approval from the respective roads department	1	4	1	2	1	1	9	-	Low
Operational Phase																					
Additional Traffic Generation	Increase in Traffic	2	3	1	2	3	1	11	-	Low	• Ensure a large portion of vehicles traveling to and from the proposed development travels in the 'off peak' periods or by bus.	2	3	1	2	3	1	11	-	Low
	Increase of Incidents with pedestrians and livestock	2	4	2	4	3	1	15	-	Low	• Reduction in speed of vehicles • Adequate enforcement of the law • Implementation of pedestrian safety initiatives • Regular maintenance of farm fences, access cattle grids	2	3	2	4	3	1	14	-	Low
	Increase in Dust from gravel roads	2	3	2	2	3	1	12	-	Low	• Reduction in speed of the vehicles • Use of dust suppressant techniques • Implement a road maintenance program under the auspices of the respective transport department.	2	3	2	2	3	1	12	-	Low
	Increase in Road Maintenance	2	3	2	2	3	1	12	-	Low	• Reduction in speed of the vehicles • Use of dust suppressant techniques • Implement a road maintenance program under the auspices of the respective transport department.	2	3	2	2	3	1	12	-	Low
Abnormal Loads	Additional Abnormal Loads	2	1	1	1	3	1	8	-	Low	• Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods. • Adequate enforcement of the law	2	1	1	1	3	1	8	-	Low
Internal Access Roads	New / Larger Access points	2	3	1	2	3	1	11	-	Low	• Adequate road signage according to the SARTSM	2	3	1	2	3	1	11	-	Low
Decommissioning Phase																					
Additional Traffic Generation	Increase in Traffic	2	3	1	2	1	2	18	-	Low	• Ensure a large portion of vehicles traveling to and from the proposed development travels in the 'off peak' periods or by bus. • Construction of an on-site concrete batching plant to reduce trips.	2	3	1	2	1	2	18	-	Low
	Increase of Incidents with pedestrians and livestock	2	4	2	4	1	2	26	-	Medium	• Reduction in speed of vehicles • Adequate enforcement of the law • Implementation of pedestrian safety initiatives • Regular maintenance of farm fences, access cattle grids • Construction of an on-site concrete batching plant to reduce trips.	2	3	2	4	1	1	12	-	Low
	Increase in Dust from gravel roads	2	3	2	2	1	2	20	-	Low	• Reduction in speed of the vehicles • Use of dust suppressant techniques • Implement a road maintenance program under the auspices of the respective transport department. • Construction of an on-site concrete batching plant to reduce trips.	2	3	2	2	1	2	20	-	Low
	Increase in Road Maintenance	2	3	2	2	2	2	22	-	Low	• Implement a road maintenance program under the auspices of the respective transport department. • Construction of an on-site batching plant to reduce trips.	2	2	2	2	2	2	20	-	Low
Abnormal Loads	Additional Abnormal Loads	3	2	1	2	1	1	9	-	Low	• Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods. • Adequate enforcement of the law	3	2	1	2	1	1	9	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Internal Access Roads	Increase in Dust from gravel roads	1	3	1	1	1	2	14	-	Low	• Enforce a maximum speed limit on the development • Use of dust suppressant techniques • Adequate watering by means of water bowser	1	3	1	1	1	2	14	-	Low
	New / Larger Access points	1	4	1	2	1	1	9	-	Low	• Adequate road signage according to the SARTSM • Approval from the respective roads department	1	4	1	2	1	1	9	-	Low
Cumulative																				
Additional Traffic Generation	Increase in Traffic	2	3	1	2	1	4	36	-	Low	• Ensure a large portion of vehicles traveling to and from the proposed development travels in the 'off peak' periods or by bus. • Construction of an on-site batching plant to reduce trips. • Coordination between all developers in the area	2	3	1	2	1	2	18	-	Low
	Increase of Incidents with pedestrians and livestock	2	4	2	4	1	4	52	-	High	• Reduction in speed of vehicles • Adequate enforcement of the law • Implementation of pedestrian safety initiatives • Regular maintenance of farm fences, access cattle grids • Construction of an on-site batching plant to reduce trips. • Coordination between all developers in the area	2	3	2	4	1	2	24	-	Medium
	Increase in Dust from gravel roads	2	3	2	2	1	4	40	-	Medium	• Reduction in speed of the vehicles • Use of dust suppressant techniques • Implement a road maintenance program under the auspices of the respective transport department. • Construction of an on-site batching plant to reduce trips. • Coordination between all developers in the area	2	3	2	2	1	2	20	-	Low
	Increase in Road Maintenance	2	3	2	2	2	2	22	-	Low	• Implement a road maintenance program under the auspices of the respective transport department. • Construction of an on-site batching plant to reduce trips. • Coordination between all developers in the area	2	3	2	2	2	2	22	-	Low
Abnormal Loads	Additional Abnormal Loads	3	2	1	2	1	4	36	-	Medium	• Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods. • Adequate enforcement of the law	3	2	1	2	1	2	18	-	Low
Internal Access Roads	Increase in Dust from gravel roads	1	4	1	1	1	3	24	-	Medium	• Enforce a maximum speed limit on the development • Use of dust suppressant techniques • Adequate watering by means of water bowser	1	3	1	1	1	2	14	-	Low
	New / Larger Access points	1	4	1	2	1	2	18	-	Low	• Adequate road signage according to the SARTSM • Approval from the respective roads department	1	4	1	2	1	1	9	-	Low

WONDERHEUVEL 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																					
Additional Traffic Generation	Increase in Traffic	2	3	1	2	1	2	18	-	Low	• Ensure a large portion of vehicles traveling to and from the proposed development travels in the 'off peak' periods or by bus. • Construction of an on-site concrete batching plant to reduce trips.	2	3	1	2	1	2	18	-	Low
	Increase of Incidents with pedestrians and livestock	2	4	2	4	1	2	26	-	Medium	• Reduction in speed of vehicles • Adequate enforcement of the law • Implementation of pedestrian safety initiatives • Regular maintenance of farm fences, access cattle grids • Construction of an on-site concrete batching plant to reduce trips.	2	3	2	4	1	1	12	-	Low
	Increase in Dust from gravel roads	2	3	2	2	1	2	20	-	Low	• Reduction in speed of the vehicles • Use of dust suppressant techniques • Implement a road maintenance program under the auspices of the respective transport department. • Construction of an on-site concrete batching plant to reduce trips.	2	3	2	2	1	2	20	-	Low
	Increase in Road Maintenance	2	3	2	2	2	2	22	-	Low	• Implement a road maintenance program under the auspices of the respective transport department. • Construction of an on-site batching plant to reduce trips.	2	3	2	2	2	2	22	-	Low
Abnormal Loads	Additional Abnormal Loads	3	2	1	2	1	1	9	-	Low	• Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods. • Adequate enforcement of the law	3	2	1	2	1	1	9	-	Low
Internal Access Roads	Increase in Dust from gravel roads	1	4	1	1	1	2	16	-	Low	• Enforce a maximum speed limit on the development • Use of dust suppressant techniques • Adequate watering by means of water bowser	1	3	1	1	1	2	14	-	Low
	New / Larger Access points	1	4	1	2	1	1	9	-	Low	• Adequate road signage according to the SARTSM • Approval from the respective roads department	1	4	1	2	1	1	9	-	Low
Operational Phase																					
Additional Traffic Generation	Increase in Traffic	2	3	1	2	3	1	11	-	Low	• Ensure a large portion of vehicles traveling to and from the proposed development travels in the 'off peak' periods or by bus.	2	3	1	2	3	1	11	-	Low
	Increase of Incidents with pedestrians and livestock	2	4	2	4	3	1	15	-	Low	• Reduction in speed of vehicles • Adequate enforcement of the law • Implementation of pedestrian safety initiatives • Regular maintenance of farm fences, access cattle grids	2	3	2	4	3	1	14	-	Low
	Increase in Dust from gravel roads	2	3	2	2	3	1	12	-	Low	• Reduction in speed of the vehicles • Use of dust suppressant techniques • Implement a road maintenance program under the auspices of the respective transport department.	2	3	2	2	3	1	12	-	Low
	Increase in Road Maintenance	2	3	2	2	3	1	12	-	Low	• Reduction in speed of the vehicles • Use of dust suppressant techniques • Implement a road maintenance program under the auspices of the respective transport department.	2	3	2	2	3	1	12	-	Low
Abnormal Loads	Additional Abnormal Loads	2	1	1	1	3	1	8	-	Low	• Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods. • Adequate enforcement of the law	2	1	1	1	3	1	8	-	Low
Internal Access Roads	New / Larger Access points	2	3	1	2	3	1	11	-	Low	• Adequate road signage according to the SARTSM	2	3	1	2	3	1	11	-	Low
Decommissioning Phase																					
Additional Traffic Generation	Increase in Traffic	2	3	1	2	1	2	18	-	Low	• Ensure a large portion of vehicles traveling to and from the proposed development travels in the 'off peak' periods or by bus. • Construction of an on-site concrete batching plant to reduce trips.	2	3	1	2	1	2	18	-	Low
	Increase of Incidents with pedestrians and livestock	2	4	2	4	1	2	26	-	Medium	• Reduction in speed of vehicles • Adequate enforcement of the law • Implementation of pedestrian safety initiatives • Regular maintenance of farm fences, access cattle grids • Construction of an on-site concrete batching plant to reduce trips.	2	3	2	4	1	1	12	-	Low
	Increase in Dust from gravel roads	2	3	2	2	1	2	20	-	Low	• Reduction in speed of the vehicles • Use of dust suppressant techniques • Implement a road maintenance program under the auspices of the respective transport department. • Construction of an on-site concrete batching plant to reduce trips.	2	3	2	2	1	2	20	-	Low
	Increase in Road Maintenance	2	3	2	2	2	2	22	-	Low	• Implement a road maintenance program under the auspices of the respective transport department. • Construction of an on-site batching plant to reduce trips.	2	2	2	2	2	2	20	-	Low
Abnormal Loads	Additional Abnormal Loads	3	2	1	2	1	1	9	-	Low	• Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods. • Adequate enforcement of the law	3	2	1	2	1	1	9	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Internal Access Roads	Increase in Dust from gravel roads	1	3	1	1	1	2	14	-	Low	• Enforce a maximum speed limit on the development • Use of dust suppressant techniques • Adequate watering by means of water bowser	1	3	1	1	1	2	14	-	Low
	New / Larger Access points	1	4	1	2	1	1	9	-	Low	• Adequate road signage according to the SARTSM • Approval from the respective roads department	1	4	1	2	1	1	9	-	Low
Cumulative																				
Additional Traffic Generation	Increase in Traffic	2	3	1	2	1	4	36	-	Low	• Ensure a large portion of vehicles traveling to and from the proposed development travels in the 'off peak' periods or by bus. • Construction of an on-site batching plant to reduce trips. • Coordination between all developers in the area	2	3	1	2	1	2	18	-	Low
	Increase of Incidents with pedestrians and livestock	2	4	2	4	1	4	52	-	High	• Reduction in speed of vehicles • Adequate enforcement of the law • Implementation of pedestrian safety initiatives • Regular maintenance of farm fences, access cattle grids • Construction of an on-site batching plant to reduce trips. • Coordination between all developers in the area	2	3	2	4	1	2	24	-	Medium
	Increase in Dust from gravel roads	2	3	2	2	1	4	40	-	Medium	• Reduction in speed of the vehicles • Use of dust suppressant techniques • Implement a road maintenance program under the auspices of the respective transport department. • Construction of an on-site batching plant to reduce trips. • Coordination between all developers in the area	2	3	2	2	1	2	20	-	Low
	Increase in Road Maintenance	2	3	2	2	2	2	22	-	Low	• Implement a road maintenance program under the auspices of the respective transport department. • Construction of an on-site batching plant to reduce trips. • Coordination between all developers in the area	2	3	2	2	2	2	22	-	Low
Abnormal Loads	Additional Abnormal Loads	3	2	1	2	1	4	36	-	Medium	• Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods. • Adequate enforcement of the law	3	2	1	2	1	2	18	-	Low
Internal Access Roads	Increase in Dust from gravel roads	1	4	1	1	1	3	24	-	Medium	• Enforce a maximum speed limit on the development • Use of dust suppressant techniques • Adequate watering by means of water bowser	1	3	1	1	1	2	14	-	Low
	New / Larger Access points	1	4	1	2	1	2	18	-	Low	• Adequate road signage according to the SARTSM • Approval from the respective roads department	1	4	1	2	1	1	9	-	Low

PAARDE VALLEY 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																					
Additional Traffic Generation	Increase in Traffic	2	3	1	2	1	2	18	-	Low	• Ensure a large portion of vehicles traveling to and from the proposed development travels in the 'off peak' periods or by bus. • Construction of an on-site concrete batching plant to reduce trips.	2	3	1	2	1	2	18	-	Low
	Increase of Incidents with pedestrians and livestock	2	4	2	4	1	2	26	-	Medium	• Reduction in speed of vehicles • Adequate enforcement of the law • Implementation of pedestrian safety initiatives • Regular maintenance of farm fences, access cattle grids • Construction of an on-site concrete batching plant to reduce trips.	2	3	2	4	1	1	12	-	Low
	Increase in Dust from gravel roads	2	3	2	2	1	2	20	-	Low	• Reduction in speed of the vehicles • Use of dust suppressant techniques • Implement a road maintenance program under the auspices of the respective transport department. • Construction of an on-site concrete batching plant to reduce trips.	2	3	2	2	1	2	20	-	Low
	Increase in Road Maintenance	2	3	2	2	2	2	22	-	Low	• Implement a road maintenance program under the auspices of the respective transport department. • Construction of an on-site batching plant to reduce trips.	2	3	2	2	2	2	22	-	Low
Abnormal Loads	Additional Abnormal Loads	3	2	1	2	1	1	9	-	Low	• Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods. • Adequate enforcement of the law	3	2	1	2	1	1	9	-	Low
Internal Access Roads	Increase in Dust from gravel roads	1	4	1	1	1	2	16	-	Low	• Enforce a maximum speed limit on the development • Use of dust suppressant techniques • Adequate watering by means of water bowser	1	3	1	1	1	2	14	-	Low
	New / Larger Access points	1	4	1	2	1	1	9	-	Low	• Adequate road signage according to the SARTSM • Approval from the respective roads department	1	4	1	2	1	1	9	-	Low
Operational Phase																					
Additional Traffic Generation	Increase in Traffic	2	3	1	2	3	1	11	-	Low	• Ensure a large portion of vehicles traveling to and from the proposed development travels in the 'off peak' periods or by bus.	2	3	1	2	3	1	11	-	Low
	Increase of Incidents with pedestrians and livestock	2	4	2	4	3	1	15	-	Low	• Reduction in speed of vehicles • Adequate enforcement of the law • Implementation of pedestrian safety initiatives • Regular maintenance of farm fences, access cattle grids	2	3	2	4	3	1	14	-	Low
	Increase in Dust from gravel roads	2	3	2	2	3	1	12	-	Low	• Reduction in speed of the vehicles • Use of dust suppressant techniques • Implement a road maintenance program under the auspices of the respective transport department.	2	3	2	2	3	1	12	-	Low
	Increase in Road Maintenance	2	3	2	2	3	1	12	-	Low	• Reduction in speed of the vehicles • Use of dust suppressant techniques • Implement a road maintenance program under the auspices of the respective transport department.	2	3	2	2	3	1	12	-	Low
Abnormal Loads	Additional Abnormal Loads	2	1	1	1	3	1	8	-	Low	• Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods. • Adequate enforcement of the law	2	1	1	1	3	1	8	-	Low
Internal Access Roads	New / Larger Access points	2	3	1	2	3	1	11	-	Low	• Adequate road signage according to the SARTSM	2	3	1	2	3	1	11	-	Low
Decommissioning Phase																					
Additional Traffic Generation	Increase in Traffic	2	3	1	2	1	2	18	-	Low	• Ensure a large portion of vehicles traveling to and from the proposed development travels in the 'off peak' periods or by bus. • Construction of an on-site concrete batching plant to reduce trips.	2	3	1	2	1	2	18	-	Low
	Increase of Incidents with pedestrians and livestock	2	4	2	4	1	2	26	-	Medium	• Reduction in speed of vehicles • Adequate enforcement of the law • Implementation of pedestrian safety initiatives • Regular maintenance of farm fences, access cattle grids • Construction of an on-site concrete batching plant to reduce trips.	2	3	2	4	1	1	12	-	Low
	Increase in Dust from gravel roads	2	3	2	2	1	2	20	-	Low	• Reduction in speed of the vehicles • Use of dust suppressant techniques • Implement a road maintenance program under the auspices of the respective transport department. • Construction of an on-site concrete batching plant to reduce trips.	2	3	2	2	1	2	20	-	Low
	Increase in Road Maintenance	2	3	2	2	2	2	22	-	Low	• Implement a road maintenance program under the auspices of the respective transport department. • Construction of an on-site batching plant to reduce trips.	2	2	2	2	2	2	20	-	Low
Abnormal Loads	Additional Abnormal Loads	3	2	1	2	1	1	9	-	Low	• Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods. • Adequate enforcement of the law	3	2	1	2	1	1	9	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Internal Access Roads	Increase in Dust from gravel roads	1	3	1	1	1	2	14	-	Low	• Enforce a maximum speed limit on the development • Use of dust suppressant techniques • Adequate watering by means of water bowser	1	3	1	1	1	2	14	-	Low
	New / Larger Access points	1	4	1	2	1	1	9	-	Low	• Adequate road signage according to the SARTSM • Approval from the respective roads department	1	4	1	2	1	1	9	-	Low
Cumulative																				
Additional Traffic Generation	Increase in Traffic	2	3	1	2	1	4	36	-	Low	• Ensure a large portion of vehicles traveling to and from the proposed development travels in the 'off peak' periods or by bus. • Construction of an on-site batching plant to reduce trips. • Coordination between all developers in the area	2	3	1	2	1	2	18	-	Low
	Increase of Incidents with pedestrians and livestock	2	4	2	4	1	4	52	-	High	• Reduction in speed of vehicles • Adequate enforcement of the law • Implementation of pedestrian safety initiatives • Regular maintenance of farm fences, access cattle grids • Construction of an on-site batching plant to reduce trips. • Coordination between all developers in the area	2	3	2	4	1	2	24	-	Medium
	Increase in Dust from gravel roads	2	3	2	2	1	4	40	-	Medium	• Reduction in speed of the vehicles • Use of dust suppressant techniques • Implement a road maintenance program under the auspices of the respective transport department. • Construction of an on-site batching plant to reduce trips. • Coordination between all developers in the area	2	3	2	2	1	2	20	-	Low
	Increase in Road Maintenance	2	3	2	2	2	2	22	-	Low	• Implement a road maintenance program under the auspices of the respective transport department. • Construction of an on-site batching plant to reduce trips. • Coordination between all developers in the area	2	3	2	2	2	2	22	-	Low
Abnormal Loads	Additional Abnormal Loads	3	2	1	2	1	4	36	-	Medium	• Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods. • Adequate enforcement of the law	3	2	1	2	1	2	18	-	Low
Internal Access Roads	Increase in Dust from gravel roads	1	4	1	1	1	3	24	-	Medium	• Enforce a maximum speed limit on the development • Use of dust suppressant techniques • Adequate watering by means of water bowser	1	3	1	1	1	2	14	-	Low
	New / Larger Access points	1	4	1	2	1	2	18	-	Low	• Adequate road signage according to the SARTSM • Approval from the respective roads department	1	4	1	2	1	1	9	-	Low

SiVEST Civil Engineering Division

51 WESSEL STREET

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Contact Person: Merchandt Le Maitre

Email: merchandtm@sivest.co.za

Appendix 6J
Visual Assessment

Scientific Aquatic Services

Applying science to the real world

29 Arterial Road West, Oriel, Bedfordview, 2007
Tel 011 616 7893
Fax 011 615 6240
www.sasenvironmental.co.za
admin@sasenvgroup.co.za

Name: Stephen van Staden
Date: Friday, 15 November 2019
Ref: SAS 219244

Attention: Ms Kerry Schwartz

TECHNICAL MEMORANDUM

Visual Impact Assessment (VIA) Report for the proposed construction of three Solar Photovoltaic Energy Facilities near Noupoort and Middelberg, Northern and Eastern Cape Provinces

Overview

Based on the review of the VIA report, overall the study is considered objective, comprehensive, and considerable focus has been placed on identifying potential sensitive receptors. The impact assessment undertaken is considered accurate. The recommendations presented in the report are appropriate and achievable. Even though there are limited mitigatory measures available it is considered the best options available. This review provides some guidelines for additional information to consider for inclusion to allow improved understanding of some comments in the document.

Scientific Aquatic Services was requested to undertake a specialist external review of the specialist visual impact assessment, by Mr. Kerry Schwartz (SiVest). The review was focused on the following Objectives:

1. Determining acceptability of the report in relation to the requirements of the National Environmental Management Act (NEMA) (Act no. 107 of 1998) minimum specialist report requirements, which are presented within Appendix 6 of the NEMA: EIA Regulations (2014, as amended).;
2. Assess the document/ report in terms of its fulfilment of the Terms of Reference stated;
3. Consider whether the report is entirely objective;
4. Determining whether the methodology clearly explained and acceptable;
5. Evaluate the appropriateness of the reference literature;
6. Evaluate the validity of the findings and consider whether the report is technically, scientifically and professionally credible (review data evidence);

7. Identify any information gaps, short comings and mitigation measures to address the short comings;
8. Indicate whether the article is well-written and easy to understand and to ensure that the work has adequately assessed the impacts of the proposed development;
9. Discuss the suitability of the mitigation measures and recommendations and Consider whether the recommendations presented are sensible and present the best options; and
10. To provide an independent opinion of the report, whether it is well written and easy to understand and ensure the work meets current requirements/best practice and normal standards of professional practice and competence have been met.

This external review is based on a desktop assessment of the documentation only and no field verification of the results was undertaken. The 5 km visual assessment zone used for investigation is deemed acceptable due to the nature of the proposed project (i.e. the height of infrastructure) and the sparsely dispersed sensitive receptors in the area.

Less attention was paid to formatting and grammatical issues as these have no bearing on the scientific validity and independency of the work done. Notes were however made on the document on selected identified issues of this nature during the review process and forwarded to the project manager by means of comments within the word document. In addition, comments were made in the report to guide rectification of the report, where required, or where wording made interpretation cumbersome.

A CV presenting the expertise of the peer reviewers have been included as an appendix to this short Memo.

The table below highlights the findings of the review process considering the National Environmental Management Act (NEMA) (Act no. 107 of 1998) minimum specialist report requirements, which are presented within Appendix 6 of the NEMA: EIA Regulations (2014, as amended).

Table 1 Review of Document according to Appendix 6 of the NEMA: EIA Regulations (2014, as amended).

No.	Requirement	Status	Comments
a)	**Details of** -	NA	
(i)	The specialist who prepared the report.	✔	NA
(ii)	The expertise of that specialist to compile a specialist report including a curriculum vitae.	✔ X	The Document Guide states that it is in Appendix A, please just insert Appendix A into the report.
b)	A declaration that the specialist is independent.	✔	NA
c)	An indication of the scope of, and the purpose for which, the report was prepared.	✔ X	The scope of work is not very clear / easily identifiable, thus it is recommended that a subheading "Scope of Work / Terms of Reference" be included.
cA)	An indication of the quality and age of base data used for the specialist report.	✔	NA
cB)	A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change.	✔	Proposed and cumulative impacts have been well defined and presented.
d)	The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment.	✔	NA
e)	A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used.	✔	NA

No.	Requirement	Status	Comments
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.	✔	NA
g)	An identification of any areas to be avoided, including buffers.	✔	NA
h)	A map superimposing the activity including the associated structure and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers.	✔	NA
i)	A description of any assumption made and any uncertainties or gaps in knowledge.	✔	The term study area first appears in the assumptions and limitations list, as it is not explained in the introduction. This is confusing to the reader as to what the study area entails. It is thus recommended that study area be defined in the introduction.
j)	A description the findings and potential implication\s of such findings on the impact of the proposed activity, including identified alternatives on the environment or activities.	✔	NA
k)	Any mitigation measures for inclusion in the EMPr.	✔	NA
l)	Any conditions for inclusion in the environmental authorisation.	✔	NA
m)	Any monitoring requirements for inclusion in the EMPr or environmental authorisation.	X	Monitoring requirements in all phases of the project should be made clear in the report if necessary.
n)	A reasoned opinion -		
(i)	As to whether the proposed activity, activities or portions thereof should be authorised.	✔	NA
(iA)	Regarding the acceptability of the proposed activity or activities.	✔	NA
(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.	✔	NA
o)	A description of any consultation process that was undertaken during the course of preparing the specialist report.	✔	NA
p)	A summary and copies of any comments received during any consultation process and where applicable all responses thereto.	✔	NA
q)	Any other information requested by the competent authority.	✔	NA

The table below highlights the findings of the review process according to the additional TOR requirements for the reviewer as per the appointment of the reviewer.

Table 1 Review Outcomes of the specialist freshwater resource study prepared

ASSESSMENT CRITERION	COMMENTS	RECOMMENDATIONS
1. Assess the document/ report in terms of its fulfilment of the Terms of Reference set stated.	Assuming the terms of reference was to undertake an appropriate visual impact assessment for the project as defined in the section defining the aims of the study the study fulfilled the terms of reference.	NA
2. Consider whether the report is entirely objective.	As stated in the VIA report, the visual impact is highly subjective to the experience of the viewer, however the VIA report can be considered objective.	NA
3. Determining whether the methodology clearly explained and acceptable.	The method of assessment is clearly explained and considered acceptable. The sense of place of the area is however not discussed in great detail and could be elaborated upon.	It is recommended that the sense of place be discussed in more detail in the report.
4. Evaluate the appropriateness of the reference literature.	The referenced material is appropriate, sufficient and relevant.	NA
5. Evaluate the validity of the findings and consider whether the report is technically, scientifically and professionally credible (review data evidence).	The manner in which the VIA assessment has been set up is technically, scientifically and professionally credible and the information presented, including the impact assessment and mitigation measures can be considered reliable and used for decision making.	
6. Identify any information gaps, short comings and mitigation measures to address the short comings.	No substantial information gaps have been identified. The sense of place of the area is however not addressed. A viewshed analysis was only conducted for the portion of the N10 that would potentially be affected by the proposed project.	• It is recommended to present a legal framework / guidelines section within the report to define the legal, policy and planning context of VIAs section. • It is recommended that either a viewshed analysis be conducted to include all the potential sensitive receptors, or an assumption and limitation should be included to state that the viewshed was not undertaken due to the flat terrain of the area.
7. Indicate whether the article is well-written and easy to understand and to ensure that the work has adequately assessed the impacts of the proposed development.	• Overall the VIA study is well written, and easy to read. • Table 1 on page 45 does not clearly indicate what the rating of 1 to 10 means and the scale just below it is also not explained. • The report has adequately assessed the impacts of the proposed development. • The reasoned opinion of the visual specialist as set out in the conclusion will allow the EAP proponent and competent authority to take informed decisions.	• It is recommended that the rating of 1 to 10 be clearly defined and the scale below it be explained in detail.
8. Discuss the suitability of the mitigation measures and recommendations and Consider whether the recommendations presented are sensible and present	• The recommendations presented are appropriate, relevant/necessary, sensible and achievable. • The proposed mitigatory measures are considered the best options available.	

ASSESSMENT CRITERION	COMMENTS	RECOMMENDATIONS
the best options.		
9. To provide an independent opinion of the report, whether it is well written and easy to understand and ensure the work meets current requirements/best practice and normal standards of professional practice and competence have been met.	Based on the findings of this review it is the opinion of the independent reviewer that: • The manner in which the specialist report has been set up is technically scientifically and professionally credible and the results can be relied upon for decision making. • The specialist report is well written and easy to read. • The mitigatory measures presented are appropriate, relevant/necessary, sensible and achievable.	The recommendations above should be considered and where the author deems them appropriate included in the final specialist report to be submitted.

SCIENTIFIC AQUATIC SERVICES (SAS) – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF STEPHEN VAN STADEN

PERSONAL DETAILS

Position in Company	Managing member, Ecologist with focus on Freshwater Ecology
Date of Birth	13 July 1979
Nationality	South African
Languages	English, Afrikaans
Joined SAS	2003 (year of establishment)
Other Business	Trustee of the Serenity Property Trust and emerald Management Trust

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Registered Professional Scientist at South African Council for Natural Scientific Professions (SACNASP);
Accredited River Health practitioner by the South African River Health Program (RHP);
Member of the South African Soil Surveyors Association (SASSO);
Member of the Gauteng Wetland Forum;
Member of International Association of Impact Assessors (IAIA) South Africa;
Member pf the Land Rehabilitation Society of South Africa (LaRSSA)

EDUCATION

Qualifications

MSc (Environmental Management) (University of Johannesburg)	2003
BSc (Hons) Zoology (Aquatic Ecology) (University of Johannesburg)	2001
BSc (Zoology, Geography and Environmental Management) (University of Johannesburg)	2000
Tools for wetland Assessment short course Rhodes University	2016

COUNTRIES OF WORK EXPERIENCE

South Africa – All Provinces
Southern Africa – Lesotho, Botswana, Mozambique, Zimbabwe Zambia
Eastern Africa – Tanzania Mauritius
West Africa – Ghana, Liberia, Angola, Guinea Bissau, Nigeria, Sierra Leone
Central Africa – Democratic Republic of the Congo

PROJECT EXPERIENCE (Over 2500 projects executed with varying degrees of involvement)

1 Mining Coal, Chrome, PGM's, Mineral Sands, Gold, Phosphate, river sand, clay, fluorspar
2 Linear developments
3 Energy Transmission, telecommunication, pipelines, roads
4 Minerals beneficiation
5 Renewable energy (wind and solar)

6 Commercial development
7 Residential development
8 Agriculture
9 Industrial/chemical

REFERENCES

- Terry Calmeyer (Former Chairperson of IAIA SA)
  Director: ILISO Consulting Environmental Management (Pty) Ltd
  Tel: +27 (0) 11 465 2163
  Email: terryc@icem.co.za

- Alex Pheiffer
  African Environmental Management Operations Manager
  SLR Consulting
  Tel: +27 11 467 0945
  Email: apheiffer@slrconsulting.com

- Marietjie Eksteen
  Managing Director: Jacana Environmental
  Tel: 015 291 4015

Yours faithfully

STEPHEN VAN STADEN

SCIENTIFIC AQUATIC SERVICES (SAS) – SPECIALIST CONSULTANT INFORMATION
CURRICULUM VITAE OF SANJA ERWEE

PERSONAL DETAILS

Position in Company	Ecologist, GIS Technician, Faunal Specialist
Date of Birth	8 April 1991
Nationality	South African
Languages	English, Afrikaans
Joined SAS	2014

EDUCATION

Qualifications

BSc Zoology	2013

Short Courses

Global Mapper	2015
SANBI BGIS Course	2017
Global Mapper Lidar Course	2017

COUNTRIES OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, North West, KwaZulu-Natal, Limpopo, Free State, Northern Cape

SELECTED PROJECT EXAMPLES

GIS Assessments

- Completed GIS mapping and GIS analysis for a significant number of ecological projects
- Desktop assessment of 45 wetland and river crossings identified along the proposed Fibreco Fibre Optic Cable Route changes between Cape Town to George, George to Port Elizabeth and from Port Elizabeth to Durban
- High level desktop ecological study and site sensitivity report as part of the site selection process for the possible Rapid Rail Extension to the Gauteng Rapid Rail Network
- Ecological scan and site sensitivity report as part of the environmental authorisation process prior to prospecting activities for two prospecting areas in Newcastle, Kwazulu-Natal
- High level desktop study and site sensitivity report as part of the environmental authorisation process prior to prospecting activities on Portion 4 of the Farm Kapstewel no 436, Administrative District of Hay, Northern Cape
- Cumulative Sensitivity Analyses using GIS Techniques for the Fuleni Anthracite Project, KwaZulu Natal.
- High level desktop study and site sensitivity report for mining activities on the farm Wessel 227 and Dibiaghomo, North of Black Rock, Northern Cape Province
- High level desktop study and site sensitivity report prior to prospecting activities for the Minerano Gold Fields Project, near Viljoenskroon, Free State Province

Wetland Assessments

- Wetland and aquatic ecological assessment for the proposed N3 De Beers Pass Route.
- Wetland assessment as part of the environmental authorisation process for the proposed Sappi Enstra Mill Wastewater Pipeline in Springs
- Wetland Verification and Rehabilitation Criteria for Aspen Hills Estate
- Wetland Ecological Assessment for development in Shoshanguve, adjacent to Tshwane University

of Technology

- Wetland assessment as part of the environmental authorisation process for the proposed Braakfontein Coal Mine near Newcastle, Kwazulu-Natal Province
- Wetland assessment as part of the water use license application for the proposed extension of a flood protection wall within the Sorex Estate, Centurion, Gauteng

Faunal Assessments

- Faunal assessment as part of the environmental authorisation process for the proposed New Belfast Mine Railway Siding, Mpumalanga
- Terrestrial ecological scan as part of the environmental authorisation process for the proposed construction of a sewer system in the Ekangala Township, Gauteng Province
- Faunal assessment as part of the environmental authorisation process for the Ledig Water Project near Pilanesberg National Park, North West Province
- Faunal assessment as part of the ecological assessment for the Op Goedenhoop Section 102 Coal Project, Mpumalanga Province
- Terrestrial faunal, floral and wetland ecological assessment update for the proposed water supply pipeline upgrade at the Duvha Power Station, Mpumalanga

Rehabilitation Plan

- Wetland rehabilitation plan for Dorothy Road, Midrand, Gauteng Province
- Rehabilitation and Management Plan for the Freshwater Resources within the Proposed Rivierplaas Farm No 1486 Residential Development, Western Cape Province
- Wetland Rehabilitation and Management Plan for proposed mixed land use development (Kosmosdal extension 92) on the remainder of portion 2 of the farm Olievenhoutbosch 389 jr, Gauteng
- Wetland rehabilitation and management plan, including input into the storm water management, landscaping and Red Data Listed species conservation for the Olifantsvlei Cemetery, Gauteng

Risk Assessment

- Motivation for General Authorisation for the development of a pipeline at Sappi in Springs, Gauteng Province

Water Use Licence Application

- Assisting in the public participation for an Integrated Water Use Licence for the proposed sewer pipeline and upgrade of the Refengkgotso Waste Water Treatment Works (WWTW);
- Writing an emergency response plan for the proposed sewer pipeline and Refengkgotso WWTW

Visual Impact Assessment

- Assistance with the proposed Haga Haga Wind Energy Facility and Grid Connection between Komga and Soto, Eastern Cape Province.
- Visual Impact Assessment as part of the Environmental Assessment and Authorisation Process for the proposed Transvaal Gold Mining Estates (TGME) Development Project: Gold Mining Project (GMP) – Pre-Mined Residue (PMR) And Hard Rock Mining (HRM) Near Sabie (Project 10161), Mpumalanga Province.
- Visual Impact Assessment as part of the Environmental Assessment and Authorisation Process for the proposed Transvaal Gold Mining Estates (TGME) Development Project: Gold Mining Project (GMP) – Pre-Mined Residue (PMR) And Hard Rock Mining (HRM) Near Pilgrims Rest (Project 10167), Mpumalanga Province.
- Visual Impact Assessment as part of the Environmental Assessment and Authorisation Process for the proposed N3 Logistics Hub, adjacent to the N3 national highway, Gauteng Province.
- Visual Impact Assessment as part of the Environmental Assessment and Authorisation Process for the proposed Mining of Gypsum on Portion 0 of the Farm Kanakies 332, near Loeriesfontein, Northern Cape Province.
- Visual Impact Assessment as part of the Environmental Authorisation Process for the Mining Right for opencast and underground mining of Gold for the Soweto Cluster West Wits Project, North of Soweto, Gauteng Province.
- Visual Impact Assessment as part of the Environmental Impact Assessment and Authorisation Process for the proposed construction of a New Water Treatment Plant at the Khutala Colliery,

Ogies, Mpumalanga Province.

- Visual Impact Assessment as part of the Environmental Assessment and Authorisation Process for the proposed Olievenhoutbosch Solar Facility, Centurion, Gauteng Province.
- Visual Impact Assessment as part of the Section 24G rectification process for the unauthorised activities at the Mamatwan Mine, near Hotazel, Northern Cape Province.
- Visual Impact Assessment as part of the Environmental Impact Assessment and Authorisation process for the proposed development of a coal washing plant, discard dump and associated activities on Portion 2 of Kromdraai 303 JS and Portion 5 of Elandsfontein 309 JS, east of Balmoral, Mpumalanga Province.
- Visual Impact Assessment as part of the Environmental Impact Assessment and Authorisation Process for the proposed Cygnus Mining Project, Limpopo Province.
- Visual Impact Assessment part of the Environmental Impact Assessment and Authorisation Process for the proposed TGME mine development project: amendment to MR83 to include the Theta, Browns and Iota Projects, near Pilgrim's Rest, Mpumalanga Province.

MOOI PLAATS SOLAR POWER (PTY) LTD / WONDERHEUVEL SOLAR POWER (PTY) LTD / PAARDE VALLEY SOLAR POWER (PTY) LTD

Proposed Construction of Three Solar Photovoltaic Energy Facilities near Noupoort and Middelburg, Northern and Eastern Cape Provinces

Visual Impact Assessment Report – Impact Phase

DEA Reference: (14/12/16/3/3/2/1134; 14/12/16/3/3/2/1135; 14/12/16/3/3/2/1136)
Issue Date: 19 November 2019
Version No.: 1
Project No.: 15324

Date:	19 11 19
Document Title:	Proposed Construction of Three Solar Photovoltaic Energy Facilities near Noupoort and Middelburg, Northern and Eastern Cape Provinces
Version Number:	1
Author:	Kerry Schwartz
Checked by:	Liandra Scott-Shaw
Approved by:	Liandra Scott-Shaw B.Sc. (Hons) Ecological Science (UKZN)
Signature:	
Externally Reviewed by:	Stephen Van Staden M.Sc. (Environmental Management), University of Johannesburg
Client:	Mooi Plaats Solar Power (Pty) Ltd / Wonderheuvel Solar Power (Pty) Ltd / Paarde Valley Solar Power (Pty) Ltd

Confidentiality Statement

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 Construction of three (3) Solar Photovoltaic Energy Facilities near Noupoort and Middelburg, Northern and Eastern Cape Provinces

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

SPECIALIST INFORMATION

Specialist Company Name:	SiVEST			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	3	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:		
Telephone:	011 798 0632	Fax:	011 803 7272	
E-mail:	kerrys@sivest.co.za			

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 Schwach

Signature of the Specialist

SiVEST

Name of Company:

03 May 2019

Date

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 1.4.** Specialist CV's are included in **Appendix A**
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	**Page 3 - 5**
(c) an indication of the scope of, and the purpose for which, the report was prepared;	**Section 1.**
(cA) an indication of the quality and age of base data used for the specialist report;	**Section 1.5.** **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 1.3.** **Section 1.5.3.**
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	**Section 1.5.**
(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 5.**
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	**Section 1.3.**
(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;	N/A
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	**Section 5.5.** **.**
(n) a reasoned opinion—	**Section 7.1.**

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 or Environmental Authorization, and where applicable, the closure plan;	
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	**No feedback has been received from the public participation process regarding the visual environment.**
(p) any other information requested by the competent authority	**No information regarding the visual study has been requested from the competent authority.**
(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**

MOOI PLAATS SOLAR POWER (PTY) LTD / WONDERHEUVEL SOLAR POWER (PTY) LTD / PAARDE VALLEY SOLAR POWER (PTY) LTD

PROPOSED CONSTRUCTION OF THREE SOLAR PHOTOVOLTAIC ENERGY FACILITIES NEAR NOUPOORT AND MIDDELBURG, EASTERN AND NORTHERN CAPE PROVINCES

VISUAL IMPACT ASSESSMENT REPORT – IMPACT PHASE

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GLOSSARY OF TERMS

ABBREVIATIONS

DEIAR	Draft Environmental Impact Assessment Report
DM	District Municipality
DoE	Department of Energy
DSR	Draft Scoping Report
DTM	Digital Terrain Model
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
FEIAR	Final Environmental Impact Assessment Report
FSR	Final Scoping Report
GIS	Geographic Information System
I&AP	Interested and/or Affected Party
IPP	Independent Power Producer
LM	Local Municipality
kV	Kilovolt
MW	Megawatt
NGI	National Geo-Spatial Information
REIPPP	Renewable Energy Independent Power Producer 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.

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

Study area: The study area or visual assessment zone is assumed to encompass a zone of 10km from the outer boundary of the proposed WEF application site, and 5km from the proposed grid connection corridor alternatives.

Visual assessment zone: The visual assessment zone or study area or visual assessment zone is assumed encompass a zone of 10km from the outer boundary of the proposed WEF application site, and 5km from the proposed grid connection corridor alternatives.

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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PROPOSED CONSTRUCTION OF THREE SOLAR PHOTOVOLTAIC ENERGY FACILITIES NEAR NOUPOORT AND MIDDELBURG, EASTERN AND NORTHERN CAPE PROVINCES

VISUAL IMPACT ASSESSMENT REPORT – IMPACT PHASE

1 INTRODUCTION

Mooi Plaats Solar Power (Pty) Ltd, Wonderheuvel Solar Power (Pty) Ltd and Paarde Valley Solar Power (Pty) Ltd are proposing to construct three (3) Solar Photovoltaic (PV) Energy Facilities on adjoining sites near Noupoort and Middelburg in the Northern Cape and Eastern Cape Provinces. Each of the proposed PV Facilities will require a full Environmental Impact Assessment (EIA) process. Additionally, the associated grid infrastructure will require a Basic Assessment (BA) to be undertaken. As such, three (3) EIAs will be undertaken, one for each proposed PV Facility, and three (3) BAs will be undertaken, one for each associated grid infrastructure. Accordingly, SiVEST has been appointed to undertake the required EIAs and BAs.

This Visual Impact Assessment (VIA) is being undertaken as part of the EIA and BA processes. During the Scoping Phase of the EIA, a scoping-level VIA was conducted with the aim of identifying potential visual issues associated with the development of the proposed solar photovoltaic energy facilities (SPEFs), and determining the potential extent of visual impacts. This study characterised the visual environment of the area and identified areas of potential visual sensitivity, with the main focus on the potentially sensitive visual receptor locations. In addition, the study provided an assessment of the magnitude and significance of the visual impacts associated with each of the proposed SPEF developments.

1.1 Project Description

At this stage it is proposed that three (3) Solar Photovoltaic (PV) Energy Facilities will be developed, these being:

- Mooi Plaats Solar PV (hereafter referred to as “Mooi Plaats”), on an application site of approximately 5303ha.
- Wonderheuvel Solar PV (hereafter referred to as “Wonderheuvel”), on an application site of approximately 5652ha.

- Paarde Valley Solar PV (hereafter referred to as “Paarde Valley”), on an application site of approximately 3962ha.

The generated electricity will be fed into the national grid at either the Hydra D MTS Substation or the proposed Coleskop WEF Substation via a 132kV power line.

The key components of the project are detailed below and the three application sites and associated grid connection proposals are shown in **Figure 1, Figure 2** and **Figure 3**.

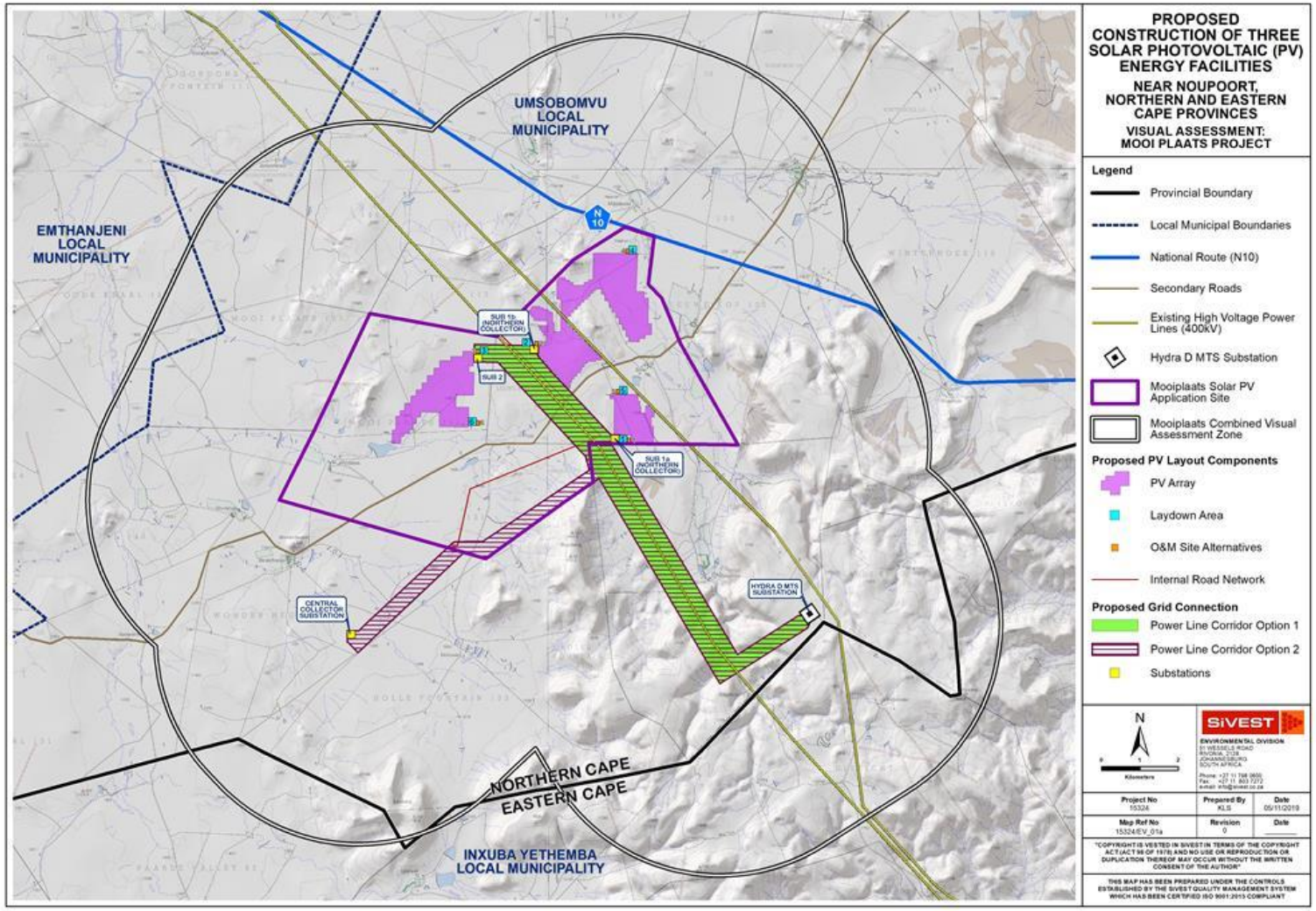

Figure 1: Proposed Mooi Plaats Solar PV Project

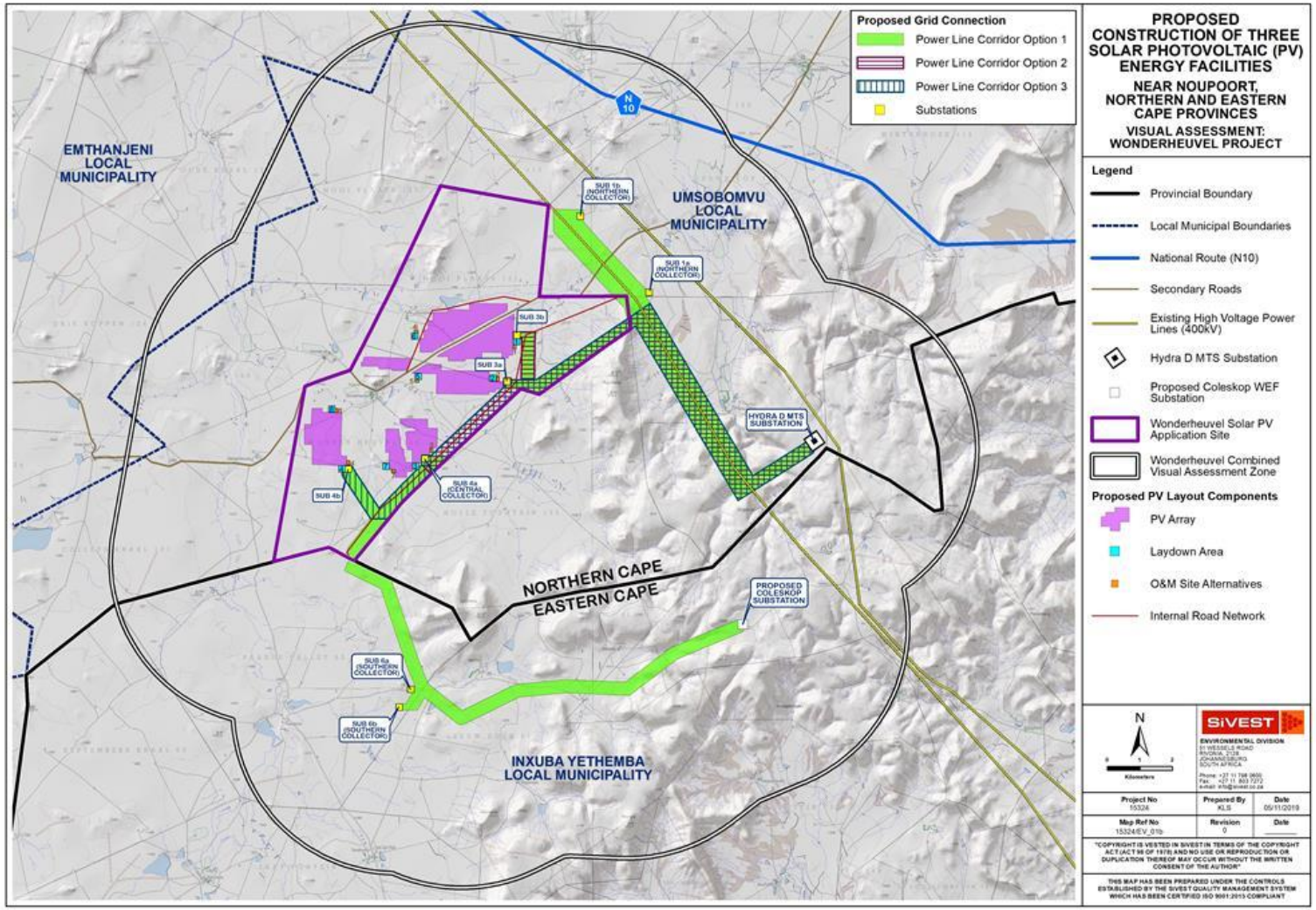

Figure 2: Proposed Wonderheuvel Solar PV Project

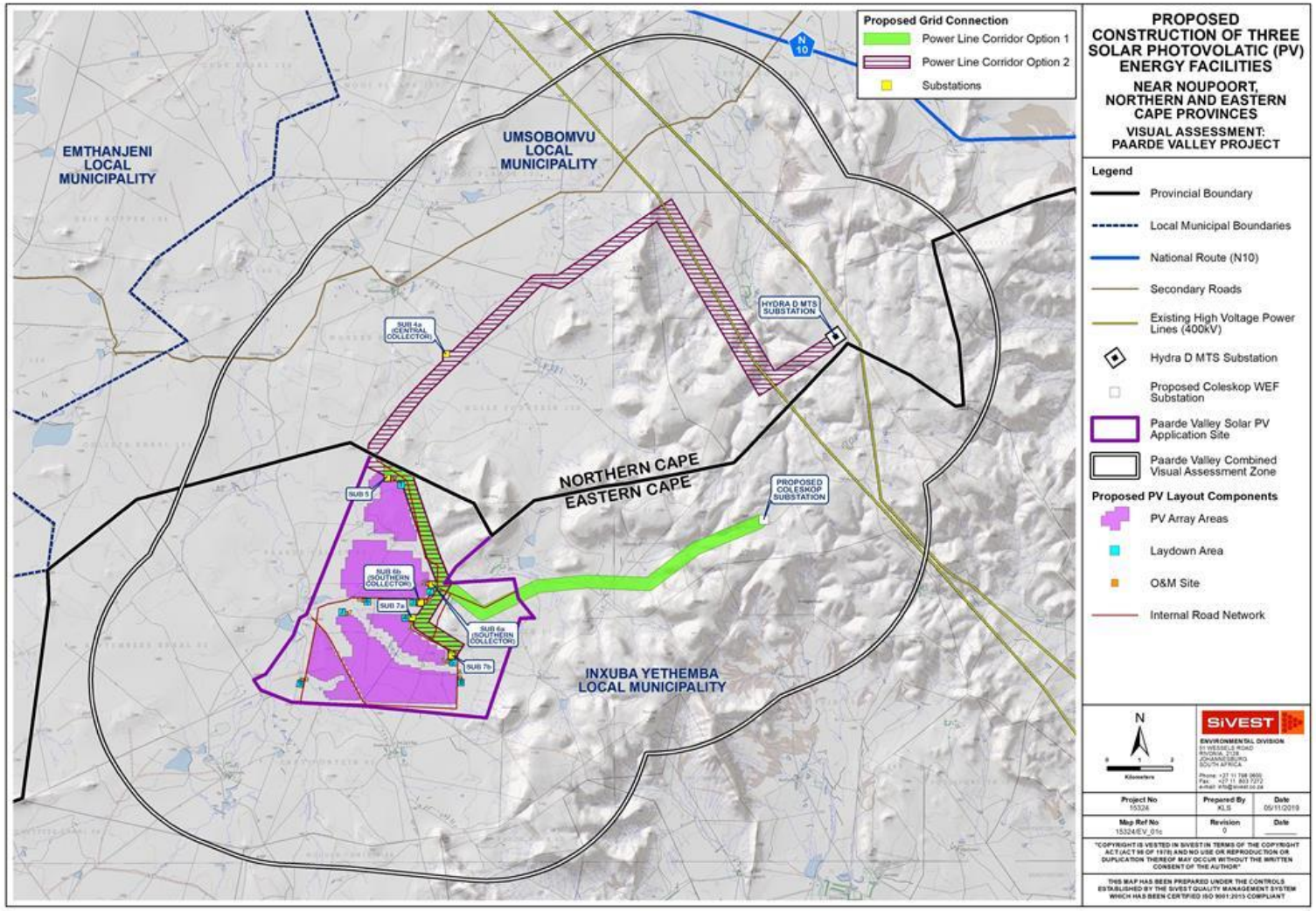

Figure 3: Proposed Paarde Valley Solar PV Project

1.1.1 Solar PV Facilities

Mooi Plaats Solar PV Energy Facility:

The proposed Mooi Plaats Solar PV Energy Facility will include the following components:

- Three (3) PV array areas, occupying a combined total area of approximately 777 hectares (ha).
- The proposed solar PV energy facility will have a maximum total generation capacity of approximately **400MW** and will comprise approximately **1 142 857** PV modules. The final number of modules as well as their configuration will only be determined in the detailed design phase.
- PV modules will be either fixed tilt mounting or single axis tracking mounting (**Figure 4**), and the modules will be either crystalline silicon or thin film technology. Each module will be approximately 2m wide and between 1m and 4m in height, depending on the mounting type.
- Internal roads, between 4m and 10m wide, will provide access to the PV arrays. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary.
- Up to three (3) temporary construction laydown / staging areas of approximately 4ha each.
- Operation and maintenance (O&M) buildings will be provided for each PV array area, occupying a site of approximately 1ha each. Up to a maximum of three (3) O&M buildings will thus be constructed.
- Medium voltage cabling will link the solar PV energy facility to the grid connection infrastructure. These cables will be laid underground wherever technically feasible (**Figure 5**).

Wonderheuvel Solar PV Energy Facility:

The proposed Wonderheuvel Solar PV Energy Facility will include the following components:

- Six (6) PV array areas, occupying a combined total area of approximately 864ha.
- The proposed solar PV energy facility will have a maximum total generation capacity of approximately **480MW** and will comprise approximately **1 371 429** PV modules. The final number of modules as well as their configuration will only be determined in the detailed design phase.
- PV modules will be either fixed tilt mounting or single axis tracking mounting, and the modules will be either crystalline silicon or thin film technology. Each module will be approximately 2m wide and between 1m and 4m in height, depending on the mounting type.
- Internal roads, between 4m and 10m wide, will provide access to the PV arrays. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary.

- Up to a maximum of four (4) temporary construction laydown / staging areas of approximately 4ha each.
- Operation and maintenance (O&M) buildings will be provided for each PV array area, occupying a site of approximately 1ha each. However, certain PV array areas will share O&M buildings. Up to a maximum of four (4) O&M buildings will thus be constructed.
- Medium voltage cabling will link the solar PV energy facility to the grid connection infrastructure. These cables will be laid underground wherever technically feasible.

Paarde Valley Solar PV Energy Facility:

The proposed Paarde Valley Solar PV Energy Facility will include the following components:

- Five (5) PV array areas, occupying a combined total area of approximately 1 337ha.
- The proposed solar PV energy facility will have a maximum total generation capacity of approximately **700MW** and will comprise approximately **2 000 000** PV modules. The final number of modules as well as their configuration will only be determined in the detailed design phase.
- PV modules will be either fixed tilt mounting or single axis tracking mounting, and the modules will be either crystalline silicon or thin film technology. Each module will be approximately 2m wide and between 1m and 4m in height, depending on the mounting type.
- Internal roads, between 4m and 10m wide, will provide access to the PV arrays. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary.
- Up to five (5) temporary construction laydown / staging areas of approximately 4ha each.
- Operation and maintenance (O&M) buildings will be provided for each PV array area, occupying a site of approximately 1ha each. Up to a maximum of five (5) O&M buildings will thus be constructed.
- Medium voltage cabling will link the solar PV energy facility to the grid connection infrastructure. These cables will be laid underground wherever technically feasible.

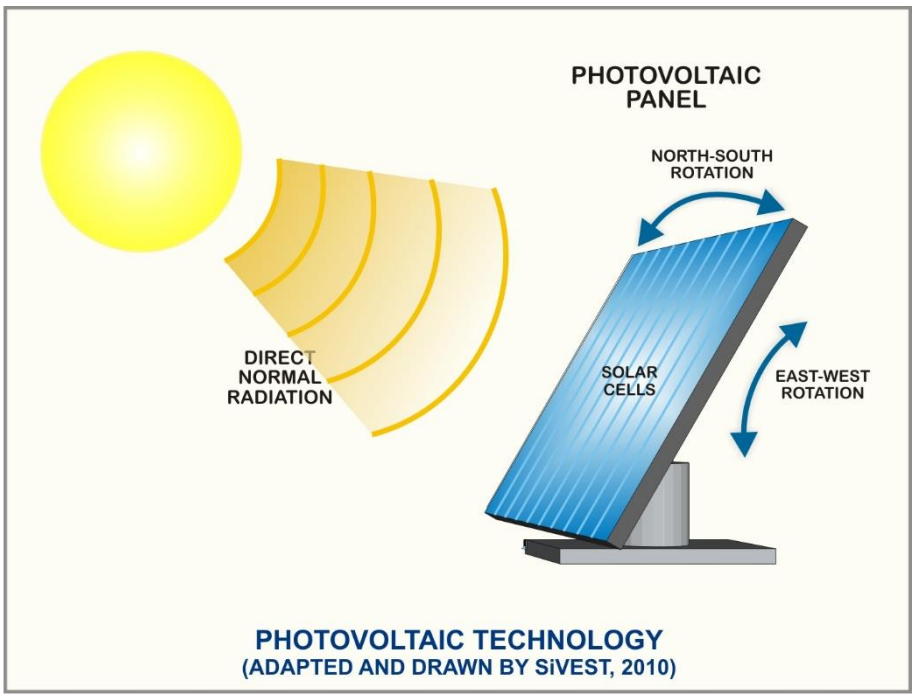

Figure 4: Typical components of a solar PV Panel

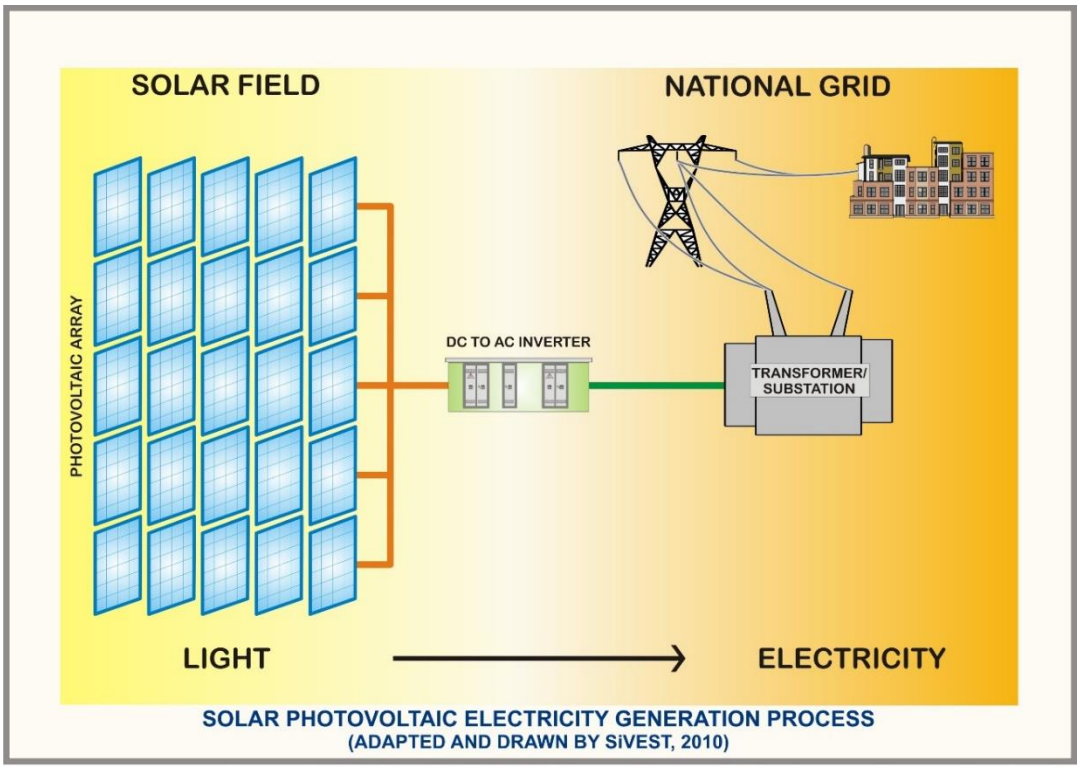

Figure 5: Conceptual PV electricity generation process showing electrical connections

1.1.2 Grid Connection Infrastructure

The proposed grid connection infrastructure for each PV facility is being assessed as part of a separate BA application. The grid connections will include the following components:

- New on-site substations and collector substations to serve each PV facility, each occupying an area of up to 4ha.
- A new 132kV overhead power line connecting the on-site substations or collector substations to either Hydra D Main Transmission Substation (MTS) or the proposed Coleskop Wind Energy Facility (WEF) substation from where the electricity will be fed into the national grid. The type of power line towers being considered at this stage will include both lattice and monopole towers which will be up to 25m in height and it is assumed that these towers will be located approximately 200m to 250m apart. The exact location of the towers will be determined during the final design stages of the power line.

Grid connection infrastructure alternatives have been provided for each PV project. These alternatives essentially provide for different route alignments with associated substations contained within an assessment corridor of between approximately 400m and 900m wide. This is to allow for flexibility to route the power line on either side of the existing high voltage Eskom power lines. The respective alternatives are as follows:

- ***Mooi Plaats Solar PV Grid Connection***

The alternatives essentially provide for two (2) different route alignments with associated substations contained within an assessment corridor between approximately 400m and 900m wide. The alternatives are as follows:

OPTION 1:

- **Corridor Option 1a** - links Substation 2 and Substation 1a to the Hydra D MTS.
- **Corridor Option 1b** - links Substation 2 and Substation 1b to the Hydra D MTS.

OPTION 2:

- **Corridor Option 2a** -links Substation 2 and Substation 1a to the Hydra D MTS via the proposed Central Collector substation located on the Wonderheuvel PV project application site.
- **Corridor Option 2b** - links Substation 2 and Substation 1b to the Hydra D MTS via the proposed Central Collector substation located on the Wonderheuvel PV project application site.

- ***Wonderheuvel Solar PV Grid Connection***

The alternatives essentially provide for three (3) different route alignments with associated substations contained within an assessment corridor between approximately 400m and 900m wide. The alternatives are as follows:

OPTION 1:

- **Corridor Option 1a** involves two (2) separate grid connections to serve the northern and southern sections of the application site.

a. The *northern connection* links the Proposed Substation 3a to the Hydra D MTS via the proposed Northern Collector Substation located on the Mooi Plaats PV project application site.
b. The *southern connection* links the proposed Substation 4a to the Coleskop WEF Substation via the proposed Southern Collector Substation located on the Paarde Valley PV Project application site.

- **Corridor Option 1b** involves two (2) separate grid connections to serve the northern and southern sections of the application site.
  a. The *northern* connection links the Proposed Substation 3a to the Hydra D MTS via the proposed Northern Collector Substation located on the Mooi Plaats PV project application site.
  b. The *southern connection* links the proposed Substation 4b to the Coleskop WEF Substation via the proposed Southern Collector Substation located on the Paarde Valley PV Project application site.

- **Corridor Option 1c** involves two (2) separate grid connections to serve the northern and southern sections of the application site.
  a. The *northern* connection links the Proposed Substation 3b to the Hydra D MTS via the proposed Northern Collector Substation located on the Mooi Plaats PV project application site.
  b. The *southern connection* links the proposed Substation 4a to the Coleskop WEF Substation via the proposed Southern Collector Substation located on the Paarde Valley PV Project application site.

- **Corridor Option 1d** involves two (2) separate grid connections to serve the northern and southern sections of the application site.
  a. The *northern connection* links the Proposed Substation 3b to Hydra D MTS via the proposed Northern Collector Substation located on the Mooi Plaats PV project application site.
  b. The *southern connection* links the proposed Substation 4b to the Coleskop WEF Substation via the proposed Southern Collector Substation located on the Paarde Valley PV Project application site.

OPTION 2:

- **Corridor Option 2a** - links Substation 3a to the Hydra D MTS via the proposed Central Collector Substation.

- **Corridor Option 2b** - Option 2b links Substation 3b to Hydra D MTS via the proposed Central Collector Substation.

OPTION 3:

- **Corridor Option 3** links Substation 4b to Hydra D MTS via the proposed Central Collector Substation.

- **Paarde Valley Solar PV Grid Connection**

The alternatives essentially provide for two (2) different route alignments with associated substations contained within an assessment corridor between approximately 400m and 900m wide. The alternatives are as follows:

OPTION 1:

- Corridor **Option 1a** involves two (2) separate grid connections to serve the northern and southern sections of the application site.
  i. The *northern connection* links Substation 5 to Coleskop Substation via the proposed Southern Collector Sub (Substation 6a will act as Central Collector for this option).
  ii. The *southern connection* links Substation 7a to the Coleskop Substation via the proposed Southern Collector Substation (Substation 6a will act as Southern Collector for this option).

- Corridor **Option 1b** involves two (2) separate grid connections to serve the northern and southern sections of the application site.
  i. The *northern connection* links Substation 5 to Coleskop Substation via the proposed Southern Collector Sub (Substation 6b will act as Southern Collector for this option).
  ii. The *southern connection* links Substation 7a to the Coleskop Substation via the proposed Southern Collector Substation (Substation 6b will act as Southern Collector for this option).

- Corridor **Option 1c** involves two (2) separate grid connections to serve the northern and southern sections of the application site.
  i. The *northern connection* links Substation 5 to Coleskop Substation via the proposed Southern Collector Sub (Substation 6a will act as Southern Collector for this option).
  ii. The *southern connection* links Substation 7b to the Coleskop Substation via the proposed Southern Collector Substation (Substation 6a will act as Southern Collector for this option).

- Corridor **Option 1d** involves two (2) separate grid connections to serve the northern and southern sections of the application site.
  i. The *northern connection* links Substation 5 to Coleskop Substation via the proposed Southern Collector Sub (Substation 6b will act as Southern Collector for this option).
  ii. The *southern connection* links Substation 7b to the Coleskop Substation via the proposed Southern Collector Substation (Substation 6b will act as Southern Collector for this option).

OPTION 2:

- Corridor **Option 2a** involves two (2) separate grid connections to serve the northern and southern sections of the application site.

i. The *northern connection* links Substation 5 to Hydra D MTS via the proposed Central Collector Sub located on the Wonderveuvel PV Project application site.
ii. The *southern connection* links Substation 6a and 7a to the Hydra D MTS via the proposed Central Collector Substation located on the Wonderheuvel PV Project application site.

- Corridor **Option 2b** involves two (2) separate grid connections to serve the northern and southern sections of the application site.
  i. The *northern connection* links Substation 5 to Hydra D MTS via the proposed Central Collector Sub located on the Wonderheuvel PV Project application site.
  ii. The *southern connection* links Substation 6b and 7b to the Hydra D MTS via the proposed Central Collector Substation located on the Wonderheuvel PV Project application site.

- Corridor **Option 2c** involves two (2) separate grid connections to serve the northern and southern sections of the application site.
  i. The *northern connection* links Substation 5 to Hydra D MTS via the proposed Central Collector Sub located on the Wonderheuvel PV Project application site.
  ii. The *southern connection* links Substation 6a and 7b to the Hydra D MTS via the proposed Central Collector Substation located on the Wonderheuvel PV Project application site.

- Corridor **Option 2d** involves two (2) separate grid connections to serve the northern and southern sections of the application site.
  i. The *northern connection* links Substation 5 to Hydra D MTS via the proposed Central Collector Sub located on the Wonderheuvel PV Project application site.
  ii. The *southern connection* links Substation 6b and 7a to the Hydra D MTS via the proposed Central Collector Substation located on the Wonderheuvel PV Project application site.

1.2 Project Location

The proposed SEFs are located on adjoining farms lying south-west of Noupoort in the Northern Cape Province (**Figure 6**).

Mooi Plaats Solar PV project is located in the Umsobomvu Local Municipality, within the Pixley ka Seme District of the Northern Cape Province. The application site lies immediately south of the N10 national route, some 23kms from Noupoort, and comprises the following farm portions:

- Portion 1 of Leuwe Kop No 120
- Remainder of Mooi Plaats No 121

Wonderheuvel Solar PV project is also located in the Umsobomvu Local Municipality, within the Pixley ka Seme District of the Northern Cape Province. The application site lies between the Mooi Plaats Solar PV application site and the Paarde Valley Solar PV application site, some 30kms from Noupoort, and comprises the following farm portions:

- Remainder of Mooi Plaats No 121
- Portion 3 of Wonder Heuvel No 140
- Portion 5 of Holle Fountain No 133

Paarde Valley Solar PV project is located in the Inxuba Yethemba Local Municipality, within the Chris Hani District District of the Eastern Cape Province. The application site is located on the southern boundary of the Wonderheuvel Solar PV application site, some 38kms from Noupoort, and 32kms from Middelburg. The application site comprises the following farm portions:

- Portion 2 of Paarde Valley No 62; and
- Portion 7 of the Farm Leeuw Hoek No. 61.

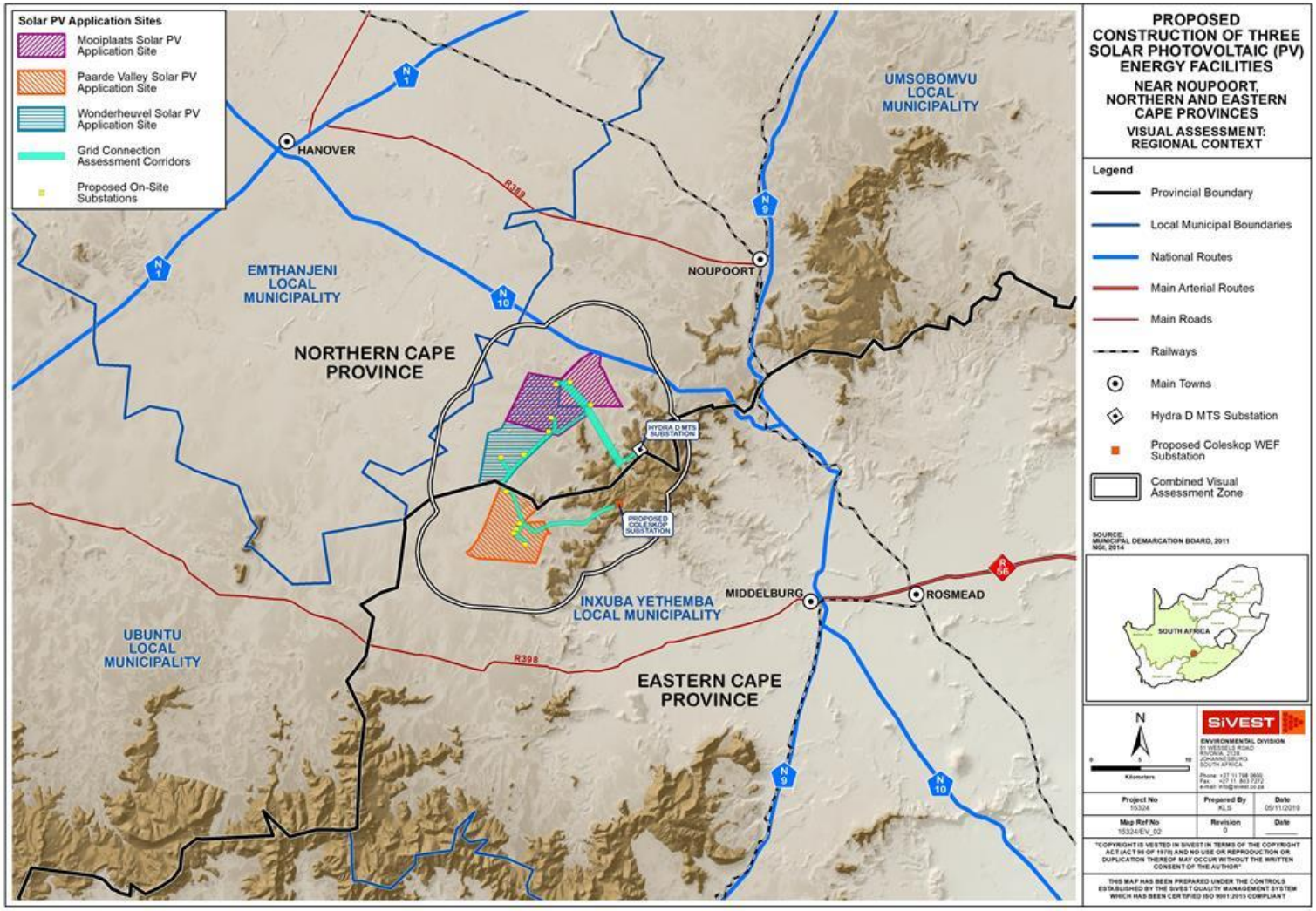

Figure 6: Regional Context

1.3 Assumptions and Limitations

- Given the nature of the receiving environment and the height of the proposed PV panels and power line towers, the study area or visual assessment zone is assumed to encompass an area of 5km from the boundary of the application sites. 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 4th and the 7th of February 2019. Due to the extent of the study area however, and the fact that many of the identified receptors are farm houses on private property, it was not possible to visit or verify every potentially sensitive visual receptor location. As such, a number of 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 EIA-level study, all analysis is based on a worst case scenario where PV panel height has been assumed to be 4m and power line towers and substation structure heights have been assumed to be 25m.

- Due to the varying scales and sources of information; maps may have minor inaccuracies. Terrain data for this 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 does 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, however any feedback from the public during the review period of the Draft Environmental Impact Assessment Report (DEIAR) will be incorporated into further drafts of this report.

- 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 SPEFs 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 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 layouts were still in the preliminary design phase and as such, no visualisation modelling was undertaken for these solar PV projects. 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 February 2019, during mid to late summer, when most rainfall occurs. Typically, the visual impact of a PV project would be less significant during the rainy periods of the year than it would during the drier periods when the surrounding vegetation is expected to provide less potential screening. The study area is however typically characterised by low levels of

rainfall and the vegetation cover is largely dominated by low shrubs. Thus, the season is not expected to have a significant effect on the visual impact of the proposed development.

- The weather conditions in the study area also affect the visual impact of the proposed development to some degree. The site visit was undertaken in clear weather conditions which tend to prevail for most of the year due to the low levels of rainfall in the area. In these clear conditions, PV panels would present a greater contrast with the surrounding landscape than they would during overcast conditions. The weather conditions during the time of the study were therefore taken into consideration when undertaking this VIA.

1.4 Specialist Credentials

The scoping phase VIA was undertaken by Kerry Schwartz and reviewed by Andrea Gibb who was previously employed as a Divisional Manager at SiVEST. Andrea Gibb has 11 years' work experience and specialises in undertaking visual impact and landscape assessments, by making use of ArcGIS technology and field surveys.

Kerry Schwartz 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 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 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

Full CVs are attached as **Appendix B**. In addition, following best practice, an external peer review was undertaken by Stephen Van Staden of Scientific Aquatic Services (CV also attached – **Appendix B**).

1.5 Assessment Methodology

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

1.5.1 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 – 2014). The characteristics identified via desktop analysis were later verified during the site visit.

1.5.2 Identification of sensitive receptors

Visual receptor locations and routes identified in the study area during the scoping phase of the project were re-assessed in order to determine the impact of the amended and/or refined SPEF and grid infrastructure proposals on each of the identified receptor locations.

1.5.3 Fieldwork and photographic review

Fieldwork undertaken during the scoping phase of the VIA involved a four (4) day site visit undertaken between the 4th and the 7th of February 2019 (mid to late summer). 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).

The findings of the field assessment have been used to inform the EIA-level VIA and no further fieldwork was considered necessary.

1.5.4 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) in an attempt to minimise the visual impact of the proposed development. The rating matrix made use of a number of 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. The receptor impact rating developed during the scoping phase of this VIA was re-examined in order to determine

the impact of the amended and/or refined SPEF and grid infrastructure proposals on each of the identified receptor locations.

1.5.5 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, further drafts of this EIA phase report will be updated to include any relevant feedback or comments received during the review period of the Draft Environmental Impact Assessment Reports (DEIARs).

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 SPEF to be a negative visual impact as it is often associated with employment creation, social up-liftment and the general growth and progression of an area, and thus the development could even have positive connotations.

2.2 Visual environment

SPEFs 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 SPEF 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 7)**.

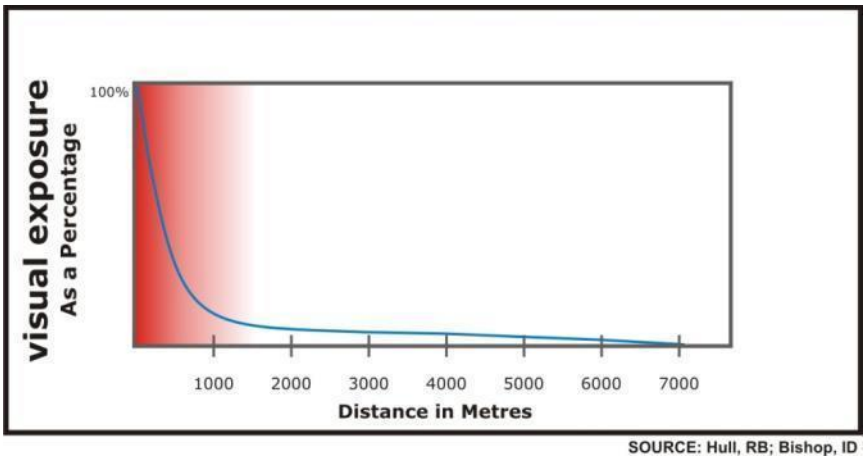

Figure 7: Conceptual representation of diminishing visual exposure over distance

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

As can be seen from the profile graph below (**Figure 8**), the combined assessment area slopes significantly downwards from a height of approximately 1 900 meters above sea level (m.a.s.l) in the east to approximately 1 400msl in the west. Hence the western sector of the study area is characterised by relatively flat terrain with undulating hills, typical of much of the Karoo (**Figure 9**). The eastern sector of the study area is however dominated by areas of greater relief where hilly terrain is characterised by incised valleys, steep slopes and flatter, higher lying plateaus with steep slopes (**Figure 10**).

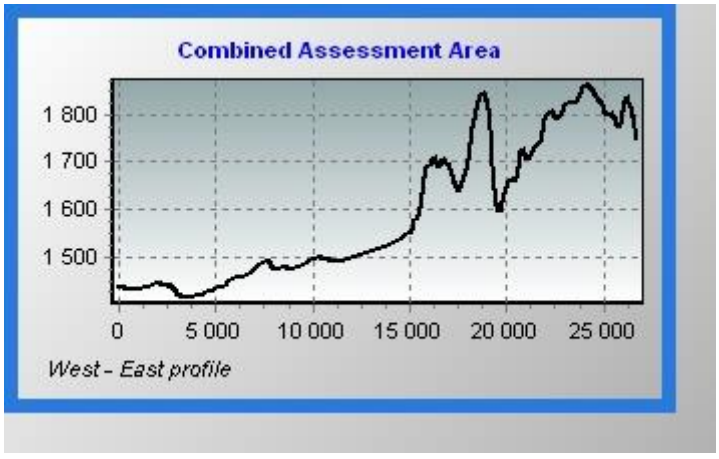

Figure 8: Topographic profile of the combined assessment area.

Maps showing the topography and slopes within and in the immediate vicinity of the combined assessment area are provided in **Figure 11** and **Figure 12.**

Figure 9: Flat to undulating terrain in the western sector of the study area

Figure 10: Hilly terrain in the eastern sector of the study area

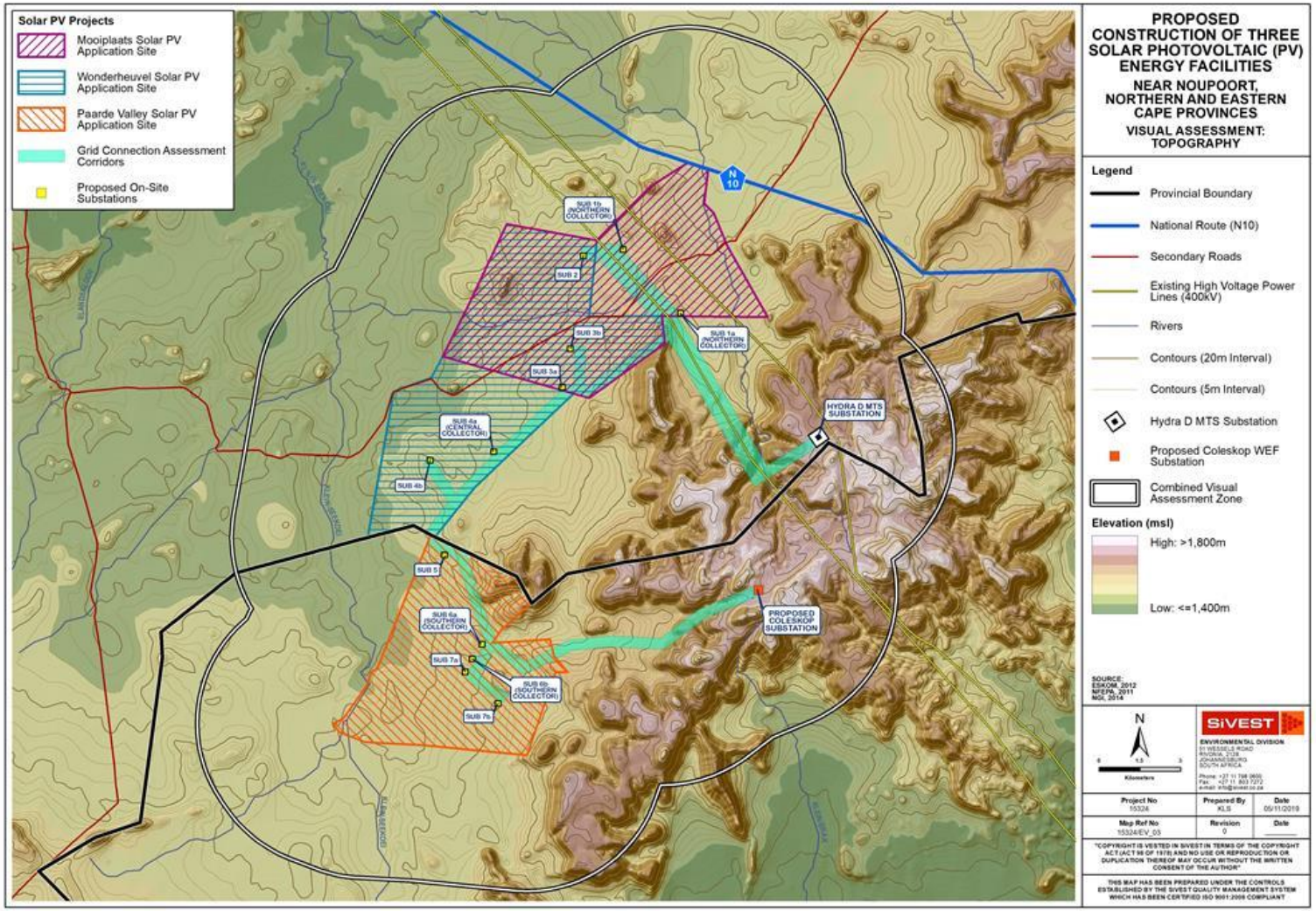

Figure 11: Topography of the study area

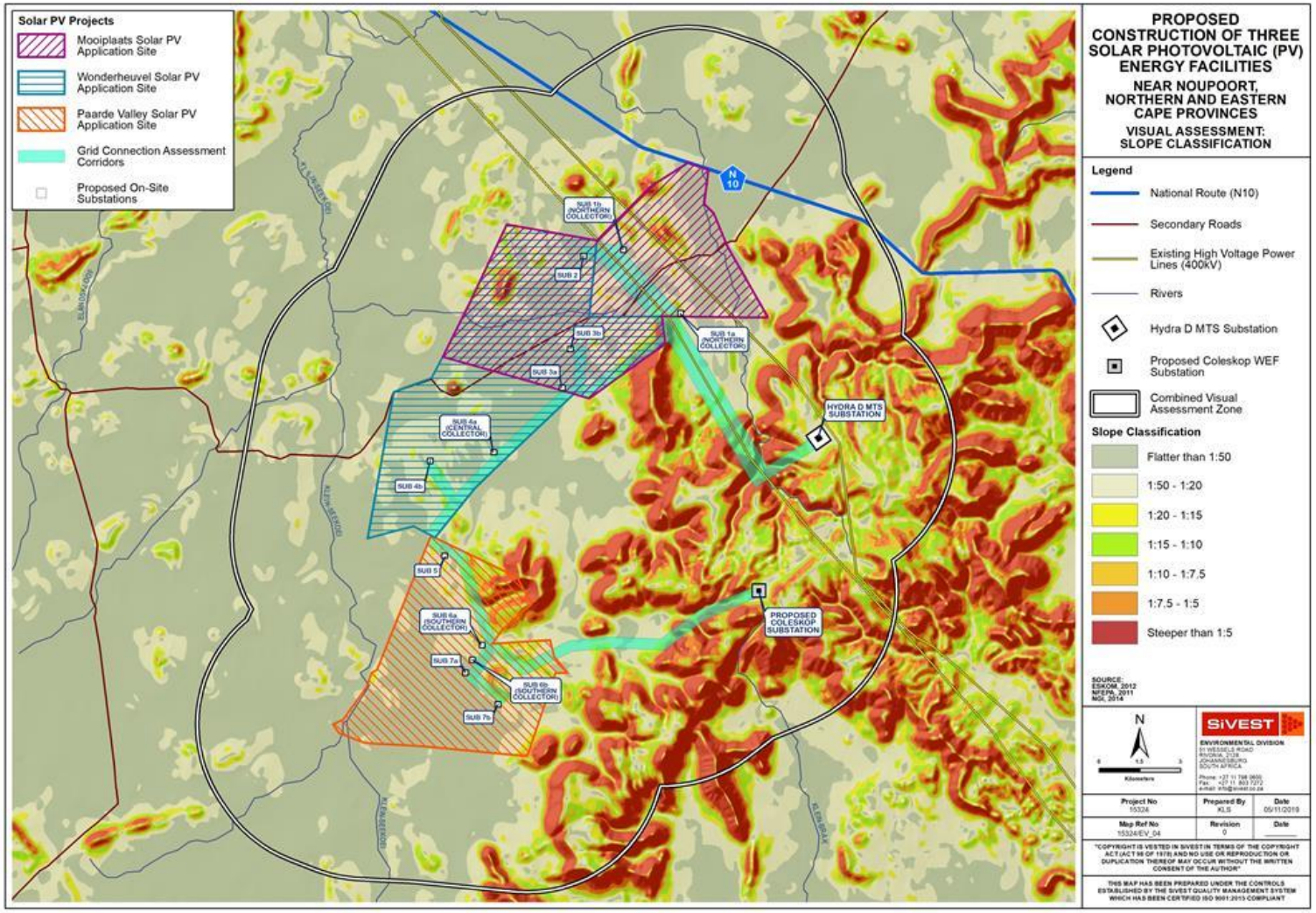

Figure 12: Slope classification

Visual Implications

Areas of flat relief, including the flat plains and the higher-lying plateaus, are characterised by wide ranging vistas (**Figure 13**), although views eastwards will be somewhat constrained by the hilly terrain in the western sector of the study area (**Figure 14**). 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. Sections of the grid connection assessment corridor may however impact on the skyline, particularly where they traverse ridges. In addition, with little to no topographic shielding, the pylons and the steel structures of the proposed substations at a maximum height of 25m are likely to be visible from many of the locally-occurring receptor locations.

Figure 13: View northwards across the study showing area wide ranging vistas

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Figure 14: Hilly terrain constraining views east and southeast

3.1.2 Vegetation

According to Mucina and Rutherford (2012), the areas of the visual assessment zone which are characterised by flatter Karoo plains are largely covered by the Eastern Upper Karoo vegetation type, while the hillier areas in the east of the study area are characterised by Besem Karee Koppies shrubland (**Figure 15**). The aridity of the area has restricted the vegetation to low shrubs distributed uniformly across the landscape (**Figure 16**), except in areas of hillier terrain which tend to be more densely vegetated with more tree species in evidence (**Figure 17**).

Additional tree species are also present in the study area, particularly where exotic tree species and other typical garden vegetation has been established around farmsteads. (**Figure 18**).

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.

Visual Implications

Vegetation cover across the study area is predominantly short and sparse and thus will not provide any visual screening. In some instances however, tall exotic trees planted around farmhouses will restrict views from receptor locations (**Figure 19**).

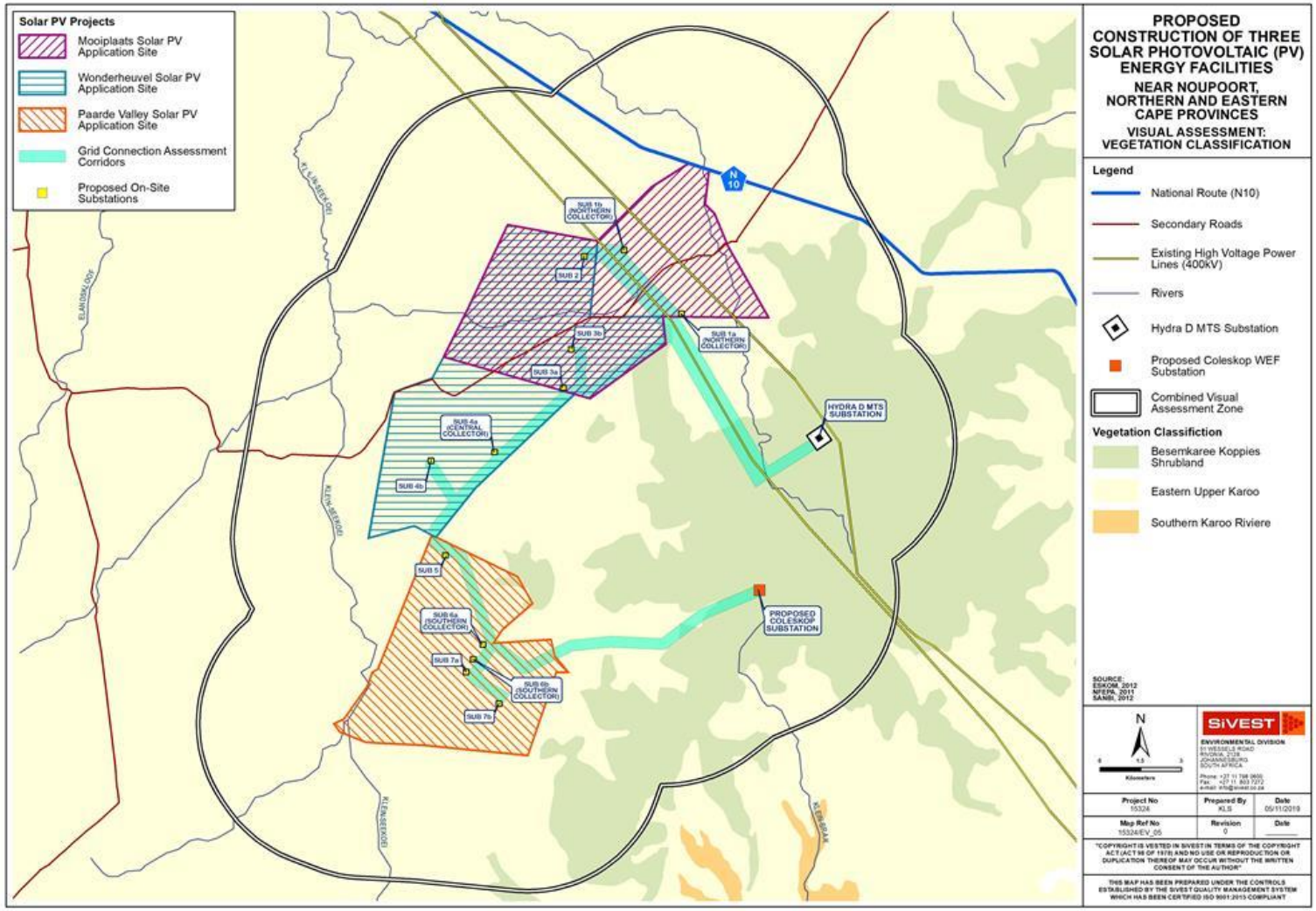

Figure 15: Vegetation Classification in the Study Area

Figure 16: Low shrubland prevalent on the flatter plains of the study area

Figure 17: Denser vegetation and tree species on hilly terrain

Figure 18: Typical trees and garden vegetation around farmhouses

Figure 19: Screening vegetation around farmhouses

3.1.3 Land Use

According to the South African National Land Cover dataset (Geoterraimage 2014), large sections of the visual assessment area are characterised by low shrubland with large areas of grassland and smaller patches of woodland / open bush and thicket / dense bush occurring in the hilly areas in the eastern sector of the study area. Significant tracts of land in the study area are classified as 'bare (none vegetated)', and while some of these 'bare' areas are representative of transformation due to human activity, in many cases these patches of land are merely undisturbed areas with very sparse vegetation cover (**Figure 20**).

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 (**Figure 21**). As such, the natural vegetation has been retained across much of the study area. Livestock farming (mostly sheep) is the dominant activity (**Figure 22**), 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. 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 23**).

Further human influence is visible in the area in the form of the N10 national route which traverses the study area in a north-west to south-east direction (**Figure 24**). In addition, there are several small patches of land scattered across the study area which are classified as 'Mines / Quarries'. These areas appear to be small quarries or 'diggings' and are mostly located adjacent to the public roads, especially along the N10.

The closest built-up area is the town of Noupoort which is situated approximately 23km north-east of the Mooi Plaats application site while Middelburg is some 30km to the south-east of the Paarde Valley application site. These small towns are well outside the combined study area for these SPEFs and are thus not expected to have an impact on the visual character of the study area.

Existing power lines in this area are also significant man-made features in an otherwise undeveloped landscape. Two sets of high voltage (400kV) power lines traverse the northern section of the study area, bisecting the Mooi Plaats solar PV application site in a north-west to south-east alignment (**Figure 25**).

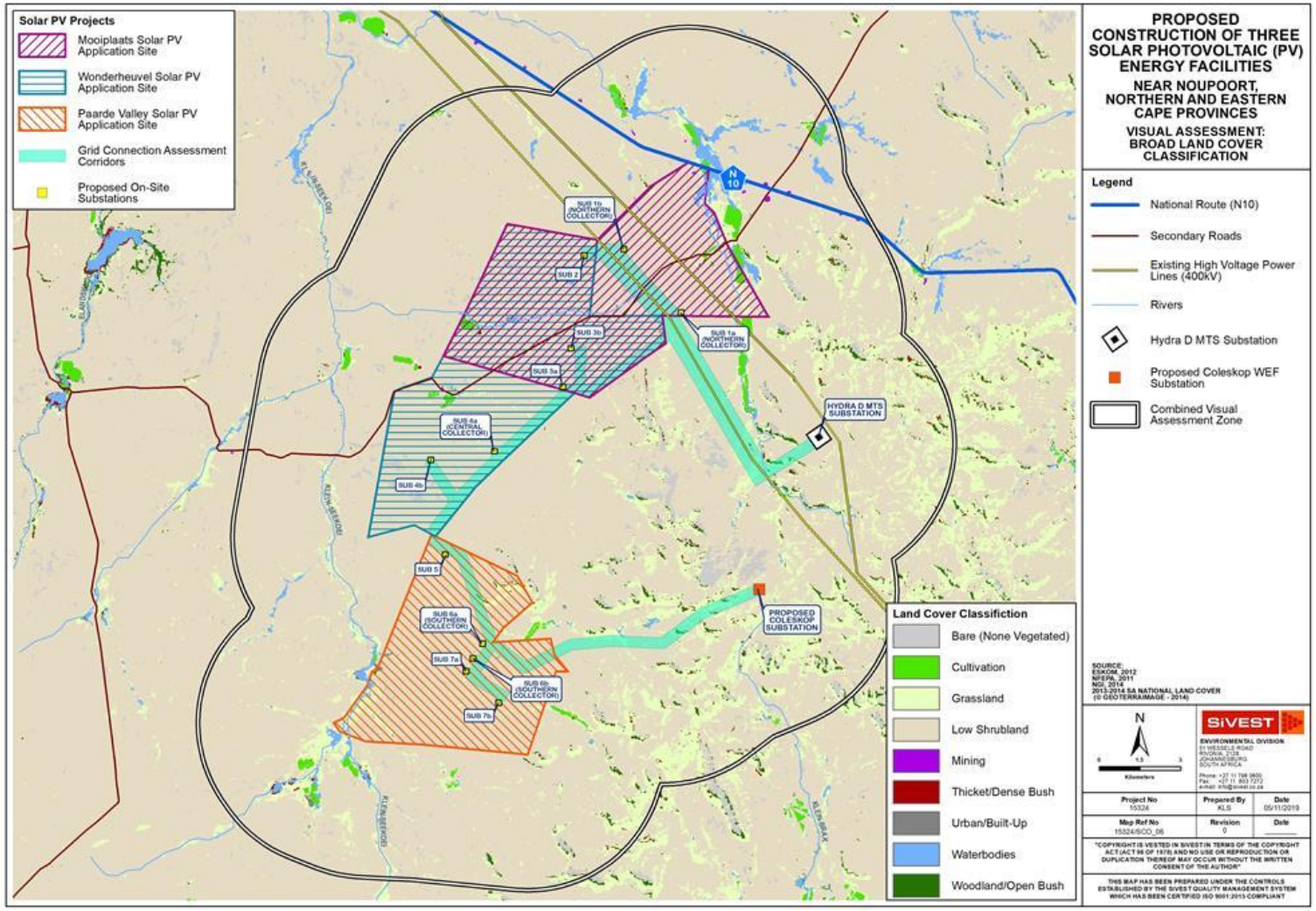

Figure 20: Land Cover Classification

Figure 21: View of cultivated land on Wonderheuvel solar PV application site

Figure 22: Evidence of sheep rearing in the assessment zone

Figure 23: Farm buildings and associated infrastructure on Mooi Plaats Solar PV application site.

Figure 24: View of the N10 National Route on the northern boundary of Mooi Plaats Solar PV application site.

Figure 25: 400kV power lines traversing the Mooi Plaats solar PV application site.

Visual Implications

As stated above, 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, scrubby 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, although the N10 national route and existing high voltage power lines form significant anthropogenic elements in the study area. The presence of this infrastructure is an important factor in this context, as the introduction of a development such as a SPEF would result in less visual contrast where other anthropogenic elements are already present, especially where the scale of those elements is similar to that of the proposed development.

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).

Cultural Landscapes can fall into three categories (according to the Committee's Operational Guidelines):

- "a landscape designed and created intentionally by man";
- an "organically evolved landscape" which may be a "relict (or fossil) landscape" or a "continuing landscape"; and
- an "associative cultural landscape" which may be valued because of the "religious, artistic or cultural associations of the natural element".

The typical 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 Noupoort and Middelburg, 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 terms of the types of cultural landscape listed above, the Karoo cultural landscape would fall into the second category, that of an organically evolved, “continuing” landscape.

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. However, considering the fact that a number of SPEFs and WEFs have been developed or are likely to be developed across the Karoo, it is possible that renewable energy facilities, including wind turbines and PV panels, may in the future become an integral part of the typical Karoo cultural landscape.

In this instance visual impacts on the cultural landscape would be reduced by the fact that the area is relatively remote and there are relatively few tourism or nature-based leisure facilities in the study area. In addition, although the northern portion of the proposed Mooi Plaats application is visible from the N10 national route, the section of this route that traverses the study area does not form part of a designated tourism route and is not expected to experience heavy volumes of tourist traffic.

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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 an SPEF will alter the visual character and sense of place. In addition, the development of other renewable energy facilities in the broader area as planned 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 42, 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 only one tourism facility was identified. In addition, 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.

The relatively flat topography in the study area and the relative lack of vegetation to provide screening would reduce the visual absorption capacity across much of the area. This would be offset to some degree where the landscape has already undergone significant transformation as a result of the N10 National route and the 400kV power lines, thus increasing the overall visual absorption capacity of the landscape.

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

3.5 Visually Sensitive Areas on the Site

During the scoping phase, 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 all three application sites would be visible to the highest numbers of receptors in the study area (**Figure 26**). This analysis took into account all the sensitive and potentially sensitive receptor locations identified as well as points along the N10 receptor roads at 500m intervals. The areas visible to the highest number of receptors were rated as areas of 'high sensitivity' which should preferably be precluded from SPEF 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 low to 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 highly 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 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 take into account 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 residences on the application sites and along the N10 receptor road. It was recommended that PV fields should not be developed within these buffer zones so as to prevent significantly adverse impacts of glint and glare on the local residents and on motorists using the N10.

These areas of visual sensitivity as identified above have been taken into account in the preliminary SPEF layouts as shown in **Figure 26**.

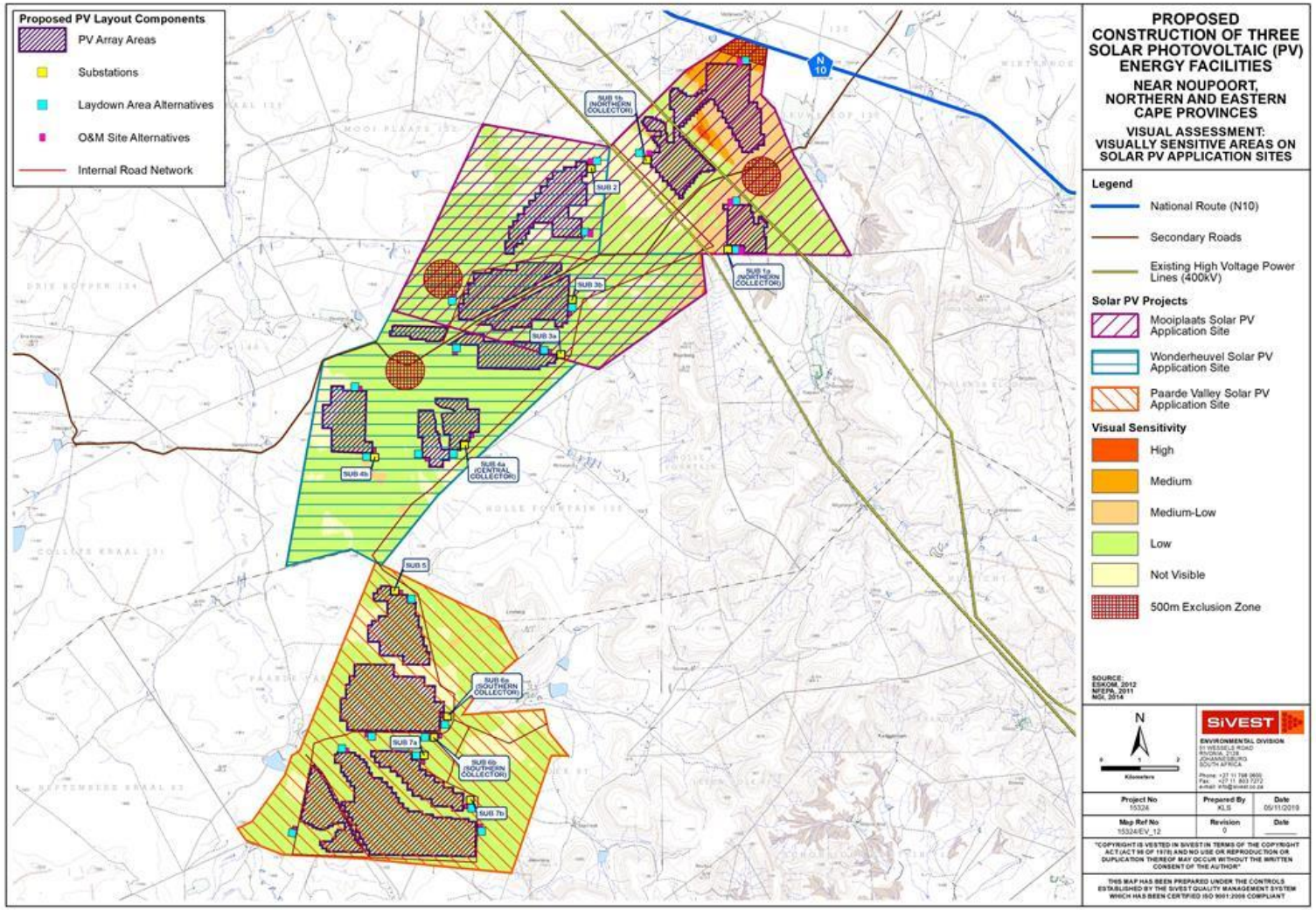

Figure 26: **Preliminary visual sensitivity analysis.**

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 grid connection 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 photovoltaic (PV) panels, which grouped together form a 'solar field'. As mentioned above, each PV panel is a large structure that is typically up to 4m high (equivalent in height to a one-storey building). 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 to be a visual intrusion, potentially altering the visual environment towards a more industrial character.

The establishment of PV facilities generally requires the clearance of taller vegetation such as trees and shrubs. This will intensify the visual prominence of the solar energy facility, particularly in natural locations where little transformation has taken place (**Figure 27**).

Figure 27: 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 typically associated with a solar PV energy facility will include the following:

- Internal access roads between 4m and 10m wide.
- Temporary construction laydown/staging areas.
- Operation and maintenance buildings, and
- Medium voltage, underground cabling (where feasible) connecting the PV plant to the grid connection infrastructure.

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 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**).

4.2 Grid Connection

Grid connection infrastructure for all three PV facilities will include:

- Collector and on-site substations to supply electricity to the Eskom grid;
- Overhead 132kV power lines to connect the substation to the Eskom grid;

Power line towers and substations are by their nature very large objects and thus highly visible. It is understood that the maximum tower height envisaged for the proposed power line is 25m

(equivalent in height to an eight storey building). Although a pylon/tower structure would be less visible than a building, the height of the structure means that the pylon would still typically be visible from a considerable distance. Visibility would be increased by the fact that the power line comprises a series of towers typically spaced approximately 200m to 400m apart in a linear alignment.

As described above, power lines and substations are not features of the natural environment, but are representative of human (anthropogenic) alteration of the natural environment. Thus, elements of grid connection infrastructure could be perceived to be highly incongruous in the context of a largely natural landscape. The height and linear nature of the power line will exacerbate this incongruity, as the towers may impinge on views within the landscape. In addition, the practice of clearing taller vegetation from areas within the power line servitude can increase the visibility and incongruity of the power line. In a largely natural, bushy setting, vegetation clearance will cause fragmentation of the natural vegetation cover, thus making the power line more visible and drawing the viewer's attention to the servitude.

In this instance, the proposed grid connection infrastructure is intended to serve the three proposed solar PV projects and as such, will only be built if these projects go ahead. The power lines and substations are therefore likely to be perceived as part of the greater PV facility and the visual impact will be relatively minor when compared to the visual impact associated with the development as a whole.

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.

As the visibility of the development would diminish exponentially over distance (refer to **section 2.4** above), receptor locations which are closer to the Solar PV facility or power line corridor would experience greater adverse visual impacts than those located further away. During the scoping phase of the project, zones of visual impact for each of the solar PV facilities and the grid connection infrastructure were delineated based on distance bands measured from the outer boundary of each application site and each power line corridor. These zones were refined during the EIA phase of the project to reflect distance bands measured from the proposed PV array areas and the amended power line corridors.

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 during the scoping phase of the project identified 34 potentially sensitive visual receptor locations, most of which appear to be existing farmsteads or farm houses. These dwellings 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 sentiments toward the proposed development are unknown.

This assessment was refined according to the findings of the field visit conducted in February 2019 and eight (8) of the identified locations were removed from the list of potentially sensitive receptors. Some of these eight locations were found to be abandoned dwellings while others were identified as structures not considered to be visual receptors. As previously mentioned, due

to access limitations during the time of the field investigation, it was not possible to fully investigate all of the identified potentially sensitive visual receptor locations from a visual perspective. Notwithstanding this limitation, these receptor locations were still regarded as being potentially sensitive to the visual impacts associated with the proposed development and were assessed as part of the VIA, via desktop means where required.

Three (3) of the identified receptor locations were confirmed to be sensitive receptors, as they are linked to leisure or nature-based activities within the study area. These three (3) receptors are all component facilities of Transkaroo Adventures, a nature based tourism undertaking providing secluded accommodation facilities, hiking trails and 4 x 4 routes in the scenic eastern sector of the assessment area.

In many cases, roads along which people travel, are regarded as sensitive receptors. The primary thoroughfare in the study area is the N10 national route which links Port Elizabeth on the Eastern Cape coast with Upington and the Namibian border to the west. In the local context, the N10 is the primary access route to Hanover and the N1 to the north-west and also to the N9 in the east which links Noupoort and Middelburg.

Thus although the section of the N10 traversing the study area does not form part of a designated tourism route, it is possible that the road is utilised, to some extent, for its tourism potential and as a result it is considered to be a potentially sensitive receptor road – i.e. a road being used by motorists who may object to the potential visual intrusion of the proposed solar PV facilities.

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.

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. It should be noted that, given the spatial distribution of the three proposed solar PV facilities, not all of the receptors identified in the assessment area will be affected by all three facilities and as such, separate receptor impact ratings have been provided for each facility and its associated grid connection infrastructure.

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, 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 and also within 500m of the nearest grid connection assessment corridor. Beyond 5km, the visual impact of a solar PV facility or power line 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.

Based on the height and scale of the solar PV projects, and the likely height of the associated power line towers, 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, the receptor has been assigned an overriding negligible 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. The 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.

In order to determine the likely visual compatibility of the proposed development, the study area was classified into the following zones of visual contrast:

- **High –** undeveloped / natural / rural areas.
- **Moderate –**
  - areas within 500m of any existing power line; in undeveloped / natural / rural area;
  - areas within 150m of cultivated land / plantations / farm buildings.

  Low –
  - areas within 500m of N10 National Route;
  - areas within 250m of P2433 secondary road;
  - areas within 250m of small quarries / diggings.

These zones are depicted in **Figure 28** below.

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.

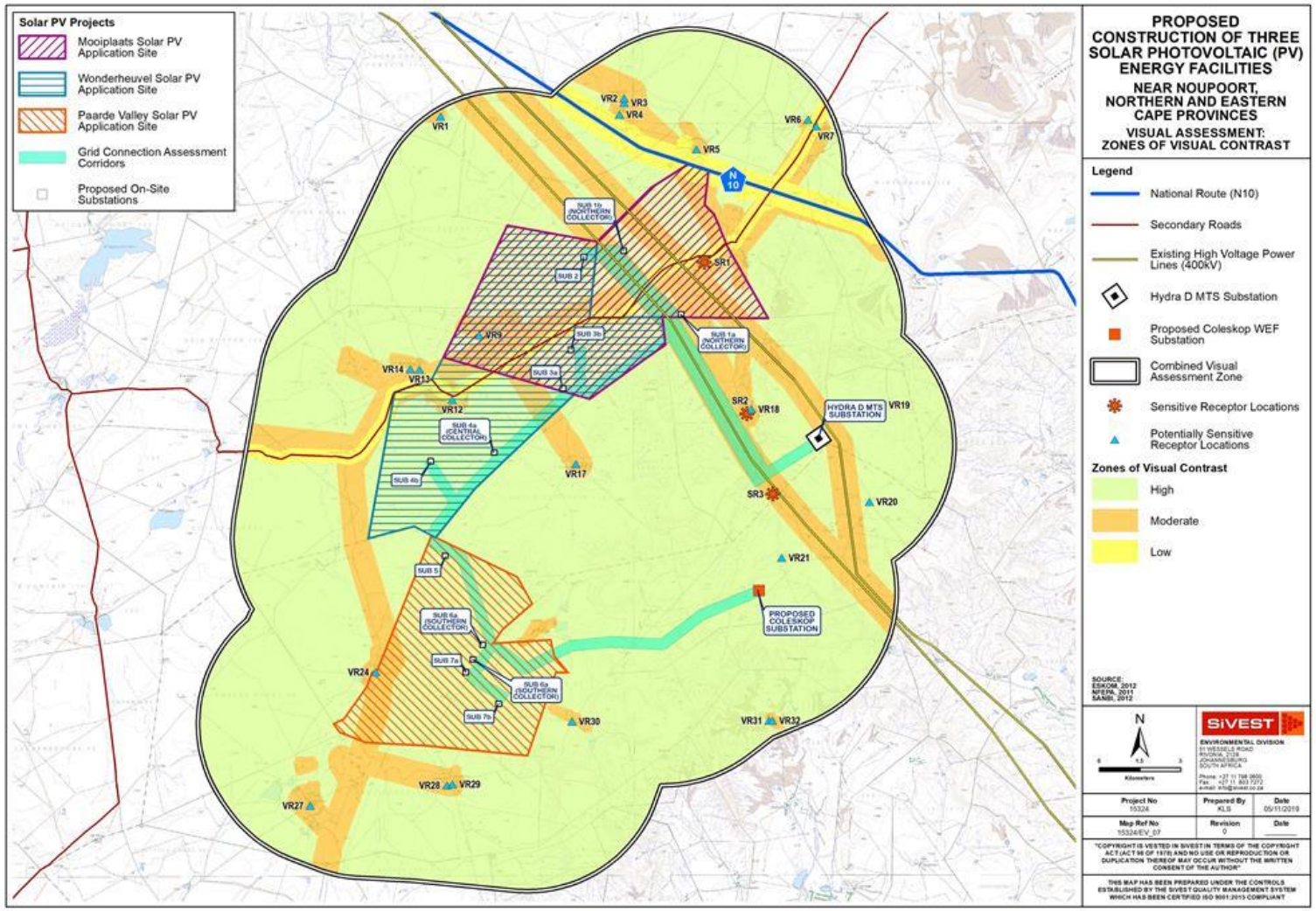

Figure 28: Zones of Visual Contrast

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**	**OVERRIDING FACTOR: 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**	

5.2.1 Mooi Plaats Solar PV Project

A total of fifteen (15) of the potentially sensitive receptors identified in the study area were found to be within 5kms of the Mooi Plaats PV application site. Only thirteen (13) of these are however located within 5kms of a PV array area. Two of the identified receptor locations, namely SR1 and SR2, are considered to be sensitive receptors as they are linked to leisure or nature-based activities within the study area. The remaining 13 receptors are existing farmsteads or farm houses which are regarded as potentially sensitive visual receptors. These receptor locations are indicated in **Figure 29**.

Fourteen (14) potentially sensitive receptors were also found to be within 5kms of the amended Mooi Plaats grid connection infrastructure. In this instance, three of the receptor locations, namely SR1, SR2 and SR3, are considered to be sensitive receptors as they are linked to leisure or nature-based activities while the remaining eleven (11) receptors are regarded as potentially sensitive visual receptors. These receptor locations are indicated in Figure 30.

Sections of the N10 receptor road are within 5kms of both the solar PV application site and the proposed grid connection infrastructure.

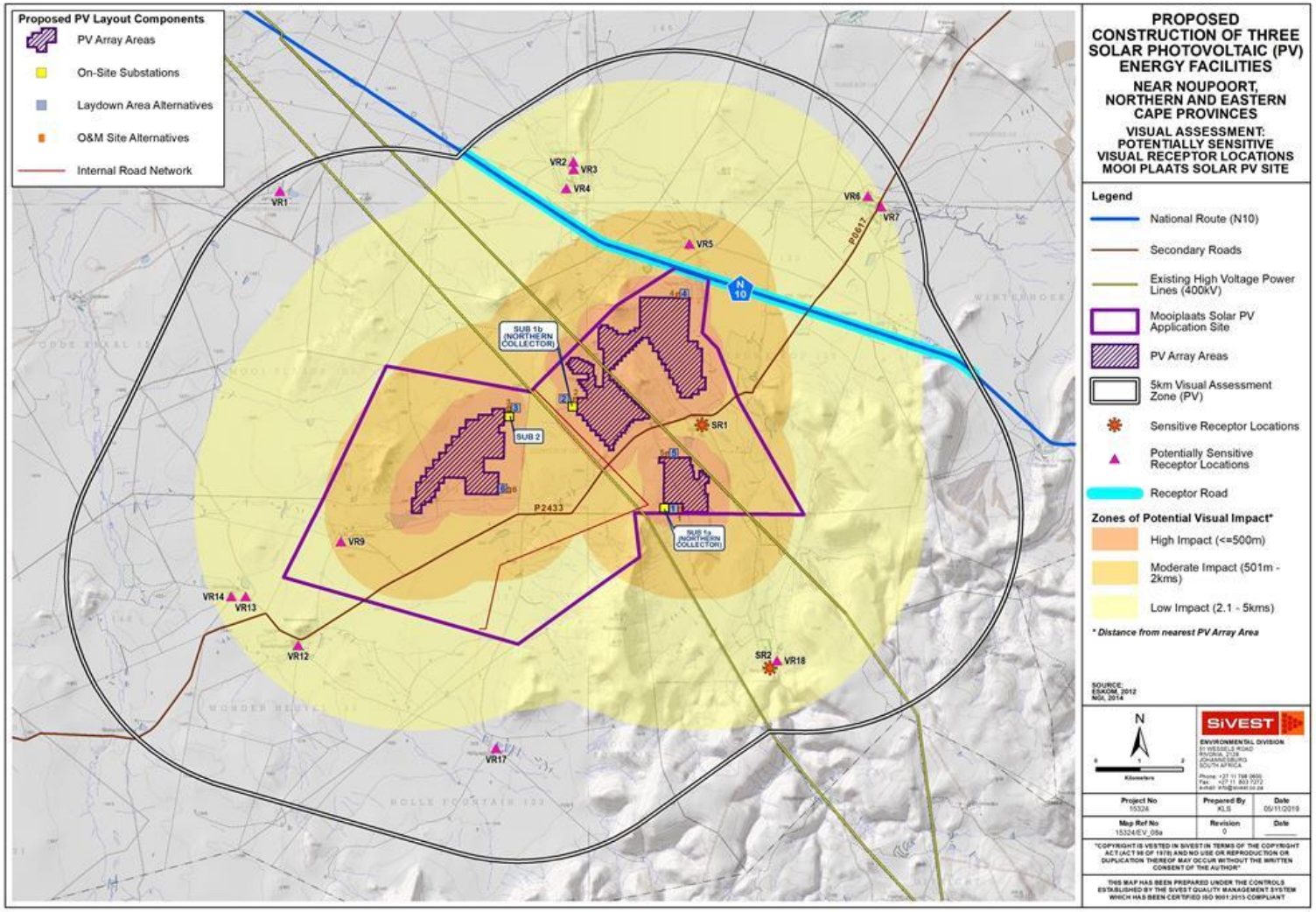

Figure 29: Potentially sensitive receptor locations within 5kms of the Mooi Plaats PV application site.

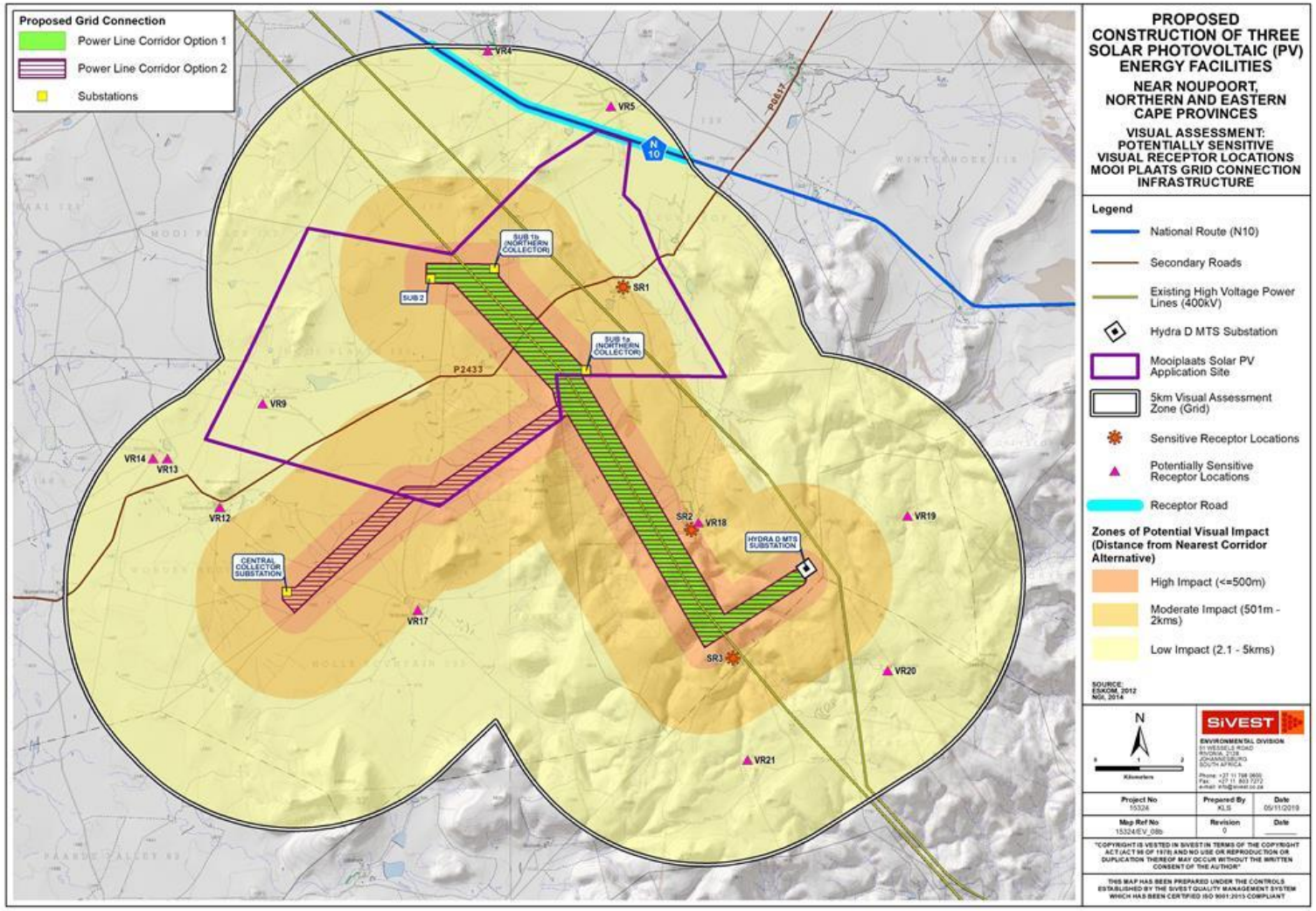

Figure 30: Potentially sensitive receptor locations within 5kms of the Mooi Plaats grid connection infrastructure.

Table 4 below presents a summary of the overall visual impact of the proposed Mooi Plaats solar PV facility and grid connection infrastructure on each of the potentially sensitive visual receptor locations which were identified within 5kms of the proposed development.

Table 4: Receptor impact rating for Mooi Plaats Solar PV Project

MOOI PLAATS SOLAR PV FACILITY					
Receptor Number	**Distance to nearest PV Array area**		**Screening**	**Contrast**	**OVERALL IMPACT RATING**
SR1 – Transkaroo Adventures*	Mod (2)	0.7km-	Mod (2)	Low (1)	**MODERATE (6)**
SR2 – Transkaroo Adventures	Low (1)	3.9km	Low (1)	Mod (2)	**LOW (4)**
VR 1 – Farmstead#	*Neg*	*6.8km*	*Negligable*		
VR 2 - Farmstead	Low (1)	3.5km	Mod (2)	Mod (2)	**MODERATE (5)**
RVR 3 - Farmstead	Low (1)	3.3km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 4 - Farmstead	Low (1)	3.0km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 5 - Farmstead	Mod (2)	1.2km	Mod (2)	Mod (2)	**MODERATE (6)**
VR 6- Farmstead	Low (1)	4.7km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 7 - Farmstead	Low (1)	4.9km	Mod (2)	Low (1)	**LOW (4)**
VR 9 – Farmstead*	Mod(2)	1.7km	Mod (2)	Mod (2)	**MODERATE (6)**
VR 12 - Farmstead	Low (1)	4.0km	Low (1)	Low (1)	**LOW (3)**
VR 13 - Farmstead	Low (1)	4.3km	Low (1)	Mod (2)	**MODERATE (4)**
VR 14 - Farmstead	Low (1)	4.6km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 17 – Farmstead#	*Neg*	*5.7km*	*Negligable*		
VR 18 - Farmstead	Low (1)	3.8km	Mod (2)	Mod (2)	**MODERATE (5)**
MOOI PLAATS GRID CONNECTION INFRASTRUCTURE					
Receptor Number	**Distance to nearest corridor alternative**		**Screening**	**Contrast**	**OVERALL IMPACT RATING**
SR1 – Transkaroo Adventures*	Mod (2)	1.9km	Mod (2)	Low (1)	**MODERATE (5)**
SR2 – Transkaroo Adventures	High (3)	0.4km	Low (1)	Mod (2)	**MODERATE (6)**
SR3 – Wilgerfontein Guest House	Mod (2)	0.6km	Low (1)	Mod (2)	**MODERATE (5)**
VR 4 - Farmstead	Low (1)	4.9km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 5 - Farmstead	Low (1)	4.5km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 9 – Farmstead*	Low (1)	3.6km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 12 - Farmstead	Low (1)	2.3km	Low (1)	Low (1)	**LOW (3)**
VR 13 - Farmstead	Low (1)	3.9km	Low (1)	Mod (2)	**LOW (4)**
VR 14 - Farmstead	Low (1)	4.2km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 17 - Farmstead	Mod (2)	1.9km	Mod (2)	Mod (2)	**MODERATE (6)**
VR 18 - Farmstead	Mod (2)	0.5km	Mod (2)	Mod (2)	**MODERATE (6)**

VR 19 - Farmstead	Low (1)	2.7km	Mod (2)	High (3)	**MODERATE (6)**
VR 20 - Farmstead	Low (1)	2.8km	Mod (2)	High (3)	**MODERATE (6)**
VR 21 - Farmstead	Low (1)	2.8km	Mod (2)	High (3)	**MODERATE (6)**

**Farmstead / homestead is located within the proposed Mooi Plaats solar PV application site. It is assumed that the occupants would have a vested interest in the development and would therefore not perceive the proposed development in a negative light.*
 # Receptor is more than 5kms from the nearest PV Array area and as such the overall impact rating is "negligible"

The table above shows that none of the potentially sensitive receptors would experience high levels of visual impact as a result of either the proposed Mooi Plaats solar PV development or the grid connection infrastructure. This is largely indicative of the presence of screening vegetation around many of the existing farmsteads in the area as well as the presence of existing power lines and other infrastructure which reduces the level of contrast.

Ten (10) receptor locations would be subjected to moderate levels of visual impact as a result of the proposed Mooi Plaats solar PV development and three (3) receptor locations will be subjected to low levels of visual impact. Two (2) of the receptors identified in the scoping phase are located more than 5kms from the nearest PV array area, and as such these receptors have been assigned a "Negligable" rating and effectively removed from any further assessment.

Twelve (12) receptor locations would experience moderate levels of visual impact from the grid connection infrastructure, while the remaining two (2) receptor locations will be subjected to low levels of visual impact.

As stated above, the N10 national route could be considered as a potentially sensitive receptor road and any development in the northern-most section of the Mooi Plaats application site is likely to be visible to motorists travelling along this route **(Figure 31)**. The degree of visibility is restricted to some extent by the topography and the likely visual impacts of the solar PV development would depend on the position of the different elements on the site. Elements of the grid connection infrastructure are between 3kms and 11kms from the N10 and will not result in any significant visual impacts on motorists travelling along this route **(Figure 32)**.

In light of this and the fact that this section of the N10 is does not form part of a recognised tourism route, visual impacts affecting the N10 are rated as moderate.

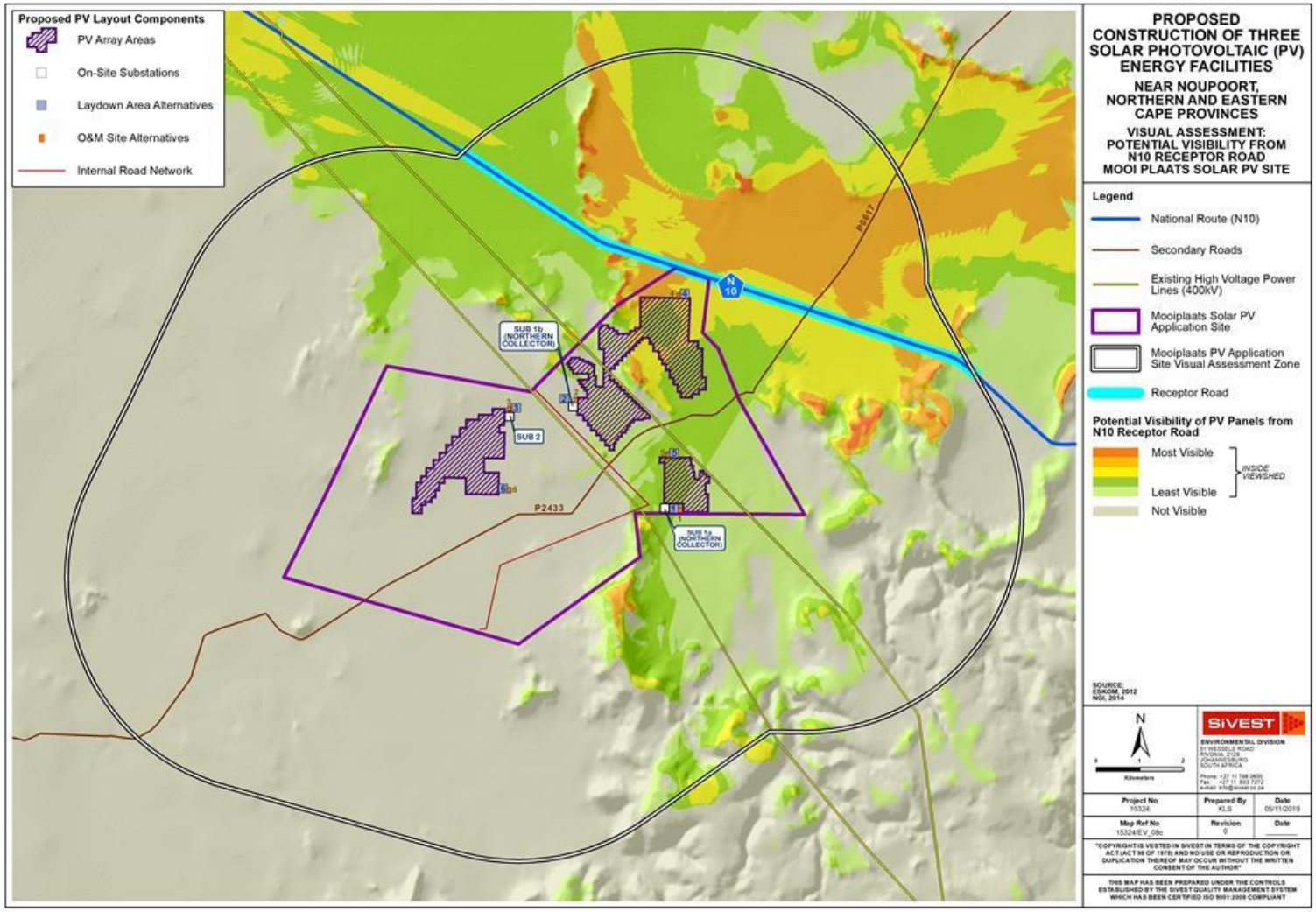

Figure 31: Potential visibility of PV Panels from N10 (Mooi Plaats project).

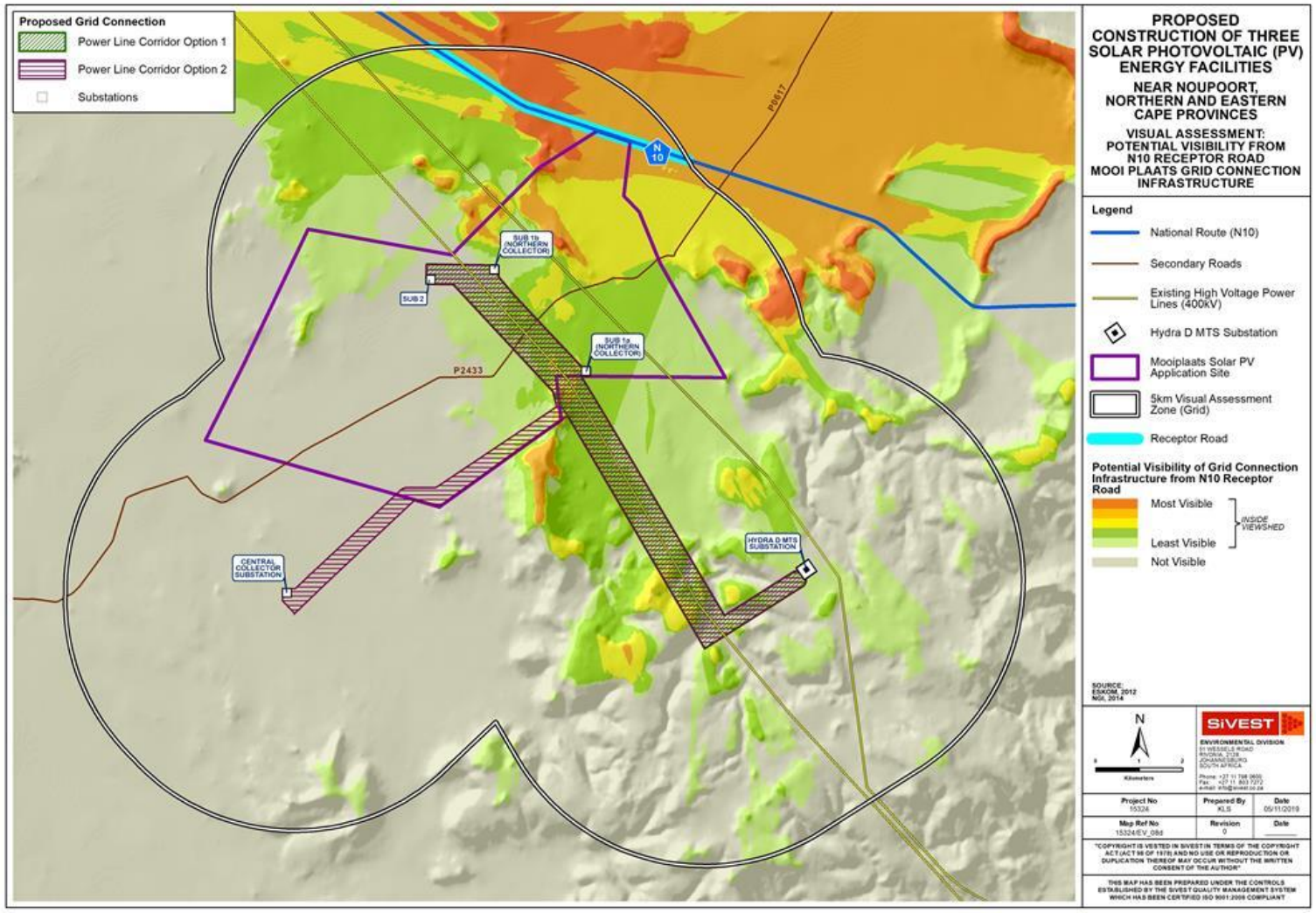

Figure 32: Potential visibility of Grid Connection Infrastructure from N10 (Mooi Plaats project).

5.2.2 Wonderheuvel Solar PV Project

A total of twelve (12) of the potentially sensitive receptors identified in the study area were found to be within 5kms of the Wondeheuvel PV application site. Only five (5) of these are however located within 5km of a PV array area. Two of the identified receptor locations, namely SR1 and SR2, are considered to be sensitive receptors as they are linked to leisure or nature-based activities within the study area. As these sensitive receptors are both more within 5km from the nearest PV Array area however, they are unlikely to experience any visual impacts as a result of the proposed development. The five (5) remaining receptors within 5km of a PV Array area are existing farmsteads or farm houses which are regarded as potentially sensitive visual receptors. These receptor locations are indicated in **Figure 33**.

Twenty (20) potentially sensitive receptors were also found to be within 5kms of the amended Wonderheuvel grid connection infrastructure. Three (3) of these receptor locations, namely SR1, SR2 and SR3, are considered to be sensitive receptors as they are linked to leisure or nature-based activities while the remaining seventeen (17) receptors are regarded as potentially sensitive visual receptors. These receptor locations are indicated in **Figure 34**.

Sections of the N10 receptor road are within 5kms of both the solar PV application site and the proposed grid connection infrastructure.

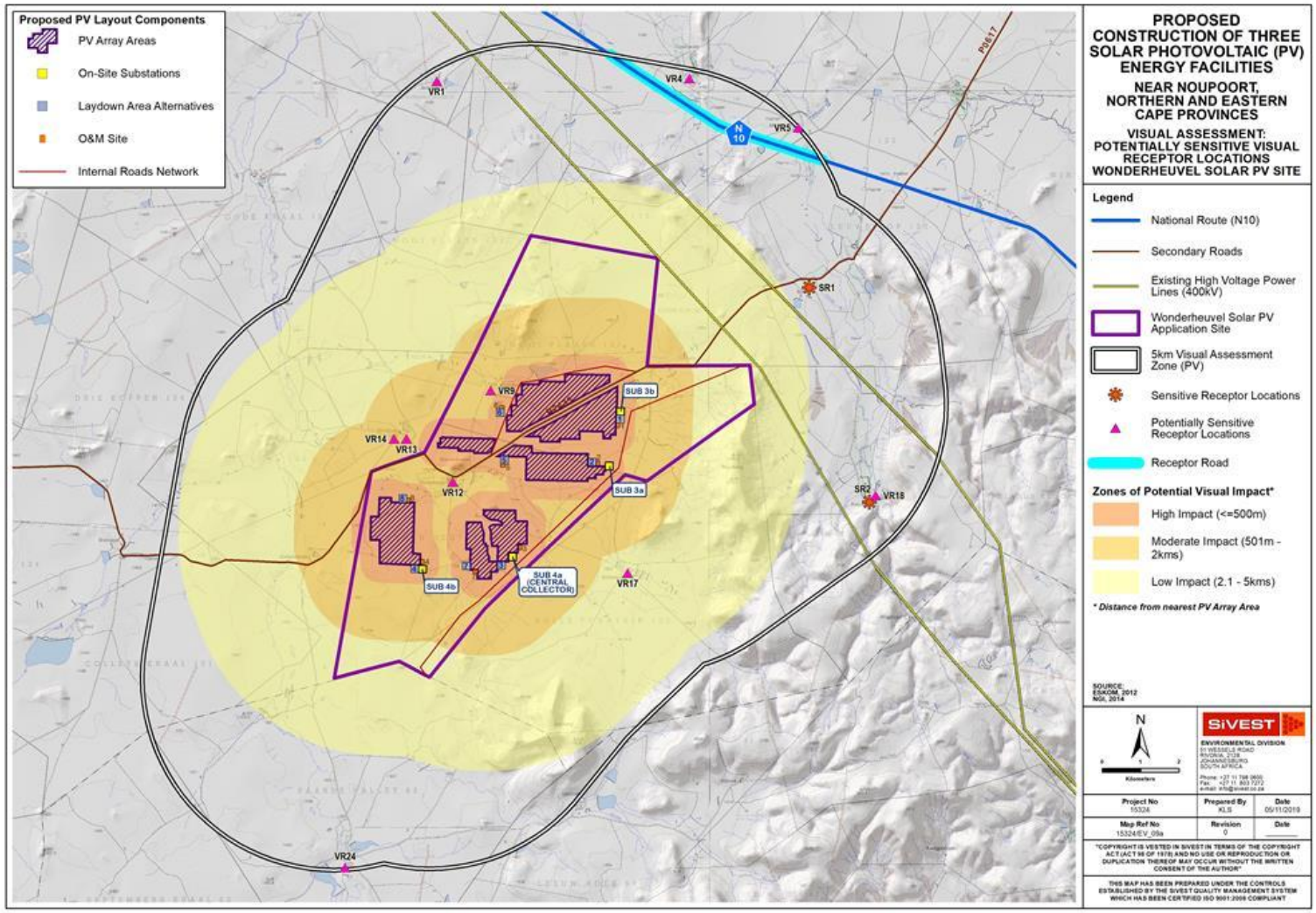

Figure 33: Potentially sensitive receptor locations within 5kms of the Wonderheuvel PV application site.

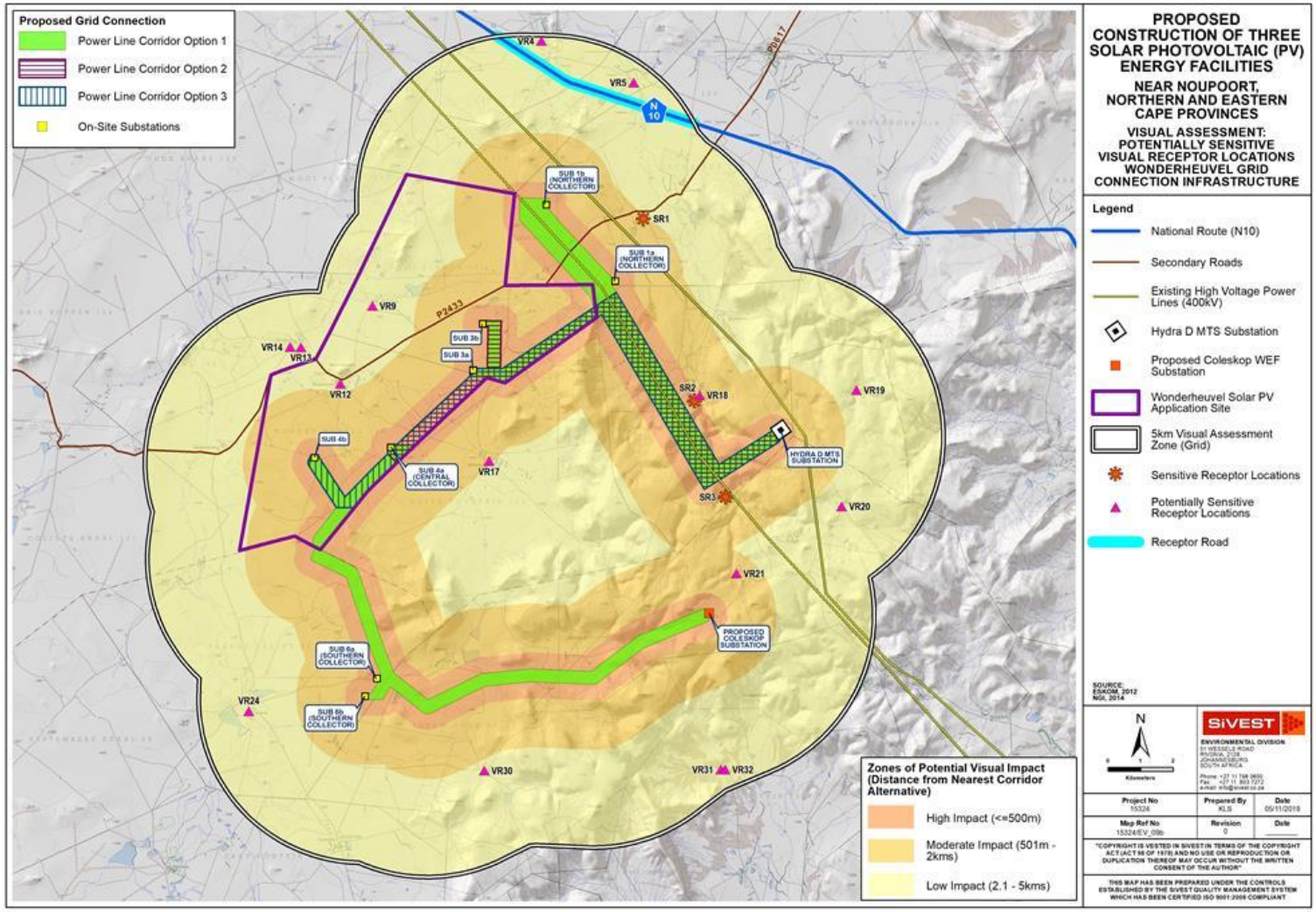

Figure 34: Potentially sensitive receptor locations within 5kms of the Wonderheuvel grid connection infrastructure.

Table 5 below presents a summary of the overall visual impact of the proposed Wonderheuvel solar PV facility and grid connection infrastructure on each of the potentially sensitive visual receptor locations which were identified within 5kms of the proposed development.

Table 5: Receptor impact rating for Wonderheuvel Solar PV Project

WONDERHEUVEL SOLAR PV FACILITY					
Receptor Number	**Distance to application site boundary**		**Screening**	**Contrast**	**OVERALL IMPACT RATING**
SR1 – Transkaroo Adventures	*Neg*	*5.6KM*	*Negligable*		
SR2 – Transkaroo Adventures	*Neg*	*6.9km*	*Negligable*		
VR 1 - Farmstead	*Neg*	*8.1km*	*Negligable*		
VR 4 - Farmstead	*Neg*	*7.9km*	*Negligable*		
VR 5 - Farmstead	*Neg*	*8.1km*	*Negligable*		
VR 9 – Farmstead*	Mod (2)	0.7km	Mod (2)	Mod (2)	**MODERATE (6)**
VR 12 – Farmstead*	Mod (2)	0.8	Low (1)	Low (1)	**LOW (4)**
VR 13 - Farmstead	Mod (2)	0.8km	Low (1)	Mod (2)	**MODERATE (5)**
VR 14 - Farmstead	Mod (2)	1.1km	Mod (2)	Mod (2)	**MODERATE (6)**
VR 17 - Farmstead	Low (1)	2.6km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 18 - Farmstead	*Neg*	*6.9km*	*Negligable*		
VR 24 - Farmstead	*Neg*	*7.9km*	*Negligable*		
WONDERHEUVEL GRID CONNECTION INFRASTRUCTURE					
Receptor Number	**Distance to nearest corridor alternative**		**Screening**	**Contrast**	**OVERALL IMPACT RATING**
SR1 – Transkaroo Adventures	Mod (2)	1.9km	Mod (2)	Low (1)	**MODERATE(5)**
SR2 – Transkaroo Adventures	High (3)	0.3km	Low (1)	Mod (2)	**MODERATE (6)**
SR3 – Wilgerfontein Guest House	Mod (2)	0.5km	Low (1)	Mod (2)	**MODERATE (5)**
VR 4 - Farmstead	Low (1)	4.8km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 5 - Farmstead	Low (1)	4.3km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 9 – Farmstead*	Low (1)	3.3km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 12 – Farmstead*	Low (1)	2.2km	Low (1)	Low (1)	**LOW (3)**
VR 13 - Farmstead	Low (1)	3.3km	Low (1)	Mod (2)	**LOW (4)**
VR 14 - Farmstead	Low (1)	3.3km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 17 - Farmstead	Mod (2)	1.9km	Mod (2)	Mod (2)	**MODERATE (6)**
VR 18 - Farmstead	Mod (2)	0.6km	Mod (2)	Mod (2)	**MODERATE (6)**
VR 19 - Farmstead	Low (1)	2.7km	Mod (2)	High (3)	**MODERATE (6)**

VR 20 - Farmstead	Low (1)	2.8km	Mod (2)	High (3)	**MODERATE (6)**
VR 21 - Farmstead	Mod (2)	1.4km	Mod (2)	High (3)	**MODERATE (7)**
VR 24 - Farmstead	Low (1)	3.4km	Low (1)	Mod (2)	**LOW (4)**
VR 28 - Farmstead	Low (1)	4.6km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 29 - Farmstead	Low (1)	4.5km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 30 - Farmstead	Low (1)	2.3km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 31 - Farmstead	Low (1)	4.4km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 32 - Farmstead	Low (1)	4.4km	Mod (2)	Mod (2)	**MODERATE (5)**

**Farmstead / homestead is located within the proposed Wonderheuvel solar PV application site. It is assumed that the occupants would have a vested interest in the development and would therefore not perceive the proposed development in a negative light.*

As shown in the table above, none of the potentially sensitive receptors would experience high levels of visual impact as a result of either the proposed Wonderheuvel solar PV development or the grid connection infrastructure. This is largely indicative of the presence of screening vegetation around many of the existing farmsteads in the area as well as the presence of existing power lines and other infrastructure which reduces the level of contrast.

Four (4) receptor locations would be subjected to moderate levels of visual impact as a result of the proposed Wonderheuvel solar PV development, while the remaining receptor location will be subjected to low levels of visual impact.

Seventeen (17) receptor locations would experience moderate levels of visual impact from the grid connection infrastructure, while the remaining three (3) receptor locations will be subjected to low levels of visual impact.

Although a section of the N10 receptor road is within 5kms of the Wonderheuvel PV application site, views of the site will be largely obstructed by the terrain (**Figure 35**). In addition, the N10 is more than 7kms from the nearest PV Array area and any visual impacts would be negligible at this distance. Elements of the grid connection infrastructure closest to the N10 are approximately 3.5km away and will not result in any significant visual impacts on motorists travelling along this route (**Figure 36**).

In light of this and the fact that this section of the N10 is does not form part of a recognised tourism route, visual impacts arising from the Wonderveuvel solar PV project affecting the N10 are rated as low to moderate.

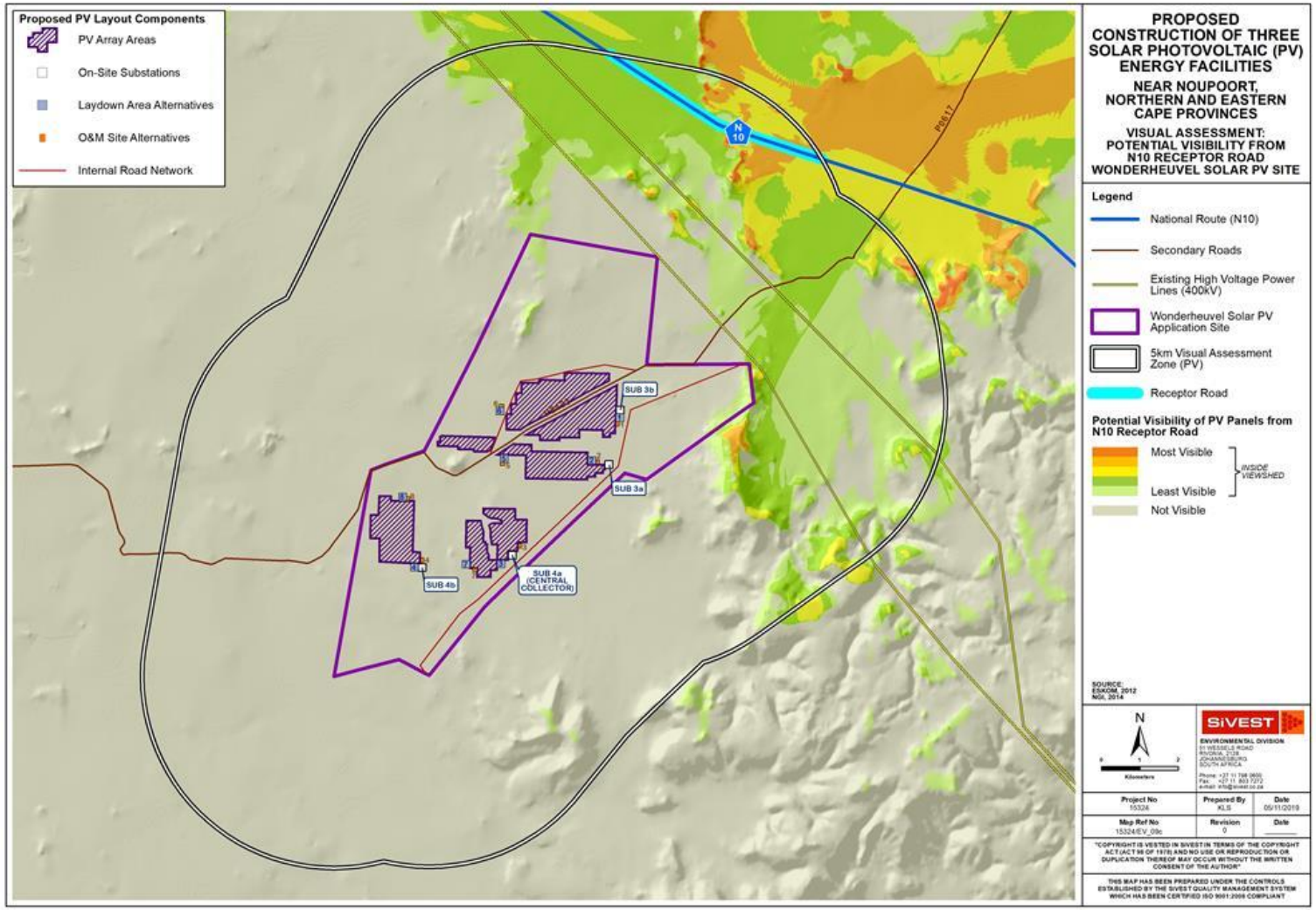

Figure 35: Potential visibility of PV Panels from N10 (Wonderheuvel project).

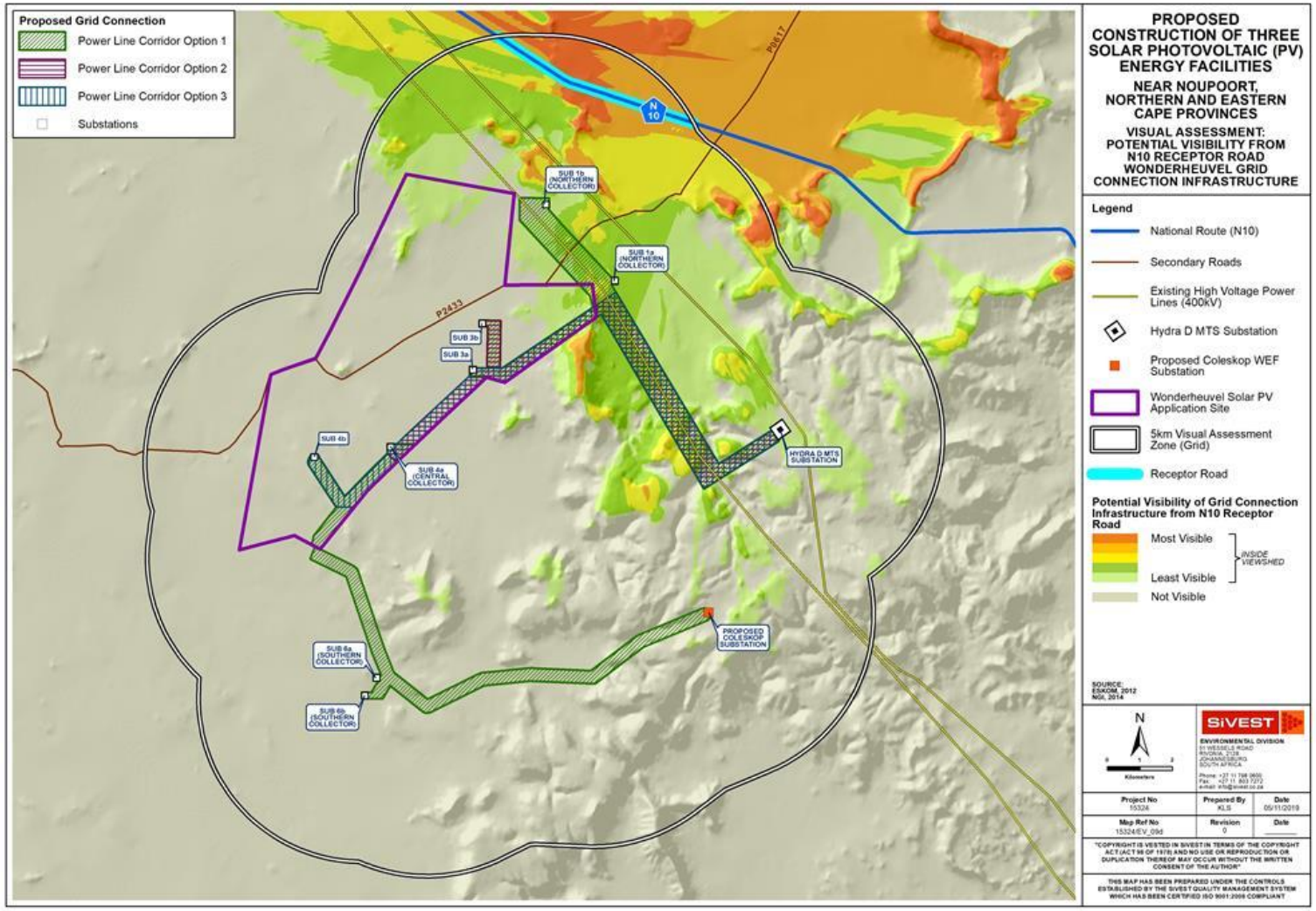

Figure 36: Potential visibility of Grid Connection Infrastructure from N10 (Wonderheuvel project).

5.2.3 Paarde Valley Solar PV Project

A total of six (6) of the potentially sensitive receptors identified in the study area were found to be within 5kms of the Paarde Valley PV application site. Only five (5) of these are however located within 5kms of a PV array area. None of these receptor locations are considered to be sensitive receptors, although all six (6) receptors are existing farmsteads or farm houses which are regarded as potentially sensitive visual receptors. These receptor locations are indicated in **Figure 37**.

Eighteen (18) potentially sensitive receptors were also found to be within 5kms of the proposed Paarde Valley grid connection infrastructure. Three (3) sensitive receptor locations are located in this area, namely SR1, SR2 and SR3, while the remaining fifteen (15) receptors, which are existing farm houses, are regarded as potentially sensitive visual receptors. These receptor locations are indicated in **Figure 38**.

No part of the N10 receptor road is within 5kms of the solar PV application site and as such motorists travelling along this route will not be affected by the proposed Paarde Valley solar PV facility. Elements of the grid connection infrastructure may however be visible to passing motorists, although the N10 is at least 3.5km from the grid assessment corridor and as such will not give rise to any significant visual impacts on motorists travelling along this route.

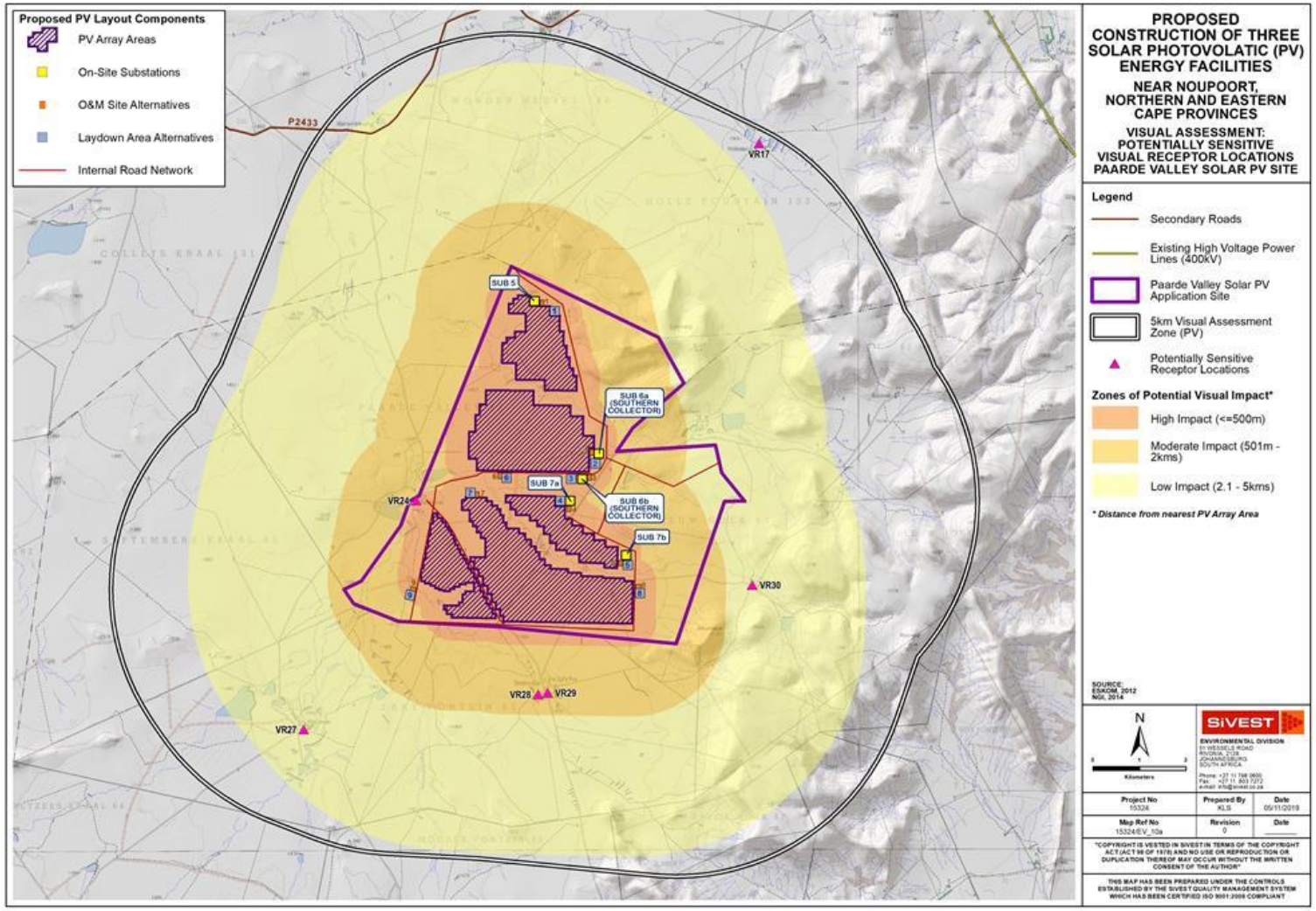

Figure 37: Potentially sensitive receptor locations within 5kms of the Paarde Valley PV application site.

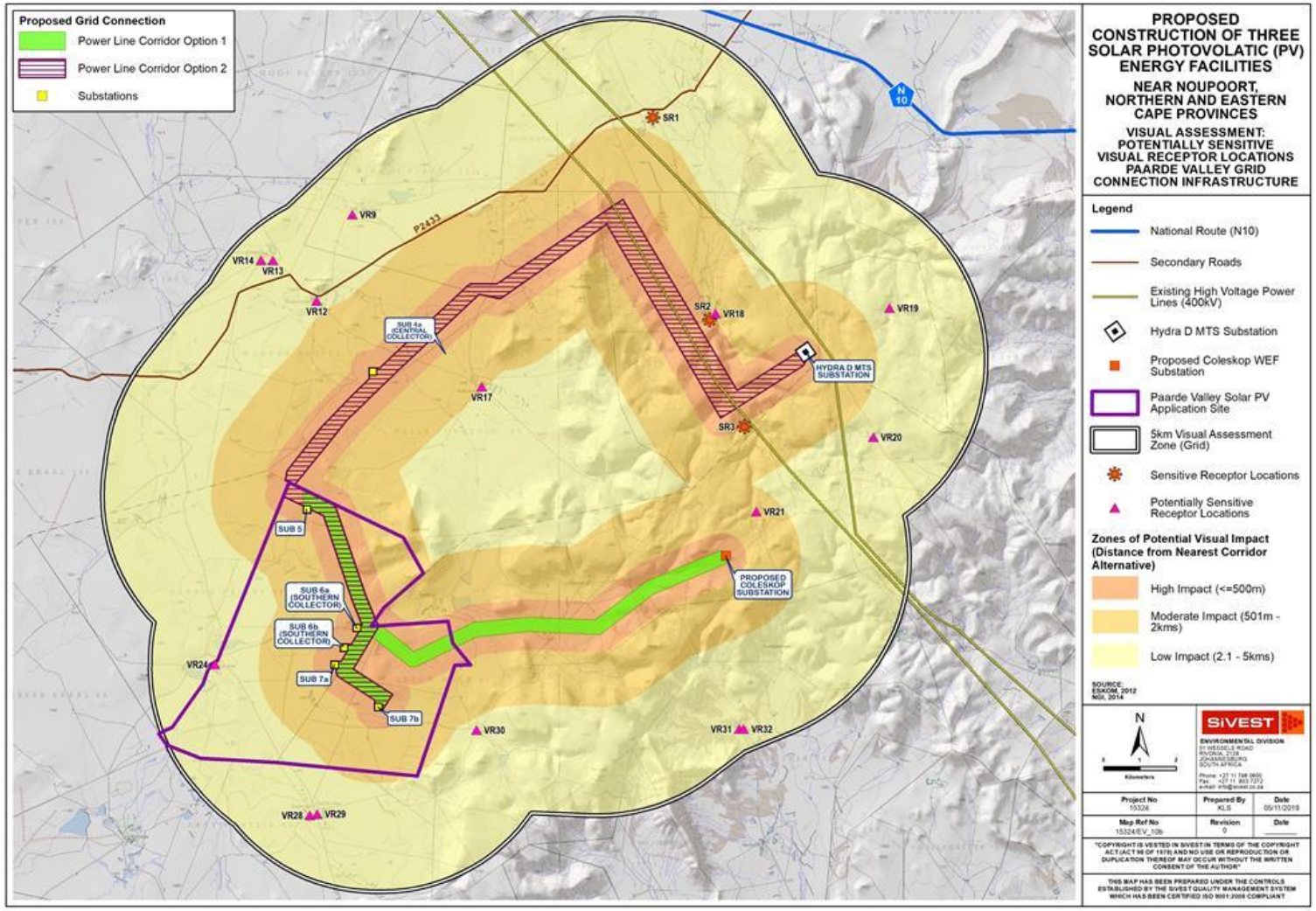

Figure 38: Potentially sensitive receptor locations within 5kms of the Paarde Valley grid connection infrastructure.

Table 6 below presents a summary of the overall visual impact of the proposed Paarde Valley solar PV facility and grid connection infrastructure on each of the potentially sensitive visual receptor locations which were identified within 5kms of the proposed development.

Table 6: Receptor impact rating for Paarde Valley Solar PV Project

PAARDE VALLEY SOLAR PV FACILITY					
Receptor Number	**Distance to application site boundary**		**Screening**	**Contrast**	**OVERALL IMPACT RATING**
VR 17 - Farmstead	*Neg*	*5.6km*	*Negligable*		
VR 24 – Farmstead*	High (3)	0.4km-	Low (1)	Mod (2)	**MODERATE (6)**
VR 27 – Farmstead	Low (1)	3.9km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 28 – Farmstead	Mod (2)	1.6km	Mod (2)	Mod (2)	**MODERATE (6)**
VR 29 – Farmstead	Mod (2)	1.5km	Mod (2)	Mod (2)	**MODERATE (6)**
VR 30 – Farmstead	Low (1)	2.6km	Mod (2)	Mod (2)	**MODERATE (5)**
PAARDE VALLEY GRID CONNECTION INFRASTRUCTURE					
Receptor Number	**Distance to nearest corridor alternative**		**Screening**	**Contrast**	**OVERALL IMPACT RATING**
SR1 – Transkaroo Adventures	Low (1)	2.4km	Mod (2)	Low (1)	**LOW (4)**
SR2 – Transkaroo Adventures	High (3)	0.3km	Low (1)	Mod (2)	**MODERATE (6)**
SR3 – Wilgerfontein Guest House	Mod (2)	0.6km	Low (1)	Mod (2)	**MODERATE (5)**
VR 9 – Farmstead	Low (1)	3.6km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 12 - Farmstead	Low (1)	2.3km	Low (1)	Low (1)	**LOW (3)**
VR 13 - Farmstead	Low (1)	3.9km	Low (1)	Mod (2)	**LOW (4)**
VR 14 - Farmstead	Low (1)	4.2km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 17 - Farmstead	Mod (2)	1.9km	Mod (2)	Mod (2)	**MODERATE (6)**
VR 18 - Farmstead	Mod (2)	0.6km	Mod (2)	Mod (2)	**MODERATE (6)**
VR 19 - Farmstead	Low (1)	2.7km	Mod (2)	High (3)	**MODERATE (6)**
VR 20 - Farmstead	Low (1)	2.7km	Mod (2)	High (3)	**MODERATE (6)**
VR 21 - Farmstead	Mod (2)	1.4km	Mod (2)	High (3)	**MODERATE (7)**
VR 24 – Farmstead*	Mod (2)	3.2km	Low (1)	Mod (2)	**MODERATE (5)**
VR 28 - Farmstead	Low (1)	3.4km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 29 - Farmstead	Low (1)	3.2km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 30 - Farmstead	Low (1)	2.3km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 31 - Farmstead	Low (1)	4.4km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 32 - Farmstead	Low (1)	4.4km	Mod (2)	Mod (2)	**MODERATE (5)**

**Farmstead / homestead is located within the proposed Paarde Valley solar PV application site. It is assumed that the occupants would have a vested interest in the development and would therefore not perceive the proposed development in a negative light.*

As shown in the table above, none of the potentially sensitive receptors would experience high levels of visual impact as a result of either the proposed Paarde Valley solar PV development or the grid connection infrastructure. This is largely indicative of the presence of screening vegetation around many of the existing farmsteads in the area as well as the presence of existing power lines and other infrastructure which reduces the level of contrast.

All receptor locations within 5km of the proposed Paarde Valley solar PV development would be subjected to moderate levels of visual impact. Fifteen (15) receptor locations would experience moderate levels of visual impact from the grid connection infrastructure, while the remaining three (3) receptor locations will be subjected to low levels of visual impact.

The N10 receptor road is more than 5kms from the solar PV application site and as such motorists travelling along this route will not be affected by the proposed Paarde Valley solar PV facility. In addition. Although elements of the grid connection infrastructure may be visible to passing motorists, the N10 is at least 3.5km from the grid assessment corridor, the grid infrastructure will not give rise to any significant visual impacts on motorists travelling along this route.

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 SPEF 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 areas are the towns of Noupoort and Middelburg which are both situated more than 30kms from the application sites and are thus too far away to have significant impacts on the night scene. At night, the general study area is 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 N10 national route.

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

Power lines and associated towers or pylons are not generally lit up at night and, thus light spill associated with the proposed grid connection infrastructure is only likely to emanate from the

proposed on-site substations. Lighting from these facilities is therefore expected to intrude on the nightscape to some degree. It should however be noted that the grid connection infrastructure will only be constructed if the proposed solar PV facilities are developed and thus the lighting impacts from the proposed substations would be subsumed by the glare and contrast of the lights associated with the PV facilities. As such, the grid connection infrastructure is not expected to result in significant lighting impacts.

5.4 Cumulative Impacts

Although it is important to assess the visual impacts of the proposed solar PV facilites and grid connection infrastructure 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.

Seventeen renewable energy projects were identified within a 35 km radius of the proposed solar PV facilities and grid connection infrastructure (**Figure 39**). These projects, as listed in **Table 7** below, were identified using the DEA'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 7: Renewable energy developments proposed within a 35km radius of the Mooi Plaats, Wonderheuvel and Paarde Valley solar PV application sites.

Project	DEA Reference No	Technology	Capacity	Status of Application / Development
Allemans Fontein SEF	14/12/16/3/3/1/730	Solar	20MW	Approved
Carolus Poort SEF	14/12/16/3/3/1/729	Solar	20MW	Approved
Damfontein SEF	14/12/16/3/3/1/728	Solar	20MW	Approved
Gillmer SEF	14/12/16/3/3/1/735	Solar	20MW	Approved
Inkululeko SEF	14/12/16/3/3/1/553	Solar	20MW	Approved
Kleinfontein SEF	12/12/20/2654	Solar	20MW	Approved
Klip Gat SEF	14/12/16/3/3/2/354	Solar	75M	Approved
Linde SEF	12/12/20/2258	Solar	40MW	In Operation
Linde SEF (Expansion)	14/12/16/3/3/1/1122	Solar	75MW	Approved
Middelburg Solar Park 1	12/12/20/2465/2	Solar	75MW	Approved
Middelburg Solar Park 2	12/12/20/2465/1	Solar	75MW	Approved
Naauw Poort SEF	14/12/16/3/3/2/355	Solar	75MW	Approved
Toitdale SEF	12/12/20/2653	Solar	20MW	Approved
Noupoort Wind Farm	12/12/20/2319	Wind	188MW	In Operation
Phezukomoya WEF	14/12/16/3/3/1/1028	Wind	315MW	EIA in Process
San Kraal WEF	14/12/16/3/3/1/1069	Wind	390MW	EIA in Process
Umsobomvu WEF	14/12/16/3/3/2/730	Wind	140MW	Approved

As can be seen from this table, thirteen (13) of these projects are Solar Photovoltaic Energy facilities (SPEFs), most of which are located more than 10kms from the application sites, clustered on the western edge of Noupoort and also to the north of Main Road 389 and along an existing rail route . Given the distance from the study area and the concentration of these facilities in close proximity to existing built infrastructure, it is not anticipated that these developments will result in any significant cumulative impacts affecting the landscape or the visual receptors within the combined assessment zone for the three solar PV projects. It should be noted that although all of these SPEF applications were approved at least five years ago, to date only one has been constructed.

The remaining four (4) projects are wind energy facilities (WEFs), all of which are located on the hillier terrain to the east of the solar PV application site. Although WEFs are expected to have different impacts when compared to solar PV projects, these renewable energy developments are however relevant as they influence the cumulative visual impact of the proposed development.

The proposed San Kraal WEF is located well outside the combined visual assessment zone, just east of the N9 national route, while only a small portion of the Phezukomoya WEF, which is located immediately west of the N9, is located within 5kms of the proposed solar PV facilities. As such, these WEFs are not expected to give rise to any significant cumulative impacts on the landscape or visual receptors within the study area.

The remaining WEF, namely Umsobomvu WEF is however almost entirely within 5kms of the proposed solar PV facilities, and is in fact adjacent to sections of each of the application sites. 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 three proposed solar PV facilities and associated grid connection infrastructure, will inevitably introduce an increasingly industrial character into a largely natural, pastoral landscape, thus giving rise to significant cumulative impacts.

It should be noted however that PV panels, at an approximate height of 4m, are considerably less visible than wind turbines and as such the proposed solar PV facilities would be outside the viewshed of many 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 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.

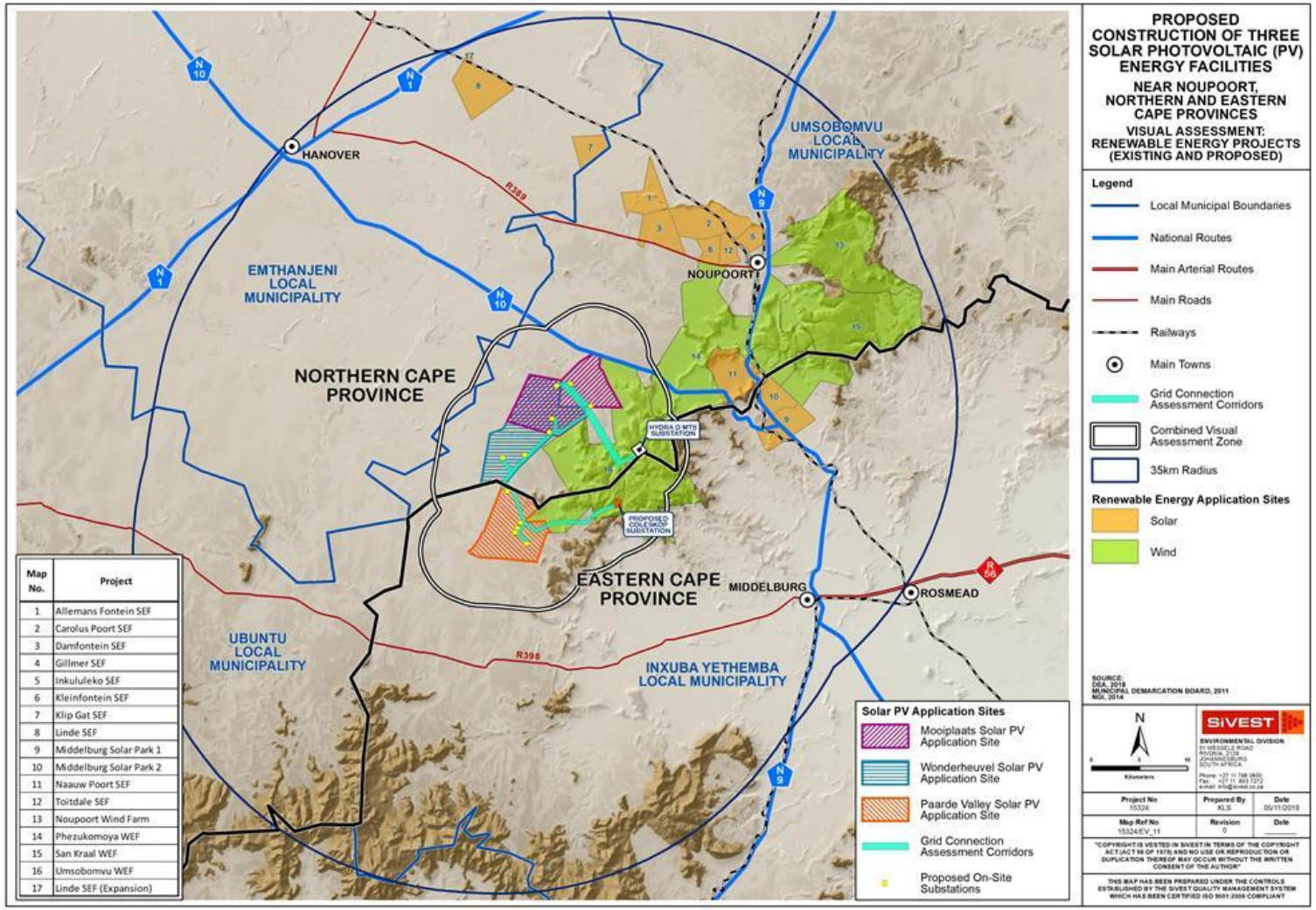

Figure 39: Renewable energy facilities proposed within a 35km radius of the Mooi Plaats, Wonderheuvel and Paarde Valley solar PV application sites.

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. The tables below present the impact matrix for visual impacts associated with the proposed construction and operation of the Mooi Plaats, Wonderheuvel and Paarde Kraal solar PV facilities the associated grid connection infrastructure. Preliminary mitigation measures have determined based on best practice and literature reviews.

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

5.5.1 Mooi Plaats solar PV Project

MOOI PLAATS 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. ▪ Locally occurring indigenous woody vegetation (trees and shrubs) should be planted along the northern boundary of the site to screen views from the N10. ▪ Retain a buffer (approximately 100m wide) of intact natural vegetation along the perimeter of the development area (i.e. the CPV panel blocks) and along the site boundary. ▪ Maintain a neat construction site by removing rubble and waste materials regularly. ▪ Temporarily fence-off the construction site (for the duration of the construction period). ▪ Where possible, the operation and maintenance buildings and laydown areas should be consolidated to reduce visual clutter.	2	2	1	2	1	2	16	-	Low

											▪ Buildings and similar structures must be in keeping with relevant regional planning policy documents. ▪ 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. ▪ Unless there are water shortages, 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 development 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 or the N10 national route in order to minimise visual impacts on these dwellings and on the receptor road. ▪ Locally occurring indigenous woody vegetation (trees and shrubs) should be planted along the northern boundary of the site to screen views from the N10. ▪ Retain a buffer (approximately 100m wide) of intact natural vegetation along the perimeter of the development area (i.e. the CPV panel blocks) and along the site boundary. ▪ 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.	2	3	3	2	2	2	24	-	Medium

										▪ 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. ▪ The O&M buildings should be painted in natural tones that fit with the surrounding environment. ▪ Buildings and similar structures must be in keeping with relevant regional planning policy documents.									
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	2	1	2	16	-	Low

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 or national routes in order to minimise visual impacts on these dwellings and on the receptor road. ▪ Suitable buffers of intact natural vegetation should be provided along the perimeter of the development area and along the site boundary. ▪ 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. ▪ The O&M buildings should be painted in natural tones that fit with the surrounding environment. ▪ Buildings and similar structures must be in keeping with relevant regional planning policy documents.	3	3	2	2	2	2	24	-	Medium

MOOI PLAATS GRID CONNECTION INFRASTRUCTURE																					
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 gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during construction would expose bare soil which could visually contrast with the surrounding environment. ▪ Vegetation clearance required for the construction of the proposed substation is expected to increase dust emissions and alter the natural character of the surrounding area, thus creating a visual impact. ▪ 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. ▪ Maintain a neat construction site by removing rubble and waste materials regularly. ▪ 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. ▪ Unless there are water shortages, 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	1	1	2	14	-	Low
Operational Phase																					
▪ Potential alteration of the visual character and sense of place. ▪ Potential visual impact on receptors in the study area.	▪ The proposed power line and substations could alter the visual character of the surrounding area and expose sensitive visual receptor locations to visual impacts.	2	4	2	2	3	1	13	-	Low	▪ Where possible, limit the number of maintenance vehicles using access roads.	2	4	2	2	3	1	13		Low

	▪ The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ 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 could be altered as a result of operational and security lighting at the proposed substation.									▪ Non-reflective surfaces should be utilised where possible. ▪ Where possible, limit the amount of security and operational lighting present at the on-site substation. ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill.									
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	2	1	2	16	-	Low
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 impact on the night time visual environment.	▪ Additional renewable energy and associated infrastructure 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 and infrastructure developments may be exacerbated, particularly in more natural undisturbed settings.	3	3	2	3	3	2	28	-	Medium	▪ Where possible, limit the number of maintenance vehicles using access roads. ▪ Non-reflective surfaces should be utilised where possible. ▪ Where possible, limit the amount of security and operational lighting present at the on-site substation.	3	3	2	2	2	2	24	-	Medium

	▪ 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.									▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill.									

5.5.2 Wonderheuval solar PV Project

WONDERVEUVEL 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. ▪ Retain a buffer (approximately 100m wide) of intact natural vegetation along the perimeter of the development area (i.e. the CPV panel blocks) and along the site boundary. ▪ Maintain a neat construction site by removing rubble and waste materials regularly. ▪ Temporarily fence-off the construction site (for the duration of the construction period). ▪ Where possible, the operation and maintenance buildings and laydown areas should be consolidated to reduce visual clutter. ▪ Buildings and similar structures must be in keeping with regional planning policy documents. ▪ Where possible, underground cabling should be utilised.	2	2	1	2	1	2	16	-	Low

											▪ Make use of existing gravel access roads where possible. ▪ Limit the number of vehicles and trucks travelling to and from the proposed site, where possible. ▪ Unless there are water shortages, 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 impact on the night time visual environment.	▪ The development 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 minimize visual impacts on these dwellings. ▪ Retain a buffer (approximately 100m wide) of intact natural vegetation along the perimeter of the development area (i.e. the CPV panel blocks) and along the site boundary. ▪ 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.	2	3	3	2	2	2	24	-	Medium

											▪ 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. ▪ The O&M buildings should be painted in natural tones that fit with the surrounding environment. ▪ Buildings and similar structures must be in keeping with regional planning policy documents.									
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	2	1	2	16	-	Low
Cumulative																					
▪ Potential alteration of the visual character and sense of place in the broader area.	▪ Additional renewable energy developments in the broader area will alter the natural character of the study area towards a more industrial	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.	3	3	2	2	2	2	24	-	Medium

▪ Potential visual impact on receptors in the study area. ▪ Potential impact on the night time visual environment.	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.									▪ Ensure that the PV arrays are not located within 500m of any farmhouses or national routes in order to minimise visual impacts on these dwellings and on the receptor road. ▪ Suitable buffers of intact natural vegetation should be provided along the perimeter of the development area and along the site boundary. ▪ 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. ▪ The O&M buildings should be painted in natural tones that fit with the surrounding environment. ▪ Buildings and similar structures must be in keeping with relevant regional planning policy documents.									

WONDERHEUVEL GRID CONNECTION INFRASTRUCTURE																					
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 gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during construction would expose bare soil which could visually contrast with the surrounding environment. ▪ Vegetation clearance required for the construction of the proposed substation is expected to increase dust emissions and alter the natural character of the surrounding area, thus creating a visual impact. ▪ 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. ▪ Maintain a neat construction site by removing rubble and waste materials regularly. ▪ 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. ▪ Unless there are water shortages, 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	1	1	2	14	-	Low
Operational Phase																					
▪ Potential alteration of the visual character and sense of place. ▪ Potential visual impact on receptors in the study area.	▪ The proposed power line and substations could alter the visual character of the surrounding area and expose sensitive visual receptor locations to visual impacts.	2	4	2	2	3	1	13	-	Low	▪ Where possible, limit the number of maintenance vehicles using access roads.	2	4	2	2	3	1	13	-	Low

	▪ The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ 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 could be altered as a result of operational and security lighting at the proposed substation.									▪ Non-reflective surfaces should be utilised where possible. ▪ Where possible, limit the amount of security and operational lighting present at the on-site substation. ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill.									
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	2	1	2	16	-	Low
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 impact on the night time visual environment.	▪ Additional renewable energy and associated infrastructure 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 and infrastructure 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	3	3	2	3	3	2	28	-	Medium	▪ Where possible, limit the number of maintenance vehicles using access roads. ▪ Non-reflective surfaces should be utilised where possible. ▪ Where possible, limit the amount of security and operational lighting present at the on-site substation. ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill.	3	3	2	2	2	2	24	-	Medium

	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.																		

5.5.3 Paarde Valley solar PV Project

PAARDE VALLEY 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. ▪ Retain a buffer (approximately 100m wide) of intact natural vegetation along the perimeter of the development area (i.e. the CPV panel blocks) and along the site boundary. ▪ Maintain a neat construction site by removing rubble and waste materials regularly. ▪ Temporarily fence-off the construction site (for the duration of the construction period). ▪ Temporarily fence-off the construction site (for the duration of the construction period). ▪ Where possible, the operation and maintenance buildings and laydown areas should be consolidated to reduce visual clutter.	2	2	1	2	1	2	16	-	Low

											▪ Buildings and similar structures must be in keeping with regional planning policy documents. ▪ 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 proposed site, where possible. ▪ Unless there are water shortages, 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 impact on the night time visual environment.	▪ The development 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 minimize visual impacts on these dwellings. ▪ Retain a buffer (approximately 100m wide) of intact natural vegetation along the perimeter of the development area (i.e. the CPV panel blocks) and along the site boundary. ▪ 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.	2	3	3	2	2	2	24	-	Medium

											▪ 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. ▪ The O&M buildings should be painted in natural tones that fit with the surrounding environment. ▪ Buildings and similar structures must be in keeping with regional planning policy documents.									
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	2	1	2	16	-	Low
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 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	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 or national routes in order to minimise visual impacts	3	3	2	2	2	2	24	-	Medium

		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.									on these dwellings and on the receptor road. ▪ Suitable buffers of intact natural vegetation should be provided along the perimeter of the development area and along the site boundary. ▪ 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. ▪ The O&M buildings should be painted in natural tones that fit with the surrounding environment. ▪ Buildings and similar structures must be in keeping with relevant regional planning policy documents.								

PAARDE VALLEY GRID CONNECTION INFRASTRUCTURE																					
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 gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during construction would expose bare soil which could visually contrast with the surrounding environment. ▪ Vegetation clearance required for the construction of the proposed substation is expected to increase dust emissions and alter the natural character of the surrounding area, thus creating a visual impact. ▪ 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. ▪ Maintain a neat construction site by removing rubble and waste materials regularly. ▪ 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. ▪ Unless there are water shortages, 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	1	1	2	14	-	Low
Operational Phase																					
▪ Potential alteration of the visual character and sense of place. ▪ Potential visual impact on receptors in the study area.	▪ The proposed power line and substations could alter the visual character of the surrounding area and expose sensitive visual receptor locations to visual impacts.	2	4	2	2	3	1	13	-	Low	▪ Where possible, limit the number of maintenance vehicles using access roads.	2	4	2	2	3	1	13	-	Low

	▪ The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ 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 could be altered as a result of operational and security lighting at the proposed substation.									▪ Non-reflective surfaces should be utilised where possible. ▪ Where possible, limit the amount of security and operational lighting present at the on-site substation. ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill.									
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	2	1	2	16	-	Low
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 impact on the night time visual environment.	▪ Additional renewable energy and associated infrastructure 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 and infrastructure 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	3	3	2	3	3	2	28	-	Medium	▪ Where possible, limit the number of maintenance vehicles using access roads. ▪ Non-reflective surfaces should be utilised where possible. ▪ Where possible, limit the amount of security and operational lighting present at the on-site substation. ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill.	3	3	2	2	2	2	24	-	Medium

	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.																		

6 COMPARATIVE ASSESSMENT OF ALTERNATIVES

The layout alternatives for the proposed laydown areas and O&M buildings identified for each PV project (as shown in **Figure 1**, **Figure 2** and **Figure 3**) are comparatively assessed in **Table 8** below.

As previously stated, grid connection infrastructure alternatives have been provided for each PV project. These alternatives essentially provide for different route alignments with associated substations contained within an assessment corridor of between approximately 400m and 900m wide. Details of these alternatives are provided in **Section 1.1.2** above. These alternatives 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 8: Comparative Assessment of Alternatives: PV Infrastructure

PV INFRASTRUCTURE ALTERNATIVES (LAYDOWN AREAS AND O&M BUILDINGS)	Preference	Reasons (incl. potential issues)
MOOI PLAATS SOLAR PV FACILITY:		
Laydown Area and O&M Building Site Option 1	Favourable	▪ Option 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 2kms away,

PV INFRASTRUCTURE ALTERNATIVES (LAYDOWN AREAS AND O&M BUILDINGS)	Preference	Reasons (incl. potential issues)
		this being SR1. The visual impacts from Option 1 affecting this receptor are therefore rated as low to moderate. As SR1 is located on the Mooi Plaats application site, it is however assumed that the owner has a vested interest in the SPEF project and thus the associated laydown area and O&M buildings would not be perceived in a negative light. The remaining receptors are all more than 4kms away and thus would only be subjected to low or negligible levels of impact. ▪ As Option 1 is some 5.4kms from the nearest section of the N10 receptor road, development at this location is not expected to impact motorists travelling along this route. ▪ Option 1 is relatively close to the existing 400kV power lines and as such the landscape has already undergone some transformation from its natural state. Thus the impacts of the proposed laydown area and O&M buildings would be significantly reduced. ▪ In light of the above, there are no fatal flaws associated with Option 1 and this alternative is considered favourable from a visual perspective.
Laydown Area and O&M Building Site Option 2	Favourable	▪ Option 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 3.1kms away, this being SR1. The visual impacts from Option 2 affecting this receptor are therefore rated as low. As SR1 is located on the Mooi Plaats application site, it is however assumed that the owner has a vested interest in the SPEF project and thus the associated laydown area and O&M buildings would not be perceived in a negative light. The remaining receptors are all more than 4kms away and thus would only be subjected to low or negligible levels of impact. ▪ Option 2 is some 3.6kms from the nearest section of the N10 receptor road, located in

PV INFRASTRUCTURE ALTERNATIVES (LAYDOWN AREAS AND O&M BUILDINGS)	Preference	Reasons (incl. potential issues)
		an area which is not expected to be visible from the N10. ▪ Option 2 is relatively close to the existing 400kV power lines and as such the landscape has already undergone some transformation from its natural state. Thus the impacts of the proposed laydown area and O&M buildings would be significantly reduced. ▪ In light of the above, there are no fatal flaws associated with Option 2 and this alternative is considered favourable from a visual perspective.
Laydown Area and O&M Building Site Option 3	Favourable	▪ Option 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 4.3kms away, this being SR1. The visual impacts from Option 2 affecting this receptor are therefore rated as low. As SR1 is located on the Mooi Plaats application site, it is however assumed that the owner has a vested interest in the SEF project and thus the associated laydown area and O&M buildings would not be perceived in a negative light. The remaining receptors are all more than 4kms away and thus would only be subjected to low or negligible levels of impact. ▪ Option 3 is some 4.2kms from the nearest section of the N10 receptor road, located in an area which is not expected to be visible from the N10. ▪ Option 3 is some 600m from the existing 400kV power lines and as such is close to an area of moderate visual contrast where the landscape has already undergone some transformation from its natural state. Thus the impacts of the proposed laydown area and O&M buildings would be significantly reduced. ▪ In light of the above, there are no fatal flaws associated with Option 3 and this alternative is considered favourable from a visual perspective.

PV INFRASTRUCTURE ALTERNATIVES (LAYDOWN AREAS AND O&M BUILDINGS)	Preference	Reasons (incl. potential issues)
Laydown Area and O&M Building Site Option 4	Least Preferred	1 Option 4 is located on relatively flat terrain and as such would only be moderately exposed on the skyline. 2 The closest potentially sensitive receptor to this alternative is approximately 1.1kms away, this being VR5. The visual impacts from Option 4 affecting this receptor are therefore rated as moderate. The remaining receptors are all more than 3kms away and thus would only be subjected to low or negligible levels of impact. 3 Option 4 is some 600m from the nearest section of the N10 receptor road, located in an area which is expected to be visible from the N10. 4 The proximity of the N10 places this alternative in a zone of low to moderate contrast where the landscape has already undergone some transformation from its natural state. Thus the impacts of the proposed laydown area and O&M buildings would be significantly reduced. 4.1 In light of the above, there are no fatal flaws associated with Option 4 and this alternative is considered least preferred from a visual perspective.
Laydown Area and O&M Building Site Option 5	Favourable	▪ Option 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 900m away, this being SR1. The visual impacts from Option 5 affecting this receptor are therefore rated as moderate. As SR1 is located on the Mooi Plaats application site, it is however assumed that the owner has a vested interest in the SEF project and thus the associated laydown area and O&M buildings would not be perceived in a negative light. The remaining receptors are all more than 4kms away and thus would only be subjected to low or negligible levels of impact. ▪ As Option 5 is some 4.1kms from the nearest section of the N10 receptor road,

PV INFRASTRUCTURE ALTERNATIVES (LAYDOWN AREAS AND O&M BUILDINGS)	Preference	Reasons (incl. potential issues)
		development at this location is not expected to impact motorists travelling along this route. ▪ Option 5 is relatively close to the existing 400kV power lines and as such the landscape has already undergone some transformation from its natural state. Thus the impacts of the proposed laydown area and O&M buildings would be significantly reduced. ▪ In light of the above, there are no fatal flaws associated with Option 5 and this alternative is considered favourable from a visual perspective.
Laydown Area and O&M Building Site Option 6	Favourable	▪ Option 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 4km away, this being VR9. The visual impacts from Option 6 affecting this receptor are therefore rated as moderate. As VR9 is located on the Mooi Plaats application site, it is however assumed that the owner has a vested interest in the SEF project and thus the associated laydown area and O&M buildings would not be perceived in a negative light. The remaining receptors are all more than 4kms away and thus would only be subjected to low or negligible levels of impact. ▪ As Option 6 is some 4.1kms from the nearest section of the N10 receptor road, located in an area which is not expected to be visible from the N10. ▪ Option 6 is relatively close to the existing power lines and District Road P2433 and as such the landscape has already undergone some transformation from its natural state. Thus the impacts of the proposed laydown area and O&M buildings would be significantly reduced. ▪ In light of the above, there are no fatal flaws associated with Option 6 and this alternative is considered favourable from a visual perspective.
WONDERHEUVEL SOLAR PV FACILITY:		

PV INFRASTRUCTURE ALTERNATIVES (LAYDOWN AREAS AND O&M BUILDINGS)	Preference	Reasons (incl. potential issues)
Laydown Area and O&M Building Site Option 1	Favourable	▪ Option 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 3.4kms away, this being VR9. The visual impacts from Option 1 affecting this receptor are therefore rated as low. As VR9 is located on the Wonderheuvel application site, it is assumed that the owner has a vested interest in the SEF project and thus the associated laydown area and O&M buildings would not be perceived in a negative light. The remaining receptors are all more than 4kms away and thus would only be subjected to low or negligible levels of impact. ▪ As Option 1 is outside the viewshed for the N10 receptor road, development at this location is not expected to impact motorists travelling along this route. ▪ Option 1 is relatively close to existing power lines and District Road P2433 and as such the landscape has already undergone some transformation from its natural state. Thus the impacts of the proposed laydown area and O&M buildings would be significantly reduced. ▪ In light of the above, there are no fatal flaws associated with Option 1 and this alternative is considered favourable from a visual perspective.
Laydown Area and O&M Building Site Option 2	Favourable	▪ Option 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 3.1kms away, this being VR17. The visual impacts from Option 2 affecting this receptor are therefore rated as low. The remaining receptors are all more than 3kms away and thus would only be subjected to low or negligible levels of impact. ▪ As Option 2 is outside the viewshed for the N10 receptor road, development at this

PV INFRASTRUCTURE ALTERNATIVES (LAYDOWN AREAS AND O&M BUILDINGS)	Preference	Reasons (incl. potential issues)
		location is not expected to impact motorists travelling along this route. ▪ Option 2 is relatively close to existing power lines and as such the landscape has already undergone some transformation from its natural state. Thus the impacts of the proposed laydown area and O&M buildings would be significantly reduced. ▪ In light of the above, there are no fatal flaws associated with Option 2 and this alternative is considered favourable from a visual perspective.
Laydown Area and O&M Building Site Option 3	Favourable	▪ Option 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 2.4kms away, this being VR12. The visual impacts from Option 3 affecting this receptor are therefore rated as low. As VR12 is located on the Wonderheuvel application site, it is assumed that the owner has a vested interest in the SEF project and thus the associated laydown area and O&M buildings would not be perceived in a negative light. The remaining receptors are all more than 3kms away and thus would only be subjected to low or negligible levels of impact. ▪ As Option 3 is outside the viewshed for the N10 receptor road, development at this location is not expected to impact motorists travelling along this route. ▪ As Option 3 is not located close to any existing infrastructural development and the landscape is largely untransformed, the proposed development would result in significant visual contrast. The impact of this is however reduced by the distance from the nearest receptor. ▪ In light of the above, there are no fatal flaws associated with Option 3 and this alternative is considered favourable from a visual perspective.

PV INFRASTRUCTURE ALTERNATIVES (LAYDOWN AREAS AND O&M BUILDINGS)	Preference	Reasons (incl. potential issues)
Laydown Area and O&M Building Site Option 4	Favourable	▪ Option 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 2.4kms away, this being VR12. The visual impacts from Option 4 affecting this receptor are therefore rated as low. As VR12 is located on the Wonderheuvel application site, it is assumed that the owner has a vested interest in the SEF project and thus the associated laydown area and O&M buildings would not be perceived in a negative light. The remaining receptors are all more than 3kms away and thus would only be subjected to low or negligible levels of impact. ▪ As Option 4 is outside the viewshed for the N10 receptor road, development at this location is not expected to impact motorists travelling along this route. ▪ As Option 4 is not located close to any existing infrastructural development and the landscape is largely untransformed, the proposed development would result in significant visual contrast. The impact of this is however reduced by the distance from the nearest receptor. ▪ In light of the above, there are no fatal flaws associated with Option 4 and this alternative is considered favourable from a visual perspective.
Laydown Area and O&M Building Site Option 5		▪ Option 5 is located on relatively flat terrain and as such would only be moderately exposed on the skyline. ▪ The closest potentially sensitive receptors to this alternative are approximately 1.4 and 1.8kms away, these being VR12 and VR9 respectively. The visual impacts from Option 5 affecting these receptors are therefore rated as moderate. As VR12 and VR9 are both located on the Wonderheuvel application site, it is assumed that the owners have a vested interest in the SEF project and thus the associated laydown area and O&M buildings would not be perceived in a

PV INFRASTRUCTURE ALTERNATIVES (LAYDOWN AREAS AND O&M BUILDINGS)	Preference	Reasons (incl. potential issues)
		negative light. The remaining receptors are all more than 2.5kms away and thus would only be subjected to low or negligible levels of impact. ▪ As Option 5 is outside the viewshed for the N10 receptor road, development at this location is not expected to impact motorists travelling along this route. ▪ Option 5 is relatively close to District Road P2433 and existing power lines and as such the landscape has already undergone some transformation from its natural state. Thus the impacts of the proposed laydown area and O&M buildings would be significantly reduced. ▪ In light of the above, there are no fatal flaws associated with Option 5 and this alternative is considered favourable from a visual perspective.
Laydown Area and O&M Building Site Option 6	Least Preferred	▪ Option 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 600m away, this being VR9. The visual impacts from Option 6 affecting this receptor is therefore rated as moderate. As VR9 is located on the Wonderheuvel application site, it is assumed that the owner has a vested interest in the SEF project and thus the associated laydown area and O&M buildings would not be perceived in a negative light. The remaining receptors are all more than 2kms away and thus would only be subjected to low or negligible levels of impact. ▪ As Option 6 is outside the viewshed for the N10 receptor road, development at this location is not expected to impact motorists travelling along this route. ▪ Option 6 is relatively close to District Road P2433 and existing power lines and as such the landscape has already undergone some transformation from its natural state. Thus the impacts of the proposed laydown area

PV INFRASTRUCTURE ALTERNATIVES (LAYDOWN AREAS AND O&M BUILDINGS)	Preference	Reasons (incl. potential issues)
		and O&M buildings would be significantly reduced. ▪ Although there are no fatal flaws associated with Option 6, given the proximity of this alternative to VR9, this alternative is considered least preferred from a visual perspective.
Laydown Area and O&M Building Site Option 7	Favourable	▪ Option 7 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 2.3kms away, this being VR12. The visual impacts from Option 7 affecting these receptors are therefore rated as moderate. As VR12 is located on the Wonderheuvel application site, it is assumed that the owners have a vested interest in the SEF project and thus the associated laydown area and O&M buildings would not be perceived in a negative light. The remaining receptors are all more than 4kms away and thus would only be subjected to low or negligible levels of impact. ▪ As Option 7 is outside the viewshed for the N10 receptor road, development at this location is not expected to impact motorists travelling along this route. ▪ As Option 7 is not located close to any existing infrastructural development and the landscape is largely untransformed, the proposed development would result in significant visual contrast. The impact of this is however reduced by the distance from the nearest receptor. ▪ In light of the above, there are no fatal flaws associated with Option 7 and this alternative is considered favourable from a visual perspective.
Laydown Area and O&M Building Site Option 8	Least Preferred	▪ Option 8 is located on relatively flat terrain and as such would only be moderately exposed on the skyline. ▪ The closest potentially sensitive receptors to this alternative are between 1.3 and 1.5kms away, these being VR12, VR3 and VR14.

PV INFRASTRUCTURE ALTERNATIVES (LAYDOWN AREAS AND O&M BUILDINGS)	Preference	Reasons (incl. potential issues)
		The visual impacts from Option 8 affecting these receptors are therefore rated as moderate. As VR12 is located on the Wonderheuvel application site, it is assumed that the owners have a vested interest in the SEF project and thus the associated laydown area and O&M buildings would not be perceived in a negative light. The remaining receptors are all more than 3kms away and thus would only be subjected to low or negligible levels of impact. ▪ As Option 8 is outside the viewshed for the N10 receptor road, development at this location is not expected to impact motorists travelling along this route. ▪ Option 8 is relatively close to District Road P2433 and existing power lines and as such the landscape has already undergone some transformation from its natural state. Thus the impacts of the proposed laydown area and O&M buildings would be significantly reduced. ▪ Although there are no fatal flaws associated with Option 8, given the proximity of this alternative to three potentially sensitive receptors, this alternative is considered least preferred from a visual perspective.
PAARDE VALLEY SOLAR PV FACILITY:		
Laydown Area and O&M Building Site Option 1	Favourable	▪ Option 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 5.0kms away, this being VR24. The visual impacts from Option 1 affecting this receptor are therefore rated as low to negligable. The remaining receptors are all more than 5kms away and thus are not expected to be subjected to any visual impacts from this alternative. ▪ As Option 1 is not located close to any existing infrastructural development and the landscape is largely untransformed, the proposed development would result in significant visual contrast. The impact of this

PV INFRASTRUCTURE ALTERNATIVES (LAYDOWN AREAS AND O&M BUILDINGS)	Preference	Reasons (incl. potential issues)
		is however reduced by the distance from the nearest receptor. ▪ In light of the above, there are no fatal flaws associated with Option 1 and this alternative is considered favourable from a visual perspective.
Laydown Area and O&M Building Site Option 2	Favourable	▪ Option 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 3.9kms away, this being VR24. The visual impacts from Option 2 affecting this receptor are therefore rated as low. As VR24 is located on the Paarde Valley application site, it is assumed that the owners have a vested interest in the SEF project and thus the associated laydown area and O&M buildings would not be perceived in a negative light. The remaining receptors are all more than 4kms away and thus would only be subjected to low or negligible levels of impact. ▪ As Option 2 is not located close to any existing infrastructural development and the landscape is largely untransformed, the proposed development would result in significant visual contrast. The impact of this is however reduced by the distance from the nearest receptor. ▪ In light of the above, there are no fatal flaws associated with Option 2 and this alternative is considered favourable from a visual perspective.
Laydown Area and O&M Building Site Option 3	Favourable	▪ Option 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 3.5kms away, this being VR24. The visual impacts from Option 3 affecting this receptor are therefore rated as low. As VR24 is located on the Paarde Valley application site, it is assumed that the owners have a vested interest in the SEF project and thus the associated laydown area and O&M buildings

PV INFRASTRUCTURE ALTERNATIVES (LAYDOWN AREAS AND O&M BUILDINGS)	Preference	Reasons (incl. potential issues)
		would not be perceived in a negative light. The remaining receptors are all more than 4kms away and thus would only be subjected to low or negligible levels of impact. ▪ As Option 3 is not located close to any existing infrastructural development and the landscape is largely untransformed, the proposed development would result in significant visual contrast. The impact of this is however reduced by the distance from the nearest receptor. ▪ In light of the above, there are no fatal flaws associated with Option 3 and this alternative is considered favourable from a visual perspective.
Laydown Area and O&M Building Site Option 4	Favourable	▪ Option 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 3.1kms away, this being VR24. The visual impacts from Option 4 affecting this receptor are therefore rated as low. As VR24 is located on the Paarde Valley application site, it is assumed that the owners have a vested interest in the SEF project and thus the associated laydown area and O&M buildings would not be perceived in a negative light. The remaining receptors are all more than 4kms away and thus would only be subjected to low or negligible levels of impact. ▪ As Option 4 is not located close to any existing infrastructural development and the landscape is largely untransformed, the proposed development would result in significant visual contrast. The impact of this is however reduced by the distance from the nearest receptor. ▪ In light of the above, there are no fatal flaws associated with Option 4 and this alternative is considered favourable from a visual perspective.
Laydown Area and O&M Building Site Option 5	Favourable	▪ Option 5 is located on relatively flat terrain and as such would only be moderately exposed on the skyline.

PV INFRASTRUCTURE ALTERNATIVES (LAYDOWN AREAS AND O&M BUILDINGS)	Preference	Reasons (incl. potential issues)
		▪ The closest potentially sensitive receptor to this alternative is approximately 2.7kms away, this being VR30. The visual impacts from Option 5 affecting this receptor are therefore rated as low. The remaining receptors are all more than 4kms away and thus would only be subjected to low or negligible levels of impact. ▪ As Option 5 is not located close to any existing infrastructural development and the landscape is largely untransformed, the proposed development would result in significant visual contrast. The impact of this is however reduced by the distance from the nearest receptor. ▪ In light of the above, there are no fatal flaws associated with Option 5 and this alternative is considered favourable from a visual perspective.
Laydown Area and O&M Building Site Option 6	Favourable	▪ Option 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 1.9kms away, this being VR24. The visual impacts from Option 6 affecting this receptor are therefore rated as moderate. As VR24 is located on the Paarde Valley application site, it is assumed that the owners have a vested interest in the SEF project and thus the associated laydown area and O&M buildings would not be perceived in a negative light. The remaining receptors are all more than 4kms away and thus would only be subjected to low or negligible levels of impact. ▪ As Option 6 is not located close to any existing infrastructural development and the landscape is largely untransformed, the proposed development would result in significant visual contrast. The impact of this is however reduced by the distance from the nearest receptor. ▪ In light of the above, there are no fatal flaws associated with Option 6 and this alternative

PV INFRASTRUCTURE ALTERNATIVES (LAYDOWN AREAS AND O&M BUILDINGS)	Preference	Reasons (incl. potential issues)
		is considered favourable from a visual perspective.
Laydown Area and O&M Building Site Option 7	Least Preferred	▪ Option 7 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 1.2kms away, this being VR24. The visual impacts from Option 7 affecting this receptor are therefore rated as moderate. As VR24 is located on the Paarde Valley application site, it is assumed that the owners have a vested interest in the SEF project and thus the associated laydown area and O&M buildings would not be perceived in a negative light. The remaining receptors are all more than 4kms away and thus would only be subjected to low or negligible levels of impact. ▪ Option 7 is relatively close to existing power lines and as such the landscape has already undergone some transformation from its natural state. Thus the impacts of the proposed laydown area and O&M buildings would be significantly reduced. ▪ Although there are no fatal flaws associated with Option 7, given the proximity of this alternative to a potentially sensitive receptor, this alternative is considered least preferred from a visual perspective.
Laydown Area and O&M Building Site Option 8	Favourable	▪ Option 8 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 2.4kms away, this being VR30. The visual impacts from Option 8 affecting this receptor are therefore rated as low. The remaining receptors are all more than 3kms away and thus would only be subjected to low or negligible levels of impact. ▪ As Option 8 is not located close to any existing infrastructural development and the landscape is largely untransformed, the proposed development would result in significant visual contrast. The impact of this

PV INFRASTRUCTURE ALTERNATIVES (LAYDOWN AREAS AND O&M BUILDINGS)	Preference	Reasons (incl. potential issues)
		is however reduced by the distance from the nearest receptor. ▪ In light of the above, there are no fatal flaws associated with Option 8 and this alternative is considered favourable from a visual perspective.
Laydown Area and O&M Building Site Option 9	Favourable	▪ Option 9 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 VR24. The visual impacts from Option 9 affecting this receptor are therefore rated as moderate. As VR24 is located on the Paarde Valley application site, it is assumed that the owners have a vested interest in the SEF project and thus the associated laydown area and O&M buildings would not be perceived in a negative light. The remaining receptors are all more than 3.5kms away and thus would only be subjected to low or negligible levels of impact. ▪ Option 9 is relatively close to existing power lines and as such the landscape has already undergone some transformation from its natural state. Thus the impacts of the proposed laydown area and O&M buildings would be significantly reduced. ▪ In light of the above, there are no fatal flaws associated with Option 9 and this alternative is considered favourable from a visual perspective.

Table 9: Comparative Assessment of Alternatives: Grid Connection Infrastructure

GRID CONNECTION INFRASTRUCTURE ALTERNATIVES (POWER LINE CORRIDORS AND ASSOCIATED SUBSTATIONS)	Preference	Reasons (incl. potential issues)
MOOI PLAATS SOLAR PV FACILITY:		
Grid Connection Option 1a	Preferred	▪ These corridor alternatives are almost identical to each other, although each one is

GRID CONNECTION INFRASTRUCTURE ALTERNATIVES (POWER LINE CORRIDORS AND ASSOCIATED SUBSTATIONS)	Preference	Reasons (incl. potential issues)
Grid Connection Option 1b	Preferred	associated with a different combination of substations. As such, there is little difference between the alternatives from a visual perspective. ▪ Both options are approximately 13kms in length. ▪ Much of both these corridor alternatives is located on relatively flat terrain and as such the power lines would only be moderately exposed on the skyline. The eastern section of the corridor does however traverse areas of higher elevation and as such power lines in these areas will be more exposed. ▪ Much of the northern sections of these corridor alternatives are in the viewshed of the N10 receptor road, although the distance from the road and the presence of the existing 400kV power lines would reduce visual impacts on passing motorists to low. According to the visibility analysis conducted however, the substation site which forms part of Option 1b would be less visible from the N10 than the substation site associated with Option 1a. ▪ There is one sensitive receptor location (SR2) and no potentially sensitive receptor locations within 500m of both alternatives and a second sensitive receptor (SR3) only 600m from the edge of the assessment corridor. As much of the assessment corridor is aligned adjacent to existing 400kV power lines however, visual impacts affecting these receptors would be reduced to moderate. ▪ The closest receptor to the substation sites is SR1, which is between 2.1kms and 2.9kms from the nearest Substation 1a and 1b respectively. ▪ In light of the above, there are no fatal flaws associated with either Grid Connection Option 1a or Grid Connection Option 1b, and both of these alternatives are considered favourable from a visual perspective.

GRID CONNECTION INFRASTRUCTURE ALTERNATIVES (POWER LINE CORRIDORS AND ASSOCIATED SUBSTATIONS)	Preference	Reasons (incl. potential issues)
		▪ The Option 1 alternatives are preferred over the Option 2 alternatives as the route is shorter and most almost entirely aligned with the existing power lines.
Grid Connection Option 2a	Favourable	▪ These corridor alternatives are almost identical to each other, although each one is associated with a different combination of substations. As such, there is little difference between the alternatives from a visual perspective. ▪ Both options are approximately 21km in length. ▪ Much of both these corridor alternatives is located on relatively flat terrain and as such the power lines would only be moderately exposed on the skyline. The eastern section of the corridor does however traverse areas of higher elevation and as such power lines in these areas will be more exposed. ▪ Much of the northern sections of these corridor alternatives are in the viewshed of the N10 receptor road, although the distance from the road and the presence of the existing 400kV power lines would reduce visual impacts on passing motorists to low. According to the visibility analysis conducted however, the substation site which forms part of Option 1b would be less visible from the N10 than the substation site associated with option 1a. The central collector substation will not be visible from the N10. ▪ There is one sensitive receptor location (SR2) and no potentially sensitive receptor locations within 500m of both alternatives and a second sensitive receptor (SR3) only 600m from the edge of the assessment corridor. As much of the assessment corridor is aligned adjacent to existing 400kV power lines however, visual impacts affecting these receptors would be reduced to moderate. ▪ The closest receptor to the substation sites is SR1, which is between 2.1kms and 2.9kms
Grid Connection Option 2b	Favourable	

GRID CONNECTION INFRASTRUCTURE ALTERNATIVES (POWER LINE CORRIDORS AND ASSOCIATED SUBSTATIONS)	Preference	Reasons (incl. potential issues)
		from the nearest Substation 1a and 1b respectively. ▪ In light of the above, there are no fatal flaws associated with either Grid Connection Option 2a or Grid Connection Option 2b, and both of these alternatives are considered favourable from a visual perspective. ▪ The Option 2 alternatives are less preferred than the Option 1 alternatives as the route is overall much longer.
WONDERHEUVEL SOLAR PV FACILITY		
Grid Connection Option 1a	Least Preferred	▪ These corridor alternatives are almost identical to each other, although each one is associated with a different combination of substations. As such, there is little difference between the alternatives from a visual perspective. ▪ All northern connection options are between 18 and 19km approximately in length, while all southern connection alternatives are approximately 19km in length. ▪ Large sections of all of these corridor alternatives are located on relatively flat terrain and as such the power lines would only be moderately exposed on the skyline. The eastern sections of both the northern and southern connections of each option do however traverse areas of higher elevation and as such power lines in these areas will be more exposed. ▪ Much of the northern sections of these corridor alternatives are in the viewshed of the N10 receptor road, although the distance from the road and the presence of the existing 400kV power lines would reduce visual impacts on passing motorists to low. According to the visibility analysis conducted however, the substation sites and the southern connection will be not be visible from this road. ▪ There is one sensitive receptor location (SR2) and no potentially sensitive receptor locations within 500m of the northern
Grid Connection Option 1b	Least Preferred	
Grid Connection Option 1c	Least Preferred	
Grid Connection Option 1d	Least Preferred	

GRID CONNECTION INFRASTRUCTURE ALTERNATIVES (POWER LINE CORRIDORS AND ASSOCIATED SUBSTATIONS)	Preference	Reasons (incl. potential issues)
		connection alternatives and a second sensitive receptor (SR3) only 600m from the edge of the assessment corridor. As much of the northern connection assessment corridor is aligned adjacent to existing 400kV power lines however, visual impacts affecting these receptors would be reduced to moderate. ▪ The closest receptor to the southern connection is more than 2km away and thus impacts on this receptor would be rated as low. ▪ The closest receptor to a substation site is VR12, which is 2.3km from Sub4a and thus would only be subjected to low levels of impact. ▪ In light of the above, there are no fatal flaws associated with either Grid Connection Options 1a, 1b, 1c or 1d and all of these alternatives are considered favourable from a visual perspective. ▪ The Option 1 alternatives are less preferred than the Option 2 and Option 3 alternatives as the route is overall much longer.
Grid Connection Option 2a	Favourable	▪ These corridor alternatives are almost identical to each other, although each one is associated with a different substation. As such, there is little difference between the alternatives from a visual perspective. ▪ Option 2a is approximately 22km in length, while Option 2b is some 2kms longer. ▪ The western sections of both these options is located on relatively flat terrain and as such the power lines would only be moderately exposed on the skyline. The eastern sections however traverse areas of higher elevation and as such power lines in these areas will be more exposed. ▪ Much of the northern sections of these corridor alternatives is in the viewshed of the N10 receptor road, although the distance from the road (more than 5km) and the presence of the existing 400kV power lines would reduce visual impacts on passing
Grid Connection Option 2b	Favourable	

GRID CONNECTION INFRASTRUCTURE ALTERNATIVES (POWER LINE CORRIDORS AND ASSOCIATED SUBSTATIONS)	Preference	Reasons (incl. potential issues)
		motorists to low. According to the visibility analysis conducted, the substation sites and the southern sections of the corridor options will be not be visible from this road. ▪ There is one sensitive receptor location (SR2) and no potentially sensitive receptor locations within 500m of the northern sections of the corridor alternatives and a second sensitive receptor (SR3) only 600m from the edge of the assessment corridor. As much of the northern section of the assessment corridor is aligned adjacent to existing 400kV power lines however, visual impacts affecting these receptors would be reduced to moderate. ▪ The closest receptor to a substation site is VR12, which is 2.3km from Sub4a (the Central Collector). As such this receptor would only be subjected to low levels of impact from the substation. ▪ In light of the above, there are no fatal flaws associated with either Grid Connection Options 2a or 2b and both of these alternatives are considered favourable from a visual perspective. ▪ The Option 2 alternatives are preferred over the Option 1 alternatives as the route is overall much shorter.
Grid Connection Option 3	Favourable	▪ Option is approximately 25km in length, and incorporates sections the other corridor alternatives examined above. ▪ The western section of this option is located on relatively flat terrain and as such the power lines would only be moderately exposed on the skyline. The eastern section however traverses areas of higher elevation and as such power lines in these areas will be more exposed. ▪ Much of the northern section of this corridor alternative is in the viewshed of the N10 receptor road, although the distance from the road (more than 5km) and the presence of the existing 400kV power lines would reduce

GRID CONNECTION INFRASTRUCTURE ALTERNATIVES (POWER LINE CORRIDORS AND ASSOCIATED SUBSTATIONS)	Preference	Reasons (incl. potential issues)
		visual impacts on passing motorists to low. According to the visibility analysis conducted, the substation sites and the southern sections of this corridor option will be not be visible from this road. ▪ There is one sensitive receptor location (SR2) and no potentially sensitive receptor locations within 500m of the northern sections of the corridor alternatives and a second sensitive receptor (SR3) only 600m from the edge of the assessment corridor. As much of the northern section of the assessment corridor is aligned adjacent to existing 400kV power lines however, visual impacts affecting these receptors would be reduced to moderate. ▪ The closest receptor to a substation site is VR12, which is 2.3km from both Sub4a (the Central Collector) and Sub4b. As such this receptor would only be subjected to low levels of impact from the substation. ▪ In light of the above, there are no fatal flaws associated with Grid Connection Option 3 and this alternative is considered favourable from a visual perspective. ▪ The Option 3 alternative is preferred over the Option 1 alternatives as the route is overall much shorter.
PAARDE VALLEY SOLAR PV FACILITY:		
Grid Connection Option 1a	Preferred	▪ These corridor alternatives are almost identical to each other, although each one is associated with a different combination of substations. As such, there is little difference between the alternatives from a visual perspective. ▪ All northern connection options are between 15 and 16km approximately in length, while all southern connection alternatives are between 12 and 14km in length. ▪ Large sections of all of these corridor alternatives are located on relatively flat terrain and as such the power lines would only be moderately exposed on the skyline.
Grid Connection Option 1b	Preferred	
Grid Connection Option 1c	Preferred	
Grid Connection Option 1d	Preferred	

GRID CONNECTION INFRASTRUCTURE ALTERNATIVES (POWER LINE CORRIDORS AND ASSOCIATED SUBSTATIONS)	Preference	Reasons (incl. potential issues)
		The eastern sections of both the northern and southern connections of each option do however traverse areas of higher elevation and as such power lines in these areas will be more exposed. ▪ There are no potentially sensitive receptor locations within 500m of any of these alternatives. The closest receptor is VR21 which is approximately 1.4km from the eastern-most section of the assessment corridor. Visual impacts affecting this receptor would be rated as moderate. ▪ The closest receptor to a substation site is VR30, which is 2.6km from Sub7b. VR28 and VR29 are both 3.2kms from Sub7b, while VR24 is 3.2km from Sub7a. Thus these receptors would only be subjected to low levels of impact resulting from the substations. ▪ In light of the above, there are no fatal flaws associated with either Grid Connection Options 1a, 1b, 1c or 1d and all of these alternatives are considered favourable from a visual perspective. ▪ The Option 1 alternatives are preferred over the Option 2 alternatives as the routes are overall much shorter and there are fewer visual receptors in close proximity.
Grid Connection Option 2a	Favourable	▪ These corridor alternatives are almost identical to each other, although each one is associated with a different combination of substations. As such, there is little difference between the alternatives from a visual perspective. ▪ All northern connection options are approximately 23km in length, while the
Grid Connection Option 2b	Favourable	
Grid Connection Option 2c	Favourable	
Grid Connection Option 2d	Favourable	

GRID CONNECTION INFRASTRUCTURE ALTERNATIVES (POWER LINE CORRIDORS AND ASSOCIATED SUBSTATIONS)	Preference	Reasons (incl. potential issues)
		southern connection alternatives are between 27 and 30km in length. ▪ Large sections of all of these corridor alternatives are located on relatively flat terrain and as such the power lines would only be moderately exposed on the skyline. The eastern sections of both the northern and southern connections of each option do however traverse areas of higher elevation and as such power lines in these areas will be more exposed. ▪ There is one sensitive receptor location (SR2) and no potentially sensitive receptor locations within 500m of the northern sections of the corridor alternatives and a second sensitive receptor (SR3) only 600m from the edge of the assessment corridor. As much of the northern section of the assessment corridor is aligned adjacent to existing 400kV power lines however, visual impacts affecting these receptors would be reduced to moderate. ▪ The closest receptor to a substation site is VR12, which is 2.3km from Sub4a (the Central Collector). As such this receptor would only be subjected to low levels of impact from the substation. ▪ In light of the above, there are no fatal flaws associated with either Grid Connection Options 2a, 2b, 2c or 2d and all of these alternatives are considered favourable from a visual perspective. ▪ The Option 2 alternatives are however less preferred than the Option 1 alternatives as the routes are overall much longer and there are more visual receptors in close proximity.

7 CONCLUSION

An EIA level visual study was conducted to assess the magnitude and significance of the visual impacts associated with the development of the proposed Mooi Plaats, Wonderheuvel and Paarde Valley solar PV facilities and associated grid connection infrastructure near Noupoort and Middelburg in the Northern and Eastern Cape Provinces. 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, solar PV developments 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 level of contrast will however be reduced by the presence of the N10 national route and existing high voltage power lines in in the northern sector of the study area.

The area is not 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 twenty six (26) potentially sensitive receptors were identified in the combined study area, three (3) of which are considered to be sensitive receptors as they are linked to leisure/nature-based tourism activities in the area. None of the receptors are however expected to experience high levels of visual impact from any of the proposed PV facilities or the grid connection infrastructure. Although the N10 receptor road traverses the study area, motorists travelling along this route are only expected to experience moderate impacts from the proposed Mooi Plaats solar PV facility and from the grid connection infrastructure associated with all three projects.

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 Mooi Plaats, Wonderheuvel and Paarde Valley solar PV facilities and associated grid connection infrastructure will be of low significance during both construction and decommissioning phases.

During operation, visual impacts from all three solar PV facilities would be of medium significance with relatively few mitigation measures available to reduce the visual impact. Visual impacts associated with the grid connection infrastructure during operation would be of low significance.

Although other renewable energy developments and infrastructure projects, either proposed or in operation, were identified within a 35km radius of the Mooi Plaats, Wonderheuvel and Paarde Valley solar PV projects, it was determined that only one of these would have any significant impact on the landscape within the visual assessment zone, namely Umsobomvu WEF. This proposed WEF, in conjunction with the three proposed solar PV facilities and associated grid connection 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.

No fatal flaws were identified for any of the proposed site alternatives for laydown areas and O&M buildings for any of the PV projects. A summary of the preference ratings for each project is provided below:

- Mooi Plaats Solar PV Facility: No preference was determined for any of the laydown area and O&M building site options and all but one site was found to be favourable. The remaining option, Site Option 4 was found to be the least preferred due to its proximity to a potentially sensitive receptor and the N10 receptor road.
- Wonderheuvel Solar PV Facility: No preference was determined for any of the laydown area and O&M building site options and all but two sites were found to be favourable. The remaining options, Site Option 6 and Site Option 8 were found to be the least preferred due to their proximity to potentially sensitive receptors.
- Paarde Valley Solar PV Facility: No preference was determined for any of the laydown area and O&M building site options and all but one site was found to be favourable. The remaining option, Site Option 7 was found to be the least preferred due to its proximity to a potentially sensitive receptor.

No fatal flaws were identified for any of the grid connection infrastructure alternatives and a summary of the preference ratings for each project is provided below:

- Mooi Plaats grid connection infrastructure: No preference was determined for any of the substation sites.The Option 1 alternatives were rated as preferred due to the fact that the route is shorter and most almost entirely aligned with the existing power lines..
- Wonderheuvel grid connection infrastructure: No preference was determined for any of the substation sites and the Option 2 and Option 3 grid connection alternatives were rated as favourable, while the Option 1 alternatives were rated as least preferred. The Option 1 alternatives are less preferred than the Option 2 and Option 3 alternatives as this route is overall much longer than the others.
- Paarde Valley grid connection infrastructure: No preference was determined for any of the substation sites and the Option 1 alternatives were rated as preferred as the routes are overall much shorter and there are fewer visual receptors in close proximity.

7.1 Visual Impact Statement

It is SiVEST's opinion that the visual impacts associated with the proposed Mooi Plaats, Wonderheuvel and Paarde Valley solar PV facilities and associated grid connection 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 Environmental Authorisations (EA) should be granted for all the relevant EIA and BA applications. SiVEST is of the opinion that the 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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