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26 October 2016
489025/ALLK/1610035

Ms. A. Gibb
SiVEST
PO Box 2921
Rivonia
2128

Attention: Ms. A. Gibb

Dear Ms. Gibb

Peer Review of the Aletta Wind Energy Facility and Substation Visual Impact Assessment Reports: SiVEST Reports: 13169

1. Introduction

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

- Environmental Impact Assessment (EIA) for the proposed construction of the Aletta 140 MW Wind Energy Facility (EIA Ref: 14/12/16/3/3/2/945); and
- Basic Assessment (BA) for the proposed construction of the Aletta Substation and associated 132 kV Power Line (BA Ref: To be determined).

As part of the Environmental Authorisation process, a Visual Impact Assessment (VIA) for each of these projects is required. As SiVEST is the primary environmental assessment practitioner (EAP) for the environmental assessments and the VIAs, SiVEST requested SRK Consulting (South Africa) (Pty) Ltd. (SRK) to undertake an external peer review of the VIAs.

This letter constitutes the independent peer review conducted by SRK for the VIAs prepared by SiVEST for the Aletta Wind Farm and the Aletta Substation projects. As both projects are within close proximity to each other and share the same sensitive receptors, this letter presents the review findings of both reports.

The following reports were peer reviewed:

- VIA for the EIA for the proposed construction of the Aletta 140 MW Wind Energy Facility (**SiVEST Report: 13169_Aletta Wind Farm_EIA Phase VIA Report_Rev 1_5 September 2016_SJ**); and
- VIA for the BA for the proposed construction of the Aletta Substation and associated 132 kV Power Line (**SiVEST Report: 13169_Aletta Grid_BA Visual Report_ Rev1_7 September 2016_SJ**).

2. Summary of Review

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

The Final Scoping Report for the Aletta Wind Farm was accepted by the Department of Environmental Affairs (DEA) on condition that the peer reviewer addresses the following points (SRK's responses relate to the VIAs for both projects):

1) The peer reviewer must be qualified to undertake the review, a CV must be provided;
    a. **SRK's Response – CV is attached as Appendix A.**
2) Determine if the Terms of Reference is Acceptable;
    a. **SRK's Response – The Terms of Reference is considered acceptable.**
3) Determine if the methodology is clearly explained and acceptable;
    a. **SRK's Response – The methodology and assumptions are clearly outlined and are considered acceptable.**
4) Determine the findings and validity of these findings;
    a. **SRK's Response – The findings are considered valid.**
5) Determine if the mitigation measures described address the short comings;
    a. **SRK's Response – The mitigation measures described are acceptable. Additional mitigation measures have been recommended in the peer-reviewed text.**
6) Evaluate the appropriateness of the reference literature;
    a. **SRK's Response – The reference literature is considered appropriate.**
7) Indicate if a site-inspection was carried out; and
    a. **SRK's Response – No site visit was undertaken for the peer review.**
8) Indicate if the article was well-written and easy to understand.
    a. **SRK's Response – The reports supplied to SRK (as specified in Section 1) are considered well written and easy to understand.**

SRK's review was guided by the National Environmental Management Act No. 107 of 1998 (NEMA) 2014 EIA Regulations, 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 VIA reports which comply with the requirement.

SRK is of the opinion that the VIA Reports compiled by SiVEST are fair and that the methodology used was transparent and well stated. There is a substantial focus on potential sensitive viewers, with care taken to attempt to identify sensitive viewers that could potentially be affected by the project.

Recommendations for improving the reports were provided as follows:

- Vegetation rehabilitation should involve the establishment of nurseries to reduce the amount of time required for the cleared vegetation to re-establish; and
- Additional mitigation measures were included in the text of the reviewed documents.

Additional comments on the reports were compiled in the following documents submitted to SiVEST on 26 October 2016:

- SRK Report: 489025_Sivest13169_Aletta Wind Farm_EIA Phase_allk_20161025; and
- SRK Report: 489025_Sivest13169_Aletta Grid_BA_allk_20161025.

Table 1: Legal Requirements for Specialist Studies

Legal Requirement in terms of Appendix 6 of the NEMA 2014 EIA Regulations		Relevant Section in the VIAs
(1)	A specialist report prepared in terms of these Regulations must contain details of:	
(a)	The specialist who prepared the report; and	**Present**
	The expertise of that specialist to compile a specialist report including curriculum vitae.	**Missing**
(b)	A declaration that the specialist is independent in a form as may be specified by the competent authority.	**Present**
(c)	An indication of the scope of, and the purpose for which, the report was prepared.	**Section 1**
(d)	The date and season of the site investigation and the relevance of the season to the outcome of the assessment.	**Section 1.3**
(e)	A description of the methodology adopted in preparing the report or carrying out the specialised process.	**Section 1.4**
(f)	The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure.	**Section 2**
(g)	An identification of any areas to be avoided, including buffers.	**Section 4 and 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.	**Present in various sections**
(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.ee	**Section 4 and Section 5**
(k)	Any mitigation measures for inclusion in the EMPR. *Note that an EMPR has three levels of impact management:* *Impact management action;* *Impact management outcome; and* *Impact management objective.*	**Section 4**
(l)	Any conditions/aspects for inclusion in the environmental authorisation.	**Section 4**
(m)	Any monitoring requirements for inclusion in the EMPR or environmental authorisation.	**Section 4**
(n)	A reasoned opinion (Environmental Impact Statement)-	**Section 6.1** (also includes summary of the impacts)
	As to whether the proposed activity or portions thereof should be authorised.	**Section 6**
	If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPR, and where applicable, the closure plan.	**Section 6**
(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.	**N/A**
(q)	Any other information requested by the competent authority.	**N/A**

Should you have any queries or comments regarding the peer review, please do not hesitate to contact Mr. Keagan Allan, SRK (031 279 1200).

Yours faithfully,

SRK Consulting (South Africa) (Pty) Ltd

SRK Consulting - Certified Electronic Signature
srk consulting
489025/42669/Letter Report
5247-3382-4020-ALLK
This signature has been printed digitally. The Author has given permission for its use for this document. The details are stored in the SRK Signature Database

Mr. K. Allan (Pr. Sci. Nat.)
Senior GIS Specialist

SRK Consulting - Certified Electronic Signature
srk consulting
489025/42669/Letter Report
2387-376-7619-KING
This signature has been printed digitally. The Author has given permission for its use for this document. The details are stored in the SRK Signature Database

Ms. K. King
Reviewer

Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (South Africa) (Pty) Ltd (SRK). SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

Appendix A: Peer Reviewer CV

Keagan Allan
Senior Scientist

Profession	Senior Scientist & GIS Specialist
Education	BSc Geographical Science – 2003 BSc (Hons) Geographical Science and Environmental Management – 2004 MSc Geographical Science (Cum Laude) – 2007
Registrations/ Affiliations	Registered Professional Natural Scientist (Pr.Sci.Nat), South African Council for Natural Scientific Professions (SACNASP), 400185/13 IAIA South Africa
Awards	Won Best Poster at the 2010 IAIAsa Conference – Poster Applications of GIS in EMF.

Specialisation

Geographical Information Systems and Remote Sensing

Expertise

Keagan Allan has been involved in the field of Geographical Information Systems (GIS) for the past 8 years. His expertise includes:

- Geographical Information Systems (GIS), more specifically data collection and manipulation; modelling of various spatial data for Visual Impact Assessments and Ground Water management and database management.
- Visual Impact Assessment Specialist – using GIS and modelling to conduct Visual Impact Assessments (VIAs) for large scale mining and industrial developments.
- GIS Development – using Visual Basic scripting to develop tools for use within the ESRI ArcMap environment.
- GIS in Environmental Management Frameworks – using Visual Basic in conjunction with GIS techniques to generate information for use in the GIS reporting in an EMF study.
- Remote Sensing (RS) more specifically the use of remotely sensed images in the classification of various land use types.

Employment

Jul 2008 – Present	SRK Consulting, Environmental Scientist, Westville
Feb 2008 – Jun 2008	Haley Sharpe, Assistant Tourism Planner, Southern Africa
Feb 2007 – Aug 2007	UKZN, Cartographic Technician, Pietermaritzburg

Languages

English – read, write, speak
Afrikaans – read, write, speak

Publications

1. ALLAN, K., EMANUAL, P., and MORRIS, J. (2010) Poster Presentation: Applications of GIS in EMF, IAIAsa Conference, Pretoria, August, 2010.
2. ALLAN, K. (2015) Paper Presentation: Environmental Management in the 21st Century: Combining Environmental Processes and GIS Technologies, IAIAsa Conference, KwaZulu-Natal, August 2015.

Keagan Allan
Senior Scientist

Key Experience: GIS / VIA Specialist

Location:	Limpopo Province
Project duration & year:	July 2008 – November 2009
Client:	SRK - JNB
Name of Project:	Olifants Water Reserves
Project Description:	Assessment of the water reserves in the Olifants River Catchment
Job Title and Duties:	GIS Specialist and modelling of groundwater levels
Value of Project:	N/A

Location:	Makhatini, KZN
Project duration & year:	July 2008 - present
Client:	ESKOM
Name of Project:	ESKOM: Makhatini EIA
Project Description:	The development of a new 22 kV power line through the Makhatini Flats area
Job Title and Duties:	GIS Specialist – mapping and modelling
Value of Project:	N/A

Location:	Pinetown, KZN
Project duration & year:	July 2008 - present
Client:	Shell South Africa
Name of Project:	Shell Wavecrest Environmental Impact Assessment (EIA)
Project Description:	EIA for the refurbishment of the Shell Wavecrest Service Station, Sarnia, Pinetown
Job Title and Duties:	Environmental Scientist, Reporting, Public Participation, Field Work.
Value of Project:	N/A

Location:	Alkmaar, Mpumalanga
Project duration & year:	August 2008 – October 2008
Client:	SRK – JNB
Name of Project:	Petroline Visual Impact Assessment
Project Description:	The identification of potential visual impacts the development of a storage depot might have on the surrounding area
Job Title and Duties:	GIS Specialist – mapping and modeling; reporting.
Value of Project:	N/A

Location:	Western Cape
Project duration & year:	August 2008 – November 2008
Client:	SRK – CPT
Name of Project:	ESKOM – Pebble bed Reactor EIA and Risk Assessment
Project Description:	Various EIAs and Risk Assessments for the placement of the proposed Pebble bed Nuclear Reactors.
Job Title and Duties:	GIS Specialist – mapping of the various factors for the project
Value of Project:	N/A

Location:	Durban North, KZN
Project duration & year:	August 2008 – November 2008
Client:	eThekwini Municipality
Name of Project:	Riverhorse as-built floodlines
Project Description:	Flood modeling along a section of the Riverhorse Valley Industrial Park.
Job Title and Duties:	GIS Specialist – mapping and modeling of the terrain
Value of Project:	N/A

Key Experience: GIS / VIA Specialist

Location:	Rustenburg, North West Province
Project duration & year:	November 2008 – January 2009
Client:	SRK – JNB
Name of Project:	Styldrift Mine – Visual Impact Assessment
Project Description:	Undertaking of a visual impact assessment for the Styldrift Mining Complex
Job Title and Duties:	GIS Specialist – mapping and modelling; reporting.
Value of Project:	N/A

Location:	Pinetown, KZN
Project duration & year:	October 2008 – February 2009
Client:	eThekwini Municipality
Name of Project:	Basic Assessment for the Palmiet River Attenuation
Project Description:	Undertaking a Basic Assessment for the proposed flood attenuation of the Palmiet River Catchment, Pinetown
Job Title and Duties:	Environmental Scientist, Reporting, Public Participation, Field Work.
Value of Project:	N/A

Location:	Lebowakgomo, Limpopo
Project duration & year:	February 2009 – February 2009
Client:	Messina Platinum Mines Ltd.
Name of Project:	Dwaalkop VIA
Project Description:	Visual Impact Assessment for the Dwaalkop Mining Operation, Limpopo
Job Title and Duties:	GIS Specialist – mapping and modeling; reporting.
Value of Project:	N/A

Location:	Mshwati Municipality
Project duration & year:	July 2009 – November 2009
Client:	INR
Name of Project:	Mshwati EMF
Project Description:	Undertaking floodline assessments and service assessment for the Mshwati EMF
Job Title and Duties:	GIS Specialist – mapping and modeling; reporting.
Value of Project:	N/A

Location:	Cape Town
Project duration & year:	August 2009 – September 2013
Client:	City of Cape Town
Name of Project:	City of Cape Town – Stormwater Asset Project
Project Description:	Assessment of stormwater assets in the City of Cape Town Municipality
Job Title and Duties:	GIS Specialist – mapping and modeling; reporting.
Value of Project:	N/A

Location:	Ogies, Mpumalanga
Project duration & year:	October 2009 – November 2009
Client:	SRK – JNB
Name of Project:	Vlakfontein Mine VIA
Project Description:	Visual Impact Assessment for the proposed opencast coal mining operations on the Vlakfontein Farm, Ogies, Mpumalanga
Job Title and Duties:	GIS Specialist – mapping and modeling; reporting.
Value of Project:	N/A

Keagan Allan
Senior Scientist

Key Experience: GIS / VIA Specialist

Location: Hilton, KZN
Project duration & year: November 2009 – January 2010
Client: Environmental Planning and Design
Name of Project: Hilton Housing Estate VIA
Project Description: Visual Impact Assessment for the proposed housing estate on the Hilton College School grounds
Job Title and Duties: GIS Specialist – mapping and modeling; reporting.
Value of Project: N/A

Location: Amajuba Municipality
Project duration & year: January 2010 – January 2011
Client: Amajuba District Municipality
Name of Project: Amajuba District Municipality Disaster Management Plan
Project Description: Disaster management plan for the district
Job Title and Duties: Data collection
Value of Project: N/A

Location: Pietermaritzburg, KZN
Project duration & year: July 2008 – May 2010
Client: Msunduzi Municipality
Name of Project: Msunduzi EMF
Project Description: Development of an EMF and SEA for the management of development in the Msunduzi Municipality
Job Title and Duties: GIS Analyst, Spatial Decision Support Tool Programmer
Value of Project: N/A

Location: Kriel Mpumalanga
Project duration & year: January 2010 – present
Client: SRK- JNB
Name of Project: Kriel EMPR Addition Reserves VIA
Project Description: Visual Impact Assessment for the proposed opencast coal mining operations near the Kendal Power Station and Kriel, Mpumalanga
Job Title and Duties: GIS Specialist – mapping and modeling; reporting.
Value of Project: N/A

Location: Richards Bay
Project duration & year: April 2010 – December 2010
Client: Mondi Richards Bay Mill
Name of Project: MONDI – Phase 1 EIA
Project Description: EIA for a proposed expansion of the Mondi Richards Bay Mill
Job Title and Duties: GIS Specialist and Environmental Assessment Practitioner
Value of Project: N/A

Location: Mpumalanga Province
Project duration & year: August 2010
Client: Mpumalanga Department of Agriculture and Land Administration
Name of Project: EMF for the Msukaligwa and Albert Luthuli Municipalities (includes Mpumalanga Lake District region)
Project Description: Development of an EMF tool for decision makers in the local municipalities
Job Title and Duties: Spatial Decision Support Tool Programmer
Value of Project: N/A

Key Experience: GIS / VIA Specialist

Location: KZN
Project duration & year: January 2010 - present
Client: Chevron
Name of Project: Chevron – Water Quality Assessments
Project Description: Various mapping for a number of Chevron sites around KwaZulu-Natal
Job Title and Duties: Cartographer
Value of Project: N/A

Location: Western Cape Province
Project duration & year: December 2010 – February 2012
Client: Cape Winelands District Municipality
Name of Project: Cape Winelands EMF
Project Description: Development of an EMF for the district municipality, as well as a GIS tool for assisting decision makers
Job Title and Duties: GIS Analyst, Spatial Decision Support Tool Programmer
Value of Project: N/A

Location: Mpumalanga Province
Project duration & year: January 2011 – February 2012
Client: Exxaro
Name of Project: New Clydesdale Coal - VIA
Project Description: Visual Impact Assessment for the consolidation of the existing EMPr and a proposed expansion to mining activities at the New Clydesdale Mine
Job Title and Duties: GIS Analyst and Visual Assessment Practitioner
Value of Project: N/A

Location: Limpopo Province
Project duration & year: February 2011 – June 2011
Client: De Beers
Name of Project: Venetia Mine EMPr Consolidation and VIA
Project Description: Visual Impact Assessment for the consolidation of the existing EMPr and a proposed expansion to mining activities at the Venetia Mine
Job Title and Duties: GIS Analyst and Visual Assessment Practitioner
Value of Project: N/A

Location: Black Mountain – Northern Cape
Project duration & year: June 2011 – February 2012
Client: SATO Holdings
Name of Project: SATO Solar Power Plant VIA
Project Description: Visual Impact Assessment for a proposed solar power plant, located near Black Mountain in the Northern Cape
Job Title and Duties: GIS Analyst and Visual Assessment Practitioner
Value of Project: N/A

Location: Eastern Cape
Project duration & year: February 2012 – October 2012
Client: Afrom Energy (Pty) Ltd.
Name of Project: Dobbin Solar Power Plant VIA
Project Description: Visual Impact Assessment for the proposed solar power generation facility near Dobbin, Eastern Cape
Job Title and Duties: GIS Analyst and Visual Assessment Practitioner
Value of Project: N/A

Keagan Allan
Senior Scientist

Key Experience: GIS / VIA Specialist

Location:	Northern Cape
Project duration & year:	February 2012 – October 2012
Client:	Afrom Energy (Pty) Ltd.
Name of Project:	Brakpoort Solar Power Plant VIA
Project Description:	Visual Impact Assessment for the proposed solar power generation facility near Victoria East, Northern Cape
Job Title and Duties:	GIS Analyst and Visual Assessment Practitioner
Value of Project:	N/A

Location:	KwaZulu-Natal
Project duration & year:	May 2011 – November 2012
Client:	Eskom Holdings SOC Ltd.
Name of Project:	Visual Impact Assessment for the Proposed Candover-Mbazwana-Gezisa 132kV Powerlines and 132/22kV 20MVA Mbazwana and Gezisa Substations, Northern KwaZulu- Natal
Project Description:	Visual Impact Assessment of the proposed new line
Job Title and Duties:	GIS Analyst and Visual Assessment Practitioner
Value of Project:	N/A

Location:	KwaZulu-Natal
Project duration & year:	February 2012 – May 2012
Client:	Eskom Holdings SOC Ltd.
Name of Project:	Bush clearing specification compiled for the Nondabuya-Ndumo 132kV powerline and the Ndumo 132/22kV substation
Project Description:	Using remote sensing to identify and cost for bush clearing contractors to clear vegetation from the proposed powerline route
Job Title and Duties:	GIS Analyst and Remote Sensing Specialist
Value of Project:	N/A

Location:	KwaZulu-Natal
Project duration & year:	November 2012 – July 2014
Client:	SiVest (Pty) Ltd.
Name of Project:	Rinaldo East Industrial Site Visual Impact Assessment
Project Description:	Visual Impact Assessment for the proposed new industrial site adjacent the N2 freeway in eThekwini
Job Title and Duties:	GIS Analyst and Visual Assessment Practitioner
Value of Project:	N/A

Location:	KwaZulu natal
Project duration & year:	December 2012
Client:	Primedia (Pty) Ltd
Name of Project:	Visula impact and shadow analysis of the proposed billboard on top of Nedbank House, Durban central business district.
Project Description:	Visual impact assessment and shadow analysis
Job Title and Duties:	GIS Analyst and visual assessment practitioner
Value of Project:	N/A

Location:	Northern Cape
Project duration & year:	February 2013
Client:	Savannah Environmental
Name of Project:	Visual impact assessment for a proposed 500 MW solar power generation facility
Project Description:	Visual impact assessment
Job Title and Duties:	GIS Analyst and visual assessment practitioner
Value of Project:	N/A

Keagan Allan
Senior Scientist

Key Experience: GIS / VIA Specialist

Location:	North West
Project duration & year:	March 2013 – November 2013
Client:	LonMin
Name of Project:	Visual Impact Assessment for Phase 1 and 2 projects of the Styldrift Mining Complex
Project Description:	Visual Impact Assessment for proposed new ventilation shafts and waste rock dumps at the Styldrift Mining Complex, North West Province
Job Title and Duties:	GIS Analyst and Visual Assessment Practitioner
Value of Project:	N/A

Location:	North West
Project duration & year:	July 2013 – September 2013
Client:	AVD Environmental (LonMin)
Name of Project:	Visual Impact for the proposed new mining complex at the Pandora Mining Complex
Project Description:	Visual Impact Assessment for a proposed new mining complex and powerline at the Pandora Mine, north West Province
Job Title and Duties:	GIS Analyst and Visual Assessment Practitioner
Value of Project:	N/A

Location:	Eastern Cape
Project duration & year:	December 2013
Client:	Primedia (Pty) Ltd
Name of Project:	Visual Impact of Proposed Billboards along main roads in Port Elizabeth
Project Description:	Visual Impact of Proposed Billboards along main roads in Port Elizabeth
Job Title and Duties:	GIS Analyst and Visual Assessment Practitioner
Value of Project:	N/A

Location:	KwaZulu-Natal Province
Project duration & year:	July 2012 – July 2014
Client:	DWAF
Name of Project:	Groundwater Resource Directed Measures: Mvoti to Umzimkulu Water Management Area
Project Description:	Assessment of the groundwater water reserves in the Mvoti to Umzimkulu Water Management Area
Job Title and Duties:	GIS Specialist and modelling of groundwater levels
Value of Project:	N/A

Location:	KwaZulu-Natal Province
Project duration & year:	August 2013 – present
Client:	Amajuba Municipality
Name of Project:	Emadlangeni Rural Water Supply Desktop Groundwater Assessment
Project Description:	Assessment of borehole distribution and borehole conditions for the supply of water in the Emadlangeni Municipality, KwaZulu-Natal
Job Title and Duties:	GIS Specialist and analyst
Value of Project:	N/A

Keagan Allan
Senior Scientist

Key Experience: GIS / VIA Specialist

Location:	Limpopo Province, South Africa
Project duration & year:	2 months (2015)
Client:	Anglo American Platinum and African Rainbow Minerals
Name of Project:	Visual Impact Assessment
Project Description:	Visual Impact Assessment Report for the proposed expansions to the existing Blinkwater Tailings Storage Facility and other Associated Infrastructure at the Mogalakwena Mine, Limpopo, South Africa.
Job Title and Duties:	GIS modelling and mapping, photograph simulation of proposed development, site inspection and reporting writing

Location:	Limpopo Province, South Africa
Project duration & year:	2 months (2015)
Client:	Anglo American Platinum and African Rainbow Minerals
Name of Project:	Visual Impact Assessment
Project Description:	Visual Impact Assessment Report for the Proposed Witrivier Waste Rock Dump at the Mogalakwena Mine, Limpopo, South Africa.
Job Title and Duties:	GIS modelling and mapping, photograph simulation of proposed development, site inspection and reporting writing

Location:	North-West Province, South Africa
Project duration & year:	2 months (2015)
Client:	Shangoni Environmental Consulting
Name of Project:	Visual Impact Assessment
Project Description:	Visual Impact Assessment Report for the proposed Tharisa Mine Rail Link, North West Province, South Africa.
Job Title and Duties:	GIS modelling and mapping, site inspection and reporting writing

Location:	Gauteng Province, South Africa
Project duration & year:	2 months (2015)
Client:	Eskom Holdings SOC Limited
Name of Project:	Visual Impact Assessment
Project Description:	Visual Impact Assessment Report for the proposed Eskom Kekana and Wonderboom Substations and associated 132kV Powerline.
Job Title and Duties:	GIS modelling and mapping, site inspection and reporting writing

Location:	KwaZulu-Natal Province, South Africa
Project duration & year:	2 months (2015)
Client:	GCS Environmental Consultants
Name of Project:	Visual Impact Assessment
Project Description:	Visual Impact Assessment Report for the proposed Rohill Business Estate, KwaZulu-Natal, South Africa.
Job Title and Duties:	GIS modelling and mapping, 3D modelling of proposed mitigation measures, site inspection and reporting writing

Location:	Limpopo Province, South Africa
Project duration & year:	4 months (2014)
Client:	Anglo American Platinum and African Rainbow Minerals
Name of Project:	Visual Impact Assessment
Project Description:	Visual Impact Assessment Report for the Proposed Modikwa Platinum Mine South 2 Shaft Project, Limpopo Province, South Africa.
Job Title and Duties:	GIS modelling and mapping, and reporting writing

Keagan Allan
Senior Scientist

Key Experience: GIS / VIA Specialist

Location:	KwaZulu-Natal, South Africa
Project duration & year:	3 months (2014)
Client:	GCS Water and Environmental Consultants
Name of Project:	Visual Impact Assessment
Project Description:	Visual Impact Assessment Report for the proposed Rohill Business Estate, KwaZulu-Natal, South Africa.
Job Title and Duties:	Site Visit, GIS modelling and mapping, and reporting writing

Location:	Gauteng Province, South Africa
Project duration & year:	On-going
Client:	Johannesburg Roads Agency
Name of Project:	Floodline Assessments
Project Description:	Various Flooding Assessments and Hazard Analysis within the Gauteng Province, South Africa
Job Title and Duties:	GIS assistance, floodline editing and map creation

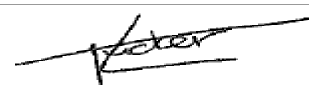
Location:	North-West Province, South Africa
Project duration & year:	4 months (2013)
Client:	Alta van Dyk Environmental Consultants cc. on behalf of LonMin (Pty) Ltd.
Name of Project:	Visual Impact Assessment
Project Description:	Visual Impact Assessment for the proposed LonMin Mine, near Brits, North-West Province, South Africa
Job Title and Duties:	Site Visit, GIS modelling and mapping, and reporting writing

BIOTHERM ENERGY (PTY) LTD

Proposed Construction of the Aletta 140MW Wind Energy Facility near Copperton, Northern Cape Province

Visual Impact Assessment Report – Impact Phase

Issue Date: 17 January 2017
Version No.: 2
Project No.: 13169

Date:	17 January 2017
Document Title:	Proposed Construction of the Aletta 140MW Wind Energy Facility near Copperton, Northern Cape Province: Visual Impact Assessment Report – Impact Phase
Author:	**Stephan Jacobs** B.Sc. (Hons) Environmental Management & Analysis (UP) B.Sc. Environmental Sciences (UP)
Version Number:	2
Checked by:	**Andrea Gibb** (internal review) B.Sc. (Hons) Environmental Management (UNISA) BSc Landscape Architecture *Cum Laude* (UP) **Keagan Allan** – SRK Consulting (South Africa) (Pty) Ltd (peer review) Pr. Sci Nat
Approved:	Kelly Tucker
Signature:	
For:	SiVEST SA (Pty) Ltd
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For full details and the expertise of the specialists that compiled / checked this report refer to Appendix 2 of the Draft Environmental Impact Assessment Report (DEIAr).

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	14/12/16/3/3/2/945
NEAS Reference Number:	
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010

PROJECT TITLE

Proposed Construction of the Aletta 140MW Wind Energy Facility near Copperton, Northern Cape Province

Specialist:	**SiVEST SA (Pty) Ltd** (including peer review from an external visual specialist)		
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The specialist appointed in terms of the Regulations

I, Andrea Gibb, declare that --

General declaration:

- 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 71 and is punishable in terms of section 24F of the Act.

Signature of the specialist

SiVEST SA (Pty) Ltd

Name of company (if applicable)

17 January 2017

Date

The specialist appointed in terms of the Regulations

I, Stephan Jacobs, declare that --

General declaration:

- 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 71 and is punishable in terms of section 24F of the Act.

Signature of the specialist

SiVEST SA (Pty) Ltd

Name of company (if applicable)

10 August 2016

Date

BIOTHERM ENERGY (PTY) LTD

PROPOSED CONSTRUCTION OF THE ALETTA 140MW WIND ENERGY FACILITY NEAR COPPERTON, NORTHERN CAPE PROVINCE

VISUAL IMPACT ASSESSMENT REPORT – IMPACT PHASE

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GLOSSARY OF TERMS

ABBREVIATIONS

DM	District Municipality
DTM	Digital terrain model
DoE	Department of Energy
EIA	Environmental Impact Assessment
GIS	Geographic Information System
I&AP	Interested and/or Affected Party
IPP	Independent Power Producer
kV	Kilovolt
LM	Local Municipality
MW	Megawatt
NGI	National Geo-spatial Information
OHL	Overhead Line
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
SANBI	South African National Biodiversity Institute
VIA	Visual Impact Assessment
VR	Visual Receptor

Definitions

Anthropogenic feature: An unnatural feature as a result of human activity.

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

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.

Study area: The study area or visual assessment zone is assumed to encompass a zone of 8km from the outer boundary of the proposed wind energy facility development area.

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

Viewshed: The outer boundary defining a visual envelope, usually along crests and ridgelines.

Visual Assessment Zone: The visual assessment zone or study area is assumed to encompass a zone of 8km from the outer boundary of the proposed wind energy facility development area.

Visual character: The physical elements and forms and land use related characteristics that make up a landscape and elicit a specific visual quality or nature. Visual character can be defined based on the level of change or transformation from a completely natural setting.

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 envelope: A geographic area, usually defined by topography, within which a particular project or other feature would generally be visible.

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 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.

BIOTHERM ENERGY (PTY) LTD

PROPOSED CONSTRUCTION OF THE ALETTA 140MW WIND ENERGY FACILITY NEAR COPPERTON, NORTHERN CAPE PROVINCE

VISUAL IMPACT ASSESSMENT REPORT – IMPACT PHASE

1 INTRODUCTION

BioTherm Energy (Pty) Ltd (hereafter referred to as BioTherm) are proposing to construct the 140MW export capacity Aletta Wind Energy Facility (hereafter referred to as the 'proposed development'), near Copperton within the Northern Cape Province. SiVEST SA (Pty) Ltd (hereafter referred to as SiVEST) has subsequently been appointed by BioTherm to undertake an Environmental Impact Assessment (EIA) for the proposed development. As part of the EIA study, the need to undertake a visual impact assessment (VIA) has been identified. During the Scoping Phase of the EIA, a desktop scoping-level visual impact assessment study has been conducted to identify key visual issues relating to the development of the wind energy facility within this context and determine the potential extent of the visual impact. This was done by characterising the visual environment of the area and identifying areas of potential visual sensitivity that may be subject to visual impacts. This visual assessment undertaken during the EIA phase focuses on the potential sensitive receptor locations, and provides an assessment of both the magnitude and significance of the visual impacts associated with the proposed development.

1.1 Wind Energy Facility Technical Details

The key technical details and infrastructure required are presented in the table below (**Table 1**).

Table 1: Aletta Wind Energy Facility summary

Project Name	**DEA Reference**	**Farm name and area**	**Technical details and infrastructure necessary for the proposed project**
Alettta Wind Energy	14/12/16/3/3/2/945	▪ Portion 1 of Drielings Pan No.101	▪ **60 wind turbines** with a total export capacity of up to 140MW. Turbines will have a hub height of up to 120m and a rotor diameter of up to 150m.

Facility (WEF)		▪ Portion 2 of Drielings Pan No.101 ▪ Portion 3 of Drielings Pan No.101 ▪ Remainder of Drielings Pan No.101 Development Area: 5 646 ha	▪ **132kV onsite Aletta IPP Substation** ▪ The turbines will be connected via **medium voltage cables** to the proposed 132kV onsite Aletta Independent Power Producer (IPP) Substation. ▪ Internal **access roads** are proposed to be between 4m to 6m wide. ▪ A temporary construction **lay down area**. ▪ A **hard standing area / platform** per turbine. ▪ The **operations and maintenance buildings**, including an on-site spares storage building, a workshop and an operations building. ▪ **Fencing** (if required) will be up to 5m where required and will be either mesh or palisade.

The key components of the project are detailed below.

1.1.1 *Turbines*

The total proposed development area is approximately 5 646 hectares (ha). The wind turbines and all other project infrastructure will be located strategically within the development area based on environmental constraints. The size of the wind turbines will depend on the development area and the total generation capacity that can be produced as a result. The wind turbines will therefore likely have a hub height of up to 120m and a rotor diameter of up to 150m (**Figure 1**). The blade rotation direction will be clock-wise. Each wind turbine will have a foundation diameter of up to 20m, and will be approximately 3m deep, however, these dimensions may be larger if geotechnical conditions dictate as such. The area occupied by each wind turbine will be up to 0.5 ha (85m x 60m). The excavation area will be approximately 1 000m² in sandy soils due to access requirements and safe slope stability requirements. A hard standing area / platform of approximately 2 400m² (60m x 40m) per turbine will be required for turbine crane usage. There will be approximately 60 wind turbines constructed with a total generation capacity of up to 140MW. The electrical generation capacity for each turbine will range from 2 to 4MW depending on the final wind turbine selected for the proposed development. It must be noted that the final selection for the turbine type will be conducted after the project has been selected as a Preferred Bidder project under the Department of Energy's

(DoEs) Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). This is as a result of technology constantly changing as time progresses.

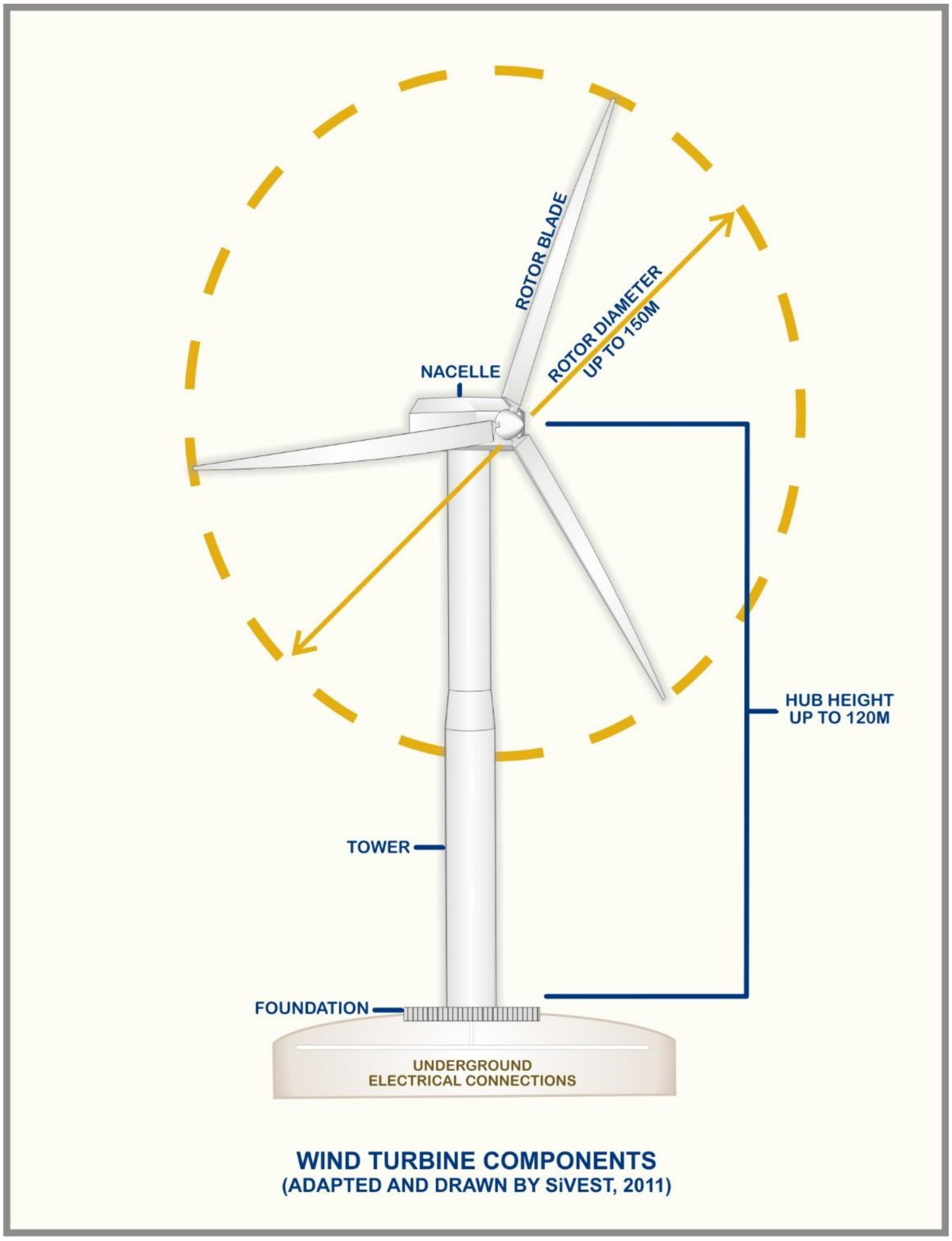

Figure 1: Typical Components of a Wind Turbine

1.1.2 *Electrical Connections*

The wind turbines will be connected (**Figure 2**) to the proposed on-site Aletta 132kV substation via underground medium voltage cables, which may be buried up to 1.5m deep. If a technical assessment deems the underground cables inappropriate, overhead lines may be used to cross features such as rivers, gullies and long runs. Where overhead power lines are to be constructed, self-supported or H-pole tower types will be used. The height will vary depending on the terrain, but will ensure minimum Overhead Line (OHL) clearances with buildings, roads and surrounding infrastructure will be maintained. The dimensions of the specific OHL structure types will depend on electricity safety requirements. The exact location of the towers, the selection of the final OHL structure types and the final designs will comply with the best practise and SANS requirements.

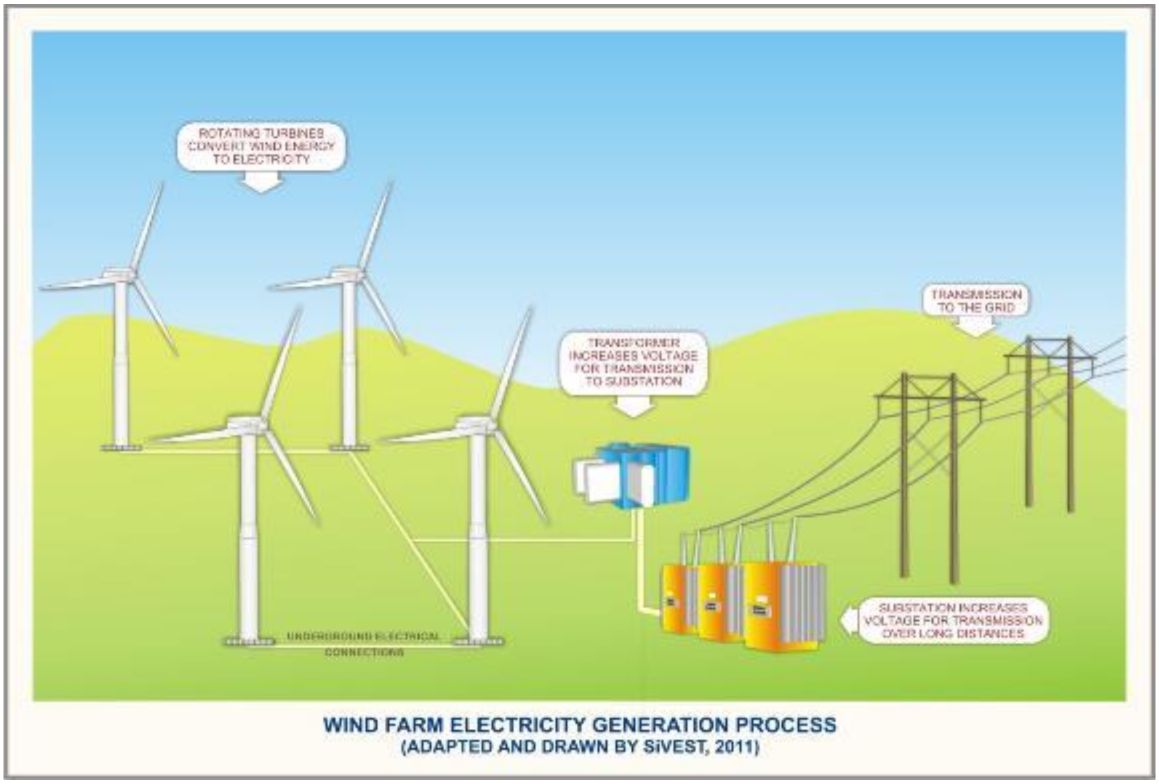

Figure 2: Conceptual Wind Energy Facility Electricity Generation Process showing Electrical Connections

1.1.3 *Roads*

The proposed internal access roads will be between 4m and 6m wide with a total length of up to 60km each. This will include the net load-carrying surface excluding any V drains that might be required. Double width roads will be required in strategic places for vehicle passing.

1.1.4 *Temporary Construction Area*

The temporary construction lay down area will be approximately 2 400m² (60m x 40m). The lay-down / staging area will be approximately 11 250m² whilst the lay-down area for concrete towers (only if required) will be approximately 40 000m².

1.1.5 *Operation and Maintenance Buildings*

The operation and maintenance buildings will include an on-site spares storage building, a workshop and operations building with a total combined footprint that will not exceed 300m². The operation and maintenance buildings will be situated in proximity to the wind energy facility substation due to requirements for power, water and access.

1.1.6 *Other Associated Infrastructure*

Other infrastructure includes the following:

- Fencing (if required) will be up to 5m where required and will be either mesh or palisade.

1.2 Site location

The proposed Aletta Wind Energy Facility (WEF) will be located approximately 17km east of Copperton, within the Siyathemba Local Municipality of the Pixley ka Seme District Municipality in the Northern Cape Province (**Figure 3**). The proposed project is located on the following properties:

- Portion 1 of the Farm Drielings Pan No. 101;
- Portion 2 of the Farm Drielings Pan No. 101;
- Portion 3 of the Farm Drielings Pan No. 101; and
- Remainder of the Farm Drielings Pan No. 101.

The project site has been identified through pre-feasibility studies conducted by BioTherm based on grid connection suitability, competition, flat topography, land availability and site access.

The proposed development location is shown in the locality map (**Figure 4**) below.

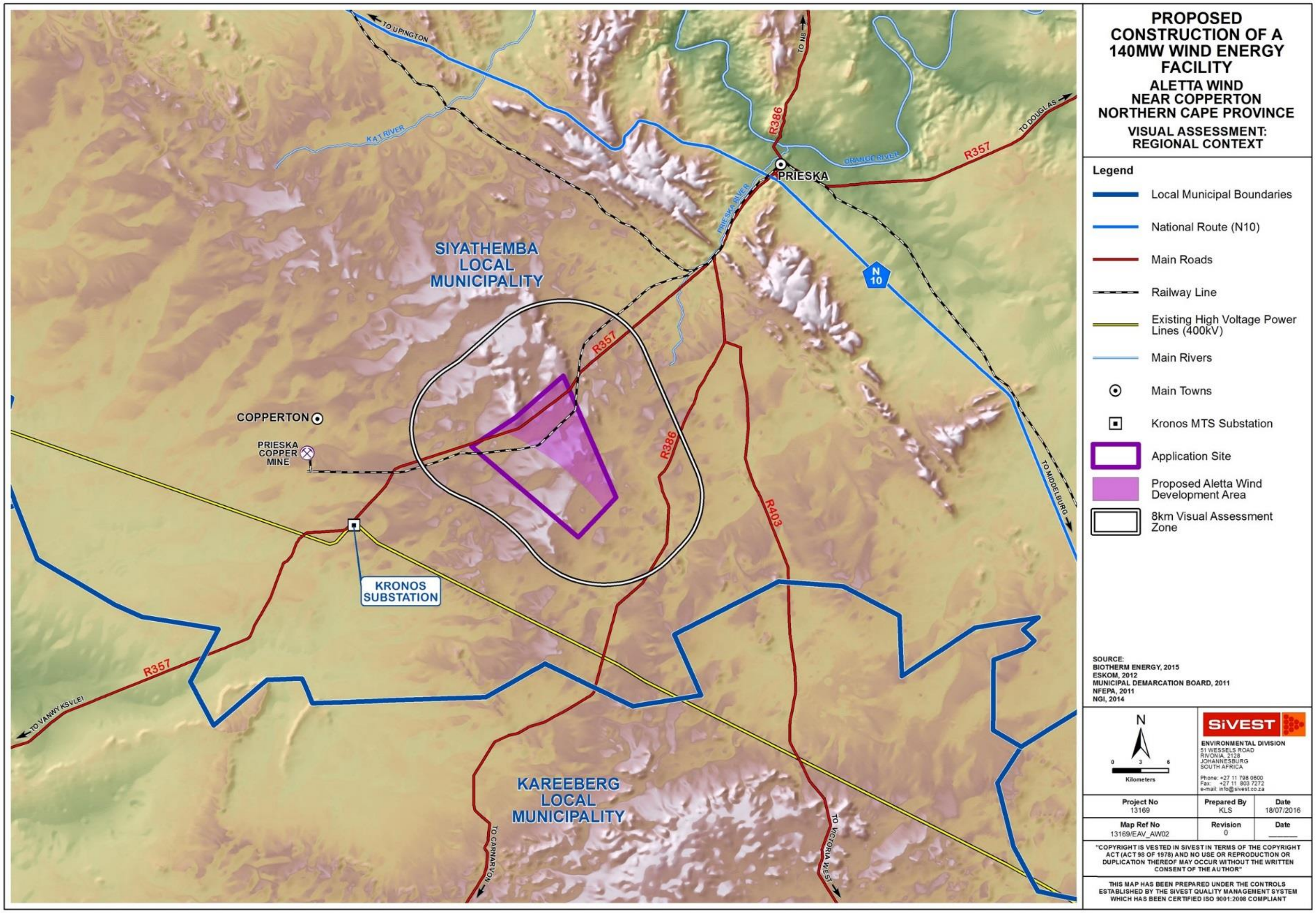

Figure 3: Regional Context Map

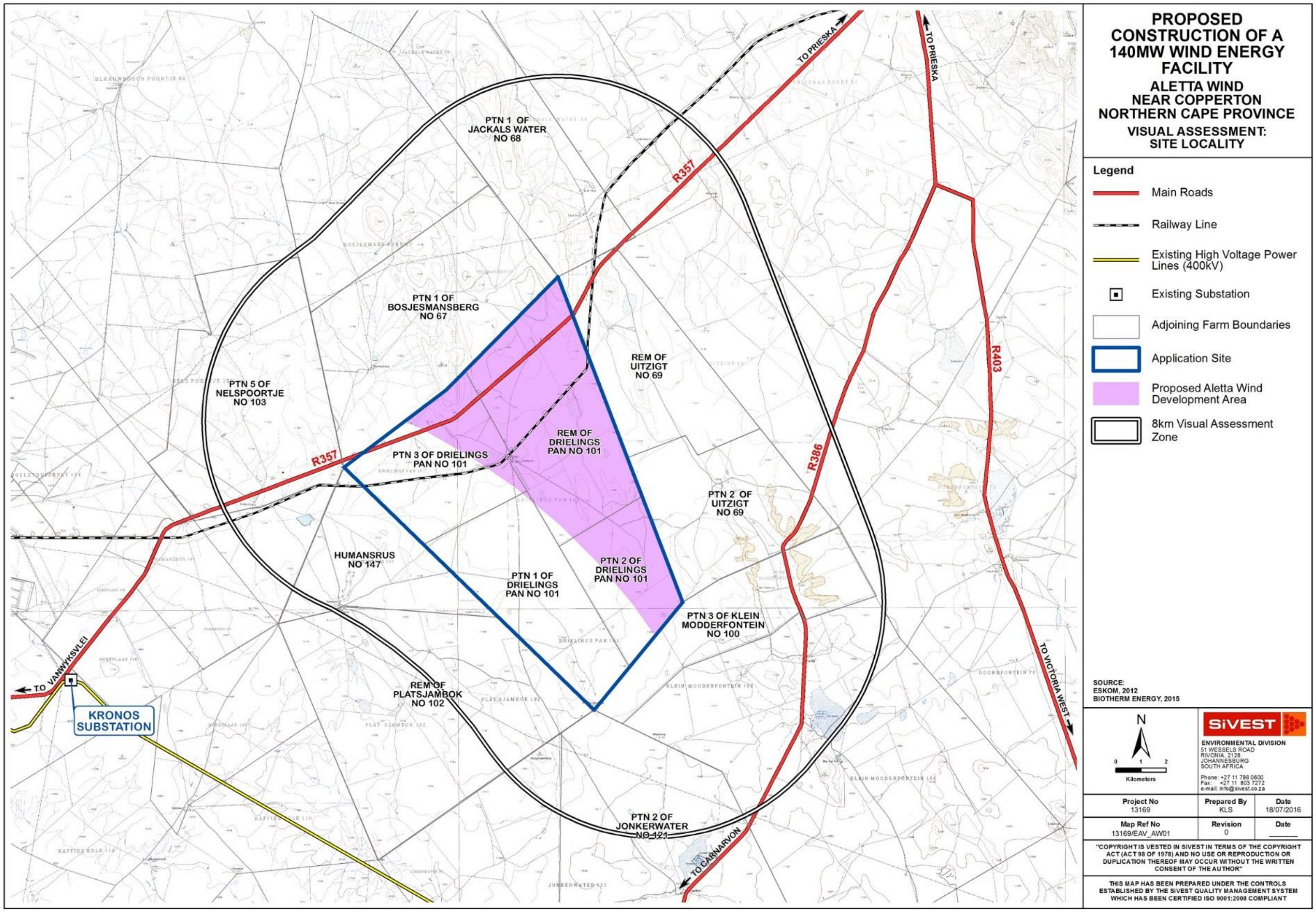

Figure 4: Locality Map

1.3 Assumptions and Limitations

- Wind turbines are very large structures by nature and could impact on receptors that are located relatively far away, particularly in areas with very flat terrain. For the purpose of this visual assessment, the study area is assumed to encompass a zone of 8km from the proposed application site. This area was assigned, as the height of the development in combination with distance are critical factors when assessing visual impacts. Beyond 8km, the wind energy facility may still be visible; however the degree of visual impact would diminish considerably and thus the need to assess the impact on potential receptors beyond this distance would not be warranted. This is demonstrated in **Figure 5** below, which provides a visual simulation of how a wind energy facility could potentially appear from a distances of approximately 8km away. As indicated, from this distance haze may impede views toward the structures, making them appear to blend with the horizon and reducing the visual contrast between the turbines and the landscape.

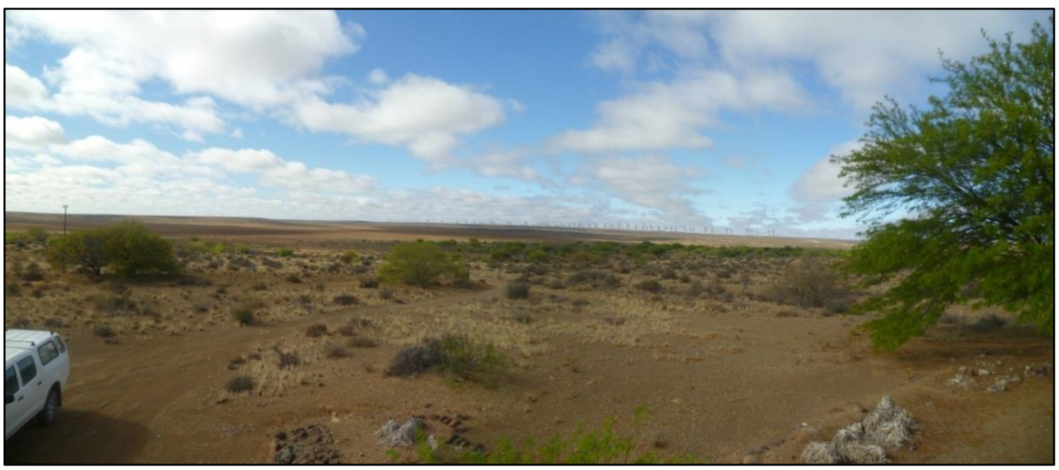

Figure 5: Visually modelled view of a wind energy facility development from a distance of approximately 8km away

- The identification of visual receptors has been based on a combination of desktop assessment as well as field-based observation. Initially Google Earth imagery was used to identify potential receptors within the study area. Thereafter a site visit was undertaken from the 27th to the 29th of July 2016 in order to verify the sensitive visual receptors within the study area and assess the visual impact of the development from these receptor locations. Due to the extensive area covered by the study area, a number of broad assumptions have been made in terms of the 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 and the economic dependency on the scenic quality of views from the facility. 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 and scenic locations within natural settings.

- During the site visit, some of the local landowners confirmed that a few of the farmsteads / residential dwellings identified during the scoping phase of this study have been abandoned and no one is currently residing within them. No further assessment was therefore undertaken from these abandoned farmsteads / residential dwellings and they were eliminated from the list of potentially sensitive receptor locations for the purpose of this EIA phase study.

- Due to access limitations during the site visit, the impact rating assessment of the proposed development on some of the potentially sensitive visual receptor locations was undertaken via desktop means. Although the use of these farmsteads / residential dwellings could not be established during the field investigation, they were still regarded as being potentially sensitive to the visual impacts associated with the proposed wind energy facility and were assessed as part of the VIA.

- No viewsheds were generated during this visual study, as the topography within the study area is relatively flat. Within this context, minor topographical features, vegetative screening, or man-made structures would be important factors which would influence the degree of visibility and which would not be factored in by the viewsheds.

- Due to the varying scales and sources of information as well as the fact that only 20m contours were available to establish the Digital Terrain Model (DTM); maps and visual models may have minor inaccuracies. As such, only large scale topographical variations have been taken into account and minor topographical features or small undulations in the landscape may not be depicted on the DTM.

- A matrix has been developed to assist in the assessment of the potential visual impact at each receptor location. The limitations of quantitatively assessing a largely subjective or qualitative type of impact should be noted. The matrix is relatively simplistic in considering five main parameters relating to visual impact, but provides a reasonably accurate indicative assessment of the degree of visual impact likely to be exerted on each receptor location by the proposed wind energy facility. The matrix should therefore be seen as a representation of the likely visual impact at a receptor location. The results of the matrix should be viewed in conjunction with the visualisation modelling to gain a full understanding of the likely visual impacts associated with the proposed development.

- The assessment of receptor-based impacts has been based on the turbine layout provided by the proponent. It is however recognised that this layout is a preliminary one, and is subject to changes based on a number of potential factors, including the findings of the EIA studies. The turbine locations may thus move, which may result in greater or lesser visual impacts on receptor locations.

- A cumulative impact assessment has been undertaken to provide a representation of the number of proposed renewable energy facilities likely to be visible from each potentially sensitive receptor location, if they were all constructed. Factors affecting visibility, such as localised screening from trees or topographical undulations have not been factored into the cumulative impact assessment.

- Visualisation modelling from all potential receptor locations has not been undertaken. An indicative range of locations were selected for modelling purposes to provide an indication of the possible impacts from different locations within the study area. It should be noted that this modelling is specific to the location, and that even sites in close proximity to one another may be affected in different ways by the proposed wind energy facility. The visual models represent a visual environment that assumes all vegetative clearing will be restored to its current state after the construction phase. This is however, an improbable scenario as some trees and shrubs may be removed which may reduce the accuracy of the models generated. At the time of this study the proposed project was still in its early planning stages. Therefore, the turbine layouts, as provided by BioTherm, may change and the infrastructure associated with the facility has not be included in the models.

- No feedback related to the visual environment has been received during the scoping and EIA phase public participation processes. Should any feedback be received, this report will be updated accordingly.

- Operational and security lighting will be required for the proposed wind energy facility and the associated infrastructure proposed within the development footprint. At the time of undertaking the visual study no information was available regarding the type and intensity of lighting required and therefore the potential impact of lighting at night has not been assessed at a detailed level. General measures to mitigate the impact of additional light sources on the ambiance of the nightscape have been provided.

- At the time of undertaking the visual study no specific information was available regarding the design and layout of services and infrastructure associated with the proposed development. The potential visual impact of the typical infrastructure associated with a wind energy facility has been assessed.

- It should be noted that the 'experiencing' of visual impacts is subjective and largely based on the perception of the viewer or receptor. A number of broad assumptions were made in terms of the sensitivity of the receptors to the proposed development. This is usually dependent on the use of the facility and the economic dependency on the natural / untransformed quality of views from the facility. 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 and residential dwellings within natural / rural settings. The presence of a receptor in an area potentially affected by the proposed development does not thus necessarily mean that a visual impact will be experienced.

- Most rainfall within the area occurs from November to March, during the summer months. The fieldwork was however undertaken at the end of July 2016, during winter. During winter months, the visual impact of the proposed development may be greater, particularly from farmhouses surrounded by tall deciduous trees. As such, the surrounding vegetation is expected to provide the minimal potential screening.

- The weather conditions in the study area also have certain visual implications and are expected to affect the visual impact of the proposed development to some degree. The fieldwork was undertaken during cloudy overcast weather conditions. These conditions would make the wind turbines appear to contrast less with the surrounding environment than they would contrast on a typical sunny day. As such, where conditions are overcast and the wind turbines are against the cloudy (white) sky, there will be less of a visual contrast than on a clear day. As such, the weather conditions during the time of the study area were taken into consideration when undertaking the impact rating for each identified sensitive and potentially sensitive receptor locations (**section 4.1**).

- No layout information could be sourced for each proposed renewable energy facility planned in close proximity to the proposed 140MW Aletta Wind Energy Facility. The distance of the potentially sensitive receptor locations from the actual layout could therefore not be utilised to determine whether the receptor is likely to be visually exposed to the development. As such, the distance from the farm on which each development is proposed was used to calculate the cumulative visual impact.

1.4 Assessment Methodology

1.4.1 *Field work and photographic review*

A three (3) day site visit was undertaken between the 27th and the 29th of July 2016 (winter). The study area for the proposed wind energy facility was visited in order to;

- verify the landscape characteristics identified via desktop means;
- capture photos to be used to visually model the proposed wind energy facility;
- verify the sensitivity of visual receptor locations identified via desktop means;
- identify any additional visually sensitive receptor locations within the study area; and
- undertake an impact rating assessment from each visually sensitive receptor location.

1.4.2 *Physical landscape characteristics*

A site visit was undertaken and digital information from spatial databases such as the National Geo-spatial Information (NGI), the South African National Land Cover (2014) and the South African National Biodiversity Institute (SANBI) were sourced to provide baseline information on the topography, vegetation and land use in the study area. These physical landscape characteristics are important factors which influence the visual character and visual sensitivity of the study area.

1.4.3 *Identification of sensitive receptors*

During the field investigation sensitive visual receptor locations within the study area, such as residences and guest farms, were identified and assessed to determine the impact of the proposed wind energy facility on each sensitive receptor location.

1.4.4 *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, cumulative effect 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 wind energy facility on each sensitive receptor location, as identified. This matrix is based on the distance of a receptor from the proposed development, the primary focus / orientation of the receptor, the presence of screening factors, the visual character and sensitivity of the area / surrounding views and the degree to which the proposed development would contrast with the surrounding environment.

1.4.5 *Visualisation modelling*

Visual simulations were produced from specific viewpoints in order to support the findings of the visual assessment. The wind energy facility was modelled at the correct scale and superimposed onto the landscape photographs which were taken during the site visit. These were used to demonstrate the visibility of the proposed turbines from various locations within the visual assessment zone and to assist with rating the visual impact.

1.4.6 *Consultation with I&APs*

Continuous consultation with Interested and Affected Parties (I&APs) undertaken during the public participation process will be used (where available) to help establish how the proposed wind energy facility will be perceived from the various receptor locations and the degree to which the impact will be regarded as negative.

2 VISUAL BASELINE ASSESSMENT

The physical and land use related characteristics are outlined below as they are important factors contributing to the visibility of a development and visual character of the study area. Defining the visual character is an important part of assessing 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 according to this visual baseline by establishing the degree to which the development would contrast or be in conformity with 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, economic importance of the scenic quality of the area, inherent cultural value of the area and presence of visual receptors.

2.1 Topography

The topography within and in the immediate vicinity of the proposed application site is characterised by a flat to gently undulating landscape (typical of much of the Karoo), that gently slopes down in a south-easterly direction (**Figure 6**).

In addition, the topography in the wider visual assessment zone is characterised by a mix of level plains with some relief, as well as areas of slightly more undulating relief, including some plains with open hills or ridges. In the wider area beyond the boundaries of the visual assessment zone, a low mountain range marks a change in topography; with the Doringberge forming a line of hills to the north-east of the application site.

Maps showing the topography and slope within and in the immediate vicinity of the proposed application site are provided in **Figure 7** and **Figure 8**.

Figure 6: View from the application site showing the typically flat to gently undulating topography with some localised hills / ridges/ koppies / mountains found within and beyond the study area

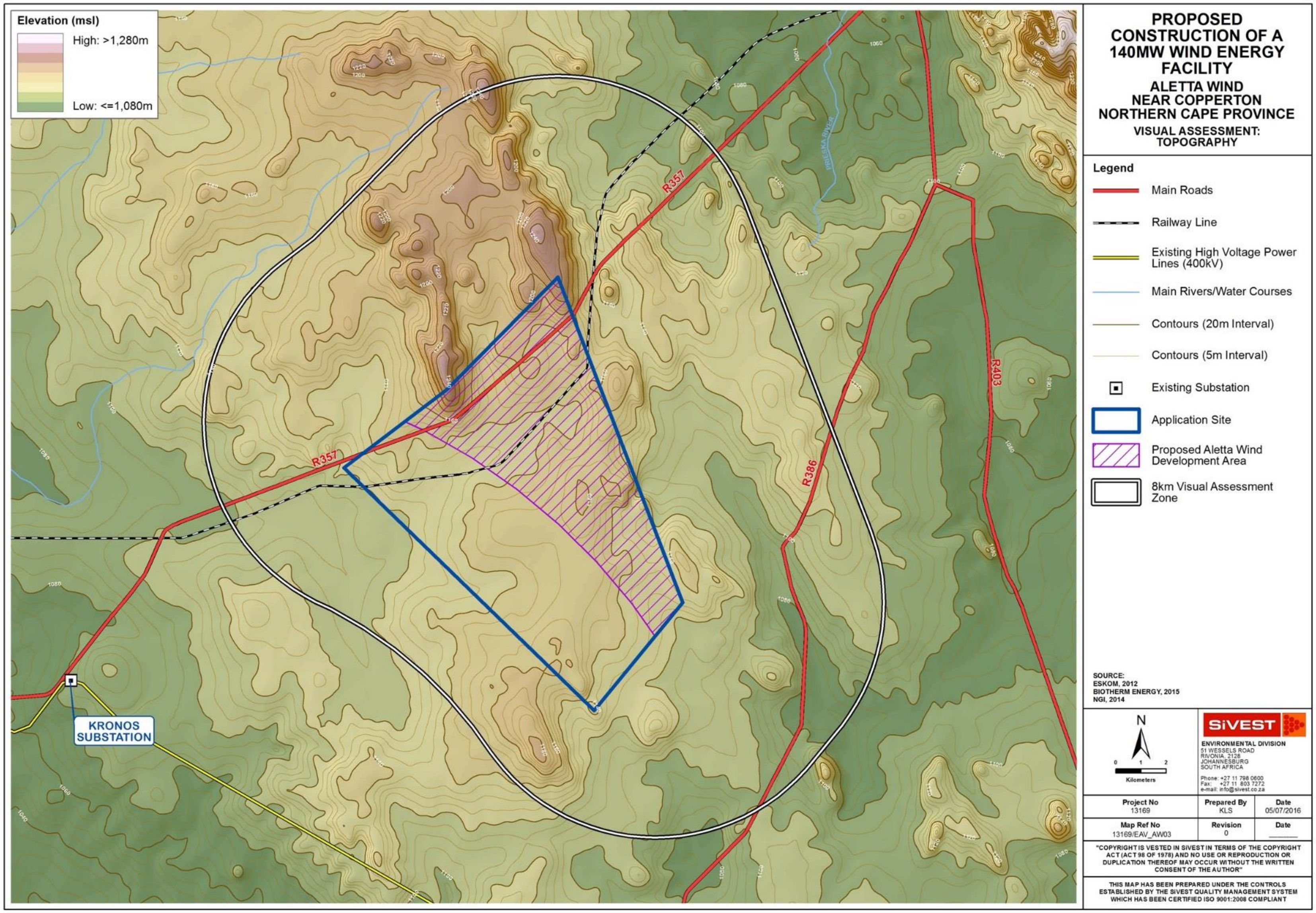

Figure 7: Map showing the topography within the study area

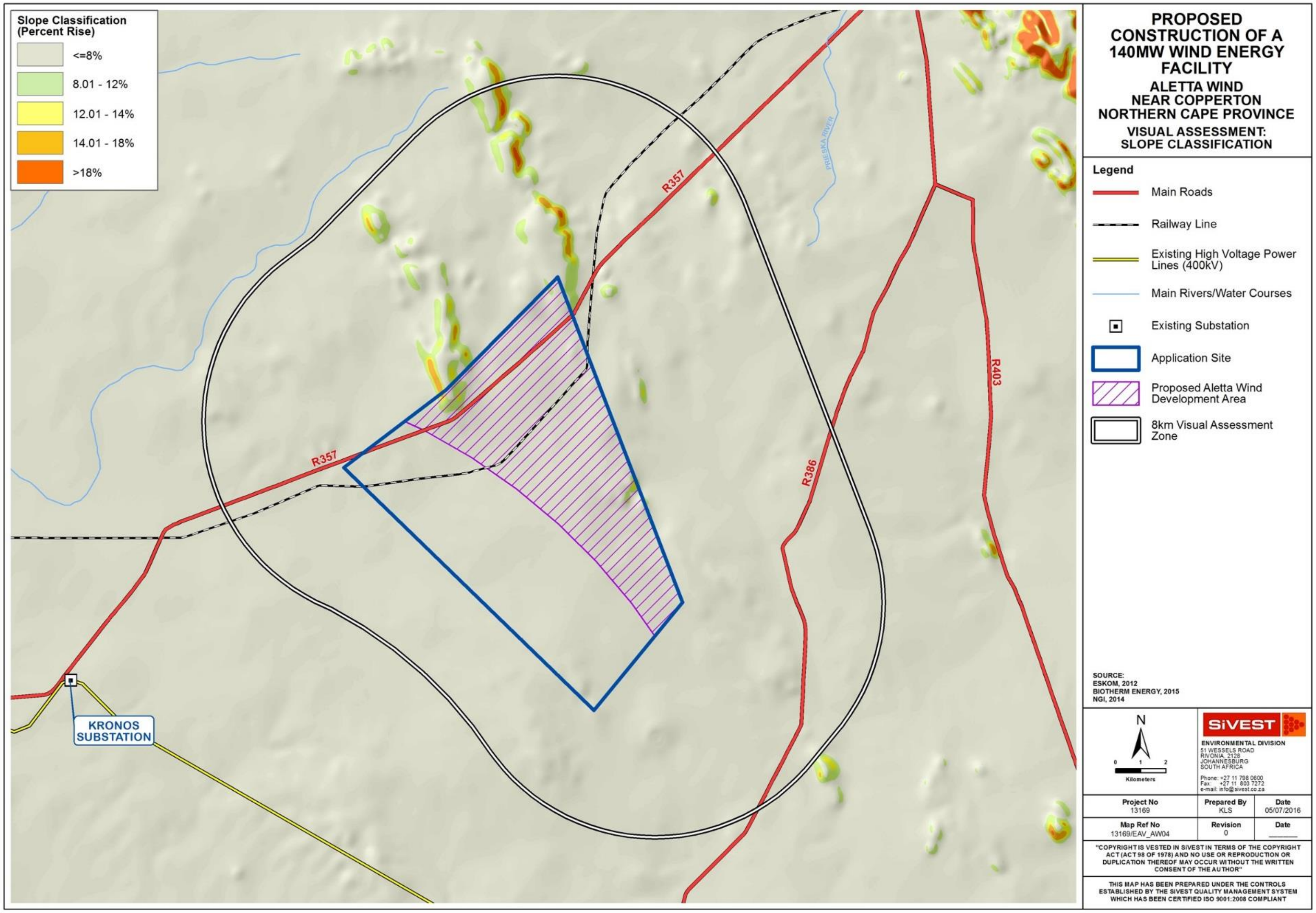

Figure 8: Map showing the slope within the study area

2.1.1 *Visual Implications*

The largely flat terrain that occurs within the immediate vicinity of the application site results in generally wide-ranging vistas throughout the study area (**Figure 9**). There are however exceptions to this generally flat topography which include the Dorinberge mountain range located to the north-east of the site, as well as the open hills or ridges located to the north. The Doringberge are situated approximately 24km from the application site and enclose the visual envelope. However, these mountains are located beyond the visual assessment zone and would offer very little topographical shielding/screening to lessen the impact of the wind energy facility from locally-occurring receptor locations. As these hills lie between Prieska and the site, they are a contributing factor in potentially shielding Prieska from the proposed development, although Prieska is situated at a distance from where the impact of the development is likely to be negligible. The hills and ridges to the north of the application site, will partially screen views of the wind energy facility from areas to the north-west, north and north-east of the application site.

Figure 9: Generally wide-ranging vistas found throughout the study area as a result of the largely flat terrain that occurs within the immediate vicinity of the application site.

2.2 Vegetation and land cover

Much of the visual assessment area is characterised by natural unimproved vegetation which is dominated by low shrubland. The highly arid nature of the area's climate has resulted in livestock rearing (i.e. sheep farming) being the dominant activity within the area. As such, the natural vegetation has been retained across the vast majority of the study area (**Figure 10**).

The nature of the climate and corresponding land use has also resulted in low stocking densities and relatively large farm properties across the area. Therefore the majority of the area is very sparsely populated, and relatively little human-related infrastructure exists.

Figure 10: Typical natural undeveloped grazing land found within the study area

Built form in areas where livestock rearing occurs is limited to isolated farmsteads, gravel access roads, ancillary farm buildings, telephone lines, fences and the remnants of disused workers' dwellings. It must also be noted that the R357 tar road and R386 gravel road traverse the northern and south-eastern sections of the study area respectively. In addition, several existing high voltage power lines can be found within the study area, while a railway line also traverses the northern section of the application site. It should however be noted that this is an old railway line which is no longer operational.

The closest built-up areas include the small mining town of Copperton as well as the old Prieska Copper Mine which was closed in 1996. Copperton is located approximately 15km to the north-west of the application site while the old Prieska Copper Mine is located approximately 14km west. In addition, the ABB Solar Facility can also be found within close proximity to the Prieska Copper Mine. Within the above-mentioned parts of the study area, greater human influence is visible in the form of mining infrastructure and electricity transmission infrastructure. The infrastructure associated with the now-defunct mine still exists, with the headgear, as well as an old slimes dams being prominent landmarks. However, these built-up areas are situated outside of the visual assessment zone and are therefore not expected to alter the visual character of the study area. Nevertheless, patches of degraded land can be found within the application site, as well as to the south-east, south and west of the site respectively. These areas of degraded land appear to be localised along the R357 and R386 roads, as well as the railway line. In addition, very small areas characterised by cultivation can be found to the south-west and north-east of the application site respectively.

A map showing the land use within the study area has been provided in **Figure 11** below.

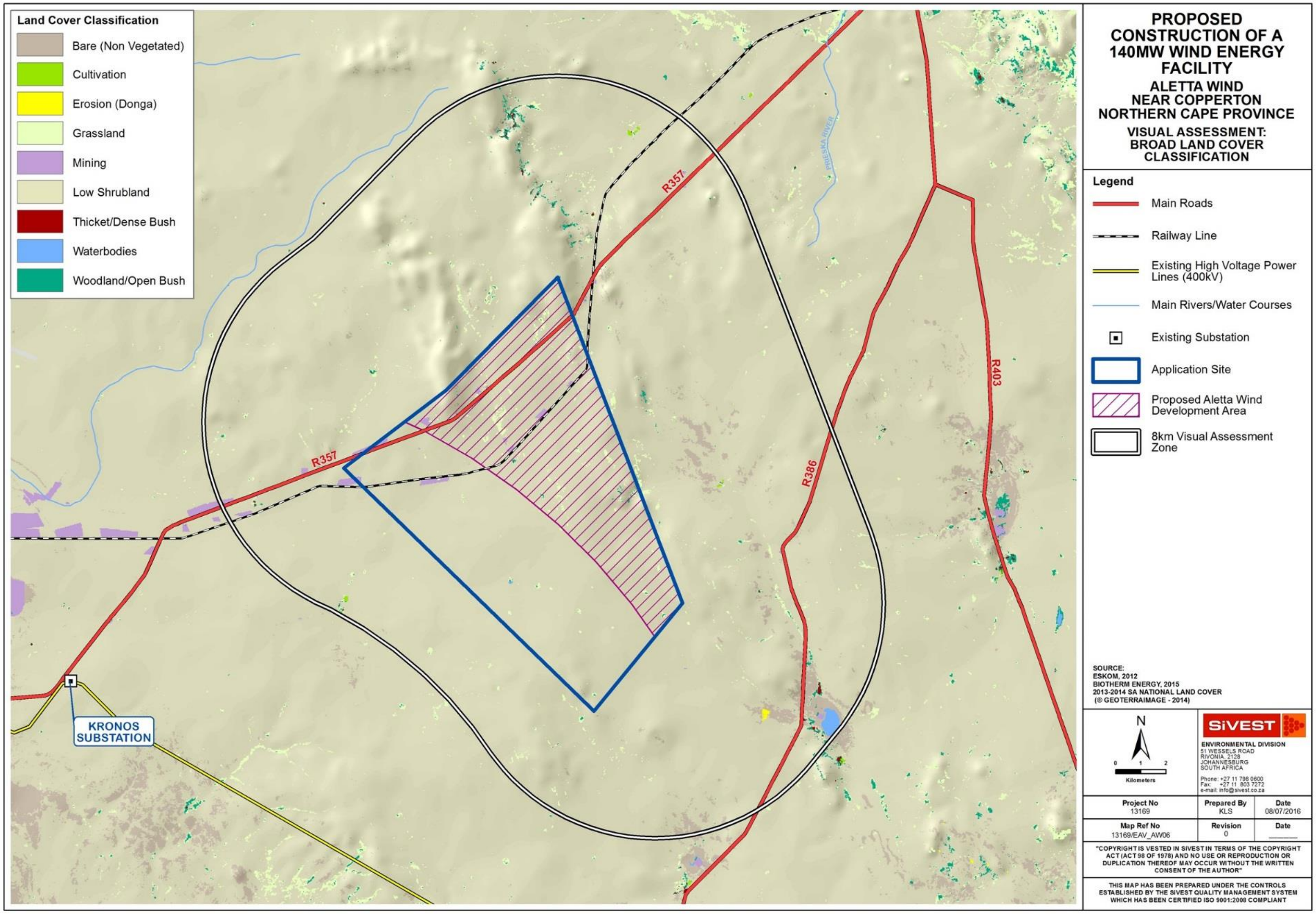

Figure 11: Map showing the land cover within the study area

The majority of the application site and visual assessment zone falls within the Bushmanland Arid Grassland vegetation unit. However, the Lower Gariep Broken Veld vegetation unit can also be found in the north of the visual assessment zone and extends slightly into the northern part of the application site. In addition, parts of the visual assessment zone also fall within the Bushmanland Vloere, Northern Upper Karoo and Upper Karoo Hardeveld vegetation units. Small sections to the north-east, south-east and south of the application site respectively fall within the Bushmanland Vloere vegetation unit. A relatively large segment of the Northern Upper Karoo vegetation unit is found to the south-east of the application site. In addition, a very small section of the visual assessment zone to the south-east of the application site falls within the Upper Karoo Hardeveld vegetation unit. The Bushland Basin Shrubland is located to the west of the application site but falls outside the study area.

According to Mucina and Rutherford (2006), the landscape of the Bushmanland Arid Grassland vegetation unit is characterised by extensive to irregular plains on a slightly sloping plateau sparsely vegetated by grassland dominated by white grasses (*Stipagrostis* species) giving this vegetation type the character of semi desert ‘steppe’. In places, low shrubs of *Salsola* change the vegetation structure. In years of abundant rainfall, rich displays of annual herbs can be expected.

The Lower Gariep Broken Veld vegetation unit is characterised by hills and low mountains, slightly irregular plains but with some rugged terrain with sparse vegetation dominated by shrubs and dwarf shrubs, with annuals conspicuous, especially in spring, and perennial grasses and herbs. Groups of widely scattered low trees such as *Aloe dichtoma* var. *dichtoma* and *Acacia mellifera* subsp. *detinens* occur on slopes of ‘koppies’ and on sandy soils of foot slopes respectively.

The Bushmanland Vloere vegetation unit is characterised by ‘Vloere’ (salt pans) of the central Bushmanland Basin as well as the broad riverbeds of the intermittent Sak River and its numerous ancient (today dysfunctional) tributaries. The patches of this vegetation unit are embedded especially within the Bushmanland Basin Shrubland and Bushmanland Arid Grassland vegetation units.

The vegetation that occurs within the Northern Upper Karoo vegetation unit includes shrubland dominated by dwarf Karoo shrubs, grasses and *Acacia mellifera* subsp. *detinens* and some other low trees. The landscape is characterised by flat to gently sloping, with isolated hills of Upper Karoo Hardeveld in the south and Vaalbos Rocky Shrubland in the north-east and with many interspersed pans.

The Upper Karoo Hardeveld is characterised by steep slopes of koppies, butts, mesas and parts of the Great Escarpment covered with large boulders and stones supporting sparse dwarf Karoo scrub with drought-tolerant grasses of genera such as *Aristida*, *Eragrostis* and *Stipagrostis*.

The aridity of the area has restricted the vegetation cover to this typically short scrub-type vegetation (**Figure 12**). Relatively large tree species such as the Black thorn (*Acacia mellifera* subsp. *detinens*), as well as some other low trees can however also be found within certain parts of the study area. In other parts, man has had an impact on the natural vegetation, especially around farmsteads, where over many years tall exotic trees and other typical garden vegetation have been established.

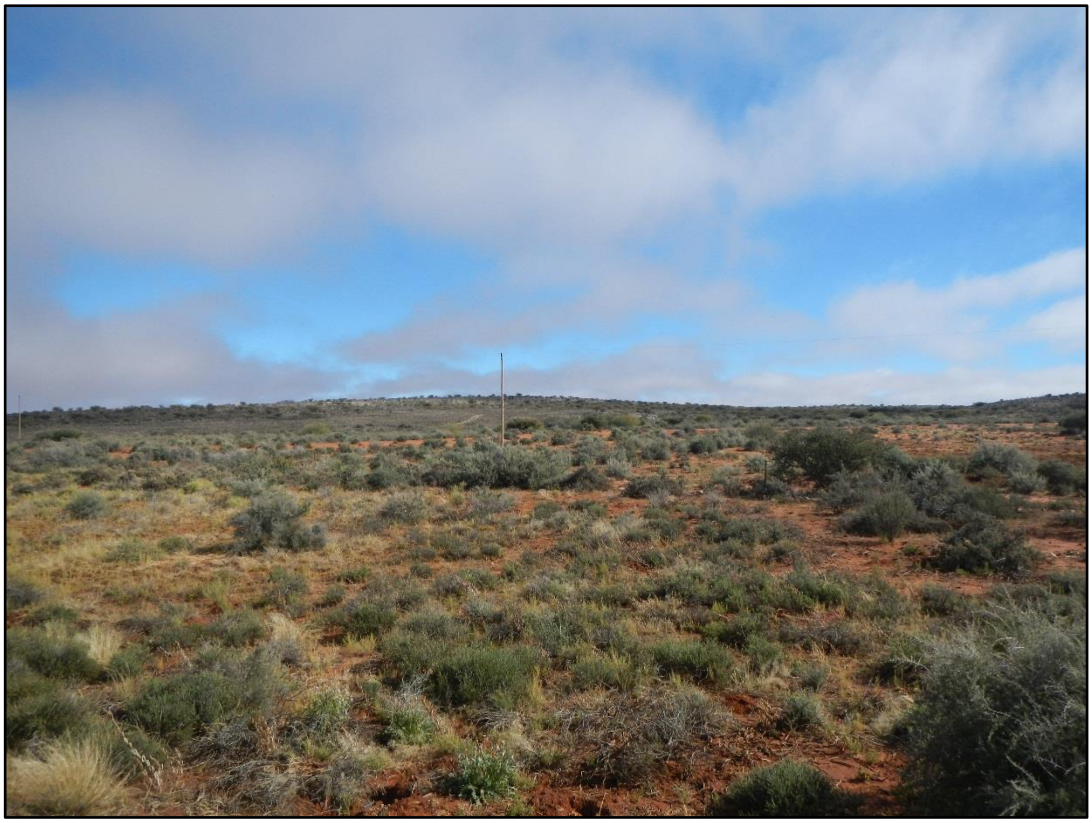

Figure 12: Typical vegetation cover found within majority of the study area.

A map indicating the vegetation cover found within the study area is provided in **Figure 13** below.

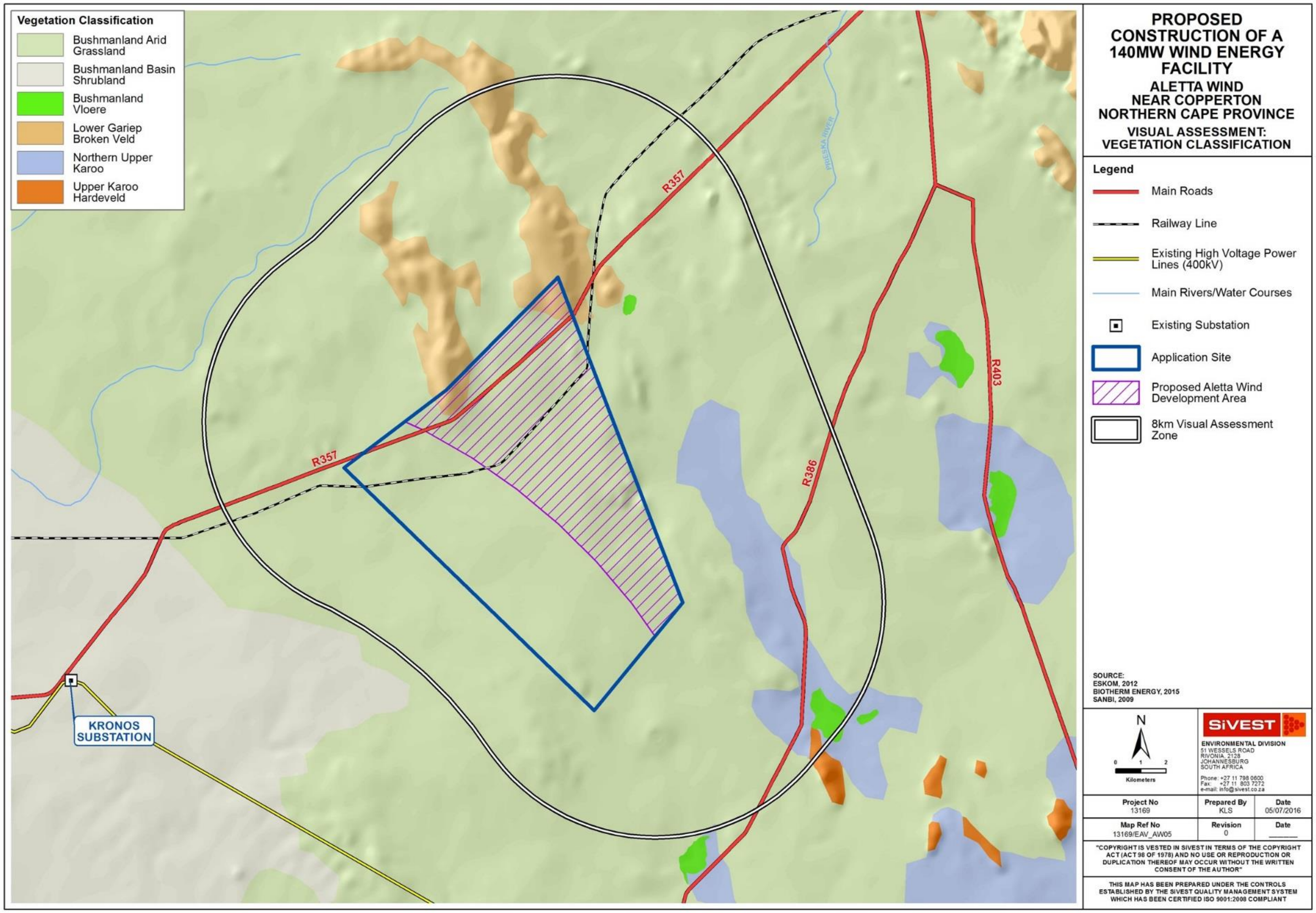

Figure 13: Map showing the vegetation classification within the study area

2.2.1 *Visual Implications*

Sparse human habitation and the predominance of natural vegetation cover across large portions of the study area would give the viewer the general impression of a largely natural rural setting (**Figure 14**). High levels of human transformation and visual degradation only become evident in the vicinity of Copperton, the Prieska Copper Mine and the ABB Solar Facility, all of which are outside the 8km assessment zone. The small sections within the visual assessment zone characterised by cultivation are however expected to give the surrounding area a more pastoral feel. Only in areas further south-east, south and west respectively (along the R357, R386 and railway line) will the landscape character appear more urban or industrial. The visual impact associated with the proposed development is expected to be relatively insignificant when viewed from these areas that they have been relatively transformed and/or degraded. The infrastructure associated with the Copper Mine and ABB Solar Facility are however unlikely to change the visual character of the study area as these are located outside of the visual assessment zone. In addition, the Copper Mine has been non-functional for a number of years and the transformation of the area around the mine is extremely localised. The town of Copperton is also located outside of the visual assessment zone and is therefore also not expected to change the visual character of the study area.

Figure 14: Typical natural or scenic visual character found within majority of the study area

The natural short scrub-like vegetation cover, which dominates within most of the application site and visual assessment zone is not expected to offer any significant visual screening. Sections of the visual assessment zone are however characterised by relatively large tree species such as the Black thorn (*Acacia mellifera* subsp. *detinens),* as well as some other low trees (**Figure 15**). These trees occur naturally in certain areas of the visual assessment zone and are expected to contribute to the overall natural character of the study area as well as provide some form of screening from the proposed development. In addition, tall exotic trees may also effectively screen the proposed development from farmhouses, where these trees occur in close proximity to the farmhouse and are located directly in the way of views toward the development (**Figure 16**).

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

Figure 15: Example of the relatively large tree species (such as the Black thorn), as well as some other low trees which can be found in sections of the visual assessment zone

Figure 16: Example of tall trees that have been established around a farmhouse in the area

2.3 Visual Character

The above physical and land use-related characteristics of the study area contribute to its visual character. Visual character can be defined based on the level of change or transformation from a completely natural setting, which would represent 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 electrical infrastructure.

Most of the study area is considered to have a rural or pastoral character as a result of the limited human habitation and associated human infrastructural footprint present within the wider study area. The nature of the predominant land use (livestock farming) has retained the natural vegetation and natural appearance of the landscape. Built infrastructure within the study area is limited to isolated farmhouses, gravel access roads, several existing high voltage power lines (**Figure 17**), boundary fences, a slimes dam and a railway line which traverses a section of the application site.

As previously mentioned, the old railway line appears to be no longer operational (**Figure 18**). In addition, the infrastructure associated with the Copper Mine is unlikely to change the visual character of the study area as the relic mine is situated outside of the visual assessment zone, has been non-functional for a number of years, and the transformation of the area around the mine is extremely localised. The town of Copperton is also situated outside the visual assessment zone and is therefore not expected to alter the visual character of the study area.

Figure 17: View of the existing high voltage power lines found within the study area which are expected to alter the overall natural / scenic character of the study area slightly and lower the visual contrast associated with the proposed wind energy facility.

Figure 18: View of the remnants of an old railway line which traverses the northern section of the application site. Note that no railway tracks are present.

The relatively low density of human transformation throughout majority of the study area is an important component contributing to the largely natural visual character of the study area. This is important in the context of potential visual impacts associated with the proposed development of a wind energy facility as introducing this type of development could be considered to be a degrading factor in this context. In addition, the hilly / mountainous terrain which occur within parts of the study area are considered to be important features that would increase the scenic appeal and visual interest in the area (**Figure 19**).

Figure 19: View of some of the hilly / mountainous areas located within parts of the study area which are expected to increase the scenic appeal and visual interest in the study area.

It should however be noted that several wind and solar energy facilities are proposed within relatively close proximity to the proposed development. These facilities, and their associated infrastructure, typically consist of very large structures which are highly visible. As such, these facilities will significantly alter the visual character and baseline in the study area once constructed resulting in a more industrial-type visual character. As previously mentioned, the ABB Solar Facility can be found with close proximity to the Prieska Copper Mine and is currently operational (**Figure 20**). This facility is however located outside of the visual assessment zone and is therefore not expected to alter the visual character of the study area.

Although the presence of other renewable energy developments will lessen the degree to which the proposed Aletta Wind Energy Facility farm would contrast with the elements and form in the surrounding environment, the cumulative impact on each potentially sensitive visual receptor location would increase. This is discussed in more detail in **section 4.5** below.

Figure 20: View of the ABB Solar Facility which is found within close proximity to the Prieska Copper Mine. This facility is however located outside of the visual assessment zone.

2.4 Cultural, Historical and Scenic Value

Cultural landscapes are becoming increasingly important concepts in terms of the preservation and management of rural and urban settings across the world. The concept of 'cultural landscape' is a way of looking at a place that focuses on the relationship between human activity and the biophysical environment (Breedlove, 2002). The cultural landscape concept is relatively new in the heritage conservation movement across the world. In 1992 the World Heritage Committee adopted the following definition for cultural landscapes:

Cultural landscapes represent 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.

According to the Committee's Operational Guidelines Cultural Landscapes can fall into three categories *i) "a landscape designed and created intentionally by man";*

ii) an "organically evolved landscape" which may be a "relict (or fossil) landscape" or a "continuing landscape";

iii) an "associative cultural landscape" which may be valued because of the "religious, artistic or cultural associations of the natural element"

The greater area surrounding the proposed development site is also 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 widely scattered farmsteads and small towns. Traditionally the Karoo has been seen by many as a dull, lifeless part of the country that was to be crossed as quickly as possible on route between the major inland centres and the Cape coast, or between the Cape and Namibia. However, in the last couple of decades this has been changing, with the launching of tourism routes within the Karoo, and the promotion of tourism in this little visited, but large part of South Africa. In a context of increasing urbanisation in South Africa's major centres, the Karoo is being marketed as an undisturbed getaway, especially as a stop on a longer journey from the northern parts of South Africa to the Western and Eastern Cape coasts. Examples of this may be found in the published "Getaway Guide to Karoo, Namaqualand and Kalahari" (Moseley and Naude-Moseley, 2008). The exposure of the Karoo in the national press during 2011, as part of the debate around the potential for fracking (hydraulic fracturing) mining activities, has brought the natural resources, land use and lifestyle of the Karoo into sharp focus. Many potential objectors stress the need to preserve the environment of the Karoo, as well as preserve the 'Karoo Way of Life', i.e. the stock farming practices which are highly dependent on the use of abstracted ground water (e.g. refer to the Treasure Karoo Action Group website http://treasurethekaroo.co.za/).

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

The 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 Karoo towns, such as Prieska and Copperton, engulfed by an otherwise rural 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 the context 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.

The study area, as visible to the viewer, represents a typical Karoo cultural landscape. This is important in the context of potential visual impacts associated with the proposed development of a wind energy facility as introducing this type of development could be considered to be a degrading factor in the context of the natural Karoo character of the study area, as discussed further below.

2.5 Sensitive and Potentially Sensitive Visual Receptor Locations

A sensitive receptor location is defined as a location, from where receptors would potentially be adversely impacted by a proposed development. This takes into account a subjective factor on behalf of the viewer – i.e. whether the viewer would consider the impact as a negative impact. As described above, the adverse impact is often associated with the alteration of the visual character of the area in terms of the intrusion of the wind energy facility into a ‘view’, which may affect the ‘sense of place’. The identification of sensitive receptor locations is typically undertaken based on a number of factors which include:

- the visual character of the area, especially taking into account visually scenic areas and areas with a natural visual character;
- the presence of leisure-based (esp. nature-based) tourism in an area;
- the presence of sites / routes that are valued for their scenic quality and sense of place;
- the presence of homesteads / farmsteads in a largely natural settings 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.

A distinction must be made between a receptor location and a sensitive receptor location. A receptor location is a site from where the proposed wind energy facility may be visible, but the receptor may not necessarily be adversely affected by any visual intrusion associated with the development. Receptor locations include locations of commercial activities and certain movement corridors, such as roads that are not tourism routes. 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.

Distance bands were used to assign zones of visual impact from the proposed development site, as the visibility of the development would diminish exponentially over distance. As such, the proposed development would be more visible to receptors located within a short distance and these receptors would experience a higher adverse visual impact than those located at a moderate or long distance from the proposed development. The distance of sensitive receptors from the proposed development site was taken into account when rating the visual impact of the proposed development on these receptors.

Based on the height and scale of the project, the radii chosen to assign these zones of visual impact are as follows:

- > 500m (very high impact zone)
- 500m < 2km (high impact zone)
- 2km < 5km (moderate impact zone)
- 5km < 8km (low impact zone)
- 8km < (Negligibly low impact zone)

During the EIA phase VIA, a number of potentially sensitive visual receptor locations were identified. These are indicated in **Figure 25** below and each receptor is identified by a specific number (e.g. VR 1 = Visual Receptor 1). Of the potentially sensitive visual receptors identified, two (2) receptor locations were identified as being sensitive. These are the Boesmansberg Guest Farm and the Nelspoortjie Karoo Guest Farm (VR 1 and VR 2 respectively). These guesthouses have been regarded as sensitive visual receptors as they are used as tourism facilities and visitors to these facilities are may likely perceive the proposed development in a negative light.

The Boesmansberg Guest Farm (VR 1) is a new guesthouse, which is located approximately 44km from the small town of Prieska. This guesthouse is located approximately 2.3km north-west of the proposed Aletta Wind Energy Facility application site and is accessible via the R357 Copperton Road (**Figure 21**). This guesthouse offers a country experience and provides guests with opportunities to view the beauty of the Karoo. This tourism facility offers veld paths where you can ride with mountain bikes or walk in the fields (http://boesmansberggasteplaas.co.za/boesmansberg-guest-farm-accommodation/). The Boesmansberg Guest Farm (VR 1) provides accommodation facilities for guests (**Figure 22**).

Figure 21: View of the entrance of the Boesmansberg Guest Farm (VR 1) which is also accessible via the R357 Copperton Road

Figure 22: Typical views of the different accommodation facilities which can be found at the Boesmansberg Guest Farm (VR 1)

The Nelspoortjie Karoo Guest Farm (VR 2) is located approximately 3.8km to the west of the proposed Aletta Wind Energy Facility application site and is accessible via the R357 Copperton Road (**Error! Reference source not found.**). In addition, this tourism facility is located approximately 47km from the town of Prieska, 15km from Copperton and 20km from the Alkantpan Test Range. The Nelspoortjie Karoo Guest Farm caters for all business class guests, especially international and local military personnel performing tests at the Alkantpan Test Range as well as the solar and wind energy facility staff working on renewable energy developments in the Copperton area. Similarly to the Boesmansberg Guest Farm (VR 1), the Nelspoortjie Karoo Guest Farm (VR 2), provides accommodation facilities for guests (**Error! Reference source not found.**) (http://www.aatravel.co.za/accommodation/south-africa/northern-cape/prieska/nelspoortjie-karoo-guest-farm-PA45745).

Figure 23: View of the entrance of the Nelspoortjie Karoo Guest Farm (VR 2) which is accessible via the R357 Copperton Road

Figure 24: Typical views of the different accommodation facilities which can be found at the Nelspoortjie Karoo Guest Farm (VR 2)

During the EIA Phase site visit, several scattered farmsteads / homesteads were identified within the study area. These dwellings are located within a mostly rural setting and the proposed development will likely alter the natural vistas experienced from these dwellings. It is important to note that these visual receptor locations are regarded as <u>potentially</u> sensitive to the proposed development as the degree of visual impact experienced from these locations will vary from one inhabitant to another, as it is largely based on the viewer's perception and sentiments toward the development. 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.

As far as possible, each sensitive and potentially sensitive visual receptor that was identified via desktop means was visited to determine the current use of the facility and rate the impact of the proposed development from the location. As mentioned above, only two (2) sensitive visual receptor locations with tourism significance were identified within the study area. This is mainly due to low levels of leisure-based or nature based tourism activities in the assessment area.

Table 2 below provides details of the visually sensitive and potentially sensitive visual receptors that were identified within the study area.

It should be noted that a few of the farmsteads / homesteads identified during the scoping phase were excluded as potentially sensitive receptor locations for the purposes of the EIA phase study as it was discovered during the time of the site visit that these were uninhabited and/or abandoned. No further assessment was undertaken from these abandoned farmsteads / homesteads as no individuals currently live in these farmsteads / homesteads and therefore no visual impact will be experienced from these locations.

Table 2: Sensitive and potentially sensitive visual receptor locations identified within the study area

Name	Details	Coordinates	Proximity to the proposed wind energy facility application site	Visual Impact Zone
VR 1	Boesmansberg Guest Farm	29°54'51.57"S 22°27'50.41"E	Approximately 2.4km	Moderate
VR 2	Nelspoortjie Karoo Guest Farm	29°57'43.78"S 22°24'55.99"E	Approximately 6.8km	Low
VR 4	Humansrus Farmstead	29°59'52.89"S 22°27'1.67"E	Approximately 7.6km	Low
VR 5	Uitzigt Farmstead	29°57'18.58"S 22°36'28.36"E	Approximately 3.2km	Moderate
VR 8	Jackalswater Farmstead 1	29°49'58.45"S 22°34'53.67"E	Approximately 6.7km	Low
VR 9	Jackalswater Farmstead 2	29°51'31.78"S 22°33'6.44"E	Approximately 2.7km	Moderate
VR 11	Platsjambok Farmstead	30°0'1.44"S 22°27'7.13"E	Approximately 7.8km	Low

Name	Details	Coordinates	Proximity to the proposed wind energy facility application site	Visual Impact Zone
VR 12	Klein Modderfontein Farmstead	29°59'38.38"S 22°37'24.68"E	Approximately 3.1km	Moderate
*VR 14	Drielingspan Farmstead 1	29°59'19.69"S 22°31'12.51"E	Approximately 2.9km (located within Aletta Wind application sie)	Moderate
*VR 15	Drielingspan Farmstead 2	29°56'50.01"S 22°31'20.40"E	Located within the Aletta Wind development area	Very high
*VR 16	Drielingspan Farmstead 3	29°56'47.61"S 22°31'16.07"E	Located within the Aletta Wind development area	Very high

**VR 14 is located within the proposed Aletta Wind application site. In addition, VR 15 and VR 16 are located within the proposed Aletta Wind development area. It is assumed that the occupants of these dwellings would have a vested interest in the development and would therefore not perceive the proposed Aletta Wind Energy Facility in a negative light. During the EIA phase fieldwork it was verified that the owner of VR 15 supports the proposed development.*

**It should be noted that VR 14 and VR 16 are currently uninhabited and no one lives in these dwellings. During the site visit, it was however discovered that VR 14 belongs to the occupant of VR 15 and that this dwelling is sometimes used as accommodation for individuals that have to undertake specific tasks (such as erecting fences) on the farm. The occupant of VR 15 has however indicated that this dwelling might be used as a home for one of the family members in the future and should therefore still be assessed as a potentially sensitive visual receptor. In addition, VR 16 is currently being used as a holiday home by a family member of the occupant of VR 15. The occupant of VR 15 has indicated that this family member has inherited this dwelling from their father and might occupy it permanently in the future. VR 16 has therefore also been assessed as a potentially sensitive visual receptor for the purpose of this EIA phase study.*

The visually sensitive and potentially sensitive receptor locations in relation to the zones of visual impact are indicated in **Figure 25** below.

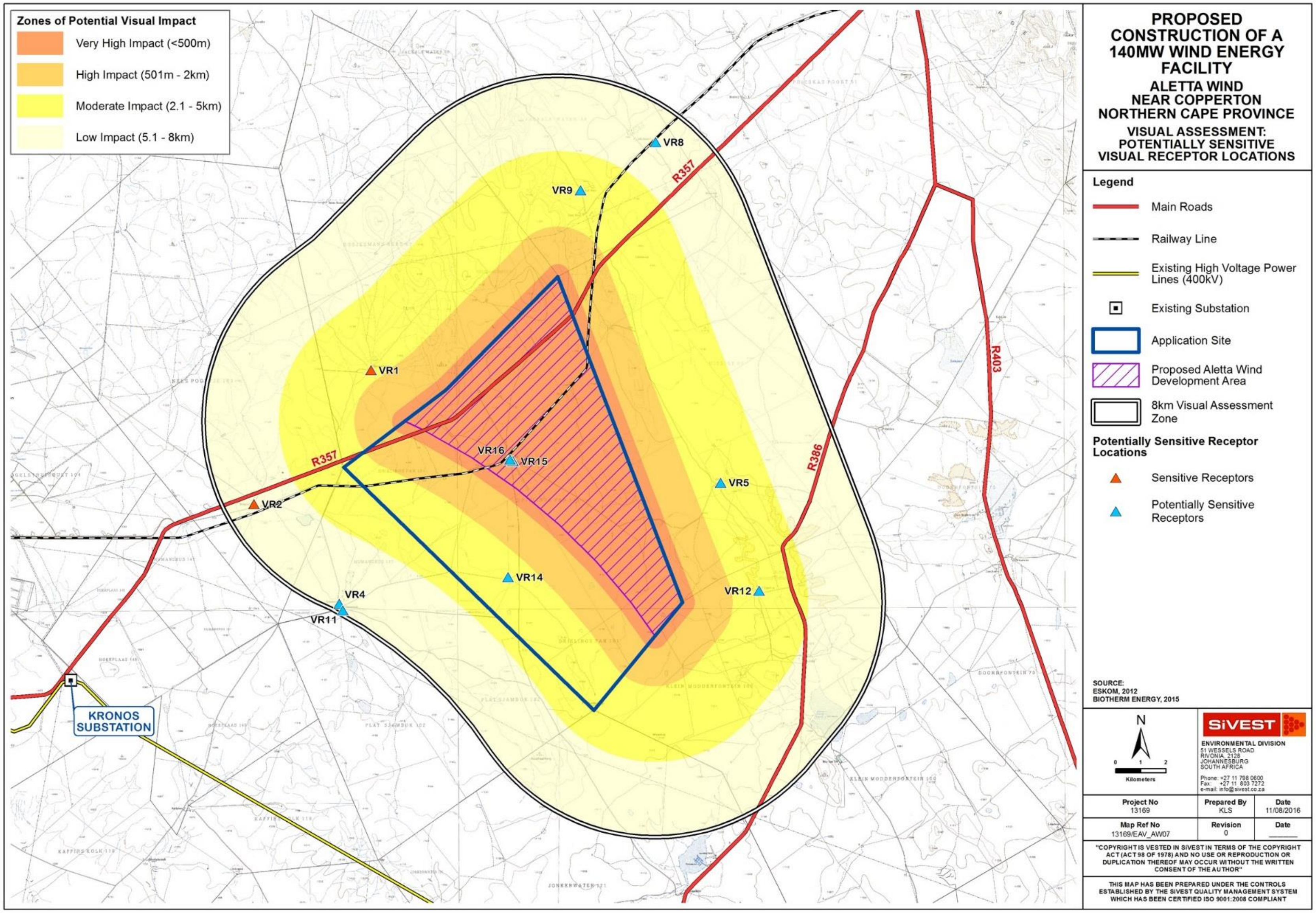

Figure 25: Visually Sensitive and potentially sensitive visual receptors within the study area

In many cases, roads, along which people travel, are regarded as sensitive receptors. The closest roads to the Aletta Wind Energy Facility application site are the R357 tar road, as well as the R386 and R403 gravel roads. The R357 traverses the northern section of the application site and provides access to the site. This road is a single carriageway tar road and is in relatively good condition (**Figure 26**). This road is primarily used by local farmers to gain access to surrounding farms / properties as well as when travelling to and from the town of Prieksa to the north-east. It must however be noted that a section of the R357 to the south-west of the application site becomes a gravel road and provides access to the existing Kronos Substation (**Figure 27**). In addition, the R386 gravel road can be found to the east of the site and traverses the south-eastern corner of the visual assessment zone. Similarly to the R357, this gravel road is also primarily used by local farmers to gain access to surrounding farms / properties as well as when travelling to and from the town of Prieksa to the north-east. It must be noted that the R403 gravel road is located outside of the visual assessment zone and is therefore not regarded as a sensitive receptor road. The R357 and R386 roads are however also not considered to be sensitive receptor roads as they are used almost exclusively as local access roads, with very little use for any other purposes. In addition, these roads do not form part of any scenic tourist routes, and are not specifically valued or utilised for their scenic or tourism potential.

Figure 26: View of the R357 tar road which traverses the proposed Aletta Wind Energy Facility application site and provides access to the site.

Figure 27: View of the south-western section of the R357 road which becomes a gravel road and provides access to the existing Kronos Substation.

As mentioned above, the south-western section of the R357 becomes a gravel road and provides access to the existing Kronos Substation (**Figure 28**) to the south-west of the application site. In addition, this section of the road also passes close by the now disused Copperton Mine and associated slimes dam (**Figure 29**). It should also be noted that existing high voltage power lines traverse certain sections of the R357 and R386 roads (**Figure 30**). Certain areas along these roads can therefore be considered to be visually ‘degraded’ by the prevalence of large human infrastructure, and are highly unlikely to be associated with any visual sensitivity.

Figure 28: View of the existing Kronos Substation which can be found along the south-western gravel section of the R357 road.

Figure 29: View of the Copperton Mine slimes dam which can be seen from sections of the R357 road. The south-western gravel section of the R357 road passes close to this slimes dam.

Figure 30: Photo of existing high voltage power lines which traverses a section of the R357 tar road.

Other thoroughfares in the study area include gravel access / secondary roads which are primarily used by local farmers to gain access to surrounding farms / properties. These roads are therefore not regarded as visually sensitive as they do not form part of any scenic tourist routes, and are not specifically valued or utilised for their scenic or tourism potential.

There are therefore no visually sensitive roads within the visual assessment zone.

2.6 Visual Sensitivity Rating

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), 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 3**), the visual sensitivity of an area is broken up into a number of categories, as described below:

i) **High** - The introduction of a new development such as the erection of a wind energy 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** - Presence of receptors, 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 3: Environmental factors used to define visual sensitivity of the study area

FACTORS	**RATING**									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Pristine / natural character of the environment										
Presence of sensitive visual receptors										
Aesthetic sense of place / scenic visual character										
Value to individuals / society										
Irreplaceability / uniqueness / scarcity value										
Cultural or symbolic meaning										
Scenic resources present in the study area										
Protected / conservation areas in the study area										
Sites of special interest present in the study area										
Economic dependency on scenic quality										
Local jobs created by scenic quality of the area										
International status of the environment										
Provincial / regional status of the environment										
Local status of the environment										
Scenic quality under threat / at risk of change*										

*Any rating above '5' for this factor the 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	110	120	130	140	150

Based on the above factors, the study area is rated as having a low visual sensitivity. This is mainly owing to the relatively uninhabited character of the area as well as the presence of degraded land and anthropogenic elements (such as the R357, R386 and the railway line) which would likely reduce the scenic quality of the area. 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. As described below, a significant amount of sensitive receptors are present in the study area. Although no formal protected areas or leisure / nature-based tourism activities exist within the study area, the area would still be valued as a typical Karoo cultural landscape.

Several renewable energy facilities are proposed within relatively close proximity to the proposed wind energy facility. As such, an assessment of the cumulative impact that will be experience from each potentially sensitive receptor is addressed in **section 4.5** below.

Although the area is associated with a low visual sensitivity, it should be stressed that the concept of visual sensitivity has been utilised indicatively to provide a broad-scale indication of the likelihood of the area to be sensitive to the visual impacts, and is based on the physical characteristics of the study area, economic activities and land use that predominates. This does not mean that high visual impacts could not potentially be experienced in areas of low visual sensitivity. The potential presence and perception of sensitive receptors as discussed below must also be taken into account.

3 GENERIC VISUAL IMPACT ASSOCIATED WITH THE WIND ENERGY FACILITY

In this section, the typical visual issues / impacts related to the establishment of a wind energy facility are discussed. It is important to note that within a few years several wind energy facilities should be constructed within South Africa. The development and associated environmental assessment of wind energy facilities in South Africa is relatively new, and thus it is valuable to draw on international experience. This section of the report therefore draws on international literature and web material (of which there is significant material available) to describe the generic impacts associated with wind energy facilities.

3.1 Wind Energy Facilities

As previously mentioned, at this stage it is anticipated that the proposed project will consist of approximately 60 wind turbines and associated infrastructure with a total generation capacity of approximately 140MW. The size of the wind turbines will have a hub height of up to 120 m and a rotor diameter of up to 150m (approximately the height of a 45-storey building). The height of the turbines and the fact that a wind energy facility consists of a series of turbines spaced apart in groups around the site would result in it being typically visible for a large radius.

Internationally, studies have demonstrated that there is a direct correlation between the number of turbines and the degree of objection to a wind energy facility, with potential opposition to a wind energy facility being lower when fewer turbines are proposed (Devine-Wright, 2005). Certain objectors to wind energy facilities also mention the "sky space" occupied by the rotors of a turbine. As well as height, "sky space" is an important issue. "Sky space" refers to the area in which the rotors would rotate. The diagram below indicates that the "sky space" occupied by rotors would be similar to that occupied by a jumbo jet (http://www.stopbickertonwindturbines.co.uk/ - page on visual impact).

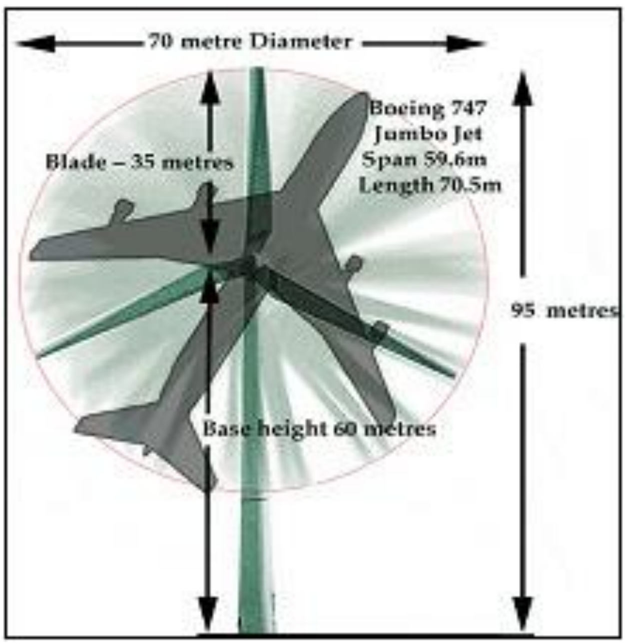

Figure 31: Sky space of a turbine in comparison to a jumbo jet

The visual prominence of the facility would be exacerbated within natural settings, in areas of flat terrain or if located on a ridge top. Even dense stands of wooded vegetation are likely to only offer partial visual screening, as the wind turbines are of such a height that they will rise above even mature large trees.

3.1.1 *Shadow flicker*

Shadow flicker is an effect which is caused when shadows repeatedly pass over the same point. It can be caused by wind turbines when the sun passes behind the hub of a wind turbine and casts a shadow that continually passes over the same point as the blade of the wind turbine rotates (http://www.ecotricity.co.uk).

The effect of shadow flicker is only likely to be experienced by people situated directly within the shadow cast by the blade of the wind turbine. As such, shadow flicker is only expected to have an impact on and cause health risks to people residing within houses that are located at a specific orientation and within close proximity to a wind turbine (less than 500m), particularly in areas where there is little screening present. Shadow flicker may also be experienced by and impact on motorist if a wind turbine is located in close proximity to an existing road. The impact of shadow flicker can be effectively mitigated by choosing the correct site and layout for the wind turbines, taking the orientation of the turbines relative to the nearby houses and the latitude of the site into consideration. Tall structures and trees will also obstruct shadows and prevent the effect of shadow flicker from impacting on surrounding residents (http://www.ecotricity.co.uk).

3.1.2 *Motion-based visual intrusion*

An important component of the visual impacts associated with wind turbines is the *movement* of the rotors. Labelled as motion-based visual intrusion, this refers to the inclination of the viewer to focus on discordant, moving features when scanning the landscape. Evidence from surveys of public attitudes towards wind energy facilities suggest that the viewing of moving blades is not necessarily perceived negatively (Bishop and Miller, 2006). The authors of the study suggest two possible reasons for this; firstly when the turbines are moving they are seen as being ‘at work’, doing good and producing energy. Conversely, when they are stationary they are regarded as a visual intrusion that has no evident purpose. More interestingly, the second theory that explains this perception is related to the intrinsic value of wind in a certain areas and how turbines may be an expression or extension of an otherwise ‘invisible’ presence.

Famous winds across the world include the Mistral of the Camargue in France, the Föhn in the Alps, or the Bise in the Lavaux region of Switzerland. The wind, in these cases, is an intrinsic component of the landscape, being expressed in the shape of trees or drifts of sands, but being otherwise invisible. The authors of the study argue that wind turbines in these environments give expression, when moving, to this quintessential landscape element. In a South African context, this phenomenon may well come to be experienced if wind energy facilities are developed in areas where typical winds, like berg winds, or the south-easter in the Cape are an intrinsic part of the environment. In this way, it may even be possible that wind energy facilities will, through time form part of the cultural landscape of an area, and become a representation of the opportunities presented by the natural environment.

3.2 Associated Infrastructure

The infrastructure associated with the proposed development will include the following:

- A new 132kV on-site Aletta IPP Substation and associated infrastructure, which will be used to connect the wind energy facility to the national network system in order to export the generated electricity to the national grid. The footprint of the on-site substation yard will be approximately 2.25 hectares.
- Medium voltage cables buried up to 1.5m deep connecting all wind turbines to the on-site Aletta IPP Substation;
- Internal access roads between 4m and 6m wide with a combined length of up to 60km.
- Double width roads will be required in strategic places for vehicle passing;
- A temporary construction lay-down area of approximately 2 400m^2 (60m x 40m). The lay-down / staging area will be approximately 11 250m^2 whilst the lay-down area for the concrete towers (only if required) will be approximately 40 000m^2;
- Operation and maintenance (O&M) buildings with a footprint of approximately 300m^2, including an on-site spares storage building, a workshop and an operations building. The operation and maintenance buildings will be situated in close proximity to the wind energy facility substation due to requirements for power, water and access; and
- Fencing (if required) with a height of up to 5m where required. This will be either mesh or palisade.

The proposed on-site Aletta IPP Substation is considered to be a large object and will typically be visible for great distances. As previously mentioned, the wind turbines will be connected to the proposed on-site substation using buried medium voltage cables. However, overhead power lines may also be used where a technical assessment of the proposed design suggests that they will be more appropriate, such as over rivers and gullies. Overhead power lines consist of a series of tall towers thus making them visible. Like wind turbines, power lines and substations are not features of the natural environment, but are representative of human (anthropogenic) alteration. Thus when placed in largely natural landscapes, they will be perceived to be highly incongruous in this setting. Conversely, the presence of other anthropogenic objects associated with the built environment, especially other power lines or switching substations, may result in the visual environment being considered to be ‘degraded’ and thus the introduction of a new power line into this setting may be less of a visual impact than if there was no existing built infrastructure visible.

Other proposed infrastructure may also be associated with visual impacts. As previously mentioned, the wind turbines are inter-connected with a series of cables, which are likely to be buried. These cables may become a visual intrusion if placed in areas of the site that are visible to the surrounding area, especially those areas that are located on low ridges and associated sloping ground. A trench dug for the cable (both during construction and post-construction once the trench has been back-filled) may become prominent if it creates a linear feature that contrasts with the surrounding vegetation. This is especially true in arid areas where the vegetation will not recover as quickly as in areas that receive good rainfall.

A similar principle exists with respect to any access roads constructed in visible areas of the site. Roads are likely to be wider than cable trenches and thus could be even more greatly visible than the cable servitude. Cutting a 'terrace' into a steep side slope would increase the visibility and contrast the road against the surrounding vegetation.

Lastly, buildings placed in prominent positions such as on ridge tops may also break the natural skyline, drawing the attention of the viewer.

The visual impact of the associated infrastructure is generally not regarded to be a significant factor when compared to the visual impact associated with wind turbines. They would however, magnify the visual prominence of the development if located on ridge tops or flat sites in natural settings where there is limited tall wooded vegetation present to conceal the impact.

4 IMPACT ASSESSMENT

4.1 Receptor Impact Rating

In order to assess the impact of the proposed development on the sensitive / potentially sensitive receptor locations listed above, a matrix that takes into account a number of factors has been developed (**Table 5**), and is applied to each receptor location.

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

- Distance of a receptor location away from the proposed development (zones of visual impact)
- Primary focus / orientation of the receptor
- Presence of screening factors (topography, vegetation etc.)
- Visual character and sensitivity of the surrounding area
- 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 sensitive / potentially sensitive receptor location in this context. It should be noted that this rating matrix is a relatively simplified way to assign a likely representative visual impact, which allows a number of factors to be considered. Experiencing of visual impacts is however a complex and qualitative phenomenon, and thus difficult to accurately quantify. 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 of 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 2km of the proposed development. Beyond 8km, the visual impact would be virtually nil, as the development would appear to merge with the elements on the horizon. Any receptor location beyond this distance has therefore been assigned an overriding negligible 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 8km from the development. Where a receptor is located within more than one distance band, such as a receptor road, it is assigned the score according to the closest distance it will get from the proposed development i.e. the highest visual impact experienced.

The orientation of a receptor becomes important in many cases, as a receptor is typically oriented in a certain direction, e.g. with views towards a certain area from a highly frequented area like a porch or garden. The visual impact of a development could thus be potentially much greater if the development intruded into such a view, and thus the highest rating has been given to a situation where the development would cross directly across an 'arc of view / orientation' – i.e. the 180^{o} panorama in a certain direction. Where the receptor does not have a primary orientation, such as a residential community where the dwellings are focused in different directions, a medium rating has been specified.

The presence of screening factors is equally important in this context as the distance away from the development. Screening factors can be vegetation, buildings, as well as topography. For example, a grove of trees located between a receptor location and an object could completely shield the object from the receptor. Topography (relative elevation and aspect) plays a similar role as a receptor location in a deep or incised valley will have a very limited viewshed and may not be able to view an object that is in close proximity, but not in its viewshed. As such, the complete screening of the development has also been assigned an overriding negligible impact rating, as the development would not impose any impact on the receptor.

The visual character of the surrounding area and views is also considered in the matrix, as introducing a new development into a natural area may adversely affect or degrade scenic views experienced by receptors. Although pastoral' or rural landscapes often have a relative density of anthropogenic (human) infrastructure (e.g. fences, centre pivots, buildings such as barns and farmhouses), views of these landscape are often perceived as sensitive to visual impacts, particularly to visual impacts of more industrial or large-scale infrastructure. A moderate rating is thus assigned to the visual character of these views. Transformed industrial landscapes have been assigned a low impact rating as a new development is unlikely to be regarded as negative within this context.

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 with 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.

Through the matrix a score for each receptor location is calculated. The range in which the score falls, as listed in **Table 4** below, determines the visual impact rating for each receptor location.

Table 4: Ratings scores

Rating	**Overall Score**
High Visual Impact	13-15
Medium Visual Impact	9-12
Low Visual Impact	5-8
Negligible Visual Impact	(overriding factor)

An explanation of the matrix is provided in **Table 5** below.

Table 5: Visual assessment matrix used to rate the impact of the proposed development on sensitive / potentially sensitive receptors

	VISUAL IMPACT RATING			
VISUAL FACTOR	**HIGH**	**MEDIUM**	**LOW**	**<u>OVERRIDING FACTOR</u>: NEGLIGIBLE**
Distance of receptor away from proposed development	0 ≤ 2km **Score 3**	2km ≤ 5km **Score 2**	5km ≤ 8km **Score 1**	8km <
Primary focus / orientation of receptor	'Arc of view' directly towards the proposed development **Score 3**	'Arc of view' partially towards the proposed development / no primary orientation **Score 2**	'Arc of view' in opposite direction of the proposed development **Score 1**	
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 character and sensitivity of the area / surrounding views	**Scenic:** Highly natural; almost no visually 'degrading' factors, the area is valued for its scenic quality and is **highly sensitive to change** **Score 3**	**Rural / pastoral:** Mostly natural with typical rural infrastructure present, the area is valued for its uninhabited nature and is **potentially sensitive to change** **Score 2**	**Transformed:** Presence of industrial-type infrastructure (e.g. urban areas and outlying residential areas), not highly valued and **not sensitive to change** **Score 1**	
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**	

The tables below present the results of the visual impact matrix. The impact of the development on each sensitive and potentially sensitive receptor location has been determined based on the factors detailed above (**Table 5**). As previously mentioned, a few of the farmsteads / homesteads identified during the scoping phase were excluded as potentially sensitive receptor locations for the purposes of the EIA phase study as it was discovered during the time of the site visit that these were uninhabited and/or abandoned. No further assessment was undertaken from these abandoned farmsteads / homesteads as no individuals currently live in these farmsteads / homesteads and therefore no visual impact will be experienced from these locations.

Table 6: Visual impact of the proposed Aletta Wind Energy Facility at VR 1 – Boesmansberg Guesthouse

VISUAL FACTOR	RATING
Distance of receptor away from proposed development	**MEDIUM:** The farmstead / residential dwelling is located approximately 2.4km from the proposed Aletta Wind Energy Facility development area. **Score 2**
Primary focus / orientation of receptor	**MEDIUM:** The Boesmansberg Guest Farm consists of a number of buildings / houses which are used as accommodation for guests (**Figure 32**). As such, the Boesmansberg Guest farm has no primary orientation. **Score 2**
Presence of screening factors	**MEDIUM:** Screening factors in the form of tall trees and a localised hill / koppie to the east of the guesthouse are expected to partially obscure views towards the proposed development (**Figure 33**) and only some the turbines are likely to be visible. **Score 2**
Visual character and sensitivity of the area / surrounding views	**MEDIUM:** Views from the farmhouse are mostly natural with typical pastoral infrastructure and other anthropogenic elements present which include; garden vegetation, large trees, telephone poles and wire fences. **Score 2**
Visual Contrast	**HIGH:** The proposed wind turbines would contrast with the dominant natural / scenic character of the landscape. There are no tall linear or industrial elements in view from the farmhouse, except for telephone poles, and as such the tall wind turbines would contrast significantly with the elements in the surrounding landscape. **Score 3**
OVERALL IMPACT RATING	**MEDIUM** **Total score 11**

Figure 32: Typical views of the guesthouse buildings / facilities which can be found at the Boesmansberg Guest Farm (VR 1)

Figure 33: View of the tall trees and the localised hill / koppie found to the east of the Boesmansberg Guest Farm (VR 1). These screening factors are expected to partially obscure views towards the proposed Aletta Wind Energy Facility.

Figure 34: Typical view towards the Aletta Wind Energy Facility application site from the south-eastern side of the main guesthouse building / facility at the Boesmansberg Guest Farm (VR 1)

Table 7: Visual impact of the proposed wind energy facility at VR 2 – Nelspoortjie Karoo Guest Farm

VISUAL FACTOR	RATING
Distance of receptor away from proposed development	**LOW:** The Nelspoortjie Karoo Guest Farm is located approximately 6.8km from the proposed Aletta Wind Energy Facility development area. **Score 1**
Primary focus / orientation of receptor	**MEDIUM:** The Nelspoortjie Karoo Guest Farm consists of a number of buildings / houses which are used as accommodation for guests (**Figure 35**). As such, the Nelspoortjie Karoo Guest Farm has no primary orientation. **Score 2**
Presence of screening factors	**LOW:** There is a relatively large amount of tall trees and other types of vegetation surrounding this receptor location (**Figure 36**). Despite the presence of these vegetative screening factors, some of the wind turbines are still expected to be visible from the guesthouse. The screening factors are therefore expected to obscure most of the proposed development. **Score 1**
Visual character and sensitivity of the area / surrounding views	**MEDIUM:** Views from the farmstead / residential dwelling are largely natural / scenic with typical rural / pastoral infrastructure and other anthropogenic elements present which include telephone poles and wire farm fences.

	Score 2
Visual Contrast	**MEDIUM:** The proposed wind turbines would contrast moderately with the dominant natural landscape elements present. There are no tall linear elements in view from the farmstead / residential dwelling except for the telephone poles. **Score 2**
OVERALL IMPACT RATING	**LOW** **Total score 8**

Figure 35: Typical views of the guesthouse buildings / facilities found at the Nelspoortjie Karoo Guest Farm (VR 2).


Figure 36: Typical views towards the Aletta Wind Energy Facility application site from some of the guestroom buildings / facilities at the Nelspoortjie Karoo Guest Farm (VR 2). Note the presence of a significant amount of vegetative screening.

Table 8: Visual impact of the proposed wind energy facility at VR 4

VISUAL FACTOR	RATING
Distance of receptor away from proposed development	**LOW:** The farmstead / residential dwelling is located approximately 7.6km from the proposed Aletta Wind Energy Facility development area. **Score 1**
Primary focus / orientation of receptor	**HIGH:** The farmstead / residential dwelling is orientated to the north-east, directly towards the proposed Aletta Wind Energy Facility application site. **Score 3**
Presence of screening factors	**MEDIUM:** The most significant screening factors surrounding this farmstead / residential dwelling include tall trees around the farmstead / residential dwelling and slight undulations in the landscape to the east. The presence of these above-mentioned screening factors are therefore expected to partially obscure the proposed Aletta Wind Energy Facility development. **Score 2**
Visual character and sensitivity of the area / surrounding views	**MEDIUM:** Views from the farmhouse / residential dwelling are largely natural / scenic. In addition, typical rural / pastoral infrastructure and other anthropogenic elements are also present which include tall trees, farm fences, wind mills and telephone poles. It must also be noted that existing high voltage power lines are visible to the south-west of this farmstead / residential dwelling (**Figure 37**). **Score 2**
Visual Contrast	**MEDIUM:** The proposed wind turbines are expected to contrast with the dominant elements within the landscape. However, the presence of the wind mills, existing high voltage power lines and other linear infrastructure is expected to marginally lower the visual contrast of the proposed wind energy

	facility and therefore result in a moderate visual contrast. In addition, from this distance the turbines would appear to be relatively equal in size to the existing infrastructural form and begin to merge with the elements on the horizon. **Score 2**
OVERALL IMPACT RATING	**MEDIUM** **Total score 10**

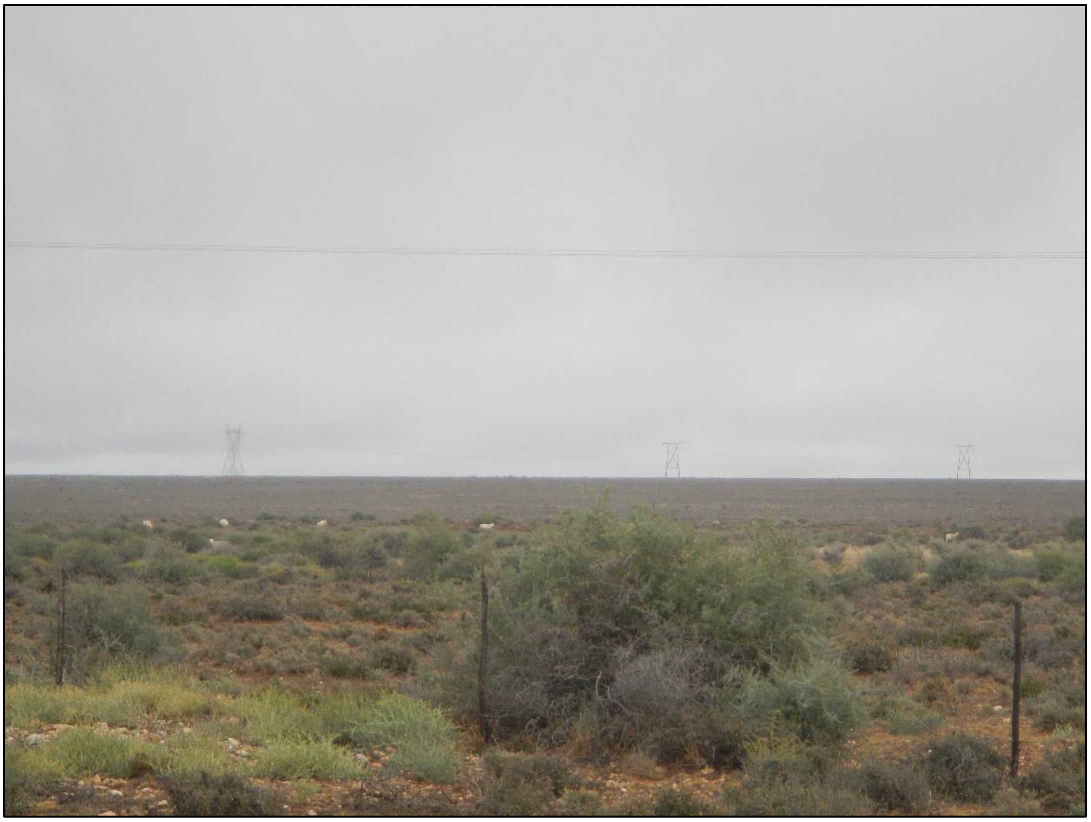

Figure 37: Typical view of the existing high voltage power lines that can be found to the south-west of the farmstead / residential dwelling at VR 4.


Figure 38: View of the farmhouse / residential dwelling at VR 4 as well as the typical view towards the proposed Aletta Wind Energy Facility application site from VR 4.

Table 9: Visual impact of the proposed wind energy facility at VR 5

VISUAL FACTOR	RATING
Distance of receptor away from proposed development	**MEDIUM:** The farmstead / residential dwelling is located approximately 3.2km from the proposed Aletta Wind Energy Facility development area. **Score 2**
Primary focus / orientation of receptor	**LOW:** The farmstead / residential dwelling is oriented to the east, in the opposite direction of the proposed Aletta Wind Energy Facility application site. **Score 1**
Presence of screening factors	**MEDIUM:** The screening factors surrounding the farmstead / residential dwelling are expected to partially obscure the proposed Aletta Wind Energy Facility. **Score 2**
Visual character and sensitivity of the area / surrounding views	**MEDIUM:** Views from the farmhouse / residential dwelling are largely natural with typical rural infrastructure present. Almost no visually degrading factors can be found within close proximity to this farmstead / residential dwelling and the area is valued for its scenic quality. In addition, views from the farmhouse at VR 5 have only been partially transformed due to pastoral practices and typical rural infrastructure. **Score 2**
Visual Contrast	**HIGH:** The presence of wind turbines would contrast with the pattern and form of the natural landscape elements, typical land use and/or human elements, as there are no tall linear or industrial elements in view from the farmhouse. **Score 3**
OVERALL IMPACT RATING	**MEDIUM** **Total score 10**

Due to access limitations during the time of the site visit, the impact assessment for VR 5 was done via desktop means and therefore photographs could not be provided. This farmstead / residential dwelling is however still considered to be a potentially sensitive visual receptor and was included as part of the impact assessment.

Table 10: Visual impact of the proposed wind energy facility at VR 8

VISUAL FACTOR	RATING
Distance of receptor away from proposed development	**N/A:** The farmstead / residential dwelling is located approximately 6.7km from the proposed Aletta Wind Energy Facility development area. The screening factors are however expected to completely block any views towards the proposed wind energy facility development.
Primary focus / orientation of receptor	**N/A:** The farmhouse is oriented to the north-east, in the opposite direction of the proposed Aletta Wind Energy Facility application site. The screening factors are however expected to completely block any views towards the proposed wind energy facility development.
Presence of screening factors	**NEGLIGIBLE:** The presence of topographical undulations to the south-west, as well as the tall trees and other vegetation surrounding the farmhouse / residential dwelling at VR 8 are expected to completely block any views towards the proposed Aletta Wind Energy Facility, i.e. the development is not within the viewshed. **Overriding factor**
Visual character and sensitivity of the area / surrounding views	**N/A:** Views from the farmhouse are largely natural /scenic with some typical rural / pastoral infrastructure present. Other anthropogenic elements which are present include wire farm fences, tall trees and telephone poles. The overall impact rating would however remain negligible due to the presence of screening factors that are expected to completely block any views towards the proposed wind energy facility development.
Visual Contrast	**N/A:** As mentioned above, the overall impact rating would remain negligible due to the presence of screening factors that are expected to completely block any views towards the proposed wind energy facility development.
OVERALL IMPACT RATING	**NEGLIGIBLE**

Figure 39: View of the farmstead / residential dwelling at VR 8 as well as the typical view towards the proposed Aletta Wind Energy Facility application site from VR 8.

Table 11: Visual impact of the proposed wind energy facility at VR 9

VISUAL FACTOR	RATING
Distance of receptor away from proposed development	**MEDIUM:** The farmstead / residential dwelling is located approximately 2.7km from the proposed Aletta Wind Energy Facility development area. **Score 2**
Primary focus / orientation of receptor	**LOW:** The farmstead / residential dwelling is orientated to the north-east, in the opposite direction of the proposed Aletta Wind Energy Facility application site. **Score 1**
Presence of screening factors	**LOW:** The presence of large trees and localised hills / koppies to the south-west of this farmstead / residential dwelling (**Figure 40**) are expected to obscure most views of the proposed Aletta Wind Energy Facility development. **Score 1**
Visual character and sensitivity of the area / surrounding views	**MEDIUM:** Views from this farmhouse are largely natural /scenic with some typical rural / pastoral infrastructure present. Existing power lines are however visible to the south-east of the farmstead / residential dwelling (**Figure 41**). In addition, other anthropogenic elements such as wind mills, wire farm fences, tall trees and telephone poles are also present. **Score 2**
Visual Contrast	**MEDIUM:** Despite the largely natural / scenic character of the surrounding environment and limited transformation within this part of the study area, the presence of vertical elements and tall electrical infrastructure (in the form of existing high voltage power lines) are expected to result in a moderate contrast with the proposed Aletta Wind Energy Facility. **Score 2**
OVERALL IMPACT RATING	**LOW** **Total score 8**

Figure 40: View of the localised hills / koppies found to the south-west of the farmstead / residential dwelling at VR 9. These localised hills koppies are expected to provide a significant amount of screening from the proposed Aletta Wind Energy Facility.

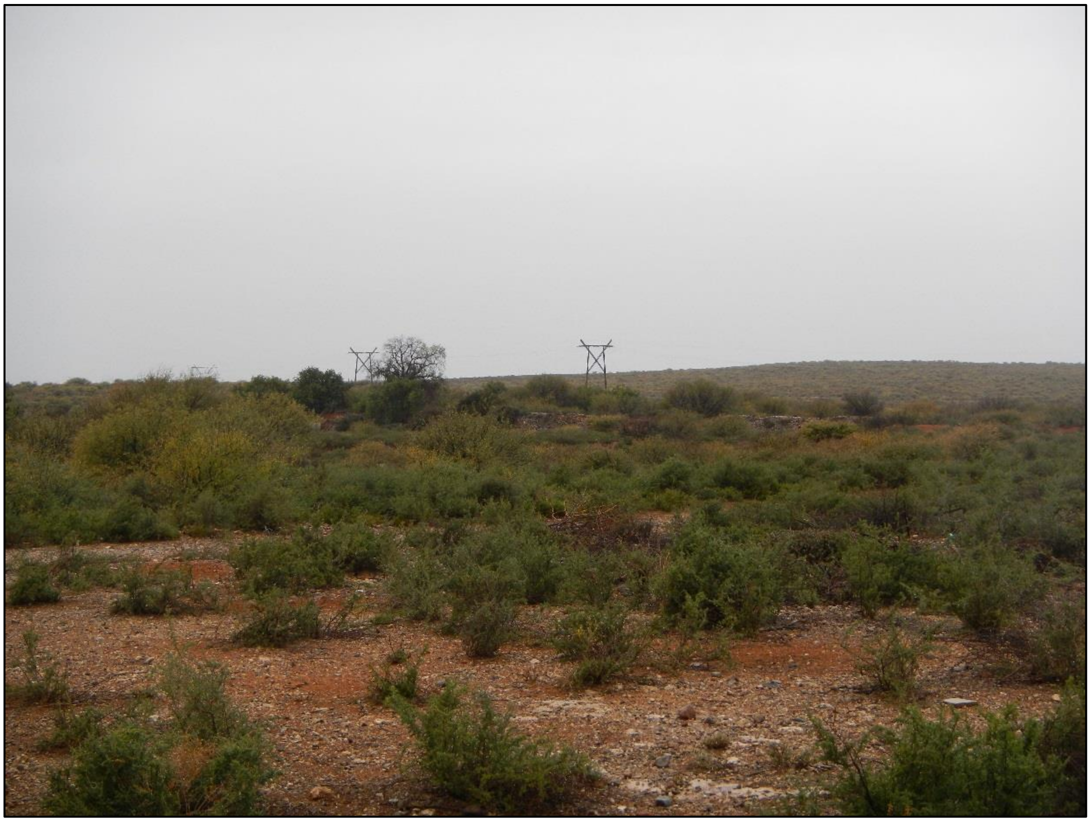

Figure 41: View of the existing power line which can be found to the south-east of the farmstead / residential dwelling at VR 9. This power line is expected to slightly and lessen the visual contrast of the proposed Aletta Wind Energy Facility.

Figure 42: View of the farmstead / residential dwelling at VR 9 as well as the typical view towards the proposed Aletta Wind Energy Facility application site from VR 9.

Table 12: Visual impact of the proposed wind energy facility at VR 11

VISUAL FACTOR	RATING
Distance of receptor away from proposed development	**LOW:** The farmstead / residential dwelling is located approximately 7.8km from the proposed Aletta Wind Energy Facility development area. **Score 1**
Primary focus / orientation of receptor	**LOW:** The farmstead / residential dwelling is orientated to the north-west, in the opposite direction of the proposed Aletta Wind Energy Facility application site. **Score 1**
Presence of screening factors	**MEDIUM:** A large amount of tall trees have been established around the farmstead / residential dwelling at VR 11. In addition, the surrounding area is characterised by slight undulations in the landscape. Despite the presence of tall trees and the slightly undulating terrain of the landscape, the above-mentioned screening factors are expected to only partially obscure views towards the proposed Aletta Wind Energy Facility development. **Score 2**
Visual character and sensitivity of the area / surrounding views	**MEDIUM:** Views from the farmhouse / residential dwelling are largely natural / scenic. In addition, typical rural / pastoral infrastructure and other anthropogenic elements are also present which include tall trees, farm fences, wind mills and telephone poles. Existing high voltage power lines are visible to the south-west of this farmstead / residential dwelling (**Figure 43**). **Score 2**
Visual Contrast	**MEDIUM:** The proposed wind turbines are expected to contrast with the dominant elements within the landscape. However, the presence of the existing high voltage power line and other vertical anthropogenic elements are expected to marginally lower the visual contrast of the proposed wind energy facility and therefore result in a moderate visual contrast. In addition, from this distance the turbines would appear to be relatively equal in size to the existing infrastructural form and begin to merge with the elements on the horizon. **Score 2**
OVERALL IMPACT RATING	**LOW** **Total score 8**

Figure 43: View of the existing high voltage power line which can be found to the south-west of the farmstead / residential dwelling at VR 11. This power line is expected to alter the natural / scenic character of the surrounding area slightly and lessen the visual contrast of the proposed Aletta Wind Energy Facility.

Figure 44: View of the farmstead / residential dwelling at VR 11 as well as the typical view towards the proposed Aletta Wind Energy Facility application site from VR 11.

Table 13: Visual impact of the proposed wind energy facility at VR 12

VISUAL FACTOR	RATING
Distance of receptor away from proposed development	**MEDIUM:** The farmstead / residential dwelling is located approximately 3.1km from the proposed Aletta Wind Energy Facility development area. **Score 2**
Primary focus / orientation of receptor	**LOW:** The farmstead / residential dwelling is orientated to the east, in the opposite direction of the proposed Aletta Wind Energy Facility application site. **Score 1**
Presence of screening factors	**LOW:** A large amount of tall trees have been established around the farmstead / residential dwelling at VR 12. In addition, the surrounding area is characterised by slight undulations in the landscape to the west of the farmstead / residential dwelling (**Figure 45**). As such, the above-mentioned screening factors are expected to obscure most views towards the proposed Aletta Wind Energy Facility development. **Score 1**
Visual character and sensitivity of the area / surrounding views	**MEDIUM:** Views from the farmhouse / residential dwelling are largely natural / scenic with typical rural / pastoral infrastructure and other anthropogenic elements also present which include tall trees, farm fences, wind mills and telephone poles. In addition, mountains can be found to the south-east of the farmstead / residential dwelling and are expected to add to the scenic character of the surrounding area (**Figure 46**). **Score 2**
Visual Contrast	**MEDIUM:** The proposed wind turbines would contrast with the dominant natural / scenic character of the landscape. There are no tall linear elements in view from the farmhouse, except for telephone poles, and as such the tall wind turbines would contrast moderately with the elements in the surrounding landscape. **Score 2**
OVERALL IMPACT RATING	**LOW** **Total score 8**

Figure 45: View of the undulating terrain to the west of the farmstead / residential dwelling at VR 12. These undulations in the landscape are expected to screen the farmstead / residential dwelling from the proposed Aletta Wind Energy Facility.

Figure 46: View of the localised mountains located to the south-east of the farmstead / residential dwelling at VR 12. These mountains are expected to add to the scenic character of the surrounding area.

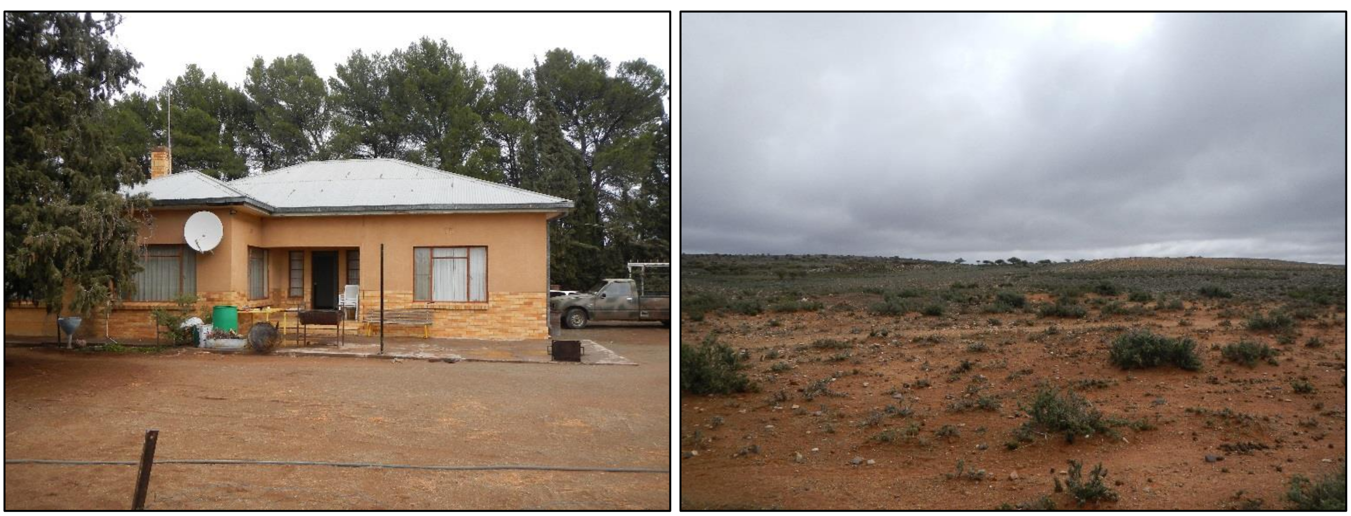

Figure 47: View of the farmstead / residential dwelling at VR 12 as well as the typical view towards the proposed Aletta Wind Energy Facility application site from VR 12.

Table 14: Visual impact of the proposed wind energy facility at VR 14

VISUAL FACTOR	RATING
Distance of receptor away from proposed development	**MEDIUM:** The farmstead is located within the proposed Aletta Wind Energy Facility application site. However, it is located approximately 2.9km from the proposed development area. **Score 2**
Primary focus / orientation of receptor	**HIGH:** The farmstead is orientated to the east, directly towards the proposed Aletta Wind Energy Facility development area. **Score 3**
Presence of screening factors	**HIGH:** This farmstead / residential dwelling has almost no large trees and other vegetation to provide screening. In addition, the surrounding landscape is largely flat. The generally flat landscape and lack of vegetative screening factors will therefore result in the proposed Aletta Wind energy Facility being highly visible. **Score 3**
Visual character and sensitivity of the area / surrounding views	**MEDIUM:** Views from this farmhouse are largely natural /scenic with some typical rural / pastoral infrastructure present. Other typical anthropogenic elements which are present near the farmhouse include wire farm fences, a man made dam and a wind mill. **Score 2**
Visual Contrast	**HIGH:** Due to the largely natural / scenic character of the surrounding environment and lack of vertical elements within the surrounding area, the wind turbines are expected to have a high contrast with the surrounding environment. **Score 3**
OVERALL IMPACT RATING	**HIGH** **Total score 13**

As previously mentioned, VR 14 is currently uninhabited and no one lives in this farmstead. During the site visit, it was discovered that VR 14 belongs to the occupant of VR 15 and that this dwelling is sometimes used as accommodation for individuals that have to undertake specific tasks (such as erecting fences) on the farm. The occupant of VR 15 has however indicated that this dwelling might be used as a home for a family member in the future and should therefore still be regarded as a potentially sensitive visual receptor. As such, VR 14 has been regarded as a potentially sensitive visual receptor for the purpose of this EIA phase study. VR 14 is however located within the proposed Aletta Wind Energy Facility application site. It is assumed that the owner of this dwelling would have a vested interest in the development and would therefore not perceive the proposed wind energy facility in a negative light.

Figure 48: View of the farmstead at VR 14 as well as the typical view towards the proposed Aletta Wind Energy Facility Development area from VR 14.

Table 15: Visual impact of the proposed wind energy facility at VR 15

VISUAL FACTOR	RATING
Distance of receptor away from proposed development	**HIGH:** The farmstead / residential dwelling is located within the proposed Aletta Wind Energy Facility development area. **Score 3**
Primary focus / orientation of receptor	**HIGH:** The farmstead / residential dwelling is orientated to the north-west, directly towards the proposed Aletta Wind Energy Facility development area. **Score 3**
Presence of screening factors	**HIGH:** The presence of relatively large trees and other surrounding vegetation is not expected to obscure views towards the proposed Aletta Wind Energy Facility development. In addition, the surrounding landscape is largely flat and this farmstead / residential dwelling is located within the proposed development area. As such, the proposed development is expected to be highly visible. **Score 3**
Visual character and sensitivity of the area / surrounding views	**MEDIUM:** Views from this farmhouse are largely natural /scenic with some typical rural / pastoral infrastructure present. Other typical anthropogenic elements present near the farmhouse include wire farm fences, tall trees, telephone poles and other farm buildings. **Score 2**
Visual Contrast	**HIGH:** Due to the largely natural / scenic character of the surrounding environment and presence of only a few vertical elements within the surrounding area, the wind turbines are expected to contrast significantly with the surrounding environment. **Score 3**
OVERALL IMPACT RATING	**HIGH** **Total score 14**

As previously mentioned, VR 15 is located within the proposed Aletta Wind Energy Facility development area. During the EIA phase fieldwork it was verified that the owner of VR 15 supports the proposed development. In addition, the occupant of this dwelling has a vested interest in the development and would therefore not perceive the proposed Aletta Wind Energy Facility in a negative light. Although the development is rated as having a high visual impact from this receptor location, the visual impact experienced by the occupant is likely to be less significant.

Figure 49: View of the farmstead / residential dwelling at VR 15 as well as the typical view towards the proposed Aletta Wind Energy Facility development area from VR 15.

Table 16: Visual impact of the proposed wind energy facility at VR 16

VISUAL FACTOR	RATING
Distance of receptor away from proposed development	**HIGH:** The farmstead / residential dwelling is located within the proposed Aletta Wind Energy Facility development area. **Score 3**
Primary focus / orientation of receptor	**HIGH:** The farmstead / residential dwelling is orientated to the east, directly towards the proposed Aletta Wind Energy Facility development area. **Score 3**
Presence of screening factors	**HIGH:** There are almost no vegetative screening factors surrounding this farmstead / residential dwelling apart from very few relatively tall trees. The surrounding landscape is also largely flat and offers limited screening. In addition, this farmstead / residential dwelling is located within the proposed wind energy facility development area. As such, the proposed Aletta Wind Energy Facility is expected to be highly visible. **Score 3**
Visual character and sensitivity of the area / surrounding views	**MEDIUM:** Views from this farmhouse are largely natural /scenic with some typical rural / pastoral infrastructure present. Other typical anthropogenic elements present near the farmhouse include wire farm fences, a few relatively tall trees, telephone poles other farm buildings.

	Score 2
Visual Contrast	**HIGH:** Due to the largely natural / scenic character of the surrounding environment and presence of only a few vertical elements within the surrounding area, the wind turbines are expected to contrast significantly with the surrounding environment. **Score 3**
OVERALL IMPACT RATING	**HIGH** **Total score 14**

As previously mentioned, VR 16 is currently uninhabited and no one lives in this dwelling. During the site visit, it was however discovered that VR 16 is currently being used as a holiday home by a family member of the occupant of VR 15. However, the occupant of VR 15 indicated that this family member has inherited this dwelling from their father and might choose to occupy it permanently in the future. VR 16 is however, located within the proposed Aletta Wind Energy Facility development area. It is assumed that the occupant of this dwelling would have a vested interest in the development and would therefore not perceive the proposed Aletta Wind Energy Facility in a negative light. Although the development is rated as having a high visual impact from this receptor location, the visual impact experienced by the occupant is likely to be less significant.

Figure 50: View of the farmstead / residential dwelling at VR 16 as well as the typical view towards the proposed Aletta Wind Energy Facility development area from VR 16.

A summary of the above impact ratings is provided in **Table 17** below.

Table 17: Visual Impact of the proposed 140MW Aletta Wind Energy Facility on the visually sensitive and potentially sensitive visual receptor locations identified within the study area- Summary and Results

RECEPTOR LOCATION	**IMPACT RATING**					
	Distance	**Orientation**	**Screening**	**Character / Sensitivity**	**Contrast**	**OVERALL**

						IMPACT RATING
VR 1	Medium	Medium	Medium	Medium	High	MEDIUM Score 11
VR 2	Low	Medium	Low	Medium	Medium	LOW Score 8
VR 4	Low	High	Medium	Medium	Medium	MEDIUM Score 10
VR 5	Medium	Low	Medium	Medium	High	MEDIUM Score 10
VR 8	N/A		Negligible	N/A		NEGLIGIBLE
VR 9	Medium	Low	Low	Medium	Medium	LOW Score 8
VR 11	Low	Low	Medium	Medium	Medium	LOW Score 8
VR 12	Medium	Low	Low	Medium	Medium	LOW Score 8
VR 14	Medium	High	High	Medium	High	**HIGH** **Score 13**
VR 15	High	High	Medium	Medium	High	HIGH Score 14
VR 16	High	High	High	Medium	High	**HIGH** **Score 14**

4.2 Visual Modelling

In order to provide an indication of what the proposed wind energy facility would look like from some of the potentially sensitive receptor locations currently in use, visual models were created to strengthen the findings of the receptor impact ratings. An indicative range of locations were selected for modelling purposes to provide an indication of the possible impacts from different locations within the study area. The models illustrate how views from the each vantage point will be transformed by the proposed development if the wind turbines are erected on the site as proposed.

As mentioned above, the following assumptions and limitations are of relevance for the visual models:

- The visual models represent a visual environment that assumes all vegetative clearing will be restored to its current state after the construction phase. This is however, is an improbable scenario as some trees and shrubs may be removed which may reduce the accuracy of the models generated.

- At the time of this study the proposed project was still in its early planning stages. Therefore, the layout plans of the turbines, as provided by BioTherm may change and all infrastructure associated with the facility has been excluded from the models.

4.2.1 *Vantage Point 1 - View toward the proposed Aletta Wind Energy Facility development area from the Nelspoortjie Karoo Guest Farm (VR 2)*

Figure 51: Existing view toward the proposed Aletta Wind Energy Facility development area from the Nelspoortjie Karoo Guest Farm (VR 2)

Figure 52: Visually modelled post-construction view toward the proposed Aletta Wind Energy Facility development area from the Nelspoortjie Karoo Guest Farm

As indicated in **Figure 52** above, vegetative screening factors surrounding this guesthouse are expected to obscure most views toward the proposed development, however some wind turbines are still expected to be visible. The visible wind turbines would contrast moderately with the dominant natural landscape elements as there are no tall linear elements in view from the guesthouse except for telephone and fence poles.

4.2.2 *Vantage Point 2 – View toward the proposed Aletta Wind Energy Facility development area from the Boesmansberg Guest Farm (VR 1)*

Figure 53: Existing view toward the proposed Aletta Wind Energy Facility development area from the Boesmansberg Guest Farm (VR 1)

Figure 54: Visually modelled post-construction view toward the proposed Aletta Wind Energy Facility development area from the Boesmansberg Guest Farm (VR 1)

As indicated in **Figure 54** above, the localised hill / koppie found to the east of this guesthouse is expected to provide some form of screening from the proposed wind energy facility development. The visible wind turbines would contrast highly with the dominant natural landscape elements as there are no tall linear elements in view from the guesthouse.

4.2.3 *Vantage Point 3 – View toward the proposed Aletta Wind Energy Facility development area from the farmstead / residential dwelling at VR 14*

As indicated in **Figure 56** to **Figure 60** below, very few screening factors are present in the surrounding area. In addition, the surrounding landscape is largely flat and offers very little screening. It must also be noted that this farmstead / residential dwelling is located within the proposed Aletta Wind Energy Facility application site and will therefore be located within close proximity to the wind turbines. The visible wind turbines would contrast highly with the dominant natural landscape elements as there are no tall linear elements in view from the farmhouse except for a wind mill and fence poles.

Figure 55: Existing view to the east (E) from the farmstead at VR 14, toward the proposed Aletta Wind Energy Facility development area

Figure 56: Visually modelled post-construction view to the east (E) from the farmstead at VR 14, toward the proposed Aletta Wind Energy Facility development area

Figure 57: Existing view to the north-east (NE) from the farmstead at VR 14, toward the proposed Aletta Wind Energy Facility development area

Figure 58: Visually modelled post-construction view to the north-east (NE) from the farmstead at VR 14, toward the proposed Aletta Wind Energy Facility development area

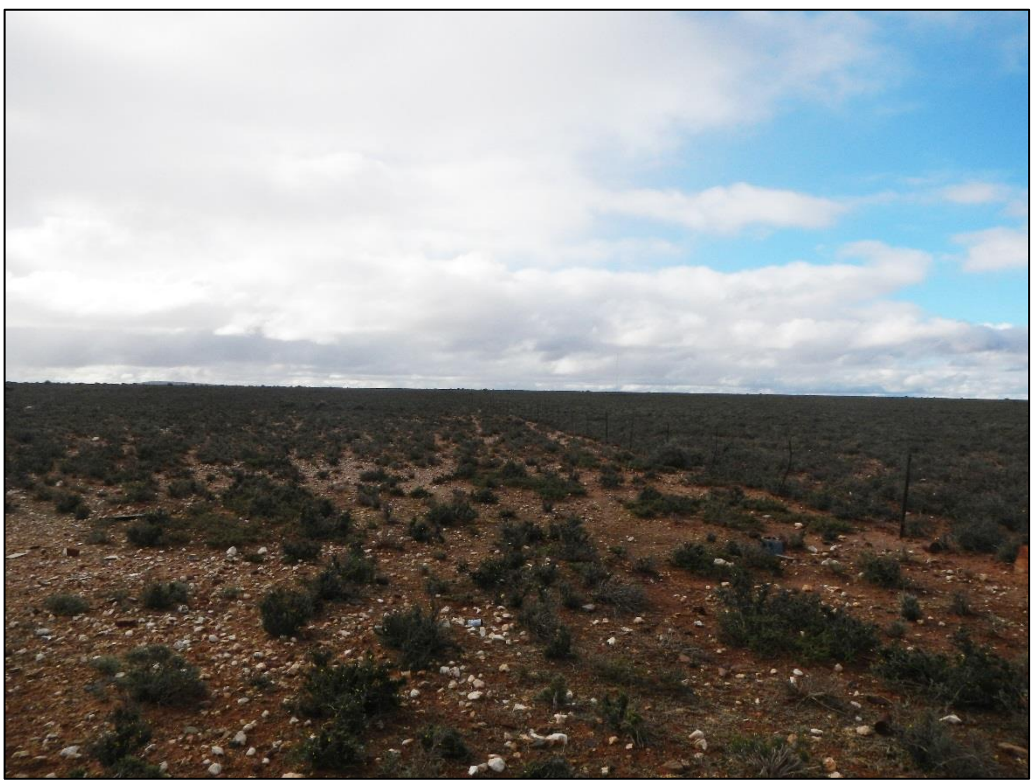

Figure 59: Existing view to the north north-east (NNE) from the farmstead at VR 14, toward the proposed Aletta Wind Energy Facility development area

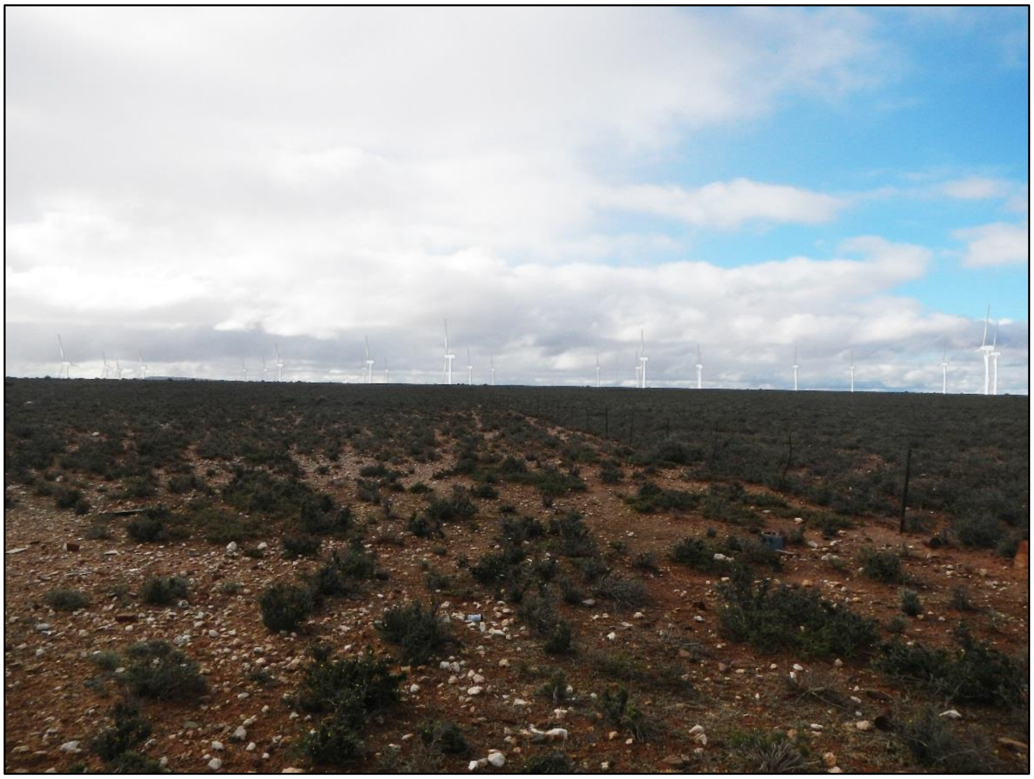

Figure 60: Visually modelled post-construction view to the north north-east (NNE) from the farmstead at VR 14, toward the proposed Aletta Wind Energy Facility development area.

4.3 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 have a significant impact on the nightscape. In contrast, introducing 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 wind energy facility at night.

The area surrounding the proposed development site is largely uninhabited and as a result, very few light sources are present. The town of Prieska is too far away to have an impact on the night scene. The town of Copperton is expected to have a limited impact on the night scene, as it is very small and is located more than 5km away. At night, the study area is characterised by a picturesque dark starry sky and the visual character of the night environment is considered to be mostly ‘unpolluted’ and pristine. The most prominent light sources within the study area at night include isolated lighting from the surrounding farmsteads, as well as transient light from the passing cars travelling along the R357 and R386 roads.

Operational and security lighting at night will be required for the proposed wind energy facility. In addition, a permanent aviation light or red aircraft warning light will be placed on the top of each wind turbine, which will create a network of red lights in the dark night-time sky. The type and intensity of lighting required was unknown at the time of writing this report and therefore the potential impact of the development at night has been discussed based on the general effect that additional light sources will have on the ambiance of the nightscape.

Although the area is not generally renowned as a tourist destination, the natural dark character of the nightscape will be sensitive to the impact of additional lighting at night. The operational and security lighting required for the proposed wind energy facility development is likely to intrude on the nightscape and create glare, which will contrast with the extremely dark backdrop of the surrounding area. In addition, the red warning lights may be particularly noticeable as their colour will differ from the few lights typically found within the environment and the flashing will draw attention to them. These lights will however have a low intensity and will create less contrast than white lights typically would (Vissering, 2011).

4.4 Visual Impacts of Associated Infrastructure

4.4.1 *Access roads*

As previously mentioned, the R357 road traverses the proposed wind energy facility application site and provides access to the site. This road is a single carriage way tar road and is in relatively good condition. This road is primarily used by local farmers to gain access to surrounding farms / properties as well as when travelling to and from the town of Prieksa to the north-east. It must however be noted that a section of the R357 to the south-west of the application site becomes a gravel road and provides access to the existing Kronos Substation. In addition, the R386 gravel road can also be found to the east of the proposed wind energy facility application site. Similarly to the R357, this gravel road is also primarily used by local farmers to gain access to surrounding farms / properties as well as when travelling to and from the town of Prieksa to the north-east. These roads are therefore not regarded as visually sensitive as they do not form part of any scenic tourist routes, and are not specifically valued or utilised for their scenic or tourism potential. It should be noted that existing high voltage power lines traverse certain sections of the R357 and R386 roads.

It is assumed that a network of gravel access roads will most likely be constructed to provide access to the wind turbines. These will most likely be positioned to follow the existing internal roads as far as possible. Where this is not possible or where no existing roads are available, new access roads will probably be constructed.

Roads are typically only associated with a visual impact if they traverse sloping ground on an aspect that is visible to the surrounding area. Considering that the access roads may be located on some undulating and hilly terrain within the application site, it is likely that the visual impact associated with constructing and upgrading these roads could impact on the surrounding area. As such, it is highly recommended that where possible, all roads should avoid steeper slopes in order to preserve the natural visual integrity of the landscape. In addition, if these roads are not maintained correctly during the construction phase, construction vehicles travelling along the gravel access roads could expose surrounding farmstead to dust plumes.

4.4.2 *Underground cabling*

As with the internal gravel access roads, the underground cabling (if required) will most likely be positioned to follow the existing internal access roads. The visual impact of this cabling would be very similar to roads in that the 'scar' associated with the cable could create a visual contrast with the largely natural vegetation on the site. As with the access roads, it is recommended that where possible, all cables should avoid steeper slopes in order to preserve the natural visual integrity of the landscape. It is further recommended that all reinstated cable trenches should be re-vegetated with the same vegetation that existing prior to the cable being laid, in order to reduce the potential for creating unnatural linear features in the environment. Local nurseries may need to be commissioned to cultivate the vegetation removed. In addition, erosion control measures should be employed to prevent the scarring from worsening with time.

4.4.3 *Power lines*

As previously mentioned, the wind turbines will be connected to the proposed Aletta IPP Substation using buried medium voltage cables. However, overhead power lines may also be used where a technical assessment of the proposed design suggests that they will be more appropriate, such as over rivers and gullies. As previously mentioned, power lines consist of a series of tall towers which make them highly visible. Power lines are not features of the natural environment, but are representative of anthropogenic transformation. Thus when placed in largely natural landscapes, they will be perceived to be highly incongruous in this setting. Conversely, the presence of other anthropogenic elements associated with the built environment, especially other power lines, may result in the visual environment being considered to be 'degraded' and thus the introduction of a new power line into this setting may be less of a visual impact than if there was no existing built infrastructure visible. It is important to note that several high voltage power lines are located within close proximity to the proposed wind energy facility application site and are expected to lessen the visual contrast associated with the introduction of a new power line (**Figure 61**).

Figure 61: View of the existing high voltage power lines that can be found within close proximity to the proposed Aletta Wind Energy Facility application site.

Power lines are anthropogenic elements that are typically found in the landscape, both in urban or industrial and in more natural rural settings. The visual impact of a power line would largely be related to the physical characteristics of the area, land use and the spatial distribution of potential receptors. These factors are also important factors used to determine whether a power line would be congruent within an environment as the degree of visual contrast is generally based on the land use, settlement density, visual character and presence of existing power lines. When combining this with the distribution and likely value judgements of visual receptors, the visual impact of the proposed power line can be determined. In areas, where the power line would contrast with the surrounding area it may change the visual character of the landscape and be perceived negatively by visual receptors.

As mentioned above, the presence of other linear structures such as roads, railways and especially other power lines would influence the perception of whether a power line is a visual impact. Where existing power lines are present the visual environment would already be visually ‘degraded’ and thus the introduction of a new power line in this setting may be considered to be less of a visual impact than if no existing built infrastructure were visible.

4.4.4 *Substation*

An on-site substation (extent unknown at this stage) will most likely be constructed to supply the generated electricity to the national grid. In isolation, the on-site substation may be considered to be visually intrusive; however, it must be assumed that if the substation would be built to serve the needs of the power generated from the wind energy facility. Thus the on-site substation would only be constructed if the wind energy facility was developed as well. The substation would likely form part of the wind energy facility complex, as viewed from the surrounding farmsteads. Views of the substation would therefore be dwarfed by the large number of turbines that would be visible. As such, the substation is not expected to be associated with a significant visual impact, or even a measurable cumulative impact.

4.5 Cumulative Impacts

Although it is important to assess the visual impacts of the proposed wind energy facility, it is equally important to assess the cumulative visual impact that could materialise in the area should other renewable energy facilities (both wind and PV plants) be granted environmental authorisation, be issued with a license and are constructed. Cumulative impacts are the impacts, which combine from different developments / facilities and result in significant impacts that may be larger than the sum of all the impacts combined.

The renewable energy developments that are being proposed in the surrounding area, are specified in **Table 18** and **Figure 62** below.

Table 18: Renewable energy developments planned in close proximity to the proposed 140MW Aletta Wind Energy Facility

Proposed Development	DEA Reference Number	Current Status of EIA	Proponent	Capacity	Farm Details
The Badudex Solar Project	14/12/16/3/3/2/546	EIA underway	Budadex (Pty) Ltd	74 MW	Portion 1 of the Farm Volgelstruis Bult No 104
The Moiblox Solar Project	14/12/16/3/3/2/547	EIA underway	Moiblox (Pty) Ltd	75 MW	Remainder of the Farm Bosjesmansberg No. 67
Garob Wind Energy Facility Project	14/12/16/3/3/2/279	Awarded Preferred Bidder Status.	Garob Wind Farm (Pty) Ltd	140 MW	Portion 5 of the Farm Nelspoortje No. 103
Copperton Wind Energy Facility	12/12/20/2099	Awarded Preferred Bidder Status.	Plan 8 Infinite Energy (Pty) Ltd	140 MW	▪ Portion 4 of the Farm Nelspoortje No. 103; and ▪ Portion 7 of the Farm Nelspoortje No. 103.
Humansrus Solar PV Energy Facility 1 and 2	14/12/16/3/3/2/707 14/12/16/3/3/2/708	Authorised	Humansrus Solar PV Energy Facility 1 (Pty) Ltd	75 MW	Remainder the Farm Humansrus No. 147
Humansrus Solar PV Energy Facility 2 and 3	14/12/16/3/3/2/888 14/12/16/3/3/2/887	EIA underway	Humansrus Solar PV Energy Facility 3/4 (Pty) Ltd	75 MW	Remainder the Farm Humansrus No. 147
Mierdam Solar Photovoltaic Facility	12/12/20/2320/2	Authorised	South Africa Mainstream Renewable Power Mierdam (Pty) Ltd	75 MW	Portion 1 of the Farm Kaffirs Kolk No. 118
Platsjambok East and West Solar Photovoltaic Facility	12/12/20/2320/4 12/12/20/2320/5	Authorised	South Africa Mainstream Renewable Power Mierdam (Pty) Ltd	75 MW	Remainder of the Farm Platsjambok 102

Proposed Development	DEA Reference Number	Current Status of EIA	Proponent	Capacity	Farm Details
Helena Solar 1, 2, and 3 PV energy facility	14/12/16/3/3/2/765 14/12/16/3/3/2/766 14/12/16/3/3/2/767	EIA underway	BioTherm Energy (Pty) Ltd	75 MW	Portion 3 of the Farm Klipgats Pan No. 117
Renewable Energy Farm near Prieska	14/12/16/3/3/2/608 14/12/16/3/3/2/609	EIA underway	NK Energie (Pty) Ltd	UNKNOWN	▪ Portion 3 of the Farm Hedley Plains No. 64; and ▪ Portion 5 of the Farm Doonies Pan No. 106
Photovoltaic Power Generation Facility near Prieska	12/12/20/1722	Awarded Preferred Bidder Status in REIPPP Window 1.	Mulilo Renewable Energy Solar PV Prieska (RF) (Pty) Ltd	19.9 MW	Portion 1 of the Farm Volgelstruis Bult No 104
PV Energy Plant near Copperton	12/12/20/2502	Authorised	Mulilo Renewable Energy (Pty) Ltd	100 MW	Portion 1 of the Farm Volgelstruis Bult No 104
Mulilo Sonnedix Prieska PV	12/12/20/2503	Awarded Preferred Bidder Status in REIPPP Window 3. Currently being constructed.	Mulilo Sonnedix Solar Enterprises (Pty) Ltd	75 MW	Remainder of the Farm Hoekplaas No. 146
Mulilo Prieska PV	12/12/20/2501	Awarded Preferred Bidder Status in REIPPP Window 3. Currently being constructed.	Mulilo Prieska PV (Pty) Ltd	75 MW	Portion 4 of the Farm Klipgats Pan No. 117
PV 2, PV 3, PV 4, PV 5 and PV 7 Energy	14/12/16/3/3/2/486 14/12/16/3/3/2/487	EIA underway	Mulilo Renewable Energy (Pty) Ltd	75 MW	Portion 4 of the Farm Klipgats Pan No. 117

Proposed Development	DEA Reference Number	Current Status of EIA	Proponent	Capacity	Farm Details
Plants on the Farm Klipgats Pan	14/12/16/3/3/2/488 14/12/16/3/3/2/489 14/12/16/3/3/2/491				
PV 2, PV 3, PV 4, PV 6, PV 7, PV 11 and PV 12 Solar Energy Plants on the Farm Hoekplaas	14/12/16/3/3/2/493 14/12/16/3/3/2/494 14/12/16/3/3/2/495 12/12/16/3/3/2/497 14/12/16/3/3/2/498 14/12/16/3/3/2/502 14/12/16/3/3/2/503	EIA underway	Mulilo Renewable Energy (Pty) Ltd	75 MW	Remainder of the Farm Hoekplaas No. 146

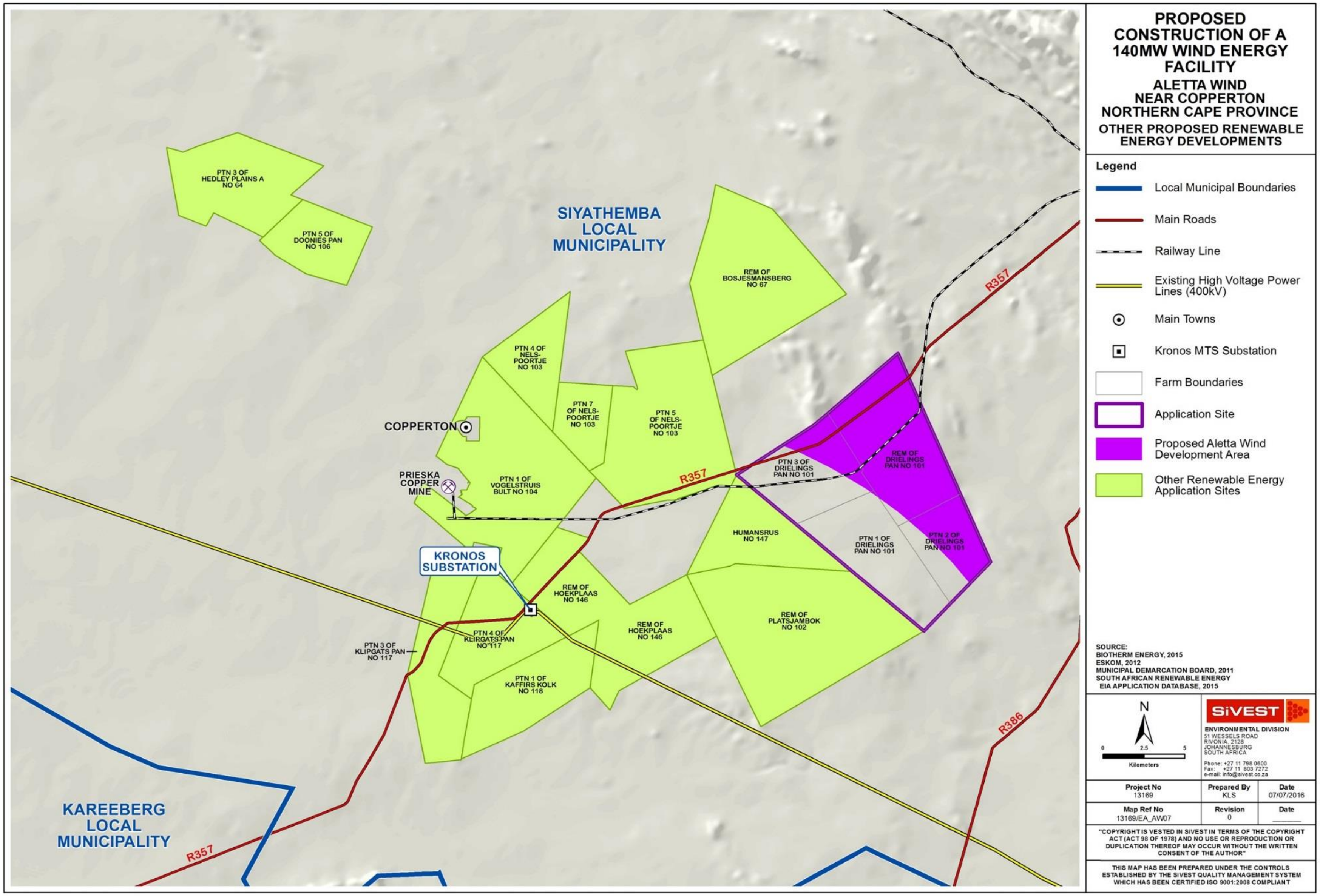

Figure 62: Location of the renewable energy developments planned within close proximity to the proposed 140MW Aletta Wind Energy Facility

These renewable energy developments and their potential for large scale visual impacts could significantly alter the sense of place and visual character within the study area, if constructed. The cumulative visual impact experienced from each potentially sensitive visual receptor location will depend on the number of proposed renewable energy developments within viewing distance. As mentioned above, the height of the development in combination with distance are critical factors when assessing visual impacts. As such, the proposed wind energy facilities are unlikely to be visible from beyond 8km, and from this distance the degree of visual impact would be considered to be insignificant. The proposed solar energy facilities are unlikely to be visible from beyond 5km, and from this distance the degree of visual impact would be considered to be insignificant.

The number of proposed developments that each receptor would be visually exposed to (i.e. the cumulative impact experienced at each site) is indicated in **Table 19** below. It should be noted that the impact at each receptor location is indicative of the 'worst case' scenario which assumes that all of the proposed facilities would be developed.

It should be noted that no layout information could be sourced for each proposed renewable energy facility during the time of this study. The distance of the potentially sensitive receptor locations from the actual layout could therefore not be utilised to determine whether the receptor is likely to be visually exposed to the development. As such, the distance from the farm on which each development is proposed was used to calculate the cumulative visual impact.

Other factors affecting visibility, such as localised screening from trees or topographical undulations have not been factored into the cumulative impact assessment. Instead the assessment should be seen as a representation of the number of proposed renewable energy facilities likely to be visible from each potentially sensitive receptor location, if they were all constructed.

Key

Likely to be visually exposed to the proposed development (within viewing distance)
Limited visual exposure to the proposed development (not within viewing distance)

Table 19: Cumulative visual impact from the sensitive and/or potentially sensitive receptor locations identified within the study area

PROPOSED RENEWABLE ENERGY FACILITY	DEVELOPER	SENSITIVE AND/OR POTENTIALLY SENSITIVE VISUAL RECEPTOR LOCATION										
		VR 1	VR 2	VR 4	VR 5	VR 8	VR 9	VR 11	VR 12	VR 14	VR 15	VR 16
Badudex Solar Project	Budadex (Pty) Ltd											
Moiblox Solar Project	Moiblox (Pty) Ltd	√					√					
Garob Wind Energy Facility Project	Garob Wind Farm (Pty) Ltd	√	√	√				√		√	√	√
Copperton Wind Energy Facility	Plan 8 Infinite Energy (Pty) Ltd	√	√									
Humansrus Solar PV Energy Facility 1 and 2	Humansrus Solar PV Energy Facility 1 (Pty) Ltd	√	√	√				√		√	√	√
Humansrus Solar PV Energy Facility 2 and 3	Humansrus Solar PV Energy Facility 3/4 (Pty) Ltd	√	√	√				√		√	√	√
Mierdam Solar Photovoltaic Facility	South Africa Mainstream Renewable Power Mierdam (Pty) Ltd											

Platsjambok East and West Solar Photovoltaic Facility	South Africa Mainstream Renewable Power Mierdam (Pty) Ltd		√	√				√		√		
Helena Solar 1, 2, and 3 PV energy facility	BioTherm Energy (Pty) Ltd											
Renewable Energy Farm near Prieska	NK Energie (Pty) Ltd											
Photovoltaic Power Generation Facility near Prieska	Mulilo Renewable Energy Solar PV Prieska (RF) (Pty) Ltd		√									
PV Energy Plant near Copperton	Mulilo Renewable Energy (Pty) Ltd		√									
Mulilo Sonnedix Prieska PV	Mulilo Sonnedix Solar Enterprises (Pty) Ltd		√	√				√				
Mulilo Prieska PV	Mulilo Prieska PV (Pty) Ltd											
PV 2, PV 3, PV 4, PV 5 and PV 7 Energy	Mulilo Renewable Energy (Pty) Ltd											

Plants on the Farm Klipgats Pan												
PV 2, PV 3, PV 4, PV 6, PV 7, PV 11 and PV 12 Solar Energy Plants on the Farm Hoekplaas	Mulilo Renewable Energy (Pty) Ltd		√	√				√				

As indicated in the table above, the greatest cumulative impact will be experienced from one (1) of the sensitive visual receptor locations, namely VR 2 - the Nelspoortjie Karoo Guest Farm. This is due to the fact that it could potentially be visually exposed to nine (9) of the proposed renewable energy developments (both wind and solar), in addition to the proposed 140MW Aletta Wind Energy Facility, should they all be constructed. In addition, the other sensitive receptor location, namely VR 1 - the Boesmansberg Guest Farm, is expected to be visually exposed to five (5) of the proposed renewable energy developments should they all be constructed. The next highest cumulative impacts will be experienced from VR 4 and VR 11, as these farmsteads / residential dwellings are expected to potentially be visually exposed to six (6) of the other renewable energy developments proposed nearby. It should also be noted that VR 5, VR 8 and VR 12 are not expected to be visually exposed to any of the other renewable energy developments proposed nearby should they all be constructed.

It should be noted that a literature review of other visual impact assessments / studies on the neighbouring adjacent properties was undertaken to ascertain any additional cumulative impacts that should be taken into consideration. Some of the project sites are at a very advanced stage, and the initial studies were undertaken in 2012 and are therefore no longer publically available. The information (including visual impact specialist studies, EIA / Scoping and EMPr Reports) that could be obtained for the surrounding proposed renewable energy sites that were taken into account are shown in **Table 20** below.

Table 20: Literature Review of Visual Impacts for Surrounding Renewable Energy Developments

Project	Relevant Impacts to be Taken into Consideration from a Visual Perspective	Proposed Mitigation Measures	Impacts Significance Rating after Mitigation
Mulilo Sonnedix Prieska PV	The potential construction phase visual impact is considered to be of medium intensity, site specific in extent and short term and therefore of low (-) significance, without mitigation. With the implementation of mitigation measures this would reduce to very low (-) significance. No difference in impact significance would result from the proposed alternatives.	▪ The following mitigation measures are recommended: - Roads and hard-standings would be constructed as part of the works; - The first 50-100 mm of naturally occurring substrate should be retained and then spread over finished areas; - All excess material shall be removed off-site, and the ground shall be returned to original	▪ Very low negative; ▪ The cumulative impact is assessed as medium negative.

		levels/gradients as far as possible; - New structures should be placed where they are least visible to the greatest numbers of people, in places where the topography can offer shielding, where possible; - Visibility of buildings and the local sub-station should be reduced by cladding the buildings in non-reflective colours and materials that will blend in with natural environment. E.g. cladding with local stone or plaster and paint with earthy tones for paint colours, roofs should be grey and non-reflective and doors and window frames should reference either the roof or wall colours; - Finishing materials of the infrastructure (including support structures) should be of colours that are non-reflective and in dark matte colours such as dark grey or charcoal; and - Information on the project should be provided to local people, such as through a poster at the entrance to the site.	

		- Minimise the construction period, where possible; - Access road are to be kept tidy, and measures shall be taken to minimise dust from construction traffic on gravel roads; - Top soil should be removed, conserved and used for rehabilitation; - Site offices, if required, should be limited to single storey and they should be sited carefully using temporary screen fencing to screen from the wider landscape; and - All site operatives should receive training in awareness of issues such as the use of hazardous chemical, proper disposal of waste, etc.	
Garob Wind Energy Facility Project	▪ Due to the low number of potentially sensitive visual receptors in the study area, the potential visual impact is expected to be of low significance. The proposed facility is therefore considered to be acceptable from a visual perspective ▪ The following visual impacts were identified: 1) Visual Impact on users of arterial and secondary	▪ Turbines located within 480m of any inhabited settlement, homestead or public road should be relocated to beyond this distance in order to negate the potential impact of shadow flicker; ▪ A lighting engineer should be consulted to assist in the planning and placement of light fixtures for the turbines and the ancillary	1. N/A; 2. N/A; 3. N/A; 4. N/A; 5. Low; 6. N/A; 7. Low; 8. Low; and 9. N/A.

	roads in close proximity to the proposed facility; 2) Visual impact on residents of homesteads and settlements in close proximity to the proposed facility; 3) Visual impact on sensitive visual receptors within the region; 4) Visual Impact on the town of Copperton; 5) Visual impact of on-site ancillary infrastructure on sensitive visual receptors in close proximity to the proposed facility; 6) Visual impact of shadow flicker on sensitive visual receptors in close proximity to the proposed facility; 7) Visual impact of lighting at night on sensitive visual receptors in close proximity to the proposed facility; 8) Visual impact of construction on sensitive visual receptors in close proximity to the proposed facility; and 9) Visual impact of the proposed facility on the visual quality of the landscape and sense of place of the region.	infrastructure in order to reduce visual impacts associated with glare and light trespass ▪ No mitigation of impacts 1,2,3,4 and 9 is possible, but measures have been recommended as best practice; ▪ Proposed Mitigation / Management Measures include the following: **<u>Planning</u>:** - Plan ancillary infrastructure in such a way and in such a location that clearing of vegetation is minimised. Consolidate existing infrastructure as far as possible, and make use of already disturbed areas rather than pristine sites where possible. - Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint. - Limit aircraft warning lights to the turbines on the perimeter, thereby reducing the overall requirement. - Shield the sources of light by physical barriers (walls, vegetation, or the structure itself). - Limit mounting heights of lighting fixtures, or	

		alternatively use foot-lights or bollard level lights. - Make use of minimum lumen or wattage in fixtures. - Make use of down-lighters, or shield fixtures. - Make use of Low Pressure Sodium lighting or other types of low impact lighting. - Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes. **<u>Construction:</u>** - Rehabilitate all of the construction areas. - Ensure that vegetation is not cleared unnecessarily to make way for access roads and ancillary buildings. - Ensure that vegetation is not unnecessarily removed during the construction period. - Reduce the construction period through careful planning and productive implementation of resources. - Plan the placement of the lay-down areas and temporary construction equipment camps in	

		order to minimize vegetation clearing (i.e. in already disturbed areas) wherever possible. - Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads. - Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities. - Reduce and control construction dust using approved dust suppression techniques as and when required (i.e. when dust becomes apparent). - Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts. - Rehabilitate all disturbed areas immediately after the completion of construction works. **<u>Operations</u>**: - Maintain the general appearance of the facility as a whole.	

		- Maintenance of roads to avoid erosion and suppress dust. - Limit aircraft warning lights to the turbines on the perimeter, thereby reducing the overall requirement. - Shield the sources of light by physical barriers (walls, vegetation, or the structure itself). - Limit mounting heights of lighting fixtures, or alternatively use foot-lights or bollard level lights. - Make use of minimum lumen or wattage in fixtures. - Make use of down-lighters, or shield fixtures. - Make use of Low Pressure Sodium lighting or other types of low impact lighting. - Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes. **<u>Decommissioning</u>**: - Remove infrastructure not required for the post-decommissioning of the site - Rehabilitate all areas. Consult an ecologist	

		regarding rehabilitation specifications - Monitor rehabilitated areas post-decommissioning and implement remedial actions.	
Humansrus Solar PV Energy Facility 2 and 3	▪ The following visual impacts could take place during the life time of the proposed PV project: **<u>Construction</u>** ○ Loss of site landscape character due to the removal of vegetation and the construction of the PV structures and associated infrastructure. ○ Wind-blown dust due to the removal of large areas of vegetation. ○ Possible soil erosion from temporary roads crossing drainage lines. ○ Windblown litter from the laydown and construction sites. **<u>Operation</u>** ○ Light spillage making a glow effect that would be clearly noticeable to the surrounding dark sky night landscapes. ○ Massing effect on the landscape from a large-scale modification. ○ On-going soil erosion.	▪ The laydown area should be sited away from the R357 road behind the disused railway line embankment, and preferably not located the more prominent ground to the south. ▪ Strict access control to a single track along the route making use of existing farm tracks for access from the road where possible. ▪ To assist in reducing the massing and crowding effects of the proposed PV structures the following is recommended: - A 75m No-go buffer from the R357 and Copperton roads should be maintained. - To reduce visual intrusion from the possible multiple power lines linking up to different proposed PV projects in the vicinity, it is recommended that the power lines as much as possible follow	▪ **<u>Preferred PV Option:</u>** - The Visual Impact Significance of the PV system and buildings is rated Medium to low for construction and low for operation phases; - If effective and integrated planning is undertaken, the cumulative visual significance has the potential to become medium positive; ▪ **<u>Alternative PV Option</u>**: - The Visual Impact Significance of both tracking and dual axis tracking PV system impacts was rated medium to low after mitigation; - Closure phase can be reduce to very low should the site be successfully rehabilitated; - With effective and integrated planning, the cumulative visual significance has the potential to become medium positive with mitigation;

	- On-going windblown dust. - Sunlight glint off PV structures. **<u>Decommissioning</u>** - Movement of vehicles and associated dust. - Wind-blown dust from the disturbance of cover vegetation / gravel. **<u>Cumulative</u>** - A long-term change in land use setting a precedent for other similar type of solar and wind energy projects. - Construction of informal settlements in the town of Copperton (and surrounds) from in-migration of persons seeking construction employment from the many different solar and wind energy projects planned for the area. ▪ The following visual impacts could take place during the life time of the proposed transmission line: **<u>Construction</u>** - Possible soil erosion from temporary roads	existing transmission line corridors. - The lay down should be located away from the main roads (as much as possible). - Dust control measures should be implemented when required. - Lights at night have the potential to significantly increase the visual exposure of the proposed project. It is recommended that mitigations be implemented to reduce light spillage.	▪ **<u>Road Access Impact (all options):</u>** - With mitigation and effective dust management, the Visual Impact significance of both Road access routes was rated low for construction and operation phases, and very low should effective rehabilitation be implemented; - With effective and integrated planning, the cumulative visual significance has the potential to be medium positive with mitigation. ▪ **<u>Self-build Grid Connection to Kronos Substation:</u>** - Construction and Operation Phase impacts were rated low with mitigation and the management of soil erosion; - With mitigation and integrating planning by DEA and Eskom, the cumulative impacts can be reduced to low; ▪ Due to the potential cluttering of the landscape from all the different power lines converging on the two local substations, the

	crossing drainage lines. o Windblown litter from the lay-down and construction sites. **Operation** o On-going soil erosion. o On-going windblown dust. o Sunlight glint off cables and structures. **Decommissioning** o Movement of vehicles and associated dust. o Windblown dust from the disturbance of cover vegetation/gravel. **Cumulative** o Massing effects from numerous power lines converging on the substations. o Cluttering effects from ad-hoc routings that are not aligned with existing Eskom power line corridors. ▪ According to the findings of this report, all of the alternatives are suitable for development with mitigation. ▪ It was found that the proposed alternatives would not constitute a significant visual impact to the characteristic		cumulative visual impact significance was rated high without mitigation. With mitigation and integrating planning by DEA and Eskom, the cumulative impacts can be reduced to low.

	landscape for the following reasons: ○ The proposed project's close proximity to the Copperton mine and TSF. ○ The old railway line and borrow pits degrade the landscape in the immediate vicinity. ○ The area is an unofficial node for Solar Energy development with adjacent sites already having authorization. ○ The alignment of the proposed project with municipal planning.		
Mierdam Solar Photovoltaic Facility	▪ The following visual impacts are associated with the construction of the proposed PV plant: **<u>Construction</u>** 1) Large construction vehicles and equipment during the construction phase will alter the natural character of the study area and expose visual receptors to visual impacts associated with the construction phase. **<u>Operation</u>** 2) The proposed solar arrays could create a visual impact on sensitive receptors in the study area by creating visual	▪ The following mitigation measures were provided for the anticipated impacts: - Carefully plan to reduce the construction period. - 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. - Ensure that dust suppression techniques are implemented on all access roads.	1) Low negative; and 2) Low negative.

	change and visual intrusion ▪ The likely visual impact of the proposed solar power plant from most of the key receptor locations has been determined to be insignificant. This is mainly due to the extensive distance between the PV layouts and the key observation locations. ▪ The thick vegetation that surrounds most receptor locations is also very effective in shielding the actual receptor location (household) from views of the proposed project. ▪ Farmsteads located within, or on the boundaries of the development site would potentially be subject to a greater degree of visual impact. However due to these farmsteads belonging to, and being inhabited by the owners of the properties on which the development is proposed, these locations are not thought to be sensitive, as they will benefit from the project financially	▪ No specialist recommendations were provided in the report.	
Platsjambok East and West Solar Photovoltaic Facility	▪ The following visual impacts are associated with the construction of the proposed PV plant:	▪ The following mitigation measures were provided for the anticipated impacts:	1) Low negative; and 2) Low negative.

	Construction 1) Large construction vehicles and equipment during the construction phase will alter the natural character of the study area and expose visual receptors to visual impacts associated with the construction phase. **Operation** 2) The proposed solar arrays could create a visual impact on sensitive receptors in the study area by creating visual change and visual intrusion. ▪ The likely visual impact of the solar power plant from most of the key receptor locations has been determined to be insignificant. This is mainly due to the extensive distance between the PV layouts and the key observation locations. ▪ The thick vegetation that surrounds most receptor locations is also very effective in shielding the actual receptor location (household) from views of the proposed project. ▪ Farmsteads located within, or on the boundaries of the development site would potentially be subject to a	- Carefully plan to reduce the construction period. - 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. - Ensure that dust suppression techniques are implemented on all access roads. ▪ No specialist recommendations were provided in the report.	

	greater degree of visual impact. However due to these farmsteads belonging to, and being inhabited by the owners of the properties on which the development is proposed, these locations are not thought to be sensitive, as they will benefit from the project financially		
Helena Solar 1, 2 and 3 PV Energy Facility	▪ The following visual impacts are associated with the construction of the proposed PV plant and associated infrastructure: **<u>Construction</u>** 1) Large construction vehicles and equipment during the construction phase will alter the natural character of the study area and expose visual receptors to visual impacts associated with the construction phase. The construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. **<u>Operation</u>** 2) The proposed PV energy facility, power line, substation, access roads and building infrastructure could exert a visual impact by altering the visual	▪ The following mitigation measures were provided for the anticipated impacts: - Carefully plan to reduce the construction period. - 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. - Ensure that dust suppression techniques are implemented on all access roads. - All reinstated cable trenches should be re-vegetated with the same vegetation that existing prior to the cable being laid. - Light fittings for security at night should reflect the light toward the	1) Low negative; 2) Medium negative (low negative for the power line, substation, access roads and building infrastructure).

	character of the surrounding area and exposing sensitive visual receptor locations to visual impacts. The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.	ground and prevent light spill. - The operations and maintenance buildings should not be illuminated at night. - Align the power line to run parallel to existing power lines and other linear impacts, where possible. - Bury cables under the ground where possible. - The operation and maintenance building should be painted with natural tones that fit with the surrounding environment. Non-reflective surfaces should be utilised where possible. - Select the alternatives that will have the least impact on visual receptors.	
PV 2-11 Solar Energy Plants on the Farm Hoekplaas	Any tall structures, such as existing powerlines, are visible for many kilometres. According to the Draft Scoping Report (DSR), the potential therefore exists that the proposed PV plants and associated infrastructure would be visible from many kilometres away. As such, it was recommended that a specialist Visual Impact Assessment (VIA) be undertaken to ascertain potential impacts on visual aesthetics. The VIA has	▪ None ▪ It was recommended that a specialist Visual Impact Assessment (VIA) be undertaken to ascertain potential impacts on visual aesthetics	▪ None

	however not been undertaken yet as this specialist study was not available when compiling this report.		

A literature review of other visual specialist studies which were conducted for the other renewable energy developments being proposed and/or constructed in the area was undertaken as part of this VIA. This was done in order to clearly define the identified cumulative impacts, and to indicate how the recommendations, mitigation measures and conclusions of the other visual impact assessment reports have been taken into consideration when drafting this visual impact assessment report. In terms of the review undertaken on the above reports, it can be noted that the findings of the other specialist studies identified similar impacts for each of the renewable energy developments mentioned above. These include th evisual impacts on users of arterial and secondary roads, the visual impacts on residents of homesteads and settlements, the visual impacts of shadow flicker on sensitive visual receptors, the visual impacts of lighting at night on sensitive visual receptors, the visual impacts of construction on sensitive visual receptors and the visual impacts on the visual quality of the landscape and sense of place. The impacts identified in the specialist studies that were reviewed are also similar to those identified in this VIA. As such, this VIA is deemed to have adequately defined, identified and assessed the cumulative visual impacts which could arise as a result of the development of the renewable energy facilities.

The visual impact assessment undertaken for the proposed Aletta Wind Energy Facility has provided mitigation measures which are in-line with those recommended in the other specialist studies. As such, the mitigation measures provided in this visual impact assessment are considered to be sufficient to reduce the visual impacts experienced within the study area. Should all of the recommended mitigation measures be implemented, it is anticipated that the visual impacts associated with the renewable energy developments could be mitigated to acceptable levels. This will also reduce the significance of the identified visual impacts and will aid in reducing the cumulative impacts experienced as a result of the other renewable energy facilities being proposed and/or constructed within the surrounding area. This was evident during the review of the other specialist studies as the significance rating for most of the identified impacts were deemed to be of medium to low significance after the implementation of mitigation measures. Additionally, with the correct mitigation and integrating planning, the significance rating of majority of the cumulative impacts will be relatively low due to the nature of the study area.

The visual specialist for the Garob Wind Energy Facility Project recommended that wind turbines located within 480m of any inhabited settlement, homestead or public roads should be relocated to beyond this distance in order to negate the potential impact of shadow flicker. A 1.4km Noise Buffer has however been implemented for the Aletta Wind Energy Facility. The above-mentioned 480m buffer recommendation can therefore be considered to be accounted for. It should be noted that some of the wind turbines have been positioned within 480m of the R357 road. This is however not considered to be necessary as this road is not considered to be a sensitive receptor road. It is used almost exclusively as a local access road, with very little use for any other purpose. In addition, this road does not form part of any scenic tourist routes, and is not specifically valued or utilised for its scenic or tourism potential. Additionally, the visual specialist for the Humansrus Solar PV Energy Facility 2 and 3 project recommended that a 75m no-go buffer from the R357 and Copperton roads should be maintained. This 75m no-go buffer is however not deemed necessary as the R357 road is not considered to be a sensitive receptor road and is used almost exclusively as a local access road, with very little use for any other purposes. As mentioned, this road does not form part of any scenic tourist routes, and is not specifically valued or utilised for its scenic or tourism potential. As such, this recommendation is not considered to be important for the proposed Aletta Wind Energy Facility and will therefore not need to be implemented.

This VIA is deemed to have clearly defined the identified cumulative impacts, and has indicated how the recommendations, mitigation measures and conclusions of the other visual impact specialist reports have been taken into consideration when drafting this report.

4.6 Overall Visual Impact Rating

The 2014 EIA regulations require that an overall rating for visual impact be provided to allow the visual impact to be assessed alongside other environmental parameters. SiVEST has developed an impact rating matrix for this purpose. The tables below present the impact matrix for visual impacts associated with the proposed construction and operation of the 140MW Aletta Wind Energy Facility and the associated infrastructure.

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

4.6.1 *Planning*

No visual impacts are expected during planning.

4.6.2 *Construction*

Table 21: Rating of visual impacts of the proposed 140MW Aletta Wind Energy Facility during construction

IMPACT TABLE	
Environmental Parameter	Visual Impact
Issue/Impact/Environmental Effect/Nature	Large construction vehicles and equipment during the construction phase will alter the natural character of the study area and expose visual receptors to visual impacts

	associated with the construction phase. The construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. Vehicles and trucks travelling to and from the proposed site on gravel access roads are also expected to increase dust emissions. The increased traffic on gravel roads and the dust plumes could create a visual impact and may evoke negative sentiments from surrounding viewers. Surface disturbance during construction would also expose bare soil, which could visually contrast with the surrounding environment. In addition, 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.	
Extent	Local / District (2)	
Probability	Probable (3)	
Reversibility	Completely reversible (1)	
Irreplaceable loss of resources	Marginal loss (2)	
Duration	Short term (1)	
Cumulative effect	Medium cumulative effects (3)	
Intensity/magnitude	Medium (2)	
Significance Rating	**Prior to mitigation measures:** Low negative impact **After mitigation measures:** Low negative impact	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	3	2
Reversibility	1	1
Irreplaceable loss	2	2
Duration	1	1
Cumulative effect	3	3
Intensity/magnitude	2	2
Significance rating	-24 (low negative)	-22 (low negative)
Mitigation measures	▪ Carefully plan to reduce the construction period. ▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ▪ Vegetation clearing should take place in a phased manner.	

	▪ Maintain a neat construction site by removing rubble and waste materials regularly. ▪ 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. ▪ Ensure that dust suppression techniques are implemented on all gravel access roads utilised during construction. ▪ Ensure that dust suppression is implemented in all areas where vegetation clearing has taken place. ▪ Ensure that dust suppression techniques are implemented on all soil stockpiles. ▪ Where possible, re-vegetate all reinstated cable trenches with the same vegetation that existed prior to the cable being laid. If possible, local nurseries should be commissioned to cultivate the vegetation removed. ▪ Where necessary, erosion control measures should be employed on reinstated cable trenches. ▪ Temporarily fence-off the construction site (for the duration of the construction period).

** Please note in the context of the visual environment 'resources' are defined as scenic / natural views that are almost impossible to replace.*

Table 22: Rating of visual impacts of the infrastructure associated with the proposed 140MW Aletta Wind Energy Facility during construction

IMPACT TABLE	
Environmental Parameter	Visual Impact
Issue/Impact/Environmental Effect/Nature	Large construction vehicles and equipment during the construction of the underground cables, overhead power lines (if required), on-site 132kV substation, access roads and building infrastructure could exert a visual impact by altering the visual character of the surrounding area and exposing sensitive visual receptor locations to visual impacts associated with the construction phase. The construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. Vehicles and trucks travelling to and from the proposed site on gravel access roads are also expected to increase dust emissions. The increased traffic on the gravel roads and the dust plumes could create a visual impact and may evoke negative sentiments from surrounding viewers.

	Surface disturbance during construction would also expose bare soil, which could visually contrast with the surrounding environment. In addition, temporarily stockpiling soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust, which would have a visual impact.	
Extent	Local/district (2)	
Probability	Probable (3)	
Reversibility	Completely reversible (1)	
Irreplaceable loss of resources	No loss (1)	
Duration	Short term (1)	
Cumulative effect	Medium cumulative effects (3)	
Intensity/magnitude	Medium (2)	
Significance Rating	**Prior to mitigation measures:** Low negative impact **After mitigation measures:** Low negative impact	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	3	2
Reversibility	1	1
Irreplaceable loss	1	1
Duration	1	1
Cumulative effect	3	3
Intensity/magnitude	2	2
Significance rating	-22 (low negative)	-20 (low negative)
Mitigation measures	▪ All reinstated cable trenches should be re-vegetated with the same vegetation that existed prior to the cable being laid, where possible. If possible, local nurseries should be commissioned to cultivate the vegetation removed. ▪ Where necessary, erosion control measures should be employed on reinstated cable trenches. ▪ Carefully plan to reduce the construction period. ▪ 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. ▪ Ensure that dust suppression techniques are implemented on all access roads utilised during construction.

4.6.3 *Operation*

Table 23: Rating of visual impacts of the proposed 140MW Aletta Wind Energy Facility during operation

IMPACT TABLE	
Environmental Parameter	Visual Impact
Issue/Impact/Environmental Effect/Nature	The proposed Aletta Wind Energy Facility could exert a visual impact by altering the visual character of the surrounding area and exposing sensitive visual receptor locations, such as the Nelspoortjie Karoo Guest Farm (VR 2) and the Boesmansberg Guest Farm (VR 1), to visual impacts. The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. Maintenance vehicles may need to access the wind energy facility via gravel access roads and are expected to increase the amount of dust generated. The increased traffic on the gravel roads and the dust plumes could create a visual impact and may evoke negative sentiments from surrounding viewers. Security and operational lighting at the proposed wind energy facility could result in light pollution and glare, which could be an annoyance to surrounding viewers
Extent	Local/district (2)
Probability	Definite (4)
Reversibility	Irreversible (4)
Irreplaceable loss of resources	Significant (3)
Duration	Long term (3)
Cumulative effect	High cumulative effects (4)
Intensity/magnitude	Medium (2)

Significance Rating	**Prior to mitigation measures:** Medium negative impact **After mitigation measures:** Medium negative impact	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	4	4
Reversibility	4	4
Irreplaceable loss	3	2
Duration	3	3
Cumulative effect	4	3
Intensity/magnitude	2	2
Significance rating	-40 (medium negative)	-36 (medium negative)
Mitigation measures	▪ Where possible, fewer but larger turbines with a greater output should be utilised rather than a larger number of smaller turbines with a lower capacity. ▪ Light fittings for security at night should reflect the light toward the ground (except for aviation lighting) and prevent light spill. ▪ Turbines should be painted plain white, as this is a less industrial colour (Vissering, 2011). Bright colours or obvious logos should not be permitted. ▪ Turbines should be repaired promptly, as they are considered more visually appealing when the blades are rotating (or at work) (Vissering, 2011). ▪ If required, turbines should be replaced with the same model, or one of equal height and scale. Repeating elements of the same height, scale and form can result in unity and lessen the visual impact that would typically be experienced in a chaotic landscapes made up of diverse colours, textures and patterns (Vissering, 2011). ▪ 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 access roads, utilised during operation.	

** Please note in the context of the visual environment 'resources' are defined as scenic / natural views that are almost impossible to replace.*

Table 24: Rating of visual impacts of the infrastructure associated with the proposed 140MW Aletta Wind Energy Facility during operation

IMPACT TABLE		
Environmental Parameter	Visual Impact	
Issue/Impact/Environmental Effect/Nature	The proposed underground cables, overhead power lines (if required), on-site 132kV substation, access roads and building infrastructure could exert a visual impact by altering the visual character of the surrounding area and exposing sensitive visual receptors to visual impacts. The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. Maintenance vehicles may need to access the infrastructure associated with the wind energy facility via gravel access roads and are expected to increase dust emissions in doing so. The increased traffic on the gravel roads and the dust plumes could create a visual impact and may evoke negative sentiments from surrounding viewers. Security and operational lighting at the associated infrastructure could result in light pollution and glare, which could be an annoyance to surrounding viewers	
Extent	Local / District (2)	
Probability	Probable (3)	
Reversibility	Irreversible (4)	
Irreplaceable loss of resources	Marginal loss (2)	
Duration	Long term (3)	
Cumulative effect	Medium cumulative effect (3)	
Intensity/magnitude	Medium (2)	
Significance Rating	**Prior to mitigation measures:** Medium negative impact **After mitigation measures:** Low negative impact	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	3	2
Reversibility	4	4
Irreplaceable loss	2	1
Duration	3	3
Cumulative effect	3	2
Intensity/magnitude	2	2

Significance rating	-34(medium negative)	-28 (low negative)
Mitigation measures	▪ Light fittings for security at the on-site 132kV substation at night should reflect the light toward the ground and prevent light spill. ▪ The operations and maintenance buildings should not be illuminated at night, if possible. ▪ Bury cables under the ground where possible. ▪ The operation and maintenance building should be painted with natural tones that fit with the surrounding environment. Non-reflective surfaces should be utilised where possible. ▪ Ensure that dust suppression techniques are implemented on all access roads, utilised during operation. ▪ Select the alternatives that will have the least impact on visual receptors (refer to **Section 5**).	

4.6.4 *Decommissioning*

It is imperative that once the wind energy facility is no longer operational, that the turbines and other associated infrastructure be removed, and the site be reclaimed and rehabilitated. The visual impacts anticipated during the decommissioning phase are potentially similar to those during the construction phase.

5 COMPARATIVE ASSESSMENT OF ALTERNATIVES

It should be noted that at this stage, only two (2) alternative site locations for the on-site 132kV substation and two (2) site alternatives for the O&M building are being investigated (**Figure 63**).

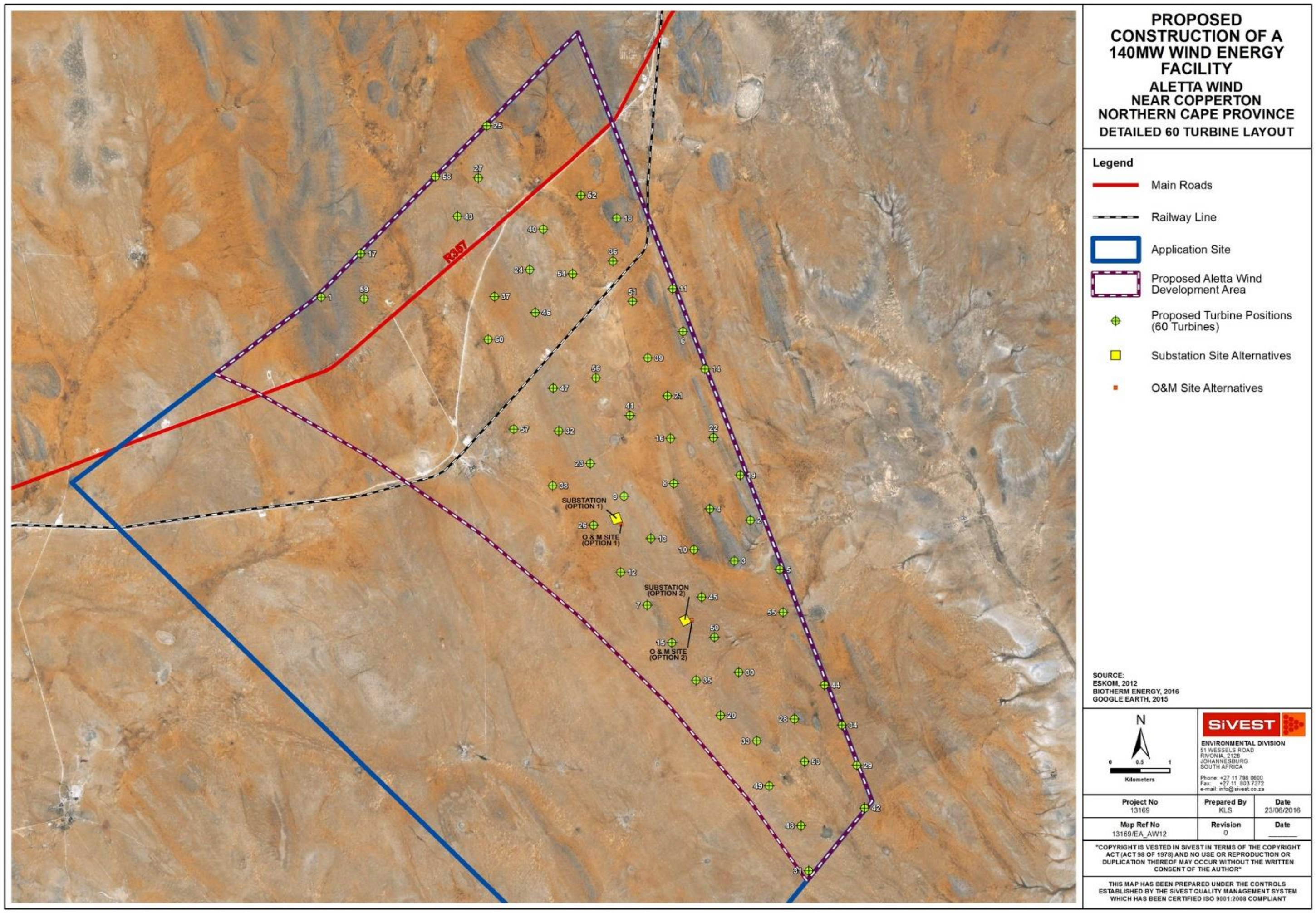

Figure 63: Turbine layout alternatives

The preference rating for each alternative is provided in **Table 25** below. The alternatives are rated as being either preferred (the alternative will result in a low visual impact / reduce the visual impact), not-preferred (the alternative will result in a relatively high visual impact / increase the visual impact), favourable (the visual impact will be relatively insignificant) and no-preference (each alternative would result in an equal visual impact).

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

- The location of the alternative in relation to areas of high elevation, especially ridges, koppies or hills;
- The location of the alternative in relation to potentially sensitive and sensitive receptor locations; and
- The location of the alternative in relation to areas of natural bushveld 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
NOT PREFERRED	The alternative will result in a high impact / increase the impact
NO PREFERENCE	The alternative will result in equal impacts

Table 25: Comparative Assessment of Alternatives – 140MW Aletta Wind Energy Facility

Alternative	Preference	Reasons (incl. potential issues)
SUBSTATION AND O & M BUILDING ALTERNATIVES		
Option 1	Favourable	No sensitive or potentially sensitive visual receptors can be found within 500m of this proposed Substation and O&M Building alternative, within the very high impact zone. In addition, no sensitive or potentially sensitive visual receptors can be found within 2km of the proposed alternative, within the high impact zone. It must however be noted that three (3) potentially sensitive visual receptors can be found within 5km of the proposed alternative, within the moderate impact zone. In addition, one (1) potentially sensitive visual receptor can be found within 8km of the proposed Substation and O&M Building alternative, within the low

Alternative	Preference	Reasons (incl. potential issues)
		impact zone, while five (5) potentially sensitive visual receptors can be found further than 8km from this alternative and are therefore expected to be negligible from a visual perspective. It is important to note that both visually sensitive receptors, namely the Boesmansberg Guest Farm (VR 1) and the Nelspoortjie Karoo Guest Farm (VR 2), can also be found further than 8km for the proposed Substation and O&M Building alternative and are therefore also expected to be negligible from a visual point of view. As such, there is no notable preference between Substation and O&M Building Option 1 and 2. Although Option 1 will be marginally preferred as it is located slightly further from one (1) of the potentially sensitive receptor locations, both are regarded as favourable options. In addition, the proposed substation and O&M building would form part of the wind energy facility and would be dwarfed by the large number of wind turbines that would be visible.
Option 2	Favourable	No sensitive or potentially sensitive visual receptors can be found within 500m of this proposed Substation and O&M Building alternative, within the very high impact zone. In addition, no sensitive or potentially sensitive visual receptors can be found within 2km of the proposed alternative, within the high impact zone. It must however be noted that four (4) potentially sensitive visual receptors can be found within 5km of the proposed alternative, within the

Alternative	Preference	Reasons (incl. potential issues)
		moderate impact zone. In addition, one (1) potentially sensitive visual receptor can be found within 8km of the proposed Substation and O&M Building alternative, within the low impact zone, while four (4) potentially sensitive visual receptors can be found further than 8km from this alternative and are therefore expected to be negligible from a visual perspective. It is important to note that both visually sensitive receptors, namely the Boesmansberg Guest Farm (VR 1) and the Nelspoortjie Karoo Guest Farm (VR 2), can also be found further than 8km for the proposed Substation and O&M Building alternative and are therefore also expected to be negligible from a visual point of view. Although Substation and O&M Building Option 2 is located slightly closer to one (1) of the potentially sensitive receptor locations there is no notable preference between the two options and both are considered to be favourable. In addition, the proposed substation and O&M building would form part of the wind energy facility and would be dwarfed by the large number of wind turbines that would be visible.

6 CONCLUSIONS

An EIA-level visual study was conducted to assess the magnitude and significance of the visual impacts associated with the development of the proposed 140MW Aletta Wind Energy Facility near Copperton in the Northern Cape Province. Although majority of the study area has a natural / scenic visual character, it is characterised by the presence of typical rural / pastoral infrastructure and is not typically valued or utilised for its tourism significance. The study area is characterised by limited transformation, however several existing high voltage power lines can be found within the 8km visual assessment zone and have altered the natural visual character of the surrounding area to some extent. It was ascertained that due to the dominant livestock (i.e. sheep) rearing practices and relatively limited human habitation in the surrounding area, only two (2) visually sensitive receptors are present in the study area, namely the Boesmansberg Guest Farm (VR 1) and the Nelspoortjie Karoo Guest Farm (VR 2). These two (2) visually sensitive receptors are regarded as facilities with current and future tourism potential and are therefore expected to experience the most significant visual impacts as a result of the proposed Aletta Wind Energy Facility development. Despite the tourism significance of these two (2) visually sensitive visual receptor locations, the proposed development is expected to have a medium visual impact on the Boesmansberg Guest Farm (VR 1) and a low visual impact on the Nelspoortjie Karoo Guest Farm (VR 2). It must be noted that the R357 tar road (which traverses the application site) and the R386 gravel road (located to the east of the proposed application site) are not considered to be a visually sensitive roads as these roads are used almost exclusively as local access roads. In addition, these roads do not form part of any scenic tourist routes and are not specifically valued or utilised for their scenic or tourism potential. Several scattered farmsteads / homesteads, which are used to house the local farmers as well as their farm workers, were also identified within the study area and are regarded as potentially sensitive visual receptors. Upon further investigation, it was established that the proposed Aletta Wind Energy Facility development would have a medium visual impact on three (3) of the potentially visual receptors. In addition, the proposed development would have a low visual impact on four (4) potentially sensitive visual receptors and a high visual impact on three (3) of the potentially sensitive visual receptor locations, namely VR 14 and VR 16.

The overall significance of the visual impacts of the proposed Aletta Wind Energy Facility development during construction and operation was assessed according to SiVEST's impact rating matrix. The impact assessment revealed that the proposed development would have a negative low visual impact during construction and a negative medium visual impact during operation, with several mitigation measures available to reduce the visual impact.

As part of the VIA, the two (2) proposed on-site substation and O&M building site alternatives were comparatively assessed. The comparative assessment of alternatives subsequently revealed that both options are favourable and there is no notable preference between the two options from a visual perspective.

Overall it can be concluded that the visual impact of the proposed Aletta Wind Energy Facility development would be reduced due to the lack of sensitive visual receptors present. However, it is expected that the proposed development would alter the largely natural / scenic character of the study area and contrast moderately with the typical land use and/or pattern and form of human elements present. It should also be noted that several renewable energy developments (both wind and solar) are being proposed within close proximity to the proposed wind energy facility. These renewable energy developments would reduce the overall natural / scenic character of the study area, however they would increase the cumulative visual impacts, should some or all of these developments be granted environmental authorisation (EA) to proceed, receive a license and be constructed. A cumulative impact assessment, including a literature review of other other visual impact assessments / studies conducted for the other renewable energy developments being proposed and/or constructed in the area was undertaken. It was determined that the greatest cumulative impact will be experienced from one (1) of the visually sensitive receptor locations, namely the Nelspoortjie Karoo Guest Farm (VR 2). In addition, the other visually sensitive receptor location, namely the Boesmansberg Guest Farm (VR 1), is expected to be visually exposed to five (5) of the proposed renewable energy developments should they all be constructed. The literature review revealed that the mitigation measures and recommendations provided in this report are similar to those identified in the other visual impact assessments / studies and are therefore deemed to be acceptable..

6.1 Visual Impact Statement

It is SiVEST's opinion that the visual impacts are not significant enough to prevent the project from proceeding and that an EA should be granted. From a visual impact perspective, only two (2) visually sensitive receptors with tourism significance have been identified within the study area, namely the Boesmansberg Guest Farm (VR 1) and the Nelspoortjie Karoo Guest Farm (VR 2). In addition, the existing electrical infrastructure and other linear elements already present within the study area have already altered the natural character of the surrounding environment to a degree and are expected to lower the visual contrast of the Aletta Wind Energy Facility slightly. The visual impact of the proposed development on most the potentially sensitive visual receptors identified within the study area was rated as being low or medium. In addition, the proposed development would have a negligible visual impact on one (1) potentially sensitive visual receptor, while a high visual impact will be experienced by three (3) potentially sensitive visual receptor locations. SiVEST is therefore of the opinion that the impacts associated with the construction and operation phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

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Appendix A

IMPACT RATING METHODOLOGY

IMPACT RATING METHODOLOGY

The determination of the effect of an environmental impact on an environmental parameter (in this instance, wetlands) is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the environmental practitioner through the process of the environmental impact assessment. The impact evaluation of predicted impacts was undertaken through an assessment of the significance of the impacts.

Determination of Significance of Impacts

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

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

Impact Rating System Methodology

Impact assessments must take account of the nature, scale and duration of effects on the environment whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is usually assessed according to the project stages:

- planning
- construction
- operation
- decommissioning

In this case, a unique situation is present whereby various scenarios have been posed and evaluated accordingly. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

Rating System Used To Classify Impacts

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

Table 1. Example of the significance impact rating table.

NATURE		
Includes a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined.		
1	Site	The impact will only affect the site
2	Local/district	Will affect the local area or district
3	Province/region	Will affect the entire province or region
4	International and National	Will affect the entire country
PROBABILITY		
This describes the chance of occurrence of an impact		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
REVERSIBILITY		
This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.

4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource.	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
DURATION		
This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity		
1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).
CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts on the environmental parameter. A cumulative effect/impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible Cumulative Impact	The impact would result in negligible to no cumulative effects

2	Low Cumulative Impact	The impact would result in insignificant cumulative effects
3	Medium Cumulative impact	The impact would result in minor cumulative effects
4	High Cumulative Impact	The impact would result in significant cumulative effects
INTENSITY / MAGNITUDE		
Describes the severity of an impact		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
SIGNIFICANCE		
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula: **(Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.** The summation of the different criteria will produce a non weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.		
Points	**Impact Significance Rating**	**Description**

6 to 28	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive Low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive Medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive High impact	The anticipated impact will have significant positive effects.
74 to 96	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive Very high impact	The anticipated impact will have highly significant positive effects.

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