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SCOPING REPORT

for

AMDA DELTA SOLAR PV ENERGY FACILITY

on

Remaining Extent Klondike No 670, and Overhead Power Line Grid Connection to the Mookodi MTS Sub-Station across Remainder of Erf 506 and Remainder of the Farm Rosendal 673, Vryburg, Registration Division, North West Province

In terms of the

National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended & Environmental Impact Regulations 2014

Prepared for Applicant: AMDA Delta (Pty) Ltd.

By: *Cape EAPrac*

Report Reference: NAL431/03

DEA Reference: To be allocated

Case Officer: To be allocated

Date: 15 August 2016

APPOINTED ENVIRONMENTAL ASSESSMENT PRACTITIONER:

***Cape EAPrac* Environmental Assessment Practitioners**

PO Box 2070
George
6530
Tel: 044-874 0365
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Report written & compiled by: **Dale Holder** (Ndip Nat Con), who has 12 years' experience as an environmental practitioner.

PURPOSE OF THIS REPORT:

Public / Stakeholder Review & Comment

APPLICANT:

AMDA Delta (Pty) Ltd.

CAPE EAPRAC REFERENCE NO:

NAL431/03

DEPARTMENT REFERENCE:

To be allocated

SUBMISSION DATE

15 August 2016

SCOPING REPORT

in terms of the

National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended &
Environmental Impact Regulations 2014

AMDA Delta PV Energy Facility

Remaining Extent Klondike No 670, and Overhead Power Line Grid Connection to the Mookodi MTS Sub-Station across Remainder of Erf 506 and Remainder of the Farm Rosendal 673, Vryburg, Registration Division, North West Province

Submitted for:

Stakeholder Review & Comment

Report Issued by:

Cape Environmental Assessment Practitioners

Tel: 044 874 0365
Fax: 044 874 0432
Web: www.cape-eaprac.co.za

PO Box 2070
17 Progress Street
George 6530

REPORT DETAILS

Title:	**SCOPING REPORT** **AMDA Delta PV Energy Facility**
Purpose of this report:	This Scoping Report forms part of a series of reports and information sources that are being provided during the Environmental Impact Assessment (EIA) for the proposed AMDA Delta solar development in the North West Province. In accordance with the regulations, the objectives of a scoping process is to, through a consultative process: (a) identify the relevant policies and legislation relevant to the activity; (b) motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location; (c) identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process; (d) identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment; (e) identify the key issues to be addressed in the assessment phase; (f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and (g) identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored. The Pre Application Draft Scoping Report was made available to all stakeholders for a 21 day review & comment period, **22 March 2016 – 15 April 2016.** An application form has been submitted to the Department of Environmental Affairs and this Scoping Report if made available for a further 30 Day Comment Period extending from **24 August 2016 – 23 September 2016.**
Prepared for:	AMDA Delta (Pty) Ltd
Published by:	*Cape Environmental Assessment Practitioners (Pty) Ltd. (Cape EAPrac)*
Authors:	Mr Dale Holder
Reviewed by:	Ms Melissa Mackay
Cape EAPrac Ref:	NAL431/03
DEA Case officer & Ref. No:	Enquiries: Mr Muhammad Essop (Case officer and reference number will be allocated after the submission of the formal application)
Date:	15 August 2016
To be cited as:	*Cape EAPrac,* 2016. Scoping Report for the proposed AMDA Delta PV Energy

	Facility. Report Reference: NAL431/03. George.

TECHNICAL CHECKLIST

The following technical checklist is included as a quick reference roadmap to the proposed project.

Company Details		
Company profile	Name and details of Developer	**AMDA Delta (Pty) Ltd** Co Reg No 2015/300643/07
Site Details		
Project Property	Description and Size in hectares of the affected property.	Farm name and number: Remaining Extent Klondike No 670, IN Registration Division, North West Province Total Property Size: 1142.4853Ha
Development Site	Approximate EIA and development areas	Initial EIA Study Area size: Approx 900Ha Development lease area : Approx 250Ha
Technology Details		
Capacity of the facility	Capacity of facility (in MW)	Net generating capacity (AC): 75MWac Installed capacity (DC): 85MWp
Solar Technology selection	Type of technology	Solar PV on fixed tilt structures or single axis tracking technology.
	Structure orientation	Fixed-tilt in north-facing orientation, or mounted on horizontal axis trackers, tracking from east to west.
	Development component dimensions: Solar PV field footprint Project sub-station Collector sub-station Buildings Roads Permanent laydown areas Construction laydown areas	Approximate dimensions 185Ha 1Ha 1Ha 1.5Ha 22km long @6m wide = 13.2Ha 7Ha 12Ha
	Solar field tracker structure height	Approx.: 3.5m
	Perimeter fence	2.4m high multi-strand electric security fence
Connection to National Grid		
Grid connection	Substation to which project will connect.	Eskom Mookodi MTS near Vryburg, North West Province 27° 0'34.63"S and 24°44'40.81"E
	Capacity of substation to connect facility	Confirmed capacity 485MW – Eskom letter for REIPPPP Bid Window 4 Accelerated Programme & 907MW in GCCA 2022 June

		2015
Power line/s	Project sub-station to collector sub-station Collector sub-station to Mookodi	A single 132kV overhead line A double 132kV overhead line
	Route/s of power lines	Approx 5.88km from collector sub-station on east of Klondike 670 property, across district road and over Municipal land to Mookodi MTS
	Height of the Power Line	25m
	Servitude Width	50m
Auxiliary Infrastructure		
Other infrastructure	Additional Infrastructure	Water from Municipality or borehole. Auxiliary electricity supply from Eskom Sewerage by conservancy tank
	Details of access roads	Existing access from N14 or new access off Vryburg - Reivilo district road
(b) the location of the activity, including – (i) The 21 digit Surveyor General code of each cadastral land parcel; (ii) Where available, the physical address and farm name; (iii) Where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.		The proposed activity is to be situated (i) **21 digit Surveyor General code**: T0IN00000000067000000 (ii) **Klondike, N14, Vryburg**

CONTENTS OF A SCOPING REPORT

Section 2 in Appendix 2 of regulation 982 details the information that is necessary for a proper understanding of the process, informing all preferred alternatives, including location alternatives, the scope of the assessment, and the consultation process to be undertaken through the environmental impact assessment process. The table below lists the minimal contents of a scoping report in terms of these regulations;

Requirement	**Details**
(a) details of - (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae;	This was compiled by Dale Holder of Cape Environmental Assessment Practitioners (Pty) Ltd (Cape EAPrac). Details of the EAP are included at the beginning of this report. A CV of the author as well as a company profile of Cape EAPrac is attached in **Appendix G4**
(b) the location of the activity, including - (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Farm name and number: Remaining Extent Klondike No 670, IN Registration Division, North West Province Total Property Size: 1142.4853Ha

Requirement	Details
(c) a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	A Location plan including co-ordinates of the proposed activity is attached in **Appendix A**.
(d) a description of the scope of the proposed activity, including - (i) all listed and specified activities triggered; (ii) a description of the activities to be undertaken, including associated structures and infrastructure;	The description of the proposed activity is detailed in section 3 on pg 14. Listed and specified activities triggered are detailed in section 2.2 on pg 5
(e) a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;	The legislative and policy context is included in section 2 on 4 page of this report.
(f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	The need and desirability of the project is included in section 5 of this report.
(h) a full description of the process followed to reach the proposed preferred activity, site and location within the site, including - (i) details of all the alternatives considered; (ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; (iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; (iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts - (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	(i) The details of all alternatives considered is included in section 7. (ii) The details of the public participation already undertaken as well as the details of the public participation for the remainder of the environmental process is detailed in section 20. (iii) An issues and responses report will be included later on in the process. (iv) Detailed site description and attributes is included in section 11. (v) A description of potential impacts identified by the EAP as well as participating specialists is included in section 22. (vi) The methodology used for the determination and ranking of significance is included in section 22.4. Please also refer to the specific methodologies in the specialist reports attached in Appendix E. (vii) This scoping report identifies the potential positive and negative impacts associated with the proposed project. These are included in section 22.1. An assessment of the significance of these identified impacts will take place in the impact assessment phase of this environmental process. (viii) The potential mitigation measures are

Requirement	Details
(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; (vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (viii) the possible mitigation measures that could be applied and level of residual risk; (ix) the outcome of the site selection matrix; (x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and (xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	addressed in section 13, 14 & 15. (ix) Details regarding the criteria for the selection of the preferred site selection is included in section 4. (x) Alternatives, including layout alternatives (for both the facility and grid connection), technological alternatives and the no-go alternative have been considered. Details of these are included in section 7. (xi) The preferred alternative was determined using a risk adverse approach whereby the baseline specialist studies were used to determine the footprint of the proposed facility.
(i) a plan of study for undertaking the environmental impact assessment process to be undertaken, including - (i) a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity; (ii) a description of the aspects to be assessed as part of the environmental impact assessment process; (iii) aspects to be assessed by specialists; (iv) a description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists; (v) a description of the proposed method of assessing duration and significance; (vi) an indication of the stages at which the competent authority will be consulted; (vii) particulars of the public participation process that will be conducted during the environmental impact assessment process; and (viii) a description of the tasks that will be undertaken as part of the environmental impact assessment process; (ix) identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.	The plan of study for Environmental Impact Assessment phase of the environmental process is included in Section 22.

Requirement	Details
(j) an undertaking under oath or affirmation by the EAP in relation to - (i) the correctness of the information provided in the report; (ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and (iii) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	The signed EAP declaration is included in **Appendix G4**.
(k) an undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment;	Appendix G4
(l) where applicable, any specific information required by the competent authority;	A pre-application meeting was held between the EAP and the DEA, where the need for any specific information was discussed and agreed upon. Minutes of this meeting are attached in Appendix G2. All correspondence with the competent authority is also included in this report in appendix G2.
(m) any other matter required in terms of section 24(4)(a) and (b) of the Act.	Compliance with section 24(4)(a) and (b) is included in the report.

ORDER OF REPORT

Draft Scoping Report – Main Report

Appendix A	:	Location, Topographical Plans
Appendix B	:	Biodiversity Overlays
Appendix C	:	Site Photographs
Appendix D	:	Solar Facility Layout Plans and Technical Layout Report (AMDA, 2016)
Appendix E	:	Specialist Reports
Annexure E1	:	Ecological Scoping Report (Todd, 2016)
Annexure E2	:	Agricultural Potential Study (Lubbe, 2016)
Annexure E3	:	Archaeology Scoping Report (Nilssen, 2016)
Annexure E4	:	Palaeontology Desktop Study (Almond, 2016)
Annexure E5	:	Integrated Heritage Study (de Kock, 2016)
Annexure E6	:	Engineering Report (AMDA, 2016)
Annexure E7	:	Visual Statement (Stead, 2016)
Annexure E8	:	Avifaunal Study (Zoghby & Todd, 2016)
Annexure E9	:	Planning Statement (Macroplan, 2016)
Annexure E10	:	Traffic Assessment and Transport Plan (KMA engineers, 2016)
Appendix F	:	Public Participation Process
Annexure F1	:	I&AP Register
Annexure F2	:	Comments and Response Report
Annexure F3	:	Adverts & Site Notices
Annexure F4	:	Pre Application - Draft Scoping Report Notifications
Annexure F5	:	Draft Scoping Report Comments and Responses
Annexure F6	:	Scoping Report Notifications (Pending)
Annexure F7	:	Scoping Report Comments and Responses Pending)
Appendix G	:	Other Information
Annexure G1	:	Correspondence with Authorities
Annexure G2	:	Minutes of Pre- Application Meeting with DEA
Annexure G3	:	Landowner Consent
Annexure G4	:	EAP Declaration & CV
Annexure G5	:	Specialist Declarations
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Annexure G7 : Correspondence with Project Team (site selection)

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SCOPING - OVERVIEW

1 PROJECT OVERVIEW

NOTE: The pre application Draft Scoping Report was provided as a background to the proposed development and was made available prior to the submission of a formal application. The formal scoping report followed the submission of an application to the Department of Environmental Affairs (DEA) and registered I&AP's are herewith given an additional opportunity to comment on the formal scoping.

Cape EAPrac has been appointed by AMDA Delta (Pty) Ltd., hereafter referred to as the Applicant, as the independent Environmental Assessment Practitioner EAP), to facilitate the Scoping & Environmental Impact Reporting (S&EIR) process required in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) for the proposed development of the 'AMDA Delta PV Energy Facility' near Vryberg in the Northern West Province of South Africa.

AMDA Delta (Pty) Ltd. Have an option to sub-lease a section of the Remaining Extent Klondike No 670, in Registration Division, North West Province from, Klondike Beleggens cc, for the purposes of developing the proposed solar facility. A copy of a letter from Klondike Beleggings cc providing consent for the continuation of the EIA is attached in **Annexure G6**.

The total generation capacity (contracted capacity)of the solar facility will not exceed 75MW for input into the national Eskom grid. The project will feed into the National Grid via the Mookodi Major Transmission Substation (MTS)

The purpose of this ***Scoping Report*** is to describe the environment to be affected, the proposed project, the process followed to date to allow registered interested and affected parties the opportunity to provide informed comment on the potential impacts associated with the development of the AMDA Delta PV Development and associated grid connection.

The pre application Draft Scoping Report was available for review and comment for a period of 21 Days extending from: **22 March 2016 – 15 April 2016**.

A formal application has now been submitted to the DEA and the formal scoping report is herewith available for a further 30 day comment period extending from **24 August 2016 – 23 September 2016**.

All comments on this report must be submitted to Cape EAPrac by no later than **23 September 2016**. Comments must be submitted to:

Cape Environmental Assessment Practitioners

Att: Mr Dale Holder

PO Box 2070, George, 6530

Fax: 044-874 0432 or Email: dale@cape-eaprac.co.za

All comments received during this timeframe, will be incorporated into the Final Scoping report that will be submitted to the DEA for consideration and decision making.

2 NEED AND DESIRABILITY

Need and desirability has been considered in detail in this environmental process. The overall need and desirability in terms developing renewable energy generation in South Africa is considered in section 1, while the project specific need and desirability is considered in section 5.

3 ENVIRONMENTAL REQUIREMENTS

The current assessment is being undertaken in terms of the **National Environmental Management Act** (NEMA, Act 107 of 1998). This Act makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the competent authority (in this case, the national Department of Environmental Affairs, DEA) based on the findings of an Environmental Assessment.

The proposed development entails a number of listed activities, which require a **Scoping & Environmental Impact Reporting (S&EIR) process**, which must be conducted by an independent environmental assessment practitioner (EAP). Cape EAPrac has been appointed to undertake this process.

The listed activities associated with the proposed development, as stipulation under 2014 Regulations **983, 984 and 985** are as follows:

Listed activity as described in GN R.983, 984 and 985	**Description of project activity that triggers listed activity**
Regulation 983 – Basic Assessment	
GN R983 Activity 11: *The development of facilities or infrastructure for the transmission and distribution of electricity-* *(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or* *(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.*	The proposed AMDA Delta PV Energy Facility will connect to the national electricity via the Mookodi MTS sub-station. The proposed distribution and transmission infrastructure includes the construction of an on-site substation (this substation will contain both Eskom and IPP components) and a 132kV overhead power line from the on-site substation.
Regulation 984 – Scoping and Environmental Impact Reporting	
GN R984 Activity 1: The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs within an urban area.	The proposed AMDA Delta PV Energy Facility will have a maximum generation Capacity (Contracted Capacity) of 75 megawatts and as such exceeds the threshold defined in this activity.
GN R984 Activity 15: The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such	The proposed AMDA Delta PV Energy Facility will have a maximum footprint of 250ha and as such exceeds the threshold

clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	defined in this activity.
Regulation 985 – Basic Assessment	
NO Activities in terms of Regulation 985.	

NOTE: Basic Assessment as well as Scoping and Environmental Impact Reporting Activities are being triggered by the proposed development and as such, the Environmental Process will follow a Scoping and Environmental Impact Reporting process.

It must be noted that these activities are all to be considered at the scoping phase, but certain of the activities listed above may no longer be relevant after the outcome of the specialist studies. In this case, these activities will be excluded from further assessment and an amended application form will be submitted to the DEA.

NOTE: R983 Activity 12 and 19 have been removed from the ongoing environmental process, as the specialist has confirmed that there are no watercourses present on the properties.

Before any of the above mentioned listed activities can be undertaken, authorisation must be obtained from the relevant authority, in this case the National Department of Environmental Affairs (DEA). Should the Department approve the proposed activity, the Environmental Authorisation does not exclude the need for obtaining relevant approvals from other Authorities who has a legal mandate.

4 DEVELOPMENT PROPOSAL & ALTERNATIVES

The proposed photovoltaic (PV) SEF will have a net generating capacity of 75 MW_{AC} with an estimated maximum footprint of ± 220 ha. A preliminary study area of ± 900 ha was identified by the Project Developer. The project footprint within this larger 900ha area was identified taking potential constraints identified by the EAP, Project Engineer and Ecological Specialist..

The technology under consideration is (PV) modules mounted on either of fixed or tracking structures. Other infrastructure includes inverter stations, internal electrical reticulation, internal roads, an on-site switching station / substation, a 132 kV overhead (OH) transmission line, auxiliary buildings, construction laydown areas and perimeter fencing and security infrastructure. The on-site switching station / substation will locate the main power transformer/s that will step up the generated electricity to a suitable voltage level for transmission into the national electricity grid, via the OH line. Auxiliary buildings include, *inter alia*, a control building, offices, warehouses, a canteen and visitors centre, staff lockers and ablution facilities and gate house and security offices. Both layout and technological alternatives have been considered as part of this application.

5 SPECIALIST STUDIES

The following specialists have and will be providing input into this environmental process:

Faunal	-	Mr Simon Todd (**Appendix E1**)
Flora	-	Mr Simon Todd (**Appendix E1**)
Avifaunal	-	Mr Blair Zoghby (**Appendix E8**)
Archaeology	-	Dr Peter Nilssen (**Appendix E3**)
Palaeontology	-	Dr John Almond (**Appendix E4**)
Integrated Heritage	-	Stefan de Kock (**Appendix E5**)
Agricultural Potential	-	Mr Christo Lubbe (**Appendix E2**)
Visual	-	Stephen Stead (**Appendix E7**)
Technical aspects	-	AMDA Developments (**Appendix E6**)
Planning	-	Macroplan (**Appendix E9**)
Socio Economic	-	Mr Tony Barbour (will form part of EIR)
Stormwater	-	To be appointed (will form part of EIR)
Traffic and Transportation	-	KMA Engineers (**Appendix E10**)

6 PLANNING CONTEXT

A Planning specialist will be appointed in order to consider the planning implications of the proposed facility. The results of the findings of the planning specialist will be presented in the EIR The following key components will likely take place from a planning perspective.

- A **land use change application** for the rezoning of approximately 220ha, from **Agricultural Zone I to Special Zone**, will be lodged at the Naledi Municipality.
- If there are restrictive Title Deed conditions burdening the proposed development, an application for the removal thereof will be lodged at the Government of the Northern Cape Province, Department: Corporate Governance and Traditional Affairs, in accordance with the Removal of Title Deed Restriction Act (Act 84 of 1967).
- Parallel to the rezoning application, a **long term lease application will be lodged at the National Department of Agriculture**, in accordance with the Subdivision of Agricultural Land Act (Act 70 of 1970).

The planning specialist will furthermore likely engage with the following authorities as part of the planning process. Where relevant, these authorities will also be engaged with as part of the Environmental Process and will be given an opportunity to provide input and comment on this

- **Naledi** for approval in terms of the relevant Zoning Scheme;
- **North West Province Department of Agriculture** as well as the **National Department of Agriculture, Forestry & Fisheries** (DAFF) for approval in terms of Act 70 of 70 (SALA) and Act 43 of 83(CARA);
- **District Roads Engineer** for comment on the land use application;
- **Department of Water and Sanitation** (DWS) for comment in terms of the National Water Act and the land use application;
- **Department of Mineral Resources** for approval in terms of Section 53 of Act 28 of 2002;
- **Department of Transport & Public Works** for comment on the land use application;
- **South African Heritage Resource** (SAHRA) Agency for comment on the land use application;
- **Civil Aviation Authority** for comment on the land use application;
- **Eskom** Northern Cape for comment on the land use application; and
- **North West Department of Environmental Affairs and Nature Conservation** for comment on the land use application.

7 CONCLUSIONS & RECOMMENDATIONS

This scoping exercise is currently being undertaken to present concept proposals to the public and potential Interested & Affected Parties and to identify environmental issues and concerns raised as a result of the proposed development alternatives to date. This will allow Interested & Affected Parties (I&APs), authorities, the project team, as well as specialists to provide input and raise issues and concerns, based on baseline / scoping studies that are in progress. The AMDA Delta PV Energy Facility will be analysed from Ecological, Avifaunal, Agricultural Potential, Visual and Heritage, perspectives, and site constraints and potential impacts identified.

This Draft Scoping Report (DSR) summarises the process to date, and the proposed way forward vis this environmental process.

Cape EAPrac is of the opinion that the information contained in this Draft Scoping Report and the documentation attached hereto is sufficient to allow the general public and key stakeholders to apply their minds to the potential negative and/or positive impacts associated with the development, in respect of the activities applied for.

The Pre Application Draft Scoping Report (DSR) was made available for stakeholder review and comment for a period of 21-days, extending from **22 March to 15 April 2016**. All comments received, have been considered and addressed, and feedback will be provided to registered stakeholders.

A formal application has been submitted and this Scoping report is made available for a further 30 Day comment period extending from **24 August 2016 – 23 September 2016.**

All stakeholders are requested to review this Scoping Report and the associated appendices, and provide comment, or raise issues of concern, directly to *Cape EAPrac* within the specified 30-day comment period.

Comments must be submitted, in writing, to the following address no later than 23 September 2016

Cape Environmental Assessment Practitioners

Att: **Mr Dale Holder**

PO Box 2070, George, 6530

Fax: 044-874 0432 or Email: dale@cape-eaprac.co.za

SCOPING - MAIN REPORT

1 INTRODUCTION

NOTE: The pre application Draft Scoping Report was provided as a background to the proposed development and was made available prior to the submission of a formal application. The formal scoping report followed the submission of an application to the Department of Environmental Affairs (DEA) and registered I&AP's are herewith given an additional opportunity to comment on the formal scoping.

Cape EAPrac has been appointed by **AMDA Delta (Pty) Ltd**, hereafter referred to as the Applicant, as the independent Environmental Assessment Practitioner EAP), to facilitate the Scoping & Environmental Impact Reporting (S&EIR) process required in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) for the proposed development of the '**AMDA Delta PV Energy Facility**' near Vryberg in the North West province..

AMDA Delta (Pty) Ltd have an option to lease a portion of the Remaining Extent Klondike No 670, IN Registration Division, North West Province for the purposes of developing the proposed solar facility. A copy of a letter from **Klondike Beleggings cc** providing consent for the continuation of the EIA is attached in **Appendix G3**.

All other land owners where the alternative grid connection (linear activity) may take place will be notified of the availability of this Draft Scoping Report and will be given an opportunity to participate in this environmental process.

The total generation capacity (contracted capacity) of the photovoltaic **power generation facility** will not exceed **75 Megawatts** (MW) for input into the national Eskom grid.

The purpose of this **Scoping Report** is to describe the environment to be affected, the proposed project, the process followed to date (focussing on the outcome of the initial public participation process and baseline specialist studies), to present the site constraints identified by the various specialist during their initial site assessments, and provide Plan of Study for the Impact Assessment phase of this development. This scoping report is made available to all stakeholders that were agreed upon with DEA during the pre-application meeting as well as I&AP's that registered in response to the Adverts or Site Notices.

The pre application Draft Scoping Report was available for review and comment for a period of 21 Days extending from: **22 March 2016 – 15 April 2016**.

A formal application has now been submitted to the DEA and the formal scoping report is herewith available for a further 30 day comment period extending from **24 August 2016 – 23 September 2016**.

All comments on this report must be submitted to Cape EAPrac by no later than **23 September 2016**. Comments must be submitted to:

Cape Environmental Assessment Practitioners

Att: Mr Dale Holder

PO Box 2070, George, 6530

Fax: 044-874 0432 or Email: dale@cape-eaprac.co.za

All comments received during this timeframe, will be incorporated into the Final Scoping report that will be submitted to the DEA for consideration and decision making.

1.1 OVERVIEW OF ALTERNATIVE ENERGY IN SOUTH AFRICA.

South Africa has for several years been experiencing considerable constraints in the availability and stability of electrical supply. Load shedding procedures have been applied since December 2005 due to multi-technical failures, as well as generation and transmission constraints.

Eskom generates about 95% of South Africa's electricity supply, and has undertaken to increase capacity to meet growing demands. At the moment, the country's power stations are 90% coal-fired, and two huge new facilities are being built to add to this capacity. However, Eskom's plans to increase its national capacity by 40 000 megawatts in the period to 2025 have had to be scaled down due to the global economic recession.

International best-practice requires a 15% electricity reserve margin to deal with routine maintenance requirements and unexpected shutdowns in electricity supply systems. South Africa has historically enjoyed a large reserve margin (25% in 2002, 20% in 2004 and 16% in 2006), but that has declined over the recent past to 8% - 10%, as a result of robust economic growth and the associated demand for electricity. The spare power available to provide supply at any time of the day is known as the reserve capacity and the spare plant available when the highest demand of the year is recorded is known as the reserve margin (National Response to South Africa's Electricity Shortage, 2008). This has resulted in limited opportunities for maintenance and necessitated that power stations are run harder. This results in station equipment becoming highly stressed and an increase in unplanned outages and generator trips. The expected demand growth will rapidly erode this margin, as well as Eskom's ability to recover after it's already stressed systems shutdown.

This necessitates the additional generation of at least 3 000MW in the shortest possible time, to allow the reserve necessary to bring Eskom's system back into balance (*ibid*). This need can either be addressed from the *supply* or the *demand* side. Where the demand side interventions include short, medium and long term aspects of a national Power Conservation Programme to incentivise the public to use less electricity (as mentioned above), one of the supply side options (besides Eskom building new plants and returning old plants to service) is to allow **Independent Power Producers** (IPPs) to contribute electricity to the national grid (National Response Document, 2008). **AMDA Delta (Pty) Ltd.** is one such body, which intends generating electricity from a renewable energy resource, namely solar.

In March 2011, the Cabinet approved South Africa's Integrated Resource Plan 2010, in terms of which energy from renewable sources will be expected to make up a substantial 42% of all new electricity generation in the country over the next 20 years. The government's New Growth Path for the economy also envisages up to 300 000 jobs being created in the "green" economy by 2020 (South Africa info website).

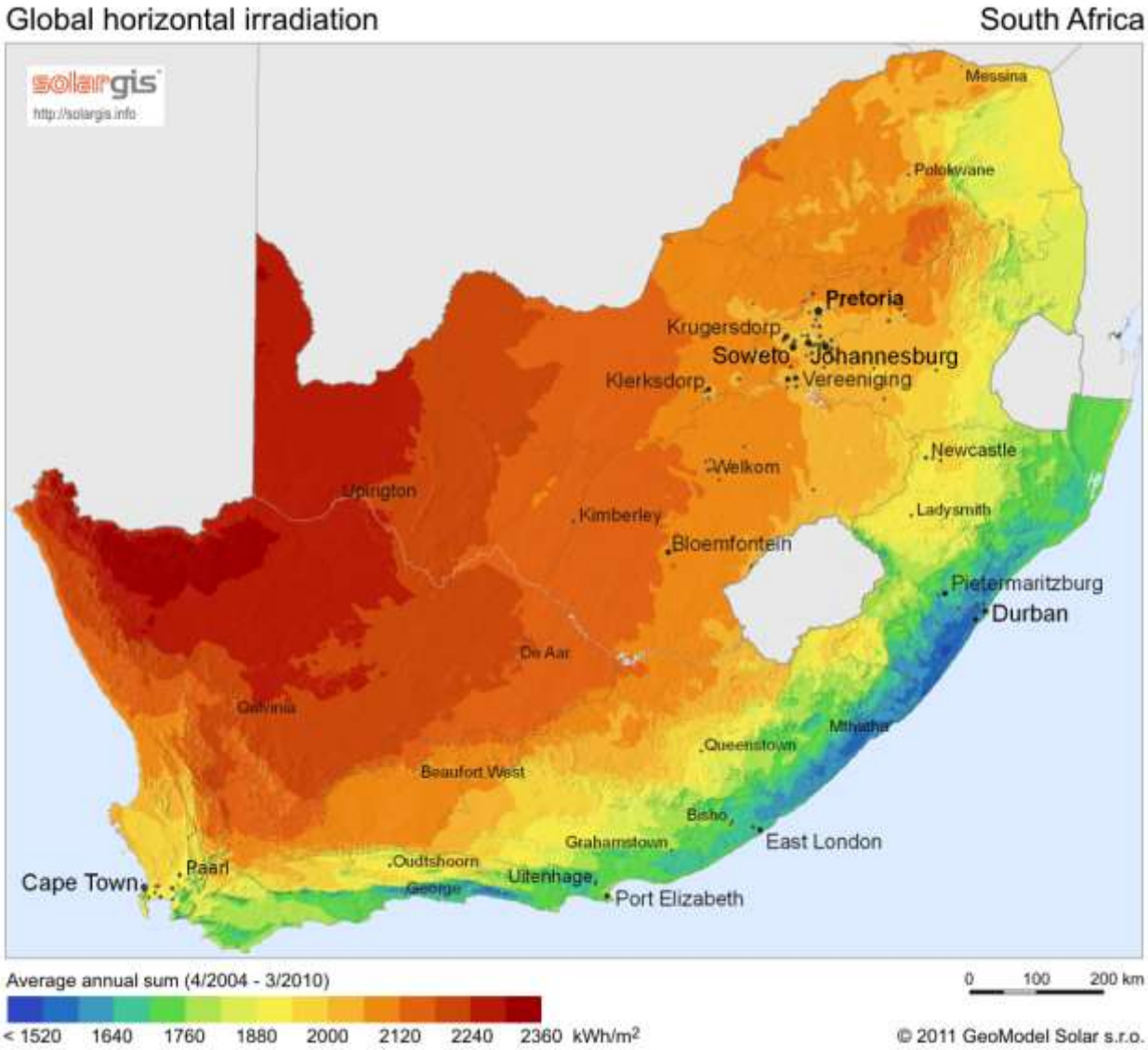

Figure 1: Global Horizontal radiation map for South Africa (Source: http://solargis.info, 2015).

The North West Provinc is considered to have extremely favourable solar radiation levels over the majority of the year, making it ideal for the production of solar-power via Photovoltaic (fixed and tracking panels) and Concentrated (solar thermal) Solar technology systems. Several solar irradiation maps have been produced for South Africa, all of which indicate that the North West Province area has **high solar irradiation**.

A Clinton Climate Initiative (CCI) pre-feasibility study has found that South Africa has one of the best solar resources on the planet (Northern Cape Business website – solar power).

AMDA Delta (Pty) Ltd. is one such IPP solar project which intends to generate 75MW of electricity from solar-energy for inclusion into the National grid. The AMDA Delta PV Energy Facility development site is considered ideal, primarily due to:

- The flat topography of the proposed development site and it's the availability for use for an alternative energy generation facility;
- The grid connection alternatives based in proximity other renewable energy activities and the Mookodi MTS sub-station; and
- Its location within a landscape, in that it is set back from roads with possible scenic quality.

Please **section 4** of this report for the details of the site selection matrix.

Minister Tina Joemat-Pettersson, the current Minister of Energy issued a media statement on 16 April 2015 on the Expansion and Acceleration of the Independent Power Producer Procurement Programme

In this statement, she stated that resolving the energy challenge remains a critical element of the South African Cabinet¡¦s list of nine strategic priorities to be pursued in partnership with the private sector and all stakeholders.

In this press release, the Minister confirmed that she instructed the Department and the IPP Office to accelerate and expand the Renewable Energy IPP Procurement Programme through:

- Utilising the enabling provisions in the current RFP to allocate additional MWs from Bid Window 4 procurement process.
- Issuing a Request for Further Proposals for an expedited procurement process of 1800MW from all technologies.
- Redesign the current RFP for the Fifth Bid Submission phase to be ready for release in the second quarter of 2016.

The Department of Energy (DoE) has set a number of dates for the submission of bid documents for private companies to apply for a licence to generate electricity. The bidding deadlines for the first two stages were as follow:

- 1st Bid Submission: 4 November 2011.
- 2nd Bid Submission: 5 March 2012.
- 3rd Bid submission: 19th of August 2013.
- 4th Bid submission: 18 August 2014.
- 5th Bid Submission: To be confirmed.

NOTE: It is the intention that the AMDA Delta PV Energy Facility solar development will submit a bid under this Renewable Energy Independent Power Producers Procurement Programme (REIPPP)

2 LEGISLATIVE AND POLICY FRAMEWORK

The legislation that is relevant to this study is briefly outlined below. These environmental requirements are not intended to be definitive or exhaustive, but serve to highlight key environmental legislation and responsibilities only.

2.1 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA

The Constitution of the Republic of South Africa (Act 108 of 1996) states that everyone has a right to a non-threatening environment and that reasonable measure are applied to protect the environment. This includes preventing pollution and promoting conservation and environmentally sustainable development, while promoting justifiable social and economic development.

2.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NEMA)

The current assessment is being undertaken in terms of the **National Environmental Management Act** (NEMA, Act 107 of 1998)[1] . This Act makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require

[1] On 18 June 2010 the Minister of Water and Environmental Affairs promulgated new regulations in terms of Chapter 5 of the National Environmental Management Act (NEMA, Act 107 of 1998), viz, the Environmental Impact Assessment (EIA) Regulations 2014. These regulations came into effect on 08 December 2014 and replace the EIA regulations promulgated in 2006 and 2010.

authorisation from the competent authority (in this case, the national Department of Environmental Affairs, DEA) based on the findings of an Environmental Assessment.

The proposed development entails a number of listed activities, which require a **Scoping & Environmental Impact Reporting (S&EIR) process**, which must be conducted by an independent environmental assessment practitioner (EAP). Cape EAPrac has been appointed to undertake this process. Figure 2 below depicts a summary of the S&EIR process.

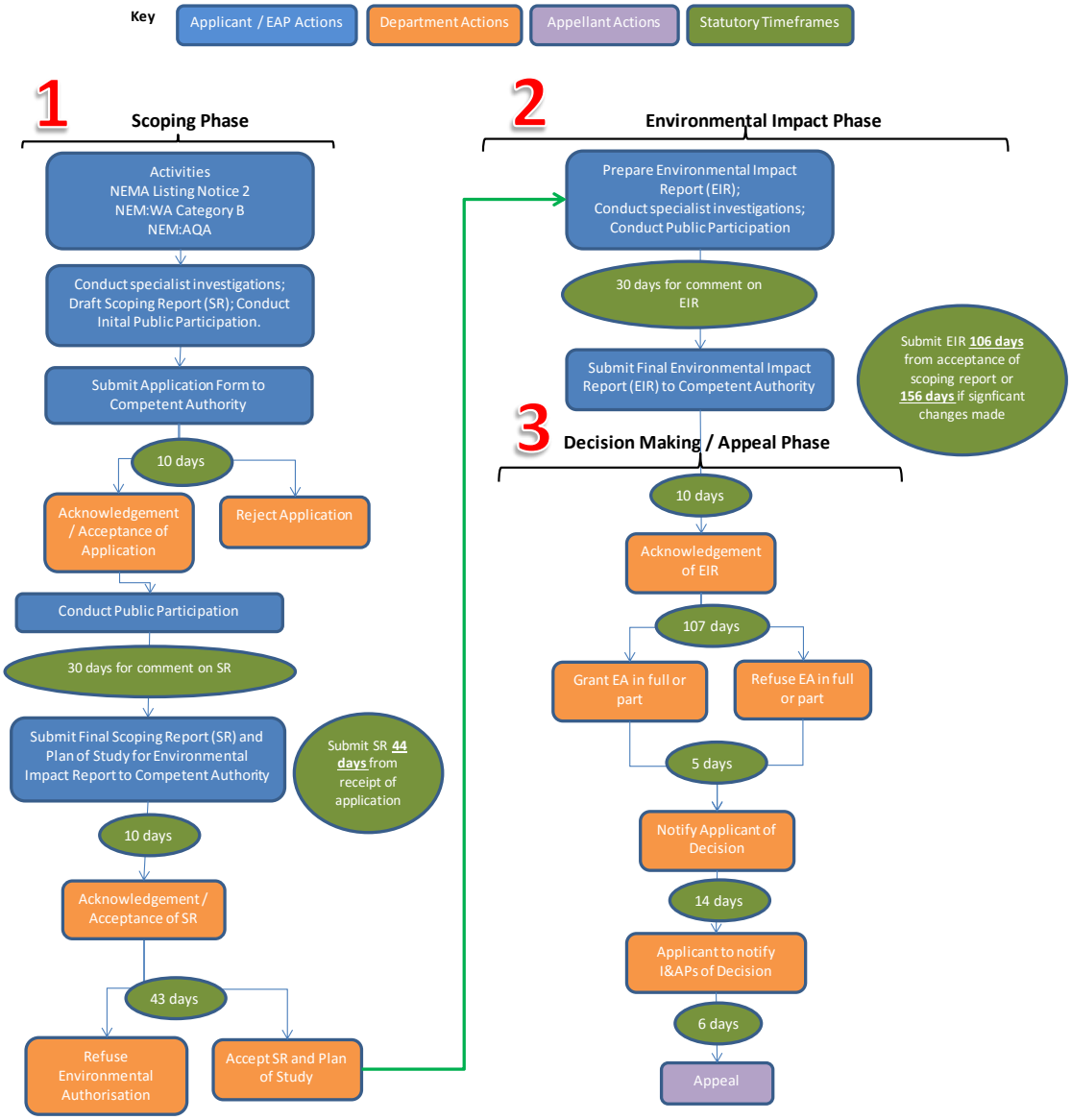

Figure 2: Summary of Scoping & EIR Process in terms of the 2014 Regulations.

The listed activities associated with the proposed development, as stipulation under 2014 Regulations **983, 984 and 985** are as follows:

Table 1: NEMA 2014 listed activities for the AMDA Delta PV Energy Facility

Listed activity as described in GN R.983, 984 and 985	Description of project activity that triggers listed activity
Regulation 983 – Basic Assessment	
GN R983 Activity 11: *The development of facilities or infrastructure for the*	The proposed AMDA Delta PV Energy Facility will connect to the national electricity

transmission and distribution of electricity- *(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or* *(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.*	via the Mookodi MTS sub-station. The proposed distribution and transmission infrastructure includes the construction of an on-site substation and a 132kV overhead power line from the on-site substation.
Regulation 984 – Scoping and Environmental Impact Reporting	
GN R984 Activity 1: The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs within an urban area.	The proposed AMDA Delta PV Energy Facility will have a maximum generation Capacity (Contracted Capacity) of 75 megawatts and as such exceeds the threshold defined in this activity.
GN R984 Activity 15: The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	The proposed AMDA Delta PV Energy Facility will have a maximum footprint of 250ha and as such exceeds the threshold defined in this activity.
Regulation 985 – Basic Assessment	
NO Activities in terms of Regulation 985.	

NOTE: GN983 Activity 12 and 18 were originally included in this environmental process. The ecologist has subsequently confirmed that there are no water courses present on the property.

NOTE: Basic Assessment as well as Scoping and Environmental Impact Reporting Activities are being triggered by the proposed development and as such, the Environmental Process will follow a Scoping and Environmental Impact Reporting process.

It must be noted that these activities are all to be considered at the scoping phase, but certain of the activities listed above may no longer be relevant after the outcome of the specialist studies. In this case, these activities will be excluded from further assessment.

Before any of the above mentioned listed activities can be undertaken, authorisation must be obtained from the relevant authority, in this case the National Department of Environmental Affairs (DEA). Should the Department approve the proposed activity, the Environmental Authorisation does not exclude the need for obtaining relevant approvals from other Authorities who has a legal mandate.

2.3 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY (ACT 10 OF 2004)

The National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA) provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The Draft National List of Threatened Ecosystems (Notice 1477 of 2009, Government Gazette No 32689, 6 November 2009) has been gazetted for public comment.

The list of threatened terrestrial ecosystems supersedes the information regarding terrestrial ecosystem status in the NSBA 2004. In terms of the EIA regulations, a basic assessment report is required for the transformation or removal of indigenous vegetation in a critically endangered or endangered ecosystem regardless of the extent of transformation that will occur. **However, all of the vegetation types on both the study sites are classified as Least Threatened.**

NEMBA also deals with endangered, threatened and otherwise controlled species. The Act provides for listing of species as threatened or protected, under one of the following categories:

- **Critically Endangered**: any indigenous species facing an extremely high risk of extinction in the wild in the immediate future.
- **Endangered**: any indigenous species facing a high risk of extinction in the wild in the near future, although it is not a critically endangered species.
- **Vulnerable**: any indigenous species facing an extremely high risk of extinction in the wild in the medium-term future; although it is not a critically endangered species or an endangered species.
- **Protected species**: any species which is of such high conservation value or national importance that it requires national protection. Species listed in this category include, among others, species listed in terms of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Certain activities, known as Restricted Activities, are regulated by a set of permit regulations published under the Act. These activities may not proceed without environmental authorization.

An ecological specialist has been appointed to provide input into the vegetation type for the site. The results of this study will be presented later on in the environmental process.

2.4 NATIONAL PROTECTED AREA EXPANSION STRATEGY (NPAES) FOR S.A. 2008 (2010)

Considering that South Africa's protected area network currently falls far short of sustaining biodiversity and ecological processes, the NPEAS aims to achieve cost-effective protected area expansion for ecological sustainability and increased resilience to Climate Change. Protected areas, recognised by the National Environmental Management: Protected Areas Act (Act 57 of 2003), are considered formal protected areas in the NPAES. The NPAES sets targets for expansion of these protected areas, provides maps of the most important protected area expansion, and makes recommendations on mechanisms for protected area expansion.

The NPAES identifies 42 focus areas for land-based protected area expansion in South Africa. These are large intact and un-fragmented areas suitable for the creation or expansion of large protected areas. **There are no NPAES expansion areas that have been identified in close proximity to the site**..

2.5 CRITICAL BIODIVERSITY AREAS.

The site falls within the planning domain of the North-West Province Biodiversity Conservation Assessment (Skowno & Desmet 2013), which maps Critical Biodiversity Areas and Ecological Support Areas within the North West Province. A large part of the site is within a Tier 2 Critical Biodiversity Area. The Tier 2 CBA is based on the presence of underlying dolerite soils, which are deemed to be more important than the surroundings area for biodiversity and are also targeted for croplands. As such, the CBA at the site is based on this broad-scale consideration and not the known presence of biodiversity features of significance within the area. While the development would result in the loss of some extent of the CBA, this is not considered significant, due to the low extent of the loss as well as the proximity of the site to Vryburg.

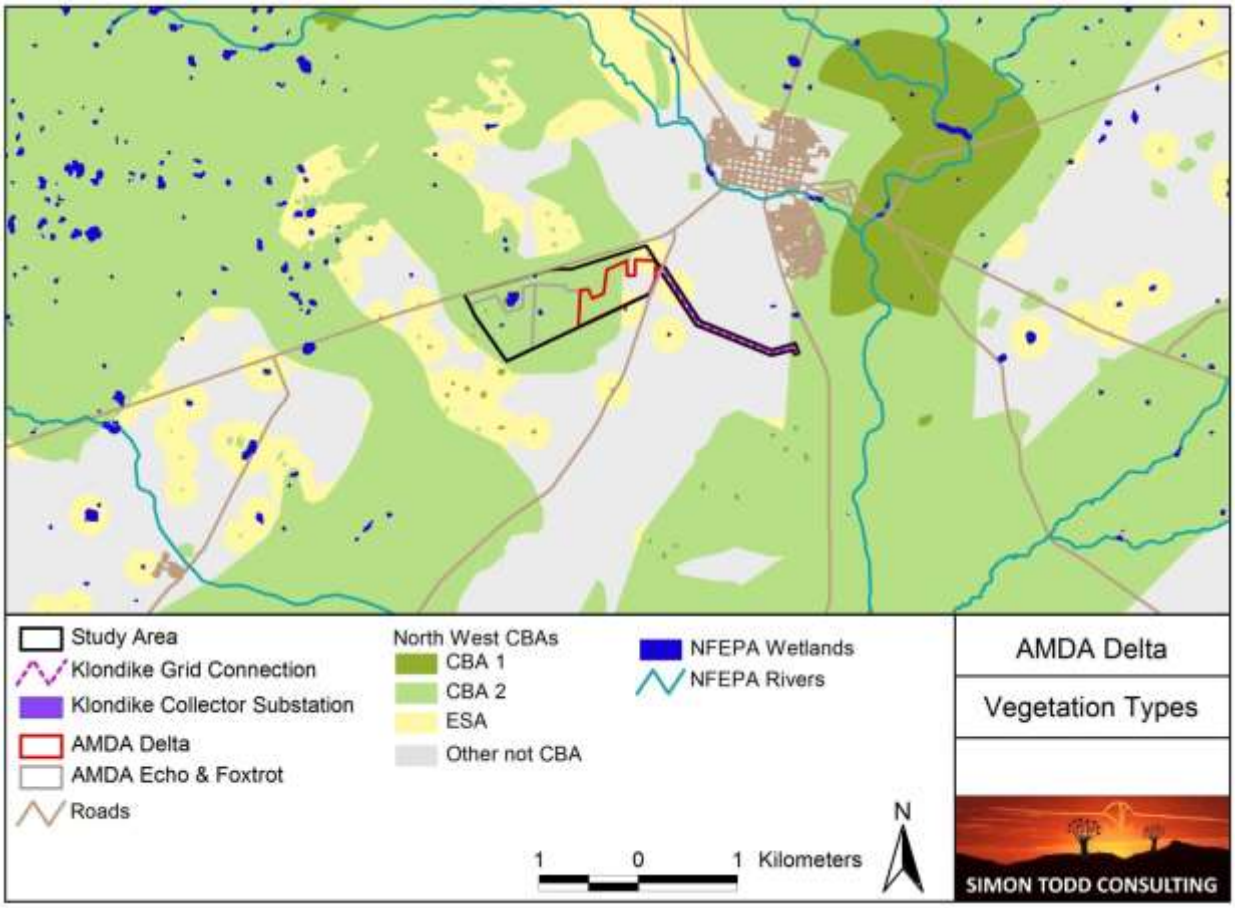

Figure 4. Critical Biodiversity Areas map for the broad study area (Skowno & Desmet 2013).

In terms of other broad-scale planning studies, the site does not fall within a National Protected Areas Expansion Strategy Focus Area (NPAES), indicating that the area has not been identified as an area of exceptional biodiversity or of significance for the long-term maintenance of broad-scale ecological processes and climate change buffering within the region.

An ecological specialist has been appointed to provide input into the sensitivity of the vegetation of the site including the context with surrounding areas. Please refer to Annexure E1.

2.6 NATIONAL FORESTS ACT (NO. 84 OF 1998):

The National Forests Act provides for the protection of forests as well as specific tree species, quoting directly from the Act: "*no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a*

licence or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated".

The Ecological specialist confirmed the following with regard to listed and threatened species. Listed species known to occur in the vicinity of the site are listed below the table. It can be confirmed that at least two of the species listed for the area do not occur at the site, those being *Encephalartos altensteinii* and *Asparagus stipulaceus*. It is also unlikely that the dwarf succulents *Nananthus vittatus* or *Lithops lesliei* subsp. *lesliei* occur at the site on account of a lack of suitable habitat. Similarly, *Rennera stellata is reportedly "*Found in or on the edge of a calcareous pan, associated with unweathered calcrete rock and fed by a fountain. Specific in habitat requirements" and is therefore highly unlikely that this species occurs at the site. Therefore only *Pelargonium sidoides* and may occur at the site, but this cannot be confirmed as this species would have been dormant at the time of the site visit. It is however widespread and the development of the site would not result in significant habitat loss for this species.

Table 2: IUCN status of plant species recorded from the vicinity of the proposed Vryburg waste water treatment works, based on the SANBI SIBIS database. Only *Acacia erioloba* can be confirmed present.

Family	Species	IUCN Status
MESEMBRYANTHEMACEAE	*Nananthus vittatus*	DDT
FABACEAE	*Acacia erioloba*	Declining
GERANIACEAE	*Pelargonium sidoides*	Declining
ASPARAGACEAE	*Asparagus stipulaceus*	NT
MESEMBRYANTHEMACEAE	*Lithops lesliei subsp. lesliei*	NT
ASTERACEAE	*Rennera stellata*	VU
ZAMIACEAE	*Encephalartos altensteinii*	VU

2.7 CONSERVATION OF AGRICULTURAL RESOURCES ACT – CARA (ACT 43 OF 1983):

CARA provides for the regulation of control over the utilisation of the natural agricultural resources in order to promote the conservation of soil, water and vegetation and provides for combating weeds and invader plant species. The Conservation of Agricultural Resources Act defines different categories of alien plants:

- Category 1 - prohibited and must be controlled;
- Category 2 – must be grown within a demarcated area under permit; and
- Category 3 - ornamental plants that may no longer be planted, but existing plants may remain provided that all reasonable steps are taken to prevent the spreading thereof, except within the flood lines of water courses and wetlands.

The abundance of alien plant species on the AMDA Delta PV Energy Facility site is very low, which can be ascribed mainly to the aridity of the site.

The Department of Agriculture, Land Reform and Rural Development is guided by Act 43 of 1983.

In order to comply with their mandate in terms of this legislation, the developer must take care of the following:

Article 7.(3)b of Regulation 9238: CONSERVATION OF AGRICULTURE RESOURCES, 1983 (Act 43 of 1983)

Utilisation and protection of vleis, marshes, water sponges and water courses

- 7.(1) “no land user shall utilize the vegetation in a vlei, marsh or water sponge or within the flood area of a water course or within 10 meters horizontally outside such flood area in a manner that causes or may cause the deterioration of or damage to the natural agriculture resources.”
- (3)(b) “cultivate any land on his farm unit within the flood area of a water course or within 10 meters horizontally outside the flood area of a water course”

The proposed AMDA Delta layout has been developed in such a manner as to insure its impacts in terms of article 7 of CARA are kept to an absolute minimum.

2.8 NATIONAL HERITAGE RESOURCES ACT

The protection and management of South Africa’s heritage resources are controlled by the National Heritage Resources Act (Act No. 25 of 1999). South African National Heritage Resources Agency (SAHRA) is the enforcing authority in the Northern Cape, and is registered as a Stakeholder for this environmental process.

In terms of Section 38 of the National Heritage Resources Act, SAHRA will comment on the detailed Heritage Impact Assessment (HIA) where certain categories of development are proposed. Section 38(8) also makes provision for the assessment of heritage impacts as part of an EIA process.

The National Heritage Resources Act requires relevant authorities to be notified regarding this proposed development, as the following activities are relevant:

- *the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;*
- *any development or other activity which will change the character of a site exceeding 5 000 m² in extent;*
- *the re-zoning of a site exceeding 10 000m^2 in extent.*

Furthermore, in terms of Section 34(1), no person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the SAHRA, or the responsible resources authority.

Nor may anyone destroy, damage, alter, exhume or remove from its original position, or otherwise disturb, any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority, without a permit issued by the SAHRA, or a provincial heritage authority, in terms of Section 36 (3).

In terms of Section 35 (4), no person may destroy, damage, excavate, alter or remove from its original position, or collect, any archaeological material or object, without a permit issued by the SAHRA, or the responsible resources authority.

Mr Stefan de Kock, of Perception Heritage Planning, has been appointed to undertake an integrated heritage assessment for the proposed AMDA Delta PV Energy Facility. This integrated heritage study ncludes an Archaeological Impact Assessment undertaken by Dr Peter Nilssen as well as a Paleontological Desktop Assessment undertaken by Dr John Almond. Please refer to Appendices E3, E4 and E5 for copies of these studies. Once the integrated heritage impact assessment is completed (during the environmental impact assessment phase of this development) this will be submitted to the South African Heritage Resources Agency for comment.

2.9 NATIONAL WATER ACT, NO 36 OF 1998

Section 21c & i of the National Water Act (NWA) requires the Applicant to apply for authorisation from the Department of Water and Sanitation for an activity in, or in proximity to any watercourse. Such an application would be required for any access road or PV infrastructure that crosses any watercourse.

Section 21(a) of the National Water Act is related to the abstraction of water from .a water resource (including abstraction of groundwater). A Water Use Licence (WUL) would be required for such abstraction.

Water required for the construction and operation of the AMDA Delta PV Energy Facility is to be sourced either sourced from Naledi Local Municipality. In Future, should the project consider abstraction from a water resource for the purposes of construction or operating of the facility, such abstraction will likely require a licence in terms of Section 21(a) of the NWA.

The Ecological specialist has not identified any water resources occurring on site and as such, the facility will not likely require a licence in terms of section 21(i) and (c) of the National Water Act.

The Department of Water and Sanitation have been registered as a key stakeholder in this environmental process.

2.10 Astronomy Geographic Advantage Act, 2007 (Act No 21 Of 2007)

The purpose of the Act is to preserve the geographic advantage areas that attract investment in astronomy. The entire Northern Cape Province, excluding the Tsantsabane Municipality, has been declared an astronomy advantage area. The Northern Cape optical and radio telescope sites were declared core astronomy advantage areas. The Act allowed for the declaration of the Southern Africa Large Telescope (SALT), Meerkat and Square Kilometre Array (SKA) as astronomy and related scientific endeavours that has to be protected.

The South African SKA Project Office have been registered as a key stakeholder on this environmental process and will be requested to provide comment and input in terms of the Astronomy Geographic Advantage Act.

2.11 THE CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS

The Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or the Bonn Convention) is an intergovernmental treaty and is the most appropriate instrument to deal with the conservation of terrestrial, aquatic and avian migratory species. The convention includes policy and guidelines with regards to the impact associated with man-made infrastructure. CMS requires that parties (South Africa is a signatory) take measures to avoid migratory species from becoming endangered (Art II, par. 1 and 2) and to make every effort to prevent the adverse effects of activities and obstacles that seriously impede or prevent the migration of migratory species i.e. power lines (Art 111, par. 4b and 4c).

2.12 THE AGREEMENT ON THE CONVENTION OF AFRICAN-EURASIAN MIGRATORY WATER BIRDS

The Agreement on the Conservation of African-Eurasian Migratory Water birds (AEWA) is an intergovernmental treaty dedicated to the conservation of migratory waterbirds and their habitat across Africa, Europe, the Middle East Central Asia, Greenland and the Canadian Archipelago. The AEWA covers 255 species of birds ecologically dependent on wetlands for at least part of their annual cycle and is a legally binding agreement by all contracting parties (South Africa included) to

guarantee the conservation of migratory waterbirds within their national boundaries through species and habitat protection and the management of human activities.

2.13 THE NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT

The National Environmental Management: Biodiversity Act (No. 10 of 2004, NEMBA) regulations on Threatened and Protected Species (TOPS) provides for the consolidation of biodiversity legislation through establishing national norms and standards for the management of biodiversity across all sectors and by different management authorities. The national Act and several sets of provincial conservation legislation provide for among other things, the management and conservation of South Africa's biodiversity; protection of species and ecosystems that necessitate national protection and the sustainable use of indigenous biological resources.

2.14 GUIDELINES TO MINIMISE THE IMPACTS ON BIRDS OF SOLAR FACILITIES AND ASSOCIATED INFRASTRUCTURE IN SOUTH AFRICA

The "Guidelines to minimise the impact on birds of Solar Facilities and Associated Infrastructure in South Africa" (Smit, 2012) is perhaps the most important (although not legally binding) document from an avifaunal impact perspective currently applicable to solar development in South Africa. The guidelines are published by BirdLife South Africa (BLSA) and detail the recommended procedure for conducting an avifaunal specialist study as well as list all of the potential impacts of interactions between birds and solar facilities and associated infrastructure. We are aware of changes to the BirdLife South Africa best-practise guidelines recently published at the Birds and Renewable Energy Forum in Johannesburg (2015) and although the revised requirements are still a work in progress and have not yet been ratified, they will inform this assessment where applicable.

2.15 ENVIRONMENTAL IMPACT ASSESSMENT GUIDELINE FOR RENEWABLE ENERGY PROJECTS

The Minister of Environmental Affairs published the Environmental Impact Assessment Guideline for Renewable Energy in terms of section 24J of the National Environmental Management Act, 1998 (Act No. 107 of 1998) on 16 October 2016.

In pursuit of promoting the country's Renewable Energy development imperatives, the Government has been actively encouraging the role of Independent Power Producers (IPPs) to feed into the national grid. Through its Renewable Energy IPPs Procurement Programme, the DoE has been engaging with the sector in order to strengthen the role of IPPs in renewable energy development. Launched during 2011, the IPPs Procurement Programme is designed so as to contribute towards a target of 3 725MW, and towards socio-economic and environmentally sustainable development, as well as to further stimulate the renewable industry in South Africa.

In order to facilitate the development of first phase IPPs procurement programme in South Africa, these guidelines have been written to assist project planning, financing, permitting, and implementation for both developers and regulators. The guideline is principally intended for use by the following stakeholder groups:

- Public Sector Authorities (as regulator and/or competent authority);
- Joint public sector authorities and project funders, e.g., Eskom, IDC, etc.
- Private Sector Entities (as project funder/developer/consultant);
- Other interested and affected parties (as determined by the project location and/or scope).

This guideline aims to ensure that all potential environmental issues pertaining to renewable energy projects are adequately and timeously assessed and addressed as necessary so as to ensure sustainable roll-out of these technologies by creating a better understanding of the environmental approval process for renewable energy projects.

The guidelines list the following possible environmental impacts associated with the development of solar energy facilities.

Table 3: Potential environmental impacts of solar energy projects (Adapted from DEA, 2015)

Impact Description	Relevant Legislation	Applicability to this project
Visual Impact	NEMA	A visual impact assessment has been undertaken
Noise Impact (CSP)	NEMA	This application is not for CSP
Land Use Transformation (fuel growth and production)	NEMA, NEMPAA, NHRA	This application is not related to fuel growth. The impact on land use transformation has however been assessed.
Impacts on Cultural Heritage	NEMA, NHRA	A Heritage, Archaeology and Palaeontology Specialist have been appointed to provide input into this environmental process.
Impacts on Biodiversity	NEMA, NEMBA, NEMPAA, NFA	A ecologist and Avifaunal specialist have been appointed to provide input into this environmental process.
Impacts on Water Resources	NEMA, NEMICMA, NWA, WSA	The ecological specialist has confirmed that there are no freshwater ecosystems present on the proposed study site footprint.
Hazardous Waste Generation (CSP and PV)	NEMA, NEMWA, HAS	The EMPR will deal with the management of waste associated with the PV infrastructure,
Electromagnetic Interference	NEMA	This project is outside of an Astronomic Advantage Area. The SKA have however been given an opportunity to comment on this proposed development
Aircraft Interference	NEMA, MSA	The Civil Aviation Authority has been given an opportunity to comment on Environmental Process.
Loss of Agricultural Land	SALA	An Agricultural potential study and Impact assessment forms part of this environmental process

Impact Description	Relevant Legislation	Applicability to this project
Sterilisation of mineral resources	MPRDA	The DMR have been given an opportunity to comment on this environmental process

Assuming an IPP project triggers the need for Basic Assessment (BA) or scoping environmental Impact Assessment (S&EIA) under the EIA regulations, included in the assessment process is the preparation of an environmental management programme (EMPr). Project-specific measures designed to mitigate negative impacts and enhance positive impacts should be informed by good industry practice and are to be included in the EMP. Potential mitigation measures for solar energy projects include but are not limited to:

- Conduct pre-disturbance surveys as appropriate to assess the presence of sensitive areas, fauna, flora and sensitive habitats;
- Plan visual impact reduction measures such as natural (vegetation and topography) and engineered (berms, fences, and shades, etc.) screens and buffers;
- Utilise existing roads and servitudes as much as possible to minimise project footprint;
- Site projects to avoid construction too near pristine natural areas and communities;
- Locate developments away from important habitat for faunal species, particularly species which are threatened or have restricted ranges, and are collision-prone or vulnerable to disturbance, displacement and/or habitat loss;
- Fence sites as appropriate to ensure safe restricted access;
- Ensure dust abatement measures are in place during and post construction;
- Develop and implement a storm water management plan;
- Develop and implement waste management plan; and
- Re-vegetation with appropriate indigenous species to prevent dust and erosion, as well as establishment of alien species.

The recommendations of these guidelines have been used to draft the Scoping Report, Environmental Impact Report and the Environmental Management Programme.

2.16 Sustainability Imperative

The norm implicit to our environmental law is the notion of sustainable development ("SD"). SD and sustainable use and exploitation of natural resources are at the core of the protection of the environment. SD is generally accepted to mean development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. The evolving elements of the concept of SD *inter alia* include the right to develop; the pursuit of equity in the use and allocation of natural resources (the principle of intra-generational equity) and the need to preserve natural resources for the benefit of present and future generations. Economic development, social development and the protection of the environment are considered the pillars of SD (the triple bottom line).

"*Man-land relationships require a holistic perspective, an ability to appreciate the many aspects that make up the real problems. Sustainable planning has to confront the physical, social, environmental and economic challenges and conflicting aspirations of local communities. The imperative of sustainable planning translates into notions of striking a balance between the many*

competing interests in the ecological, economic and social fields in a planned manner. The 'triple bottom line' objectives of sustainable planning and development should be understood in terms of economic efficiency (employment and economic growth), social equity (human needs) and ecological integrity (ecological capital)."

As was pointed out by the Constitutional Court, SD does not require the cessation of socio-economic development but seeks to regulate the manner in which it takes place. The idea that developmental and environmental protection must be reconciled is central to the concept of SD - it implies the accommodation, reconciliation and (in some instances) integration between economic development, social development and environmental protection. It is regarded as providing a "conceptual bridge" between the right to social and economic development, and the need to protect the environment.

Our Constitutional Court has pointed out that the requirement that environmental authorities must place people and their needs at the forefront of their concern so that environmental management can serve their developmental, cultural and social interests, can be achieved if a development is sustainable. "*The very idea of sustainability implies continuity. It reflects the concern for social and developmental equity between generations, a concern that must logically be extended to equity within each generation. This concern is reflected in the principles of inter-generational and intra-generational equity which are embodied in both section 24 of the Constitution and the principles of environmental management contained in NEMA.*" [Emphasis added.]

In terms of NEMA sustainable development requires the integration of the relevant factors, the purpose of which is *to ensure that development serves present and future generations.*[2]

It is believed that the proposed 75MW AMDA Delta PV Facility supports the notion of sustainable development by presenting a reasonable and feasible alternative to the existing vacant land use type, which has limited agricultural potential due the lack of water and infrastructure.

Furthermore the proposed alternative energy project (reliant on a natural renewable resource – solar energy) is in line with the national and global goal of reducing reliance on fossil fuels, thereby providing long-term benefits to future generations in a sustainable manner.

3 ACTIVITY

The proposed photovoltaic (PV) SEF will have a net generating capacity of 75 MW_{AC} with an estimated maximum footprint of ± 250 ha. A preliminary study area of ± 900 ha was identified by the Project Developer with input from the EAP and Ecological Specialist. Following this, ecological, agricultural, visual and archaeological experts were appointed to undertake their baseline assessments and sensitivity analysis on the site. This sensitivity plan will be used to determine the exact layout / position of the proposed PV footprint.

The technology under consideration is photovoltaic (PV) modules mounted on either of fixed or tracking structures. Other infrastructure includes inverter stations, internal electrical reticulation, internal roads, an on-site switching station / substation, a 132 kV overhead (OH) transmission line, auxiliary buildings, construction laydown areas and perimeter fencing and security infrastructure. The on-site switching station / substation will locate the main power transformer/s that will step up the generated electricity to a suitable voltage level for transmission into the national electricity grid, via the OH line. Auxiliary buildings include, *inter alia*, a control building, offices, warehouses, visitors centre, staff lockers and ablution facilities and gate house and security offices.

[2] See definition of "sustainable development" in section 1 of NEMA.

Figure 3: Proposed Facility layout showing access road and evacuation line

An engineering layout report will be developed and included in further reports that form part of this environmental process.

4 SITE SELECTION MATRIX

Please refer to the site selection process report as provided by AMDA Developments and attached in Annexure G7. The following is summarised from this document.

In choosing a site for the development of a solar PV project the developer, go through a process of evaluating a number of possible alternative sites in terms of the criteria that would make a viable site worth bidding in the competitive Department of Energy's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP).

The REIPPPP is a very competitive program and a site that is marginally less suitable from a solar resource or development cost perspective has less chance of securing a successful bid. Therefore the developers, put a lot of effort into evaluating and selecting the best available sites.

The Department of Environmental Affairs, together with other State Departments has gone through a Strategic Environmental Assessment process which has resulted in the creation of Renewable Energy Development Zones (REDZ). These REDZ's are a guideline as to where it is appropriate to develop renewable energy projects and the development of renewable energy projects is not restricted only to these areas. It is therefore still important to evaluate individual sites within or across these REDZ's and other areas to determine and select the most competitive sites.

The main criteria used in the evaluation of the alternative development sites are; a good solar resource, proximity to Eskom grid access, Eskom grid capacity, a flat open site, sufficient development space, no mountains nearby, low value land, low agricultural potential, low environmental sensitivity, availability of water and the land must be available for development.

A site should preferably be adjacent to or close by to a point where it can connect to the Eskom grid. Connection lines of up to a few kilometers can still be competitive.

The Eskom grid has to have the capacity at the grid connection point to evacuate the power from the project. If any extensive grid strengthening needs to be done to evacuate the power this grid upgrade is done at the cost of the project and thus the project is unlikely to be competitive.

Also at issue here is that the time taken to select, sign up, permit and bid a project is usually longer than the interval between successive REIPPPP bids. There is thus the risk that other projects might take up the available grid capacity in the time the project is being permitted and the project might have to be abandoned.

The project design and layout can be optimized on a flat open site as no special or expensive adjustments need to be made for shadow effects between the various components. The proximity of mountains can reduce the yield at a site. Land with a gentle northwards slope is also suitable.

Sufficient space allows for the optimization of the layout, but more importantly if there is sufficient space for multiple projects economies of scale can lead to very competitive bids.

Land with a high agricultural potential should not be used for the development of a solar PV project as food security outranks energy security.

A site with a low land value will allow a cost effective lease price and hence a more competitive bid.

Sites without any significant environmental sensitivities allow for development optimization without any costly layout constraints or design precautions. Environmental sensitivities include floral, faunal sensitivities as well as the existence or proximity to water courses or wetlands.

Water is needed for the construction and operational stages of a project. The solar PV projects use a low volume of water during the operational phase and so securing this water is usually not an issue. During the construction stage more water is needed and the water often needs to be obtained from distant sources and transported.

5 NEED AND DESIRABILITY

In keeping with the requirements of an integrated Environmental Impact process, the DEA&DP [3]*Guidelines on Need and Desirability (2010 & 2011)* were referenced to provide the following estimation of the activity in relation to the broader societal needs. The concept of need and desirability can be explained in terms of its two components, where *need* refers to *time* and *desirability* refers to *place*. Questions pertaining to these components are answered in the Sections below.

The section 1.1 above considers the overall need for alternative, so-called 'green energy' in light of the known environmental burdens associated with the impact of coal power generation through which most of our country's electricity is currently being generated. Associated aspects such as air pollution, water use and carbon tax are discussed in order to further explain the need and desirability for 'green energy' projects in general.

5.1.1 Feasibility consideration

The commercial feasibility for the proposed 75MW$_{AC}$ AMDA Delta PV Energy Facility to be built on private land near Vryberg, has been informed by its contextual location, and economic, social and environmental impacts and influence. The project has gathered sufficient information and

[3] The Western Cape Provincial guidelines on Need and Desirability were considered in the absence of National and Northern Cape Guidelines.

commissioned various studies of the site and the region to make qualified and reliable assumptions on the project's various impacts.

5.1.2 Solar Resource & Energy Production

The arid climate experienced in the North West Province lends itself to the availability of high levels of solar energy. Considering the steady nature of the solar radiation at the AMDA Delta site, the resource is sufficient to guarantee a positive return on investment.

5.1.3 Solar Farm & Grid Connection

Among the outstanding characteristics of the AMDA Delta PV Energy Facility site is its exceptionally flat nature, sufficient non sensitive environments and accessible location, facilitating the delivery of bulky PV Panel infrastructure, and the construction and assembly process. The proximity of the site to the N14 decreases the impact on secondary roads and natural habitat from the traffic going to and from the solar facility during construction and operations. The proximity of the Mookodi Sub Station also allows for connection via a relatively short transmission line. As the site is not used for intensive agricultural purposes, the solar facility will not interfere with the agricultural productivity of the area (an agricultural specialist has been commissioned to confirm this)

5.1.4 Social impact

The The local economy, mainly supported by limited agriculture, simply isn't enough to accommodate the high level of unemployment.

Power generation is one of the rare growth opportunities for the North West Province due to the high solar irradiation levels and its strategic position relative to the National Transmission Network. This setup creates unprecedented growth opportunities for the area and the establishment of a **renewable energy project is considered important to diversify and compliment the economic development of the region**.

Notwithstanding this general understanding of social impact, a Social Specialist (Mr Tony Barbour) has been appointed to undertake a Social Impact Assessment (SIA) of this proposed development. This SIA will form part of the Impact Assessment Phase of the environmental process.

5.1.5 Employment & Skills Transfer

The benefits of renewable energy facilities to local regions are not confined to the initial investment in the project. They also provide a reliable and on-going income for landowners and municipality, creating direct employment opportunities for locals, as well as flow-on employment for local businesses through provision of products and services to the project and its employees.

The AMDA Delta PV Energy Facility will have a positive impact on local employment. During the estimated 18 month construction phase, the project will **employ approximately 40-50 people** of various qualifications. The majority will be provided by the local labour market. During operations, the solar facility is expected to have **6-10 permanent employees** ranging from security staff to administration and artisans. Due the fact that there is no skilled labour in the field of renewable energy as yet, the employment structure will consist of local and overseas capacity. To guarantee successful operations over the lifetime of the investment, the AMDA Delta PV Energy Facility will use the skills of outside labour to **cross-train local specialists**. This cross training and skills development will take place especially in the area of technical maintenance and administration.

The economic impact of the proposed AMDA Delta PV Energy Facility reflects expenditures related to the construction and operation. These activities will increase economic activity within the region and province.

5.1.6 need (time)

Is the land use considered within the timeframe intended by the existing approved Spatial Development Framework (SDF)? (I.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP?

Yes, 'the employment of renewable energy technology' / development has a spatial strategic place in the Naledi Municipality SDF while the need for a policy on the development of sustainable solar energy farms has been identified as Key Development Priority / Project.

Should the development occur here at this point in time?

Yes, the proposed AMDA Delta PV Energy Facility is to be located outside the Vryberg urban edge, would provide a welcomed diversification to the local economy and perhaps serve as a catalyst for further expansion in the stream of sustainable renewable energy development (identified as a priority development strategy IDP & SDF).

Does the community / area need the activity and the associated land use concerned?

The NAledi Municipality identified the opportunity for a renewable energy project through their SDF and IDP processes, which include public participation. The proposed renewable energy development will allow for a diversification of employment, skills and contribute to the potential development of small business associated with its construction, operation and maintenance activities.

From the location near Vryberg the proposed solar farm will contribute electricity to the constrained Northern Cape and National electrical network, contributing to a provincial and national need. The AMDA Delta PV Energy Facility has been designed to in such a way as to avoid or minimize potential negative impacts of the local environment while enhancing potential positive impacts, locally and regionally.

Are the necessary services with adequate capacity currently available?

Some existing, some new. The AMDA Delta PV Energy Facility development requires the installation of a 132 kV overhead transmission line to connect to the Mookodi Sub Station (feed into the national grid system), as well as an access road to the development site from the existing N14. The cost of supplying the new infrastructure will be covered by the Applicant. The bird-friendly additions to the proposed new powerline will have a net benefit to the existing line, through minimizing bird collisions and electrocutions.

The water required for the construction and operation of the solar facility will be sourced from the Naledi Municipality and will be supplemented by stored rainwater (The applicant is engaging directly with the municipality to confirm the municipalities water supply capacity and their capability of providing water for this development).

Construction waste will be disposed of at an existing landfill site. The applicant must engage with the municipality to identify an applicable licensed site that has sufficient capacity.

Is this development provided for in the infrastructure planning of the municipality?

Yes. Attracting private investment and the employment of renewable energy development are identified as priority strategies to create sustainable urban and rural settlements.

Is this project part of a national programme to address an issue of national concern or importance?

Yes. In order to meet the increasing power demand within South Africa, Eskom has set a target of 30% of all new power generation to be derived from independent power producers (IPPs). AMDA

Delta (Pty) Ltd. is one such IPP which intends to generate not exceeding 75MW (megawatts) of Alternating Current (AC) electricity from the proposed Solar Farm, for input into the national grid (via the Mookodi Sub-Station).

5.1.7 Desirability (place)

Is the development the best practicable environmental option for this land / site?

The target property is outside the Vryberg Urban Edge and as such may not be considered for an alternative land use such as urban development. The property has a poor agricultural potential due to the arid climate and soil conditions. These factors have rendered the property vacant with limited land use option alternatives. Since Photovoltaic solar facilities have a limited footprint, the physical impact on receiving environment would be low, while the remaining undeveloped areas may rehabilitate to their natural state in time and remain protected as such.

Would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?

No.

Would the approval of this application compromise the integrity of the existing approved environmental management priorities for the area?

Unlikely. According to the national vegetation map (Mucina & Rutherford 2006), the solar development site lies entirely within a vegetation type that is classified as Least Threatened (Ecosystems that cover most of their original extent and which are mostly undamaged, healthy and functioning). Considering the extent of this relatively intact ecosystem type, and the fact that the site is not highly sensitive (there are no unique, threatened or otherwise unique habitats present which are not widely available in the wider landscape), it can withstand some loss of natural area through development.

Do location factors favour this land use at this place?

Yes. The North West Province region has been identified as being viable for Solar energy generation due to the following factors:

- Excellent solar radiation (compared to other regions).
- Close to existing main transport routes and access points.
- Close to connection points to the local and national electrical grid.
- Outside Critical Biodiversity areas.

The ecological sensitive areas on and surrounding the solar site have informed the optimal location and layout for the proposed solar project, with minimal impact to the receiving environment, subject to implementation of mitigation measures.

How will the activity or the land use associated with the activity applied for, impact on sensitive natural and cultural areas?

The alternatives considered for the solar development have been iteratively designed and informed by various investigations and assessments that considered both the natural and cultural landscapes. The natural and cultural sensitive areas have been identified and where possible, avoided to prevent negative impacts on such areas.

How will the development impact on people's health and wellbeing?

The site is located outside of the Vryberg urban edge and as a result is unlikely to impact negatively on the community's health and wellbeing.

Will the proposed activity or the land use associated with the activity applied for, result in unacceptable opportunity costs?

Unlikely. The next best land use alternative to the solar facility is limited agriculture (the status-quo). However, the proposed solar development site does not have any significant agricultural value and has not been utilized for any intensive agricultural purposes. The site is too small to generate noteworthy financial benefit from agricultural activities. The development of the proposed solar facility would constitute the loss of less than 250ha of the overall property. The economic benefits and opportunities that the proposed solar development holds for the landowner and the local economy of the municipal area cannot be recovered from the current or potential agricultural activities.

The opportunity costs in terms of the water-use requirements of the solar facility are within acceptable bounds if one considers the confirmed capacity from the local authority and minimal demand on the resources.

Will the proposed land use result in unacceptable cumulative impacts?

Unlikely. This will be determined in the ongoing environmental process.

6 SOCIO ECONOMIC CONTEXT OF THE NALEDI MUNICIPAL AREA

A Social Specialist (Mr Tony Barbour) has been appointed to undertake a SIA for the proposed project. The complete SIA will form part of the Draft Environmental Impact Report. The proposed approach to this assessment is provided below.

This project is situated within the Renewable Energy Development Zones (REDZ). Vryburg is located within the Naledi Local Municipality, which forms part of the Ruth Segomotsi District Municipality.

In terms of baseline data, separate baseline data and reviews of the relevant IDPs and other key policy and planning documents will need to be taken for the respective local and district municipalities. Representatives from the relevant local municipalities will also need to be interviewed.

This proposal outlines the approach and costs associated with the undertaking a Social Impact Assessment (SIA) as part of the EIA process. In order to save costs a single site visit will be undertaken for all six sites.

6.1 APPROACH TO SIA

The proposed approach to the SIA is based on the Guidelines for SIA endorsed by Western Cape Provincial Environmental Authorities (DEA&DP) in 2007. The Guidelines are based on accepted international best practice guidelines, including the Guidelines and Principles for Social Impact Assessment (Inter-organizational Committee on Guidelines and Principles for Social Impact Assessment, 1994) and IAIA Guidance for Assessing and Managing Social Impacts (2015). The approach to the study will involve

- Project initiation and review of project information etc.
- Collection and review of reports and baseline socio-economic data on the area. This includes socio-economic characteristics of the affected areas, current and future land uses, and land uses planning documents relating to the study area and surrounds;

- Identification of the components associated with the construction and operational phase of the proposed project, including estimate of total capital expenditure, number of employment opportunities created, breakdown of the employment opportunities in terms of skill levels (low, medium and high skilled), breakdown of wages per skill level, assessment procurement policies etc.;
- Identify and set up meetings key stakeholders;
- Interviews with key affected parties, including local communities, local landowners, key government officials (local and regional), non-government organizations, the client, local farmers associations, tourism and conservation officials, chamber of commerce etc.;
- Identification and assessment of key social issues and assessment of potential impacts (negative and positive) associated with the construction and operational phase of the proposed dam. A key focus of the assessment will be an assessment of the potential socio-economic benefits for the local community associated with the proposed development.
- Identification of appropriate measures to avoid, mitigate, enhance and compensate for potential social impacts;
- Preparation of Draft Report for comment (This report will form part of the Draft EIR);
- Incorporate comments and prepare Final Report.

6.2 INTERVIEW PROCESS

The interview process is a fundamental component of the SIA process.

6.2.1 Identifying and contacting interested and affected parties to set up interviews

In this regard the first stage of the interview process is identifying the key stakeholders to be interviewed as part of the SIA. The public participation database provides a starting point for this process. However, the SIA also seeks to identify people who may not have been able to attend public meetings and or register as Interested and Affected Parties (IAPs), such as farm workers and other potentially vulnerable groups who do not have access to daily newspapers, computers and or transport etc. The process of identifying and contacting people to set up interviews can be a time consuming process and in many instances dates and times have to be changed on a regular basis to accommodate the needs of the IAPs.

6.2.2 Time allocated to interviews

A minimum of 45 – 60 minutes should be allocated to each interview. This provides the interviewer with the opportunity to introduce himself or herself to the interviewee and outline the proposed development, before focusing on the interview itself. Based on this timeframe the maximum number of interviews that can be conducted in a day is in the region of 5-6, bearing in mind that time must be allocated for traveling between interviews. In rural areas the distances can be significant and as such the number of interviews that can be undertaken in a day is less than 5.

6.3 OBJECTIVES OF THE SIA

The objectives of the SIA are to provide the EIA with a detailed description of the local socio-economic conditions affected by the proposed project and to identify the potential social opportunities and risks associated with the project. Is so doing the SIA will seek to identify measures that can be implemented to avoid and or minimize the potential social risks. The SIA will also identify measures to enhance the potential social benefits associated with the proposed project. Experience with other renewable energy projects has also shown that the information collected as part of the SIA can assist the proponent to identify potential opportunities and beneficiaries for the establishment of a Community Trust.

7 CONSIDERATION OF ALTERNATIVES

The proposed AMDA Aplha PV Energy Facility is to consist of solar photovoltaic (PV) technology with fixed, single or double axis tracking mounting structures, with a net generation (contracted) capacity of 75MW_{AC} (MegaWatts - Alternating Current) (and up to 90MW_{DC} Direct Current installed/nameplate capacity), as well as associated infrastructure, which will include:

- On-site switching-station / substation;
- Auxiliary buildings (gate-house and security, control centre, office, warehouse, canteen & visitors centre, staff lockers etc.);
- Inverter-stations, transformers and internal electrical reticulation (underground cabling);
- Access and internal road network;
- Laydown area;
- Overhead electrical transmission line / grid connection (connect to the Mookodi substation);
- Rainwater tanks; and
- Perimeter fencing.

During the pre-application stage a number of project footprints and configurations were considered by the applicant and optimised with input from ecological specialists.

7.1 PRELIMINARY DEVELOPMENT ZONE

In February 2016 the applicant defined a preliminary development zone for the proposed development. This took into account the terrain and other technical requirements for the development as well as feedback from the Ecological Specialist, Mr Simon Todd.

Figure 4: Preliminary Development Zone

7.2 PREFERRED PROJECT FOOTPRINT

Based on the preliminary development zones informed by the ecological specialist, the preferred project footprint was developed to be technically feasible, while incorporating the recommendations of the specialist.

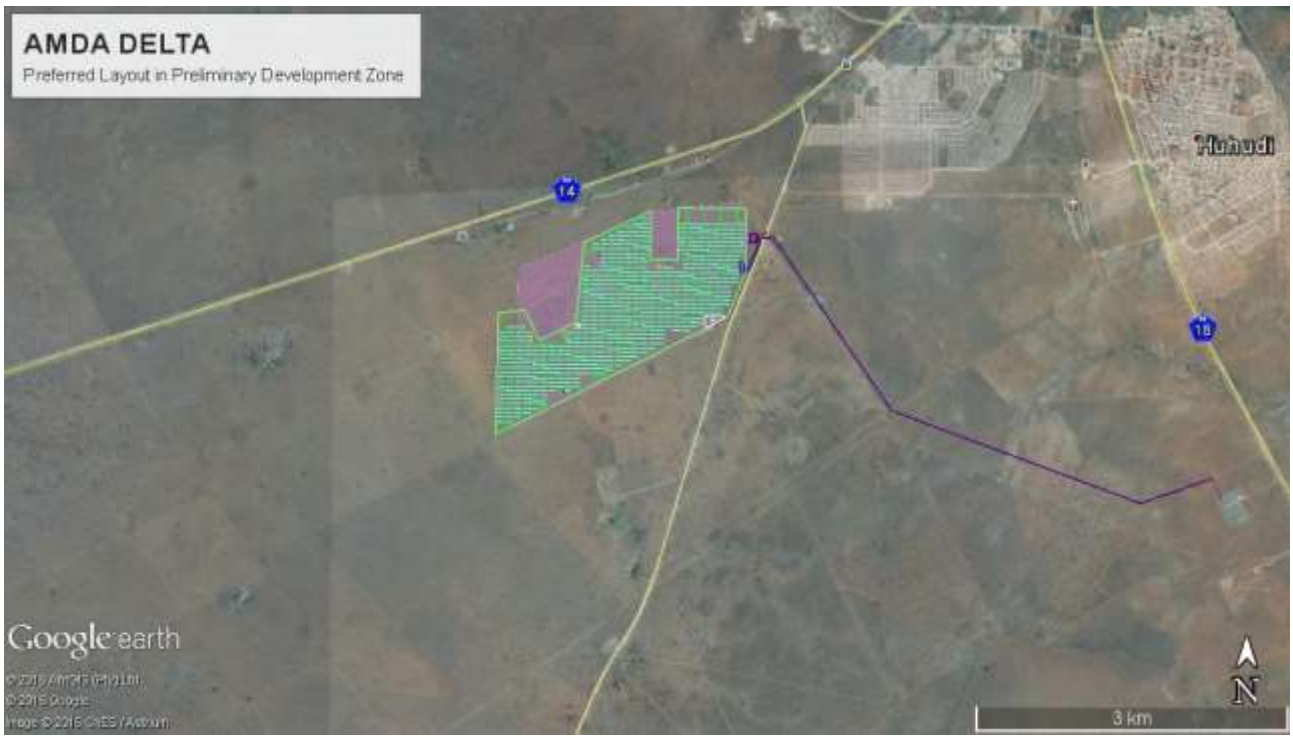

Figure 5: Preferred project footprint within ecologically defined development zone

7.3 MITIGATED PROJECT FOOTPRINT

On completion of the scoping phase of the Environmental Process, a mitigated project footprint will be developed to avoid any other sensitive features identified.

7.4 THE NO-GO ALTERNATIVE

The Status Quo Alternative proposes that the AMDA Delta PV Energy Facility not go ahead and that the area in proximity to the Mookodi substation remain undeveloped as it is currently. The land on which the proposed project is proposed is currently vacant. It is currently used for limited cattle grazing activities, however due to a combination of poor soil quality, water scarcity and extreme climatic conditions, it has no potential for irrigated crop cultivation. The area in question is also considered too small to generate noteworthy financial benefit from agricultural activities due to its low carrying capacity.

The 'No-go/Status Quo' alternative will limit the potential associated with the land and the area as a whole for ensuring energy security locally, as well as the meeting of renewable energy targets on a provincial and national scale. Should the 'do-nothing' alternative be considered, the positive impacts associated with the solar facility (increased revenue for the farmer, economic investment, local employment and generation of electricity from a renewable resource) will not be realised.

The no-go alternative is thus not considered a favourable option in light of the benefits associated with the proposed solar facility, however it will be used as a baseline from which to determine the level and significance of potential impacts associated with the proposed solar development during the Impact Assessment phase of the on-going environmental process.

8 TECHNICAL OVERVIEW

AMDA developments have prepared a technical development report which is attached in Appendix E6. The following is summarised from this report.

8.1 PROJECT SUMMARY - MAIN FEATURES

The proposed PV plant will convert the incident solar energy into direct current (DC) electricity by means of photovoltaic modules. The electricity is transferred to DC/AC inverters to convert it to alternating current (AC). The inverters are matched to the selected PV module technology, and in turn are connected to a step-up transformer in order to raise the voltage up to the grid requirements.

The Engineering, Procurement and Construction (EPC) will be carried out by an EPC Contractor in accordance with good engineering practice, with due diligence, care and professionalism. The design of the facility and the selection of equipment will be tailored for the specific site conditions, such as solar resource and climate etc.

Photovoltaic power plants have a wide range of technologies that can be considered for incorporation into the plant. During the EIA and bid process the developer will put out a Request for Offers (RFO) from credible EPC Contractors who will make proposals with respect to the technology to be used and possible equipment suppliers for the PV plant. These include the PV module manufacturer, the type and capacity of the modules, the support structure or tracker type, and manufacturer, the inverter type, etc. Some of these alternatives are discussed in more detail below.

The solar PV industry is a rapidly developing industry and the advances in the general efficiencies of the technology and also the reduction of production costs are such that it would not be feasible to commit to specific technologies and manufacturers at this stage. The average bid price for solar PV projects decreased from R2.75/kWh to about R0.75/kWh between Round 1 in October 2011 and Round 4 in 2015 respectively.

Therefore the project description will be in generic terms and will not specify specific brands and capacities.

8.2 GENERAL LAYOUT DESIGN CRITERIA

The choice of the technology or more specifically, the PV module and tracker or rack structure is the chief determinant in the layout of the PV plant. Fixed rack structures, single and two axis trackers all have different spatial requirements.

An optimised layout or spatial arrangement of the solar field is prepared based on the performance criteria and spatial requirements of the preferred equipment choices above taking into account the further design criteria listed below.

- 16 m from the centre of any power lines, either they are single power lines or double power lines
- 95 m from the centre of provincial roads (a relaxation to a lesser distance can be sought)
- 16 m to any Telkom line
- A minimum distance of 10 m to the perimeter fence to prevent theft and avoid shadows cast by the fence
- Internal and perimeter service roads of 3m surface width and 5 m reserve width
- A main access road with a 10 m reserve width

8.2.1 FOUNDATIONS

A geotechnical study will be carried out in order to provide data for the selection of the foundation. Depending on the structure or tracker that is selected, the following foundation options may be considered.

- Mass concrete block foundation
- Ground screw foundation
- Ground bolt foundation
- Concrete pile foundation
- Vibratory driven steel pile foundation

For fixed or rack structures, either driven steel piles or small concrete footings are cast in the ground for the foundations. These concrete foundations are typically of the same size as for small buildings.

The preferred technology for trackers is the vibratory driven steel pile foundation. This might be achievable on this site, however in localised areas with hard ground conditions, a steel pile in concrete in a pre-drilled hole is the more likely foundation solution. A concrete pile may also be used.

8.2.2 STRUCTURES

In order to support the PV modules, a steel structure must be used. There are different options which will be considered: a fixed or rack structure, a 1-axis tracker (horizontal, vertical or polar axis) and a 2-axis tracker. The current trend is towards rack structures or horizontal single axis trackers because of the superior production rates and cost effectiveness.

There are numerous rack and tracker manufacturers in the market, many with proprietary technology and the system chosen will depend on the proposals by the EPC Contractors.

The materials commonly used in support and tracker structures are:

- Galvanized steel
- Stainless steel
- Anodized aluminium

8.2.2.1 Fixed or rack structures

A typical rack or fixed structure will usually have two rows of 20 modules (2 strings). The modules are placed in portrait arrangement. The foundation technology is usually a direct-driven (rammed) installation, with a ramming depth subject to the soil characteristics.

Figure 6: Examples of Fixed Rack Structures

The design of the fittings for fixing the modules to the rack structures will enable thermal expansion of the metal without transferring mechanical loads that could affect the integrity of the modules. The structure will probably have anti-theft bolts.

8.2.2.2 Single-axis trackers

With a typical horizontal single-axis tracker the PV modules are attached to beams on the rotating structure. A number of these beams are placed adjacent and parallel to each other and driven by a common rotation mechanism. This allows for a modular design with each tracker module having a single central motor and a number of tracker arms. This simplifies design and allows for an extremely efficient use of space.

The system produces more output than rack structures yet still has extremely low energy consumption.

Precision electronics with GPS input and proprietary positioning algorithms ensure that the PV modules are positioned at an optimum angle to the sun at all times.

Figure 7: STI-Norland tracker

8.2.3 PV MODULES

There are various types of PV modules defined according to the materials and technology used:

- Si-Monocrystalline
- Si-Polycrystalline
- Thin Film
- High Concentrated

There are also a wide range of PV module manufacturers in the market. Currently the trend for utility scale facilities such as this is towards polycrystalline module technology.

In the REIPPPP an important bid criteria is local content and the use of locally manufactured or assembled PV modules to help the local economy, local job creation and the local communities.

The EPC Contractor establishes rigorous quality control procedures for the PV modules suppliers. These procedures are applied from the source of the supply, as well as during the entire supply chain.

Since the environmental impact of the various PV module alternatives will be the same, for the purpose of the EIA, all of the abovementioned film technology alternatives are under investigation.

8.2.4 INVERTERS

There are various types of inverters defined according to their technology. The inverter will be selected on the basis of making the most of its rated power according to the manufacturer specifications and the power to be installed in each site. The choice of inverter depends on the performance of the PV module chosen (type and model) and the size (capacity).

The number of inverters to be used is determined in a design optimisation process where there is a trade-off between fewer large capacity inverters or more lower capacity inverters widely distributed across the solar field. Typically there would be about 2250 inverters used in a 75MW PV project.

8.2.5 CONCENTRATOR BOXES

The concentrator boxes are outdoor switchgear boxes or cabinets where the electrical wires from the tracker or rack group are collected. The concentrator boxes are designed for outdoor conditions and are mounted on a concrete base.

8.2.6 TRANSFORMATION CENTRE

The transformation centre will be a concrete or steel prefabricated structure built to house the transformer and the associated protection devices. In the transformer, voltage level will be transformed from 0.38 kV to 132 kV. This might be done in a single step or in multiple steps, for example from 0.38 kV to 11 kV and then from 11 kV to 132 kV .

The number of transformers to be used is determined in a design optimisation process where there is a trade-off between fewer large capacity transformers or more lower capacity transformers widely distributed across the solar field. Typically there would be about 75 transformers used in a 75MW PV project.

8.2.7 DISTRIBUTION CENTRE

The distribution centre is where all the medium voltage lines coming from the various transformers are collected. The distribution centre also houses the meters used to measure the electricity produced and exported to the grid. The distribution centre is housed in a pre-fabricated or a steel

structure and a MV line runs from here to the collector sub-station and from there to the Eskom substation.

8.2.8 ELECTRICAL RETICULATION

The electrical reticulation within the PV plant, from the trackers or racks through to the distribution centre will all be underground.

The electrical reticulation will comprise of a Direct Current (DC) component from the PV modules to the inverters and an Alternating Current (AC) component from the inverters to the Eskom connection.

Typically the DC cabling is based on pre-assembled harnesses from each string-end connection up to the concentrator boxes. The harnesses incorporate a first-level over-current protection by means of properly sized line- fuses. The DC cable will be in full compliance with IEC and SANS standards, with single layer of XLP insulation, 90º temperature rating (wet or dry), suited for direct burial installation, rated for 1kV and UV resistant.

Typically, the cables will be sized to ensure a maximum 1.5% voltage drop between PV

modules and inverters.

Typically the AC-MV cable will be in full compliance with IEC, SANS and NRS Standards, with stranded aluminium conductor, triple extruded insulation system and high dielectric strength 22kV insulation. The MV cables will be suited for direct burial, for operation at 105°C continuous, 140°C in emergency and 250°C in short-circuit.

8.2.9 EVACUATION LINE

The electricity from the PV power plant will be evacuated via a 132kV overhead line to the new collector sub-station on the site and from there to the Eskom grid at their Mookodi sub-station. The connection point for the evacuation line will be determined by the Eskom grid connection requirements and the line will be designed and built to Eskom's standards.

The alignment of the evacuation line will be determined by the proposed grid connection point and any environmental sensitivities between the PV power plant and the grid connection point. The EIA will assess the evacuation line as a corridor, rather than a static line.

8.2.10 LIGHTINING PROTECTION SYSTEM

To protect the PV plant, equipment and personnel from lightning strikes a lightning protection system composed of masts and surges arresters will be installed. This system will be designed by a specialist and will comply with the South African laws and standards.

Although current lightening protection designs only allow for low height protection on the individual structures, provision has been made in the applications for 15m high conductor masts.

8.2.11 AUXILARY POWER SUPPLY

The PV plant requires a continuous power supply for the operation of the plant. This is for the plant monitoring and control systems, the perimeter and security systems, lights and air-conditioning etc for the buildings. Also if trackers are used, a small supply is required for the operation for the trackers.

The most cost effective and efficient source is for the auxiliary power supply is usually directly from the Eskom sub-station. The project can possibly connect to one of the existing 11kV supply lines which cross the property.

8.2.12 EMERGENCY POWER SUPPLY

In order to ensure the continuous operation of the monitoring system and security a backup diesel generator system, with at least 2 hours of autonomy, is usually installed.

8.2.13 MONITORING & CONTROL SYSTEMS

A SCADA (Supervisory Control And Data Acquisition) system will be installed. The primary purpose of SCADA is to monitor, control and alarm plant or regional operating systems from a central location. While override control is possible, it is infrequently utilized.

There are three main elements to a SCADA system, various RTU's (Remote Telemetry Units), communications and an HMI (Human Machine Interface). Each RTU effectively collects information at a site, such as from the inverters or met station, while communications bring that information from the various plant or regional RTU sites to a central location, and occasionally returns instructions to the RTU.

The HMI displays this information in an easily understood graphics form, archives the data received, transmits alarms and permits operator control as required. The HMI is essentially a PC system running powerful graphic and alarm software programs.

Communication within a plant will be by data cable, wire or fibre-optic, while regional systems most commonly utilize radio or the internet. The real time information can be monitored remotely, typically by the O&M company and the plant owners etc.

8.2.14 MET STATIONS

There will be a number of meteorological stations installed on the site in order provide adequate meteorological data to evaluate the PV plant performance. The typical meteorological station will include all or some of the following items:

- Lattice structure 3m high for the support of the systems
- pyranometer for tilted radiation
- horizontal pyranometer for global radiation
- ambient temperature sensor with natural ventilation antiradiant shield
- anemometer at 5m height
- a vane to measure the wind direction
- module temperature sensor
- humidity sensor
- data logger
- GSM/GPRS modem
- UPS or non-stop power supply system

8.3 SITE PREPARATION

Owing to the relatively open or expansive nature of the PV plant and hence the construction process, no specific service or haul roads are envisaged. The site will be sufficiently cleared to allow access for the excavation equipment and the rough terrain vehicles that will deliver the site assembled PV rack or trackers structures to their positions.

Vegetative ground cover reduces dust which influences the PV panel efficiency. The re-growth of the ground cover or rehabilitation is thus important to the PV plant. It thus makes sense to minimise the disruption of the existing vegetative ground cover.

The portions of the site needed will be cleared, grubbed and graded by means of the necessary cuts and fills in order to condition the terrain to the maximum slopes allowed for buildings, roads and racks. Given the flat nature of the site there is very little cut and fill envisaged.

8.3.1 TRENCHES

Depending on the number of cables that run in each trench and the voltage level, the dimensions of the trenches can vary. The typical width is 0.6 m and depth is from 0.6m to 1.10 m. The cable or cables are laid in a suitable bedding material, usually sand. If the in-situ material is not suitable for bedding, then bedding material will be sourced from local commercial sources. The trenches are then backfilled using suitable material that came from the trench excavations.

Trenches are usually excavated by a TLB or an excavator if the ground is hard, but given the quantity of trenching within the PV plant specialist trenching machines might be used.

8.3.2 ACCESS AND INTERNAL ROADS

The proposal is that access to the site will be either via the existing access to the farm from the N14 or a new access road from the existing Vryburg – Reivilo District Road. This gravel road will serve as the access point for the proposed cluster of solar PV developments.

The access off the District Road will be designed and built to the Road Authority's standards. The Road Authority's consent will be sought during the permitting process and construction will only commence once the detail design and specifications have been approved by the Road Authority.

Sufficient space will be allowed at the access points to ensure that the vehicles do not stack up on the District Road while being processed through security. Also the road alignment and layout will take into account the necessary safety precautions.

The common access and internal roads shall be constructed as all-weather type, the common access road will be 6m wide and the internal roads 3m wide, all with wide, open side drains forming part of the drainage system.

Passing bays will be provided at strategic points on the access road to allow the circulation of two trucks in opposite directions at the same time during the construction and operational phases.

The roads will be built with a minimum of 400mm depth of sub-grade preparation and an aggregate base layer of up to 150mm thick compacted to the 95% Proctor (AASHTO). The base layer will either be of material obtained from the excavations on site or aggregate from a commercial source.

The road layout will be designed in order to ensure ease of access to every rack or tracker structure and the horizontal geometry will be designed to enable the turning of trucks and construction vehicles.

The design process will investigate surfacing some of the roads to minimise dust.

During the operational phase access around the site is generally only required for security and routine inspection. Access for cleaning operations or maintenance is very infrequent, thus the internal service roads need only be gravel tracks.

8.3.3 DRAINAGE

The stormwater drainage system proposed will be a surface management system based on not collecting and concentrating the storm-water but rather spreading or distributing it over the site to soak away or drain slowly. This avoids the soil erosion and downstream flooding problems normally associated with the concentrated flows.

The design should allow the flows to be similar to the normal pre-development flows.

The detail drainage and stormwater surface management design will be done during the detail planning stage.

A Stormwater, Washwater and Erosion Management Plan will be developed and will form part of the Environmental Management Plan for the facility.

8.3.4 BUILDINGS & SERVICES

The buildings and facilities needed to service a PV plant are; a control room (20m^2), a small office (30 m^2), a meeting room (30 m^2)ablution facilities and kitchen area (20 m^2), a small workshop (40 m^2) and a store of 300 to 400 m^2. There will also be facilities for the security personnel on the site. There is space allocated in the PV plant layout for the buildings near the entrance to the site.

One option is to build a farm type shed of approximately 500 m^2 (40m x 12,5m) with the control room and offices etc inside the building. However, given that the electricity generating license has a 20 year term the trend is to provide temporary buildings such as Park-Homes or containers.

Services for the buildings are provided as follows.

- Electricity will come from the Eskom sub-station.
- The control room and the office will have air-conditioning
- Enviro-loo toilets will be used. These toilets are used in a number of National Parks and Nature Reserves. The toilets do not require a water supply and operate by separating the solid and water waste and then drying the waste by evaporation. The dry solids are removed and can safely be spread as compost in the field.
- Alternatively a conventional waterborne sewerage system could be installed draining to a conservancy tank. The effluent would be routinely collected and transported to the Local Authority's waste water treatment works for processing.
- The source for the small amount of potable water required for use by the site personnel will need to be determined during the planning process. See below.

Should the available water need treatment then the appropriate plant and equipment will established on site and used.

8.3.5 PARKING AREA

There will be small a hardstand parking / lay-down area near the buildings, to be used for the operational phase.

8.3.6 PERIMETER FENCING

Given the high material values and risk of theft associated with PV panels and electrical cabling it is imperative that the perimeter fences and security systems get installed and commissioned as soon as is practical. This is especially so before the electrical reticulation is operational when the materials are easier to steal.

The process will be to first fence off a delivery, storage and processing area within the site as a start and then to erect the perimeter fence and security. This will allow the initial construction start up activities to begin earlier.

The proposed perimeter fence is 2.4 m weld-mesh or wire and netting fence which is electrified or a 2.4m high electric fences with only electric strands. The electrification will be non-lethal and non-electrified outlier wires will be placed to each side of the fence to prevent small animals getting stuck under the electric fence.

A single 6m automated sliding gate will be provided for vehicular access as well as a single 1m wide gate for pedestrians.

8.3.7 SECURITY SYSTEM

The perimeter, access points and general site will be monitored by CCTV cameras infrared / night vision technology and passive intrusion detection systems. There will be security lighting which will be linked to the passive intrusion detection systems so will not be on all night.

8.3.8 OPEN SPACE AND FIRE MANAGEMENT

A firebreak of the appropriate width will be established and maintained both inside and outside of the perimeter fence. The internal perimeter road will form part of the firebreak.

An open space and veld fire management plan will be drafted and included in the Environmental Management Programme for the project. This management plan will need to be aligned with the erosion and the invasive alien plant management plans as they are inextricably linked.

8.3.9 WATER USAGE DURING CONSTRUCTION PHASE

The temporary water requirement for the construction stage of the PV plant is mainly for the production of concrete for the structure and tracker foundations, for road construction and for general construction processes and dust control etc.

About 9Ml would be needed for the construction stage of a 75MW solar PV plant. This equates to an average draw down rate of about 80kl per day during the construction period.

Possible sources for this water are to be investigated and the relevant authorities will be approached during the EIA process.

8.3.10 WATER USAGE DURING OPERATIONAL PHASE

A PV Plant does not require much water for operation. The main requirements are water for the domestic needs of the security and operational personnel and for the cleaning of the PV panels.

Possible sources for this water are to be investigated and the relevant authorities will be approached during the planning stage, concurrent to the EIA process. Noting that the majority of the water is required for cleaning, the water could be obtained from the Local Authority and brought to site by a vehicle equipped especially for the cleaning operation. The water for the “domestic” use could similarly be transported to site.

Based on the metered water usages at our existing facilities near Douglas in the Northern Cape, a 75MW PV plant would require about 1600kl per annum for general and office use during the operational phase and a further 525kl for washing the PV modules. This is for two washes per year at 3,5kl per MW capacity per wash. A total of about 2225kl per year ins needed.

Note that the amount of potable water required during the operational phase usually does not trigger a Water Use License, however if the water is not sourced from a Registered Water Service Provider the water use will need to be registered.

8.4 PHASES OF THE PROJECT

8.4.1 CONSTRUCTION PHASE

The construction phase includes all the varied activities and operations needed to develop a fully operational PV power plant. As an example, but not limited to, the following activities will occur on site in the construction phase:

- Temporary fencing of the construction yard site
- Installation of perimeter fence
- Site clearing as needed – to be kept to a minimum to avoid dust
- Delivery of construction materials and equipment
- Foundation excavation
- Installation of foundation piles
- Installation of electrical reticulation
- Installation of lightning protection system
- Assembly of trackers or racks
- Moving of the assembled trackers or racks to their final position
- Installation and set-up of electrical equipment
- Construction of buildings
- Installation of security system
- Commissioning of the systems
- Commissioning tests

The following areas will be indicated on the concept Site Development Plan. These areas are based on the typical requirements for a PV facility and the final position and exact shape of these areas will be determined during detail planning and design optimisation and can also be affected by site conditions.

- Lay down area
- Assembly area
- Spoil heaps and borrow pit area
- Construction traffic

8.4.1.1 LAYDOWN AREAS

It is an area needed for the reception of different materials such as PV modules, rack or tracker components, motors, gears, electrical devices, conduiting for wires, transformers, switchgears, prefabricated structures etc.

8.4.1.2 ASSEMBLY AREAS

It is an area proposed for a safe and fast assembly of the racks or trackers. There, needed materials are laid within the assembly area in order to streamline the assembly process. Once the rack or tracker is preassembled, a rough terrain vehicle will transport the tracker to its final position for the installation process (erection on the foundations, wiring connection, gear mounting… etc).

8.4.1.3 SPOIL HEAPS AND BORROW PIT AREAS

To the extent that it is possible a balanced cut, borrow, fill and spoil approach will be followed. Thus any material needed in the construction process, be it earthworks, road-works, building foundations or trench backfilling etc. will be sourced from within the development footprint of the site.

Suitable material will thus be sourced from cuts and trenches or any part of the development footprint and the un-suitable material will be spoiled into non-engineered landscaped areas.

Given the relatively small amount of earthworks in the construction process the only spoil envisaged would be material unsuitable to be used in road-works or as backfilling that comes from road-bed, trenches or pile holes. This should be relatively insignificant volumes and can be spread on site.

Should the spoil volume be larger, then landscaped features such as screening berms around the sub-station and PV power plant can be created from the spoil. These would be dressed with suitable soil and planted.

8.4.1.4 CONSTRUCTION TRAFFIC

During the construction phase the traffic will peak at about 10 large delivery vehicles and 40 to 50 concrete trucks per day while the footings are being cast and then drop to about 20 to 30 large delivery vehicles per day while the electrical reticulation is being installed and the trackers are being erected.

A transportation and Traffic Management Plan will form part of the Environmental Management Programme for the Facility.

8.4.2 OPERATIONAL PHASE

The operational phase includes all operations needed to be carried out to maintain the PV power plant in a full operational mode producing as much electricity as possible and feeding it into the Eskom distribution network.

As an example, but not limited to, the following activities occur in operation phase:

- Checking and verifying of the electricity production
- Maintaining and monitoring a weather station
- Routine inspection of all equipment and systems
- Periodic maintenance

- Periodic cleaning of PV modules
- 24hour security operations

The traffic generated by the PV plant during operation phase once the plant is generating electricity is negligible and will be of the order of four or five vehicles per day.

There will be no residential or overnight accommodation on the site.

8.4.3 DECOMMISSIONING OR UPGRADING PHASE

After the 20 years of operation, the PV plant will either continue to operate or be upgraded if a new license is granted, or the plant will be decommissioned.

Given the degradation of performance of PV modules with time, the plant will function at a lesser export capacity over the new license period.

Upgrading the PV power plant will consist of replacing old PV modules for new ones, increasing the total peak power of the plant (a process called “Repowering”) or increasing the power of the plant by adding new elements such as trackers, PV modules or transformers.

If the plant is to be decommissioned then the site should be returned to close to its original state. Other than the concrete all of the components of a PV plant have an intrinsic value either for re-use or recycling. This intrinsic or scrap value will cover the cost of decommissioning the plant and rehabilitating the site.

- The PV panels will be removed from the trackers and sent to special recycling facilities without further disassembly at the site. The better, functional PV panels can be re-used in less stringent environments.
- The transformers and electrical control devices would either be removed for reuse, with or without re-conditioning, or sold as scrap after removal of the fluids.
- The electrical power management and conditioning equipment would be recycled or disposed of as scrap.
- The underground cable runs could be abandoned in place, or they could be pulled out. The cable has a very high scrap value so the latter is more likely.
- The steel in the fixed rack or tracker structures has high scrap value so these structures will be dismantled and removed for scrap.
- The steel tracker piles can be removed and sold as scrap. Alternatively the steel or the concrete piles can be cut off just below ground level and abandoned.
- The gravel or aggregate in the access road, on-site service roads, in the electrical substations, transformer pads, and building foundations could be removed and recycled for use in other fill operations if not abandoned.
- The buildings can be taken over by the farmer for his operations or all the re-usable material can be removed and the shell demolished and the rubble taken away to a commercial dump site. Temporary buildings can be removed or relocated.

Disturbed land areas can be rehabilitated, the rubble removed, the soil scarified and reseeded or replanted with indigenous vegetation.

Part of the decommissioning and rehabilitation process would be the inspection for and documentation of the presence of industrial wastes in the soil from minor spills or leaks, and decontamination as necessary. If deemed necessary soil testing would be conducted after decommissioning.

Transportation activities during site decommissioning would be similar to but less and of shorter duration than those during site development and construction.

9 ECONOMIC CONTEXT

AMDA developments will include a cost/benefit overview as part of the Engineering layout report that will form part of the impact assessment phase of the Environmental process. The economic context of the municipal area and the impacts of this project on the economy of the region will be considered in further detail by a specialist as part of the Social Impact Assessment.

10 PROJECT PROGRAMME AND TIMELINES

As mentioned previously the AMDA Delta PV Facility is intended to be lodged under the IPP procurement programme. The programme has definite and stringent timelines, which the project should meet. Note that the Department of Energy has not yet released the exact dates for the 5th and 6th bidding submissions.

NOTE: The AMDA Delta PV Energy Facility intends submitting their bid during the 5th bidding window or thereafter if unsuccessful in immediate bidding rounds.

11 SITE DESCRIPTION AND ATTRIBUTES

The ecological and agricultural specialists will provide a detailed account of the site in terms of the following aspects:

11.1 TOPOGRAPHY

The terrain type is that of level plains with some relief and slope less than 2%.

11.2 GEOLOGY

The geology is of the Transvaal Rooiberg Griqualand Supergroup. Sedimentary and Volcanic rocks of this sequence include Dolomite (90%) and Sandstone (10%).

Diagnostic for this geology is surface limestone of Tertiary to Recent age and fine and coarse-grained dolomite, chert and dolomitic limestone with prominent interbedded chert, limestone and banded ironstone (Ghaap Plateau Formation, Campbell Group).

11.3 CLIMATE

The region is classified as a semi-arid zone with desert climate.

The following specific parameters are applicable:

Table 4: Climate data

Climate				
Monthly Rainfall		Daily Evaporation	Temperature	
Month	Precipitation		Season	Temperature
January	74mm	6.6mm	Summer Max	31.1-35°C
February	78mm	5.4mm	Summer Min	29.3-31°C
March	84mm	4.6mm	Winter Max	21.9-24°C

April	32mm	3.6mm	Winter Min	0.1-Minus 2
May	18mm	2.5mm		
June	10mm	2.0mm		
July	2mm	2.2mm		
August	6mm	3.2mm		
September	13mm	4.6mm		
October	28mm	5.5mm		
November	51mm	6.3mm		
December	61mm	6.6mm		

11.4 VEGETATION

Mr Simon Todd of Simon Todd consulting undertook an ecological scoping study for this proposed development from which the following is drawn. Please refer to Appendix E1 for a full copy of the ecological scoping report.

11.4.1 Broad-Scale Vegetation Patterns

According to the national vegetation map (Mucina & Rutherford 2006), the site falls entirely within a single vegetation type, Ghaap Plateau Vaalbosveld. . Ghaap Plateau Vaalbosveld is a relatively widespread vegetation type which occupies 15424 km^2 of the high elevation (1100-1500 m) plains of the Northern Cape, from Campbell in the south to around Vryburg in the north. Ghaap Plateau Vaalbosveld is not a threatened vegetation type and is currently classified as Least Threatened. Less than 2% has been transformed by intensive agriculture and mining activity (Mucina & Rutherford 2006). The vegetation type is however very poorly protected and does not fall within any formal protected areas. Although only one endemic species, *Rennera stellata* is known from the vegetation type, the Ghaap Plateau is a recognised centre of endemism.

The composition of this vegetation unit varies quite a lot, partly in response to regional variation, but also in response to landuse and livestock grazing pressure and fire, which can lead to shifts from relatively open savannah-type situations to dense bush-infested vegetation forms. Typically, this vegetation unit is dominated by *Tarchonanthus camphoratus* and other low shrubs such as *Searsia tridactyla* and *Acacia mellifera* but there may also be areas of open grassland or savannah-type vegetation typically characterised by species such as *Olea europea* subsp *africana*, *Searsia lancea*, *Acacia karoo*, *Acacia tortilis*, *Ziziphus mucronata* subsp. *mucronata*, *Searsia pyroides* var. *pyroides* and *Gymnosporia buxifolia*. This vegetation type is usually associated with surface limestone of Tertiary to Recent age with dolomite and chert of the Campbell Group supporting shallow soils of the Mispah and Hutton forms. The dominant land type is Fc with some Ae and Ag.

Figure 8: Cleared area where the woody vegetation has been cleared and historically ploughed, these areas are considered low sensitivity as although the grass layer has largely recovered, diversity is still significantly lower than untransformed areas. More than half the Klondike Delta site consists of previously transformed areas.

Figure 9: *Tarchonanthus camphoratus* dominated bushveld at the site, which is usually indicative of overgrazing. Trees in these areas include *Acacia tortillis*, *Acacia erioloba* and *Searsia lancea* which occur scattered at moderate density. These areas are considered medium sensitivity.

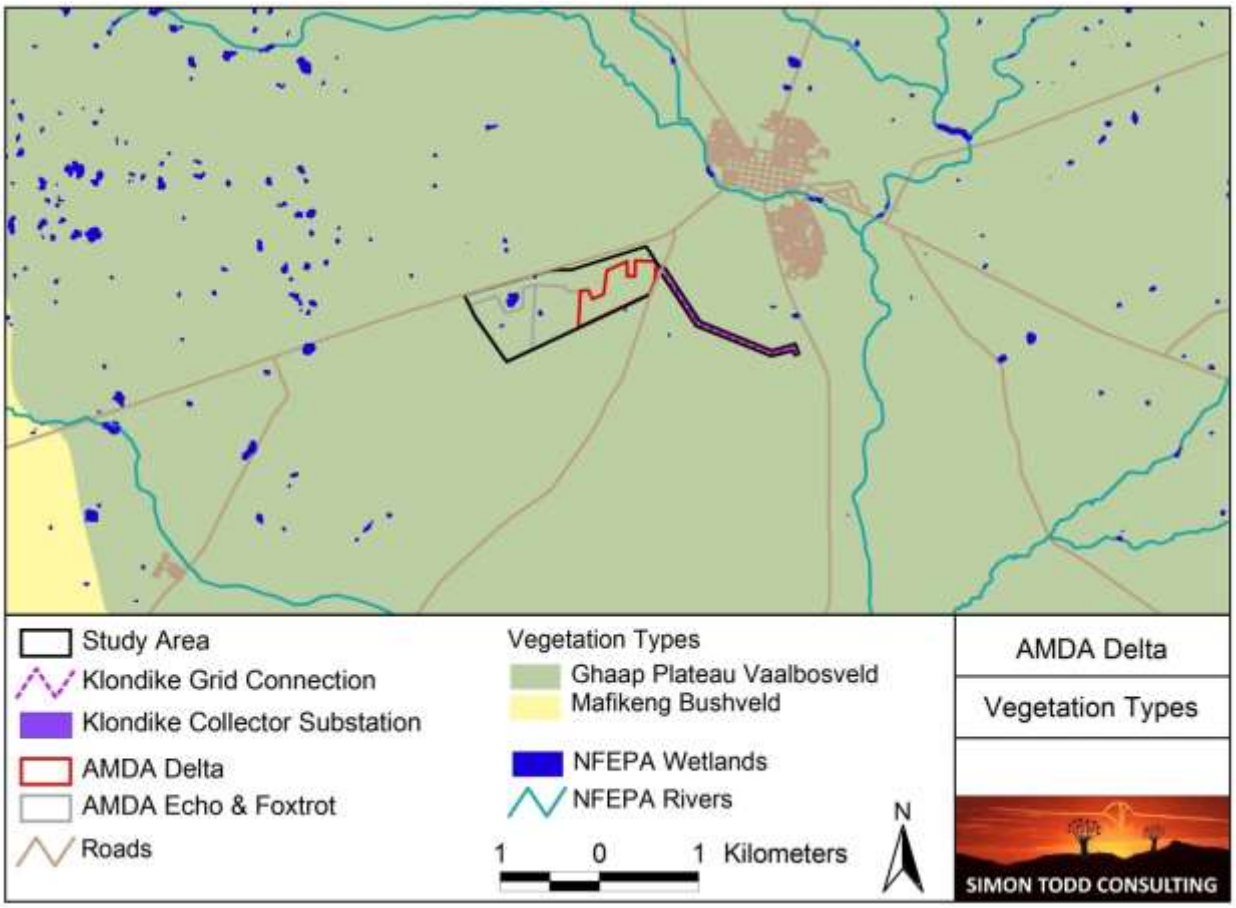

Figure 10: Broad-scale overview of the vegetation in and around the Klondike site. The vegetation map is an extract of the national vegetation map as produced by Mucina & Rutherford (2006), and also includes rivers and wetlands delineated by the National Freshwater Ecosystem Priority Areas assessment (Nel et al. 2011).

11.4.2 Listed and Protected Plant Species

Listed species known to occur in the vicinity of the site are listed below in Table 1. It can be confirmed that at least two of the species listed for the area do not occur at the site, those being *Encephalartos altensteinii* and *Asparagus stipulaceus*. It is also unlikely that the dwarf succulents *Nananthus vittatus* or *Lithops lesliei* subsp. *lesliei* occur at the site on account of a lack of suitable habitat. Similarly, *Rennera stellata is reportedly "*Found in or on the edge of a calcareous pan, associated with unweathered calcrete rock and fed by a fountain. Specific in habitat requirements" and is therefore highly unlikely that this species occurs at the site. Therefore only *Pelargonium sidoides* and may occur at the site, but this cannot be confirmed as this species would have been dormant at the time of the site visit. It is however widespread and the development of the site would not result in significant habitat loss for this species.

Table 5: IUCN status of plant species recorded from the vicinity of the proposed Vryburg waste water treatment works, based on the SANBI SIBIS database. Only *Acacia erioloba* can be confirmed present.

Family	Species	IUCN Status
MESEMBRYANTHEMACEAE	*Nananthus vittatus*	DDT
FABACEAE	*Acacia erioloba*	Declining
GERANIACEAE	*Pelargonium sidoides*	Declining
ASPARAGACEAE	*Asparagus stipulaceus*	NT

Family	Species	IUCN Status
MESEMBRYANTHEMACEAE	*Lithops lesliei subsp. lesliei*	NT
ASTERACEAE	*Rennera stellata*	VU
ZAMIACEAE	*Encephalartos altensteinii*	VU

11.5 CRITICAL BIODIVERSITY AREAS & BROAD-SCALE PROCESSES

The site falls within the planning domain of the North-West Province Biodiversity Conservation Assessment (Skowno & Desmet 2013), which maps Critical Biodiversity Areas and Ecological Support Areas within the North West Province. A large part of the site is within a Tier 2 Critical Biodiversity Area. The Tier 2 CBA is based on the presence of underlying dolerite soils, which are deemed to be more important than the surroundings area for biodiversity and are also targeted for croplands. As such, the CBA at the site is based on this broad-scale consideration and not the known presence of biodiversity features of significance within the area. While the development would result in the loss of some extent of the CBA, this is not considered significant, due to the low extent of the loss as well as the proximity of the site to Vryburg.

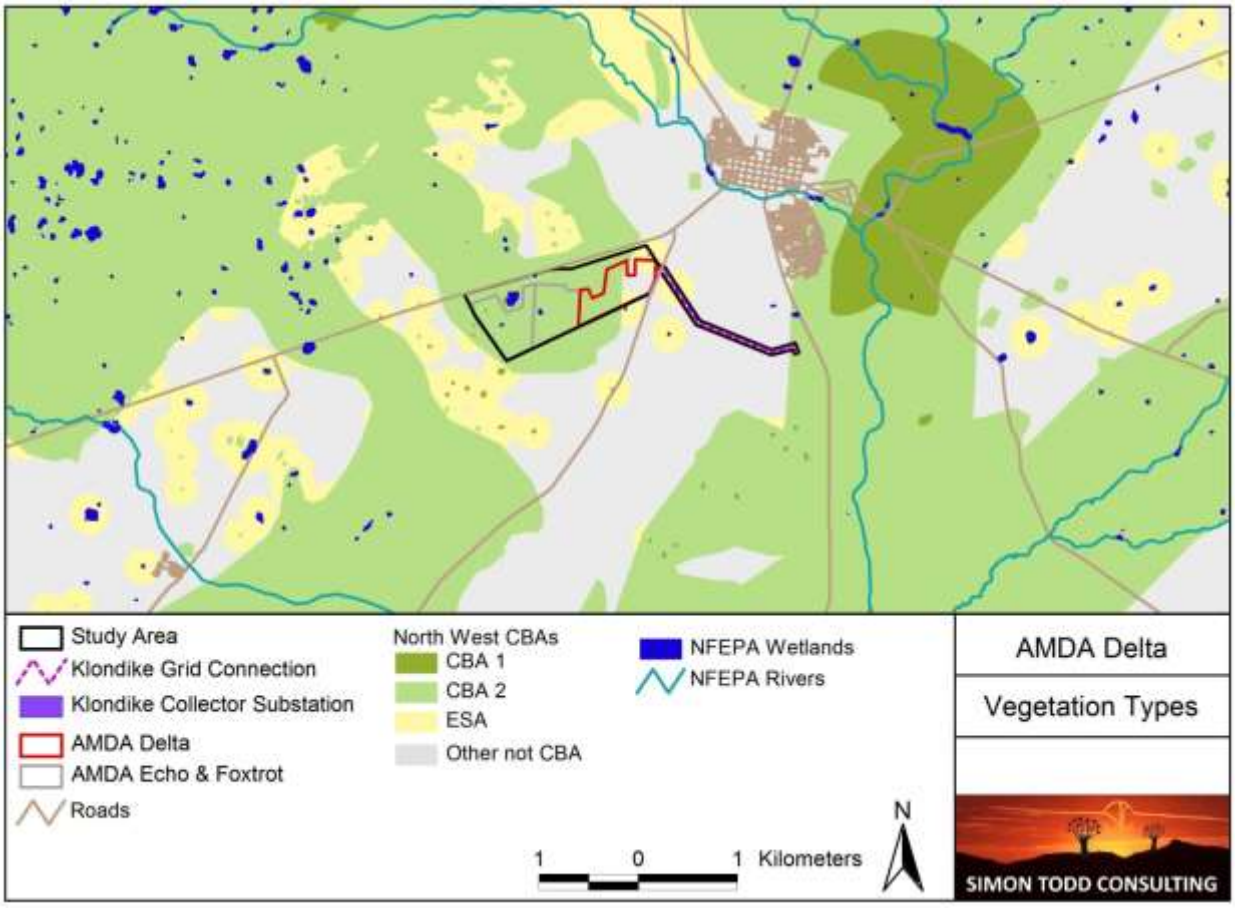

Figure 11: Critical Biodiversity Areas map for the broad study area (Skowno & Desmet 2013).

In terms of other broad-scale planning studies, the site does not fall within a National Protected Areas Expansion Strategy Focus Area (NPAES), indicating that the area has not been identified as an area of exceptional biodiversity or of significance for the long-term maintenance of broad-scale ecological processes and climate change buffering within the region.

As there are a number of other renewable energy developments in the wider area, it is important to consider the potential for cumulative impact on the area. A map of all the DEA-registered renewable energy developments in the area is depicted in Figure 5 below and illustrates that there is currently not a lot of the renewable energy development in the area. As a result, the potential for cumulative impact in the area is still relatively low and a significant impact on broad-scale ecological processes is not likely.

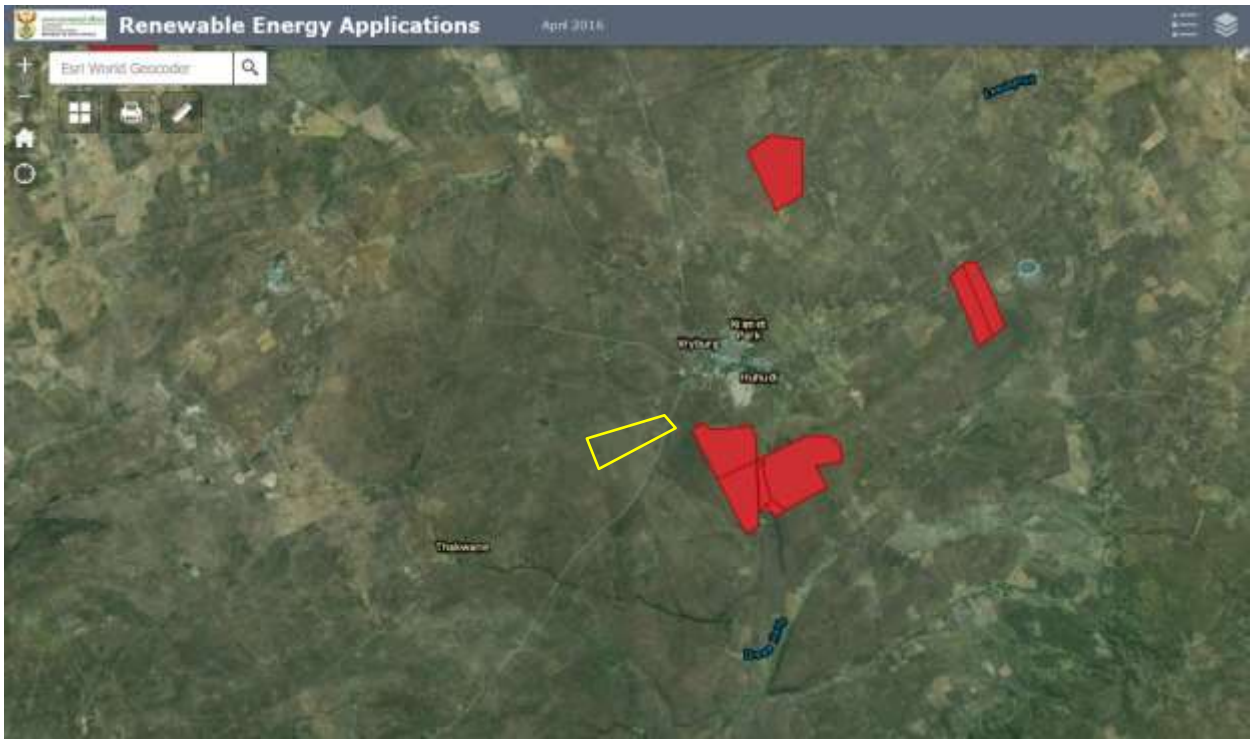

Figure 12: Map of DEA-registered renewable energy projects around the Klondike site indicated by the yellow-outlined area, showing other renewable energy developments in the area around Vryburg.

11.6 FAUNA

Mr Simon Todd of Simon Todd consulting undertook an ecological scoping study for this proposed development from which the following is drawn. Please refer to Appendix E1 for a full copy of the ecological scoping report.

11.6.1 Faunal Communities

11.6.1.1 Mammals

The potential diversity of mammals in the area is relatively high with as many as 47 terrestrial mammals and 9 bats present. Species which were observed in the area include Springhare *Pedetes capensis*, Aardvark *Orycteropus afer*, Cape Porcupine *Hystrix africaeaustralis*, South African Ground Squirrel *Xerus inauris*, Yellow Mongoose *Cynictis penicillata* and Steenbok *Raphicerus campestris*. This is also a game-farming area and many antelope species which would not have occurred naturally in the area have been introduced and many that would have historically been extirpated have also been reintroduced. As these are not free roaming and are intensively managed, they are not considered in detail here.

Listed mammals which may occur in the area include the Brown Hyaena *Hyaena brunnea* (Near Threatened), Black-footed Cat *Felis nigripes* (Vulnerable), Honey badger *Mellivora capensis* (IUCN LC, SA RDB EN), South African hedgehog *Atelerix frontalis* (SA RDB NT) and Ground Pangolin *Smutsia temminckii* (VU). Although it is likely that most of these listed species are present in the

wider area, they are less likely to be present within the affected area due to the proximity of the site to Vryburg as well as the disruption of landscape connectivity for larger fauna in the area due to the various public roads that border the site. The roads are fenced on both sides with mesh fencing and limit faunal movement of larger species through these areas. Species such as the Black-footed cat would not be significantly affected due to their small size and would be likely to be using the site on occasion. Given the limited extent of the development area and the frequent human disturbance, the development would affect a very small area relative to the extensive national ranges of the listed species and the impact of the development on habitat loss for these species would be negligible.

Potential impacts on mammals are likely to be restricted largely to disturbance during the construction phase and habitat loss during the operational phase. Given the largely intact nature of the area, cumulative impacts are likely to be relatively low and overall impacts on fauna are likely to be low and local in nature.

11.6.1.2 Reptiles

The site lies within the known distribution of approximately 40 reptile species (Appendix 3). This is a moderate total, suggesting that the general area does not have exceptional reptile species richness. The composition of the reptile fauna is likely to comprise 1 terrapin, 2 tortoises, 20 snakes, 14 lizards and skinks, 1 worm-lizard and 3 geckos. This suggests a reptile community which is high in snake diversity and relatively low in other groups. No species of conservation concern are known to occur in the area. There are no rocky hills or drainage lines within the site, which would significantly reduce the reptile diversity within the affected areas.

In terms of the likely impact of the development on reptiles, habitat loss is likely to be of local significance only due to the relatively low footprint of the development and the relatively low reptile diversity of the site. Furthermore, many species would be able to use the vegetation under the panels and some species would take advantage of the buildings and structures present. Some transient disturbance of reptiles during construction is likely due to disturbance and vegetation clearing. Overall, as there are few range-restricted or listed reptile species at the site, impacts on reptiles from the development is likely to be local in nature and not of broader significance.

11.6.1.3 Amphibians

The site lies within or near the range of 14 amphibian species, indicating that the site potentially has a moderately diverse frog community. The area is arid and the sandy substrate characteristic of large parts of the site is not conducive to generating large amounts of runoff and the development of well-developed drainage lines. There are no drainage lines or pans that would hold water for extended periods at the site, with the result that only those species which are relatively independent of water are likely to occur in the affected area. The only species of conservation concern which may occur in the area is the Giant Bullfrog *Pyxicephalus adspersus*. This species breeds in ephemeral pans in grassland, savannah and Nama karoo and it is confirmed present in the wider area. There is a single moderately large pan at the site which would potentially be used by frogs, but does not appear to be large enough for breeding purposes of the Giant Bullfrog. Overall, impacts on amphibians are likely to be local in nature and restricted largely to the construction phase, when impact generating activities would potentially include disturbance and vegetation clearing, pollution and habitat destruction.

12 PLANNING CONTEXT

A planning specialist was appointed to provide input into the planning requirements for the proposed development, should it receive an environmental authorisation and begin with a town planning process. A statement in this regard was provided by macroplan town planners and is attached in Appendix E9.

The following planning statement outlines the details of the planning process, as well as the responsibilities of the land use planning specialist, specifically pertaining to the projects envisioned on the above-mentioned property:

The property is located within the Naledi Local Municipality and any process of land use change will be subject to the Scheme Regulations of the said municipality.

The property is currently zoned for Agriculture in terms of the Naledi Scheme Regulations. In order to allow for the development of a renewable energy facility thereon, the applicable portion of the property will have to be rezoned to an appropriate zoning.

There is no default zoning in the Naledi Scheme Regulations allowing for renewable energy development and a Special Consent will have to be requested on the property.

The application for land use change will be compiled and submitted in terms of Section 15 of the Land Use Planning Ordinance 15 of 1985 (LUPO).

The Spatial Planning and Land Use Management Act (SPLUMA, Act 16 of 2013) commenced on 01 July 2015 and retracts the Removal of Restrictions Act, Act 84 of 1967. However, according to a circular issued by the Department of Rural Development and Land Reform, the North-West Province will in interim still make use of this Act.

Since SPLUMA has not taken effect in the Naledi Local Municipality where they are still using LUPO as an interim measure, the decision-making authority on such an application remains with the Council of the Naledi Local Municipality.

The application for Special Consent cannot be submitted to the Local Authority without the following being included as Annexures to the application:

Environmental Authorisation (EA) acquired through the EIA process.

No-Objection letter from the Department of Agriculture Forestry and Fisheries (DAFF).

No-Objection from the South African National Roads Agency Limited (SANRAL), regarding the adjacency of the N14 national Road.

No-Objection from the North West Province Department of Public Works and Roads (DPWR).

A full statement of how services will be rendered on the property. This includes water supply, electricity supply, solid waste disposal, sewerage disposal etc.

The town planning process may therefore be summarised as follows:

Compilation of application and motivation for the land use change at the local authority.

Receipt of No-Objection from the Department of Agriculture Forestry.

Receipt of No-Objection from SANRAL.

Receipt of No-Objection from DPWR.

Receipt of a clear statement of service delivery.

Finalising the application and motivation to align with the details contained in the received documents.

Submission of land use change application to the local authority.

Receipt of invoice of administrative fees from the local authority and confirmation that public participation may commence.

Placement of public notices in local print media, registered mail and on-site, inviting members of public to comment on the proposed development.

Responding to public comments, if any.

Referral and recommendation of the application from the local authority's planning department to their Local Council.

Decision to be transcribed in a formal letter from the Local Authority to the client.

13 AGRICULTURAL POTENTIAL OF THE STUDY SITE

Mr Christo Lubbe, an agricultural specialist, has been appointed to undertake an Agricultural potential study of the proposed development as well as an Agricultural Impact Assessment. Please refer to annexure E2 from which the following is drawn.

The proposed Power Plant will be located approximately 8km west-southwest of Vryburg and bordered by the N14 and Reivilo roads.

The farm is very close to Vryburg in the North West province, next to the N14 national road. The region is known for its beef production and cultivated land is scarce because of the low rainfall and shallow soils. Urban development in the form of Lodge type accommodation exists next to the N14 and formal housing next to the Reivilo road, which forms the north and eastern boarders of the site. The south and western boarders are natural grazing farms.

The site is surrounded by stock farming activities. To the north and northeast, the residential area is visible.

Figure 13: Location of the proposed power facility

North :Natural veld (Lodge in background)

East: residential

South: Extensive cattle farming

West: Extensive cattle farming

Figure 14: Surrounding Developments

13.1 PAST AND CURRENT AGRICULTURAL ACTIVITIES ON SITE

Extensive cattle farming is practised on savannah veld that was strengthened by the establishment of Wool grass (*Anthephora pubescens*).This took place about 15 years ago, according to the owner. No signs of cultivating activities were noticed.

The property is fenced with high game fencing on the borders and internal fencing for grazing camps. Two boreholes equipped with engines and powerheads provide stock watering.

The past and current activities are extensive cattle farming. An older Google Earth image shows cultivation on a part of the farm but this does not exist anymore. These cultivated lands were established with Wool Grass (*Anthephora pubescens)* and Blue Buffalo Grass *(Cenchrus ciliaris*) - grasses suited for the rainfall and soil. These grasses are now used as a standing hay and no mechanical harvesting takes place. According to the owner, this establishment took place in excess of fifteen years back.

The farm is divided in fourteen camps. Each group of four camps has a handling facility in the centre of the four camps and a water point. Stock watering is pumped from boreholes with powerheads and diesel engines to reservoirs and troughs.

13.2 VELD CONDITION ASSESSMENT

A veld condition assessment was done simultaneous with the soil survey, by visual acknowledgement.

The photos in Figure 15 show that the basal cover is low; consisting mainly of shrubs and poor grazing grasses enhanced with the establishment of Wool grass. There is a moderate stand of Velvet raisin (*Grevia flava*). This shrub has high value as grazing shrub.

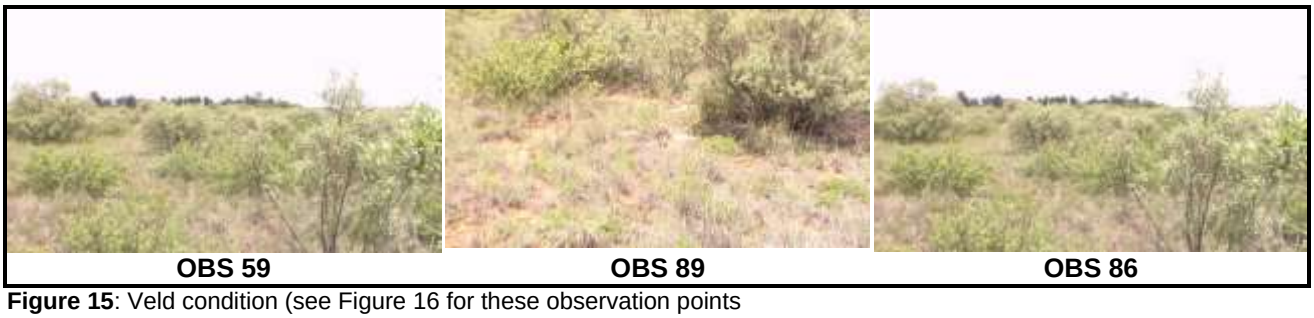

Figure 15: Veld condition (see Figure 16 for these observation points

13.3 SOILS

According to AGIS, the predicted land type is *Fc*, which accommodates pedological young landscapes in which alluvial or Aeolian rock can be found. The dominant soil forming processes have been rock weathering. *Fc* specially refers to the fact that lime occur regularly in the soil profile.

Soils in this group usually show the following characteristics:

- Soils have minimal development, are usually shallow, on hard or weathering rock, with or without intermittent diverse soils.
- Lime is generally present in part or most of the landscape.
- Red and yellow well-drained sandy soil with high base status may occur.
- Freely drained, structure less soils may occur.
- Soils may have favourable physical properties.
- Soils may also have restricted depth, excessive drainage, high erodibility and low natural fertility.

13.3.1 Soil Classification

An augering survey was carried out in February 2016. At each augering point, an observation record was completed.

The soil observation records in the table below are representative of the three soil forms found on the site. These are further described below each observation record.

The soils were then grouped in uniform utilization polygons, as illustrated in Figure 16.

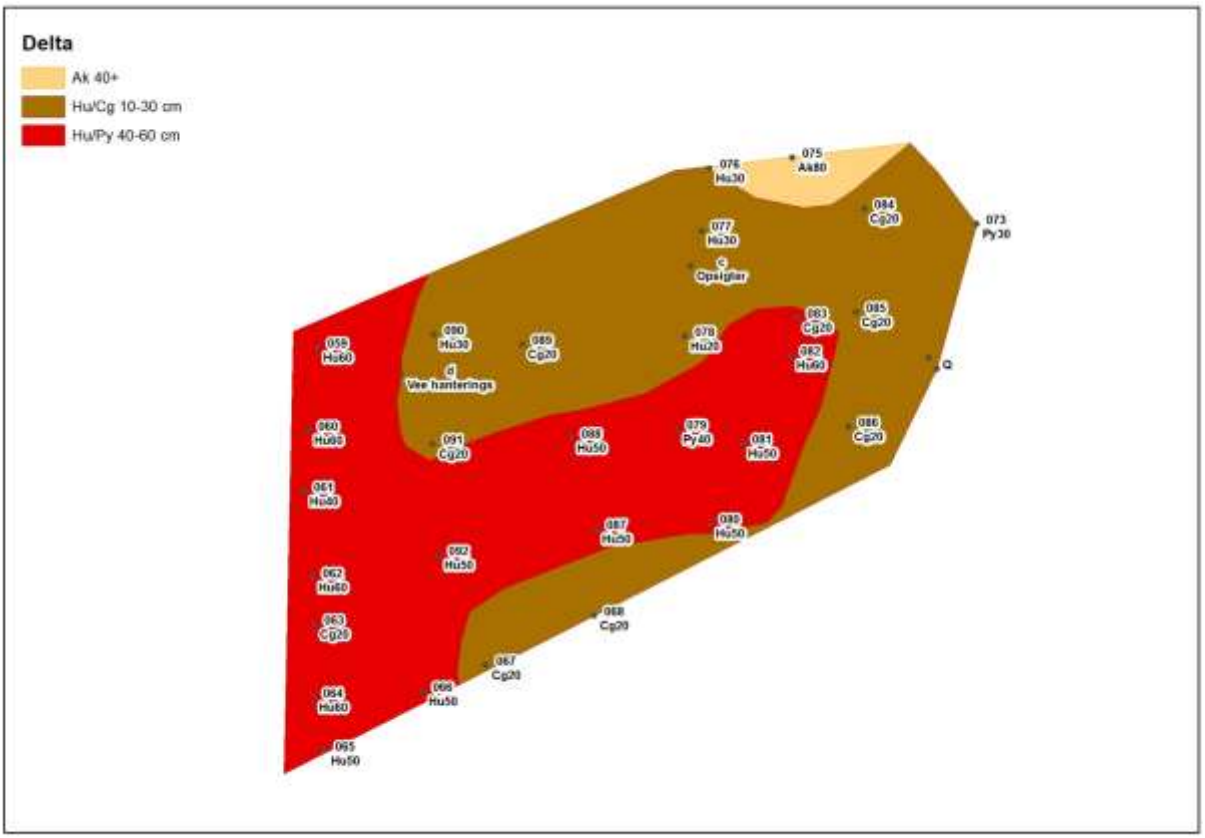

Figure 16: Observation points on soil map

Table 6: Soil Forms

OBS	75	**COMMENT**													
LAT	26 59 01.38	**SLOPE GRAD**		1			**MOISTURE**		L						
LONG	24 41 30	**SLOPE SHAPE**		R			**EROSION**		L						
	FORM	Ak	**TSD**	80	**WET**	0	**HOR**	**TYPE**	**DEPTH**	**COL**	**CLAY**	**S-GR**	**CONS**	**STRUC**	**STONE**
	FAM	1000	**ESD**	80	**C**	I	**1**	**A**	20	7.5YR44	10	f	4	wc	0
	ROUGH	1	**ASD**	80	**GEO**	D1	**2**	**B**	80	7.5YR46	12	f	4	a	0
	TERR_POS	1	**LTN**	h	**PHOTO**		**3**								
	L.COVER/USE:														
	VIS.VELD.COND	**A**		**B**		**C**		**D**		**E**		**TOTAL**			

Askham form (Family Aroab)

Profile:

20 cm brown sandy (fine grade) weak crumbly structure top soil.

60 cm strong brown sandy (fine grade), with apedal structured sub soil.

Restricted by Hardpan carbonate layer

OBS	86	**COMMENT**													
LAT	26 59 31.98	**SLOPE GRAD**		1			**MOISTURE**		L						
LONG	24 41 37.02	**SLOPE SHAPE**		R			**EROSION**		L						
	FORM	Cg	**TSD**	20	**WET**	0	**HOR**	**TYPE**	**DEPTH**	**COL**	**CLAY**	**S-GR**	**CONS**	**STRUC**	**STONE**
	FAM	1000	**ESD**	20	**C**	I	**1**	**A**	20	2.5YR44	10	f	4	wc	0
	ROUGH	1	**ASD**		**GEO**	D1	**2**								
	TERR_POS	1	**LTN**		**PHOTO**		**3**								
	L.COVER/USE:	shrub surface lime													
	VIS.VELD.COND	**A**		**B**		**C**		**D**		**E**		**TOTAL**			

Coega form (Family Nabies)

Profile:

10 cm reddish brown, sandy (fine grade), weak crumbly structure top soil.

Restricted by Hardpan Carbonate layer

OBS	77	COMMENT												
LAT	26 59 9.9	SLOPE GRAD		1		MOISTURE		L						
LONG	24 41 18.48	SLOPE SHAPE	R			EROSION		L						
	FORM	Hu	TSD	30	WET	0	HOR	TYPE	DEPTH	COL	CLAY	S-GR	CONS	STRUC	STONE
	FAM	3100	ESD	30	C	I	1	A	10	2.5YR44	10	f	4	wc	0
	ROUGH	1	ASD	30	GEO	D1	2	B	30	2.5YR44	15	f	4	a	0
	TERR_POS	1	LTN	rr	PHOTO		3	C							
	L.COVER/USE:														
	VIS.VELD.COND	A		B		C		D		E		TOTAL			

Hutton form (Family Stella)
Profile:
10 cm reddish brown sandy (fine grade) top soil
20 cm reddish brown sandy (fine grade) with apedal structured sub soil
Restricted by rock.

OBS	59	COMMENT												
LAT	26 59 22.9	SLOPE GRAD		1		MOISTURE		L						
LONG	24 40 29.82	SLOPE SHAPE	R			EROSION		L						
	FORM	Hu	TSD	60	WET	0	HOR	TYPE	DEPTH	COL	CLAY	S-GR	CONS	STRUC	STONE
	FAM	3100	ESD	60	C	I	1	A	20	5YR44	10	f	4	wc	0
	ROUGH	1	ASD	60	GEO	D1	2	B	60	5YR46	15	f	4	a	0
	TERR_POS	1	LTN	rr	PHOTO		3	C							
	L.COVER/USE:														
	VIS.VELD.COND	A		B		C		D		E		TOTAL			

Hutton form (Family Stella)
Profile:
20 cm reddish brown sandy (fine grade) top soil
40 cm reddish brown sandy (fine grade) with apedal structured sub soil
Restricted by rock.

13.3.2 Summary .of soil properties

13.3.2.1 Effective rooting depth

Almost half of the soil area (153ha) on the site has an effective depth of less than 30cm. The restriction is rock and hard carbonates sub surface layers. The top surface is also rough with a high level of surface rock. Cultivation is not possible because of these mechanical restrictions.

The other half (160 ha) have an average depth of 60 cm. The root development area is restricted by carbonate hard setting or rock, as indicated in Figure 16.

The stony nature soils reduce available soil for root development and water retention.

The stoniness is also a high mechanical risk for agricultural machinery.

The very shallow soil depth, with its limited water holding capacity, restricts root development.

13.3.2.2 Texture

The clay content top horizon is 10% and sub horizon is 12% with fine sand grade. Texture class: loam sand.

The very fine sand grade of top soil influences the stability and erodibility potential.

Low clay percentage results in low water holding capacity and low nutrient availability, which leads to low soil fertility.

13.3.2.3 Depth limiting layer

Hard setting layer (Hard carbonate horizon) and/or Carbonate rock. The effects of this include:

- mechanical limitations for cultivation (Stoniness)
- Prevent root development
- Limit water holding capacity

Soils have carbonate-rich B-horizons. The use of Calcic soils is limited by climate (low rainfall and high evaporation), shallow soil depth, high pH, low plant available P and trace elements (especially Fe), toxic levels of extractable B and stoniness. All calcic soils are highly susceptible to water erosion.

13.4 LAND CAPABILITY AND SUITABILITY FOR AGRICULTURE

The land surveyed falls in capability class VI, generally not suited for cultivation. Very severe limitations restrict land use to grazing, woodlands or wildlife - see Table 7 and Table 8.

Table 7: Land Capability and Suitability Assessment for Crop Production

Land capability class	Suitability Rating	Major Limitation to Crop Production	Area (ha)	% of Local Study Area
Class VI Cg/Lithosols	Very low	Low water holding capacity Shallow rooting zone Severe climate Severe erosion hazard	153ha	49
Class IV Ak>40cm	Low	Low water holding capacity Severe climate	160ha	51

Table 8: Land Capability and Suitability Assessment for Grazing

Area Description	Suitability Rating	Major Limitation to Grazing	Area (ha)	% of Local Study Area
Cattle	Medium -	Very shallow rooting depth on carbonate hard setting, low clay content, low rainfall, with carrying capacity of 7ha /LSU	313	100

13.5 ASSESSMENT OF CONNECTING LINES

The PV field is to be connected to the National grid via an overhead line to sub-station Mookodi MTS. See Figure 17.

Figure 17: Connection line

. Refer to Figure 17. From point 74 the powerline will follow an existing road (and powerlines) up to point 95. From here, still on the existing line and inspection road, it will run to the power station (underneath the gridline from Vryburg). The soil is predominantly of very low agricultural value. The

limiting factors are shallow soil depth and mechanical restrictions, due to a very high percentage stones in top and subsoil.

The only cultivation that takes place is near point 93 - a small centre pivot for cultivated pasture.

The land cover northeast of the road leading to the substation is natural veld with the nature of unattended land. The photos in Figure 18 show the soil surface and vegetation on the alignment to the sub-station.

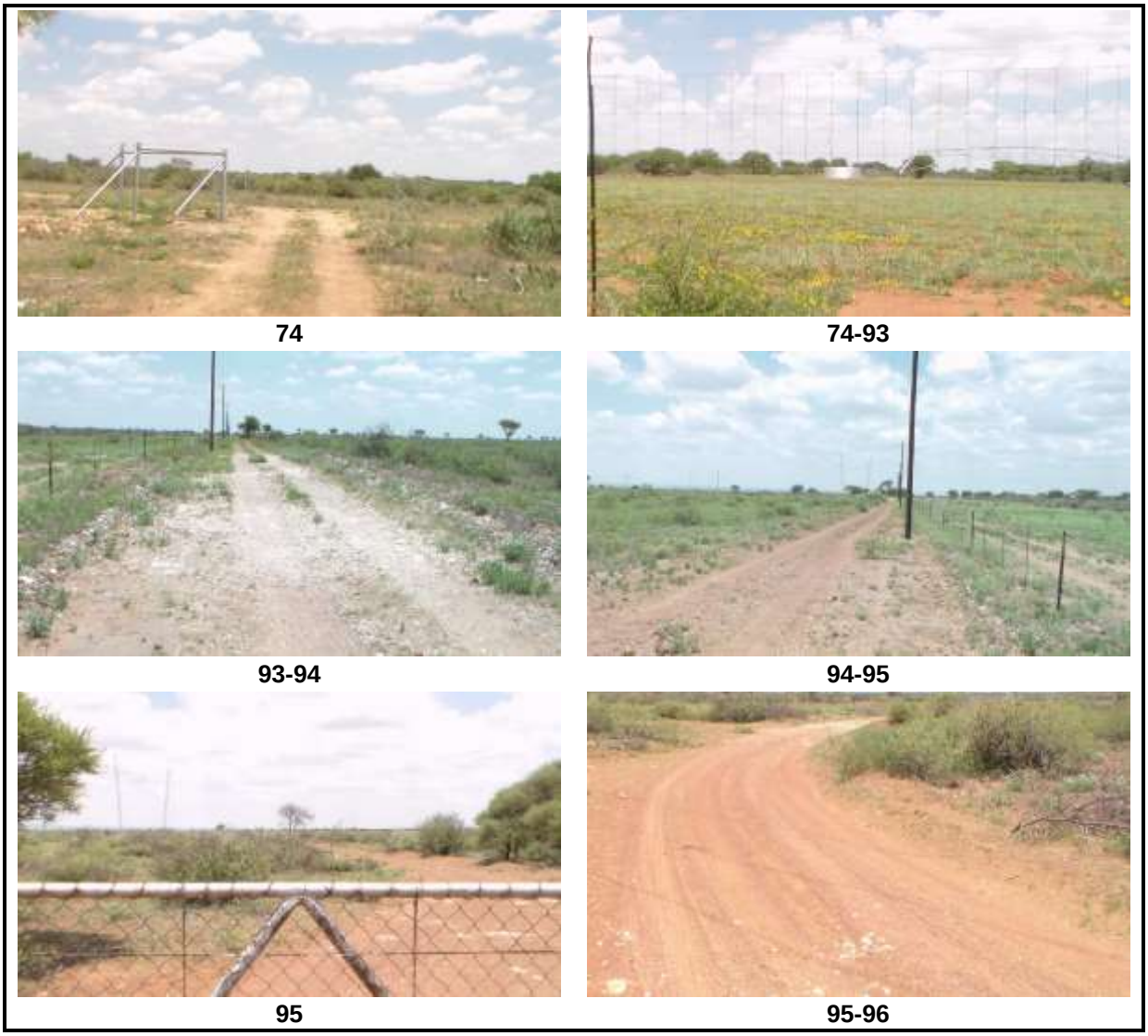

Figure 18: Route of the proposed connecting line

13.6 WATER AVAILABILITY/PROVISION

Water is provided to livestock from a borehole pumped to a reservoir and troughs.

13.7 SUMMARY OF FINDINGS

The site is largely unsuitable for cultivation due to the following limiting factors:

- Low annual rainfall, high evaporation and extreme temperatures restrict dry land cultivation.
- The very shallow soil depth with its limited water holding capacity restricts root development
- The soils have carbonate-rich B-horizons. The use of Calcic soils is limited by climate (low rainfall and high evaporation), shallow soil depth, high pH, low plant available P and trace

elements (especially Fe), toxic levels of extractable B and stoniness. All calcic soils are highly susceptible to water erosion.

- The very fine sand grade of top soil influences the stability and increases erodibility potential.
- Low clay percentage results in low water holding capacity and low nutrient availability, resulting in low soil fertility.

Although the grazing potential is very low, the area could be utilised for grazing.

14 POTENTIAL IMPACTS ON THE AGRICULTURAL ENVIRONMENT

The following potential impacts on the land were identified by the agricultural specialist:

- The possibility of permanent loss of high potential agricultural land and the impairment of land capability due to construction
- Veld conditions for grazing and the possible impact of vegetation removal during construction;
- The alteration of drainage patterns and its associated risk for erosion; due to the removal of vegetation during construction of the facility, the building of service and access roads if rehabilitation is not properly done in erosion-sensitive areas.
- Placement of spoil material generated from construction related excavations, which can cover agricultural land and thereby render it unsuitable for future agriculture.

These correlate with the focus points during the field investigation and are discussed below.

14.1 AN AREA LOST FOR AGRICULTURE

When determining what effect the change in land use will have in the profitability of the farming enterprise, the value and importance that the specific land portion plays in the farming milieu have to be established.

The physical potential for agricultural production is determined by using maize as a reference crop.

The three basic elements required for plant growth in the soil profile is air, moisture and nutrition. Crops have different depths to which their roots develop to obtain the three elements required for optimal production. The depth in the soil profile before it is interrupted by a limiting layer is the effective rooting depth.

It may be possible to remove this layer by mechanical intervention and ameliorate the soil profile to a deeper depth, which is then called Ameliorated soil depth.

The depth to where rainfall can wet the soil profile, restricted by the soil texture and annual rainfall is called Wetting depth. The lesser of Effective and Wetting depth is always used in calculations.

The ratio of air and moisture or permeability of the soil is a factor of its physical properties, which include texture, structure, consistency, colour, mottling and infiltration rate

The combination of soil and climate determine the environment in which the plant development will take place. This will then give the physical potential of the area for the production of maize. This does not consider economic viability and sustainability.

The economic viability is established when the expected long term yield is correlated with the breakeven point for maize on the proposed land unit. The *Crafford & Knott* equation is used to determine long term yield for maize:

$$\text{Soil potential (kg/ha)} = \frac{\text{Mean annual rainfall mm x Soil depth cm}}{12.8} \times C1$$

Using the best case scenario for rainfall (460mm), effective depth (60cm) and permeability (0,8), the expected yield for maize is then 1,7 ton/ha.

The breakeven point for dry land maize production in this region is 3,5 ton/ha.

Cultivation on this portion is therefore not a recommended option due to the low expected yield compared to the breakeven point of maize production. Such marginal soil should rather be used for grazing. The grazing area thus lost will be 313ha or 44 LSU.

During the operational phase, harvesting of fodder will take place as part of the maintenance operation. Although of low quality (not effectively fertilized), it can be used as roughage during winter. The affected area is therefore just partly lost with the potential to be completely rehabilitated after the lease period.

14.2 VEGETATION REMOVAL

Vegetation removal during construction may have a negative impact on veld conditions for grazing and may cause erosion. The development of the proposed facility will take place in three phases, construction, operational and decommissioning. During each of these phases, the land surface will be exposed to specific impacts caused by the stripping of vegetation and mechanical disturbance of the soil profile:

14.2.1 Construction phase

During this phase stripping of vegetation takes place, topsoil is removed and stock piled, access roads are constructed, structures are erected and vegetation resettled.

The construction will be executed in phases to ensure minimum exposure for wind erosion and topsoil to be eroded.

The resettlement of vegetation forms the basis on which the last two phases shall perform and is the starting point of the rehabilitation process. To obtain a denser vegetation cover in the first season, an annual crop like oats (Avena Sativa) can be included in the seed mixture of the preferred rehabilitation grass species.

With the construction of a road network the necessary civil and conservation practices must be applied to ensure the lowest erosion and drainage impacts.

14.2.2 Operational phase:

This is the longest phase (25-30 years). During this phase the re-vegetated surface must be conserved and constructed roads and structures be maintained.

Natural growth of vegetation under the PV panels is possible, since they are translucent and allow vegetation to grow underneath. The single axis trackers will allow water and light penetration between panels (better than with fixed panels).

The aim during this period is to establish a vegetated surface cover that will combat erosion and dust generation. Cutting the vegetative growth on required intervals is important to maintain a vigorous growth rate and low risk of veld fires.

14.2.3 Decommissioning phase

When the facility reaches the end of its economic lifespan, decommissioning will take place.

The area must be restored to its natural stage. Not necessarily the pre-settlement condition, but rather adhering to the following principles:

- Stabilisation of erosion
- Establishment of dense and protective cover
- Introduction of palatable plant species

The rehabilitation process is subject to environmental conditions and the benchmark has to be correlated to the general composition of surrounding farms.

Mitigation measures are set out in par 14.4.1.

14.3 ALTERING OF DRAINAGE PATTERNS BY CONSTRUCTION

The facility is designed to be built on upper midslope with a slope gradient of < 2%.

Because of the relative small catchment and nature to form small pans, there will be a very low influence on surface drainage downstream. See **Figure 19**.

The roads will be constructed according to civil and conservation practices to convey run off effectively

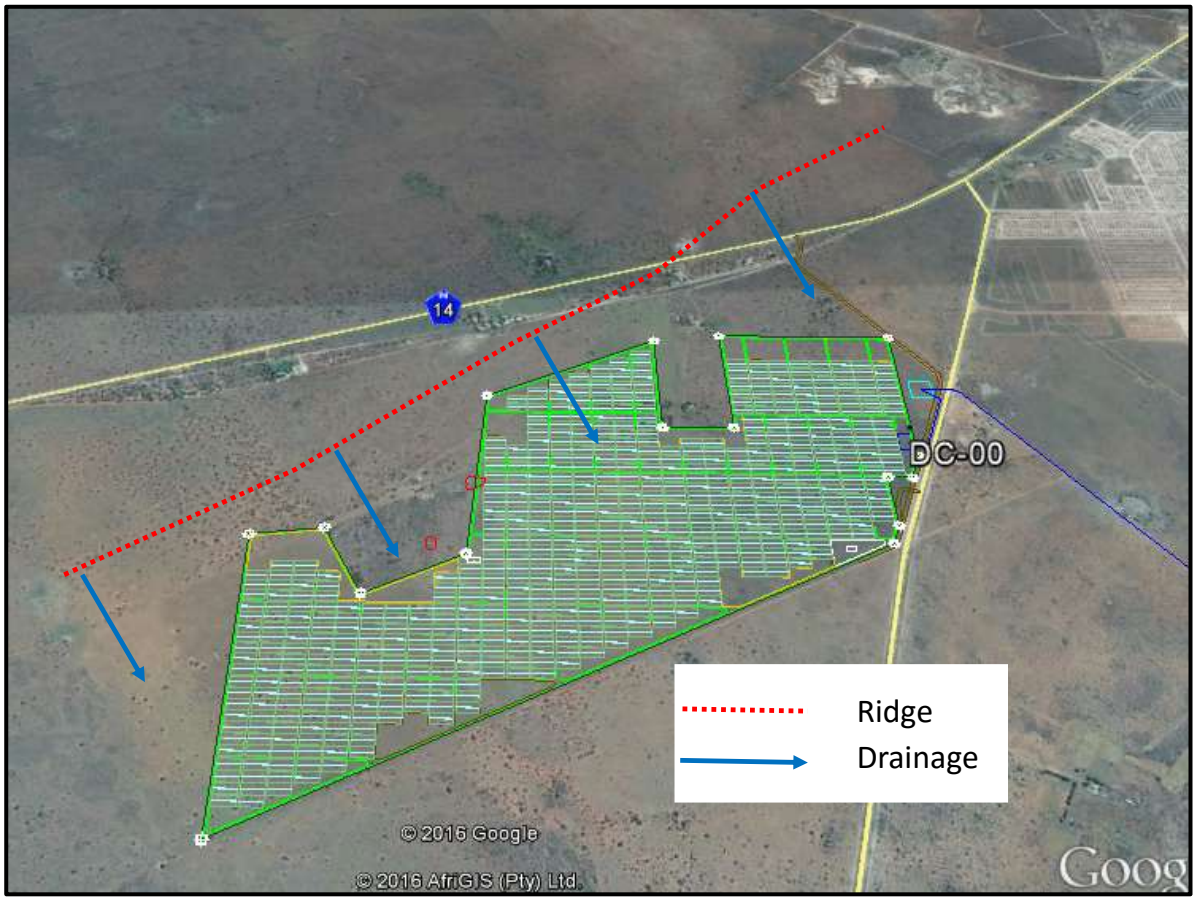

Figure 19: Drainage pattern

14.4 PROPOSED AGRICULTURAL MITIGATION MEASURES

14.4.1 Vegetation

The rehabilitation process starts during construction already and is subject to environmental conditions. The benchmark should correlate with the general composition of surrounding farms.

The goal would be stabilise the erosion, establish a dense and protective plant cover and finally introduce palatable plant species.

The site preparation should be carried out in phases to reduce the risk of erosion and keeping the topsoil ''alive'' in the stockpiles.

14.4.2 Erosion

Soil moisture increases cohesion of sand and loam, temporarily preventing wind erosion. Therefore, excavation and road construction should take place during the peak rain season January to March.

Oats (Avena sativa) should be included in the seed mixture (planting date 15 January -15 February) for cover in March to June. Rye grass (Secale cereal) in the seed mixture (Planting date mid-March) will provide cover for May to September. Including these companion crops in the seed mixture will suppress weed growth and protect the Woolgrass seedlings against wind erosion

The mechanised drill planting of PV panel supports eliminate foundation excavations with only trenches for cabling to be excavated, which would be refilled with the excess material

14.4.3 Closure Plan

The aim of the closure plan is to restore the site. All components of the facility will be dissembled and roads will be demolished. Rehabilitation should focus on:

- The stabilisation of erosion
- The establishment of a dense protective vegetation cover and even introducing a more palatable plant cover.
- Former access roads should evenly be re-vegetated.

As already mentioned, rehabilitation will be an ongoing process, starting at construction.

14.5 CUMMULATIVE EFFECTS ASSESMENT

Figure 20 shows the various farms on which similar developments are constructed / planned. In combination with this proposed AMDA Foxtrot facility, they may have a cumulative effect on the agricultural region.

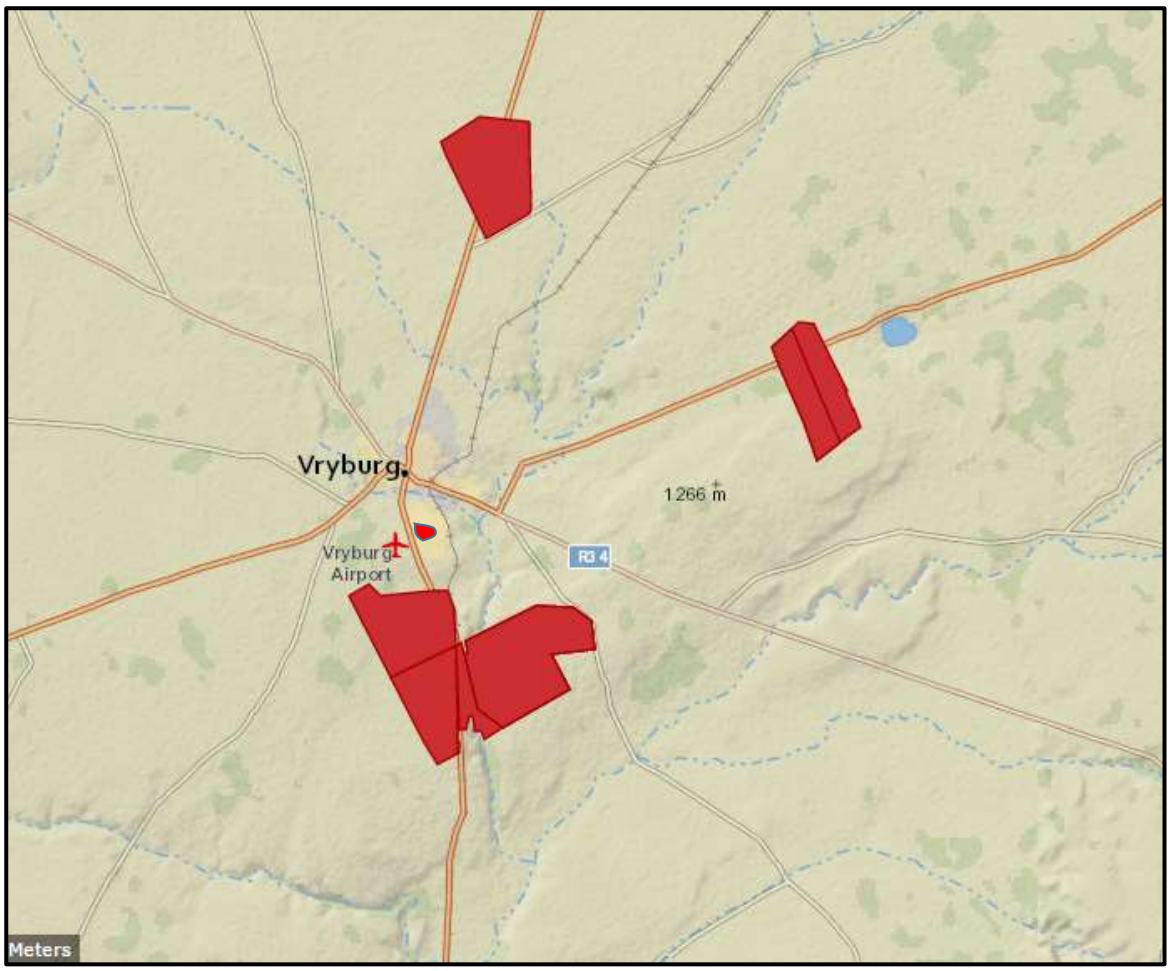

Figure 20: Renewable Energy Farms in the Vryburg area

(Source: Department of Environmental Affairs)

To assess the cumulative effects that the various developments may have on agriculture, the following situations will have to be addressed:

14.5.1 Changes in hydrological regimes

The hydrological regimes will not be effected because.

- The low amount of water used for cleaning is still available to groundcover after use. The same apply to rainwater due to the positioning of the panels.
- Runoff water from roads is safely released to infiltrate and refill the ground reservoir

14.5.2 Decrease in quantity and quality of soils

The semi aridity conditions of soils and climate reserve the agricultural potential for low potential grazing. Cultivated fields effected were established with pastures more than fifteen years back because of low quality soils and harsh climate.

14.5.3 Loss of natural habitat or historic character through industrial development

The proposed facility will be situated on the brim of urban and industrial expansion. With the transition already taking place, the facility will not interrupt a “sole agricultural character”. However, due to the isolated position, only a limited view of the facility will be visible from a secondary road.

14.5.4 Loss of biodiversity

The region is classified as a semi-arid zone with desert climate. Because of previous cultivation, it is not pristine grassland anymore. The general farming practise performed is cattle farming.

The habitat will be lost for cattle farming for the lease period only. With appropriate management, the habitat could change to a grazing composition containing more palatable grasses than before it was transformed.

No specific comments were received during the consultation and public participation processes and no additional information was thus far requested by the competent authority.

14.6 CONCLUSION

The findings of this study indicate that the site's agricultural potential is low. Due to poor soil properties and extreme climatic conditions, farming activities consist of grazing for cattle.

The proposed power facility will have minimal impacts on agriculture, locally and on site, and will have very little influence on the current commercial farming.

15 ECOLOGICAL SENSITIVITY OF THE STUDY SITE

Mr. Simon Todd, of Simon Todd Consulting, has been appointed to undertake Ecological Sensitivity Analysis and Ecological Impact Assessment of the proposed AMDA Delta PV Energy Facility. A copy of the ecological scoping report is attached in Appendix E1 from which the following is drawn.

The sensitivity map for the proposed development area of the Klondike Delta PV plant site is illustrated below. There are no highly sensitive features identified within the site that would be affected by the development. A significant proportion of the site consists of previously transformed areas considered to be low sensitivity. Although a significant proportion of the grass cover within these areas has recovered, some growth forms such as geophytes do not easily return and the diversity of these areas will be depressed for some decades compared to undisturbed areas. The intact areas are dominated by *Tarchonanthus* which is indicative of poor grazing management with moderate tree density. These areas are considered moderate sensitivity and there are no features present within the site that are not commonly available in the wider area. Overall, there are no vegetation features of significant concern within the development footprint and no listed fauna which would be significantly impacted by the development of the Delta PV Power Plant at the site.

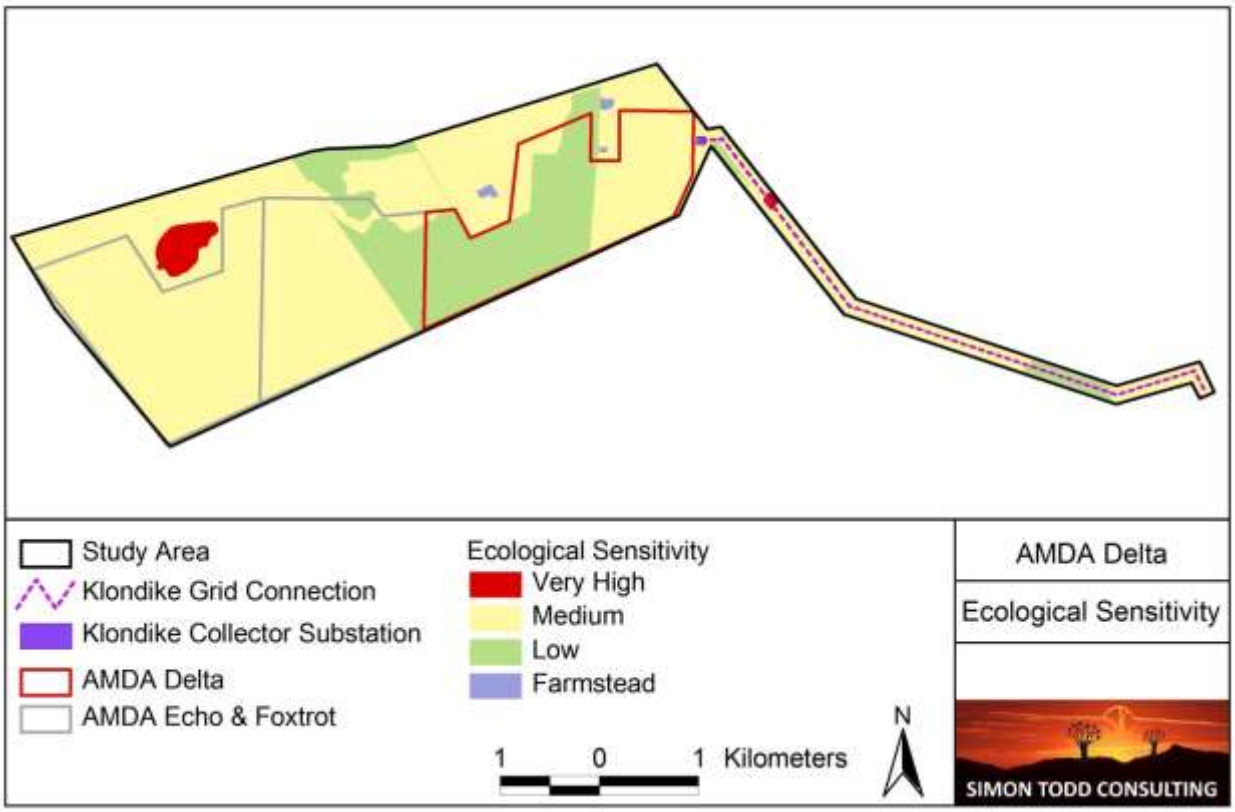

Figure 21: Ecological sensitivity map of the Klondike Delta PV Plant, showing that the majority of the site consists of the previously transformed vegetation of low sensitivity.

16 VISUAL CONSIDERATIONS

Mr Stephen Stead of Visual Resource Management Africa has been appointed to undertake a Visual Impact Assessment of the proposed AMDA Delta PV Energy Facility. A copy of the Visual Impact Assessment is attached in Appendix E7 and the following is summarised from this document.

The terrain in which the proposed project is to be sited, is predominantly flat, with drainage to the south into the Droe Hartrivier. Some low hill features are located to the northwest of the proposed site but at a distance of approximately 25km and outside of the proposed project landscape context. As depicted in the West to East profile, the elevation fall is to the centre with the proposed site located at approximate elevation 1230 mamsl from a high point of 1300 mamsl to the west. The drop in elevation to the east, and the gradual rise in elevation to the west are likely to reduce the viewshed extent. The south to north profile depicts some variation across the terrain, draining to the south. As with the West to East profile, the slight undulation of the terrain in combination with the lower visual profile of the proposed PV project, is likely to contain the visual extent of the proposed project to within a local extent.

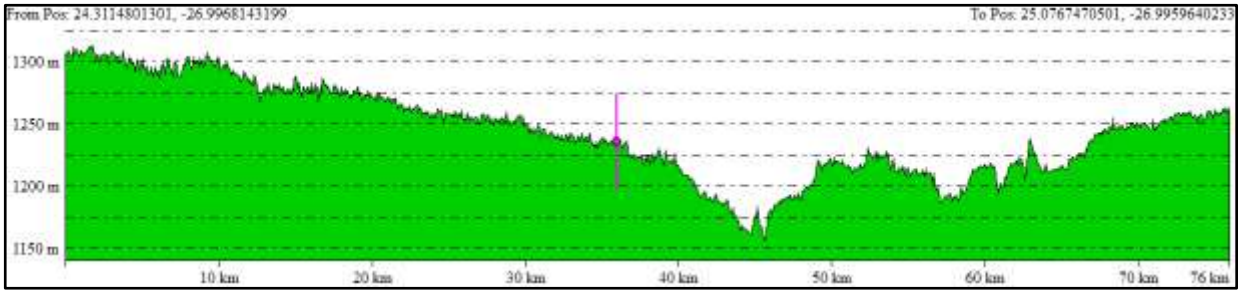

Figure 22: West to East topographic profile.

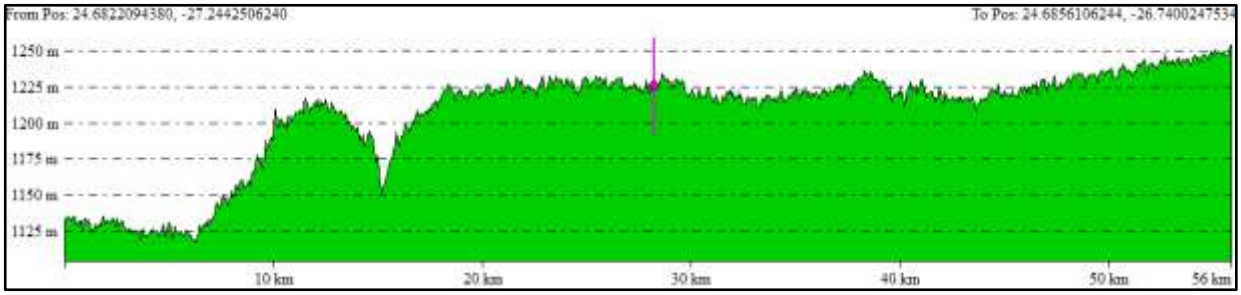

Figure 23: South to North topographic profile.

16.1 PROJECT VISIBILITY AND EXPOSURE

The visible extent, or viewshed, is 'the outer boundary defining a view catchment area, usually along crests and ridgelines' In order to define the extent of the possible influence of the proposed project, a viewshed analysis is undertaken from the proposed sites at a specified height above ground level as indicated in the below table making use of open source NASA ASTER Digital Elevation Model data (NASA, 2009). The extent of the viewshed analysis was restricted to a defined distance that represents the approximate zone of visual influence (ZVI) of the proposed activities, which takes the scale, and size of the proposed projects into consideration in relation to the natural visual absorption capacity of the receiving environment. The maps are informative only as visibility tends to diminish exponentially with distance, which is well recognised in visual analysis literature (Hull & Bishop, 1988).

Table 9: Proposed Project Heights and Viewshed Constraints Table

Project Phase	Proposed Activity	Approx. Max. Height (m)	Approx. ZVI (km)
Construction	PV	5	12
Operation	Monopoles	25	6

As depicted in the below, the (4) viewsheds generated from the proposed site corner points, have a constrained extent and as such the visible extent is rated ***Local***. Even within the 2km buffer distance area, fragmentation is starting to take place. Beyond the 6km distance, a visual incidence is very unlikely due to the medium sized bushveld vegetation.

As depicted in Figure 10 below, the (3) viewsheds generated along the proposed power line routing is rated ***Local***. The 2km high exposure area depicts full coverage, but views start to fragment in the 2km to 6km distance zone, limiting visual extent to the northeast areas. The route is also proposed to follow existing Eskom power servitude which would increase the visual absorption capacity of the area.

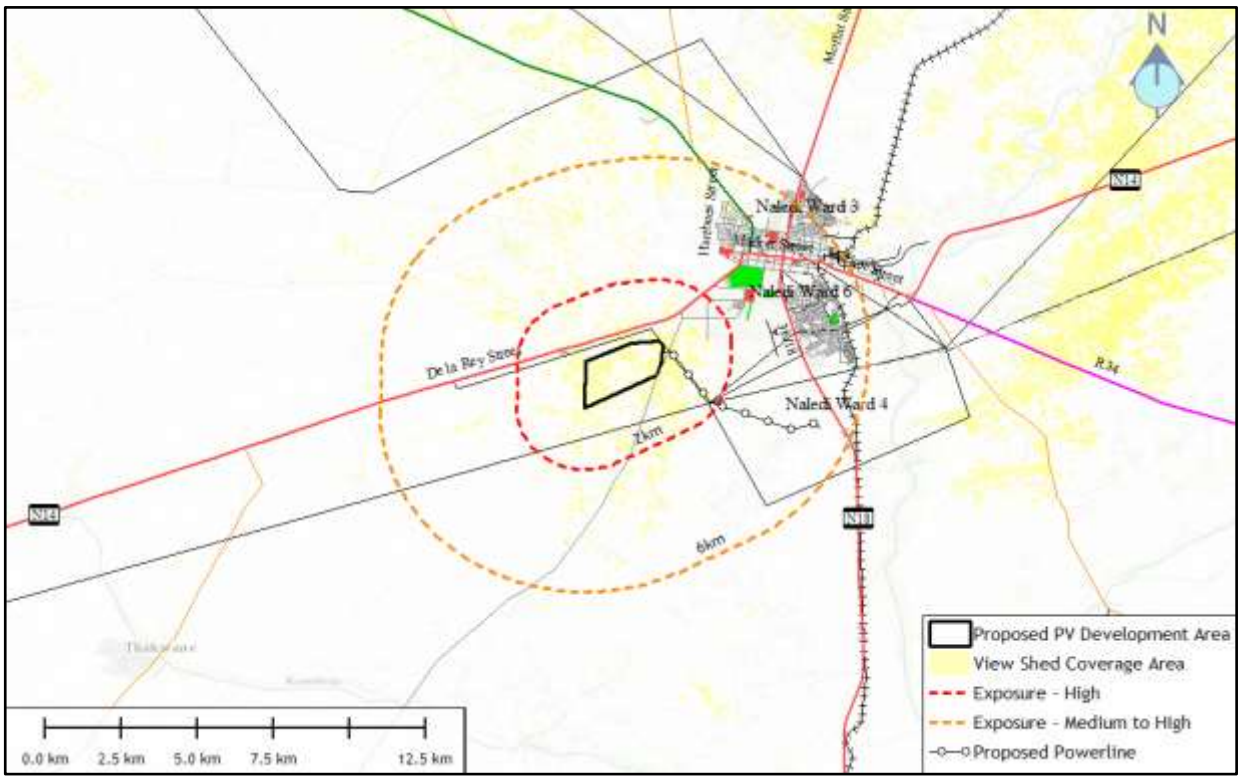

Figure 24: Viewshed for the PV structures at the high points generated from a 5m offset overlaid onto OS terrain Image.

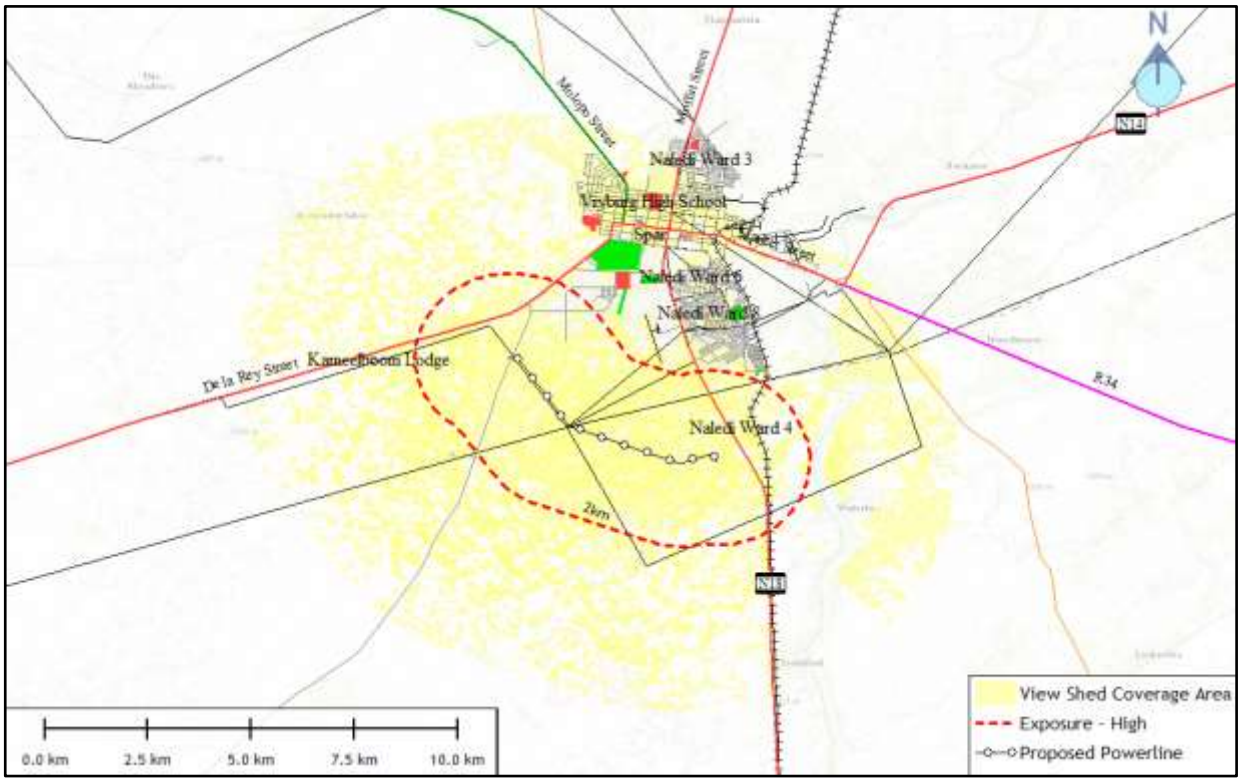

Figure 25: Viewshed for the power line structures at the high points generated from a 25m offset overlaid onto OS terrain Image.

Receptors and key landmarks located within the defined viewshed include:

High Exposure

- N14 National Road

- Klondike Conference Centre
- Mata Hara B&B
- Kameelboom Lodge
- Isolated farmsteads.

The overall visual exposure of the proposed landscape modification to the surrounding high exposure receptors is defined as ***high***. The N14 and the three tourist facilities located adjacent the proposed site, are located in close proximity.

16.2 REGIONAL LANDSCAPE CHARACTER

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

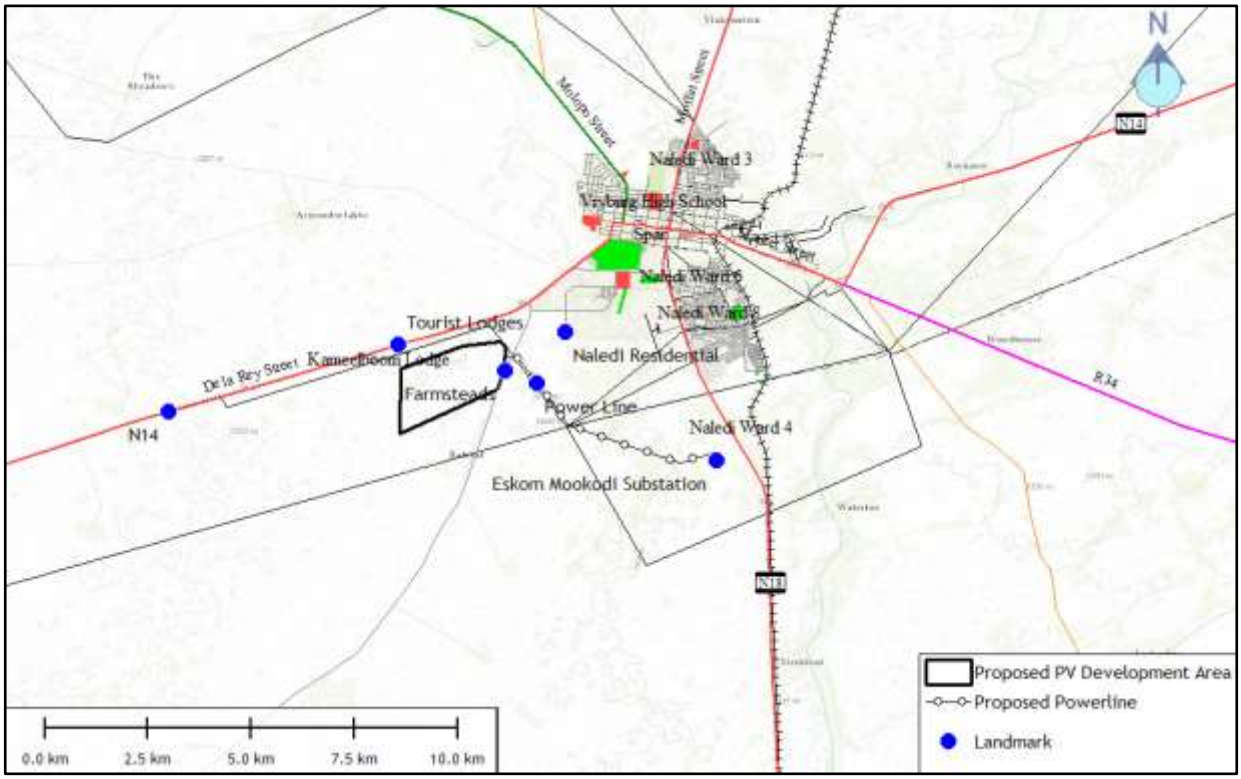

Figure 26: Surrounding landmark photograph location point and profile lines map.

Figure 27: Photograph of the N14 National Road

Figure 28: Photograph of one of the three tourist lodges located along the N14 National Road.

Figure 29: Photograph of the existing Eskom line along which the proposed power line is to be routed.

Figure 30: Photograph of the existing Eskom Mookodi Substation

Figure 31: Photograph of the Naledi residential areas to the east of the proposed development.

16.2.1 Vegetation

According to Mucina & Rutherford the general vegetation in the Vryburg area falls into the Savanna Biome and more specifically in the Ghaap Plateau Vaalbosveld group. The vegetation and landscape features are described as "a flat plateau with well-developed shrub layer with *Tarcho camphoraturs* and *Acacia karroo*. Common species include Namaqua Fig *Ficus chordata*, White Stinkwood *Celtis africana* and False Olive *Buddleja saligna*".

The Plantzafrica website defines the "Savanna Biome is the largest Biome in southern Africa, occupying 46% of its area, and over one-third the area of South Africa. It is well developed over the lowveld and Kalahari region of South Africa. It is characterized by a grassy ground layer and a distinct upper layer of woody plants. Where this upper layer is near the ground the vegetation may be referred to as Shrubveld, where it is dense as Woodland, and the intermediate stages are locally known as Bushveld."

The website indicates that "the environmental factors delimiting the biome are complex: altitude ranges from sea level to 2 000 m; rainfall varies from 235 to 1 000 mm per year; frost may occur from 0 to 120 days per year; and almost every major geological and soil type occurs within the biome. A major factor delimiting the biome is the lack of sufficient rainfall that prevents the upper layer from dominating, coupled with fires and grazing, which keep the grass layer dominant. Summer rainfall is essential for the grass dominance, which, with its fine material, fuels near-annual fires. In fact, almost all species are adapted to survive fires, usually with less than 10% of plants, both in the grass and tree layer, killed by fire. Even with severe burning, most species can resprout from the stem bases."

Relating to the site, the website indicates that "the shrub-tree layer may vary from 1 to 20 m in height, but in Bushveld typically varies from 3 to 7 m. The shrub-tree element may come to dominate the vegetation in areas that are being overgrazed. Most of the savanna vegetation types are used for grazing, mainly by cattle or game. In the southernmost savanna types, goats are the major stock".

16.2.2 Other Projects

As depicted in the figure below, due to the location of the proposed site within the Renewable Energy Development Zones (REDZs) Area 6, other renewable projects are also located within the

vicinity. Located due east of the proposed project site are a Mainstream, Kabi Solar and DPS79 Solar projects. They each have a 75MW capacity. The location of many renewable projects around the Eskom substation is likely to create a strong cumulative change to the landscape character.

Figure 32: Google Earth map depicting the Department of Environmental Affairs Renewable Energy projects in relation to the proposed three AMDA PV projects (western purple areas).

16.2.3 Landuses

The closest town is Vryburg and is located approximately 5km to the east of the site. The town is medium in size and is expanding to the south. As indicated in Figure 16, expansion of the formal residential areas of Naledi does extend to just east of the proposed site.

The predominant land use around the area is agriculture, with all property zoned agricultural. The Vryburg area is well known as a beef cattle farming area. The farms are large in size and, with the bushveld treed landscape, the isolated farmhouses do not dominate the landscape, with the natural vegetation dominating the local sense of place.

16.2.4 Infrastructure and Settlement

The main linear infrastructure elements identified within the surrounding areas are the N14 National Road and a 400kV Eskom Power Line to the south of the proposed site. The N14 National Road starts in the Gauteng area, routing through the town of Vryburg in the east to the town of Springbok in the west. Being the main westerly route road from the eastern interior to the west, it is well utilised and would carry tourist traffic visiting the tourist areas around Upington, and in addition, offer road access into Namibia from Gauteng.

16.2.5 Tourism

Three tourist facilities were identified in close proximity to the proposed project. These are all to the north of the proposed site, and are located on a narrow strip of land between the site and the N14. The properties are small in size, due to the realignment of the N14 further to the north to straighten out a short section of the road. The larger narrow section of subdivided land was then further subdivided into four portions, three of which are utilising the adjacent N14 National Road to

attract overnight accommodation. The Klondike Conference centre is located to the east, with the Mata Hara and Kameelboom Lodge further to the west. The Klondike Conference centre is the most established, comprising of ten chalets, a conference centre and a chapel.

Figure 33: Klondike Conference Centre chalets

16.3 SITE LANDSCAPE CHARACTER

Topographic statistics indicate that the site covers an area of 3 sq. km. The minimum elevation is 1210 mamsl and the maximum elevation is 1243 mamsl, with the average elevation set as 1226 mamsl. The maximum slope is indicated as 12 degrees and the average slope is a gradual 3.7 degrees. The dominant aspect, and drainage, is to the east.

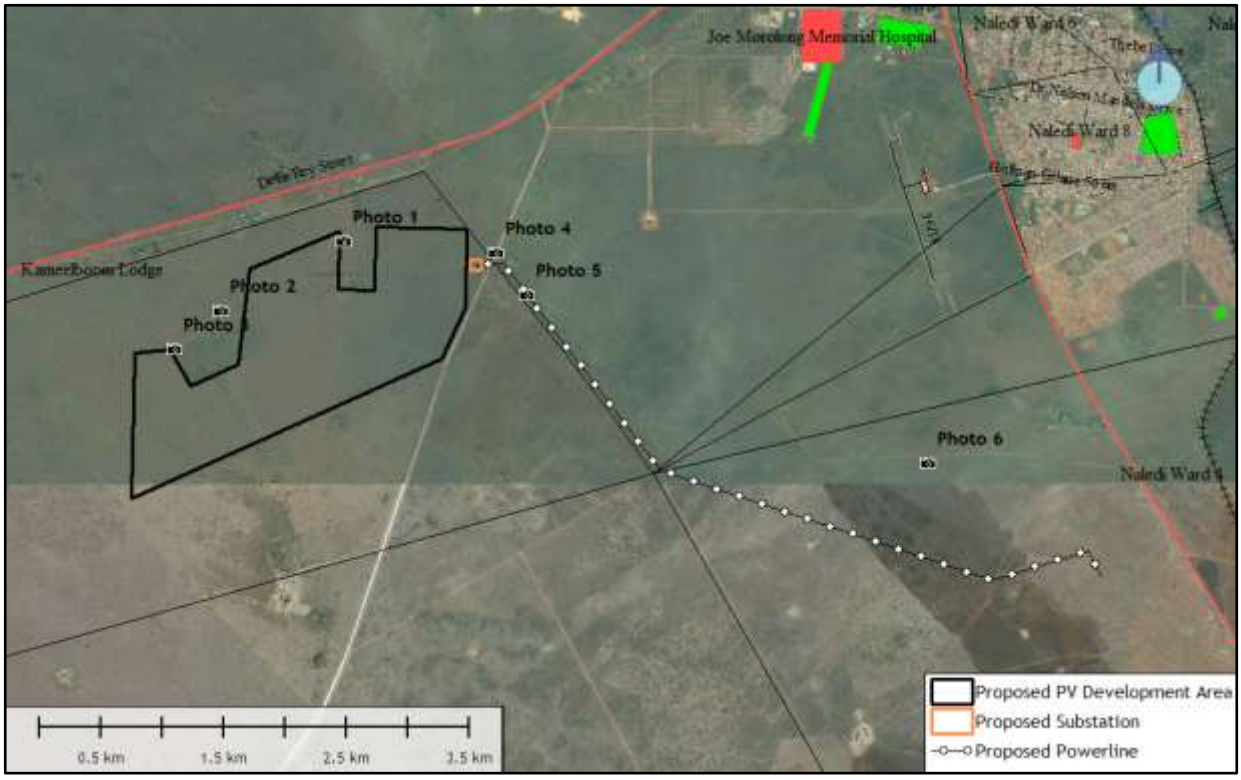

Figure 34: Site photograph locality overlay only OS satellite image map.

Figure 35: Photograph 1 in a northerly direction showing the Klondike chalet roofs in the background as seen from the proposed PV site.

Figure 36: Photograph 2 in a southerly direction of some of the existing agricultural buildings found on the proposed site (non development area).

Figure 37: Photograph 3 taken in a westerly direction of the medium sized vegetation and the farm roads on the proposed site.

Figure 38: Photograph 4 taken in a westerly direction of the proposed substation area as seen from the adjacent district road.

Figure 39: Photograph 5 taken in a easterly direction of the proposed power line routing along the existing Eskom power line.

Figure 40: Photograph 6 taken in a southerly direction of the existing Eskom 400kV power line along which the proposed project power line is proposed.

16.4 VISUAL RESOURCE MANAGEMENT (VRM) CLASSES

In terms of the VRM methodology, landscape character is derived from a combination of scenic quality, receptor sensitivity to landscape change, and distance of the proposed landscape modification from key receptor points. These three criteria are rated in terms of the VRM scenic quality and receptor sensitivity questionnaires that are appended to the addendum. The Classes are not prescriptive and are utilised as a guideline to determine the carrying capacity of a visually preferred landscape that is utilised to assess the suitability of the landscape change associated with the proposed project. Due to the uniformity of the proposed site, only a single landscape was defined for the modified vaalbosveld landscape.

16.4.1 Scenic Quality

The scenic quality is determined making use of the VRM scenic quality questionnaire (refer to addendum). Seven scenic quality criteria area scored on a 1 (low) to 5 (high) scale. The scores are totalled and assigned a A (High), B (Moderate) or C (low) based on the following split:

A= scenic quality rating of ≥19;

B = rating of 12 – 18,

C= rating of ≤11

Table 10: Landscape Scenic Quality rating table.

Landscape	Modified Vaalbosveld
Landform	1
Vegetation	3
Water	0
Colour	2

Adjacent scenery	2
Scarcity	1
Cultural modifications	-2
Score	7
Category	C

(A= scenic quality rating of ≥19; B = rating of 12 – 18, C= rating of ≤11)

16.4.2 Receptor Sensitivity

Sensitivity levels are a measure of public concern for scenic quality. Receptor sensitivity to landscape change is determined by rating the following factors in terms of Low to High:

Table 11: Landscape Receptor Sensitivity rating table.

Landscape	**Modified Vaalbosveld**
Type of user	L
Amount of use	M
Public interest	L
Adjacent land users	H
Special areas	L
Score	L

(H = High, M = Moderate, L = Low sensitivity)

16.4.3 VRM Class Objectives

The BLM has defined four Classes that represent the relative value of the visual resources of an area and are defined making use of the VRM Matrix below:

i. **Classes I and II** are the most valued
ii. **Class III** represent a moderate value
iii. **Class IV** is of least value

Table 12: VRM Class Matrix Table

		VISUAL SENSITIVITY LEVELS								
		High			Medium			Low		
SCENIC QUALITY	A (High)	II	II	II	II	II	II	II	II	II
	B (Medium)	II	III	III/ IV *	III	IV	IV	IV	IV	IV
	C (Low)	III	IV	IV	IV	IV	IV	IV	IV	IV

DISTANCE ZONES	Fore/middle ground	Background	Seldom seen	Fore/middle ground	Background	Seldom seen	Fore/middle ground	Background	Seldom seen

* If adjacent areas are **Class III** or lower, assign **Class III**, if higher, assign **Class IV**

Table 13: VRM Class Summary Table

Landscape Area	ZVI	Scenic Quality	Receptor sensitivity	Visual Inventory	Visual Resource Management
Significant vegetation	NA				Class I
Modified Vaalbosveld	FG/MG	C	Low	Class IV	Class III

(Key: FG = Foreground, MG = Middle ground, BG = Background)

Class I

Class I is assigned when legislation restricts development in certain areas. The visual objective is to preserve the existing character of the landscape, the level of change to the characteristic landscape should be very low, and must not attract attention. A Class I visual objective was assigned to the following features within the proposed development area due to their protected status within the South African legislation:

- Any river / streams and associated flood lines buffers identified as significant in terms of the WULA process.
- Any wetlands identified as significant in terms of the WULA process.
- Any ecological areas (or plant species) identified as having a high significance.

Class II

Class II visual objectives were assigned to the following features:

- No Class II landscape were defined.

Class III

Class III visual objectives were assigned to the following landscapes:

- Modified Vaalbosveld

Based on the VRM matrix, the inventory landscape was rated Class IV due to the low scenic quality and the low receptor sensitivity. However, due to the close proximity to the three tourist related activities to the north of the proposed site, this inventory class was changed to Class III to protect the surrounding agricultural sense of place, which is used to some degree by the receptors making use of the tourist facilities. The Class III visual objective is to partially retain the existing character of these rural landscapes, where the level of change to the characteristic landscape should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer, and changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Class IV

Class IV visual objectives were assigned to the following features:

- No Class IV landscape were defined.

16.5 KEY OBSERVATION POINTS

Key Observation Points (KOPs) are defined by the Bureau of Land Management as the people (receptors) located in strategic locations surrounding the property that make consistent use of the views associated with the site where the landscape modifications are proposed. These locations are important in terms of the VRM methodology, which requires that the degree of contrast that the proposed landscape modifications will make to the existing landscape be measured from these most critical locations, or receptors, surrounding the property.

The main receptors for this site, where clear views of the proposed project could result in a change to local visual resources, are:

- N14 Westbound
- Klondike Conference Centre
- Kameelboom Lodge / Mata Hara B&B
- Rural residential

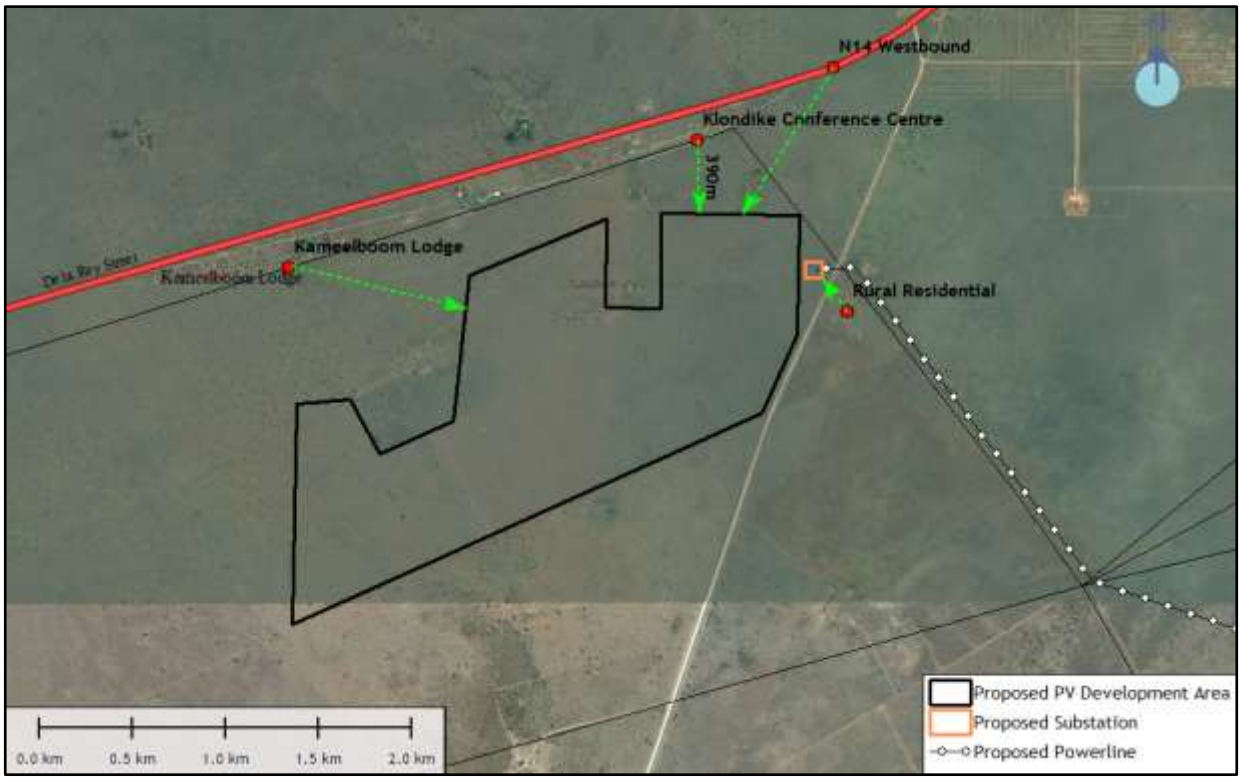

Figure 41: Map depicting the main receptor locations associated with the proposed study area.

Figure 42: Photograph taken from N14 westbound towards the proposed site.

Figure 43: View towards the proposed site as seen from Kameelboom Lodge campsite.

Figure 44: Photograph from the Klondike Conference Centre chalets towards the proposed site.

Figure 45: Photograph towards the proposed substation as seen from the district road to the east of the site.

16.6 VISUAL ABSORPTION CAPACITY

The VAC of the site is rated ***Medium***. There is some undulation of the landscape, but the main feature increasing the VAC levels is the treed Vaalbosveld remains landscape. Cultural modifications also include the Naledi residential areas to the east, the Eskom distribution power lines to the south, distribution power lines on the site and surrounding the site, as well as numerous farmsteads around the site. The proposed power line is also aligned along two existing Eskom servitudes which increases the vertical visual element in the landscape.

16.7 PROJECT VISIBILITY

The proposed PV structures have a constrained viewshed extent and as such is rated ***Local***. Even within the 2km buffer distance area, fragmentation of the viewshed is starting to take place. Beyond the 6km distance, a visual incidence is very unlikely. It is likely that the PV project zone of visual influence would not extend beyond the foreground / middle ground buffer of 4 kilometres from the site. This is mostly due to the surrounding Vaalbosveld trees, which in most instances will be higher than the proposed PV structures that would significantly fragment most views.

The proposed power line routing has a constrained viewshed extent and as such is rated ***Local***. The 2km high exposure area depicts full coverage, but views start to fragment in the 2km to 6km distance zone, limiting visual extent to the northeast areas. It is likely that the power line zone of visual influence would not extend beyond two kilometres from the site, due to the small visual footprint of the monopoles.

16.8 PROJECT EXPOSURE

The overall visual exposure of the proposed landscape modification to the surrounding receptors is defined as ***high***. The N14 and the three tourist facilities located adjacent the proposed site, are located in close proximity.

16.9 SCENIC QUALITY

The Scenic Quality rating for the modified Vaalbosveld landscape is rated ***Medium to Low***. Landform is rated low due to the flat terrain that has no outstanding landscape features. Vegetation is rated medium due to the Vaalbosveld type trees that offer some variety and colour to the landscape. Water is absent on the site and rated low. Colours are shades of greens from the trees and the yellows from the grasses. Adjacent dwellings are well screening by local trees that hide the house colours. Adjacent scenery is rated medium to low. The existing adjacent residential areas, the power lines and the road infrastructure increase the local VAC levels. Scarcity is rated low as the land is zoned agriculture and is interesting within it's setting but is fairly common within the region.

16.10 RECEPTOR SENSITIVITY

The overall receptor sensitivity to the landscape change is likely to be ***low***. The type of users do include tourist who could be more sensitive to landscape change, however the higher VAC of the area and close proximity of the site to the Naledi residential development are likely to reduce receptor sensitivity to low. The area is buffered from the N14 and would be mainly screened from these receptors. Other receptors include adjacent tourism accommodation and conference activities and the amount of use is rated medium. The partial screening and higher VAC from the remaining vaalbosveld trees in the buffer zone, would reduce public interest and is rated low. Adjacent land users include tourists that use the site as part of their tourism based sense of place and as such is rated high. The area is zoned agricultural and rated low for special zonings.

17 HERITAGE CONSIDERATIONS

An Integrated Heritage Impact Assessment is in the process of being undertaken. This will include a Built Environment Assessment, Archaeological Impact Assessment, and Palaeontological Impact Assessment. Please refer to the following appendices for these studies:

- Appendix E3 – Archaeology Scoping Report (Nilssen, 2016);
- Appendix E4 – Palaeontology Desktop Study (Almond, 2016); and
- Appendix E5 – Integrated Heritage Study (de Kock, 2016).

The following has been summarised by the integrated heritage specialist as part of the scoping phase of the environmental process.

The proposed development site (±250 ha in extent) forms part of the remaining extent of farm Klondike No 670 (±1142.4853 ha in extent) and is situated approximately and is situated about 7km SW of Vryburg in the North West Province - on the southern side of the N14 National road as illustrated through Figure 1 below. The following statement was articulated in the Scoping Archaeological Impact Assessment report (Nilssen, 2016:4) to describe the study area:

"...Google Earth imagery suggests that vegetation cover is likely to be open and sparse and that archaeological visibility will be adequate for an assessment. Water sources in the form of pans occur within the study area and it is also possible that ancient drainage lines are present. Such features are commonly attractive to life, and it is likely that archaeological resources occur in their vicinity".

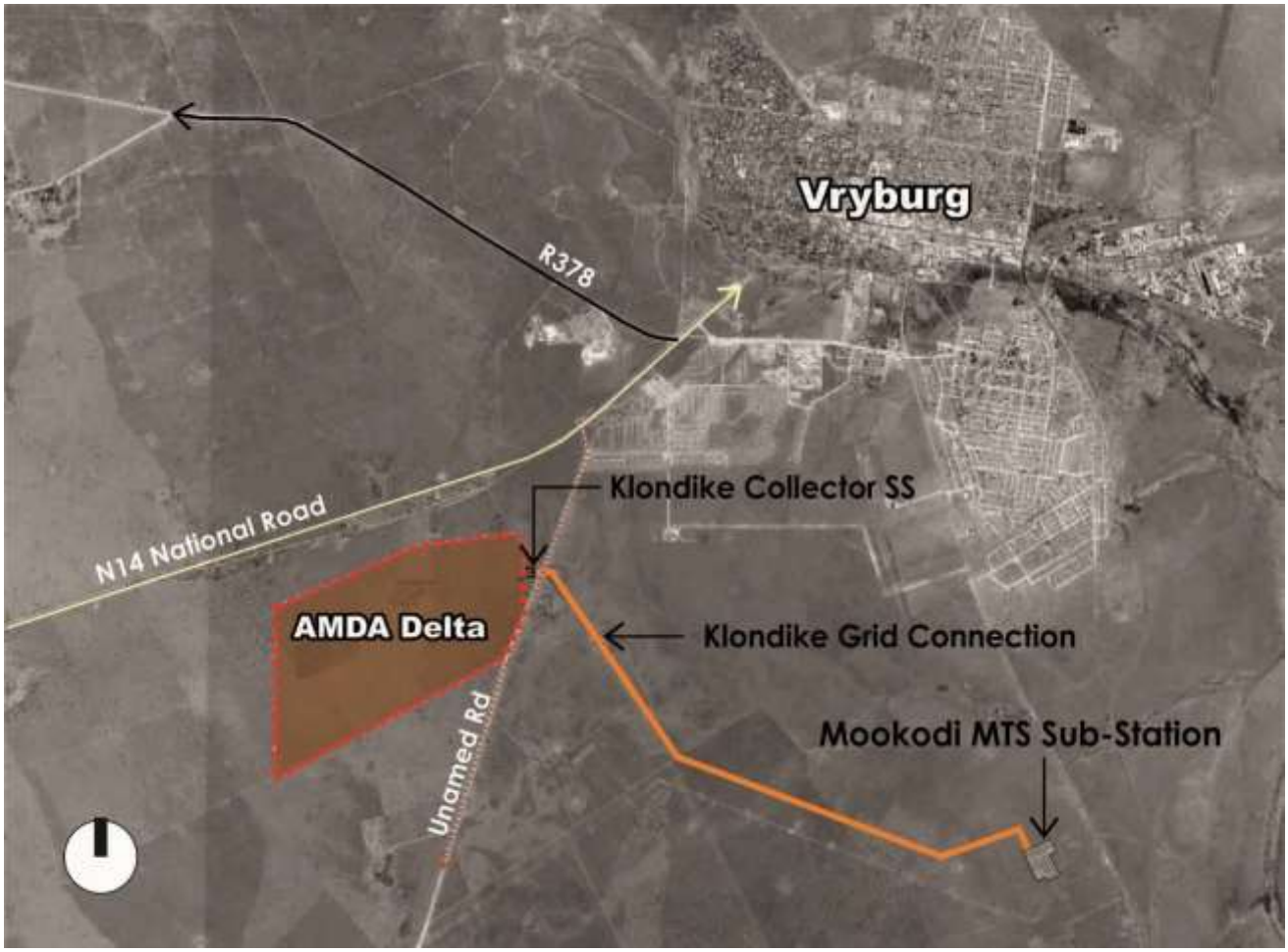

Figure 46: Location of property and proposed site in relation to Vryburg and direct environs (Source: GoogleEarth, 2015)

Compilation of the Integrated HIA report for the proposed development activity (including relevant development alternatives); will include the professional inputs from the following specialist reports sanctioned as part of the HIA process:

- Basic archival background research, Cultural landscape assessment, Built environment analysis and assimilating inputs from various specialist report (*Perception Planning*);
- Visual Impact Assessment (*VRM Africa, S Stead*)
- Archaeological Impact Assessment (*Dr. Peter Nilssen*);

- Desktop Palaeontological Impact Assessment (*Natura Viva, Dr. J. Almond*).

The Integrated HIA, which will be submitted to the relevant competent authorities in due course, will contribute to the overall EIA process through the following professional inputs/ components:

- Field work carried out by various specialists;
- Liaison with project manager, environmental assessment practitioner (EAP) and various specialist consultants;
- Assimilating findings and recommendations emanating from specialist inputs into HIA;
- Identification of heritage-related issues and concerns;
- Analysis of development site and its environs;
- Identification of contextual spatial informants;
- Establishing cultural significance, based on criteria set out in NHRA;
- Identification of heritage-related design informants based on the above;
- Focussed public participation process (PPP) aimed at soliciting heritage-related comments (to be coordinated with PPP to be managed by EAP;
- Address outcomes from focussed public participation process, if any;
- Assess conformity of final proposed site layout to design informants identified;
- Submission to competent authority.

Having regard to the above, it is recommended that an Integrated Heritage Impact Assessment, including the various professional inputs set out in Section 5 of this report, be undertaken and submitted to the relevant competent authorities for adjudication.

18 AVIFAUNAL CONSIDERATIONS

An avifaunal Impact Assessment has been undertaken by Mr Blair Zoghby of Simon Todd consulting. A copy of this study is attached in Appendix E8. The following pertinent points are transcribed from this study:

18.1 TERMS OF REFERENCE

The specific terms of reference for this avifaunal specialist scoping study include the following:

- A description of the environment of the study area in terms of the avian habitats present.
- A consolidated list of bird species and priority bird species (priority species will include nationally and/or globally threatened, rare, endemic or range-restricted bird species) likely to occur within the study area and broader impact zone of the development, with information on the relative value (in terms of breeding, nesting, roosting and foraging) of the site for these birds.
- A delineation of areas that are potentially highly sensitive, no-go areas that may need to be avoided by the development.

- A description and evaluation of the environmental issues and potential impacts (including direct, indirect and cumulative impacts) that the proposed development may have on the bird species present. Direct, indirect and cumulative impacts of the identified issues will be evaluated within the avifaunal specialist scoping study in terms of the following criteria:
    - The **nature**, which includes a description of what causes the effect, what will be affected and how it will be affected.
    - The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international.
- A statement regarding the potential significance of the identified issues based on the evaluation of the issues/impacts.
- Identification of potentially significant impacts to be assessed within the EIA phase and the details of the methodology to be adopted in assessing these impacts. This should be detailed enough to be included within the Plan of Study for the EIA and include a description of the proposed method of assessing the potential environmental impacts associated with the development.

18.1.1 Approach

The avifaunal specialist scoping study included the following steps:

- A review of all available published and unpublished literature pertaining to bird interactions with SEFs and their associated power infrastructure, summarising the issues involved and the current level of knowledge in the field. Various information sources including data on the local avifauna of the area and previous studies of bird interactions with SEFs and their associated power infrastructure were be examined.
- A site visit of 3 days to the study area (26-28 February 2016) to determine the *in situ* local avifauna and avian habitats present on site to:
    - Quantify aspects of the local avifauna (such as species diversity and abundance);
    - Identify important avian features present on site (such as nesting and roosting sites);
    - Confirm the presence, abundance, habitat preference and movements of priority species;
    - Identify important flyways across the site; and
    - Delineate any obvious, highly sensitive, no-go areas to be avoided by the development.
- The compilation of a consolidated and annotated list of the avifauna likely to occur within the study area and the broader impact zone of the development based on a combination of existing distributional data, species seen during the site visit and previous experience of the avifauna of the area.
- The compilation of a short-list of priority bird species (including nationally and/or globally threatened, rare, endemic or range-restricted bird species) which could be affected by the proposed development. These species will subsequently be considered as adequate surrogates for the local avifauna in general, and mitigation of impacts on these species will

be considered likely to accommodate any less important bird populations that may also potentially be affected.

- An avian site sensitivity map was generated by integrating avian microhabitats present on site and avifaunal information collected during the site visit. The avian sensitivity of the different units identified in the mapping procedure were rated according to the following scale:
    - *Low:* Areas of natural or transformed habitat with a low sensitivity where there is likely to be a negligible impact on ecological processes and avifauna. Most types of development can proceed within these areas with little ecological impact.
    - *Medium*: Areas of natural or previously transformed land where the impacts are likely to be largely local. These areas usually comprise the bulk of habitats within an area. Development within these areas can proceed with relatively little ecological and avian impacts provided that appropriate mitigation measures are taken.
    - *High:* Areas of natural or transformed land where a high impact is anticipated due to the high biodiversity, sensitivity or important ecological role of the area. Development within these areas is undesirable and should only proceed with caution as it may not be possible to mitigate all impacts appropriately.
    - *Very High:* Critical and unique habitats that serve as habitat for rare, threatened, endemic or range-restricted species and/or perform critical ecological roles. These areas are essentially no-go areas from a development perspective and should be avoided as much as possible.

In some situations, areas were also classified between the above categories, such as *Medium-High,* where it was deemed that an area did not fit well into a certain category but rather fell most appropriately between two sensitivity categories.

- The construction of a matrix of potential impacts of the development on the local avifauna will be drawn up and the significance of these impacts will be assessed.
- A final statement on the overall significance of the potential impacts of the development on the avifauna of the area will be written up.

18.1.2 Data sources used

The following data sources and reports were used in varying degrees of detail for this study:

- The Southern African Bird Atlas Project 1 (SABAP 1; Harrison *et al*., 1997) quarter degree squares (QDC) 2624DC (51 cards) and 2724BA (9 cards) as well as the Southern African Bird Atlas Project 2 (SABAP 2; http://sabap2.adu.org.za/index.php) pentads 2655_2435 (2 cards), 2655_2440 (41 cards), 2700_2435 (1 card) and 2700_2440 (4 cards) were consulted to determine the bird species likely to occur within the study area and the broader impact zone of the development.
- The conservation status, endemism and biology of all species considered likely to occur within the study area was then determined from Hockey *et al.* (2005) and Taylor *et al.* (2015).
- The South African National Vegetation Map (Mucina & Rutherford, 2006) was consulted in order to determine the vegetation types and their conservation status that occur within the study area

18.1.3 Limitations and assumptions

The specialist made the assumption that the sources of information used in the compilation of this report are reliable. However, it must be noted that there are limiting factors and these could detract from the accuracy of the predicted results:

- There is a scarcity of published, scientifically vetted information regarding the avifaunal impacts at existing SEFs. Recent studies at SEFs (all using different solar technologies) in southern California have revealed that a wide range of bird species are susceptible to morbidity and mortality at SEFs, regardless of the type of technology employed. It must however be noted, that facility related factors could influence impacts and mortality rates and as such, each SEF must be assessed individually, taking all variables into account.
- Assessment of the impacts associated with bird-SEF interactions is problematic due to: (i) limitations on the quality of information available describing the composition, abundance and movements of the local avifauna, and (ii) the complete absence of any local, empirical data describing the known impacts of existing SEFs on birds (Jenkins, 2011).
- Limited time in the field and no seasonal spread means that important components of the local avifauna (i.e. nest sites or localised areas of key habitats for rare or threatened species) could have been missed. However, the development area does not contain many large trees, so it is highly unlikely that there are any significant nesting sites of larger species present within the affected area that would not have been observed.

The site visit as well as personal experience of the avifauna of the area and of similar species in different parts of South Africa, through the specialist's experience working across the country, goes some way to remedying any knowledge deficiencies.

18.2 DESCRIPTION OF THE AFFECTED ENVIRONMENT

18.2.1 BROAD-SCALE VEGETATION PATTERNS

According to the national vegetation map (Mucina & Rutherford, 2006), the site falls entirely within the Ghaap Plateau Vaalbosveld vegetation type (Figure 2). This vegetation type is comprised of flat plateau with a well-developed shrub layer and an open tree layer. It is classified as *Least Threatened*, with very little of the area of this vegetation type having been transformed. There is however none of this vegetation type conserved in statutory conservation areas.

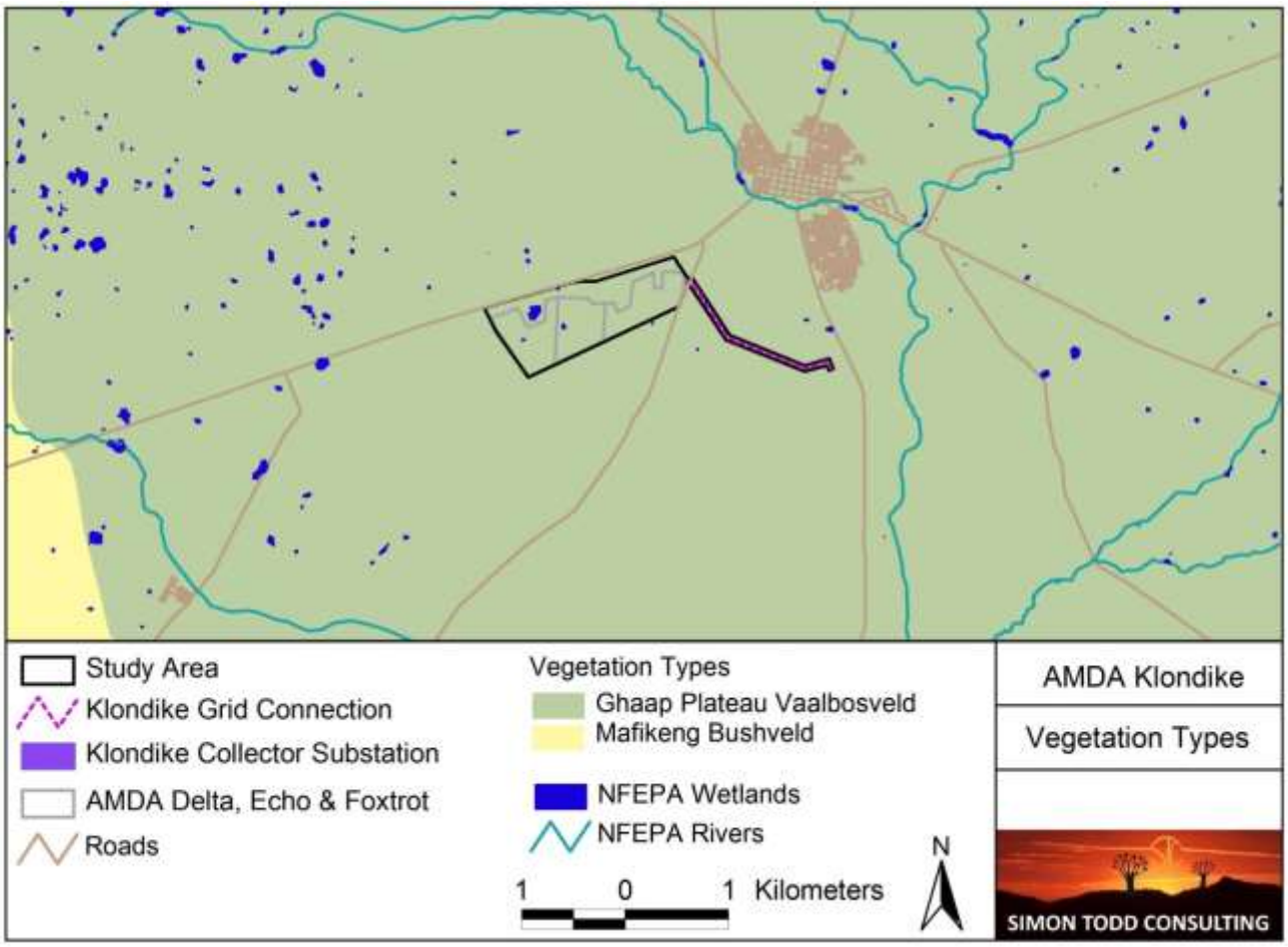

Figure 47: Extract of the national vegetation map for the study area, showing the site within the Ghaap Plateau Vaalbosveld vegetation type.

18.3 AVIAN MICROHABITATS

While broad-scale vegetation patterns influence the distribution and abundance of bird species holistically, it is the fine-scale vegetation patterns and various avian microhabitats in an area that determine local avifauna populations.

A number of different avian microhabitats were identified at the site and these formed the basis of the avian site sensitivity map. These units include:

- *Vaalbos shrubland:* This habitat unit represents the majority of the vegetation in the study area (Ghaap Plateau Vaalbosveld) and is largely made up of extensive plains of low shrubs *Tarchonanthus camphoratus* (an encroaching species in overgrazed or disturbed veld – which is evident in the study area). This habitat unit does not support the highest diversity and abundance of bird species.

- *Bushveld:* This habitat unit is found patchily throughout the study area and is characterised by a mix of larger trees, shrubs and interspersed open plains. The higher biomass and structural and compositional variation in the vegetation supports a high diversity and abundance of bird species, with large trees potentially providing roosting and nesting for many bird species (no important roosting or nesting sites were however recorded in the study area).

- *Cultivated/modified land:* This habitat unit occurs intermittently throughout the study area and represents a significant feeding area for many bird species. The land preparation

process opens up the soil and makes insects, seeds, bulbs and other food sources readily accessible to birds.

- *Ephemeral pan:* There is one ephemeral pan (which will only hold water after heavy rains) within the study area. This habitat unit is important for numerous species, as it is a reliable source of surface water in the area and because the vegetation surrounding the pan supports larger trees (i.e. structural and compositional variation and potential roosting and nesting sites).

It should however be noted, that the study area has already been subject to varying degrees of disturbance and degradation caused by past and present land-use practises. Evidence of high stocking rates and grazing pressure is apparent. There is also a network of minor farm roads throughout.

Figure 48: Vaalbos shrubland (left) is considered relatively low sensitivity due to low avifaunal diversity and use of these areas, while the Cultivated/modified land (right), has been impacted but remains relatively important for avifauna for foraging and where larger trees are present, this also provide structural diversity.

Figure 49: Patches of Bushveld, dominated by *Grewia flava* and *Tarchonanthus camphoratus*, left and areas with a higher density of trees, right, especially *Searsia lancea* and *Acacia tortillis*.

18.4 AVIFAUNA

Up to 218 bird species are known to occur within the study area and broader impact zone of the development (Appendix 1), including 17 red-listed or threatened species (Table 1), 12 endemic species and 36 near-endemic species. Of these, 53 species were recorded during the site visit,

most notable of which being the sightings of Secretarybird *Sagittarius serpentarius* and Abdim's Stork *Ciconia abdimii* just outside of the study area and European Roller *Coracias garrulus* within the study area.

The birds of greatest potential relevance and importance in terms of the possible impacts of the SEF and its associated power infrastructure are likely to be local populations of threatened or endemic passerines (Ant-eating Chat *Myrmecocichla formicivora* and Cape Longclaw *Macronyx capensis*), shy ground-nesting species (Burchell's Courser *Cursorius rufus* and Double-banded Courser *Rhinoptilus africanus*), resident or visiting large terrestrial birds (Secretarybird, Abdim's Stork, Black Stork *Ciconia nigra* and Blue Crane *Anthropoides paradieus*), resident or passing raptors (Martial Eagle *Polemaetus bellicosus,* Tawny Eagle *Aquila rapax,* Lanner Falcon *Falco biarmicus* and Red-footed Falcon *Falco vespertinus*) and transient waterbirds (Greater Flamingo *Phoenicopterus ruber,* Lesser Flamingo *Phoenicopterus minor* and Yellow-billed Stork *Mycteria ibis*).

At the time of the site visit (26-28 February 2016) bird species diversity and abundance was high in both the *Bushveld* and *Cultivated/modified land* habitat units. Similarly so, outside of the study area, within the broader impact zone of the development, *Cultivated/modified land* supported large aggregations of Abdim's Stork. This species forages on irrigated lands, pastures and recently ploughed fields and is also attracted to areas following insect emergences.

On the basis of the observations recorded during the field visit, and in combination with already documented information on the avifauna of the study area, 17 priority species are considered central in this avifaunal impact study (Table 1). These are mostly threatened species which are known to occur, or could occur, in relatively high numbers in the study area and the broader impact zone of the development and which are likely to be, or could be, negatively affected by the SEF. Two species, Secretarybird and Abdim's Stork were recorded within the broader impact zone of the development, while one species, European Roller, was recorded within the study area.

Overall, the avifauna of the study area and the broader impact zone of the SEF is not considered unique and is typical of what occurs across large areas of the Savannah Biome, which therefore suggests that the sensitivity of the site, from an avian perspective, is moderate and negative impacts would be of local significance only.

Table 14: Priority species list considered central to the avifaunal impact study for the proposed Klondike SEF, selected on the basis of conservation status (Taylor *et al.*, 2015).

Common name	**Scientific name**	**Conservation status**	**Regional endemism**	**Estimated importance of local population**	**Preferred habitat**	**Likelihood of occurring in study area**	**Susceptible to**
Bustard, Kori	*Ardeotis kori*	Near-threatened	-	Low	Dry open savanna woodland, dwarf shrubland and occasionally grassland	Low	Collision
Courser, Burchell's	*Cursorius rufus*	Vulnerable	Near-endemic	Moderate	Sparsely vegetated arid regions	Moderate	Habitat loss/disturbance
Crane, Blue	*Anthropoides*	Near-threatened	Endemic	Low	Grasslands, but also in wetlands, cultivated	Moderate	Collision

Common name	Scientific name	Conservation status	Regional	Estimated	Preferred habitat	Likelihood of	Susceptible to
	paradieus				pastures and croplands		
Duck, Maccoa	*Oxyura maccoa*	Near-threatened	-	Moderate	Inland water bodies with emergent vegetation; flyover	Low	Habitat loss/disturbance
Eagle, Martial	*Polemaetus bellicosus*	Endangered	-	Low	Open savanna and woodland on plains, also semi-arid shrublands	Moderate	Collision; electrocution
Eagle, Tawny	*Aquila rapax*	Endangered	-	Moderate	Open savanna woodland	Moderate	Habitat loss/disturbance; electrocution
Falcon, Lanner	*Falco biarmicus*	Vulnerable	-	Low	Open grassland or woodland near cliff or electricity pylons	Low	Habitat loss/disturbance; collisions
Falcon, Red-footed	*Falco vespertinus*	Near-threatened	-	High	Open semi-arid and arid savannas	High	Habitat loss / disturbance
Flamingo, Greater	*Phoenicopterus ruber*	Near-threatened	-	Moderate	Saline or brackish water bodies; flyover		Collisions
Flamingo, Lesser	*Phoenicopterus minor*	Near-threatened	-	Moderate	Eutrophic shallow wetlands, saltpans; flyover	Moderate	Collisions
Roller, European	*Coracias garrulus*	Near-threatened	-	Low	Open woodlands	Moderate	Habitat loss / disturbance
Secretarybird	*Sagittarius serpentarius*	Vulnerable	-	Moderate	Open grassland with scattered trees and shrubs	High	Habitat loss/disturbance; collisions
Stork, Abdim's	*Ciconia abdimii*	Near-threatened	-	Moderate	Grassland, savanna woodland and cultivated lands	Moderate	Habitat loss/disturbance; collisions
Stork, Black	*Ciconia nigra*	Vulnerable	-	Moderate	Mountainous regions	Moderate	Collision; electrocution
Stork, Yellow-billed	*Mycteria ibis*	Endangered	-	Low	Inland freshwater bodies, occasionally in estuaries	Moderate	Habitat loss/disturbance
Vulture, Cape	*Gyps coprotheres*	Endangered	Near-endemic	Low	Mountainous regions, but range widely in surrounding areas	Low	Habitat loss/disturbance; collisions;

Common name	Scientific name	Conservation status	Regional	Estimated	Preferred habitat	Likelihood of	Susceptible to
							electrocutions
Vulture, White-backed	*Gyps africanus*	Critically Endangered	-	Low	Savanna woodland and bushveld	Low	Habitat loss/disturbance; collisions; electrocutions

18.5 AVIAN SITE SENSITIVITY MAP

The avian site sensitivity map was generated by integrating avian microhabitats present on site and avifaunal information collected during the site visit. It is important to delineate sensitive avian microhabitats within the study area in order to ensure the development does not have a long term negative impact on these habitats. Important avian microhabitats in the developable area play an integral role within the landscape, providing nesting, foraging and reproductive benefits to the local avifauna.

The majority of the site falls within *Medium-Low* sensitivity areas associated with the *Vaalbos shrubland* habitat unit. The vegetation in this habitat unit is homogenous, lacking structural and compositional variation, and did not support a high diversity and abundance of bird species. Similarly so, the *Cultivated/modified land* habitat unit was also classified as *Medium-Low* sensitivity.

Patches of *Bushveld* throughout the study area were assessed as being of *Medium* sensitivity. These areas supported a relatively high diversity and abundance of bird species, due to the structural and compositional variation in the vegetation, but were also subject to varying degree of degradation throughout.

One section, the *Ephemeral pan,* was assessed as being of *Very High* sensitivity. This habitat unit provides the only source of surface water in the area and supports a number of large trees surrounding the pan – which could potentially be important for roosting and nesting.

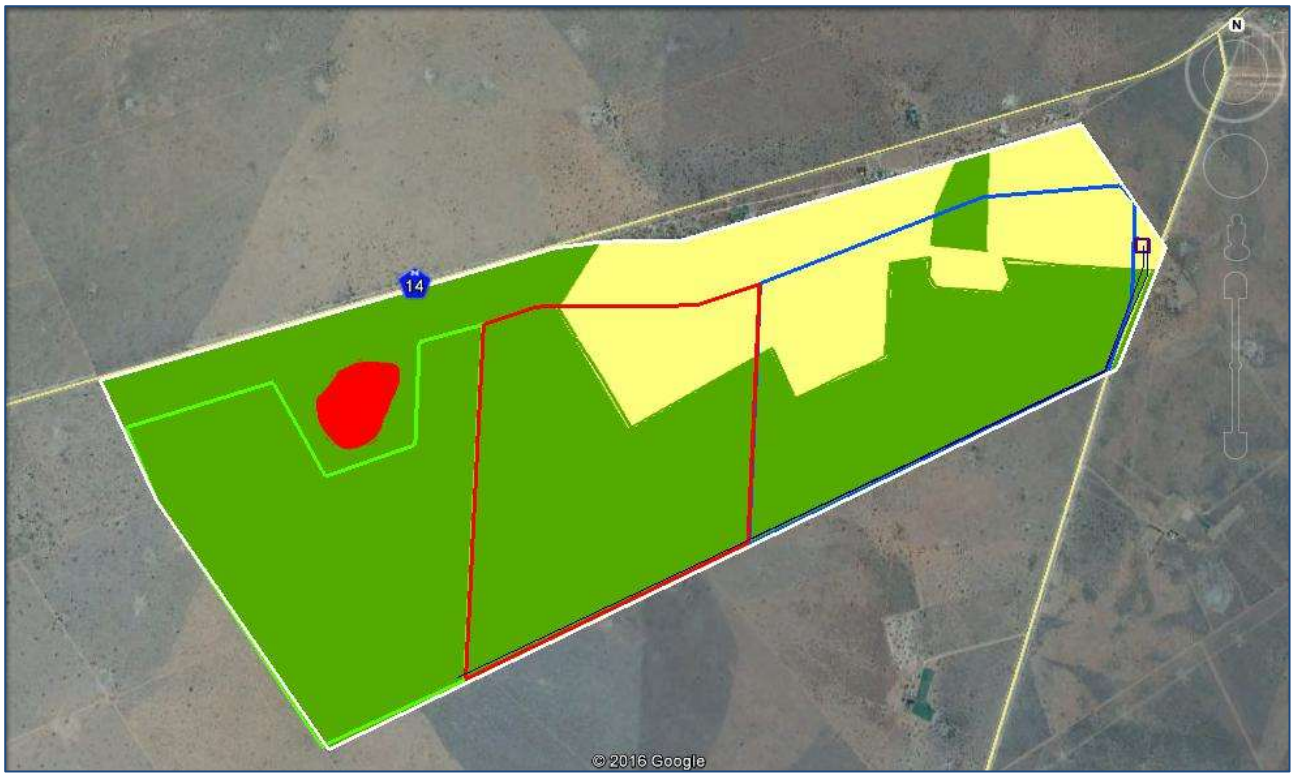

Figure 50: Avian site sensitivity map of the Klondike SEF illustrating the property boundaries (white) and preferred site layouts (Delta = Blue, Echo = Red and Foxtrot = Green). Avifaunal sensitivity: Green = *Medium*-Low, Yellow = *Medium* and Red = *Very High*.

18.6 CONCLUSION

The study area and more specifically the proposed development area are not considered unique habitats in the landscape and are already subject to varying degrees of transformation and degradation. Although two threatened and/or priority species were recorded in the broader impact zone of the development – Secretarybird and Abdim's Stork – and one species within the study area – European Roller - the area is not considered critical for their conservation and the extent of habitat loss for these species would be considered low.

The proposed Klondike facilities and their associated power infrastructure has been assessed as having a **medium-low** impact on priority species and general avifauna occurring in the study area and broader impact zone of the development. Factors resulting in the relatively low impact include the proximity of the site to Vryburg as well as the low structural diversity of the Vaalbosveld which occupies a significant proportion of the site. There were no breeding sites of large raptors or other species of concern observed within the study area and it is not considered to be locally or regionally of above average significance value for avifauna.

The development will pose several impacts to avifauna, including: a **low** displacement impact caused by disturbance and habitat destruction associated with construction and maintenance activities of the proposed SEF and its associated power infrastructure; a **low** impact of electrocutions of birds on power infrastructure, with the implementation of mitigation measures; and a **medium** impact of avian collisions with power line infrastructure and solar panels. These impacts will be assessed in detail in the EIA phase, based on the final layout of the three developments in relation to the various avifaunal features and habitats present at the site. Mitigation and avoidance measures that should be implemented to reduce the impact of the development will be investigated in the EIA, based on the final layout of the development and other technical features of the facilities.

19 IDENTIFICATION AND NATURE OF POTENTIAL IMPACTS

Potential impacts of the project have been identified by the EAP and participating specialists. These are discussed below and the significance thereof will be assessed in the Environmental Impact Report.

In this section, the potential impacts and associated risk factors that may be generated by the development are identified.

19.1 IDENTIFICATION OF POTENTIAL ECOLOGICAL IMPACTS.

Potential ecological impacts resulting from the development of the AMDA Delta PV Energy Facility would stem from a variety of different activities and risk factors associated with the preconstruction, construction and operational phases of the project including the following:

19.1.1 Preconstruction Phase

- Human presence and uncontrolled access to the site may result in negative impacts on fauna and flora through poaching of fauna and uncontrolled collection of plants for traditional medicine or other purpose.
- Site clearing & exploration activities for site establishment would have a negative impact on biodiversity if this was not conducted in a sensitive manner.

19.1.2 Construction Phase

- Vegetation clearing for the reflector field, access roads, site fencing etc could impact listed plant species as well as high-biodiversity plant communities. Vegetation clearing will also lead to habitat loss for fauna and potentially the loss of sensitive faunal species, habitats and ecosystems.
- Increased erosion risk would occur due to the loss of plant cover and soil disturbance created during the construction phase. This may impact downstream riparian and wetland habitats if a lot of silt enters the drainage systems.
- Presence and operation of construction machinery on site. This will create a physical impact as well as generate noise, pollution and other forms of disturbance at the site.
- Increased human presence can lead to poaching, illegal plant harvesting and other forms of disturbance such as fire.

19.1.3 Operational Phase

- The operation of the facility will generate noise and disturbance which may deter some fauna from the area.
- The areas inside the facility will requirement management and if this is not done appropriately, it could impact adjacent intact areas through impacts such as erosion, alien plant invasion and contamination from pollutants, herbicides or pesticides.
- The associated overhead power lines will pose a risk to avifauna susceptible to collisions and electrocution with power line infrastructure.

19.1.4 Cumulative Impacts

- The loss of unprotected vegetation types on a cumulative basis from the broad area may impact the countries' ability to meet its conservation targets.

- Transformation of intact habitat would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations.

19.2 IDENTIFICATION OF ECOLOGICAL IMPACTS TO BE ASSESSED IN THE EIA PHASE

In this section each of the potential impacts identified above is explored in more detail with reference to the features and characteristics of the site and the likelihood that each impact would occur given the characteristics of the site and the extent and nature of the development.

19.2.1 Impacts on vegetation and protected plant species

It is highly likely that some protected species occur at the site which may be impacted by the development. Vegetation clearing during construction will lead to the loss of currently intact habitat within the development footprint and is an inevitable consequence of the development. As this impact is certain to occur it will be assessed for the construction phase.

19.2.2 Soil erosion and associated degradation of ecosystems

The large amount of disturbance created during construction would potentially leave the site vulnerable to soil erosion, from both wind and water. Vegetation clearing, the panel arrays and access roads will all result in increased levels of runoff which will need to be managed and which would pose an erosion risk. Soil erosion is therefore considered a likely potential impact and will be assessed for the construction phase and operational phase.

19.2.3 Direct faunal impacts

Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some impact on fauna is highly likely to occur during construction as well as operation and this impact will therefore be assessed for the construction phase and operational phase.

19.2.4 Impacts on Avifauna

The development would result in some habitat loss for avifauna. However, as the extent of the site is relatively low and the affected vegetation type is still largely intact, this is not likely to be of high significance. Although a power line is required by the development and it would potentially generate significantly more impact than habitat loss, the grid connection is not part of the current assessment and is not considered here. An impact on avifauna due to habitat loss is a possibility and it will be assessed for the operational phase of the development.

19.2.5 Alien Plant Invasion

The disturbance created during construction is highly likely to encourage the invasion of the disturbed areas by alien species. It is possible that species will colonise the disturbed areas if given the opportunity. This impact is deemed highly likely to occur and will be assessed as a likely impact associated with the development.

19.2.6 Reduced ability to meet conservation obligations & targets

The loss of unprotected vegetation types on a cumulative basis from the broad area may impact the countries' ability to meet its conservation targets. Although the receiving vegetation type in the study area is classified as Least Threatened and is still more than 98% intact, it is a relatively restricted vegetation types for an arid area and would therefore be vulnerable to cumulative impact. This impact will therefore be assessed in light of the current development as well as any other developments in the surrounding area which would also contribute to cumulative impacts.

19.2.7 Impact on broad-scale ecological processes

Transformation of intact habitat on a cumulative basis would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. Due to the presence of a number of other renewable energy and mining developments in the area, this is a potential cumulative impact of the development that will be assessed during the EIA.

19.3 IDENTIFICATION OF POTENTIAL AVIFAUNAL IMPACTS

While renewable energy sources, such as solar energy, are important to the future development of power generation and hold great potential to alleviate the dependence on fossil fuels, they are not without their environmental risks and negative impacts. Poorly sited or designed SEFs can have negative impacts on not only vulnerable species and habitats, but also on entire ecosystem functioning. These impacts are extremely variable, differing from site to site, and are dependent on numerous contributing factors which include the design and specifications of the development, the importance and sensitivity of avian microhabitats present on site and the diversity and abundance of the local avifauna.

19.3.1 Impacts of solar energy facilities

19.3.1.1 Habitat loss

Although the degree of this impact is dependent on the location and scale of the development, this is potentially the most significant impact associated with the construction and operation (maintenance) of SEFs. Extensive areas of vegetation (habitat) are cleared to accommodate the considerable amount of infrastructure required at these facilities, reducing the amount of habitat available to birds for foraging, roosting and breeding (Smallie, 2013). Given the considerable space requirements of commercially viable facilities (> 200 ha), this effect could be significant in some instances, particularly given the possibility that the initial footprint of successful facilities may be expanded over time, and allowing for the possible cumulative effects of multiple facilities in one area. This impact is likely to affect smaller bird species (i.e. larks and pipits) with small home ranges, as entire territories could be removed during construction activities.

19.3.1.2 Disturbance and displacement

Construction of SEFs requires a significant amount of machinery and labour to be present on site for a period of time. For shy, sensitive species or ground-nesting birds resident in the area, construction activities are likely to cause a temporary disturbance or even result in displacement from the site entirely. In addition, species commuting around the site may become disorientated by the reflected light and consequently fly longer distances to avoid the area, potentially resulting in displacement and energy implications (Smallie, 2013). Similarly, but to a lesser extent, ongoing maintenance activities at the operational facility are likely to cause some degree of disturbance to birds in the general vicinity.

19.3.1.3 Mortality

Bird mortality has been shown to occur due to direct collisions with solar panels. Species affected include waterbirds, small raptors, doves, sparrows and warblers (Kagan et al., 2014). The reflective surfaces of PV panels may confuse approaching birds and in some cases act as an attractant, being mistaken for large water bodies, resulting in injuries and/or mortalities when birds attempt to land on the installations.

19.3.1.4 Human conflict

Certain bird species may seek to benefit from the installations, using the erected structures as prominent perches, sheltered roost sites or even nesting sites, and possibly foraging around the infrastructure in response to changes in the distribution of preferred foods (i.e. plants growing under the panelling and other animals attracted to the facility). This may result in the fouling of critical components in the solar array, bringing local bird populations into conflict with facility operators.

19.3.2 Impacts of associated power infrastructure

19.3.2.1 Collisions with power infrastructure

Power lines pose a significant collision risk to birds, affecting a particular suite of collision prone species. These are mostly heavy-bodied birds such as bustards, cranes, storks, large eagles and various species of waterbirds that have limited manoeuvrability in flight, which makes it difficult for them to take the necessary evasive action to avoid colliding with power lines (Anderson, 2001; van Rooyen 2004a; Jenkins *et al.,* 2010).

19.3.2.2 Electrocutions on power line and power infrastructure

Avian electrocutions occur when a bird perches or attempts to perch on an electrical structure and causes an electrical short circuit by physically bridging the gap between live components and/or live and earthed components (van Rooyen, 2004b; Lehman *et al.,* 2007). Electrocution risk is strongly influenced by the power line voltage and the design of the pole structure and mainly affects larger, perching species such as vultures, eagles and storks that are capable of spanning the spaces between energised components.

19.3.2.3 Habitat destruction and disturbance associated with the construction and maintenance of power lines, substations and service roads

During the construction phase and maintenance of power lines, substations and service roads, some habitat destruction and alteration inevitably takes place. These activities have an impact on birds breeding, foraging and roosting in close proximity to the servitude through the modification of habitats and disturbance, particularly during breeding activities.

19.3.3 PROJECT SPECIFIC ASSESSMENT OF IMPACTS

Specific impacts of the proposed Klondike SEF are most likely to be manifested in the following ways:

- Disturbance and displacement of local endemic passerines – Ant-eating Chat and Cape Longclaw – and shy ground-nesting species – Burchell's Courser and Double-banded Courser – from nesting and/or foraging areas by construction and/or operation and/or decommissioning of the SEF.

- Disturbance and displacement of resident or visiting large terrestrial species – Secretarybird, Abdim's Stork, Black Stork and Blue Crane – from nesting and/or foraging areas by construction and/or operation and/or decommissioning of the SEF, and/or mortality of these species in collisions with new power lines whilst flying *en route* to distant resource areas.

- Disturbance and displacement of resident or visiting raptors – Martial Eagle, Tawny Eagle and lanner Falcon – from foraging areas by construction and/or operation and/or decommissioning of the SEF, and/or mortality of these species in collisions with new power lines or by electrocutions when perched on power infrastructure.

- Injury or mortality of transient waterbirds – Greater Flamingo, Lesser Flamingo and Yellow-billed Stork – using possible flight paths in and out of resource areas in the broader impact zone of the SEF in collisions with solar panels and/or new power lines.

Generally, however, the anticipated impacts on avifauna of the proposed development are not considered to be of any great significance if mitigation measures are applied. There will be some habitat loss for endemic passerines, some species – endemic passerines, large terrestrial species and raptors – may be displaced from a broader area either temporarily by construction and maintenance activities, or more permanently by the disruptive, reflective properties of the solar panels and ongoing activities at the operational development, and some species (large terrestrials, raptors and transient waterbirds) may be killed in interactions (collisions and electrocutions) with the new power lines and power infrastructure, but numbers affected are likely to be low.

19.4 IDENTIFICATION OF POTENTIAL ARCHAEOLOGICAL IMPACTS.

Because tangible heritage resources are non-renewable and each archaeological occurrence is unique, it is important that areas affected by development are assessed for the presence and sensitivity of such resources prior to development. The AMDA Delta PV Facility will involve both area and linear developments that could have a permanent negative impact on archaeological resources if they were to occur in the area.

19.5 IDENTIFICATION OF POTENTIAL VISUAL IMPACTS

Due to the proximity of the N14, potential Visual Impacts have been identified because of the potentially high exposure. The potential Impacts have been identified above and scoping level assessments completed. See Appendix E7.

20 CONSIDERATION OF POTENTIAL CUMULATIVE IMPACTS

There are currently a total of three projects (AMDA Delta, AMDA Echo and AMDA Foxtrot) proposed on this portion of land as depicted in the image below.

The Environmental Impact Assessment Phase of this environmental process will have to consider the potential cumulative impacts of the facilities on this particular portion of land as well as those of other proposed developments in the surrounding area.

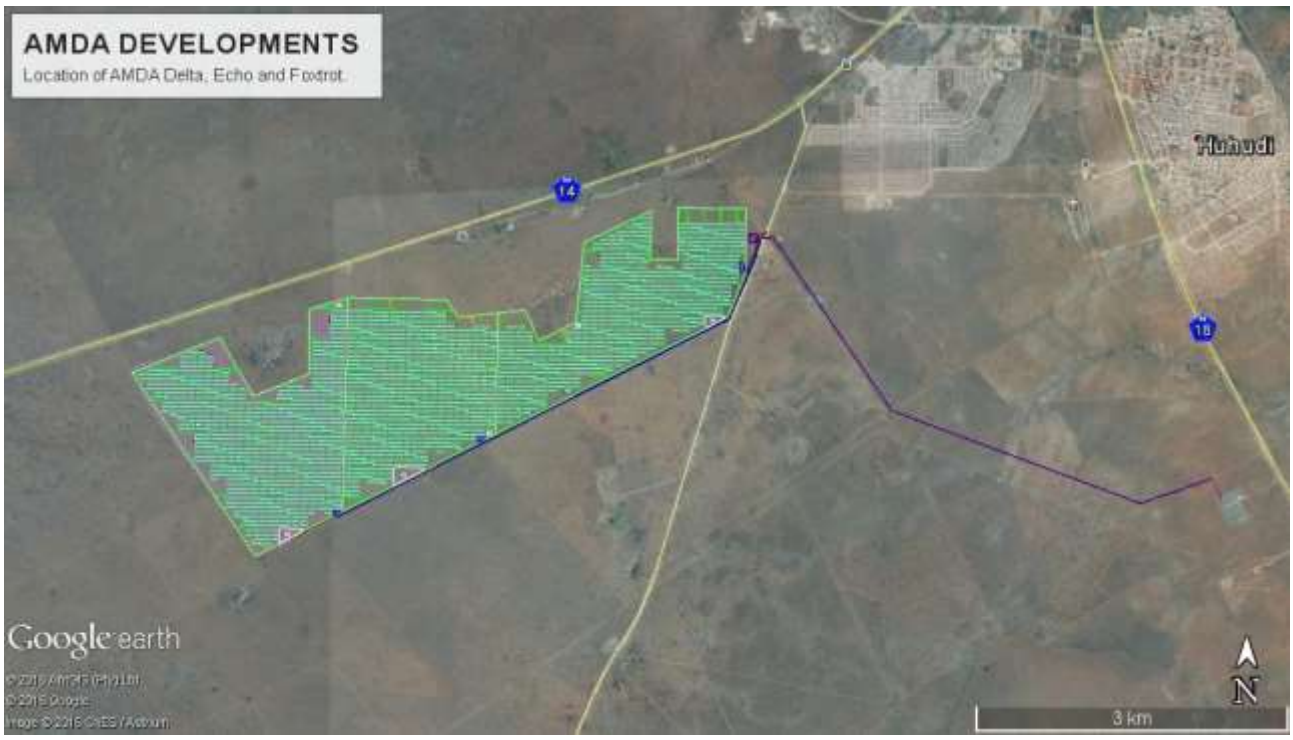

Figure 51: Showing other renewable energy projects on the property

According to the DEA Database of renewable energy projects, there are three other projects situated to the south East of the proposed AMDA Delta Project as depicted in the image below.

Figure 52: Showing the proposed AMDA Delta PV Development in relation

The terms of reference for the specialist assessment include a very specific requirement to consider the cumulative impact of all other projects in the vicinity of this project.

No potentially fatal flaws have been identified associated with cumulative impacts during this scoping phase of the environmental process. The potentially most significant cumulative impact is deemed to the failure to meet conservation targets as a result of all the developments combined.

The ecology specialist will assess the significance of this during the impact assessment phase of the environmental process.

21 SUMMARY OF POTENTIAL SITE CONSTRAINTS

The following preliminary site-specific constraints were identified by this scoping / baseline phase of the environmental process. As part of the risk adverse approach, these site constraints once confirmed by participating specialists may used to further refine the proposed solar facility layout – The preferred layout will be developed taking all of these constraints into consideration.

21.1 FLORA:

- ***Protected*** plants species and communities;
- **Cumulative impact** of loss of vegetation considering the other renewable energy projects on and adjacent to the site.

21.2 FAUNA (INCL AVIFAUNA):

- Potential **collision and electrocution from power-line infrastructure** are significant causes of mortality for bustards, flamingos, eagles and vultures.

21.3 AGRICULTURAL POTENTIAL:

No specific constraints in terms of agricultural potential were identified during the scoping stage. A specialist will however assess the potential impacts on Agricultural Resources

21.4 HERITAGE:

No specific site constraints have been identified during the scoping stage. A specialist will however undertake a comprehensive Heritage Impact Assessment

21.5 VISUAL:

No specific site constraints have been identified during the scoping stage. A Specialist will undertake a Full Visual Impact Assessment.

21.6 FRESHWATER

There are no freshwater resources on the site and as such no further specialist investigation will take place.

22 PUBLIC PARTICIPATION PROCESS TO DATE

Section 41 in Chapter 6 of regulation 982 details the public participation process that has to take place as part of an environmental process. The table below provides a quick reference to show how this environmental process has or intends to comply with these legislated requirements relating to public participation. Further details of public participation are included in the following appendices:

- Appendix F1: I&AP Register
- Appendix F2: Comments and Responses Report
- Appendix F3: Adverts and Site Notices
- Appendix F4: Pre Application Draft Scoping Report Notifications
- Appendix F5: Pre Application Draft Scoping Report Comments and Responses
- Appendix F6: Scoping Report Notifications
- Appendix F7: Scoping Report Comments and Responses

Further appendices will be added to the public participation report once these stages are completed.

Regulated Requirement	Description
(1) If the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an environmental authorisation in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land. (2) Subregulation (1) does not apply in respect of-. (a) linear activities;	Proof of landowner consent for the PV facility is attached in **Annexure G3.** The proposed grid connection is deemed to constitute a linear activity and as such not required to obtain landowner consent. These landowners have however been notified of this environmental process and have been given an opportunity to participate.
The person conducting a public participation process must take into account any relevant guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of an application or proposed application which is subjected to public participation by -	
(a) fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of - (i) the site where the activity to which the application or proposed application relates is or is to be undertaken; and (ii) any alternative site;	Two site notices have been placed on the boundary of the site. Photographic evidence of these notices is attached in **Annexure F3**.
(b) giving written notice, in any of the manners provided for in section 47D of the Act, to -	
(i) the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;	The owner is the only current occupier of the site. Landowner consent is attached in **Annexure G3**.
(ii) owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;	Owners of adjacent properties have been notified of this environmental process. Such owners have been requested to inform the occupiers of the land of this environmental process. Please refer to **Annexure F4** for copies of these notifications
(iii) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;	The ward councillor has been notified of this environmental process. Please refer to **Annexure F4** for copies of these notifications
(iv) the municipality which has jurisdiction in the area;	The Naledi Local Municipality has been notified of this environmental process. Please refer to **Annexure F4** for copies of these

Regulated Requirement	Description
	notifications.
(v) any organ of state having jurisdiction in respect of any aspect of the activity; and	Please refer to section 20.1 below showing the list of organs of state that were notified as part of this environmental process. Please refer to **Annexure F4** for copies of these notifications.
(vi) any other party as required by the competent authority;	A pre application meeting was held with the competent authority. At this meeting the competent authority provided input into the proposed Stakeholder register. All additional parties identified at this pre-application meeting have been included in the stakeholder register and have received notifications of the availability of this report.
(c) placing an advertisement in - (i) one local newspaper; or (ii) any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;	A notice of the availability of this Draft Scoping Report has been placed in "Die Stellander". Please refer to **Annexure F3** for a copy of this advertisement. There is currently no official Gazette that has been published specifically for the purpose of providing public notice of applications
(d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph (c)(ii);and	Adverts were not placed in provincial or national newspapers, as the potential impacts will not extend beyond the borders of the district municipal area.
(e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desirous of but unable to participate in the process due to - (i) illiteracy; (ii) disability; or (iii) any other disadvantage.	Notifications have included provision for alternative engagement in the event of illiteracy, disability or any other disadvantage. In such instances, Cape EAPrac will engage with such individuals in such a manner as agreed on with the competent authority.
(3) A notice, notice board or advertisement referred to in subregulation (2) must - (a) give details of the application or proposed application which is subjected to public participation; and (b) state - (i) whether basic assessment or S&EIR procedures are being applied to the application;	Please refer to **Annexure F3**.

Regulated Requirement	Description
(ii) the nature and location of the activity to which the application relates; (iii) where further information on the application or proposed application can be obtained; and (iv) the manner in which and the person to whom representations in respect of the application or proposed application may be made.	
(4) A notice board referred to in subregulation (2) must - (a) be of a size at least 60cm by 42cm; and (b) display the required information in lettering and in a format as may be determined by the competent authority.	Please refer to **Annexure F3**.
(5) Where public participation is conducted in terms of this regulation for an application or proposed application, subregulation (2)(a), (b), (c) and (d) need not be complied with again during the additional public participation process contemplated in regulations 19(1)(b) or 23(1)(b) or the public participation process contemplated in regulation 21(2)(d), on condition that - (a) such process has been preceded by a public participation process which included compliance with subregulation (2)(a), (b), (c) and (d); and (b) written notice is given to registered interested and affected parties regarding where the - (i) revised basic assessment report or, EMPr or closure plan, as contemplated in regulation 19(1)(b); (ii) revised environmental impact report or EMPr as contemplated in regulation 23(1)(b);or (iii) environmental impact report and EMPr as contemplated in regulation 21(2)(d); may be obtained, the manner in which and the person to whom representations on these reports or plans may be made and the date on which such representations are due.	This will be complied with if final reports are produced later on in the environmental process.
(6) When complying with this regulation, the person conducting the public participation process must ensure that - (a) information containing all relevant facts in respect of the application or proposed application is made available to potential interested and affected parties; and	All reports that are submitted to the competent authority will be subject to a public participation process. These include: - PRE Application Draft Scoping Report - Scoping Report - Plan of Study for Environmental Impact Report

Regulated Requirement	Description
(b) participation by potential or registered interested and affected parties is facilitated in such a manner that all potential or registered interested and affected parties are provided with a reasonable opportunity to comment on the application or proposed application. (7) Where an environmental authorisation is required in terms of these Regulations and an authorisation, permit or licence is required in terms of a specific environmental management Act, the public participation process contemplated in this Chapter may be combined with any public participation processes prescribed in terms of a specific environmental management Act, on condition that all relevant authorities agree to such combination of processes.	- Environmental Impact Report - Environmental Management Plan - All specialist reports that form part of this environmental process.

22.1 REGISTRATION OF KEY STAKEHOLDERS

A number of key stakeholders were automatically registered and will be given an opportunity to comment on this Draft Scoping Report. This list was agreed upon with the competent authority during the pre-application meeting. Copies and proof of these notifications are included in **Appendix E**. A list of key stakeholders registered for this process included in the table below.

Table 15: Key Stakeholders automatically registered as part of the Environmental Process

Stakeholders Registered		
Neighbouring property owners	Department of Environmental Affairs and Nature Conservation	Department of Water Affairs
Naledi Municipality: Municipal Manager and Planning Department.	South African National Parks	Department of Science and Technology
Naledi Municipality: Ward Councillors	South African National Roads Agency Limited	The Council for Scientific and Industrial Research
South African Heritage Resources Agency	Department of Transport and Public Works	The South African Square Kilometre Array
Northwest province Heritage Resources Authority	Department of Health	The South African Civil Aviation Authority
Department of Agriculture, Forestry and Fisheries	Department of Minerals and Energy	Department of Science and Technology
Provincial Department of Agriculture	Eskom	Department of Communications
Naledi Municipality Ward councillors	Department of Mineral Resources	SENTECH
Department of Environmental	Birdlife Africa.	Endangered Wildlife Trust.

Stakeholders Registered		
Affairs, Biodiversity Directorate.		

22.2 ADVERTS AND SITE NOTICES.

An advert was placed in die Stellalander on 09 March 2016, calling for the registration of Interested and Affected parties.

Figure 53: Advert as placed in "die stellalander" 9March 2016

Site notices were placed on the boundary of the study site. Two site notices were placed on the boundary of the study site. These were placed at the two existing entrances to the property.

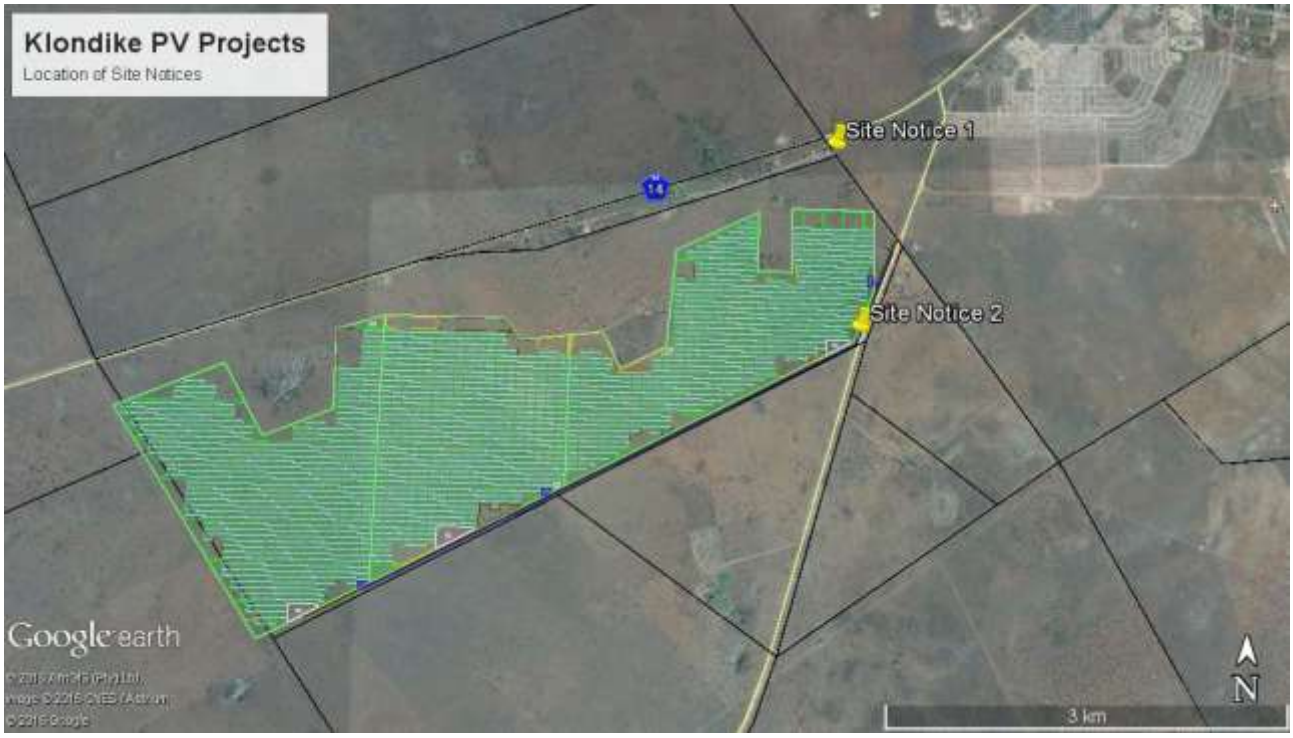

Figure 54: Showing location of site notices.

The site notices were placed at the coordinates reflected in the table below.

Table 16: Geographic location of site notices.

	Latitude			Longitude		
Site Notice 1	26°	58’	47.71”	24°	41’	35.39”
Site Notice 2	26°	59’	35.75”	24°	41’	41.32”

22.3 NOTIFICATION OF AVAILABILITY OF PRE APPLICATION DRAFT SCOPING REPORT

Automatically registered I&AP’s were notified of the availability of the Draft Scoping Report for review and comment. In order to facilitate effective comment, all State Departments and key stakeholders have been provided with digital copies of the report on CD.

A copy of the Draft Scoping report is also made available on the Cape EAPrac website.

22.4 COMMENTS AND RESPONSES ON THE PRE APPLICATION DRAFT SCOPING REPORT

No specific comments or issues were raised in response to the pre application Draft Scoping Report. Certain parties did however confirm their registration as an interested and affected parties. Copies of these comments and registrat

22.5 SUBMISSION OF APPLICATION AND NOTIFICATION OF AVAILABILITY OF SCOPING REPORT

An application has been submitted to the National Department of Environmental Affairs and the formal scoping report is made available for a further 30 day comment period extending from **24**

August 2016 – 23 September 2016. All comments received during this period will be included in the final scoping report that will be submitted to the National Department of Environmental Affairs for decision making.

23 ASSUMPTIONS & LIMITATIONS

This section provides a brief overview of *specific assumptions and limitations* having an impact on this environmental application process:

- It is assumed that the information on which this report is based (specialist studies and project information, as well as existing information) is **correct, factual and truthful.**
- The proposed development is **in line** with the statutory planning vision for the area (namely the local Spatial Development Plan), and thus it is assumed that issues such as the cumulative impact of development in terms of character of the area and its resources, have been taken into account during the strategic planning for the area.
- It is assumed that all the relevant **mitigation measures** and agreements specified in this report will be implemented in order to ensure minimal negative impacts and maximum environmental benefits.
- It is assumed that due consideration will be given to the **discrepancies in the digital mapping** (PV panel array layouts against possible constraints), caused by differing software programs, and that it is understood that the ultimate/final positioning of solar array will only be confirmed on-site with the relevant specialist/s.
- It is assumed that Stakeholders and Interested and Affected Parties notified during the initial public participation process will submit all relevant **comments within the designated** review and comment period, so that these can included in the Final Scoping Report can be timeously submitted to the delegated Authority, the Department Environmental Affairs for consideration.

The assumptions and limitations of the various specialist studies are included in their respective reports attached in **Appendix D**.

24 PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT

In compliance with section (i) of Appendix 2 of regulation 982, the following plan of study for undertaking the Environmental Impact Assessment Report is provided. In terms of these regulations the following must be included in this plan of study.

(i) a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;
(ii) a description of the aspects to be assessed as part of the environmental impact assessment process;
(iii) aspects to be assessed by specialists;
(iv) a description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists;
(v) a description of the proposed method of assessing duration and significance;
(vi) an indication of the stages at which the competent authority will be consulted;
(vii) particulars of the public participation process that will be conducted during the environmental impact assessment process; and
(viii) a description of the tasks that will be undertaken as part of the environmental impact assessment process;

(ix) identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

24.1 DESCRIPTION OF THE ALTERNATIVES TO BE CONSIDERED AND ASSESSED

The following Alternatives have been considered in this scoping report and where relevant will be assessed in the impact assessment phase of this environmental process:

- Site Alternatives;
- Layout Alternatives;
- Technology Alternatives; and
- No Go Alternative

Please refer to **section 6** of this report, where alternatives are discussed in detail.

24.2 ASPECTS TO BE ASSESSED

All potential impacts to on the economic, social and biophysical environments that have been identified in this scoping report will be assessed in the Environmental Impact Assessment phase of this Environmental Process.

Please refer to **section 16** of this report where potential environmental impacts to be assessed have been identified. This list is not exhaustive, and additional aspects to be assessed may be identified through the remainder of this environmental process, by I&AP's, the EAP or participating specialists.

24.3 ASPECTS TO BE ASSESSED BY SPECIALISTS;

The following specialists will be providing assessment of impacts in their respective disciplines:

- Faunal – Mr Simon Todd;
- Avifaunal – Blair Zoghby;
- Botanical – Mr Simon Todd;
- Visual – Mr Stephen Stead (VRMA) ; and
- Archaeological – Dr Peter Nilssen.
- Paleontological – Dr John Almond; and
- Agricultural Potential – Mr Christo Lubbe.
- Social – Mr Tony Barbour.

Please refer to **sections 10 - 15** of the report where the aspects to be assessed by each discipline are discussed in more detail.

24.4 ASSESSMENT METHODOLOGY

All possible impacts need to the assessed – the **direct, in-direct as well as cumulative impacts**. Impact criteria should include the following:

- **Nature of the impact**
  This is an appraisal of the type of effect the construction, operation and maintenance of a development would have on the affected environment. This description should include what is to be affected and how.
- **Extent of the impact**
  Describe whether the impact will be: local extending only as far as the development site area; or limited to the site and its immediate surroundings; or will have an impact on the region, or will have an impact on a national scale or across international borders.

- **Duration of the impact**
  The specialist should indicate whether the lifespan of the impact would be short term (0-5 years), medium term (5-15 years), long terms (16-30 years) or permanent.
- **Intensity**
  The specialist should establish whether the impact is destructive or benign and should be qualified as low, medium or high. The specialist study must attempt to quantify the magnitude of the impacts and outline the rationale used.
- **Probability of occurrence**
  The specialist should describe the probability of the impact actually occurring and should be described as improbable (low likelihood), probable (distinct possibility), highly probable (most likely) or definite (impact will occur regardless of any prevention measures).

The impacts should also be assessed in terms of the following aspects:

- **Status of the impact**
  The specialist should determine whether the impacts are negative, positive or neutral ("cost – benefit" analysis). The impacts are to be assessed in terms of their effect on the project and the environment. For example, an impact that is positive for the proposed development may be negative for the environment. It is important that this distinction is made in the analysis.
- **Cumulative impact**
  Consideration must be given to the extent of any accumulative impact that may occur due to the proposed development. Such impacts must be evaluated with an assessment of similar developments planned and already in the environment. Such impacts will be either positive or negative, and will be graded as being of negligible, low, medium or high impact.
- **Degree of confidence in predictions**
  The specialist should state what degree of confidence (low, medium or high) is there in the predictions based on the available information and level of knowledge and expertise.

Based on a synthesis of the information contained in the above-described procedure, the specialists are required to assess the potential impacts in terms of the following significance criteria:

- **No significance**: The impacts do not influence the proposed development and/or environment in any way.
- **Low significance**: The impacts will have a minor influence on the proposed development and/or environment. These impacts require some attention to modification of the project design where possible, or alternative mitigation.
- **Moderate significance**: The impacts will have a moderate influence on the proposed development and/or environment. The impact can be ameliorated by a modification in the project design or implementation of effective mitigation measures.
- **High significance**: The impacts will have a major influence on the proposed development and/or environment.

24.5 CONSULTATION WITH COMPETENT AUTHORITY.

The competent authority has been identified as the National Department of Environmental Affairs. Engagement with the competent authority will be ongoing throughout the environmental process and will include the following as a minimum:

- Pre Application Meeting (Completed);

- Provided with a copy of the Draft Scoping Report for Review and comment (Pre-application);
- Submission of application form and engagement on the contents of the application form;
- Provided with a copy of Scoping report for review and decision making;
- Provided with a copy of the Environmental Impact Report for review and decision making; and
- Undertaking a site inspection with the competent authority if deemed necessary.

24.6 PUBLIC PARTICIPATION TO BE CONDUCTED DURING THE EIA

Please refer to **section 19** of this report where the ongoing public participation process, including aspects that will take place within the EIA phase, is discussed in detail.

24.7 TASKS TO BE UNDERTAKEN IN THE EIA PHASE

In terms of the 2014 EIA regulations, an environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include -

(a) details of -

(i) the EAP who prepared the report; and

(ii) the expertise of the EAP, including a curriculum vitae;

(b) the location of the activity, including:

(i) the 21 digit Surveyor General code of each cadastral land parcel;

(ii) where available, the physical address and farm name; and

(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;

(c) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is -

(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken;

(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;

(d) a description of the scope of the proposed activity, including -

(i) all listed and specified activities triggered and being applied for; and

(ii) a description of the associated structures and infrastructure related to the development;

(e) a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;

(f) a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location;

(g) a motivation for the preferred development footprint within the approved site;

(h) a full description of the process followed to reach the proposed development footprint within the approved site, including:

(i) details of the development footprint alternatives considered;

(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;

(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;

(iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

(v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts -

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources; and

(cc) can be avoided, managed or mitigated;

(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;

(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

(viii) the possible mitigation measures that could be applied and level of residual risk;

(ix) if no alternative development locations for the activity were investigated, the motivation for not considering such; and

(x) a concluding statement indicating the preferred alternative development location within the approved site;

(i) a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity, including -

(i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and

(ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;

(j) an assessment of each identified potentially significant impact and risk, including -

(i) cumulative impacts;

(ii) the nature, significance and consequences of the impact and risk;

(iii) the extent and duration of the impact and risk;

(iv) the probability of the impact and risk occurring;

(v) the degree to which the impact and risk can be reversed;

(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and

(vii) the degree to which the impact and risk can be mitigated;

(k) where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;

(l) an environmental impact statement which contains -

(i) a summary of the key findings of the environmental impact assessment:

(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and

(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;

(m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;

(n) the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;

(o) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation

(p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;

(q) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;

(r) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;

(s) an undertaking under oath or affirmation by the EAP in relation to:

(i) the correctness of the information provided in the reports;

(ii) the inclusion of comments and inputs from stakeholders and I&APs;

(iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and

(iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;

The Environmental Impact Report for the proposed AMDA Delta PV energy facility will consider and comply with the legislated requirements.

24.8 MEASURES TO AVOID, REVERSE, MITIGATE OR MANAGE IDENTIFIED IMPACTS

As shown in this scoping report, the proposed AMDA Delta Energy Facility followed a risk adverse approach, whereby primary specialist input was utilised to ensure that the project is developed in such a way as to avoid impacts, thus reducing the need for further mitigation and management.

The EAP and participating specialists, as part of the impact assessment phase, will provide mitigation measures to ensure that the potential impacts are further reduced. An environmental management programme will be developed to ensure management and monitoring of additional impacts.

The following additional specialist management plans will form part of the overall Environmental Management Programme:

- Stormwater Management Plan;
- Washwater Management Plan;
- Traffic and Transportation Management Plan;
- Alien Vegetation Management Plan;
- Habitat Restoration Plan;
- Plant Rescue and Protection Plan; and
- Open Space Management Plan.

24.9 CONTENTS OF THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT

The final impact assessment report should as a minimum include the following sections:

- Executive Summary;
- Introduction And Description Of Study;
- Methodology;
- Results;
- Assessment of Impacts (Direct, In-direct & Cumulative, including mitigation measures to reduce negative impacts and measures to enhance positive impacts and the completion of impact tables);
- Comparative Assessment between project Alternatives;
- Discussion and Recommendation for Preferred Alternative;
- Specialist recommendation for Pre-Construction, Construction and Operational Phases); and
- Conclusion.

24.10 BRIEF FOR SPECIALIST STUDIES TO BE UNDERTAKEN AS PART OF THE EIA PHASE

- Each specialist is required to consider the project in as much detail as is required to inform his/her impact assessment.
- Specialists must ensure that they are aware of the necessary **planning, environmental and service requirements** associated with the proposal.
- Specialists must ensure that they **liaise with other relevant specialists** (via the EAP) if it seems necessary to use information from another discipline.
- Impact Assessments must **consider all the identified alternatives** in order to provide a comparative assessment of impacts **as well as the no-go option.**
- Specialists should consider **national and international guidelines and standards** relevant to their respective focus area. For example: *The Environmental, Health and Safety Guidelines (2007) IFC, World Bank Group* etc.

- Any **assumptions** made and any uncertainties or **gaps in knowledge**, as well as **limitations** regarding the specialist studies, must be clearly described and explained.
- The proximity of the site in relation to **key features** must be considered.
- The **Draft Impact Assessment report** of each specialist are subject to public/stakeholder review and comment – all comments received will be considered by each specialist, responded to and the final impact assessment report updated accordingly.

25 PLAN OF STUDY FOR SPECIALIST IMPACT ASSESSMENTS

The relevant participating specialists will undertake impact assessments of the proposal in their specific field of expertise. The following specialists will provide studies as part of the environmental impact assessment phase of this environmental process:

- Botanical – Mr Simon Todd
- Fauna – Mr Simon Todd
- Avifauna – Mr Blair Zoghby
- Integrated Heritage – Mr Stefan de Kock
- Archaeology – Dr Peter Nilssen
- Palaeontology – Dr John Almond
- Visual – Mr Stephen Stead
- Agriculture – Mr Christo Lubbe
- Socio Economic – Mr Tony Barbour
- Traffic Assessment – KMA Engineers

25.1 TERMS OF REFERENCE FOR SPECIALIST IMPACT ASSESSMENTS

Please refer to the table below for a summary of the terms of reference that specialists will consider as part of their studies. Please also refer to the detailed plans of study for each specific specialist in the sections below.

Table 17: Summary of terms of reference for specialist assessments.

Specialist Study	Aim of the Study / Input	Terms of Reference
Agricultural Potential	Determine the impacts that the construction, operation and decommissioning of the proposed 75MW Solar Development and associated infrastructure will have on agricultural resources and recommend mitigation measures. The above assessment must include the NO-GO option as a baseline.	• Investigate the study site as identified. • Assess the impact on the loss of agricultural land; • The impact of the loss of agricultural land within the property as well as the cumulative impacts from loss of agricultural land within the greater areas.
Ecological / Biophysical	Determine the impacts that the construction, operation and decommissioning of the proposed AMDA Delta PV Energy Facility, substation / auxiliary building site, transmission line and associated infrastructure will have on vegetation and fauna. The above assessment must include the NO-GO alternative and include a cumulative assessment.	• Approximately 250ha will be disturbed during construction and shaded during operation. • A six metre wide access road will be required to access the facility • 5m wide access gravel roads and internal road network will need to be constructed to and between the PV panel arrays. • An on-site substation of approx. as well as auxiliary buildings with a footprint of approximately 1ha will be constructed.

		• A transmission line of approximately from the on-site substation to the MTS substation will be required. • Based on the findings of the Scoping Ecological Report assess potential impacts on fauna & flora from the construction, operation and decommissioning activities. • Describe avoidance measures required, as well as mitigation / management measures that may be implemented to avoid or reduce any negative impacts on vegetation and fauna. • Consider and Assess the cumulative impacts of this development; • Identify any avoidance areas within the current proposal • Provide sufficient management and mitigation measures to reduce all impacts to the lowest possible levels.
Avifaunal	Undertake an avifaunal impact assessment.	• Undertake an avifaunal impact assessment for the proposed development that complies with the current (adopted) guidelines of Bird Life South Africa (BLSA)
Heritage	Assess the proposed AMDA Delta PV Energy Facility and associated infrastructure (on-site substation, auxiliary buildings, transmission line, roads etc.) during construction, operation and decommissioning on Heritage Resources and the Cultural Landscape and provide recommendations for avoidance &/ mitigation.	• On the basis of the public participation process for the Scoping phase, conclude the Heritage Impact Assessment, which includes: • Analysis of Cultural Landscape, Visual – Spatial and Cumulative Impacts; • Liaison with other specialists regarding the Archaeological and Paleontological and Impact Assessments. • Describe mitigation / management measures that may be implemented to avoid or reduce any negative impacts. • Consider and Assess the cumulative impacts of this development • Identify any avoidance areas within the current proposal • Provide sufficient management and mitigation measures to reduce all impacts to the lowest possible levels.
Archaeological	Assess the proposed AMDA Delta PV Energy Facility and associated infrastructure (on-site substation, auxiliary buildings, transmission line, roads etc.) during construction, operation and decommissioning on Archaeological Resources and provide recommendations for avoidance &/ mitigation.	• Outline the requirements for the Archaeological monitoring (should this be necessary) during earthmoving activities so as to avoid or minimize negative impact on potential subsurface archaeological resources. • Describe mitigation / management measures that may be implemented to avoid or reduce any negative impacts. • Consider and Assess the cumulative impacts of this development • Identify any avoidance areas within the current proposal

		• Provide sufficient management and mitigation measures to reduce all impacts to the lowest possible levels.
Palaeontology	Undertake a Paleontological desktop assessment of the study site	• Determine the significance of the site in terms of potential paleontological resources. • Provide recommendation for the conservation of any resources identified. • Consider and Assess the cumulative impacts of this development • Identify any avoidance areas within the current proposal • Provide sufficient management and mitigation measures to reduce all impacts to the lowest possible levels.
Planning	Re-zoning and Long-term Lease Applications.	• Start preparing Re-zoning & Lease Applications based on preferred, mitigated layout of the solar facility. • Follow-up with Naledi Municipality and Department of Agriculture regarding progress of the Re-zoning & Lease Applications for the Solar Facility on Agricultural land. • Consider and Assess the cumulative impacts of this development • Identify any avoidance areas within the current proposal • Provide sufficient management and mitigation measures to reduce all impacts to the lowest possible levels.
Visual	Undertake a Visual Impact assessment of the proposed AMDA Delta PV Energy Facility.	• Determine sensitive visual resources in the surrounding. • Undertake a view shed analysis of the proposed development. • Assess the visual significance of the proposed project. • Provide mitigation measures if necessary. • Consider and Assess the cumulative impacts of this development • Identify any avoidance areas within the current proposal • Provide sufficient management and mitigation measures to reduce all impacts to the lowest possible levels.
Socio Economic	Undertake a Social Impact Assessment	Undertake a Social impact Assessment as per the requirements highlighted below and in terms of the guidelines for involving social specialists in EIA Processes

25.2 PLAN OF STUDY FOR ECOLOGICAL IMPACT ASSESSMENT

The Ecological specialist, Mr Simon Todd will undertake the following activities as part of the ecological impact assessment.

25.2.1 Assessment methodology

Direct, indirect and cumulative impacts of the issues identified above, will assessed during the Impact Assessment phase of the project according to the following standard methodology:

- The **nature** which shall include a description of what causes the effect what will be affected and how it will be affected.
- The **extent** wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- The **duration** wherein it will be indicated whether:
    - the lifetime of the impact will be of a very short duration (0- 1 years).
    - the lifetime of the impact will be of a short duration (2-5 years).
    - medium-term (5-15 years).
    - long term (> 15 years); or
    - permanent
- The **magnitude** quantified as small and will have no effect on the environment, minor and will not result in an impact on processes, low and will cause a slight impact on processes, moderate and will result in processes continuing but in a modified way, high (processes are altered to the extent that they temporarily cease) and very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** of occurrence, which shall describe the (likelihood of the impact actually occurring. Probability will be estimated as very improbable (probably will not happen), improbable (some possibility, but of low likelihood), probable (distinct possibility), highly probable (most likely) and definite (impact will occur regardless of any prevention measures).

The significance which shall be determined through a synthesis of the characteristics described above and will be assessed as follows:

- **No significance**: the impacts do not influence the proposed development and/or environment in any way.
- **Low significance**: the impacts will have a minor influence on the proposed development and/or environment. These impacts require some attention to modification of the project design where possible, or alternative mitigation.
- **Moderate significance**: the impacts will have a moderate influence on the proposed development and/or environment. The impact can be ameliorated by a modification in the project design or implementation of effective mitigation measures.
- **High significance**: the impacts will have a major influence on the proposed development and/or environment and will result in the “no-go” option on the development or portions of the development regardless of any mitigation measures that could be implemented. This level of significance must be well motivated.

and;

- the status, which will be described as either **positive**, **negative** or **neutral**.
- the degree to which the impact can be **reversed**.
- the degree to which the impact may cause **irreplaceable loss of resources**.
- the degree to which the impact can be **mitigated**.

25.2.2 Proposed activities for the EIA phase

Although the current study includes information collected on-site as well as a desktop assessment, the proposed development area has been specifically investigated and fieldwork during the EIA phase will be an important activity required to validate and refine the findings of this report. This will include the following studies and activities:

- **Characterise** the vegetation and plant communities present within the site in greater detail. On-site surveys will be conducted to generate a species list for the site as well as identify and where necessary map different plant communities present at the site if they are associated with different sensitivity classes.
- **Identify and map** the presence of any **unique** and special habitats at the site such as gravel patches, rock fields and other localised habitats.
- **Locate, identify and map** the location of **significant populations** of species of conservation concern, so that the final development footprint can be adjusted so as to avoid and reduce the impact on such species. Some species of concern may be widespread and others localised and the distribution of such species will be established during the site visit.
- Evaluate the likely **presence** of listed **faunal** species at the site such as the Giant Bullfrog, and identify associated habitats that should be avoided to prevent impact to such species.
- Evaluate, based on the site attributes, what the most applicable **mitigation measures** to reduce the impact of the development on the site would be and if there are any areas where specific precautions or mitigation measures should be implemented.
- **Assess** the **impacts** identified in the scoping phase in light of the site-specific findings and the final layout to be provided by the developer.

25.3 PLAN OF STUDY FOR ARCHAEOLOGICAL / HERITAGE IMPACT ASSESSMENT

The purpose of an AIA is to conduct a survey of the affected areas in order to identify, record and rate the significance of archaeological resources, to assess the impact of the proposed area and linear developments on such resources and to recommend mitigation measures where necessary.

To assess the nature and significance of the archaeological record in the affected area, it was necessary to conduct a comprehensive foot survey. The latter focused on the provisional development layout plan including the 220ha portion of the affected property as well as the power line route and access roads.

The potential for different landforms, sediments or landscape features to contain archaeological traces is assessed according to type, such as rocky surfaces, sandy surfaces, cultivated areas, previously developed or disturbed areas, rock shelters, and so on. Overall, the significance of archaeological occurrences or sites are evaluated in terms of their content and context. Attributes to be considered in determining significance include artefact and/or ecofact types, rarity of finds, exceptional items, organic preservation, aesthetic appeal, potential for future research, density of finds and the context in which archaeological traces occur.

Open vegetation and large expanses of exposed ground surfaces provided excellent archaeological visibility and allowed for a good understanding of the archaeological record in the area based on surface observations. Due to good archaeological visibility and, as it turned out, very sparse archaeological occurrences, survey walk tracks were spaced between about 50 and 80m apart and were fixed with a hand held GPS to record the search area. After gaining an understanding of the nature of the archaeological record, the survey transects were set further apart. The position of archaeological occurrences, observations and photo localities were also fixed by GPS. Digital audio notes of observations and a comprehensive, high quality digital photographic record were made.

Once archaeological traces have been identified, recorded and assessed in terms of their significance, the aim of the AIA is to assess the potential negative impacts of development on such resources and to make recommendations in mitigation. The end product of the AIA is a report that forms part of the Integrated Heritage Impact Assessment and that meets standards required by the South African Heritage Resources Agency (SAHRA) in terms of the National Heritage Resources

Act, No. 25 of 1999. The AIA report will detail results from the literature review and fieldwork, and will assess potential negative impacts associated with the proposed development and make recommendations in mitigation where necessary.

25.4 PLAN OF STUDY FOR SOCIAL IMPACT ASSESSMENT

25.4.1 APPROACH

The proposed approach to the SIA is based on the Guidelines for SIA endorsed by Western Cape Provincial Environmental Authorities (DEA&DP) in 2007. The Guidelines are based on accepted international best practice guidelines, including the Guidelines and Principles for Social Impact Assessment (Inter-organizational Committee on Guidelines and Principles for Social Impact Assessment, 1994) and IAIA Guidance for Assessing and Managing Social Impacts (2015). The approach to the study will involve

- Project initiation and review of project information etc.
- Collection and review of reports and baseline socio-economic data on the area. This includes socio-economic characteristics of the affected areas, current and future land uses, and land uses planning documents relating to the study area and surrounds;
- Identification of the components associated with the construction and operational phase of the proposed project, including estimate of total capital expenditure, number of employment opportunities created, breakdown of the employment opportunities in terms of skill levels (low, medium and high skilled), breakdown of wages per skill level, assessment procurement policies etc.;
- Identify and set up meetings key stakeholders;
- Interviews with key affected parties, including local communities, local landowners, key government officials (local and regional), non-government organizations, the client, local farmers associations, tourism and conservation officials, chamber of commerce etc.;
- Identification and assessment of key social issues and assessment of potential impacts (negative and positive) associated with the construction and operational phase of the proposed PV facility. A key focus of the assessment will be an assessment of the potential socio-economic benefits for the local community associated with the proposed development.
- Identification of appropriate measures to avoid, mitigate, enhance and compensate for potential social impacts;
- Preparation of Draft Report for comment;
- Incorporate comments and prepare Final Report.

25.4.2 Comments on the interview process

The interview process is a fundamental component of the SIA process. The experience with previous SIA's is that the interview process (identifying interviewees, setting up meetings, confirming interviews, and undertaking interviews) is a time consuming process that is not always fully understood and or appreciated by the client.

25.4.3 Identifying and contacting interested and affected parties to set up interviews

In this regard the first stage of the interview process is identifying the key stakeholders to be interviewed as part of the SIA. The public participation database provides a starting point for this process. However, the SIA also seeks to identify people who may not have been able to attend public meetings and or register as Interested and Affected Parties (IAPs), such as farm workers and other potentially vulnerable groups who do not have access to daily newspapers, computers

and or transport etc. The process of identifying and contacting people to set up interviews can be a time consuming process and in many instances dates and times have to be changed on a regular basis to accommodate the needs of the IAPs.

25.4.4 Time allocated to interviews

Experience with previous interviews has shown that a minimum of 45 – 60 minutes should be allocated to each interview. This provides the interviewer with the opportunity to introduce himself or herself to the interviewee and outline the proposed development, before focusing on the interview itself. Based on this timeframe the maximum number of interviews that can be conducted in a day is in the region of 5-6, bearing in mind that time must be allocated for traveling between interviews. In rural areas the distances can be significant and as such the number of interviews that can be undertaken in a day is less than 5. The process of setting up, confirming and undertaking interviews is therefore a time consuming exercise.

25.5 OBJECTIVES OF THE SIA

The objectives of the SIA are to provide the EIA with a detailed description of the local socio-economic conditions affected by the proposed project and to identify the potential social opportunities and risks associated with the project. Is so doing the SIA will seek to identify measures that can be implemented to avoid and or minimize the potential social risks. The SIA will also identify measures to enhance the potential social benefits associated with the proposed project. Experience with other renewable energy projects has also shown that the information collected as part of the SIA can assist the proponent to identify potential opportunities and beneficiaries for the establishment of a Community Trust.

26 REMAINDER OF THE PROCESS TO BE FOLLOWED

The following process is to be followed for the remainder of the environmental process:

- On completion of the comment period on this Scoping Report, all comments received will be incorporated and the final report will be submitted to the DEA for decision making.
- Once the DEA accepts the Scoping Report and Plan of Study for Environmental Impact Report, the relevant specialists will undertake and complete their respective impact assessments;
- Discussions will be held with the various specialists and project team members in order to determine how best the development concept should be amended / refined to avoid significant impacts;
- The EIR will be made available for public review and comment period of 30-days;
- The Final EIR will be submitted to the DEA for consideration and decision-making;
- The DEA's decision (Environmental Authorisation) on the FEIR will be communicated with all registered I&APs.

27 CONCLUSION & RECOMMENDATIONS

This scoping exercise is currently being undertaken to present concept proposals to the public and potential Interested & Affected Parties and to identify environmental issues and concerns raised as a result of the proposed development alternatives to date. This will allow Interested & Affected Parties (I&APs), authorities, the project team, as well as specialists to provide input and raise issues and concerns, based on baseline / scoping studies undertaken. The AMDA Delta PV Energy Facility have been analysed from Ecological, Avifaunal Agricultural Potential, Heritage and

Visual perspectives, and site constraints and potential impacts identified. Additional specialists identified during this scoping process and as discussed above will provide additional input into this environmental process.

This Scoping Report (DSR) summarises the process to date, reports on the relevant baseline studies that will undertaken

Cape EAPrac is of the opinion that the information contained in this Draft Scoping Report and the documentation attached hereto is sufficient to allow the general public and key stakeholders to apply their minds to the potential negative and/or positive impacts associated with the development, in respect of the activities applied for.

This Scoping Report (DSR) is made available for stakeholder review and comment for a period of 30 days, extending from **24 August 2016 – 23 September 2016**. All comments received, will be considered and addressed, and feedback will be provided to registered stakeholders.

All stakeholders are requested to review this Draft Scoping Report and the associated appendices, and provide comment, or raise issues of concern, directly to *Cape EAPrac* within the specified 30-day comment period.

Comments must be submitted, in writing, to the following address no later than 23 September 2016

Cape Environmental Assessment Practitioners

Att: **Mr Dale Holder**

PO Box 2070, George, 6530

Fax: 044-874 0432 or Email: dale@cape-eaprac.co.za

28 ABBREVIATIONS

AFNP	Augrabies Falls National Park
AIA	Archaeological Impact Assessment
BGIS LUDS	Biodiversity Geographic Information System Land Use Decision Support
CBA	Critical Biodiversity Area
CDSM	Chief Directorate Surveys and Mapping
CEMPr	Construction Environmental Management Programme
DEA	Department of Environmental Affairs
DEA&NC	Department of Environmental Affairs and Nature Conservation
DME	Department of Minerals and Energy
EAP	Environmental Impact Practitioner
EHS	Environmental, Health & Safety
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
ESA	Ecological Support Area
GPS	Global Positioning System
GWh	Giga Watt hour
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
kV	Kilo Volt
LUDS	Land Use Decision Support
LUPO	Land Use Planning Ordinance
MW	Mega Watt
NEMA	National Environmental Management Act
NEMBA	National Environmental Management: Biodiversity Act
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act
NPAES	National Protected Area Expansion Strategy
NSBA	National Spatial Biodiversity Assessment
NWA	National Water Act

PM	Post Meridiem; "Afternoon"
PSDF	Provincial Spatial Development Framework
S.A.	South Africa
SACAA / CAA	South African Civil Aviation Authority
SAHRA	South African National Heritage Resources Agency
SANBI	South Africa National Biodiversity Institute
SANS	South Africa National Standards
SDF	Spatial Development Framework
TOPS	Threatened and Protected Species

29 REFERENCES

DEA (2010). *National Climate Change Response Green Paper 2010.*

DEA (January 2008). *National Response to South Africa's Electricity Shortage.* Interventions to address electricity shortages.

DEA&DP (2003). Waste Minimisation *Guideline for Environmental Impact Assessment reviews.* NEMA EIA Regulations Guideline & Information Series, Department Environmental Affairs & Development Planning.

DEA&DP (2005). *Guideline for the review of specialist input in the EIA process*. NEMA EIA Regulations Guideline & Information Document Series, Department of Environmental Affairs & Development Planning.

DEA&DP (2005). *Guideline for involving biodiversity specialists in the EIA process*. NEMA EIA Regulations Guideline & Information Document Series, Department of Environmental Affairs & Development Planning.

DEA&DP (2005). *Guideline for environmental management plans*. NEMA EIA Regulations Guideline & Information Document Series, Department of Environmental Affairs & Development Planning.

DEA&DP (2005). *Provincial urban edge guideline*. Department Environmental Affairs & Development Planning.

DEA&DP (2006). *Guideline on the Interpretation of the Listed Activities.* NEMA EIA Regulations Guidelines & Information Document Series, Department of Environmental Affairs & Development Planning.

DEA&DP (2007). *Guide on Alternatives,* NEMA EIA Regulations Guidelines & Information Document Series, Department of Environmental Affairs & Development Planning.

DEA&DP (2007). *Guideline on Appeals,* NEMA EIA Regulations Guidelines & Information Document Series, Department of Environmental Affairs & Development Planning.

DEA&DP (2007). *Guideline on Exemption Applications.* NEMA EIA Regulations Guidelines & Information Document Series, Department of Environmental Affairs & Development Planning.

DEA&DP (2007). *Guideline on Public Participation*. NEMA EIA Regulations Guidelines & Information Document Series, Department of Environmental Affairs & Development Planning.

DEA&DP (2009). *Guideline on Need & Desirability,* NEMA EIA Regulations Guideline and Information Document Series, Department Environmental Affairs & Development Planning.

DEA&DP (2009). *Guideline on Alternatives*, NEMA EIA Regulations Guideline and Information Document Series, Department Environmental Affairs & Development Planning.

DEA&DP (2009). *Guideline on Transitional Arrangements,* NEMA EIA Regulations Guideline and Information Document Series, Department Environmental Affairs & Development Planning.

DEA&DP (2009). *Guideline on Exemption Applications*. NEMA EIA Regulations Guideline and Information Document Series, Department Environmental Affairs & Development Planning.

DEA&DP (2009). *Guideline on Appeals*. NEMA EIA Regulations Guideline and Information Document Series, Department Environmental Affairs & Development Planning.

DEA&DP (2009). *Guideline on Public Participation*. NEMA EIA Regulations Guideline and Information Document Series, Department Environmental Affairs & Development Planning.

DEA&DP. (May 2006). *Strategic Initiative to Introduce Commercial Land Based Wind Energy Development to the Western Cape*: Specialist Study: Executive Summary - CNdV Africa prepared for Provincial Government of the Western Cape.

Department of Mineral & Energy (1998). *White Paper on Energy Policy of the Republic of South Africa***.**

Department of Mineral & Energy (2003). *The White Paper on Renewable Energy***.**

DEAT (2002). Integrated Environmental Management Information Series 3: *Stakeholder Engagement*. Department of Environmental Affairs and Tourism, Pretoria.

DEAT (2004). *Criteria for determining alternatives in EIAs*, Integrated Environmental Management, Information Series 11, Department of Environmental Affairs & Tourism, Pretoria.

DEAT (2004). *Environmental Management Plans*, Integrated Environmental management, Information Series 12, Department Environmental Affairs & Tourism.

DEAT (2005). *Assessment of Impacts and Alternatives*, Integrated Environmental Management Guideline Series, Department of Environmental Affairs & Tourism, Pretoria.

DEAT (2005). Guideline 4: *Public Participation*, in terms of the EIA Regulations 2005, Integrated Environmental Management Guideline Series, Department of Environmental Affairs and Tourism, Pretoria.

DEAT (2006). *EIA Regulations* in terms of the National Environmental Management Act (Act No 107 of 1998) (Government Notice No R 385, R 386 and R 387 in Government Gazette No 28753 of 21 April 2006).

DWA (2001). *Generic public participation guideline*. Department of Water Affairs and Forestry.

Hsai-Yang, F (Ed)(2006). *Environmental Geotechnology Dictionary* (online version). University of North Caroline, Charlotte, USA.

Integrated Resource Plan for Electricity (Oct. 2010)**.** Revision 2, Version8.

International Finance Corporation – World Bank Group. (April 2007). *Environmental, Health and Safety Guidelines for Electric Power Transmission and Distribution.*

International Finance Corporation – World Bank Group. (April 2007). *Environmental, Health and Safety Guidelines for Wind Energy.*

International Finance Corporation – World Bank Group. (April 2007). *General Environmental, Health and Safety Guidelines.*

Keatimilwe K & Ashton PJ 2005. *Guideline for the review of specialist input in EIA processes.* Department Environmental Affairs & Development Planning.

Lochner P (2005). *Guideline for Environmental Management Plans*. Department Environmental Affairs & Development Planning.

Lower Orange River Transfrontier Conservation Area Planning: Background Information Document (August 2007). Retrieved on 29 March 2012 from:

www.dwaf.gov.za/Documents/Other/RMP/LOR/LORRMPBIDAug07.pdf

Mucina, L. & Rutherford, M.C. (eds) 2006. *The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19.* South African National Biodiversity Institute, Pretoria.

Münster, F. (2005). *Guidelines for Determining the Scope of Specialist Involvement in EIA Processes: Edition 1.* CSIR Report No ENV-S-C 2005 053 A. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning, Cape Town.

Oberholzer B (2005). *Guideline for involving visual & aesthetic specialists*. Department Environmental Affairs & Development Planning.

National Energy Regulator of South Africa (NERSA)(Feb.2010). *Rules on selection criteria for renewable energy projects under the REFIT Programme.*

National Protected Area Expansion Strategy for S.A. 2008: Priorities for expanding the protected area network for ecological sustainability and climate change adaptation. Government of South Africa, Pretoria, 2010. ISBN 978-1-919976-55-6.

Northern Cape Business online. Retrieved from: http://www.northerncapebusiness.co.za on 27 March 2012.

Northern Cape Business online. *Solar Power.* Retrieved from: http://www.northerncapebusiness.co.za/special_features/941417.htm on 27 March 2012.

Saayman, I. (2005). *Guideline for Involving Hydrogeologists in EIA Processes: Edition 1.* CSIR Report No ENV-S-C 2005 053 D. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning, Cape Town.

SANBI Biodiversity GIS (2007). South African National Biodiversity Institute, Cape Town, South Africa.

Winter S & Beaumann N (2005). *Guideline for involving heritage specialists in EIA processes.* Department Environmental Affairs & Development Planning.