ENVIRONMENTAL IMPACT ASSESSMENT PROCESS
FINAL SCOPING REPORT

PROPOSED BLACKWOOD SOLAR ENERGY FACILITY, FREE STATE PROVINCE

(DEA Ref: 14/12/16/3/3/2/281)

REVISED FINAL SCOPING REPORT FOR SUBMISSION TO THE DEPARTMENT OF ENVIRONMENTAL AFFAIRS
MARCH 2014

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PUBLIC REVIEW OF THE REVISED FINAL SCOPING REPORT

Blackwood Solar Energy Facility (Pty) Ltd is proposing to establish a solar energy facility and associated infrastructure on a site located approximately 25km south-east of Kimberley and 45km south-west of Boshof in the Free State Province. The project is referred to as the **Blackwood Solar Energy Facility**. An Environmental Impact Assessment is being undertaken for this proposed project. The project has been registered with the Department of Environmental Affairs (DEA) with the reference number: 14/12/16/3/3/2/281.

A draft Scoping Report was released for public review in September 2013 for a 30-day public review period (40 days for Organs of State). Following the review of the draft scoping, a final scoping report was submitted to DEA in October 2013. The DEA has however requested additional information prior to providing acceptance for the process to proceed. This additional information relates to the following (refer to Appendix B for copy of correspondence):

» Details of the project need and desirability in the region of the project.
» Description of alternatives and a lesser sensitive site.
» Proper public participation process.
» Location of the Power Line route alternatives on the map.

This scoping report has been compiled to include the above requested information, and has been made available for review by all stakeholders for a 40-day period prior to the re-submission to the National Department of Environmental Affairs. Members of the public, local communities and stakeholders were invited to comment on the Revised Final Scoping Report which was made available for public review and comment from 22 January 2014 – 03 March 2014. The report was available at the following locations:

» www.savannahSA.com
» Kimberley Public Library
» Boshof Public Library

Comments were received through written submission via fax, post or e-mail. I&APs were also informed in writing that this Revised Final Scoping Report has been prepared and submitted to DEA and is available for comment and for download from the website: www.savannahsa.com. Copies of the Revised Final Scoping Report can be requested, if desired or required by I&APs from the consultant. I&APs have been advised to submit comments to the DEA case officer (Thulisile Nyakunga) with a copy to Savannah Environmental.

The revised final scoping report includes an updated sensitivity map based on field work undertaken by the ecologist in order to provide a clearer indication of

the availability of low sensitivity areas for the development of the proposed project.

Table 1 below details the additional information requirements requested by the DEA, and indicates how the changes and/additional information requested has been included in this Final Scoping Report. **These changes and/additional information will be underlined throughout this FSR.**

TABLE 1: AMENDMENTS REQUESTED BY DEA

No.	Information requirements	Amendments made to address requirements
a)	» The application form and SR must be amended to include the correct listed activities. » The SR must adequately identify and include a description of the environmental issues and potential impacts, including cumulative impacts for each of the listed activities applied for. » In addition, the relevant aspects of the development that will apply to that specific listed activity must be adequately addressed.	» An amended application form with updated listed activities has been submitted to DEA. Relevant project activities have been updated in this FSR. » Refer to chapter 5 & 6 of this report for description of the environmental issues and potential impacts associated with listed activities applied for, including cumulative impacts.
b)	» In light of the above, this Department advises that the following listed activities and their relevant issues be addressed , this includes: * Activity – 544 Item 13 * Activity – 544 Item 18 * Activity – 546 Item 04 » It is noted that the application form and/or FSR included activity 04; 10; 12; 13; and, 16 of GNR 546 dated 18 June 2010. If this activity is applicable, the impacts associated with this activity must be adequately identified. In addition, written comment from the provincial Department of Environmental Affairs indicating that this activity applies must be obtained. The respective geographical areas as defined in GNR 546 dated 18 June 2010must be indicated	» These activities are no longer considered applicable to the proposed project, as determined through the scoping process. An amended application form with updated listed activities has been submitted to DEA. Relevant project activities have been updated in this FSR. » An amended application form was submitted to DEA on the 26 September 2013 to remove activity 04; 10; 12; 13; and, 16 of GNR 546 dated 18 June 2010. An acknowledgement and acceptance of this amendment was received on the 10 October 2013 (refer to Appendix B).
c)	The SR must adequately identify and include a description of the environmental issues and potential impacts, including cumulative impacts that have been identified in accordance with Regulation 28(g) of the EIA	Chapter 5 & 6 of this report describe environmental issues and potential impacts, including cumulative impacts.

No.	Information requirements	Amendments made to address requirements
	Regulations, 2010.	
d)	The amended SR must provide a detailed description of the need and desirability, not only providing motivation on the need for clean energy in South Africa of the proposed activity in accordance with Regulation 22(g) of the EIA Regulations, 2010. The need and desirability must also indicate if the proposed development is needed in the region and if the current proposed location is desirable for the proposed activity compared to other sites.	Refer to section 1.2 of this report.
e)	The amended SR must provide a detailed description of any identified alternatives to the proposed activity that are feasible and reasonable, including the advantages and disadvantages that the proposed activity or alternatives will have on the environment and on the community that may be affected by the activity in accordance with Regulation 28(j) of the EIA Regulations, 2010.	Refer to section 2.1 of this report and appendix M (report on the identification of a suitable site).
f)	It must be noted that the preferred site alternative as described in the SR is located in an area that has medium to high ecological sensitivities. As such, alternate, less sensitive sites must be identified to be investigated in the EIA phase in the amended SR.	Please refer to Figure 1 and 2 which indicates an updated sensitivity map compiled from the ecological field survey, as well as an updated layout indicating a clearer indication of the availability of low sensitivity areas for the development of the proposed project.
g)	The maps provided in the SR do not show the route alternatives of the power lines, i.e. option 1, 2 and 3. The maps must be amended to indicate the various route alignments in the amended SR.	Refer to Fig 1.1 of this report and Appendix A for updated maps.
h)	The SR must include a Plan of Study for the Environmental Impact Assessment (PoSEIA) in accordance with Regulation 28(n) of the EIA Regulations, 2010.	Refer to section 9.4 of this report.
i)	A Cumulative Impact Assessment is required to be part of the PoS for EIA should there be other similar facilities in the region.	Refer to section 9.4 of this report. An assessment of cumulative impacts will be included in the EIA Phase of the process.
j)	The Public Participation Process in the FSR was not done in accordance to Chapter 6 of the EIA Regulations, 2010. As such, the requirements of the Public Participation Process must be in accordance with	As detailed in the Draft and Final Scoping Reports, the public participation was undertaken in accordance with the EIA Regulations. Further detail is provided in Chapter 3

No.	Information requirements	Amendments made to address requirements
	Regulation 54 to 57 of the GN R543 of EIA Regulations, 2010.	under section 3.2 of this report.
k)	It must be noted Regulation 56(7) of the EIA Regulations, 2010 indicates that State Departments must be afforded a 40 day comment period on the draft reports. On review of the FSR, the EAP provided State Departments 30 days to comment on the draft reports,	A 40-day review period was provided to Organs of State on the Draft Scoping Report as required in terms of Section 24 of NEMA. A 40 day comment period on this FSR is provided to all I&APs as required by the DEA.
l)	The SR must meet the requirements of this rejection letter and the requirements of Regulation 28 of the EIA Regulations, 2010.	Please refer to the table below which details compliance with the legal requirements as per the EIA Regulations.
m)	A shapefile of the preferred development layout/footprint must be submitted to this Department (DEA). The shapefile must be created using the Hartebeesthoek 94 Datum and the data should be in Decimal Degree Format using the WGS84 Spheroid.	Shapefiles will be provided to the DEA as required.
o)	» Copies of the SR must be circulated to all key stakeholders, Organs of State and registered I&APs for a duration of 40 days for comment. » The issues raised by I&APs must be addressed in a table format indicating the issue/concern raised and the EAP's response thereto and must include copies of the I&AP's correspondence as well as a copy of this Department's rejection letter » The EAP must provide proof that all registered I&APs have been notified of the availability of the SR	» All I&APs are provided a 40 day period to comment on this FSR. The period for review is 22 January 2014 – 03 March 2014 » Refer to Appendix E5 (comment & response report) for issues raised by I&APs and the EAP's response » Refer to appendix E2 & E3 for proof of notification to I&APs.

LEGAL REQUIREMENTS IN TERMS OF THE EIA REGULATIONS

Table 2 below details how the legal requirements of Section 285 of GNR543 of the EIA Regulations (Scoping Report content) have been addressed within this report.

NEMA REGULATIONS 543, SECTION 28 REQUIREMENTS FOR THE CONTENT OF SCOPING REPORTS	CROSS REFERENCE IN THIS SCOPING REPORT
(a) details of— (i) the EAP who prepared the report; and	Section 1.4

NEMA REGULATIONS 543, SECTION 28 REQUIREMENTS FOR THE CONTENT OF SCOPING REPORTS	CROSS REFERENCE IN THIS SCOPING REPORT
(ii) the expertise of the EAP to carry out scoping procedures	
(b) a description of the proposed activity	Refer to section 1.1 of this report.
(c) a description of any feasible and reasonable alternatives that have been identified	Section 2.1
(d) a description of the property on which the activity is to be undertaken and the location of the activity on the property, or if it is— (i) a linear activity, a description of the route of the activity; or (ii) an ocean-based activity, the coordinates where the activity is to be undertaken	Section 1.1
(e) a description of the environment that may be affected by the activity and the manner in which activity may be affected by the environment	Chapter 4
(f) an identification of all legislation and guidelines that have been considered in the preparation of the scoping report	Section 3.3
(g) a description of environmental issues and potential impacts, including cumulative impacts, that have been identified	Chapter 5 and 6
(h) details of the public participation process conducted in terms of regulation 27(a), including—	
(i) the steps that were taken to notify potentially interested and affected parties of the application	Section 3.2.3
(ii) proof that notice boards, advertisements and notices notifying potentially interested and affected parties of the application have been displayed, placed or given	Appendix D
(iii) a list of all persons or organisations that were identified and registered in terms of regulation 55 as interested and affected parties in relation to the application	Appendix C
(iv) a summary of the issues raised by interested and affected parties, the date of receipt of and the response of the EAP to those issues	Appendix E5
(i) a description of the need and desirability of the proposed activity	Section 1.2
(j) a description of identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity	Section 2.1
(k) copies of any representations, and comments received in	Appendix E2 & E3

NEMA REGULATIONS 543, SECTION 28 REQUIREMENTS FOR THE CONTENT OF SCOPING REPORTS	CROSS REFERENCE IN THIS SCOPING REPORT
connection with the application or the scoping report from interested and affected parties	
(l) copies of the minutes of any meetings held by the EAP with interested and affected parties and other role players which record the views of the participants	Appendix E4
(m) any responses by the EAP to those representations and comments and views;	Appendix E5
(n) a plan of study for environmental impact assessment which sets out the proposed approach to the environmental impact assessment of the application, which must include—	Chapter 9
(i) a description of the tasks that will be undertaken as part of the environmental impact assessment process, including any specialist reports or specialised processes, and the manner in which such tasks will be undertaken	
(ii) an indication of the stages at which the competent authority will be consulted	
(iii) a description of the proposed method of assessing the environmental issues and alternatives, including the option of not proceeding with the activity; and	
(iv) particulars of the public participation process that will be conducted during the environmental impact assessment process	
(o) any specific information required by the competent authority	Refer to Page i-iii for information requested by DEA
(p) any other matters required in terms of sections 24(4)(a) and (b) of the Act.	Refer to Page i-iii for information requested by DEA
(2) In addition, a scoping report must take into account any guidelines applicable to the kind of activity which is the subject of the application.	Section 3.3.
(3) The EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation (1)(c), exist.	Section 2.1 and appendix M

PROJECT DETAILS

Title	:	Environmental Impact Assessment Process Final Scoping Report for the Proposed Blackwood Solar Energy Facility near Boshof, Free State Province
DEA Reference No.	:	14/12/16/3/3/2/281
Authors	:	Savannah Environmental (Pty) Ltd Sheila Muniongo Karen Jodas
Sub-consultants	:	Savannah Environmental McGregor Museum Paleo Field Services Karen Hansen Landscape Architect) Environmental Consulting and Research Johan Lanz Consulting
Applicant	:	Blackwood Solar Energy Facility (Pty) Ltd
Report Status	:	Revised Final Scoping Report for submission to Department of Environmental Affairs
Submission date	:	07 March 2014

When used as a reference this report should be cited as: Savannah Environmental (2014) Final Scoping Report for the Proposed Blackwood Solar Energy Facility near Boshof, Free State Province.

EXECUTIVE SUMMARY

The overarching objective for the renewable energy facility planning process is to maximise electricity production through **exposure to the solar resource**, while minimising infrastructure, operational and maintenance costs, as well as **social and environmental impacts**.

With this in mind, **Blackwood Solar Energy Facility (Pty) Ltd**, is proposing to establish a commercial Solar Energy Facility with a net generating capacity of **up to 75 MW** and associated infrastructure in the Free State approximately 25km south-east of Kimberley and 45km south-west of Boshof. The proposed project is to be known as the **Blackwood Solar Energy Facility**, identified to be feasible by the developer due to favourable exposure to the solar resource. Two power line options are proposed to connect the facility to the Eskom grid.

The Scoping Report has been prepared in accordance with the EIA Regulations published in Government Notice 33306 of GN R543, R544, R545 and R546 (18 June 2010), in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998). The nature and extent of the solar and grid connection components of the proposed project, as well as potential environmental impacts associated with the construction of the solar energy facilities is explored in more detail in this Scoping Report. This Scoping Report aims to identify potential issues associated with the proposed project, and define the extent of studies required within the EIA. This was achieved through an evaluation of the proposed project involving specialists with expertise relevant to the nature of the project and the study area, the project proponent, as well as a consultation process with key stakeholders that includes both relevant government authorities and interested and affected parties (I&APs).

Table 3 below provides a summary of the study area, key project details for each of the components (solar energy facility and power lines) described in this Final Scoping Report. A summary of the environmental baseline is also indicated.

Table 3: Summary of the study area, key project details and potential impacts

	Solar Energy Facility	**Power Lines**
DEA Reference number	14/12/16/3/3/2/281	
Study Area		
Site	The remainder of portion 1 of the farm Pandamsfontein 1593	» Landau`s Dam 212 » Susanna 197 » Olifantskop 196 » Olifantsfontein 366 » Rooifontein 211 » Rietpan 390

	Solar Energy Facility	Power Lines
		» Karreeboom 1716
Number of landowners affected	1	6
Preferred siting	Areas of flat topography	Areas of flat topography
Total size of study area	Approximately 1460 ha	**Option 1:** Width – 31-40m wide servitude Length - ±1.5km Height - ± 32m **Option 2:** Width – 31-40m wide servitude Length -±25km Height - ± 32m
Site access road	Approximately 7km from the N8 (28°55'15.22"S: 24°57'52.52"E) to the PV panels area (28°52'50.75"S: 24°57'25.81"E)	To be determined upon agreement with landowners
Land cover	Natural grasslands and degraded natural grasslands	Natural grasslands and degraded natural grasslands
Grazing capacity	Between 14 and 21 hectares per large stock unit	Between 14 and 21 hectares per large stock unit
Critical Biodiversity Areas	None	None
Project details		
Generation capacity	75 MW	132 kV overhead power line
Anticipated construction footprint	300ha	**Option 1:** Width – 31-40m wide servitude Length -100m-2km Height - ± 32m **Option 2:** Width – 31-40m wide servitude Length -±25km Height - ± 32m
Number of on-site substations	1	N/A
Existing access roads to be utilised	Yes	Linear activity - to be determined upon agreement with landowners
Width of access roads required	Approximately 5m	Access tracks to be established
Point of grid connection	Option 1: From site to loop in and loop out into existing Eskom power line on site ;	Essential infrastructure to facilitate evacuation of power into the grid

	Solar Energy Facility	Power Lines
	Option 2: From site to Boundary substation via a 25km overhead power line	
Summary of baseline and mapped sensitivity		
Agriculture and soil	From an agricultural impact point of view, no sensitive areas (other than the 2 hectare cultivated area) were identified during scoping that should be avoided for inclusion in the development.	
Flora	970 plant species have been recorded within the region, only 7 of which are of high conservation concern. Ecologically sensitive areas include depressions and wetlands such as larger drainage lines, dams and pans. Areas with deeper sandy soils are expected to have a higher density of protected tree species, i.e. *Acacia erioloba* (Camel Thorn). Area of low sensitivity identified sufficient to accommodate proposed project.	
Fauna	They are a number species of conservation concern: » Amphibian, 1 red data species - Giant Bull Frog (*Pyxicephalus adspersus*), » Reptiles, 4 are endemic - Distant's Ground Agama (*Agama aculeata distanti*), Aurora House Snake (*Lamprophis aurora*), Marico Gecko (*Pachydactylus mariquensis*) and Greater Padloper (*Homopus femoralis*), » Mammals, 3 are red data species, listed as Near Threatened, Brown Hyena - (*Hyaena brunnea*), Honey Badger (*Mellivora capensis*) and South African Hedgehog (*Atelerix frontalis*)	
Birds	Approximately 174 bird species could occur in the study, of which 11 Red Listed bird species are considered likely to occur within the study area. Ecologically bird sensitive areas include depressions and wetlands.	
Ecology	» Many large old *Acacia tortilis*, which are essential for the functionality of this very dry ecosystem, » Smaller pans detected within the site, » Depressions and edges with unique vegetation, » Higher productivity and red data species that is restricted to their specific habitats.	
Visual	It is evident from the preliminary viewshed analyses that the proposed facility would have a fairly contained area of potential visibility (i.e. within a 3.5km radius of the site), especially to the south-east of the site. This area of exposure is generally restricted to vacant natural land, but may contain some potentially sensitive visual receptors such as dwellings and travellers on both the N8 and the railway line	
Heritage sites	None identified at this stage.	

No environmental fatal flaws were identified to be associated with the proposed project in the context of the site, provided the project is located within the areas of lower ecological sensitivity. However, areas of preliminary sensitivity were identified through the scoping phase as illustrated in Figure 2 below based on desktop studies undertaken. Further investigation in this regard is required.

The sensitivity map is a rough scale estimate of sensitivity on the site, and these areas will be subject to survey and ground-truthing during the EIA phase of the project. This sensitivity has been further refined from that presented in the Draft Scoping Report through the ecological field survey in order to provide a clearer indication of the availability of low sensitivity areas for the development of the proposed project.

These potentially sensitive areas will, therefore, be further investigated and assessed through detailed specialist studies (including field surveys) during the EIA phase. Local level environmental and planning issues will now be considered within **site-specific studies** to be undertaken as part of the EIA for the project. The assessments through the EIA process will assist in delineating areas of environmental sensitivity within the broader site and ultimately inform the placement of the solar energy facility and associated infrastructure on the site in order to minimise impacts on the environment.

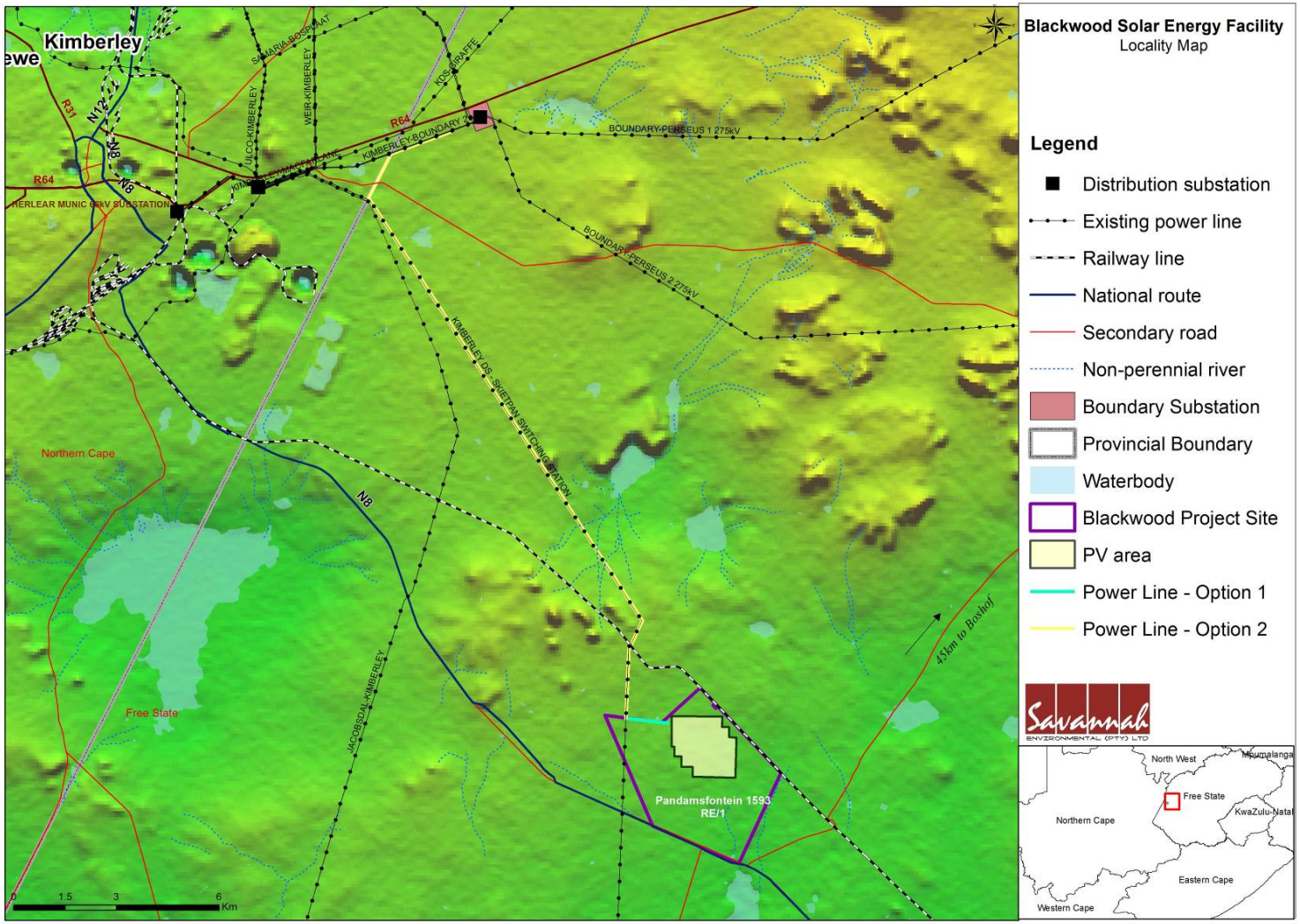

Figure 1: Locality map showing the proposed study area and nearest substations to which grid connection is required

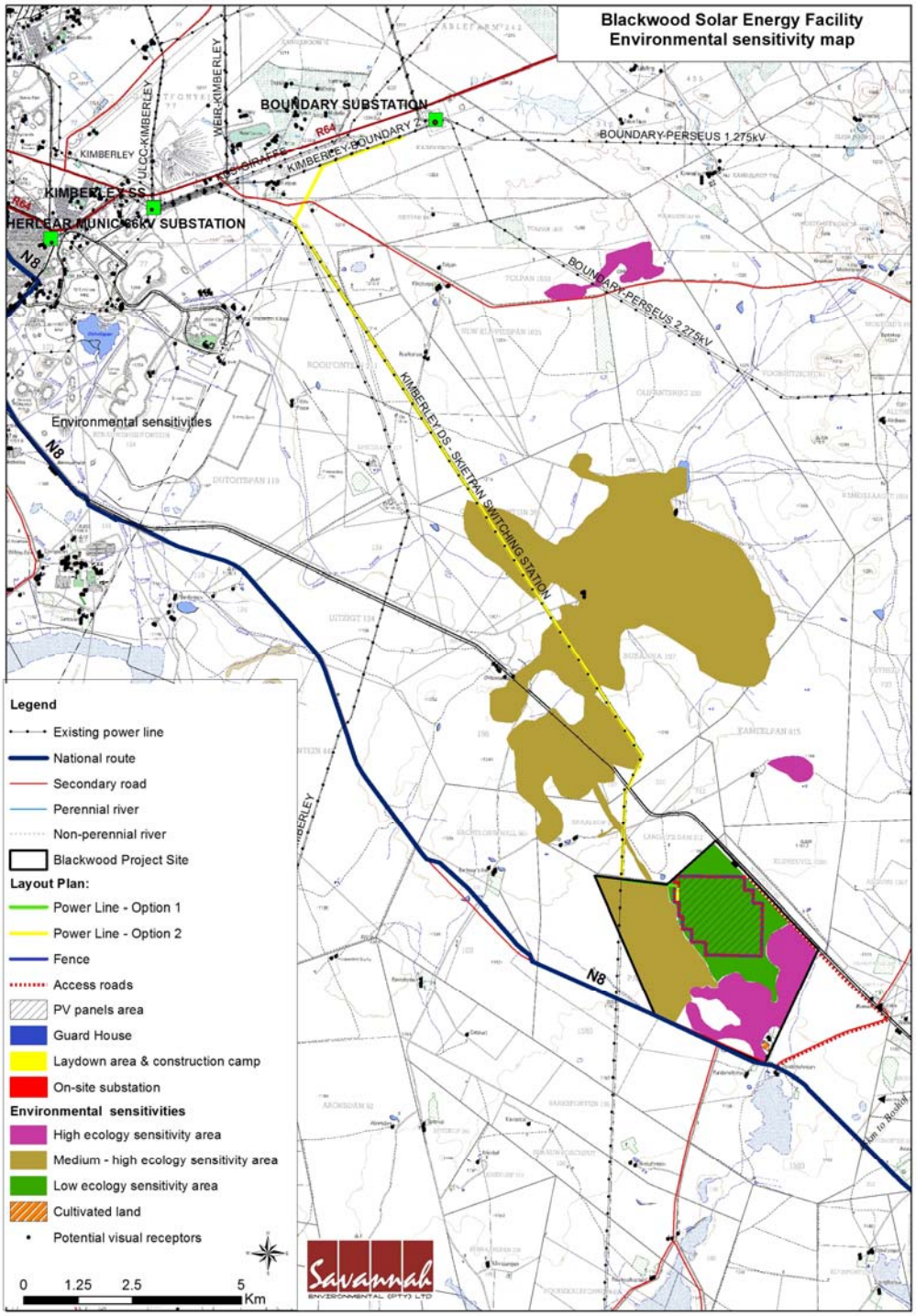

Figure 2: Potential environmental sensitivity based on overlay of sensitivities identified at Scoping and verified through ecological field survey

TABLE OF CONTENTS

PAGE

PUBLIC REVIEW OF THE REVISED FINAL SCOPING REPORT ii
LEGAL REQUIREMENTS IN TERMS OF THE EIA REGULATIONS v
EXECUTIVE SUMMARY ix
TABLE OF CONTENTS xv
APPENDICES xviii
DEFINITIONS AND TERMINOLOGY 19
ABBREVIATIONS AND ACRONYMS 23
CHAPTER 1 INTRODUCTION 1
1.1. Overview of the project 3
1.2. Need and desirability of the proposed project 6
a) Free State Province Provincial Growth and Development Strategy (2004-2014) **7**
b) Lejweleputswa District Municipality Integrated Development Plan **7**
c) Tokologo Integrated Development Plan **8**
d) Financial Viability and Community Needs **8**
e) Strategic Integrated Projects (SIPs) **9**
f) The Need for the Blackwood Energy Facility Project **9**
g) The Desirability for the Blackwood Solar Energy Facility Project **10**
h) How the principles of environmental management as set out in section 2 of NEMA have been taken into account in the planning for the proposed project **11**
1.3. Requirement for an Environmental Impact Assessment Process 11
1.4 Details of the Environmental Assessment Practitioner and Expertise to conduct the Scoping and EIA Phases 14
CHAPTER 2 SCOPE OF THE PROPOSED PROJECT 17
2.1. Project Alternatives 17
2.1.1 Site Alternatives **18**
2.1.2 Layout and Design Alternatives **20**
2.1.3 Technology Alternatives **20**
2.1.4. Do Nothing Alternative **22**
2.2. Photovoltaic (PV) Solar Energy Facility and the Generation of Electricity 24
2.3 Description of the Associated Infrastructure 26
2.4 Water Usage Associated with the Solar Energy Facility 27
2.6 Overview of the Construction Phase 28
2.6.1 Conduct Surveys **28**
2.6.2 Establishment of Access Roads to the Site **29**
2.6.3 Establishment of Laydown Areas on Site **29**
2.6.4 Erect PV Cells and Construct Substation and Invertors **29**
2.6.5 Establishment of Ancillary Infrastructure **31**
2.6.6 Construction of Power lines **31**
2.6.7 Undertake Site Rehabilitation **32**
2.7 Operation Phase 32
2.8 Decommissioning Phase 32

2.8.1 Site Preparation **32**
2.8.2 Disassemble and Replace Existing Components **33**
CHAPTER 3APPR H TO UNDERTAKING THE SCOPING PHASE 34
3.1. Objectives of the Scoping Phase 34
3.2. Overview of the Scoping Phase 35
3.2.1. Authority Consultation and Application for Authorisation in terms of GNR543 of 2010 36
3.2.2. I&AP Identification, Registration and the Creation of an Electronic Database 36
3.2.3. Notification of the EIA Process 38
3.2.4. Public Involvement and Consultation 39
3.2.5. Identification and Recording of Issues and Concerns 40
3.2.6. Evaluation of Issues Identified through the Scoping Process 40
3.2.7. Public Review of Draft Scoping Report and Public Meeting ... 41
3.2.8. Authority comments on the draft Scoping Report 41
3.2.9. Final Scoping Report 41
3.3 Regulatory and Legal Context 42
3.3.1. Regulatory Hierarchy 42
3.3.2 Legislation and Guidelines that have informed the preparation of this Scoping Report 44
CHAPTER 4 DESCRIPTION OF THE RECEIVING ENVIRONMENT 49
4.1 Regional Setting: Location of the Study Area 49
4.2 Climatic Conditions 51
4.3 Biophysical Characteristics of the Study Area 51
4.3.1. Topography and Geology **51**
4.3.2 Soil, Agricultural Potential and Land Capability **53**
4.3.3. Drainage and Wetlands **54**
4.4. Land uses 54
4.5. Access and Transport Routes in the Region 54
4.6. Ecological Profile 56
4.6.1. Vegetation **56**
4.6.2 Species of conservation concern **57**
4.7 Social Characteristics of the Study Area and Surrounds 58
4.8 Heritage features of the region 61
4.8.1. Heritage and archaeology **61**
4.8.2. Palaeontology (Fossils) **62**
CHAPTER 5 SCOPING OF ISSUES ASSOCIATED WITH THE PROPOSED BLACKWOOD SOLAR ENERGY FACILITY 64
5.1 Construction phase 64
5.2 Operational phase 65
5.3 Scoping of Issues associated with the solar facility 65
5.3.1 Potential Impacts on Soil and Agricultural Potential 65
5.3.2 Potential impacts on ecology (flora and fauna) 67
5.3.3 Potential impacts on Palaeontological and Heritage Resources 79
5.3.4 Potential Visual Impacts 82

5.3.5 Potential Social Impacts 87
5.4 Decommissioning phase 90
5.5 Cumulative impacts 90
CHAPTER 6 SCOPING OF ISSUES ASSOCIATED WITH THE PROPOSED POWER LINES .. 94
6.1 Construction phase 94
6.2 Operational phase 96
6.3 Scoping of Issues 96
6.3.1 Potential Impacts on Land Use and Soil 97
6.3.2 Potential Ecological Impacts 98
6.3.3 Potential Impacts on Birds 102
6.3.4 Potential impacts on Heritage and Paleontological Resources 105
6.3.5 Potential Visual Impacts 107
6.3.6 Potential Impacts on the Social Environment 107
6.4 Decommissioning phase 108
6.5 Cumulative impacts 108
CHAPTER 7 CONCLUSIONS – PROPOSED BLACKWOOD SOLAR ENERGY FACILITY ... 110
7.1. Conclusions drawn from the Evaluation of the Proposed Site for Development of Solar Energy Facility 110
7.2. Summary of potential impacts and evaluation of the proposed project 111
CHAPTER 8 CONCLUSIONS – GRID CONNECTION INFRASTRUCTURE 118
8.1. Conclusions drawn from the Evaluation of the Proposed Grid Connection Infrastructure 118
8.2. Summary of potential impacts and evaluation of the proposed project 119
CHAPTER 9 PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT 123
9.1. Aims of the EIA Phase 123
9.2. Authority Consultation 124
9.3. Consideration of Alternatives 124
9.4. Assessment of Potential Impacts and Recommendations regarding Mitigation Measures 124
9.5. Methodology for the Assessment of Potential Impacts 129
9.6. Public Participation Process 131
9.7. Key Milestones of the Programme for the EIA 132
CHAPTER 10 REFERENCES 133

APPENDICES

Appendix A: EIA Project Consulting Team CVs
Appendix B: Correspondence with Authorities (DEA)
Appendix C: Stakeholder Database
Appendix D: Site Notice & Advertisements
Appendix E: Public Participation Information
- **Appendix E1:** Stakeholder Consultation
- **Appendix E2:** Other Organs of State Consultation
- **Appendix E3:** Comments received
- **Appendix E4:** Minute of meetings
- **Appendix E5:** Comment & Response Report

Appendix F: Ecology Scoping Study
Appendix G: Heritage Scoping Study
Appendix H: Paleontological Impact Assessment (desktop)
Appendix I: Social Scoping Study
Appendix J: Soil Scoping Study
Appendix K: Visual Scoping Study
Appendix L: A3 Maps
Appendix M: Site Motivation Letter

DEFINITIONS AND TERMINOLOGY

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Archaeological material: Remains resulting from human activities which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.

Cumulative impacts: The impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Drainage: A drainage line is a lower category or order of watercourse that does not have a clearly defined bed or bank. It carries water only during or immediately after periods of heavy rainfall i.e. non-perennial, and riparian vegetation may or may not be present

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Endemic: An "endemic" is a species that grows in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

Environment: the surroundings within which humans exist and that are made up of:

i. The land, water and atmosphere of the earth;
ii. Micro-organisms, plant and animal life;
iii. Any part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental impact: An action or series of actions that have an effect on the environment.

Environmental impact assessment: Environmental Impact Assessment (EIA), as defined in the NEMA EIA Regulations and in relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application.

Environmental management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental management programme: An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its on-going maintenance after implementation.

Fossil: Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000).

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800

Indirect impacts: Indirect or induced changes that may occur as a result of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

Interested and affected party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups and the general public.

Perennial and non-perennial: Perennial systems contain flow or standing water for all or a large proportion of any given year, while non-perennial systems are episodic or ephemeral and thus contains flows for short periods, such as a few hours or days in the case of drainage lines.

Riparian: the area of land adjacent to a stream or river that is influenced by stream-induced or related processes. Riparian areas which are saturated or flooded for prolonged periods would be considered wetlands and could be described as riparian wetlands. However, some riparian areas are not wetlands (e.g. an area where alluvium is periodically deposited by a stream during floods but which is well drained).

Photovoltaic effect: Electricity can be generated using photovoltaic solar panels which are comprised of individual photovoltaic cells that absorb solar energy to directly produce electricity. The absorbed solar radiation excites the electrons inside the cells and produces what is referred to as the Photovoltaic Effect.

Rare species: Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare".

Red data species: Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Significant impact: An impact that by its magnitude, duration, intensity, or probability of occurrence may have a notable effect on one or more aspects of the environment.

Watercourse: as per the National Water Act means -
(a) a river or spring;

(b) a natural channel in which water flows regularly or intermittently;
(c) a wetland, lake or dam into which, or from which, water flows; and
(d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks

Wetlands: land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which under normal circumstances supports or would support vegetation typically adapted to life in saturated soil (Water Act 36 of 1998); land where an excess of water is the dominant factor determining the nature of the soil development and the types of plants and animals living at the soil surface (Cowardin et al., 1979).

ABBREVIATIONS AND ACRONYMS

BID	Background Information Document
CBOs	Community Based Organisations
CDM	Clean Development Mechanism
CSIR	Council for Scientific and Industrial Research
CO_2	Carbon dioxide
D	Diameter of the rotor blades
DAFF	Department of Forestry and Fishery
DEA	National Department of Environmental Affairs
DMR	Department of Minerals Resources
DOT	Department of Transport
DWA	Department of Water Affairs
EIA	Environmental Impact Assessment
EMP	Environmental Management Programme
GIS	Geographical Information Systems
GG	Government Gazette
GN	Government Notice
GWh	Giga Watt Hour
Ha	Hectare
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IEP	Integrated Energy Planning
km^2	Square kilometres
km/hr	Kilometres per hour
kV	Kilovolt
m^2	Square meters
m/s	Meters per second
MW	Mega Watt
NEMA	National Environmental Management Act (Act No 107 of 1998)
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act (Act No 25 of 1999)
NGOs	Non-Governmental Organisations
NIRP	National Integrated Resource Planning
NWA	National Water Act (Act No 36 of 1998)
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency Limited
SDF	Spatial Development Framework

INTRODUCTION CHAPTER 1

Blackwood Solar Energy Facility (Pty) Ltd is proposing to establish a commercial photovoltaic solar energy facility with a net generating capacity of up to 75MW, as well as associated infrastructure on a site located in the Free State approximately 25km south-east of Kimberley and 45km south-west of Boshof (refer to Figure 1.1). This project is to be known as the Blackwood Solar Energy Facility. Based on a pre-feasibility analysis, site identification process undertaken by Blackwood Solar Energy Facility (Pty) Ltd, a favourable area has been identified for consideration and evaluation through an Environmental Impact Assessment (EIA).

The solar energy facility is proposed to accommodate several arrays of tracking or static **photovoltaic (PV) panels** and associated infrastructure over the proposed site. From a regional perspective, the greater area is considered favourable for the development of commercial solar electricity generating facilities by virtue of the **climatic conditions** (primarily as the economic viability of a solar energy facility is directly dependent on the annual solar irradiation values for a particular area), relief and aspect, the extent of the site, and the availability of a direct **grid connection** (i.e. point of connection to the National grid).

The nature and extent of this facility, as well as potential environmental impacts associated with the construction, operation and decommissioning phases are explored in more detail in this Scoping Report.

Scoping is an important part of the EIA process, as it helps to ensure that the impact assessment is appropriately focussed. The main objectives of the Scoping process are:

» To engage with stakeholders at an early stage of the development so that they may contribute their views with regards to the proposed project;
» To identify potential issues and impacts associated with the proposed development;
» To define the scope of the Environmental Impact Assessment (EIA);
» To define the methodology that is required for the EIA; and
» To describe the plan of study for the EIA.

In terms of NEMA, the Scoping Report is submitted to the competent authority (i.e. the National Department of Environmental Affairs (DEA)) as part of the decision-making process with regard to the proposed solar energy project. The Scoping Report is also intended to provide sufficient background information to other Organs of State, non-statutory bodies, the general public, organisations and local communities in order to obtain their commentary and input on the proposed

development. The Scoping Phase of the EIA process identifies and describes potential issues associated with the proposed project, and defines the extent of the studies required within the EIA Phase of the process. The EIA Phase will assess those identified potential environmental impacts and benefits associated with all phases of the project including design, construction, operation and decommissioning, and will recommend appropriate mitigation measures for potentially significant environmental impacts.

The Scoping Report consists of ten sections:

» **Chapter 1** provided background to the proposed project and the environmental impact assessment.
» **Chapter 2** describes the activities associated with the project (project scope). This chapter also describes solar energy as a power generation option and provides insight of the available technologies.
» **Chapter 3** outlines the process which was followed during the Scoping Phase of the EIA process, including the consultation programme that was undertaken and input received from interested and affected parties.
» **Chapter 4** describes the existing biophysical and socio-economic environment.
» **Chapter 5** provides an identification and evaluation of the potential issues associated with the proposed Solar Energy Facility.
» **Chapter 6** provides an identification and evaluation of the potential issues associated with the proposed grid connection infrastructure.
» **Chapter 7** presents the conclusions of the scoping evaluation for the proposed Solar Energy Facility.
» **Chapter 8** presents the conclusions of the scoping evaluation for the proposed grid connection infrastructure.
» **Chapter 9** describes the Plan of Study for EIA.
» **Chapter 10** provides references used to compile the Scoping Report.

The Scoping Phase of the EIA process identifies potential issues associated with the proposed project, and defines the extent of the studies required within the EIA Phase. The EIA Phase will address those identified potential environmental impacts and benefits associated with all phases of the project including design, construction and operation) on, and recommends appropriate mitigation measures for potentially significant environmental impacts.

The release of Draft Scoping Report provided stakeholders with an opportunity to verify that the issues they have raised to date have been captured and adequately considered within the study. The Final Scoping Report has incorporated all issues and responses prior to submission to the National Department of Environmental Affairs (DEA), the decision-making authority for the project

1.1. Overview of the project

The Blackwood Solar Energy Facility is proposed on the Remainder of Portion 1 of the farm Pandamsfontein 1593 (SG code: F00400000000159300001) which falls within the Tokologo Local Municipality, which is part of Lejweleputswa District Municipality. The proposed development site is traversed by the Kimberley DS - Skietpan Switching Station 132kV power line. Access to the site is provided directly from the N8 national highway.

A broader study area of 1468 ha is being considered within which the facility is to be constructed, although the actual development footprint is anticipated to be approximately 300 ha in extent. Therefore, it is anticipated that the PV panels and the associated infrastructure can be appropriately placed within the boundaries of the broader site to avoid any identified environmental sensitivities or constraints identified through the EIA process.

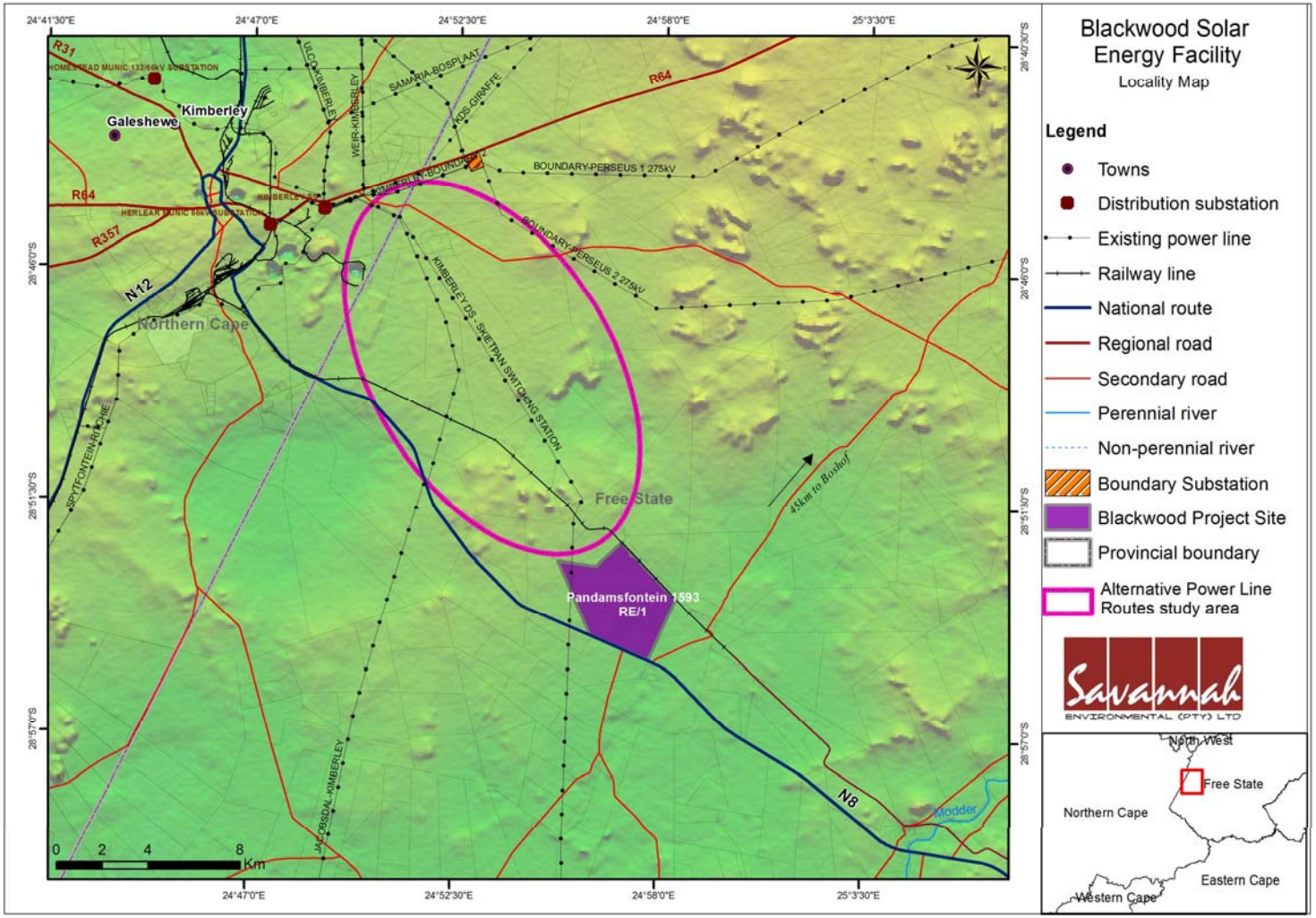

Figure 1.1: Locality map for the proposed site for the Blackwood Solar Energy Facility, indicating the proximity to grid connection infrastructure

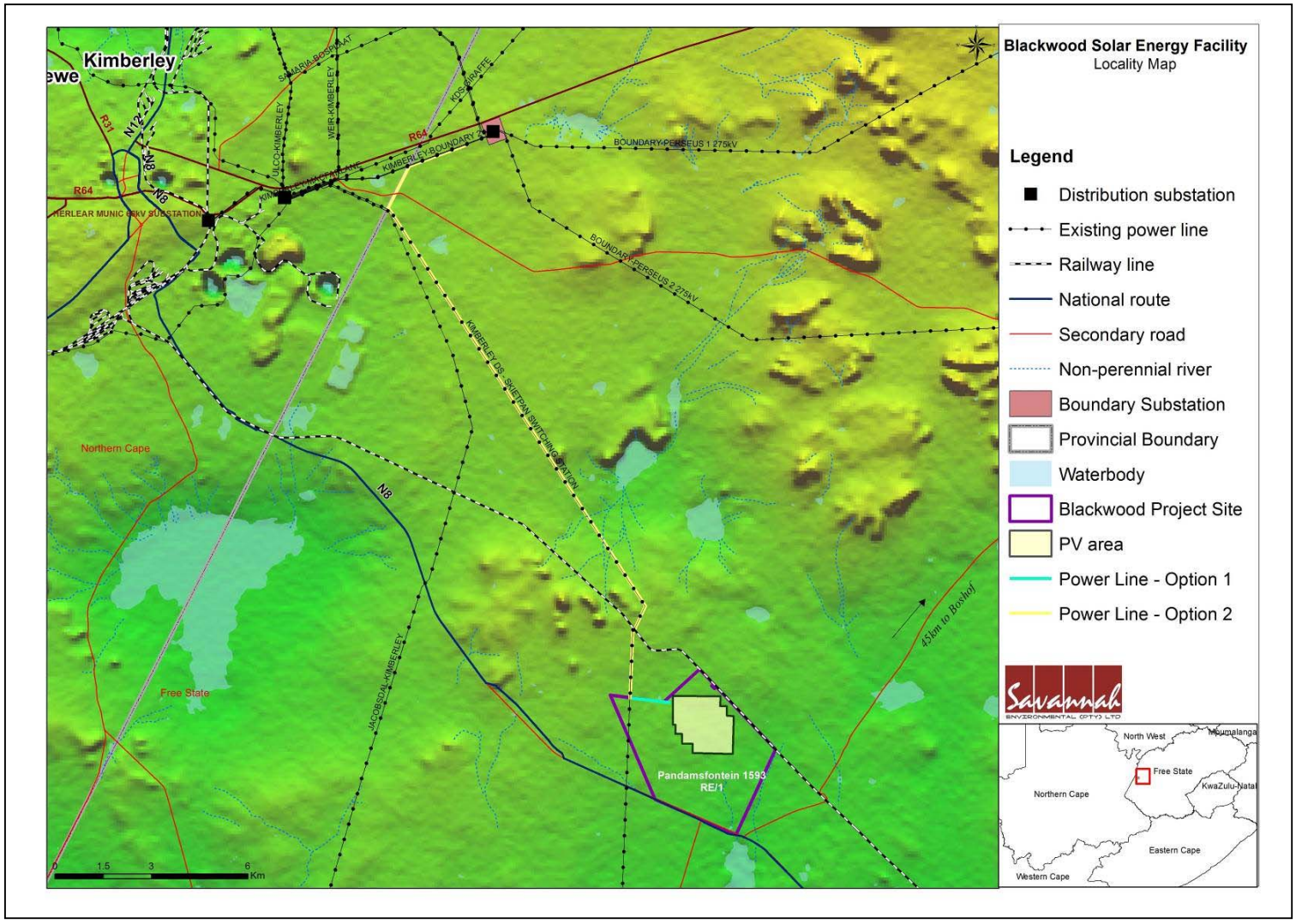

Figure 2.2: Locality map for the proposed layout for the Blackwood Solar Energy Facility, indicating the proximity to grid connection infrastructure.

The facility as depicted on Figure 1.2 is proposed to include several arrays of photovoltaic (PV) solar panels with a generating capacity of up to 75 MW and includes the following associated infrastructure:

» Solar panels (fixed/tracking technology) with an export capacity of up to 75MW.
» Mounting structures for the solar panels to be rammed steel piles or piles with pre-manufactured concrete footings, alternative making use of ground screws to support the PV panels.
» Central invertor/transformer stations to collect all energy generated from the PV panels. The inverter's role is to convert direct current (DC) electricity to alternating current (AC) electricity at grid frequency.
» An on-site substation and overhead power line to facilitate the connection between the solar energy facility and the Eskom grid via one of the following options:
    - A loop in/loop out of the Kimberley DS - Skietpan Switching Station 132kV power line which traverses the site;
    - Construction of an overhead distribution power line of approximately 20km in length to the Boundary Substation
» Internal access roads and fencing
» Associated buildings including a workshop area for maintenance, storage, and control facility with basic services such as water and electricity

The overarching objective for the Blackwood Solar Energy Facility is to maximise electricity production through exposure to the solar resource, while minimising infrastructure, operational and maintenance costs, as well as social and environmental impacts. In order to meet these objectives, local level environmental and planning issues will be assessed through the EIA through site-specific studies in order to delineate areas of sensitivity within the broader site; this will serve to inform the design of the facility.

The nature and extent of the proposed facility, and the potential environmental impacts associated with the construction, operation and decommissioning phases are explored in more detail in this Scoping Report.

1.2. Need and desirability of the proposed project

According to the DEA Draft Guideline on Need and Desirability in terms of the Environmental Impact Assessment (EIA) Regulations, 2010 (October 2012) the need and desirability of a development must be measured against the contents of the Integrated Development Plan (IDP), Spatial Development Framework (SDF) and Environmental Management Framework (EMF) for an area, and the sustainable development vision, goals and objectives formulated in, and the desired spatial form and pattern of land use reflected in, the area's IDP and SDF.

a) Free State Province Provincial Growth and Development Strategy (2004-2014)

The Free State Provincial Growth and Development Strategy (FSPGDS) is a nine-year strategy (2004-2014) which aims to achieve the objectives of Vision 2014. As a provincial policy framework, it sets the tone and pace for shared growth and development in the Province. It addresses the key social, economic, environmental and spatial imperatives in the Province. Underlying the FSGDS are the following imperatives:

» The need to effectively use scarce resources within the Province, whilst addressing the real causes of development challenges.
» The need to accelerate service delivery based on a common provincial development agenda as the basis for provincial strategic direction.
» The need to identify investment opportunities and provide an environment of certainty critical for private-sector investment.
» The need to promote intergovernmental coordination between the three spheres of government.
» The need to facilitate facilitates the implementation of the People's Contract within the Province.
» The need to provide a common vision as the basis for common action amongst all stakeholders, both inside and outside government.
» The need to provide a framework for budgets, implementation, performance management and spatial development.

Of specific relevance to the proposed Blackwood Energy Facility, the FSPGDS also identifies a number of natural constraints to economic growth and development. These include, low rainfall coupled with the limited soil potential and the impact of this on agriculture, limited water availability and depletion of mineral resources. What is of interest is that none of the natural constraints impact on the renewable energy sector, specifically the solar energy sector. Solar energy, specifically PV solar energy, therefore provides the Free State with an opportunity to diversify its economy in a way that is not affected by natural constraints such as low rainfall and limited water supplies.

b) Lejweleputswa District Municipality Integrated Development Plan

The LDM IDP is informed by and aligned with the Free State Provincial Growth and Development Strategy (FSGDS) and other governmental programmes and policies. In this regard the FSPGDS identified four key priority areas, two of which are relevant to the proposed solar energy facility project, namely:

» Economic development, employment and investment;
» Social and Human Development.

The IDP identifies a number of priority areas, of which the following are regarded as relevant:

» Local Economic Development,
» Basic Service Delivery and Infrastructure Investment.

The proposed solar energy facility will contribute towards the above-mentioned priority areas through local economic upliftment and job creation.

c) Tokologo Integrated Development Plan

The vision for the TLM is "A progressive municipality, which through co-operative governance, creates conditions for economic growth, social development and meet the basic needs of the community and improve the quality of life of all residents". A Community Needs assessment undertaken as part of the IDP revision lists a number of needs that are relevant to the proposed project, including, job-creation, up-grading of community facilities and infrastructure, support for local economic development and SMMEs, and bursaries for learners. The need to protect the natural environment is also identified as a key objective in the IDP. The IDP also notes that the bulk electrical network in the TLM is well established. However, development has been hampered by the quality/ stability of the supply.

The Blackwood Solar Energy project will be able to meet with some of these needs as identified by the TLM IDP through job-creation, infrastructural development and support for local economic development and SMMEs.

d) Financial Viability and Community Needs

In terms of the energy yield predicted from the facility, the developer considers the Blackwood project to be financially viable. The "need and desirability" of the local community as reflected in an IDP for the area, is also considered in the EIA. In the South African context, developmental needs (community needs) are often determined through the above planning measures (IDP, SDF and/ EMF). The Blackwood solar energy facility project is in line with the Tokologo & Lejweleputswa Local Municipality Integrated Development Plan (IDP) as discussed above. In terms of the needs on the local community, the IDP identified the need for development, social services, education and employment opportunities in this area. The Blackwood project could potentially contribute positively to these community needs. The project will create employment and business opportunities, as well as the opportunity for skills development for the local community. In addition, indirect benefits and spend in the local area will benefit the local community.

e) Strategic Integrated Projects (SIPs)

In 2010, a National Development Plan was drafted to address socio economic issues affecting development in South Africa. These issues were identified and placed under 18 different Strategic Integrated Projects (SIPs) to address the spatial imbalances of the past by addressing the needs of the poorer provinces and enabling socio-economic development. Amongst these is the green energy in support of South African Economy i.e. SIP 8 and 9. The SIP aims at supporting sustainable green energy initiatives on national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP, 2010).

In fulfilment of SIP 8 (green energy) and to meet the targets set in the Integrated Resource Plan (IRP 2010), the Department of Energy has introduced the REIPPP Programme, which is now in its fourth year. The proposed Blackwood Solar Energy Facility will contribute towards SIP 8 and SIP 9 due to the addition of clean energy to the grid and the project will create significant socio-economic benefits at a local, regional and national scale. The associated power line infrastructure will see the transmission of energy into the national grid and thus contribute towards SIP 10.

f) The Need for the Blackwood Energy Facility Project

The need for harnessing renewable energy resources (such as solar energy for electricity generation) is linked to increasing pressure on countries to increase their share of renewable energy generation due to concerns such as exploitation of non-renewable resources and the rising cost of fossil fuels. In order to meet the long-term goal of a sustainable renewable energy industry and to diversify the energy-generation mix in South Africa, a goal of 17,8GW of renewables by 2030 has been set by the Department of Energy (DoE) within the Integrated Resource Plan (IRP) 2010. This energy will be produced mainly from wind, solar, biomass, and small-scale hydro (with wind and solar comprising the bulk of the power generation capacity). This amounts to a goal of ~42% of all new power generation being derived from renewable energy forms by 2030.

In responding to the growing electricity demand within South Africa, as well as the country's targets for renewable energy, Blackwood Solar Energy Facility (Pty) Ltd proposes the establishment of the Blackwood Solar Energy Facility to add new capacity to the national electricity grid.

The development of the project would benefit the local/regional/national community by developing a renewable energy project. Surrounding communities would also benefit from the development through job creation and spin-offs. In addition, according to Department of Energy (DoE) bidding requirements the developer must plan for a percentage of the profit per annum from the solar

energy facility to go back into the community through a social beneficiation scheme. Therefore there is a potential for creation of employment and business opportunities, and the opportunity for skills development of for the local community.

g) The Desirability for the Blackwood Solar Energy Facility Project

The use of solar irradiation for electricity generation is essentially a non-consumptive use of a natural resource. A solar energy facility also qualifies as a Clean Development Mechanism (CDM) project (i.e. a financial mechanism developed to encourage the development of renewable technologies) as it meets all international requirements in this regard. The proposed site located on the Remainder of Portion 1 of the farm Pandamsfontein 1593 was selected for the development of a solar energy facility based on its predicted climate (solar resource), suitable proximity in relation to the existing and available electricity grid, and minimum technical constraints from a construction and technical perspective. Blackwood Solar Energy Facility (Pty) Ltd considers this area, and specifically the demarcated site on the Remainder of Portion 1 of the farm Pandamsfontein 1593 was to be highly preferred for the development of a solar energy facility. The reasons include:

» There are no arable lands in the studied area or directly adjacent to it, which could be impacted upon by the proposed development
» This specific farm is not commercially farmed by the current owner, parts of the farm are rented out to other commercial farmers and another part of the farm is used to house a Cheetah and Lion breeding facility.
» The development of the Blackwood Solar Energy Facility will allow current livestock grazing to continue on areas of the farm portions which will not be occupied by solar panels and associated infrastructure. Therefore the current land-use will be retained on much of the site (i.e. 80% of the site), while also generating renewable energy from the sun. As the landowner will benefit from a portion of the revenue from the facility, the development of the project provides an alternative source of income, contributing towards the sustainability of the current farming operations. This presents a win-win situation for the landowner, the economical use of the site, and the developer.
» The power can be readily evacuated to strengthen the local Eskom grid. The Eskom Boundary Substation is located 20km away from the proposed site and according to the Eskom planning office; Boundary Substation has sufficient excess capacity available to support a solar facility development larger than the prescribed maximum of 75 MW.
» A number of essential service infrastructure elements are currently present in the vicinity of the site, including a 132 kV Eskom distribution line traverses the area allowing for good access to the national grid. The site is in close proximity to an electrical load centre, being Kimberley

» The site is directly accessible off the N8.

h) How the principles of environmental management as set out in section 2 of NEMA have been taken into account in the planning for the proposed project

The principles of NEMA have been considered in this assessment through compliance with the requirements of the relevant legislation in undertaking the assessment of potential impacts, as well as through the implementation of the principle of sustainable development where appropriate mitigation measures have been recommended for impacts which cannot be avoided. In addition, the successful implementation and appropriate management of this proposed project will aid in achieving the principles of minimisation of pollution and environmental degradation.

The EIA process has been undertaken in a transparent manner and all effort has been made to involve interested and affected parties, stakeholders and relevant Organs of State such that an informed decision regarding the project can be made by the Regulating Authority.

The general objectives of Integrated Environmental Management have been taken into account for this EIA report by means of identifying, predicting and evaluating the actual and potential impacts on the environment, socio-economic conditions and cultural heritage component. The risks, consequences, alternatives as well as options for mitigation of activities have also been considered with a view to minimise negative impacts, maximise benefits, and promote compliance with the principles of environmental management.

1.3. Requirement for an Environmental Impact Assessment Process

The construction and operation of the proposed Blackwood Solar Energy Facility project is subject to the requirements of the Environmental Impact Assessment Regulations (EIA Regulations) published in terms of Section 24(5) of the National Environmental Management Act (NEMA, No 107 of 1998). This section provides a brief overview of EIA Regulations and their application to this project.

NEMA is the national legislation that provides for the authorisation of 'listed activities'. In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these activities must be considered, investigated, assessed and reported on to the competent authority that has been charged by NEMA with the responsibility of granting environmental authorisations. As this is a proposed electricity generation project and thereby considered to be of national importance, the National Department of Environmental Affairs (DEA) is the

competent authority[1] and Free State Department of Economic Development, Tourism and Environmental Affairs (DETEA) will act as a commenting authority. An application for authorisation has been accepted by DEA for the proposed project under application reference number **14/12/16/3/3/2/281.**

The proposed solar energy facility is subject to the requirements of the EIA Regulations published in terms of Section 24(5) of NEMA. The need to comply with the requirements of the EIA Regulations ensures that the competent authority is provided with the opportunity to consider the potential environmental impacts of a project early in the project development process and to assess if potential environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental studies are required in accordance with the EIA Regulations to provide the competent authority with sufficient information in order to make an informed decision.

Blackwood Solar Energy Facility has appointed Savannah Environmental as the independent Environmental Assessment Practitioner (EAP) to conduct the EIA process for the proposed project.

In terms of sections 24 and 24D of NEMA, as read with the EIA Regulations of GN R543 (Regulations 26-35), R544, R545 and R546, a Scoping Study and EIA are required to be undertaken for this proposed project as it includes the following activities listed in terms of GN R545, GN R 544 and GN R 546 (as amended in December 2010): Please note that an amended application form with updated listed activities has been submitted to DEA. Relevant project activities have been updated in this in the table below.

Relevant Notice	Activity No.	Description of Listed Activity	Relevant Component(s) of Facility
GN544, 18 June 2010	10	The construction 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	*The facility will require the construction of a distribution substation as well as an overhead distribution power line connecting to the Eskom substation, or power line.*
GN 544, 18 June 2010	11	The construction of: (x) buildings exceeding 50 square metres in size; or (xi) infrastructure or structures covering 50 square metres or	*The proposed development could potentially impact on drainage lines.*

[1] In terms of the Energy Response Plan, the DEA is the competent authority for all energy related applications.

Relevant Notice	Activity No.	Description of Listed Activity	Relevant Component(s) of Facility
		more Where such construction occurs within a watercourse or within 32 metres of a watercourse, measures from the edge of a watercourse, excluding where such construction will occur behind the development setback line.	
GN544, 18 June 2010	18	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock or more than 5 cubic metres from (i) a water course	*The proposed activity might require the infilling and deposition of materials within watercourses.*
GN 544, 18 June 2010	22	The construction of a road, outside urban areas; (ii) where no reserve exists where the road is wider than 8 metres.	*The facility will require the upgrade of the existing road and construction of new access roads within the site.*
GN545, 18 June 2010	1	The construction of facilities or infrastructure, for the generation of electricity where the output is 20 megawatts or more.	*The PV facility will have a generating capacity of up to 75MW.*
GN545, 18 June 2010	15	Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more;	*The PV facility and associated infrastructure will have a development footprint of more than 20 ha.*
GN546, 18 June 2010	14	The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation (a) In Free State: i) All areas outside urban areas	*The solar energy facility will be located outside urban areas and may require the clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation cover.*

On the basis of the above listed activities, a Scoping and an EIA Phase is required to be undertaken for the proposed project. This process is to be undertaken in two phases as follows:

» The **Scoping Phase** includes the **identification** of potential issues associated with the proposed project through a **desktop study** and consultation with affected parties and key stakeholders. Areas of sensitivity within the broader site are identified and delineated in order to identify any environmental fatal flaws, and sensitive or no go areas. Following a public review period of the draft report, this phase culminates in the submission of a Final Scoping Report and Plan of Study for EIA to the DEA.
» The **EIA Phase** involves a detailed assessment of potentially significant positive and negative impacts (direct, indirect, and cumulative) identified in the Scoping Phase. This phase includes detailed specialist investigations and public consultation. Following a public review period of the draft report, this phase culminates in the submission of a Final EIA Report and a draft **Environmental Management Programme** (EMPr), including recommendations of practical and achievable mitigation and management measures, to DEA for review and decision-making.

An EIA is an effective planning and decision-making tool for the project developer as it allows for the identification and management of potential environmental impacts (and indicates whether potential environmental impacts can be avoided, minimised or mitigated to acceptable levels). It provides the opportunity for the developer to be fore-warned of potential environmental issues, allows for resolution of the issues reported on in the Scoping and EIA Reports as well as facilitating dialogue with interested and affected parties (I&APs).

Comprehensive, independent environmental studies are required in accordance with the EIA Regulation to provide the competent authority with sufficient information in order to make an informed decision.

1.4 Details of the Environmental Assessment Practitioner and Expertise to conduct the Scoping and EIA Phases

Savannah Environmental was contracted by Blackwood Solar Energy Facility Pty Ltd as an independent Environmental Assessment Practitioner (EAP) to undertake both Scoping and EIA processes for the proposed project. Neither Savannah Environmental nor any of the specialist sub-consultants on this project are subsidiaries of, or are affiliated to Blackwood Solar Energy Facility Pty Ltd. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed project.

Savannah Environmental is a specialist environmental consulting company providing holistic environmental management services, including environmental impact assessments and planning to ensure compliance and evaluate the risk of development; and the development and implementation of environmental management tools. Savannah Environmental benefits from the pooled resources, diverse skills and experience in the environmental field held by its team.

The Savannah Environmental team have considerable experience in environmental impact assessments and environmental management, and have been actively involved in undertaking environmental studies, for a wide variety of projects throughout South Africa, including those associated with electricity generation, including renewable energy projects.

» *Sheila Muniongo* - the principle author of this report holds an Honours Bachelor degree in Environmental Management and 3 years experience in the environmental field. Her key focus is on environmental impact assessments, public participation, environmental management programmes, and mapping through ArcGIS for variety of environmental projects. She is currently involved in several EIAs for renewable energy projects EIAs across the country.
» Karen Jodas - a registered Professional Natural Scientist and holds a Master of Science degree. She has 16 years experience consulting in the environmental field. Her key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and guideline development. She is currently responsible for the project management of EIAs for several renewable energy projects across the country and the EAP on this project.
» *Gabriele Wood***:** the public participation consultant for this project, hold an Honours Bachelor degree in Anthropology and has 6 years experience in Public Participation and Social consulting, including professional execution of public participation processes for a variety of projects as well as managing and co-ordinating public participation processes for Environmental Impact Assessments (EIA).

In order to adequately identify and assess potential environmental impacts associated with the proposed project, Savannah Environmental has appointed the following specialist consultants to conduct specialist impact assessments:

» Ecology – Marianne Strohbach (Savannah Environmental)
» Soils and Agricultural Potential – Johann Lanz (Johann Lanz Consulting)

» Heritage - David Morris (McGregor Museum)
» Palaeontological Assessment – Lloyd Rossouw (Palaeo Field Services)
» Visual – Karen Hansen (Karen Hansen Landscape Architect)
» Social – Tony Barbour (Environmental Consulting and Research)

Refer to Appendix A for the curricula vitae for the environmental assessment practitioners from Savannah Environmental and the specialist consultants.

SCOPE OF THE PROPOSED PROJECT CHAPTER 2

The following chapter provides an overview of the proposed Blackwood Solar Energy Facility and details of the project scope which includes the planning/design, construction, operation and decommissioning activities. This chapter also explores site and technology alternatives as well as a "do nothing" option. Lastly, it explores solar energy facilities as a means for power generation.

The Blackwood Solar Energy Facility is proposed to be established on the Remainder of Portion 1 of the farm Pandamsfontein 1593, situated in the Free State approximately 25km south-east of Kimberley and 45km south-west of Boshof, within Tokologo Local Municipality, within the jurisdiction of Lejweleputswa District Municipality.

The facility is proposed to include several arrays of photovoltaic (PV) solar panels with a generating capacity of up to 75 MW and includes the following associated infrastructure:

» Solar panels (fixed/tracking technology) with an export capacity of up to 75MW.
» Mounting structures for the solar panels to be rammed steel piles or piles with pre-manufactured concrete footings, alternative making use of ground screws to support the PV panels.
» Central invertor/transformer stations to collect all energy generated from the PV panels. The inverter's role is to convert direct current (DC) electricity to alternating current (AC) electricity at grid frequency.
» An on-site substation and overhead power line to facilitate the connection between the solar energy facility and the Eskom grid via one of the following options:
    - A loop in/loop out of the Kimberley DS - Skietpan Switching Station 132kV power line which traverses the site;
    - Construction of an overhead distribution power line of approximately 20km in length to the Boundary Substation
» Internal access roads and fencing
» Associated buildings including a workshop area for maintenance, storage, and control facility with basic services such as water and electricity

2.1. Project Alternatives

In accordance with the requirements of the EIA Regulations, project alternatives have been considered within the Scoping process. These are detailed below.

2.1.1 Site Alternatives

Only one technically and economically feasible alternative larger site for the establishment of the proposed project has been identified by the developer for investigation in an EIA process, i.e. the Remainder of Portion 1 of the farm Pandamsfontein 1593. This is based on an investigation by the developer of various sites within the area (refer to Appendix M for the full motivation on site selection). The following factors have been considered in determining a preferred site for PV solar development including:

Site Location

According to the Free State Provincial Spatial Development Framework (PSDF) (2013), the Southern Free State, especially the Xhariep region, is regarded as an ideal location to harness the natural solar energy for generating electricity. The Xhariep region has the second-best solar irradiation index after the Upington area, and therefore positions this region as an ideal location for the development of concentrated solar power (CSP) and photovoltaic (PV) solar power generation technologies. The proposed Blackwood PV site is situated 2km west of the Xhariep region, and it presents a superior opportunity to harness the natural sun power and to generate electricity.

The proposed site is situated in close proximity to the city of Kimberley. This is a town marked with high levels of unemployment and poverty. Other surrounding towns include Boshof which experiences similar levels of unemployment and poverty. As a consequence, local labour would be easy to source. This fits in well with the IPP Procurement Programme economic development criteria for socio-economic upliftment. Currently, a large proportion of local labour is used in the agricultural industry. A few negatives related to agricultural employment are that it is very seasonal and it is not always in close proximity to employees' homes, forcing workers to travel large distances on a daily basis to reach their place of employment. Over the years, employment in the mining sector has shown a dramatic decrease.

Properties to the north of the proposed site were considered by the developer as possible sites for investigation but landowners advised that a mining company has acquired the mineral prospecting rights to most of the neighbouring properties which render these sites unfeasible for development of a facility such as that proposed. The properties to the north east of the proposed site are considered more environmentally sensitive than the proposed site due to the large population of Camel Thorn trees in these areas. Also these north-eastern areas have dense bush cover and therefore tend to include more game and hunting farms than those areas close to the proposed development site, rendering these sites potentially more sensitive from a social perspective than the proposed development site.

Climatic Conditions

The economic viability of a photovoltaic plant is directly dependent on the annual direct solar irradiation values. The region where the Blackwood Solar PV project is proposed has the second-best solar radiation index after Upington (FS-PSDF, 2013).

Site Extent

Space is a restraining factor for the development of a solar energy facility. The proposed project site is approximately 1468 ha in extent, which exceeds ~300 ha required area for the installation of the 75MW project. This will allow sufficient space for the avoidance of any identified environmental constraints within the final design for the proposed solar facility.

Land availability

The land is available for lease by the developer. This specific farm is not commercially farmed by the current owner. Reasons for this are:

- Parts of the farm are rented out to other commercial farmers.
- A part of the farm is used to house a Cheetah and Lion breeding facility.
- The predominant agricultural practices in this area are livestock farming, predominantly cattle farming. Sheep farming tends to present more of a challenge as the property is located adjacent to the N8 national road and sheep farming is exposed to livestock theft.

Site access

Large volumes of material and components would need to be transported to the project site during the construction phase of the project. The accessibility of the site was therefore a key factor in determining the viability of the solar energy facility site, particularly taking transportation costs (direct and indirect) into consideration and the impact of this on project economics. The proposed development site is accessible directly off the N8. The site is therefore appropriately located for easy transport of components, materials and equipment as well as labour movement to and from the site.

Gradient of the site

A level surface area is preferred for the installation of PV panels and specifically for PV technologies (Fluri, 2009). This reduces the need for extensive earthworks associated with the levelling of a site, thereby minimising environmental impacts. The topography of the broader farm portion is generally characterised by very gently undulating terrain with typical gradients between 1% (1:100) and 8% (1:12). The altitude ranges from 830m in the northern parts of the farm to 795m in the south.

Grid Connection

A 132 kV Eskom distribution line traverses the area allowing for good access to the national grid. The site is in close proximity to an electrical load centre, being Kimberley. Access to the Eskom grid is vital to the viability of the facility. The facility will require a new on-site substation (approximately 120 x 70m in extent) and associated power line to evacuate the power from the facility into the Eskom grid. With respect to the evacuation, two power line alternatives have been proposed, which include:

» Option 1 – A loop in/loop out of the Kimberley DS - Skietpan Switching Station 132kV power line which traverses the site;
» Option 2 – Construct an overhead distribution power line of approximately 20km in length to the Boundary Substation located ~20km north of the site.

This solar energy facility also ties in with the Eskom 10-year development in which they propose to strengthen the Eskom transmission network in the area.

Based on the above considerations, as well as discussions with Eskom, Blackwood Solar Energy Facility (Pty) Ltd considers the proposed site as a technically preferred site for the development of a PV Solar Energy Facility. .

2.1.2 Layout and Design Alternatives

The proposed facility is expected to have a development footprint of approximately 300 ha. It is anticipated that the facility and its associated infrastructure (i.e. on-site substation and internal roads, etc.) can be appropriately positioned within the broader site (1468 ha) to avoid areas of environmental sensitivity. Therefore, the extent of the site allows for the identification of layout design and site-specific alternatives.

The Scoping Phase aims to identify potentially environmentally sensitive areas on the site which should be avoided by the proposed development as far as possible. These areas will need to be considered in greater detail during the EIA Phase through site-specific specialist studies. The information from these studies will be used to inform layout alternatives for the proposed development site and inform recommendations regarding a preferred alternative. Specific design alternatives will include *inter alia* the layout and mounting of the PV panels, and alternative routes for the power line corridors and access roads. The aim of this planning process is to avoid environmentally sensitive areas as far as possible and inform the final design of the facility.

2.1.3 Technology Alternatives

Few technology options are available, and the use of those that are considered are usually differentiated by weather and temperature conditions that prevail on

the site, so that optimality is obtained by the final selection. Solar energy is considered to be the most suitable renewable energy technology for this site, based on the site location, ambient conditions and energy resource availability.

The environmental impacts of the PV technology choices are not the same. Therefore, the selection of technology will affect environmental impacts of the proposed development. The primary differences which affect the potential for environmental impacts relate to the extent of the facility, or land-take (disturbance or loss of habitat), as well as the height of the facility (visual impacts). The impacts associated with the operation and decommissioning of the facility will be the same irrespective of the technology chosen. Two solar energy technology alternatives are being considered for the proposed project and include:

» Fixed Mounted PV systems (static/fixed-tilt panels);
» Tracking PV systems (with solar panels that rotate around a defined axis to follow the sun's movement);

Fixed Mounted PV System

In a fixed mounted PV system (fixed-tilt), PV panels are installed at a pre-determined angle from which they will not move during the lifetime of the plant's operation. The limitations imposed on this system due to its static placement are offset by the fact that the PV panels are able to absorb incident radiation reflected from surrounding objects. In addition, the misalignment of the angle of PV panels has been shown to only marginally affect the efficiency of energy collection. There are further advantages which are gained from fixed mounted systems, including:

» The maintenance and installation costs of a fixed mounted PV system are lower than that of a tracking system, which is mechanically more complex given that PV mountings include moving parts.
» Fixed mounted PV systems are an established technology with a proven track record in terms of reliable functioning. In addition, replacement parts are able to be sourced more economically and with greater ease than with alternative systems.
» Fixed mounted systems are robustly designed and able to withstand greater exposure to winds than tracking systems.
» Fixed mounted PV systems occupy less space than the tracking systems.

Tracking PV System

Tracking PV Systems (single axis or dual axis trackers) are fixed to mountings which track the sun's movement. There are various tracking systems. A 'single

axis tracker' will track the sun from east to west, while a dual axis tracker will in addition be equipped to account for the seasonal waning of the sun. These systems utilise moving parts and more complex technology, which may include solar irradiation sensors to optimise the exposure of PV panels to sunlight, tracking PV panels follow the suns rotational path all day, every day of the year giving it the best solar panel orientation and generating the maximum possible the site is in close proximity to an electrical load centre, being Kimberley.would not be realised. Although the facility is only proposed to contribute 75 MW to the grid capacity, this would assist in meeting the growing electricity demand throughout the country and would also assist in meeting the government's goal for renewable energy.

2.1.4. Do Nothing Alternative

The no-go option would mean that the proposed development to install the Blackwood PV facility and associated infrastructure would not be implemented. Should this alternative be selected, there would be no impacts on the site due to the construction and operation activities of a solar energy facility. However, there will be impacts at a local and a broader scale. At a broader scale, the benefits of additional capacity to the electricity grid and those associated with the introduction of renewable energy would not be realised. Although the facility is only proposed to contribute 75 MW to the grid capacity, this would assist in meeting the growing electricity demand throughout the country and would also assist in meeting the government's goal for renewable energy. At a broader scale, the benefits of this solar energy facility would not be realised. The generation of electricity from renewable energy resources offers a range of potential socio-economic and environmental benefits for South Africa. These benefits include:

» ***Increased energy security*:** The current electricity crisis in South Africa highlights the significant role that renewable energy can play in terms of power supplementation. In addition, given that renewables can often be deployed in a decentralised manner close to consumers, they offer the opportunity for improving grid strength and supply quality, while reducing expensive transmission and distribution losses.
» ***Resource saving*:** Conventional coal fired plants are major consumers of water during their requisite cooling processes. It is estimated that the achievement of the targets in the Renewable Energy White Paper will result in water savings of approximately 16.5 million kilolitres, when compared with wet cooled conventional power stations. This translates into revenue savings of R26.6 million. As an already water-stressed nation, it is critical that South Africa engages in a variety of water conservation measures, particularly due to the detrimental effects of climate change on water availability.

- ***Exploitation of our significant renewable energy resource:*** At present, valuable national resources including biomass by-products, solar radiation and wind power remain largely unexploited. The use of these energy flows will strengthen energy security through the development of a diverse energy portfolio.
- ***Pollution reduction:*** The releases of by-products through the burning of fossil fuels for electricity generation have a particularly hazardous impact on human health and contribute to ecosystem degradation. The use of solar radiation for power generation is considered a non-consumptive use of a natural resource which produces zero greenhouse gas emissions.
- ***Climate friendly development:*** The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner and thereby allows South Africa to contribute towards mitigating climate change through the reduction of greenhouse gas (GHG) emissions. South Africa is estimated to be responsible for approximately 1% of global GHG emissions and is currently ranked 9th worldwide in terms of per capita carbon dioxide emissions.
- ***Support for international agreements:*** The effective deployment of renewable energy provides a tangible means for South Africa to demonstrate its commitment to its international agreements under the Kyoto Protocol, and for cementing its status as a leading player within the international community.
- ***Employment creation:*** The sale, development, installation, maintenance and management of renewable energy facilities have significant potential for job creation in South Africa.
- ***Acceptability to society:*** Renewable energy offers a number of tangible benefits to society including reduced pollution concerns, improved human and ecosystem health and climate friendly development.
- ***Support to a new industry sector:*** The development of renewable energy offers the opportunity to establish a new industry within the South African economy.

South Africa currently relies on coal-powered energy to meet more than 90% of its energy needs. As a result South Africa is one of the highest per capita producers of carbon emissions in the world and Eskom, as an energy utility, has been identified as the world's second largest producer carbon emissions. The No-Development option would represent a lost opportunity for South Africa to supplement is current energy needs with clean, renewable energy. Given South Africa's position as one of the highest per capita producer of carbon emissions in the world, this would represent a High negative social cost.

Nevertheless, at a provincial and national level, it should be noted that the proposed Blackwood Solar Energy Facility is not unique. In this regard, a significant number of other renewable energy developments are currently

proposed in the Free State Province and other parts of South Africa. Foregoing the proposed Blackwood Solar Energy Facility would therefore not necessarily compromise the development of renewable energy facilities in South Africa. However, the socio-economic benefits for local communities as a result of the development of this particular project in the TLM would be forfeited.

2.2. Photovoltaic (PV) Solar Energy Facility and the Generation of Electricity

Solar energy facilities, such as those using PV panels, use the energy from the sun to generate electricity through a process known as the **Photovoltaic Effect**. This effect refers to photons of light colliding with electrons, and therefore placing the electrons into a higher state of energy to create electricity.

A photovoltaic (PV) cell is made of silicone that acts as a semi-conductor used to produce the photovoltaic effect. Individual PV cells are linked and placed behind a protective glass sheet to form a photovoltaic panel. The PV cell is positively charged on one side and negatively charged on the other side and electrical conductors are attached to either side to form a circuit. This circuit then captures the released electrons in the form of an electric current (direct current). An inverter must be used to change the direct current (DC) to alternating current (AC). The electricity is then distributed through a power line for use.

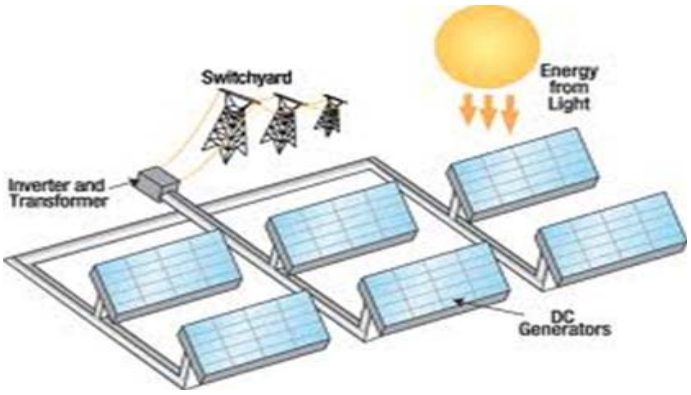

Figure 2.3: Schematic diagram of a PV plant (Sourced from: http://www.solar-green-wind.com/archives/tag/solar-cells)

The PV panels can either comprise a fixed/static support structure (as illustrated in Figure 2.4) set at an angle (fixed-tilt) so to receive the maximum amount of solar irradiation, or a single or double axis support structure which can be either fixed or tracking. The angle of the panel is dependent on the latitude of the

proposed facility and the angles may be adjusted to optimise for summer or winter solar irradiation characteristics.

Figure 2.4: Photovoltaic (fixed/ static) panel

The PV panels are designed to operate continuously for more than 20 years, unattended and with low maintenance.

The Photovoltaic Effect is achieved through the use of the following components:

Photovoltaic Cells

A PV cell is made of silicone that acts as a semiconductor used to produce the photovoltaic effect. A single cell is sufficient to power a small device such as an emergency telephone. However, to produce up to 75 MW of power, the proposed facility will require numerous cells arranged in multiples/arrays which will be placed behind a protective glass sheet and fixed to a support structure. Each PV cell is positively charged on one side and negatively charged on the other side, with electrical conductors attached to either side to form a circuit. This circuit captures the released electrons in the form of an electric current (direct current).

The Inverter

An inverter is used to convert the electricity which is produced as direct current into alternating current for the purpose of grid connection. In order to connect a large solar facility to the national grid, numerous inverters will be arranged in several arrays to collect, and convert the produced power.

The Support Structure

The PV panels will be fixed to a support structure set at an angle (fixed-tilt) so to receive the maximum amount of solar irradiation. The angle of the panel is dependent on the latitude of the proposed facility and the angles may be adjusted to optimise for summer or winter solar radiation characteristics.

2.3 Description of the Associated Infrastructure

The proposed Blackwood Solar Energy Project will also require various support infrastructures, located within the perimeter of the facility.

A summary of the details and dimensions of the infrastructure is shown in Table 2.1.

Table 2.1: Dimensions of typical structures required for the PV Facility

Component	Description / Dimensions
Location of the site	~25km south-east of Kimberley and 45km south-west of Boshof. Located in the Free State Province
Municipal Jurisdiction	» Tokologo Local Municipality » Lejweleputswa District Municipality
Extent of the proposed development footprint	~ 300ha
Extent of site available for development	~1468 ha
Site access	Access to the site will use existing roads where possible and where there are no existing roads, new access roads will be constructed (± 5000 m in length and 5m wide).
Generating capacity	75 MW
Proposed technology	Ground-mounted photovoltaic panels utilising static or tracking technology
Cabling	Cabling between the projects components is to be lain underground between 2 – 4 meters deep where practical.
Panel Spec (installed capacity)	86.25 MW
Panel Dimensions	± 1m x 2m
Number of Panels	± 350 000
Number of inverters and Height	± 60 inverter stations/mini substations at a height of ± 3m
Main Transformer capacity	Varies according to detailed design and client requirement, 1 x 80 MVA transformation capacity is typical
Final Height of installed panels from	3.5m (fixed), 4m (tracking)

Component	Description / Dimensions
ground level	
Construction camp & laydown area	± 200m x 150m
Substation	A new 132 kV on-site substation (120m X 70m in extent) to evacuate the power from the facility into the Eskom grid
Power line connection	Servitude width – 32 m Servitude length: * Option 1 - varies between 100m-1km according the positioning of the project * Option 2 - ~20km to the Boundary Substation located to the north of the project site.
Mounting Structure	Mounting structure (up to 3.5m in height) to be either rammed steel piles or piles with pre-manufactured concrete footings, ground screws to support the PV panels
Services required	» Sewage and Refuse material disposal - all sewage and refuse material generated during the establishment of the proposed site will be collected by a contractor to be disposed of at a licensed waste disposal site » Water and electricity – water will be obtained from the municipality or a licence will be obtained from DWA for abstracting water from local boreholes. Electricity will be generated from generators for any electrical work on site.
Infilling or depositing material	Any infilling material that may be required for project development will be obtained from: » Option 1: Cut and fill material from construction activities on the site (i.e. from the Remainder of portion 1 of the farm Pandamsfontein 1593). » Option 2: Contractor to source suitable grade material from an approved/registered borrow pit in the broader Kimberley region. Any excess/spoil material will be disposed of to a licensed landfill site.

2.4 Water Usage Associated with the Solar Energy Facility

An operational PV plant has no direct water requirement associated with the generation of electricity. Water is required primarily for the construction of the facility and well as for human consumption (sanitation) during operation. In

many instances, water is used to clean off dust or dirt that builds up on the panels.

During the construction period, water will be used for site preparation, compaction of building pads, road preparation, and dust control where necessary. A 75MW plant will require approximately 15 000 m^3 of water during the construction phase, although a higher volume could be required in the hotter periods of the year when dust suppression would be required on a more frequent basis. A volume of approximately 5 000 m^3 per annum would be required during the operational phase. Blackwood Solar Energy Facility (Pty) Ltd is considering three alternative sources to meet the water requirements for the proposed Blackwood Solar Energy Facility, namely:

1. Source water from the Local Water Services Provider (Tokologo Local Municipality).
2. Source water from groundwater i.e. borehole/s on the site (Remainder of portion 1 of the farm Pandamsfontein 1593)
3. During occasional thunderstorms, significant amounts of rainfall can be collected off rooftops in rainwater tanks. This water can be used to supplement existing water supplies, however may require adequate treatment to make it potable. Rainfall in the area is, however, unpredictable and seasonal, and water sourced in this way will not be permanently available.

These alternatives will be firmed up through consultation with the Department of Water Affairs (DWA) and the Tokologo Local Municipality to establish the availability of the resource, and assessed further in the EIA.

2.6 Overview of the Construction Phase

In order to construct the Blackwood Solar Facility, a series of activities will need to be undertaken. The construction process is discussed in more detail below.

2.6.1 Conduct Surveys

Prior to initiating construction, a number of surveys will be required including, but not limited to:

» Geotechnical survey - the geology and topography of the development footprint will be surveyed. The geotechnical study will focus on flood potential, foundation conditions, potential for excavations, and the availability of natural construction materials. The geotechnical examination will include surface and subsurface exploration, soil sampling and laboratory analysis.
» Site survey - will be done for the finalisation of the design layout of the solar arrays, and the other associated infrastructure. The micro-siting footprint will

consider any environmental sensitivity identified during the EIA Phase investigations and will need to be confirmed in line with the Environmental Authorisation issued for the facility.

2.6.2 Establishment of Access Roads to the Site

The site can be accessed from the N8 national road which lies parallel to the south western boundary of the site (refer to Figure 2.5). Within the site itself, access will be required to the individual facility components for construction purposes (and later limited access for maintenance). Upgrade of access roads within the site will be required and new access roads will be required (± 5000m in length and 5m wide). Access road construction would normally comprise of compacted rock-fill with a layer of higher quality surfacing stone on top. The strength and durability properties of the rock strata at the proposed site are not known at this stage, and this will need to be assessed via a geotechnical study to be conducted by the project proponent. Depending on the results of these studies, it may be possible in some areas, to strip off the existing vegetation and ground surface and level the exposed formation to form an access track surface. The final layout of the access roads will be determined following the identification of site related sensitivities.

2.6.3 Establishment of Laydown Areas on Site

Laydown and storage areas will be required for the typical construction equipment which will be required on site. The laydown area will be ± 200m x 150m in extent.

2.6.4 Erect PV Cells and Construct Substation and Invertors

The construction phase involves installation of the solar PV panels and the entire necessary structural and electrical infrastructure to make the plant operational. In addition, preparation of the soil and improvement of the access roads would continue for most of the construction phase. For array installation, typically vertical support posts are driven into the ground. Depending on the results of the geotechnical report a different foundation method, such as screw pile, helical pile, micropile or drilled post/pile could be used. The posts will hold the support structures (tables) on which PV modules would be mounted. Brackets attach the PV modules to the tables. Trenches are dug for the underground AC and DC cabling and the foundations of the inverter enclosures and transformers are prepared. While cables are being laid and combiner boxes are being installed, the PV tables are erected. Wire harnesses connect the PV modules to the electrical collection systems. Underground cables and overhead circuits connect the Power Conversion Stations (PCS) to the on-site AC electrical infrastructure and ultimately the project's substation.

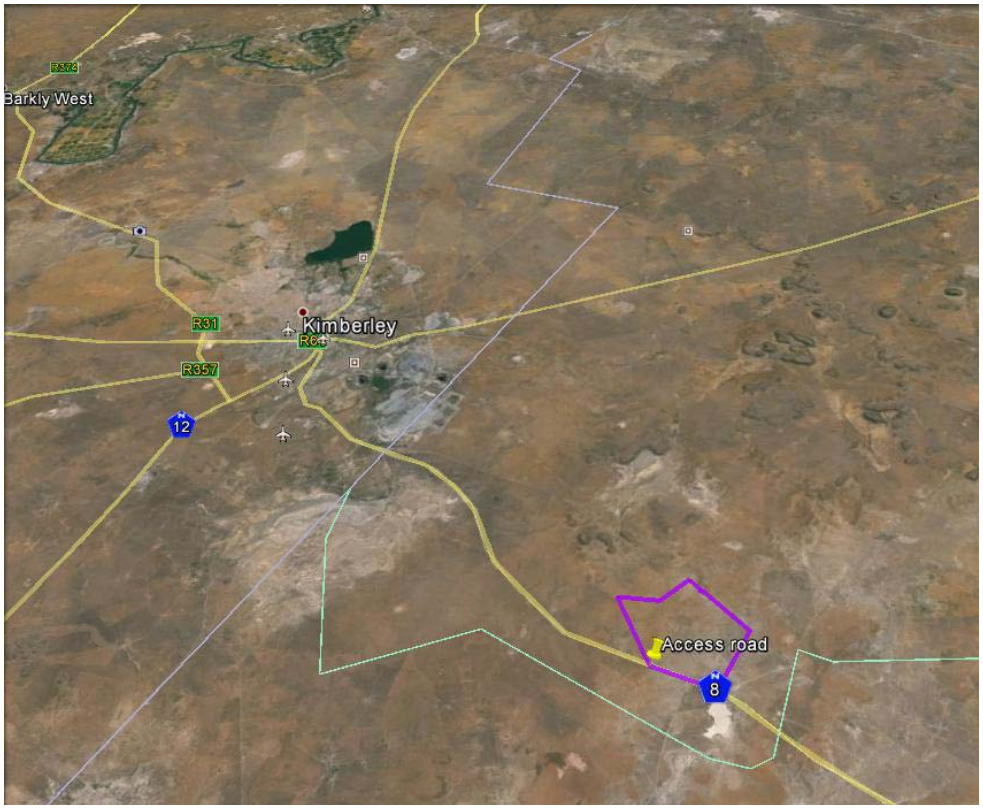

Figure 2.5: Aerial map showing all main access roads to the proposed site

Figure 2.6: Frame, structural details (Courtesy of Igeam, 2011)

Figure 2.7 Mounting of the frame for the PV panels (Courtesy of Igeam, 2011)

The construction of a substation would require a survey of the site, site clearing and levelling and construction of access road/s (where required), construction of a level terrace and foundations, assembly, erection, installation and connection of equipment, and rehabilitation of any disturbed areas and protection of erosion sensitive areas.

2.6.5 Establishment of Ancillary Infrastructure

Ancillary infrastructure will include a short loop in and loop out configuration to the existing Kimberley DS - Skietpan Switching Station 132kV power line which traverses the site or alternatively construct a 20km overhead power line to the Boundary Substation or to the Kimberley DS, workshop, storage & laydown areas, gatehouse & security complex as well as a temporary contractor's equipment camp.

The establishment of these facilities/buildings will require the clearing of vegetation and levelling of the development site and the excavation of foundations prior to construction. A laydown area for building materials and equipment associated with these buildings will also be required.

2.6.6 Construction of Power lines

Power lines are constructed in the following simplified sequence:

Step 1: Survey of the route
Step 2: Selection of best-suited conductor, towers, insulators, foundations
Step 3: Final design of line and placement of towers
Step 4: Vegetation clearance and construction of access roads (where required)
Step 5: Tower pegging
Step 6: Construction of foundations
Step 7: Assembly and erection of towers on site

Step 8: Stringing of conductors

Step 9: Rehabilitation of disturbed area and protection of erosion sensitive areas

2.6.7 Undertake Site Rehabilitation

Once construction is completed and once all construction equipment is removed, the site must be rehabilitated where practical and reasonable. On full commissioning of the facility, any access points to the site which are not required during the operational phase must be closed and rehabilitated.

2.7 Operation Phase

The electricity that is generated from the PV panels will be stepped up through the on-site inverters and transformers at the on-site substation. Thereafter a power line will distribute the electricity from the on-site substation through either a loop in/loop out configuration to the existing Kimberley DS - Skietpan Switching Station 132kV power line which traverses the site or construct a 20km overhead power line to either the Boundary Substation or Kimberley DS.

It is anticipated that a full-time security, maintenance and control room staff will be required on site. Each component within the solar energy facility will be operational except under circumstances of mechanical breakdown, unfavourable weather conditions or maintenance activities.

2.8 Decommissioning Phase

The Blackwood Solar Facility is expected to have a lifespan of more than 20 years (with maintenance) and the power plant infrastructure would only be decommissioned once it has reached the end of its economic life. If economically feasible/desirable the decommissioning activities would comprise the disassembly and replacement of the individual components with more appropriate technology/ infrastructure available at that time. However, if not deemed so, then the facility would be completely decommissioned which would include the following decommissioning activities.

2.8.1 Site Preparation

Site preparation activities will include confirming the integrity of the access to the site to accommodate the required equipment (e.g. lay down areas) and the mobilisation of decommissioning equipment.

2.8.2 Disassemble and Replace Existing Components

The components would be disassembled, and reused and recycled (where possible), or disposed of in accordance with regulatory requirements.

An Environmental Impact Assessment (EIA) process refers to that process (in line with the EIA Regulations) which involves the identification of and assessment of direct, indirect, and cumulative environmental impacts associated with a proposed project or activity. The EIA process comprises two main phases: i.e. **Scoping Phase** and **EIA Phase**. The EIA process culminates in the submission of an EIA Report (including an Environmental Management Programme (EMPr)) to the competent authority for decision-making. The EIA process is illustrated below:

Figure 3.1: The Phases of an EIA Process

The Scoping Phase for the proposed Blackwood Solar Energy Facility has been undertaken in accordance with the EIA Regulations (GNR543), in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No. 107 of 1998). This scoping process is aimed at identifying potential issues associated with the proposed project, and defining the extent of studies required within the EIA. This was achieved through an evaluation of the proposed project involving specialists with expertise relevant to the nature of the project and the study area, the project proponent, as well as a consultation process with key stakeholders, relevant government authorities, and interested and affected parties (I&APs).

This chapter outlines the process which was followed during the Scoping Phase of the EIA process.

3.1. Objectives of the Scoping Phase

This Scoping Phase aimed to:

» Identify and evaluate potential environmental (biophysical and social) impacts and benefits of the proposed development (including design, construction, operation and decommissioning) within the broader study area through a desk-top review of existing baseline data and specialist studies.

» Identify potentially sensitive environmental features and areas on the site to inform the preliminary design process of the facility.
» Define the scope of studies to be undertaken within the EIA process.
» Provide the authorities with sufficient information in order to make a decision regarding the scope of issues to be addressed in the EIA process, as well as regarding the scope and extent of specialist studies that will be required to be undertaken as part of the EIA Phase of the process.

Within this context, the objectives of this Scoping Phase are to:

» Clarify the scope and nature of the proposed activities.
» Clarify the reasonable and feasible project-specific alternatives to be considered through the EIA process, including the "do nothing" option.
» Identify and evaluate key environmental issues/impacts associated with the proposed project, and through a process of broad-based consultation with stakeholders and desk-top specialist studies, identify those issues to be addressed in more detail in the Impact Assessment Phase of the EIA process, as well as potentially sensitive environmental features and areas which should be considered in the preliminary design phase.
» Conduct an open, participatory, and transparent public involvement process and facilitate the inclusion of stakeholders concerns regarding the proposed project into the decision-making process.

3.2. Overview of the Scoping Phase

The Scoping Phase has been undertaken in accordance with the EIA Regulations (GNR543), in terms of NEMA. Key tasks undertaken within the scoping phase included:

» Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
» Submission of an application form for authorisation to the competent authority (DEA) in terms of Regulation 12 and 26 of Government Notice No R543 of 2010.
» Undertaking a public involvement process throughout the Scoping process in accordance with Chapter 6 of Government Notice No R543 of 2010 in order to identify issues and concerns associated with the proposed project.
» Undertaking of independent specialist studies in accordance with Regulation 32 of Government Notice No R543 of 2010.
» Preparation of a Draft Scoping Report and Plan of Study for EIA in accordance with the requirements of the Regulation 28 Government Notice No R543 of 2010.

» Preparation of a Comments and Response Report detailing key issues raised by I&APs as part of the EIA Process (in accordance with Regulation 57 of Government Notice No R543 of 2010).

The tasks are discussed in detail below.

3.2.1. Authority Consultation and Application for Authorisation in terms of GNR543 of 2010

As this is an energy generation project, the National Department of Environmental Affairs (DEA) is the competent authority[2] for this application. As the project falls within the Free State Province, the Free State Department of Economic Development, Tourism and Environmental Affairs (DETEA) is the commenting authority for the project. Consultation with these authorities has been undertaken throughout the Scoping Phase. This consultation has included the submission of an application for authorisation to DEA, with a copy submitted to DETEA. Authorisation to continue with the Scoping Phase of the project was granted when this application was accepted by DEA, and allocated the reference number **14/12/16/3/3/2/281**.

A record of all authority correspondence i.e. National, Provincial and Local authorities undertaken prior to and within the Scoping Phase is included within Appendix B and E.

3.2.2. I&AP Identification, Registration and the Creation of an Electronic Database

The aim of the public participation process conducted was primarily to ensure that:

» All potential stakeholders and I&APs are identified and consulted with.
» Information containing all relevant facts in respect of the application is made available to potential stakeholders and I&APs.
» Participation by potential I&APs is facilitated in such a manner that all potential stakeholders and I&APs are provided with a reasonable opportunity to comment on the application.
» Comments received from stakeholders and I&APs is recorded and considered in the EIA process, where appropriate.

The following sections detail the tasks which were undertaken as part of the public participation process.

[2] In terms of the Energy Response Plan, the DEA is the competent authority for all energy related applications.

The first step in the public involvement process was to initiate the identification of relevant stakeholders and interested and affected parties (I&APs). This process was undertaken through existing contacts and databases, recording responses to site notices and newspaper advertisements, as well as through the process of networking. Stakeholder groups identified include:

- National government departments, including:
  - South African Heritage Resources Agency (SAHRA)
  - Department of Water Affairs (DWA)
  - Department of Agriculture, Forestry and Fisheries (DAFF)
  - National Department of Energy (DoE)
  - Department of Mineral Resources (DMR)
  - The South African Civil Aviation Authority (CAA)

- Provincial government departments including:
  - Free State Department of Economic Development, Tourism and Environmental Affairs (DETEA)
  - Department of Police, Transport and Public Works
  - Provincial Department of Water Affairs
  - Free State Department of Agriculture

- Parastatals including:
  - South African National Roads Agency Limited (SANRAL)
  - Eskom

- Local and District Municipalities having jurisdiction over the study area being the:
  - Tokologo Local Municipality
  - Lejweleputswa District Municipality

- Neighbouring landowners
- Other potentially affected parties and landowners
- Industry and business
- Community Based Organisations, and
- Non-Governmental Organisations.

It must be noted that the process of identification of stakeholders and I&APs will be on-going throughout the EIA process.

All relevant stakeholder and I&AP information has been recorded within a database of affected parties (refer to Appendix C for a listing of recorded parties). While I&APs have been encouraged to register their interest in the project from the start of the process, the identification and registration of I&APs will be on-

going for the duration of the EIA process. The I&AP database will be updated throughout the EIA process, and will act as a record of the parties involved in the public involvement process

3.2.3. Notification of the EIA Process

In order to notify and inform the public of the proposed project and invite members of the public to register as interested and affected parties (I&APs), the project, and EIA process was advertised in the following newspapers:

» The Volksblad (22 July 2013)
» Snuffelblad (19 July 2013)

A second advert was placed announcing the date and venue of the public meeting. This advert appeared in the following newspapers:

» Volksblad – (06 September 2013)
» Snuffelblad – (06 September 2013)

A third advert was placed announcing the availability of the Draft Scoping report for public review. This advert appeared in the following newspapers:

» Volksblad – (27 September 2013)
» Diamond Fields Advertiser – (26 September 2013)

Site notices (in English and Afrikaans) were placed at visible points on the perimeter fence of the site on 26 July 2013. Further notices were placed at the Boshof Library; outside the Tokologo Local Municipality (and its satellite office in the township) and at the Kimberley Public Library, in accordance with the requirements of the EIA Regulations. In addition to the advertisements and site notices, key stakeholders and registered I&APs were notified in writing of the commencement of the EIA process. Copies of all the advertisements, site notices and written notifications are included within Appendix D.

In addition to the above advertisements and notices, key stakeholders and registered I&APs were notified in writing of the commencement of the EIA process. These parties included, inter alia-:

» Tokologo Local Municipalities and Lejweleputswa District Municipality
» Neighbouring and affected landowners
» Organs of State having jurisdiction in respect of any aspect of the activity, including:
    * Free State Department of Economic Development, Tourism and Environmental Affairs (DETEA)
    * Free State - Department of Police, Transport and Public Works

- Free State - Provincial Department of Water Affairs
- Free State - Department of Agriculture
- South African and Provincial Heritage Resources Agency
- SANRAL
- Eskom
- Department of Energy(DoE
- Department of Mineral Resources (DMR)
- The South African Civil Aviation Authority (CAA)
- National Department of Agriculture, Forestry and Fisheries (DAFF)

Copies of all the advertisements placed and notices distributed are contained in Appendix D of this report.

3.2.4. Public Involvement and Consultation

The aim of the public participation process was primarily to ensure that:

» All potential stakeholders and I&APs are identified and consulted with;
» Information containing all relevant facts in respect of the application is made available to potential stakeholders and I&APs;
» Participation by potential I&APs is facilitated in such a manner that all potential stakeholders and I&APs are provided with a reasonable opportunity to comment on the application; and
» Comment received from stakeholders and I&APs is recorded.

In order to provide information regarding the proposed project and the EIA process, a background information document (BID) for the project was compiled at the outset of the process (refer to Appendix E). The BID was distributed to identified stakeholders and I&APs, additional copies were made available at public venues within the broader study area, and it was posted electronically on the Savannah Environmental website.

Through consultation with key stakeholders and I&APs, issues for inclusion within the issues-based scoping study were identified and confirmed. In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their views, issues and concerns regarding the project, various opportunities have been provided, and will continue to be provided in order for I&APs to have their issues noted as follows:

» **Public meeting** in the study area (open meeting advertised in the local press)
» **Focus group meetings** (pre-arranged and stakeholders invited to attend)
» One-on-one **consultation meetings** (for example with directly affected or surrounding landowners)

» **Telephonic** consultation sessions
» Written, faxed or e-mail **correspondence**

Networking with I&APs will continue throughout the duration of the EIA process.

3.2.5. Identification and Recording of Issues and Concerns

All comments received from stakeholders and I&APs on the proposed project will be included in the Final Scoping Report. A Comments and Response Report will be compiled to include all comments received during the scoping phase of the process, including those received in the public review period of the Draft Scoping Report.

3.2.6. Evaluation of Issues Identified through the Scoping Process

Issues (both direct and indirect environmental impacts) associated with the proposed project identified within the scoping process have been evaluated through desk-top studies. In evaluating potential impacts, Savannah Environmental has been assisted by the following specialist consultants:

Specialist	Area of Expertise	Refer Appendix
Marianne Strohbach (Savannah Environmental)	Ecology	Appendix F
David Morris (McGregor Museum)	Heritage	Appendix G
Lloyd Rossouw (Palaeo Field Services)	Palaeontology	Appendix H
Tony Barbour (Environmental Consulting and Research)	Social	Appendix I
Johann Lanz (Johan Lanz Consulting)	Soils and Agricultural Potential	Appendix J
Karen Hansen (Karen Hansen Landscape Architect)	Visual	Appendix K

In order to evaluate issues and assign an order of priority, it was necessary to identify the characteristics of each potential issue/impact:

» *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) or regional

The evaluation of the issues resulted in a statement regarding the potential significance of the identified issues, as well as recommendations regarding further studies required within an EIA.

Specialist Scoping Reports are contained within Appendices F – K.

3.2.7. Public Review of Draft Scoping Report and Public Meeting

All registered I&APs were notified of the availability of the draft Scoping Report and public meeting by letter prior to the release of the draft Scoping Report (refer to Appendix E). The draft Scoping Report was made available for public review from 25 September 2013 at the following locations:

» Boshof Library
» Kimberley Public Library
» www.savannahsa.com

In order to facilitate comments on the draft Scoping Report, a public feedback meeting was held at the Kimberley Public Library Hall on the 18 September 2013 from 17:30 and 18:30. The public meeting was advertised in the print media and the notice of the meeting distributed to all I&APs (refer to Appendix D and E).

Two separate meetings were held one with the general public and the second with the affected surrounding landowners (refer to attendance register and minutes of the meeting in Appendix E).

3.2.8. Authority comments on the draft Scoping Report

Government Departments who have jurisdiction over matters relating to the environment identified in Section 3.2.2 of this report were invited to comment on the draft Scoping Report. The following government departments submitted comments on the draft Scoping Report (refer to correspondence with organs of state in Appendix E):

» Department of Police, Transport and Public Works
» Eskom
» Department of Water Affairs (DWA)

The responses to the comments have been tabled in the comments and responses report in Appendix E.

3.2.9. Final Scoping Report

This Final Scoping Report has been updated to capture the comments received from stakeholders and I&APs during the comment period of the draft Scoping

Report. It is this final report upon which the decision-making environmental Authorities provide comment, recommendations, and acceptance to undertake the EIA Phase of the process.

Please note that a draft Scoping Report was released for public review in September 2013 for a 30-day public review period (40 days for Organs of State). Following the review of the draft scoping report, a final scoping report was submitted to DEA in October 2013. The DEA has however requested additional information prior to providing acceptance for the process to proceed. This revised final scoping report has been compiled to include requested information, and has been available (at Boshof Library, Kimberley Public Library and www.savannahsa.com)for review by all stakeholders for a 40-day period prior to the re-submission to the National Department of Environmental Affairs.

3.3 Regulatory and Legal Context

The South African energy industry is evolving rapidly, with regular changes to legislation and industry role-players. The regulatory hierarchy for an energy generation project of this nature consists of three tiers of authority who exercise control through both statutory and non-statutory instruments – that is National, Provincial and Local levels. As solar energy development is a multi-sectoral issue (encompassing economic, spatial, biophysical, and cultural dimensions) various statutory bodies are likely to be involved in the approval process for solar energy facility projects and the related statutory environmental assessment process.

3.3.1. Regulatory Hierarchy

At **National Level**, the main regulatory agencies are:

» *Department of Energy (DoE):* This Department is responsible for policy relating to all energy forms, including renewable energy, and is responsible for developing and approving the IRP (Integrated Resource Plan for Electricity).
» *National Energy Regulator of South Africa (NERSA):* This body is responsible for regulating all aspects of the electricity sector, and will ultimately issue licenses for solar energy developments to generate electricity.
» *Department of Environmental Affairs (DEA):* This Department is responsible for environmental policy and is the controlling authority in terms of NEMA and the EIA Regulations. The DEA is the competent authority for this project, and charged with granting the relevant environmental authorisation.
» *The South African Heritage Resources Agency (SAHRA):* SAHRA is a statutory organisation established under the National Heritage Resources Act, No 25 of 1999, as the national administrative body responsible for the protection of South Africa's cultural heritage.

» *National Department of Agriculture, Forestry, and Fisheries (DAFF):* This Department is responsible for activities pertaining to subdivision and rezoning of agricultural land. The forestry section is responsible for the protection of tree species under the National Forests Act (Act No 84 of 1998).
» *South African National Roads Agency (SANRAL):* This Agency is responsible for the regulation and maintenance of all national routes.
» *National Department of Water Affairs (DWA):* This Department is responsible for water resource protection, water use licensing and permits.
» *Eskom:* Commenting authority regarding Eskom infrastructure and grid connection.
» *South African Civil Aviation Authority (CAA):* This department is responsible for aircraft movements and radar, which are aspects that may have bearing on location and planning for renewable energy facilities.

At **Provincial Level**, the main regulatory agency is:

» *Free State Department of Economic Development, Tourism and Environmental Affairs (DETEA):* This Department is the commenting authority for the project.
» *Department of Police, Transport and Public Works:* This Department is responsible for roads and the granting of exemption permits for the conveyance of abnormal loads on public roads.
» *Provincial Department of Water Affairs:* This Department is responsible for water resource protection, water use licensing and permits.
» *Free State Heritage Authority:* This body is responsible for commenting on heritage related issues in the Free State Province.
» *Free State Department of Agriculture:* This Department is responsible for all matters which affect agricultural land.
» *Free State Department of Mineral Resources (DMR):* Approval from this department may be required to use land surface contrary to the objects of the Act in terms of section 53 of the Mineral and Petroleum Resources Development Act, (Act No 28 of 2002): In terms of the Act, approval from the Minister of Mineral Resources is required to ensure that proposed activities do not sterilise a mineral resource that might occur on site.

At **Local Level**, the local and municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. In the Free State Province, both the local and district municipalities play a role. The local municipality is the Tokologo Local Municipality that forms part of the Lejweleputswa District Municipality. There are also numerous non-statutory bodies such as environmental non-governmental organisations (NGOs) and community based organisations (CBO) working groups that play a role in various aspects of planning and environmental monitoring that will have some influence on proposed solar energy development in the area.

3.3.2 Legislation and Guidelines that have informed the preparation of this Scoping Report

The following legislation and guidelines have informed the scope and content of this Final Scoping Report:

» National Environmental Management Act (Act No. 107 of 1998)
» EIA Regulations, published under Chapter 5 of the NEMA (GNR R543 in Government Gazette 33306 of 18 June 2010)
» Guidelines published in terms of the NEMA EIA Regulations, in particular:
  * Companion to the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations of 2010 (Draft Guideline; DEA, 2010)
  * Public Participation in the EIA Process (DEA, 2010)
  * Integrated Environmental Management Information Series (published by DEA)
» Tokologo Municipality Integrated Development Plan (2011-2013)
» International guidelines – the Equator Principles and the International Finance Corporation and World Bank Guidelines.

Several other Acts, standards or guidelines have also informed the project process and the scope of issues evaluated in the scoping report, and to be addressed in the EIA. A listing of relevant legislation is provided in Table 3.1. A more detailed review of legislative requirements applicable to the proposed project will be included in the EIA phase.

Table 3.1: Initial review of relevant policies, legislation, guidelines, and standards applicable to the proposed Blackwood Solar Energy project EIA

Legislation	Applicable Sections
National Legislation	
Constitution of the Republic of South Africa (Act No 108 of 1996)	» Bill of Rights (S2) » Environmental Rights (S24) – i.e. the right to an environment which is not harmful to health and well-being » Rights to freedom of movement and residence (S22) » Property rights (S25) » Access to information (S32) » Right to just administrative action (S33)
National Environmental Management Act (Act No 107 of 1998)	» National environmental principles (S2), providing strategic environmental management goals and objectives of the government applicable throughout the Republic to the actions of all organs of state that may significantly affect the environment

Legislation	Applicable Sections
	» NEMA EIA Regulations (GN R543 of 18 June 2010) published in terms of Chapter 5 of the NEMA » Public Participation (S2) » The requirement for potential impact on the environment of listed activities must be considered, investigated, assessed and reported on to the competent authority (S24 – Environmental Authorisations) » Duty of Care (S28) requiring that reasonable measures are taken to prevent pollution or degradation from occurring, continuing or recurring, or, where this is not possible, to minimise & rectify pollution or degradation of the environment » Procedures to be followed in the event of an emergency incident which may impact on the environment (S30) » Appeals against decisions made by authorities (S43)
Environment Conservation Act (Act No 73 of 1989)	» National Noise Control Regulations (GN R154 dated 10 January 1992) » Noise impacts are expected to be associated with the construction phase of the project and are not likely to present a significant intrusion to the local community. Therefore is no requirement for a noise permit in terms of the legislation.
National Heritage Resources Act (Act No 25 of 1999)	» Stipulates assessment criteria and categories of heritage resources according to their significance (S7) » Provides for the protection of all archaeological and palaeontological sites, and meteorites (S35) » Provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority (S36) » Lists activities which require developers any person who intends to undertake to notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development (S38) » Requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction (S44)
National Environmental Management: Biodiversity Act (Act No 10 of 2004)	» Provides for the MEC/Minister to list ecosystems which are threatened and in need of protection (S52) » Provides for the MEC/Minister to identify any

Legislation	Applicable Sections
	process or activity in such a listed ecosystem as a threatening process (S53) » A list of threatened & protected species has been published in terms of S 56(1) - Government Gazette 29657. » Three government notices have been published, i.e. GN R 150 (Commencement of Threatened and Protected Species Regulations, 2007), GN R 151 (Lists of critically endangered, vulnerable and protected species) and GN R 152 (Threatened or Protected Species Regulations). » This act also regulates alien and invader species. » Under this Act, a permit would be required for any activity which is of a nature that may negatively impact on the survival of a listed protected species.
National Environmental Management: Air Quality Act (Act No 39 of 2004)	» National, provincial and local ambient air quality standards (S9 - 10 & S11) » Listed Activities (S21) » Atmospheric Emissions Licenses (S22) » Measures in respect of dust control (S32) » Measures to control noise (S34)
Conservation of Agricultural Resources Act (Act No 43 of 1983)	» Prohibition of the spreading of weeds (S5) » Classification of categories of weeds & invader plants (Regulation 15 of GN R1048) and restrictions in terms of where these species may occur » Requirement & methods to implement control measures for alien and invasive plant species (Regulation 15E of GN R1048) » Soil protection/conservation, and erosion control
National Water Act (Act No 36 of 1998)	» National Government is the public trustee of the Nation's water resources (S3) » Entitlement to use water (S4) – entitles a person to use water in or from a water resource for purposes such as reasonable domestic use, domestic gardening, animal watering, fire fighting and recreational use, as set out in Schedule 1. General Authorisation Government Gazette No. 20526 8 October 1999 is of relevance. » Duty of Care to prevent and remedy the effects of pollution to water resources (S19) » Procedures to be followed in the event of an emergency incident which may impact on a water resource (S20) » Definition of water use and requirement for water use licenses for certain activities (S21) » Requirements for registration of water use (S26

Legislation	Applicable Sections
	and S34) » Definition of offences in terms of the Act (S151)
National Environmental Management: Waste Act (Act No 59 of 2008)	» The purpose of this Act is to reform the law regulating waste management in order to protect health and the environment by providing for the licensing and control of waste management activities. » The Act provides listed activities requiring a waste license
National Forests Act (Act No 84 of 1998)	» Protected trees: According to this act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that 'no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister'. » Forests: The Act prohibits the destruction of indigenous trees in any natural forest without a licence.
Aviation Act (Act No 74 of 1962)	» Obstacle limitations and marking outside aerodrome or heliport
National Roads Act (Act No 7 of 1998)	» Policy concerning use and management of national roads.
Guideline Documents, Policies and White Papers	
South African National Standard (SANS) 10328, Methods for environmental noise impact assessments in terms of NEMA No. 107 of 1998	» Prediction of impact that noise emanating from a proposed development would have on occupants of surrounding land by determining the rating level. » Noise limits are based on the acceptable rating levels of ambient noise contained in SANS 10103
Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads	» Outlines the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits
Tokologo Local Municipality, Integrated Development Plan (2010/2011) and Lejweleputswa District Municipality, Integrated Development Plan (2011/2012)	» According to the Municipal Systems Act of 2000, all Municipalities have to undertake an Integrated Development Planning (IDP) process to produce Integrated Development Plans (IDPs). As the IDP is a legislative requirement it has a legal status and it supersedes all other plans that guide development at local government level.
Free State Provincial Spatial Development Framework (2013)	» According to the FS (PSDF – 2013), the Free State renewable energy is a key focus area of the Free State Development Corporation, especially the

Legislation	Applicable Sections
	solar energy sector
The Department of Agriculture, Forestry and Fisheries (DAFF) (2010)	» This report states that 'it is important to conduct land use in a way that it optimally adheres to the potential of the land. Consequently, it is imperative that all available land with the potential for producing sustained high crop yields, thus land with a high agricultural production potential, as well as land with a potential carrying capacity for livestock, be effectively utilized and protected for agricultural use. » Agricultural production or the use of land for any other purpose should nevertheless not be conducted in a way that it could result in the degradation or loss of the available natural resources. This especially has reference in ensuring that high potential and unique agricultural land is preserved for current and future production thereby ensuring sustainable utilization of the country's natural resource base and adhering to food security.''
The White Paper on the Energy Policy of the Republic of South Africa (December 1998)	Investment in renewable energy initiatives, such as the proposed solar energy facility, is supported by this white Paper.
The White Paper on Renewable Energy (November 2003)	This Paper sets out Government's vision, policy principles, strategic goals and objectives for promoting and implementing renewable energy in South Africa.
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) – National norms and standard for the storage of waste.	» Provides uniform national approach relating the management of waste facilities » Ensure best practice in management of waste storage » Provides minimum standards for the design and operation of new and existing waste storage

DESCRIPTION OF THE RECEIVING ENVIRONMENT CHAPTER 4

This section of the Final Scoping Report provides a description of the environment that may be affected by **Blackwood Solar Energy Facility**. This information is provided in order to assist the reader in understanding the receiving environment within which the proposed facility is situated. Features of the biophysical, social and economic environment that could directly or indirectly be affected by, or could affect, the proposed development have been described. This information has been sourced from existing information available for the area, and aims to provide the context within which this EIA is being conducted.

The entire proposed project development area on the Remainder of Portion 1 of the farm Pandamsfontein 1593 is described below. A summary of the environment of the project is provided at the end of this Chapter. A more detailed description of each aspect of the affected environment is included within the specialist scoping reports contained within Appendices F - K.

4.1 Regional Setting: Location of the Study Area

The site is located in the Tokologo Local Municipality, which is one of five local municipalities that fall within the Lejweleputswa District Municipality (DC18). The identified site is situated in the Free State approximately 25km south-east of Kimberley and 45km south-west of Boshof, located on the Remainder of Portion 1 of the farm Pandamsfontein 1593 (refer to Figure 4.1.). The centre of the site is 2 km east of the N8 and the site can be accessed directly from the N8. An Eskom power line (Kimberley DS - Skietpan Switching Station 132kV) traverses the site in a south-west to north-east direction.

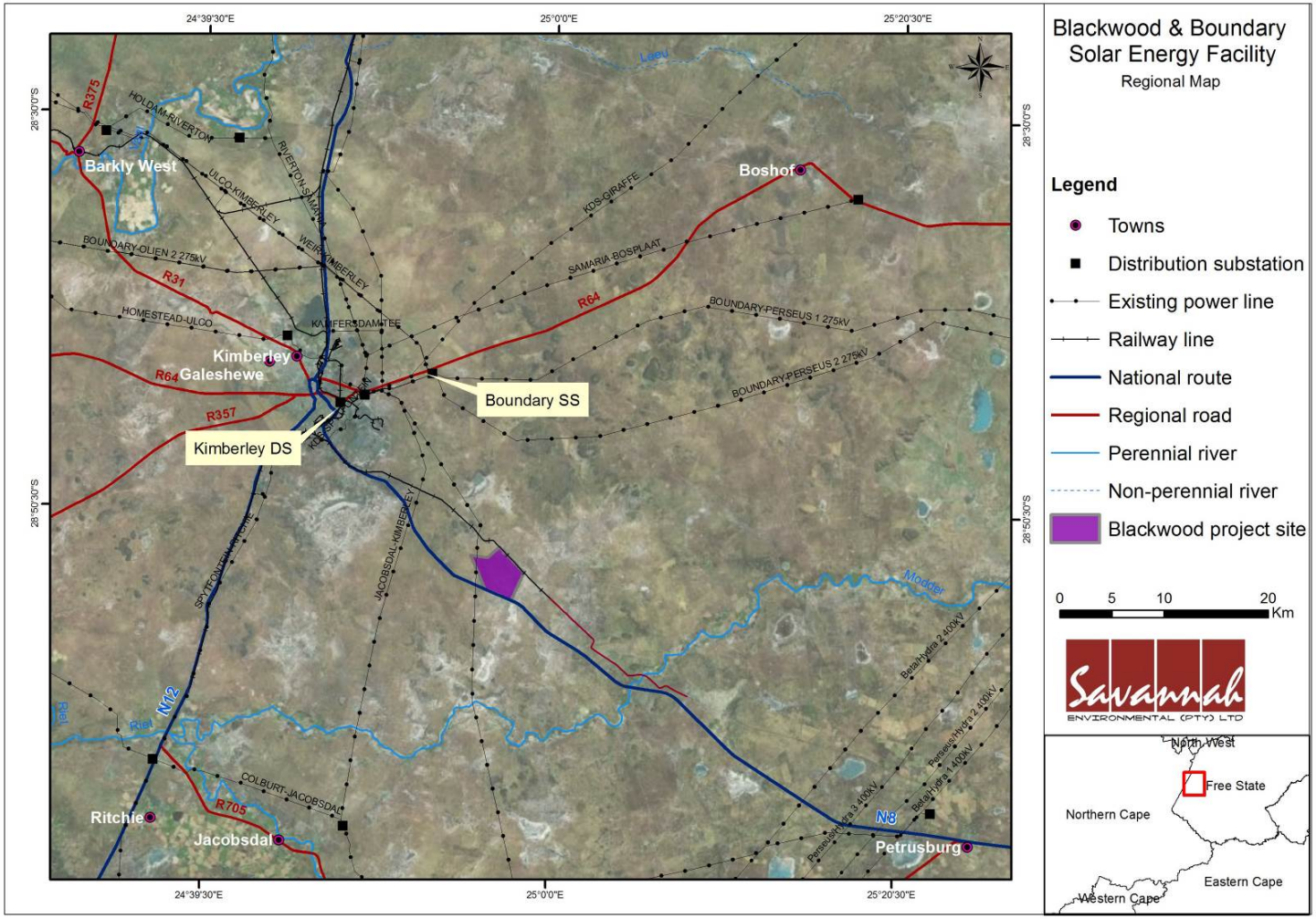

Figure 4.1: Regional context of the Blackwood Solar Energy Facility project site

4.2 Climatic Conditions

The climate for the Blackwood Solar Energy Facility project site has been derived from climatic data summarised for Kimberley (worldweatheronline, meteoblue), located about 25 km north-west of the Project site. The area receives approximately 400 - 450 mm of rain on average per year. From May to September, rainfall is minimal (Figure 4.2), with most rainfall occurring from November to April, peaking between January and March. Temperatures in summer peak during December and January at a daily average of 33˚C to 37˚C, with an average of 17C˚to 20˚C for June. During July, night temperatures are on average -4˚C to 2˚C, with frosts during winter common.

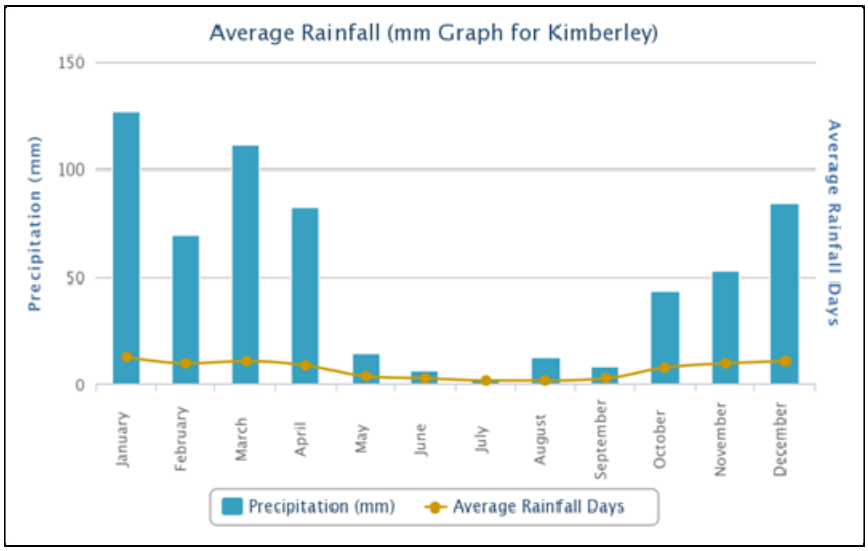

Figure 4.3: Average monthly precipitation and temperatures for the study area.

4.3 Biophysical Characteristics of the Study Area

4.3.1. Topography and Geology

The proposed site is on a level plain with a gentle slope of approximately 1% at a south-easterly aspect across the site. The site slopes from northwest, at about 1190m, down to south-east at about 1160m above sea level (asl). The highest point locally is about 3.5km away to the north, at 1230m, 'Olifantskop'.

The geology of the region has been described by Bosch (1993). The area in question is underlain by sediments of widely different geological ages (Figure 4.3, portion of 1: 250 000 scale geological map 2824 Kimberley, Council for Geoscience, Pretoria, 1991) (Cole 2005; Johnson *et al.* 2006; Partridge *et al*. 2006). From oldest to youngest, the geology in and around the affected area is made up of early Permian Ecca shales (Prince Albert Formation, *Ppr*), Jurassic

dolerite intrusions (*Jd,* Karoo Dolerite Suite), Quaternary calcretes, surface limestones, calcified pan dunes (lunettes) (*Qc*) and aeolian sands (*Qs*). The wind-blown sands represent the latest geological phase and are made up of the characteristically red-brown Kalahari sands (Hutton sands). The geological map indicates that, except for dolerite intrusions, the affected area lies within an outcrop area of the Prince Albert Formation (Ecca Group) that is mainly covered by Quaternary-age surface deposits made up of surface calcretes and a thick mantle of aeolian sand.

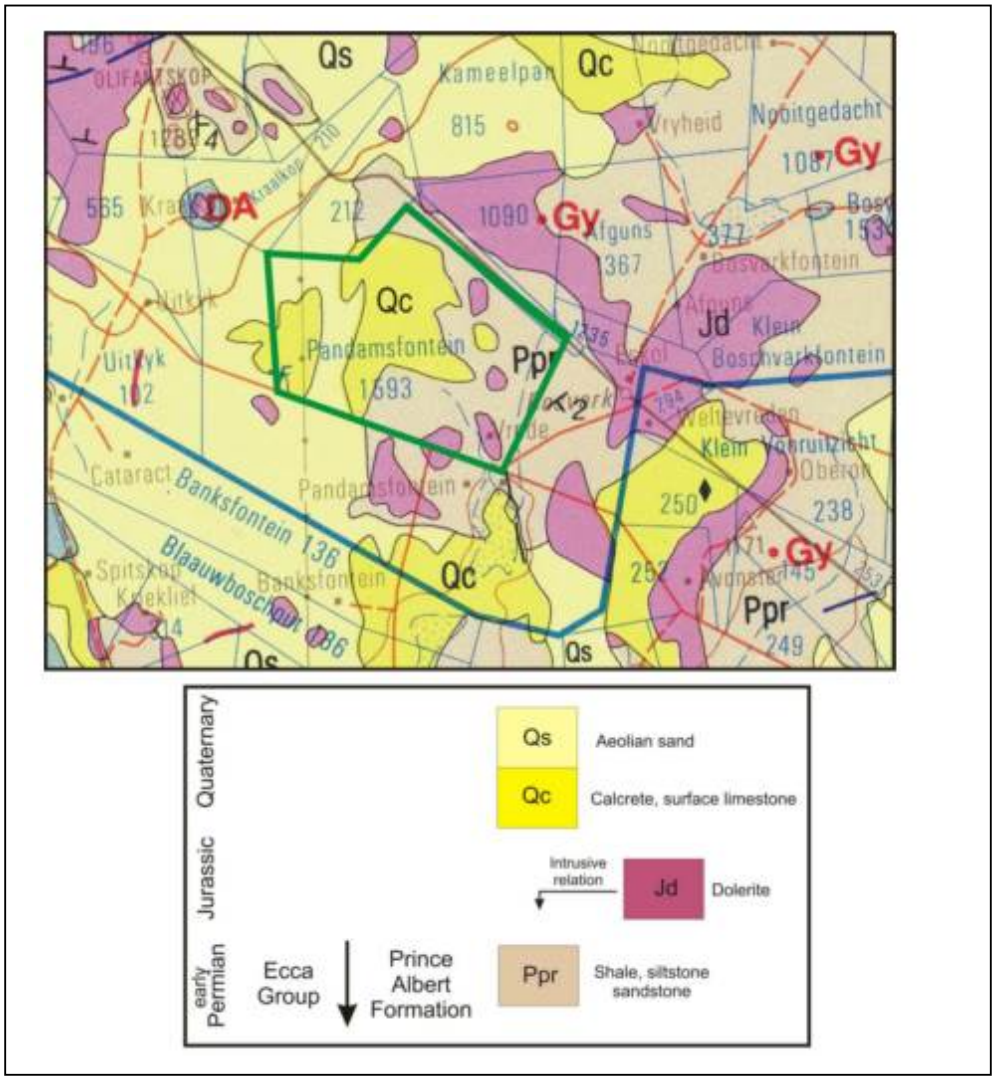

Figure 4.3: Map of the geology underlying the project area and its surroundings

4.3.2 Soil, Agricultural Potential and Land Capability

There are two land types across the site, namely Fb1 and Ae45 (refer to Figure 4.4). Fb1 occupies the majority of the site, with Ae45 occurring only on a smaller portion of the site of the north-west margin of the site. Land capability is the combination of soil suitability and climate factors. The entire site has a land capability classification, on the 8 category scale, of Class 5 – non-arable, moderate potential grazing land. The most important limitations are shallow soils and aridity. The land on the site has a low to moderate susceptibility to water erosion, and is classified as class 5 water erosion hazard (on 8 class scale). It is classified as susceptible to wind erosion, with sands sub-dominant or present.

The site is located within a cattle farming agricultural region, although the landowner is not commercially farming the site itself. Agricultural potential is fairly uniform across the site. There is no cultivation or irrigation except for a very small patch of about 2 hectares adjacent to the farm yard. The grazing capacity is classified as between 14 and 21 hectares per large stock unit.

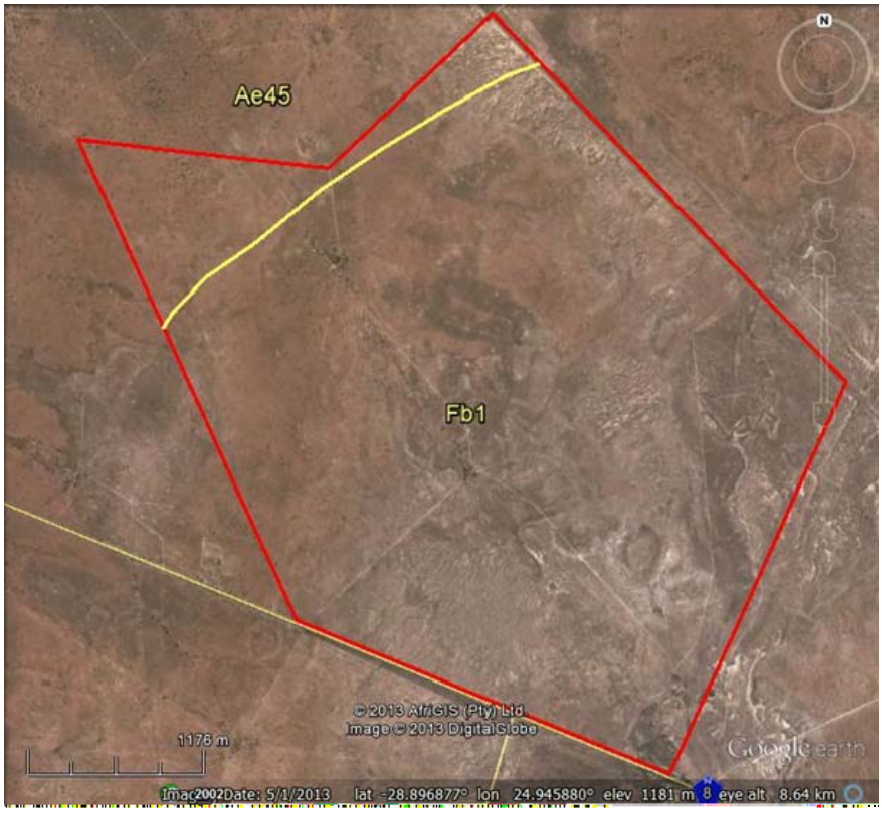

Figure 4.4: Map showing the distribution of the two land types across the proposed site

4.3.3. Drainage and Wetlands

The perennial Modder River lies more than 11km to the south of the site. Pans do occur locally, although none occur on the site. Seasonal watercourses occur locally. Smaller ephemeral[3] drainage lines are visible from available Google-earth imagery within the farm portion. Most of these drain into larger salt pans just south of the farm, indicating that the drainage lines carry only small amounts of very localised, short-lived surface floods during the rainfall season. Higher volumes of water may move into the pans from below-ground seepage off surrounding plains, especially where soils may be shallow. Along the approximate shortest distance between the farm portion and the Boundary substation that may be affected for the alternative grid connection, several salt pans, drainage lines and smaller seepage pans occur. The largest salt pans are formed by localised drainage between smaller rocky ridges and outcrops, which can also be expected to have higher species diversity.

4.4. Land uses

Land use activities within the broader region and on the surrounding areas of the proposed site are predominantly agricultural (livestock and sheep farming). This site is not commercially farmed by the current owner. A percentage of the farm space is used to house a Cheetah and Lion breeding facility. This Cheetah and Lion breeding facility attracts tourism to the area. There is evidence of surface mining locally as well as some cultivation activities in the larger project area (Figure 4.5). A 132kV power line traverses the north-western corner of the proposed site and a railway line to Modderrivier and Petrusburg lies adjacent to the eastern boundary of the project site. The site is adjacent to the N8 which according to the FS PSDF (2013) is referred to as an 'active tourist route'; this tourism corridor links Bloemfontein and Lesotho, passing Ladybrand, Thaba Nchu, and Botshabelo. From Bloemfontein westwards the N8 leads via Petrusburg to Kimberley. This route is also an alternative route for travellers from KwaZulu-Natal to the Eastern Cape and Cape Town via Bloemfontein.

4.5. Access and Transport Routes in the Region

A major national road found in the broader study area, the N8 links Kimberley and Bloemfontein via Petrusburg in a SE direction. Access to the proposed development area is directly off the N8 national road

[3]Defined as a drainage line or even larger river that will carry water only for very brief periods of time – as short as one hour to one or two days, and only after a larger rainfall event. It may typically have more below-ground water reserves supporting higher/denser vegetation, but soil does not remain saturated for long enough to support specially adapted flora.

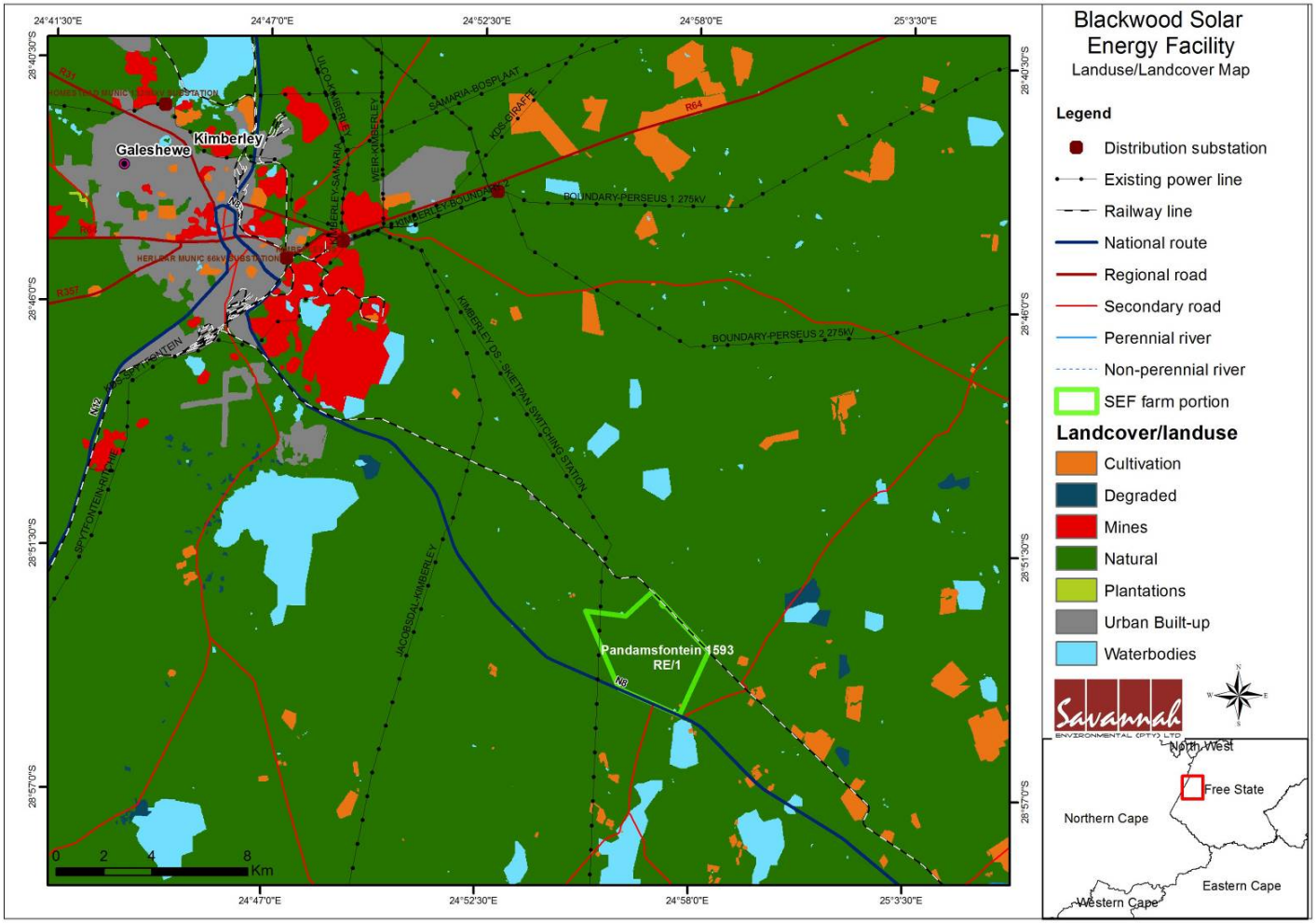

Figure 4.5: Land use and land cover of the project site

4.6. Ecological Profile

4.6.1. Vegetation

The study area is situated in the Savanna biome, Eastern Kalahari Bushveld. The vegetation unit covering the study area is Kimberley Thornveld. Other vegetation units that may be affected if the alternative option for the grid connection must be followed include Vaalbos Rocky shrubland and Highveld Salt Pans (refer to Figure 4.6, Mucina & Rutherford 2006).

The Kimberly Thornveld vegetation is considered least threatened. A target of 16% has been earmarked for conservation, of which 2% are already protected in the Vaalbos National Park, Sandveld, Bloemhof Dam, and S.A. Lombard Nature Reserves. Eighteen percent of the vegetation unit is already transformed, mostly to cultivated lands and urban areas (Mucina & Rutherford 2006).

Vaalbos Rocky Shrubland occurs in highly fragmented elevated areas such as slopes, hills, and ridges within plains of the Kimberley Thornveld. Many sections of this vegetation type may be too small to be mapped at the scale used by Mucina and Rutherford (2006), so its presence can be expected on the farm portion as well.

Highveld Salt Pans (considered least threatened) are scattered throughout South Africa where rainfall ranges between 300 and 400 mm per annum. They occur in depressions of various sizes in plateau landscapes, forming temporary water bodies. Drainage from the pans is limited to absent, and therefore salinity rises as water evaporates during the season. Vegetation that can persist in these more saline and seasonally inundated conditions on the pan edges consists of a sparse grassy dwarf shrubland (Mucina and Rutherford 2006).

The tree and shrub layer is well developed, albeit occurring in a very patchy mosaic. Tree species dominating within this vegetation unit are *Boscia albitrunca, Acacia erioloba,* (both species protected by the NFA), *A. tortilis*, and *A. karroo*. Dominant shrubs include *Tarchonanthus camphoratus* and *A. mellifera* subsp. *detinens*. Both these shrub species may increase significantly once the herbaceous layer is weakened, with the possibility of forming impenetrable thickets. The grass layer can be patchy and open with large areas of uncovered soil during the dry season. *Eragrostis lehmanniana* is considered the most dominant grass species of this vegetation type, with *Digitaria eriantha* and *Themeda triandra* the most valuable grasses for grazing (Mucina & Rutherford 2006).

4.6.2 Species of conservation concern

Flora community

There are approximately 970 plant species that have been recorded in the broader study area according to the SANBI database. It can be expected that collection intensity in the area has been high due to the activities of the McGregor Museum Herbarium in Kimberley, even though the study area itself may not have been sampled in the past. It is unlikely that all of the recorded species will occur within the study area. Of the previously recorded species, several are endemic to South Africa, have red-data status or are nationally and/or provincially protected. The presence of these species on site will have to be verified during a detailed field study, but it can be assumed that protected species, including trees, will be part of the study area's vegetation due to availability of suitable habitat for these species.

They are seven plants species recorded that are of conservation concern and that may occur within the development area, these include:

» *Aloinopsis rubrolineata* (Rare)
» *Crinum bulbispermum*(Declining)
» *Drimia sanguinea* (Near Threatened)
» *Lithops lesliei subsp. Lesliei* (Near Threatened)
» *Nananthus vittatus* (Data Deficient - Taxonomically)
» *Rennera stellate* (Vulnerable)
» *Oxalis setosa* (Data Deficient - Taxonomically)

Acacia erioloba-Camel Thorn (Declining) is a protected trees specie that can be found in the area. Their occurrence on the site will be identified during a field survey.

Alien invasive species that could possibly occur on the study site or that would pose the biggest threat of invasion include *Opuntia* and *Prosopis* species. Seeds of both species are readily distributed by sheet erosion, mammals, and birds. Additional alien invasive species do occur in the surrounding area along major transport routes, which could be accidentally introduced to the project site during construction.

Fauna Community

They are a number of amphibians, reptiles, birds and mammal species of conservation concern that could occur in the study area according to various existing databases (SANBI, ADU) and Apps (2000), and these are discussed below:

» **Amphibians**: The ADU lists 14 amphibian species for the greater project area, of these, one is a red data species, listed as *Near Threatened*, the Giant

Bull Frog (*Pyxicephalus adspersus*) (Minter *et al.,* 2004). The remaining species are considered as *Least Concern.*

» **Reptiles**: The ADU lists 50 reptile species for the greater project area, of these, 4 are endemic, Distant's Ground Agama (*Agama aculeata distanti*), Aurora House Snake (*Lamprophis aurora*), Marico Gecko (*Pachydactylus mariquensis*) and Greater Padloper (*Homopus femoralis*). Although none of the 50 reptile species are of particular conservation concern, all are protected provincially under Schedule 1 of the Nature Conservation Ordinance 8 of 1969.

» **Birds**: The SABAP 2 database lists 174 bird species for the pentad (2840_2445) incorporating the greater project area. Of these, 11 are red data species, 7 of which are listed as *Vulnerable,* Cape Vulture (*Gyps coprotheres*)*,* White-backed Vulture (*Gyps africanus*), Kori Bustard (*Ardeotis kori*), Ludwig's Bustard (*Neotis ludwigii*), Martial Eagle (*Polemaetus bellicosus*), Tawny Eagle *(Aquila rapax)* and Lesser Kestrel (*Falco naumanni*) and 4 listed as *Near Threatened,* Greater Flamingo (*Phoenicopterus ruber*), Lesser Flamingo (*Phoenicopterus minor*), Chestnut-banded Plover (*Charadrius pallidus*) and Secretarybird (*Sagittarius serpentarius*). These will be identified during the field survey in the EIA.

» **Mammals**: The ADU lists 13 mammal species for the greater project area, of these, 3 are red data species, listed as *Near Threatened,* Brown Hyena (*Hyaena brunnea*), Honey Badger (*Mellivora capensis*) and South African Hedgehog (*Atelerix frontalis*) and 15 are protected provincially under Schedule 1 of the Nature Conservation Ordinance 8 of 1969, Cape Fox (*Vulpes chama*), Bat-eared Fox (*Otocyon megalotis*), Striped Polecat (*Ictonyx striatus*), Slender Mongoose (*Galerella sanguinea*), Yellow Mongoose (*Cynictis penicillata*), Suricate (*Suricata suricatta*), Small-spotted Genet (*Genetta genetta*), Aardwolf (*Proteles cristatus*), African Wild Cat (*Felis silvestris lybica*), Black-footed Cat (*Felis nigripes*), Aardvark (*Orycterus afer*)

4.7 Social Characteristics of the Study Area and Surrounds

Socio economic and demographic profiles in the study area are based on the information provided in the Tokologo Integrated Development Plan (2010/2011) as well as Lejweleputswa District Municipality Integrated Development Plan (2010/2011).

4.7.1 Administrative and Social profile

Lejweleputswa District Municipality

The Lejweleputswa District Municipality (LDM) is located in the north western part of the Free State and is one of five district municipalities in the Free State. The district covers an area of 31686 km^2 and is made up of 5 local municipalities, namely:

» Masilonyana Local Municipality (Theunissen, Brandfort, Winburg, Soutpan and Verkeedevlei);
» Matjhabeng Local Municipality (Welkom, Virginia, Odendaalsrus, Hennenman, Ventersburg and Allanridge);
» Nala Local Municipality (Bothaville and Wesselsbron);
» Tokologo Local Municipality (Boshof, Dealesville and Hertzogville); and,
» Tswelopele Local Municipality(Bultfontein and Hoopstad)

According to the FSPGDS (2006-14), Lejweleputswa is the major contributor in the Free State Gross Geographic Product (GGP) and is also an important agricultural area. The district is predominantly known as the Free State Goldfields which forms a part of the larger Witwatersrand basin. The economy of the region is dominated by the gold mining industry and agriculture sectors in particular maize production. Bothaville is considered one of the most important maize centres in South Africa

Tokologo Local Municipality (TLM)

The TLM covers an area of 9 326 km^2 and is located in the Western part of the Free State Province within Lejweleputswa District Municipality (LDM). The TLM consists of three former Transitional Local Councils, namely Boshof, Dealesville and Hertzogville, as well as a portion of a former Transitional Rural Council (Moddervaal) which contained approximately 1480 farms.

Boshof is the administrative seat of the TLM and is located approximately 124km west of Bloemfontein and 53km east of Kimberley, along the R64 (old Bloemfontein/Kimberley Road). The majority of the commercial and industrial activities in the TLM are based in Boshof. The associated townships of Kareehof and Seretse are predominantly dormitory towns dominated by low income households with limited economic activities, save for corner shops and informal traders.

Population: Socio-economic data from Census 2011 indicates that the population in the TLM decreased marginally from 32 455 in 2001 to 28 986 in 2011. The dependency ratio improved from 62.4% to 58.9%.

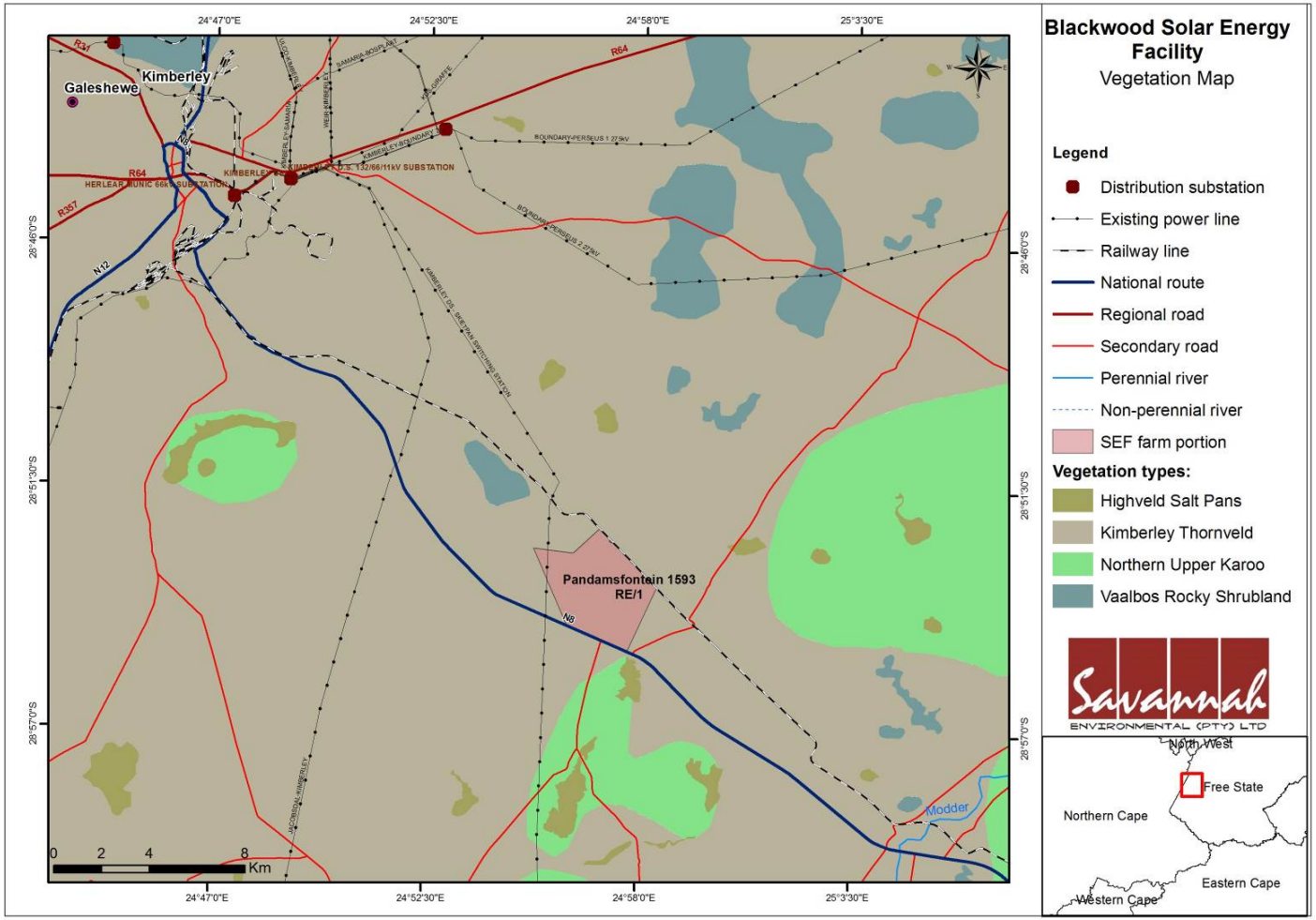

Figure 4.6: Map of the vegetation types as defined by Mucina and Rutherford (2006) on and around the proposed project area.

Unemployment and Level of education: Unemployment increased from 26.8% in 2001 to 27.5% in 2011. The main contributor was the increase in youth unemployment from 33.1% to 35.8%. In terms of employment, there was improvement in the education levels, with the number of people with no schooling decreasing from 31.5% to 20.8%. This does, however, still represent a high level of people over the age of 20 with no schooling. For example the figure for the Free State Province as a whole was 7.1% in 2011. While the percentage of the population over the age of 20 with matric also increased from 12% in 2001 to 17.8% in 2011, this is still well below the provincial average of 26.7%. The levels education in the TLM is therefore low. This can be attributed to the rural nature of the area.

Municipal basic service: The level of services provided by government also improved, with households supplied with flush toilets linked to sewage increasing from 13.9% to 18.5%, households with piped water within the house increasing from 19% to 22.7% and households provided with electricity growing from 73.1% to 84.2%. It is therefore reasonable to say that the quality of life of the residents of the TLM has improved since 2001. However, having said this, the services levels in the TLM are substantially lower than those for the Free State Province as a whole. The percentages for flush toilets, piped water and household with electricity for the Free State Province as a whole in 2011 were 64.9%, 44.8% and 89.9% respectively. The level of household services in the TLM is therefore low.

4.8 Heritage features of the region

4.8.1. Heritage and archaeology

Previous archaeological surveys carried out in the region include impact assessments east of the project site in the vicinity of Bosvark (proposed gypsum mining) and, particularly, at Alexandersfontein/Benfontein, a large Pleistocene lake on the margins of which numerous Stone Age occurrences have been recorded in lake-shore and spring eye settings. The heritage baseline information for the broader region includes the following.

Colonial frontier: Nineteenth century farming infrastructure representing the influx of frontier (Trekboer, in some cases Griqua) settlers occurs in the area in the form of stone kraals and dwellings (or ruins thereof), as well as graves (e.g. Morris 2011). Some such features may be found on the site, together with more recent features (built environment older than 60 years being subject to provisions of the National Heritage Resources Act). The property is also close to the Diamond Fields (Kimberley) and hence may include material traces pertaining to the diamond rush, as also to the period of the Anglo-Boer War (although no action was fought at this particular spot).

Later Stone Age: Later Stone Age sites have been noted in the region, particularly on the farm Benfontein (Alexandersfontein). A notable feature, apart from surface scatters

of stone tools, are rock engraving sites on dolerite hills (Morris 1988) such as at Tafelkop and near Bosvark (Morris 2011), as well as on a series of hills on the farms Olifantsfontein and Suzanna just west of the property (Fock & Fock 1989).

The terrain on which the proposed Blackwood Solar Energy Facility would be located is likely to include traces of Stone Age utilisation of the landscape with palimpsests of material spanning Pleistocene and Holocene times. Some occurrences may turn out to be significant, depending on a site specific survey. Where there are dolerite outcrops or hills, rock engravings may occur. Nineteenth- and twentieth-century cultural history may occur in the form of stone kraals, ruins of dwellings, extant dwellings and infrastructure (those over 60 years old are explicitly protected by the Act), and graves. Intangible heritage values attached to places may be recoverable from current or former inhabitants (farmers, farm-workers).

Pleistocene: Middle and Earlier Stone Age: Assemblages ascribed to the Pleistocene age Earlier and Middle Stone Age and 'Fauresmith' industry (Beaumont & Morris 1990; Underhill 2011) are known to occur in the area, typically within and at the base of the red Hutton Sands overlying calcrete or dolerite. Mostly very low density occurrences have been noted in surveys nearby, while in certain localities sites of higher density and significance have been documented, notably on the fringes of the Alexandersfontein Pan (e.g. Butzer *et al*. 1973; Butzer 1976; Morris 2002).

Observations derived from previous experience of the area indicate that:

» The terrain on which the proposed Blackwood Solar Energy Facility would be located is likely to include traces of Stone Age utilisation of the landscape with palimpsests of material spanning Pleistocene and Holocene times.
» Where there are dolerite outcrops or hills, rock engravings may occur.
» Nineteenth- and twentieth-century cultural history may occur in the form of stone kraals, ruins of dwellings, extant dwellings and infrastructure (those over 60 years old are explicitly protected by the Act), and graves. Intangible heritage values attached to places may be recoverable from current or former inhabitants (farmers, farm-workers).

4.8.2. Palaeontology (Fossils)

'Paleontological' means any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

The project area is completely underlain by the Quaternary-age aeolian deposits, surface calcretes, dolerite outcrop, as well as older Ecca sediments of the Prince Albert Formation. The south-eastern part of the affected area lies within an outcrop area of Ecca Group sediments, which are considered being of low to moderate palaeontological significance. The rest of the site's surface area is covered by superficial deposits made

up of Quaternary-aged calcretes and aeolian sands. The older surface calcretes (Qc) developed as valley sediments on pediments and flat surfaces during arid periods is generally favourable for the preservation of fossil remains.

Dolerite, in the form of dykes and sills, is common throughout the region and intruded into Karoo Supergroup rocks as large volumes of Drakensberg lavas during the Jurasic Period. Dolerites are not palaeontologically significant. Quaternary-age surface deposits in the region can be highly fossiliferous in places, especially those that are directly related to fluvial environments along major river courses, spring areas or pans.

SCOPING OF ISSUES ASSOCIATED WITH THE PROPOSED BLACKWOOD SOLAR ENERGY FACILITY CHAPTER 5

Chapters 5 presents the potential issues identified for the proposed Blackwood Solar Energy Facility. This chapter serves to describe the identified potential environmental impacts associated with the proposed project and to make recommendations for further studies required to be undertaken in the EIA phase, and/or recommendations for the management of these impacts for inclusion in the Environmental Management Programme (EMPr) to be prepared as part of the EIA Phase.

Specialist scoping reports are included within **Appendix F to K** wherein the potential issues relating to the project are identified. Some environmental impacts are expected to be of greater significance than others and require a greater level of investigation, and therefore specialist scoping studies for the following anticipated impacts have been undertaken:

» Soil and agricultural potential impacts
» Ecological (flora and faunal) impacts
» Visual impacts
» Heritage and palaeontology impacts

A discussion of the potential cumulative impacts associated with the proposed project at this stage of the process is presented in Section 5.5.

5.1 Construction phase

An understanding of the activities to be undertaken during the construction process is necessary to predict the potential impacts of the facility on the environment. These have been explained in detail in Chapter 2 of this report and include:

» land clearing for site preparation and access routes
» transportation of supply materials and fuels
» construction of foundations involving excavations and placement of concrete
» construction of on-site substation, overhead and underground power lines
» operating cranes for unloading and installation of PV panels (where required)
» commissioning of new installations
» waste removal and rehabilitation of disturbed sites.

Environmental issues: associated with construction activities may include, amongst others, alteration of land use, soil erosion, visual impacts, threats to biodiversity and ecological processes, including habitat alteration and impacts to fauna and social impacts (as indicated in Section 5.3).

5.2 Operational phase

Operational activities will include regular maintenance of the PV installation and all associated site infrastructure.

Environmental issues: specific to the operation of the Solar Energy Facility could include visual impacts, impacts on biodiversity and impacts on agriculture due to the changes in land use.

5.3 Scoping of Issues associated with the solar facility

The text and tables below provide an indication of the potential direct and indirect environmental issues and impacts which have been identified during the Scoping phase of the EIA and which may be relevant during the construction and operational phases of the Solar Energy Facility. Impacts associated with decommissioning of the project(s) are expected to be similar to those associated with the construction phase.

5.3.1 Potential Impacts on Soil and Agricultural Potential

There are two land types across the site, namely Fb1 and Ae45. Fb1 occupies the majority of the site, with Ae45 occurring only on a smaller portion to the north of the site. The land on site has a low to moderate susceptibility to water erosion, and is classified as class 5 water erosion hazard (on 8 class scale). It is classified as susceptible to wind erosion, with sands sub-dominant or present. There is no cultivation or irrigation except for a very small patch of about 2 hectares adjacent to the farm yard. The grazing capacity is classified as between 14 and 21 hectares per large stock unit. From an agricultural impact point of view, no sensitive areas (other than the 2 hectare cultivated area) were identified during scoping that should be avoided for inclusion in the development. Agricultural potential is fairly uniform across the site and there are therefore no preferred locations for the development within the site.

Table 5.1: Potential Impacts on Soil, Land Use and Agriculture

Issue	Nature of Impact and applicable listed activity	Extent of Impact	'No go' areas
Construction Phase			
Physical soil disturbance due to construction activities	» Soil erosion due to alteration of the land surface run-off characteristics. Alteration of run-off characteristics may be caused by construction-related land surface disturbance, vegetation removal, the establishment of hard standing areas and roads, and the presence of panel surfaces. Erosion will cause loss and deterioration of soil resources and may occur during all phases of the project. » Loss of topsoil due to poor topsoil management (burial, erosion, etc) during construction related soil profile disturbance (levelling, excavations, road surfacing etc.) and resultant decrease in that soil's agricultural suitability. » Degradation of vegetation due to vehicle trampling, during construction phase. *Listed activity: GN 545 1 & 15, GN 546 14(a)(i)*	Local	None
Impacts on current land use and agricultural potential due to construction activities	» Loss of agricultural land use due to direct occupation by PV panels and associated infrastructure, including roads, for the duration of the project. » *Listed activity: GN 545 1 & 15, GN 546 14(a)(i)*	Local	Small 2ha area under cultivation
Operation Phase			
Potential social impacts	» Loss of agricultural land use due to direct occupation by PV installation and other infrastructure, including roads, for the duration of the project. » Generation of additional land use income.	Local	None
Cumulative impacts	» Cumulative impacts due to the regional loss of agricultural resources and production as a result of other developments on agricultural land in the region.	Regional	None

Gaps in knowledge and recommendations for further study:

The significance of agricultural impacts is influenced by the limited agricultural potential of the land that is suitable only for grazing. As a result, agricultural impacts are not likely to be of high significance. Mitigation measures can also be put in place to reduce the significance of certain of these impacts, such as erosion.

The following assessments will be undertaken in the EIA phase:

» More detailed assessment of soil conditions;
» Assessment of erosion and erosion potential on site;
» Assessment of the impacts of specific construction activities and layout on soil conditions;
» Assessment of specific on-site agricultural activities.

Detail regarding the above is provided in further detail in Chapter 9.

5.3.2 Potential impacts on ecology (flora and fauna)

Impacts of the proposed development will be mostly on the vegetation and supporting substrate. Potential expected impacts are listed below in Table 5.2. Impacts on animals are regarded as low to minimal unless it affects their specific (limited) habitat or migration routes.

The initial mapping as depicted on Figure 5.1 was done conservatively and has been significantly revised after a detailed field investigation, that has determined that the proposed development needs to be moved to a much lesser sensitive ecological area as shown in Figure 5.2. Those habitats that are considered to be the most sensitive are considered as such primarily because of their ecosystem function and associated vegetation. Fauna and flora depend on this ecosystem functionality, which provides specialised niches for fauna and flora, creates corridors in the landscape, filters water, traps sediments and slows water runoff from catchments to retain water, seed and nutrient resources within the ecosystem (Tongway and Hindley 2004).

The sensitivity analysis has been updated after a detailed field investigation. Overall findings can be summarized as follows (Figure 5.2):

» *High Sensitivity Areas*: This area contains depressions and edges with unique vegetation, higher productivity and red data species that are restricted to their specific habitats. Smaller pans detected within these areas and should be treated as Treat as No-Go Area

» *Medium-high Sensitivity*: This area has the most productive agricultural land, many large old Acacia tortilis, which are essential for the functionality of this

very dry ecosystem and may not be removed. Also essential to maintain future agricultural and game farming potential. Smaller pans detected within these areas and should be treated as Treat as No-Go Area

» *Low Sensitivity*: The area is relatively dry karroid dwarf shrubveld with shallow soils over calcrete with low production potential. Protected plants and burrowing animals do occur, but these are relatively common and not threatened. Area is suitable for development - erosion control will be necessary, it will be desirable to re-establish a low grass/shrub layer in as many areas as possible after construction to prevent erosion and dust (fine loamy soil).

PV arrays have been positioned in such a way around lesser sensitive areas to prevent any unjustified negative impact.

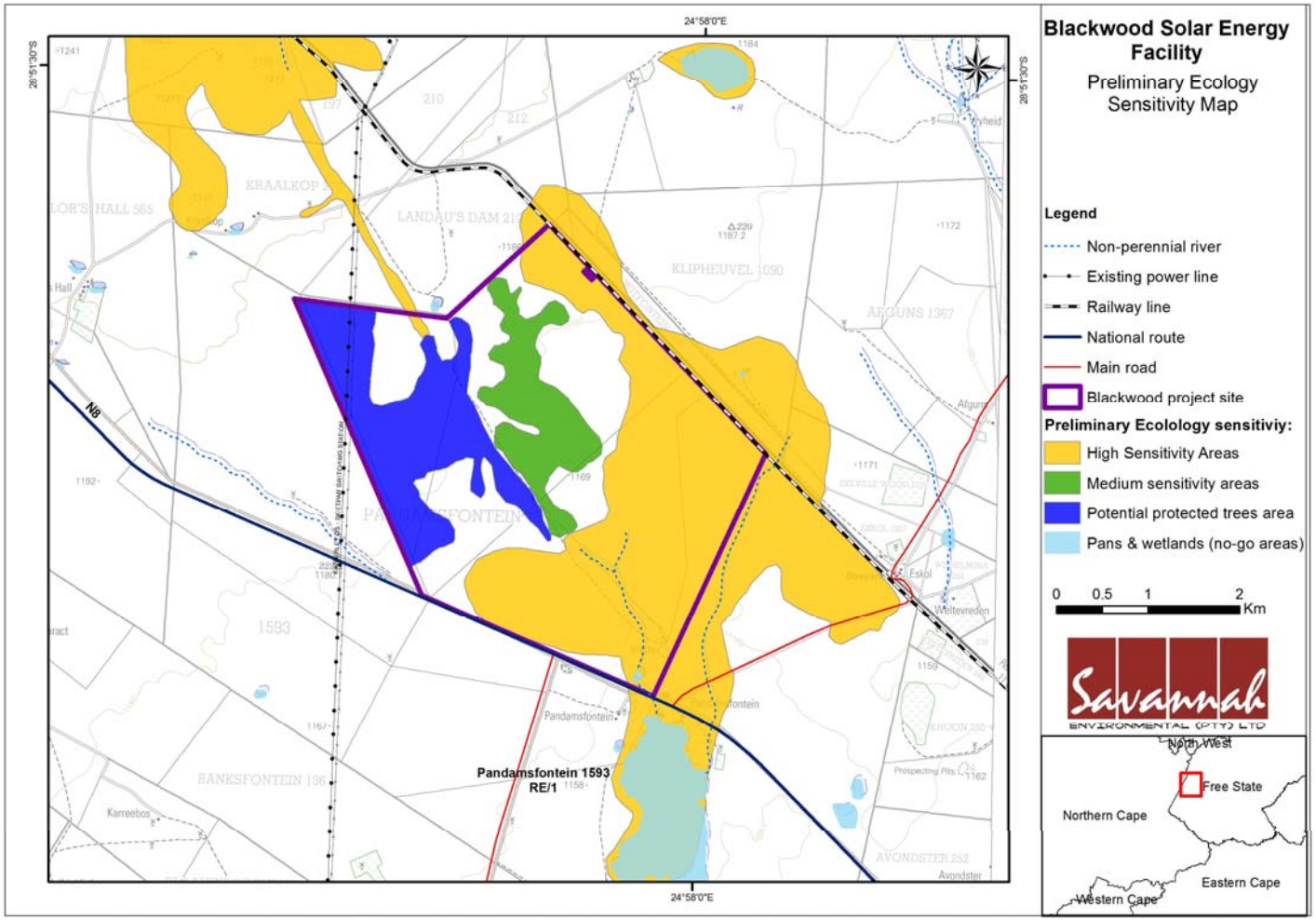

Figure 5.1: Preliminary ecological sensitivity map of the study site and surrounding area at desktop scoping level

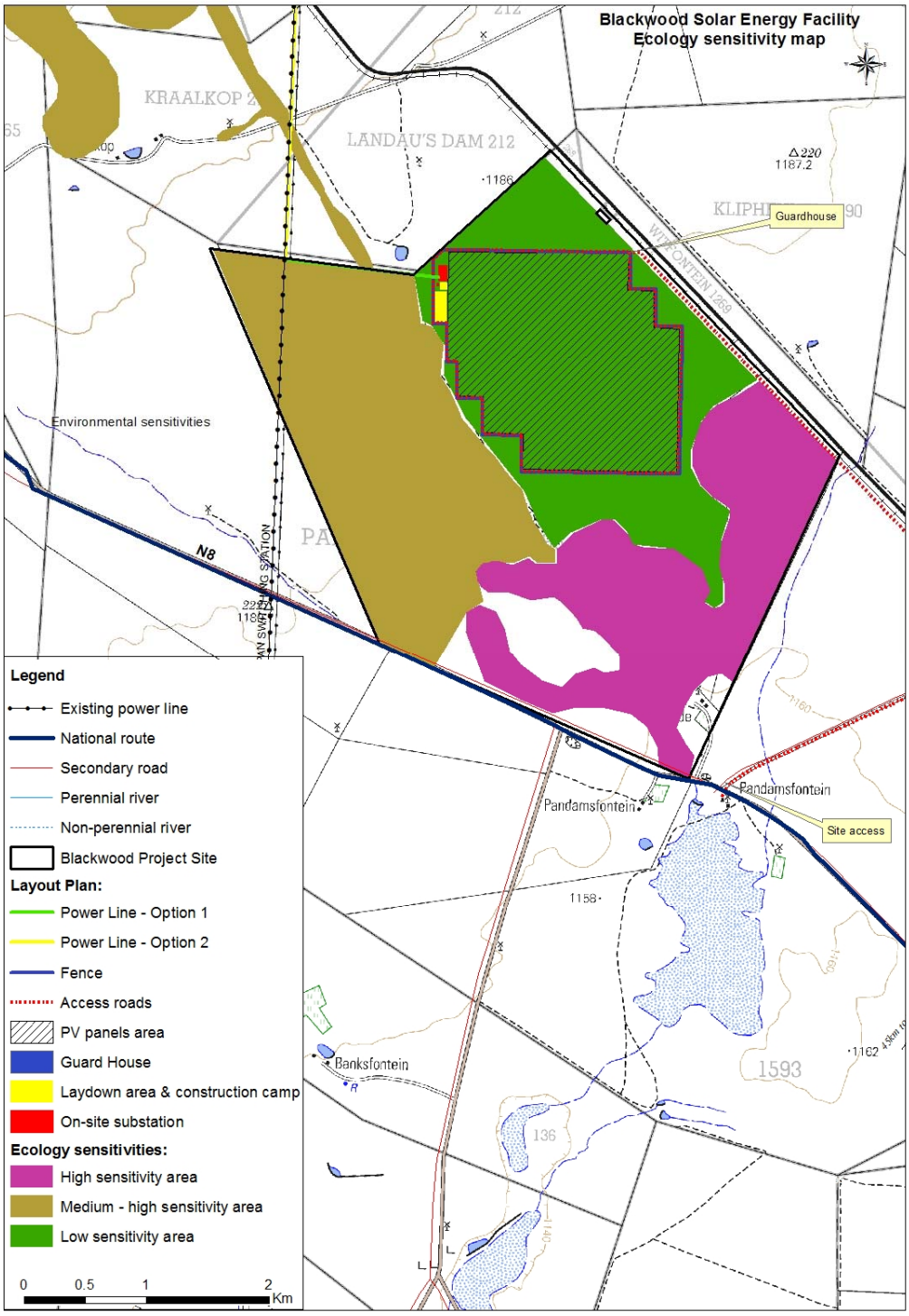

Figure 5.2: Ecological sensitivity map of the study site and surrounding area (as confirmed through field investigations)

Table 5.2: Potential impacts on ecology

Issue	Nature of Impact and applicable listed activity	Extent of Impact Facility	'No go' areas
Construction phase			
Disturbance to and loss of indigenous natural vegetation	Construction of infrastructure will lead to direct loss of vegetation, causing a localised or more extensive reduction in the overall extent of vegetation. Consequences of the clearing and loss of indigenous natural vegetation occurring may include: » Increased vulnerability of remaining vegetation portions to future disturbance, including erosion; » General loss of habitat for sensitive species; » General reduction in biodiversity; » Disturbance to processes maintaining biodiversity and ecosystem goods and services; or » Direct loss of ecosystem goods and services. *Listed activity: GN 545 1 & 15, GN 546 14(a)(i)*	Local	The only No-Go areas are smaller pan areas within site.
Loss of protected trees	According to the National Forests Act, no person may cut, disturb, damage or destroy any listed protected tree species. Protected tree species are expected to occur in parts of the study area, depending on local conditions. A permit is required from the Department of Agriculture, Forestry and Fisheries (DAFF) before any protected trees may be impacted. The loss of protected trees may have wider consequences than losing individuals of species of conservation concern: » In the prevailing environment of the study area, large trees are usually keystone species. This implies that with the removal of such trees, a host of other fauna and flora species will be affected due to the drastic change or complete obliteration of microhabitats associated with these trees.	Local and surroundings	

Issue	Nature of Impact and applicable listed activity	Extent of Impact Facility	'No go' areas
	» The loss of mature, large trees can lead to a permanent loss of these trees and their ecosystem function from the environment, as trees grow very slowly and recruitment events in the study area are limited, all due to the highly variable and generally low rainfall. This effect may become worse with prevailing changes in rainfall patterns due to climate change. *Listed activity: GN 545 1 & 15, GN 546 14(a)(i)*		
Loss of habitat for threatened and /or protected vertebrates	Threatened fauna species are affected due to loss or alteration of habitat. Animals are generally mobile and, in most cases, can move away from a potential threat, but may suffer from the loss or fragmentation of habitat and associated resources. Threatened species include those classified as critically endangered, endangered, or vulnerable. For any other species, a loss of individuals or localised populations is unlikely to lead to a change in the conservation status of the species. However, in the case of threatened animal species, loss of a population or individuals could lead to a direct change in the conservation status of the species. This may arise if the proposed infrastructure is located where it will impact on such individuals or populations or the habitat that they depend on. Consequences may include: » Reduction in area of occupancy of affected species; » Reduction of reproductive potential and success of species, and » Loss of genetic variation within affected species. These may all lead to a negative change in conservation status of the affected species, which implies a reduction in the chances of the species overall survival chances.	Local	The only No-Go areas are smaller pan areas within site.

Issue	Nature of Impact and applicable listed activity	Extent of Impact Facility	'No go' areas
	Listed activity: GN 545 1 & 15, GN 546 14(a)(i)		
Impacts on water resources and wetland features	Available Google Earth imagery shows that small seasonal drainage lines, pans, and dams may be present within the greater study area, but are limited on the site. Just beyond the study site, and potentially along the grid connection alternative, larger salt pans occur. The closest large perennial river is the Modder River, flowing approximately 11 km south of the farm portion, and not likely to be impacted by the proposed development. » Construction, if it occurred within any significant drainage lines, wetlands or immediately surrounding areas, would lead to direct or indirect loss of or damage to some of these areas or changes to the catchment of these areas; » The nature of the site preparation and construction activities for the proposed development will change surface characteristics, rainfall interception patterns and hence runoff characteristics of the area; » This may affect the geohydrology, susceptibility to erosion and potential erosion rates of the landscape, which may lead to an alteration to or loss of habitat for fauna and flora species, especially those that depend on drainage lines or wetland habitats; A decline in ecosystem functionality of smaller wetlands and drainage lines will impact lower-lying larger wetlands, such as the salt pans, whilst also reducing the ability of the environment to buffer effects of extreme climatic events. *Listed activity: GN 544 11 & 18, GN 545 1, 546 14(a)(i)*	Local and regional	The only No-Go areas are smaller pan areas within site.
Establishment and spread of weeds and alien	Major factors contributing to the invasion by alien invader plants and weeds includes high disturbance (such as clearing for construction activities or fires) and unsustainable grazing practices. Exotic species are often more prominent near	Local	Several alien species are expected to grow along major transport lines in

Issue	Nature of Impact and applicable listed activity	Extent of Impact Facility	'No go' areas
invader plants.	infrastructural disturbances than within less disturbed natural vegetation. Consequences of the presence of invasive plants, especially if in high density, may include: » Loss of indigenous vegetation; » Change in vegetation structure leading to a change in various habitat characteristics and associated ecosystem function; » Change in plant species composition; » Change in soil chemical properties; » Loss of sensitive habitats; » Loss or disturbance to individuals of rare, endangered, endemic and/or protected species; » Fragmentation of sensitive habitats; » Change in flammability of vegetation, depending on alien species; » Hydrological impacts due to increased transpiration and runoff; and » Impairment of wetland function. *Listed activity: GN 545 15, 546 14(a)(i)*		the area, and could be present within the study area already. A full list of species present and with a potential of establishing on site will be provided in the EIA phase.
Operation Phase			
Disturbance or loss of natural vegetation	PV panels create large areas of altered surface characteristics, rainfall interception patterns, and intensive shade that will not be tolerated by most of the species present on site, as these have evolved with a high daily irradiance. Consequently, it can be expected that within the solar energy facility footprint, species composition and topsoil characteristics will change.	Local	The only No-Go areas are smaller pan areas within site.

Issue	Nature of Impact and applicable listed activity	Extent of Impact Facility	'No go' areas
	No equivalent facilities have been constructed in an adjacent or similar environment to date, therefore the nature and density of vegetation which may persist cannot be predicted at this stage. A sparser or less stable vegetation beneath the PV panels, together with the altered surface and runoff characteristics may lead to: » Increased vulnerability of remaining vegetation to future disturbance, including erosion; » Accelerated erosion may negatively affect the functionality of nearby salt pans; » General loss or significant alteration of habitats for sensitive species; » Loss in variation within sensitive habitats due to loss of portions of it; » General reduction in biodiversity; » Increased fragmentation (depending on location of impact); » Future extinction debt of a particular species; » Disturbance to processes maintaining biodiversity and ecosystem goods and services; and » Loss of ecosystem goods and services. *Listed activity: GN 545 1 & 15, GN 546 14(a)(i)*		
Altered runoff patterns due to rainfall interception by PV panels and compacted areas	The PV panels create large surfaces of rainfall interception, where rainfall is collected and concentrated at the edges from where it then moves onto the ground in larger, concentrated quantities opposed to small drops being directly intercepted and raindrop impact dispersed by vegetation, then absorbed by the ground. This may lead to a localised increase in runoff during rainfall events, which could result in localised accelerated erosion. Likewise, access roads and areas where soils have been compacted during construction will have a low rainfall infiltration rate, hence creating more localised	Local and surroundings	The only No-Go areas are smaller pan areas within site.

Issue	Nature of Impact and applicable listed activity	Extent of Impact Facility	'No go' areas
	runoff from those surfaces. This runoff will therefore need to be monitored and channelled where necessary to prevent erosion over larger areas.		
Disturbance to migration routes and associated impacts to species populations	Components of the proposed development may interfere with current migration routes of fauna species. This may lead to: » Reduced ability of species to move between breeding an foraging grounds, reducing breeding success rates; » Increased mortality rates due to fatal collisions with infrastructure; » Reduced genetic variation due to reduced ability of especially smaller organisms' to have individual interaction *Listed activity: GN 545 1 & 15, GN 546 14(a)(i)*	Local and surroundings	The only No-Go areas are smaller pan areas within site.
Impacts on wetland features, ephemeral drainage lines, seepage areas, seasonal pans, salt pans	Available Google Earth imagery shows that small seasonal drainage lines, pans, and dams may be present within the study area. Just beyond the study area, and potentially along the grid connection alternative, are larger salt pans. In accordance with the National Water Act, impact on wetland features should be avoided. Disturbance on adjacent areas may also influence drainage lines and wetlands: » Accidental spills, if not contained and mitigated immediately, may results in pollution of water resource systems; » The nature of the proposed development, especially the PV arrays and new hard surfaces, will change surface characteristics, rainfall interception patterns and hence runoff characteristics of the project area; » This may affect the geohydrology, susceptibility to erosion and potential erosion rates of the landscape, which may lead to a significant alteration to or loss of habitat for fauna and flora species that depend on riparian and wetland habitats; » Altered runoff patterns may influence infrequent filling of possible small pans on site, which may eliminate localised populations of water-dwelling organisms such	Local to regional	The only No-Go areas are smaller pan areas within site.

Issue	Nature of Impact and applicable listed activity	Extent of Impact Facility	'No go' areas
	as the tadpole shrimp (*Triops* sp) that depend on occasional small areas of standing water to breed out and regenerate; » A decline in ecosystem functionality of smaller wetlands and riparian areas of smaller drainage lines will impact lower-lying larger wetlands *Listed activity: GN 544 11 & 18, 546 14(a)(i)*		
Establishment and spread of declared weeds and alien invader plants.	The envisaged altered vegetation cover after construction and during the operation phase of the proposed development will create a window of opportunity for the establishment of alien invasive species. In addition, regenerative material of alien invasive species may be introduced to the site by birds, or machinery and persons traversing through areas with such plants or materials that may contain regenerative materials of such species. Consequences of the establishment and spread of invasive plants include: » Loss of indigenous vegetation or change in vegetation structure leading to an even more significant change in or loss of various habitat characteristics; » Loss of plant resources available to fauna; » Change in soil chemical properties; » Loss or fragmentation of sensitive or restricted habitats; » Loss or disturbance to individuals of rare, endangered, endemic and/or protected species; » Change in flammability of vegetation, depending on alien species; » Hydrological impacts due to increased transpiration and runoff; » Increased production and associated dispersal potential of alien invasive plants, especially to lower-lying wetland areas, and » Impairment of wetland function.	Local to regional	None identified at this stage. A high risk of potential introduction from material transport to the site does exist.

Issue	Nature of Impact and applicable listed activity	Extent of Impact Facility	'No go' areas
	The extent to which the site contains alien plants will be determined in the EIA phase. *Listed activity: GN 545 15, 546 14(a)(i)*		

Gaps in knowledge and recommendations for further study:

» Ecological sensitivities within the boundaries of the site have been mapped at a desk-top level only, and need to be confirmed with a detailed field study. Several protected and red-data species as well as highly sensitive habitats potentially occur on the site. However, the likelihood that the development, once the final layout has been designed in accordance to findings of a field investigation, will compromise the survival of any species of conservation concern may be limited.
» Plant species of conservation concern will be easiest to identify during the growing season, between February and April.
» A detailed ecological survey and sensitivity assessment will be undertaken during the EIA phase.

5.3.3 Potential impacts on Palaeontological and Heritage Resources

Palaeontological impacts:
The south-eastern portion of the site lies within an outcrop area of Ecca Group sediments, which are considered to be of low to moderate palaeontological significance. The rest of the site's surface area is covered by superficial deposits made up of Quaternary-aged calcretes and aeolian sands. The older surface calcretes (*Qc*) developed as valley sediments on pediments and flat surfaces during arid periods is generally favourable for the preservation of fossil remains. A series of palaeontologically sensitive pans are located to the south and north of the site and form part of a natural drainage line joining the Modder River located to the south of the site. These pan dunes are, along with Quaternary alluvial deposits of the Modder River, considered to be of potentially high palaeontological significance.

Heritage Impacts:
Any primary and secondary disturbance of surfaces in the development footprint could have a destructive impact on heritage resources, should these be present. In the event that such resources are found, they are likely to be of a nature that potential impacts could be mitigated by documentation and/or salvage following approval and permitting by the South African Heritage Resources Agency (SAHRA) and, in the case of any built environment features, by the Free State Provincial Heritage Resources Authority. Although unlikely, there may be some that could require preservation *in situ* and this would result in the need for the development footprint to be modified.

Disturbance of surfaces includes any construction: of a road, a pipeline, erection of a power line tower, or preparation of a site for a substation, plant, or building, or any other clearance of, or excavation into, a land surface. In the event of archaeological materials being present such activity would alter or destroy their

context (even if the artefacts themselves are not destroyed, which is also obviously possible).

Some of the activities indicated here have a generally lower impact than others. For example, Sampson (1985) has shown that power lines tend to be less destructive on Stone Age sites than roads since access along the route of the line during construction and maintenance tends to be by way of a 'twee-spoor' temporary roadway (not scraped, the surface not significantly modified). Individual tower positions might be of high archaeological significance (e.g. a grave, or an engraving). Note: the impact of a 'twee-spoor' could be far greater on Iron Age landscapes in other parts of South Africa, where stone walling might need to be breached.

Table 5.3: Potential heritage and palaeontological impacts

Issue	Nature of Impact and applicable listed activity	Extent of Impact	'No go' areas
Construction Phase			
Potential impacts on heritage resources	Construction of a solar energy facility and associated infrastructure impacting on heritage resources including graves, ruins, kraals and Stone Age sites. *Listed activity: GN 545 (15)*	Local	None identified. To be confirmed during EIA Phase
Potential movement, damage, or destruction of fossil material	The potential to impact on fossil material resulting from excavations and ground moving activities into surface calcretes and Ecca sediments during the construction phase of the solar facility and its associated infrastructure is considered moderate to high without on-site inspection of the site development footprint. *Listed activity: GN 545 (15)*	Local	None identified. To be confirmed during EIA Phase
Potential impact on graves	The proposed solar energy facility could directly impact on marked and unmarked graves. *Listed activity: GN 545 (15)*	Local and regional	None identified. To be confirmed during EIA Phase
Operation Phase			
Potential impact on sense of place	The proposed solar energy facility and its infrastructure could directly impact on both the visual context and sense of place of historical sites.	Local and regional	None identified. To be confirmed during EIA Phase

Gaps in knowledge and recommendations for further study

A site visit (Phase 1 Impact Assessment) is recommended to substantiate the findings of the palaeontology and heritage desktop studies.

In parts of this landscape a prevailing erosion regime, sparse vegetation and generally shallow soil profiles would mean that archaeological traces would be mostly on the surface. However, sub-surface occurrences can be expected where the landscape is mantled by deeper sands or other forms of sedimentation, or where material has been deliberately buried (most obviously, graves).

A proviso is routinely given that, should sites or features of significance be encountered during construction (this could include an unmarked burial, an ostrich eggshell water flask cache, or a high density of stone tools, for instance), specified steps are necessary (cease work, report to heritage authority). A site visit will be necessary to inspect various parts of the terrain on foot, focusing on areas of expected impact. Heritage traces would be evaluated in terms of their archaeological significance. Observations derived from previous experience of the area would need to be tested by way of observations made on the ground. Preparatory to fieldwork, all relevant reports for surveys in the area would be reviewed.

A detailed heritage survey and assessment will be undertaken during the EIA phase as described in Chapter 9.

5.3.4 Potential Visual Impacts

For this study, the specialist has determined that the maximum distance from the likely perimeters of the photovoltaic installation that would be assessed could extend more than 3.5km in some instances, and therefore the visibility of the facility up to 5km will be tested for the proposed project. This theoretical viewshed[4] is arrived at from a combination of the type of infrastructure, its possible height, the extent of the site and the long open views in this locality. This should however be ground truthed during the EIA phase of this process.

The visual signposts to signal the exact location of the application site are from its proximity of the N8 to the west and to the railway line to the east. The site could be held in view by users of the N8, by users of other local roads and by rail users.

[4] The viewshed refers to the theoretical outer-most extent of the area from which an object may be seen. Visibility can be obscured in part or in whole by objects within the viewshed such as existing buildings, trees, or landform.

People living in farmsteads locally may become visually aware of the development. There may be tourists and visitors to the area who could also be affected.

The landscape character of the site, and locally is open grassland with few centres of habitation, transmission lines, and gravel roads. It has value for agriculture and some value for tourism. Views seem to be long and open in all compass directions. The simplicity of the forms and the long open views bring visual clarity to the landscape.

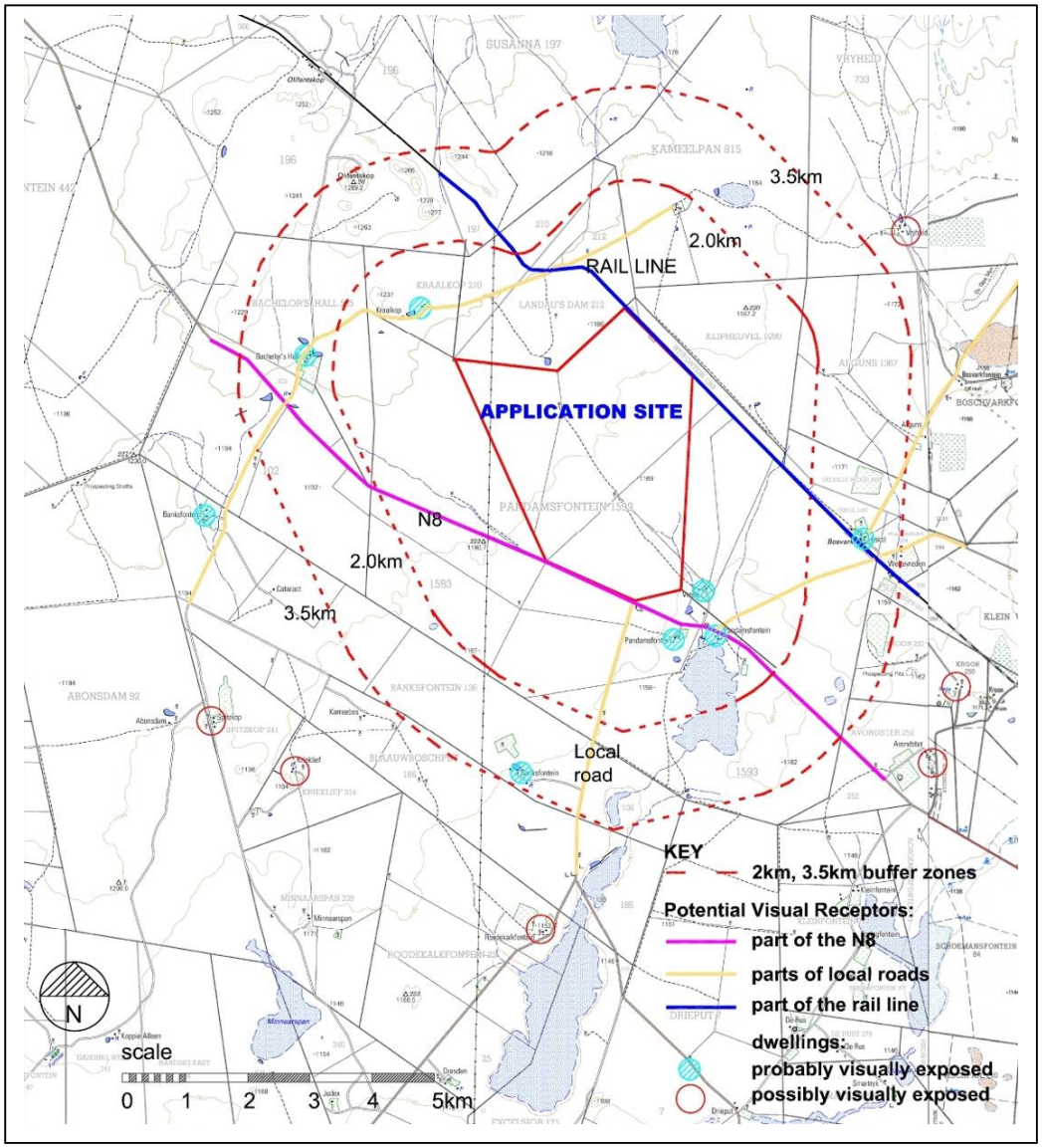

Figure 5.2: Map indicating the potential visual receptors in the vicinity of the proposed Blackwood PV Facility site

Table 5.4: Potential visual impacts

Issue	Nature of Impact and applicable listed activity	Extent of Impact	'No go' areas
Construction Phase			
Potential visual impacts associated with the construction phase	Visual impact of construction traffic, deliveries, lay down areas, accommodation, offices. *Listed activity: GN 544 22, GN 545 (15), GN 546 14(a)(i)*	Local	None identified
Operation Phase			
The development will be visible to people living and working within 3.5km of the infrastructure, transportation corridors users, residents, and local recreational, and/or tourism users.	May be aware of visually incompatible element in the landscape. *Listed activity: GN 544 22, GN 545 (15), GN 546 14(a)(i)*	Local	None identified
Secondary visual impacts	» The potential visual impact of ancillary infrastructure (i.e. the substation at the facility, associated power line and access roads) on observers in close proximity of the facility. » New industrial element in the landscape. Large man-made structures superimposed on a rural landscape. *Listed activity: GN 544 22, GN 545 (15), GN 546 14(a)(i)*	Local	None identified
Effect of the removal and control of vegetation	» Adds to visual exposure » Changes character of site.	Regional	None identified

Issue	Nature of Impact and applicable listed activity	Extent of Impact	'No go' areas
height within a PV installation.	*Listed activity: GN 545 (15), GN 546 14(a)(i),*		
Introduction of industrial development into an agricultural area	Significant views will be obtained by the receptors. Factors affecting visibility: proximity, duration, extent. *Listed activity: GN 545 (15), GN 546 14(a)(i),*	Regional	None identified
The duration of the operational period, up to and beyond 20 years	Maintenance crews, inspections, maintenance operations	Local	None identified
Cumulative impacts	Potential cumulative visual impacts (or alternately, consolidation of visual impacts) with specific reference to the existing power line infrastructure traversing the development site, as well as a railway line adjacent to the site.	Local	None identified

Gaps in knowledge and recommendations for further study:

The fact that some components of the proposed solar energy facility may be visible does not necessarily imply a high visual impact. Sensitive visual receptors within (but not restricted to) a 3.5 km buffer zone from the facility need to be identified and the severity of the visual impact assessed within the EIA phase of the project. Methodology for assessing the potential visual impacts in the EIA phase includes:

» The evaluation of criteria specific for Visual Impacts Assessments listed in the Department of Environmental Affairs and Development Planning guideline document "Guideline for involving visual and aesthetic specialists in EIA processes".
» Determining Visual Distance/Observer Proximity to the facility
» Determining Viewer Incidence/Viewer Perception
» Determining the Visual Absorption Capacity of the landscape
» Determining the Visual Impact Index

5.3.5 Potential Social Impacts

The potential positive social impacts during the construction phase are largely linked to the creation of employment and skills development opportunities. The potential negative impacts are linked to the impact on local road surfaces associated with the transport of heavy components and the impact on local communities and current farming activities associated with the presence of construction workers on the site.

During the operation phase the potential exists for further, albeit limited, job creation and some skills development (positive impacts). However, there is also the potential for impacts on the social dynamics of the study area due to the construction of the proposed project. On a regional scale, the operation of the project could possibly potentially result in positive changes in the quality of lives of many by means of strengthening the current electricity supply for the greater area. On a national scale, the proposed project could aid with the government's aim to assist in meeting the government's target for renewable energy.

A number of key social issues are potentially associated with the construction and operation of the solar energy facility as noted in the table below.

Table 5.8: Potential social impacts

Issue	Nature of Impact	Extent of Impact	'No go' areas
Construction phase			
Impact on rural sense of place	Impact on sense of place closely linked to the potential visual impacts from the solar energy facility (panels up to 3.5 m in height)	Local and regional	N/A
Impact on farming activities	» Safety and security impacts, stock losses, damage to farm infrastructure and damage to farm roads. » Potential impact on farming operations and loss of productive land (during the construction and operational phase).	Local and regional	N/A
Impact on existing infrastructure	Potential damage to roads by heavy equipment and increased traffic volumes.	Local and regional	N/A
Influx of job seekers into the area	» The influx of job seekers may result in an increase in sexually transmitted diseases, including HIV/AIDS; increase in prostitution; increase in alcohol and drug related incidents; increase in crime; and creation of tension and conflict in the community. » Potential threat to farm safety due to increased number of people in the area and construction workers.	Local and Regional	N/A
Creation of employment and business opportunities	Positive impact associated with direct and indirect business opportunities created as a result of the proposed project.	Local and regional	N/A
Creation of potential training and skills development opportunities	Positive impact associated with potential for skills development and business opportunities.	Local	N/A
Potential up and down-stream economic opportunities for the local,	Maximising opportunities to local and regional SMMEs and other businesses to provide a range of services.	Local, Regional and National	N/A

Issue	Nature of Impact	Extent of Impact	'No go' areas
regional and national economy			
Operation phase			
Creation of jobs opportunities and potential training and skills development opportunities	Positive impact associated with potential for skills development, jobs and business opportunities.	Local and Regional	N/A
Renewable energy	Provision of clean, renewable energy source for the national grid	Local and Regional	N/A

Gaps in knowledge and recommendations for further study:

The identification and assessment of social impacts will be guided by the Guidelines for specialist SIA input into EIAs adopted by DEA & DP in the Western Cape in 2007 and supported by DEA. The approach will include:

» Review of existing project information, including the Planning Documents;
» Collection and review of reports and baseline socio-economic data on the area (IDPs, Spatial Development Frameworks etc.);
» Site visit and interviews with key stakeholders in the area including local land owners and authorities, local community leaders and councillors, local resident associations and residents, local businesses, community workers etc;
» Identification and assessment of the key social issues and opportunities;
» Preparation of Draft Social Impact Assessment (SIA) Report, including identification of mitigation/optimisation and management measures to be implemented; and
» Finalisation of the SIA Report.

5.4 Decommissioning phase

Decommissioning activities would include removal of project infrastructure and site rehabilitation. Similar to the construction phase, environmental issues associated with decommissioning activities may include, among others, noise impacts, soil erosion, and threats to biodiversity and ecological processes, including habitat alteration and impacts to fauna. Impacts associated with decommissioning are expected to be similar to those expected for the construction phase.

5.5 Cumulative impacts

Cumulative impacts, in relation to an activity, refer to the impact of an activity that in-itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area. For cumulative effects analysis to assist the decision-maker and inform interested parties, it must be limited to effects that can be evaluated meaningfully (DEAT, 2004). Boundaries must be set so analysts are not attempting to measure effects on everything. Therefore, the cumulative impacts associated with the proposed Blackwood Solar Energy Facility have been viewed from two perspectives within this report:

» Cumulative impacts associated with the scale of the project.
» Cumulative impacts associated with other relevant approved or existing solar developments within 30 km radius of the proposed facility.

Most development impacts are indirect, subtle, and cumulative or unfold over several years following construction or commencement of the operation of the development. While a possible mechanism for an impact to occur can usually be identified, the actual likelihood of occurrence and its severity are much harder to describe (Hill and Arnold, 2012).

The anticipated cumulative impacts on agricultural resources, ecological and social receptors are not considered to be of high significance as identified at this Scoping stage of the process. Based on the scoping of issues undertaken in Section 5.3, it can be reasoned that the most significant potential impact could be the visual impact of the facility (if the PV panels are up to 3.5 m in height) due to its anticipated visibility beyond the site boundaries and throughout much of the region. However, the potential for cumulative impacts associated with the construction of multiple facilities within approximately 30km from the study area (accounting primarily for visual, ecological, heritage, soil and agricultural potential and avifaunal impacts) will be addressed during the EIA phase once a preliminary layout is available.

According to the baseline data mapped for the Strategic Environmental Assessment for the rollout of wind and solar PV energy in South Africa (DEA and CSIR, 2013), there are approved and proposed PV facilities located within 30 km from the proposed Boundary solar facility as shown in Table 5.7 and Figure 5.3. At the time of writing this EIA report, Pulida Solar Park is a preferred bidder project and ACSA PV installation at Kimberley Airport is under construction.

Table 5.7: Other solar projects within a 30 km radius of the Blackwood Solar Energy project

Project	Applicant / Developer	DEA Ref. No	Location	Status
Pulida Solar Park	Pulida Energy (Pty) Ltd	14/12/16/3/3/2/391	On the remainder of the farm Klipdrift 20, Letsemeng local municipality	Environmental Authorisation issued – preferred bidder round 3
Kabi Kimberly PV Solar Energy Facility and associated infrastructure	Kabi Solar	12/12/20/2124	Kennilworth Estate no 71, east of Kimberly	Environmental Authorisation issued
Proposed construction of a 100MW photovoltaic solar power generation plant on the farm Kenilworth Estate No 71	BioTherm Energy (Pty) Ltd	12/12/20/2440	Kennilworth Estate no 71, east of Kimberly	Environmental Authorisation issued
Proposed ACSA PV	ACSA PV	12/12/20/2148	Kimberley	Construction

Project	Applicant / Developer	DEA Ref. No	Location	Status
installation at Kimberley Airport			Airport	underway
Proposed establishment of the Wag 'n Bietjiespan Solar Farm	Oakleaf Investment Holdings 65 (Pty) Ltd	12/12/20/1862	Portions 3 & 4 of Wag 'n Bietjiespan 1586, near Boshof	EIA in progress
Proposed Boundary Solar Energy Facility on a site near Boshof	Rodicon Trading and Investments (Pty) Ltd	14/12/16/3/3/2/555	Farm Karreeboom 1716, 15 km south east of Kimberley.	EIA in progress
Renewable energy generation project on	Dioflash (Pty) Ltd	14/12/16/3/3/392	Farm Melrose East 149, Letsemeng Local Municipality,	EIA in progress
Proposed Olam Energy Project 10	Transalloys (Pty) Ltd	14/12/16/3/3/1/438	Remaining extent of the farm Boschkop 202, Free State	Environmental Authorisation issued
Proposed Inyanga Energy Project 8	Islandsite Investment	12/12/20/2582	Remaining extent of the farm Boschkop 202, Northern Cape Province	EIA in progress

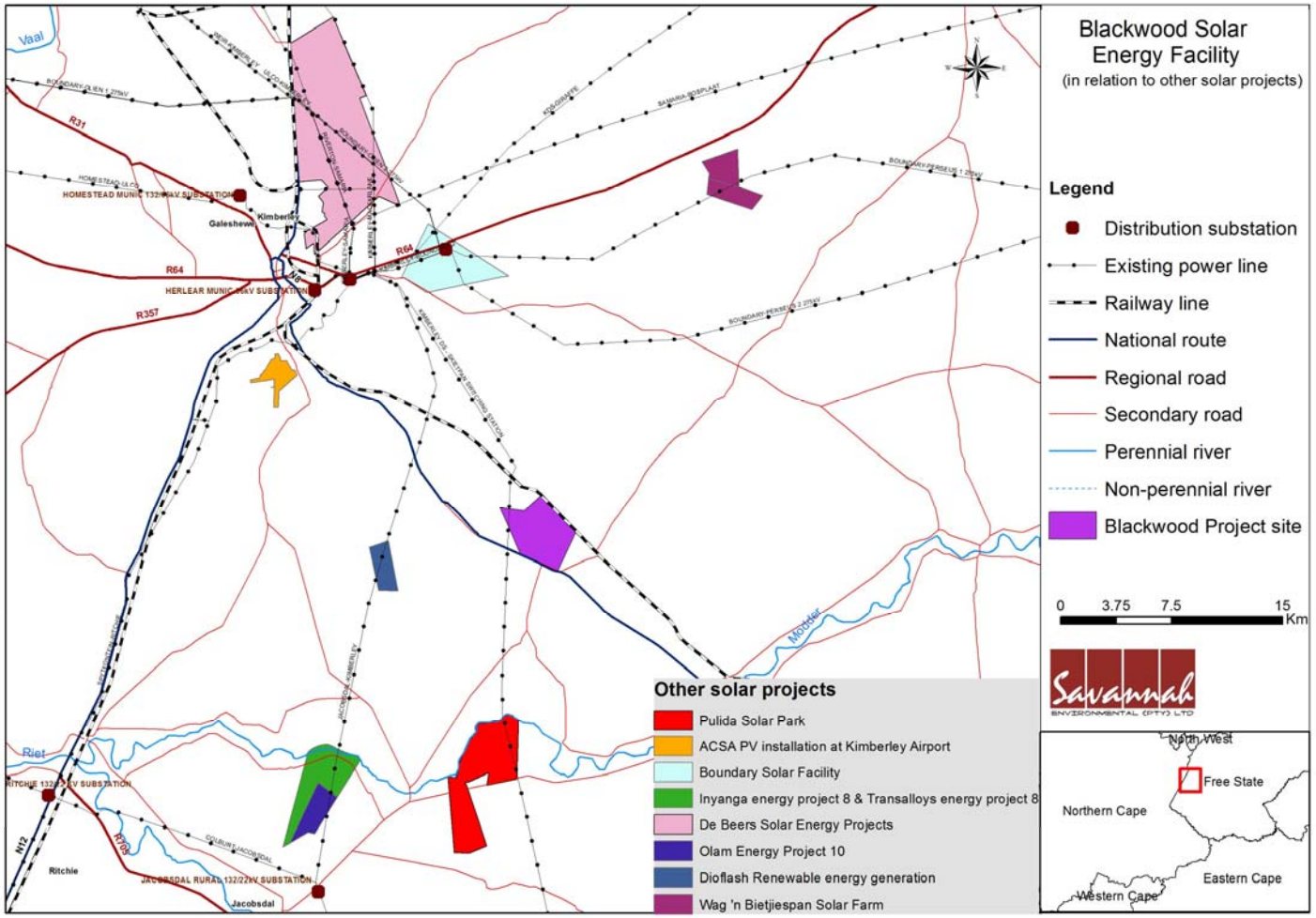

Figure 5.3: Blackwood Solar Energy Facility in relation to other solar projects within a 30 km radius of the site (Note:: the above is based on farm portions where developments are proposed, the above information is sourced from the CSIR SEA process, and has not been verified by DEA)

SCOPING OF ISSUES
ASSOCIATED WITH THE PROPOSED POWER LINES CHAPTER 6

The route or alignment of the proposed **132 kV power line** associated with the Blackwood Solar Energy facility is subject to the findings of specialist studies during the EIA phase. Despite the absence of specific power line routes and associated corridors, connection points and the study area where connection to the grid will be required have been identified (shown in Figure 6.1) and the potential impacts as a result of the construction and operation of the proposed power lines could be addressed for the purposes of scoping. The environmental and social impact of the power line corridor(s) will be thus be assessed in detail within the EIA process once the power line corridor/s has been identified.

The text and tables below provide a summary of the findings of the scoping study undertaken for the construction and operation phases of the proposed **132 kV power lines** as essential infrastructure in support of the Blackwood Solar Energy Facility. Impacts associated with decommissioning are expected to be similar to those associated with construction.

Specialist scoping reports are included within **Appendix F to K** wherein issues relating to the whole project (i.e. solar facility, power line components) are identified. Potential direct and indirect impacts of the proposed power lines are identified as far as possible despite the current absence of the route alignments at the time of completion of the specialist reports. The assessment of impacts relating to the power lines will be undertaken in the EIA phase.

A discussion of the potential cumulative impacts associated with the power lines are presented in Section 6.5.

6.1 Construction phase

An understanding of the activities to be undertaken during the construction process is necessary to predict the potential impacts of the proposed power lines on the environment. Construction activities for the proposed 132 kV power lines are anticipated to include:

» Step 1: Survey of the route
» Step 2: Selection of best-suited conductor, towers, insulators, foundations
» Step 3: Final design of line and placement of towers
» Step 4: Issuing of tenders and award of contract to construction companies
» Step 5: Vegetation clearance and construction of access roads (where required)

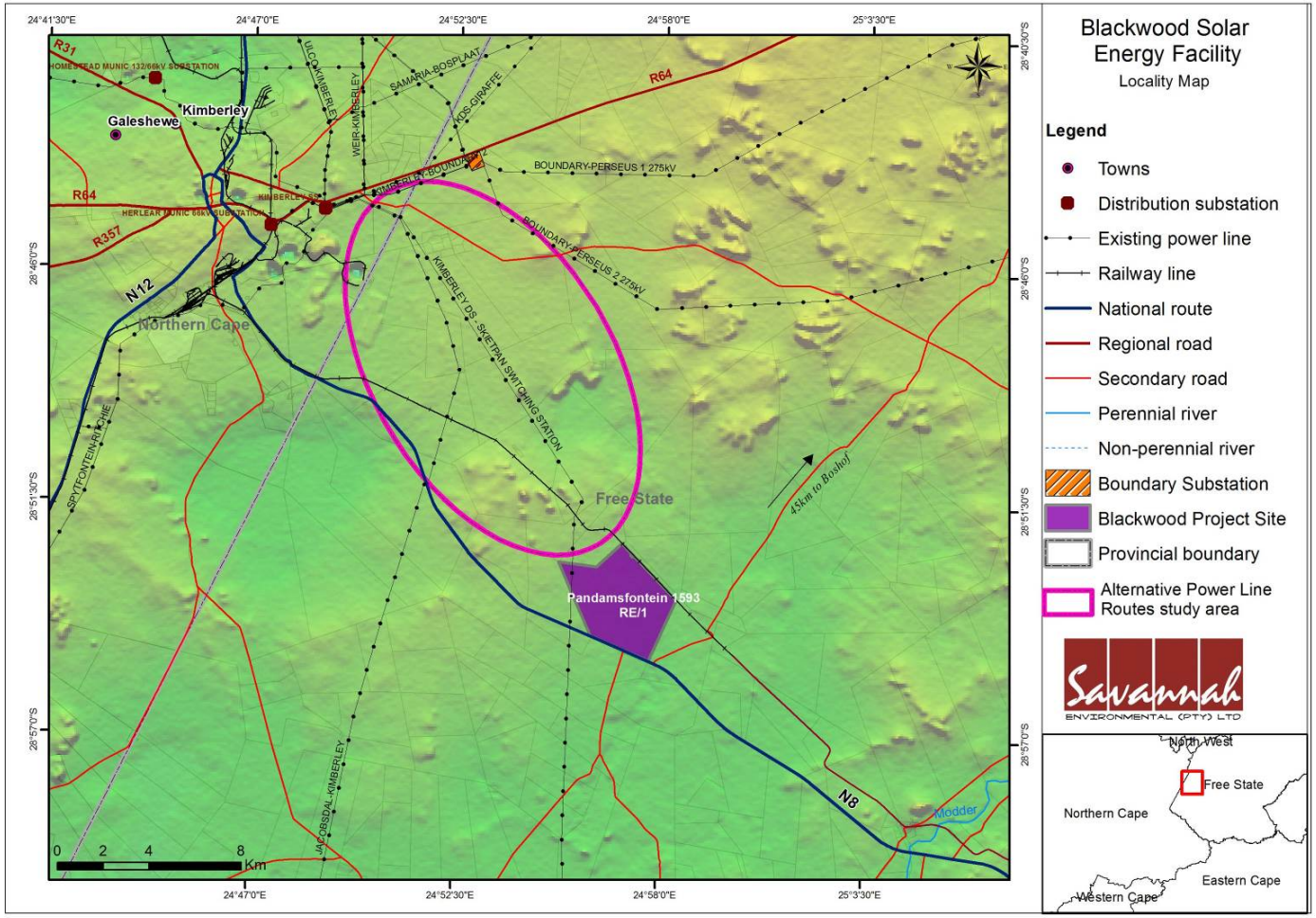

Figure 6.1: Locality map for the proposed site for the Blackwood Solar Energy Facility, indicating the proximity to grid connection infrastructure and the study area for the proposed power line to the Boundary Substation

» Step 6: Tower pegging
» Step 7: Construction of foundations
» Step 8: Assembly and erection of towers on site
» Step 9: Stringing of conductors
» Step 10: Rehabilitation of disturbed areas and protection of erosion sensitive areas
» Step 11: Testing and commissioning
» Step 12: Continued maintenance

Environmental issues associated with linear construction activities may include, amongst others, alteration of land use, soil erosion, visual impacts, noise impacts, impacts on vegetation, impacts on fauna and social impacts.

6.2 Operational phase

Operational activities include regular maintenance of the 132 kV power lines and associated 31 – 40m wide servitude. The operational or economic life of the power lines is anticipated to be in the region of 40 years (including maintenance).

Environmental issues specific to the operation of the power lines could include visual impacts, bird injury or mortality resulting from collisions with lines and electrocution of larger bird species, loss of grazing capacity and impacts on biodiversity.

6.3 Scoping of Issues

There are two power line options that have been considered in the scoping phase:

» Option 1: loop in and loop out of the existing Eskom power line traversing the project site. Impacts relating to the construction and operation of this option will be limited to the site.
» Option 2 entails the construction of a 20km overhead power line to the Boundary Substation located north of the project site.
» The approximate position of the proposed 132 kV power line options has not been identified yet; however, connection points and the study area where connection to the grid will be required have been identified (Figure 6.1). As option 2 will be located outside of the Blackwood Solar Facility project area, most of the impacts relating to the construction and operation thereof will be registered outside of the site and will be local-regional in extent. To minimise these impacts, the proposed power line is most like to be aligned with existing infrastructure in the project area. The exact position of the power line will be determined in the EIA phase.

6.3.1 Potential Impacts on Land Use and Soil

Agricultural land use within the region is predominantly grazing with isolated areas of cultivation occurring. The significance of impacts on agricultural resources and grazing capacity will be a dependent on the potential to align the power lines with existing infrastructure and be limited primarily within the construction phase (as grazing within the power line servitude will be allowed to continue during operation).

Table 6.1: Potential Impacts on Soil, Land Use and Agriculture

Issue	Nature of Impact and applicable listed activity	Extent of Impact	'No go' areas
Construction Phase			
Physical soil disturbance due to construction activities	» Soil erosion due to alteration of the land surface run-off characteristics. » Loss of topsoil due to poor topsoil management (burial, erosion, etc.) during construction of power line towers. *Listed activity: GN 545 (15), GN 546 14(a)(i),*	Local and regional	None identified
Impacts on current land use and agricultural potential due to construction activities	» Placement of spoil material generated from construction related excavations which can cover grazing land and thereby render it unsuitable for future agriculture. » Temporary disturbance to livestock management due to disruptions to farm fences and stock watering infrastructure during the construction phase. *Listed activity: GN 545 (15), GN 546 14(a)(i),*	Local and regional	None
Operational Phase			
Potential social impacts	» Loss of agricultural land use due to direct occupation by the power line towers and servitude for the duration of the project.	Local and Regional	N/A

Gaps in knowledge & recommendations for further study:

As change in land use is anticipated to be primarily a construction impact, further knowledge on the erosion potential along the power line routes will be required.

The assessment of impacts on agriculture and land use will therefore largely be focussed on the Solar Energy Facility given the linear nature of the proposed power lines and the likelihood that grazing activities in the region will only be disrupted during the construction phase.

6.3.2 Potential Ecological Impacts

At a regional level, the vegetation type along the power line routes includes the Kimberley Thornveld. Other vegetation units that may be affected if the alternative power line options to the Boundary Substation must be followed include Vaalbos Rocky shrubland and Highveld Salt Pans. Vegetation overall is considered as of least conservation concern, but within the vegetation types more sensitive communities, habitats and species of conservation concern, including protected trees, are expected to be present. Areas with potentially high numbers of protected species have only been mapped within the farm portion, but there may be similar habitats along the grid connection alternative route.

Potentially sensitive areas were delineated for the scoping study from visual inspection of Google Earth imagery, the areas thus identified as assumed to have higher sensitivity (Figure 6.2) are depressions and wetlands such as larger drainage lines, dams and pans. Impacts of the proposed development will be mostly on the vegetation and supporting substrate. Potential expected impacts are listed below in Table 5.2. Impacts on animals are regarded as low to minimal unless it affects their specific (limited) habitat or migration routes.

The sensitivity analysis has been updated after a detailed field investigation. Overall findings can be summarized as follows (Figure 6.3):

» *High Sensitivity Areas*: This area contains depressions and edges with unique vegetation, higher productivity and red data species that is restricted to their specific habitats. Smaller pans detected within these areas and should be treated as Treat as No-Go Area

» *Medium-high Sensitivity*: This area has the most productive agricultural land, many large old Acacia tortilis, which are essential for the functionality of this very dry ecosystem and may not be removed. Also essential to maintain future agricultural and game farming potential. Smaller pans detected within these areas and should be treated as Treat as No-Go Area

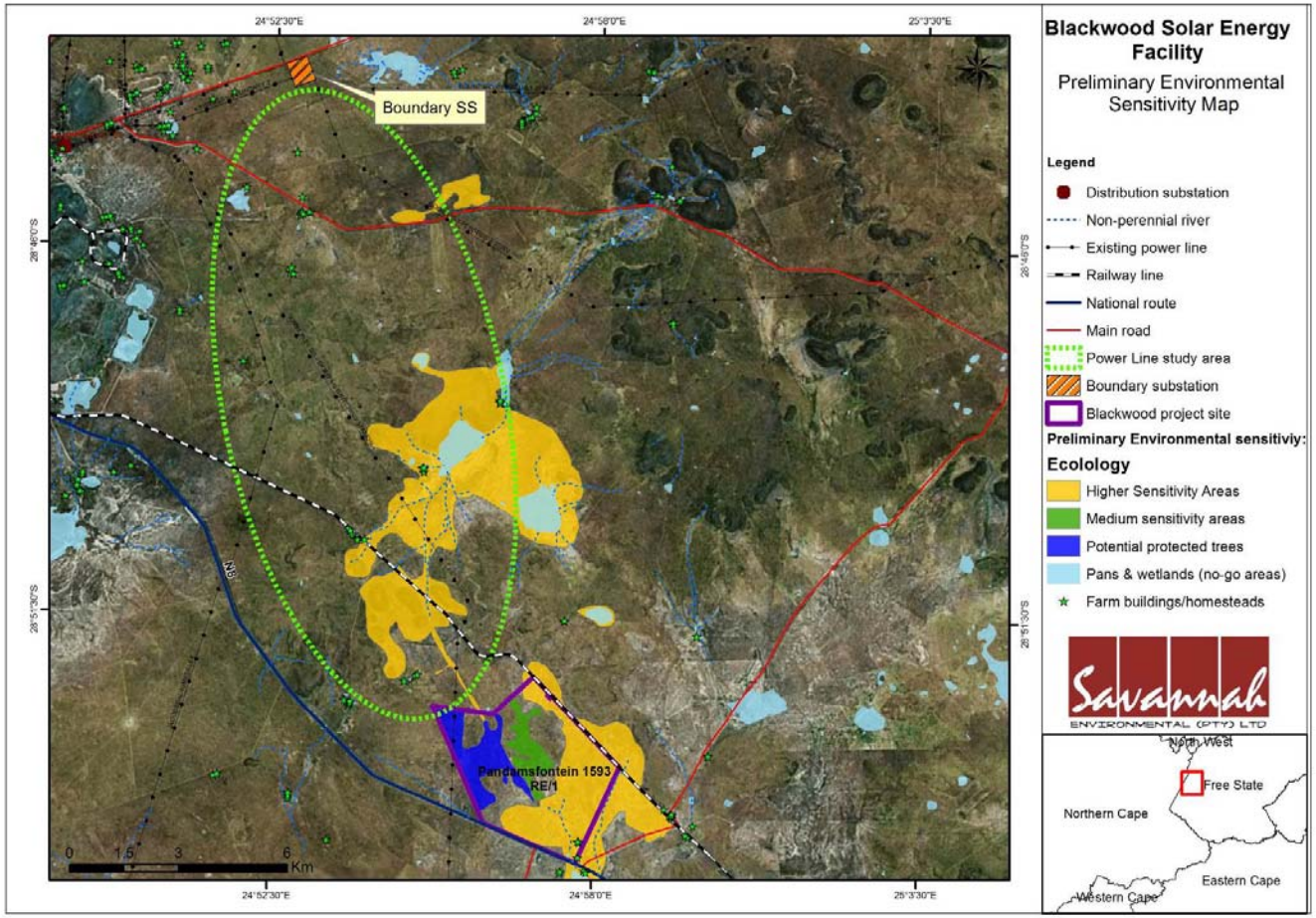

Figure 6.2: Preliminary sensitivity map of the broader study area identified for establishment of the proposed power line to the Boundary Substation at desktop level

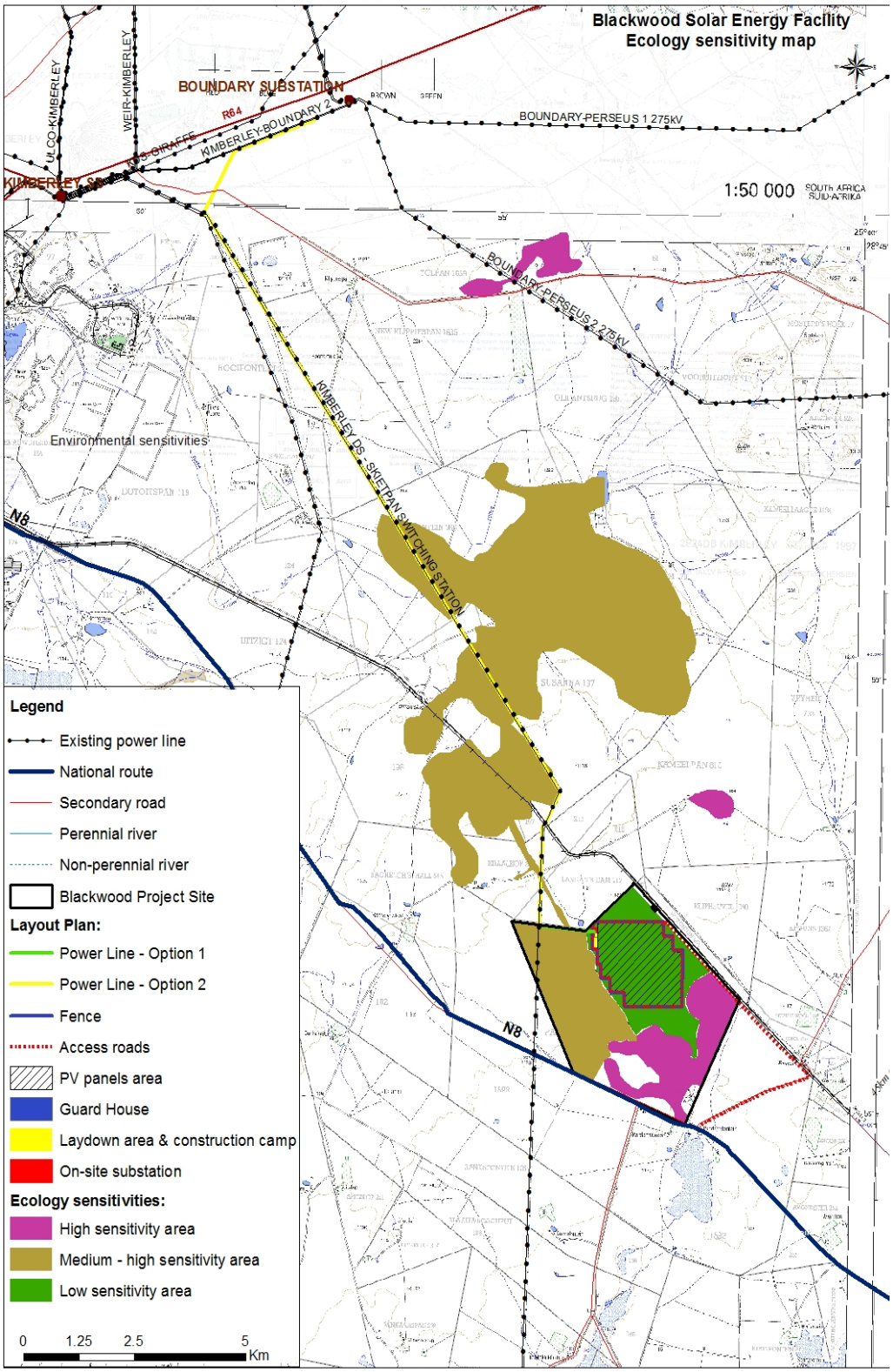

Figure 6.3: Ecological sensitivity map of the broader study area identified for establishment of the proposed power line to the Boundary Substation at as confirmed through field investigations.

Table 6.2: Potential impacts on ecology

Issue	Nature of Impact and applicable listed activity	Extent of Impact	'No go' areas
Construction Phase			
Degradation of ecosystems	» Disturbance and transformation of habitat. » Infiltration by alien and invasive plant species. » Soil erosion around access roads/tracks. » Direct or indirect impacts on watercourses and drainage lines. » Disturbance along steep slopes during construction of power lines often leads to long-term erosion problems that are not usually rectified. *Listed activity: GN 545 (15), GN 546 14(a)(i),*	Local	The only No-Go areas so far identified are larger pans and inselbergs; areas of potential high(er) sensitivity have been mapped on a preliminary basis. A more detailed investigation will be undertaken as part of the EIA phase
Operational Phase			
Establishment and spread of declared weeds and alien invader plants.	The envisaged altered vegetation cover after construction and during the operation phase of the proposed development will create a window of opportunity for the establishment of alien invasive species. In addition, regenerative material of alien invasive species may be introduced to the site by birds, or machinery and persons traversing through areas with such plants or materials that may contain regenerative materials of such species. Consequences of the establishment and spread of invasive plants include: » Loss of indigenous vegetation or change in vegetation structure leading to an even more significant change in or loss of various habitat characteristics; » Loss of plant resources available to fauna; » Change in soil chemical properties; » Loss or fragmentation of sensitive or restricted habitats; » Loss or disturbance to individuals of rare, endangered, endemic and/or	Local to regional	None identified at this stage.

Issue	Nature of Impact and applicable listed activity	Extent of Impact	'No go' areas
	protected species; » Change in flammability of vegetation, depending on alien species; » Hydrological impacts due to increased transpiration and runoff; » Increased production and associated dispersal potential of alien invasive plants, especially to lower-lying wetland areas, and » Impairment of wetland function. The extent to which the power line route contains alien plants will be determined in the EIA phase. *Listed activity: GN 545 (15), GN 546 14(a)(i),*		

Comparison of Alternatives

» Option 1 (approximately 100m-2km within the proposed project area) appears to be the most preferred alternative from an ecological perspective as most ecology impacts resulting from the construction and operation of this route will be contained on site.
» Option 2 (approximately 20 km to the Boundary Substation) appears to be the least preferred option from an ecological perspective. The broader area between the proposed solar facility and the Boundary Substation contains areas of high ecological importance such as wetlands.

Gaps in knowledge & recommendations for further study:

The two power line alternatives will need to be investigated in the field to ensure that there are no significant biodiversity features along the routes that would be impacted and to ensure that the most favourable route from a biodiversity perspective can be identified.

6.3.3 Potential Impacts on Birds

The following features and factors are relevant in the selection of a preferred power line alignment:

» Pans and ridges: Pans and ridges are of particular importance for birds in the study area. Routes between larger salt pans or over ridges should be regarded as possible migration routes to low-flying birds such as Flamingos or raptors,

which could suffer higher mortality rates due to collisions with overhead power lines.

» Rivers & drainage lines: The facility site contains several small seasonal drainage lines, and the study area crosses several of these. These areas are important habitat for birds and are also used as flight paths for various bird species commuting around the area.
» Other power lines: It is a proven fact that placing a new power lines next to an existing power lines reduces the risk of collisions to birds. The reasons for that are two-fold, namely it creates a more visible obstacle to birds and the resident birds, particularly breeding adults, are used to an obstacle in that geographic location and have learnt to avoid it (APLIC 1994; Sundar & Choudhury 2005). Other power lines running parallel to the proposed alignment were therefore treated as a risk-reducing factor.
» Primary and secondary roads: These were taken as an indication of human activity and particularly vehicle and pedestrian traffic. It was assumed that birds will avoid the immediate vicinity of roads due to the presence of traffic and pedestrians, and therefore alignment of the power line along these routes would potentially reduce the risk of collision, habitat destruction and disturbance.
» Length of power line: If all other factors are more or less equal, the longer a power line the greater the risk to birds. The shorter options are therefore more preferred.

The following species of concern are likely to occur within or pass through the greater project area due to the availability of suitable roosting and breeding sites nearby and the species' wide ranging foraging patterns:

Cape Vulture (*Gyps coprotheres*)
White-backed Vulture (*Gyps africanus*)
Kori Bustard (*Ardeotis kori*)
Ludwig's Bustard (*Neotis ludwigii*)
Martial Eagle (*Polemaetus bellicosus*)
Tawny Eagle *(Aquila rapax)*
Lesser Kestrel (*Falco naumanni*)
Greater Flamingo (*Phoenicopterus ruber*)
Lesser Flamingo (*Phoenicopterus minor*)
Chestnut-banded Plover (*Charadrius pallidus*)
Secretarybird (*Sagittarius serpentarius*)

Each of the power line options should consider threats to the above species including electrocutions and collisions with overhead power lines, and disturbance at breeding and roosting sites, as discussed in Table 6.3.

Table 6.3: Potential impact on avifauna

Issue	Nature of Impact and applicable listed activity	Extent of Impact	'No go' areas
Construction phase			
Destruction of bird habitat & disturbance of birds	» Of the red data species, many are terrestrial breeders that could potentially be affected by the physical development and/or species that are known to be at risk of colliding with overhead power lines. » Saltpans have been identified as potentially sensitive areas due to their importance to red list species - flight paths between saltpans and around inselbergs need to be assessed in relation to the proposed development layout, in order to better understand the potential for collision or electrocution of avifauna species. *Listed activity: GN 544 10, GN 545 (15), GN 546 14(a)(i)*	Local to regional	Saltpans and Inselbergs will be highly sensitive for avifauna, and flight paths between saltpans and around inselbergs need to be assessed. Potential terrestrial breeding areas may exist and need to be studied.
Operational phase			
Increase in mortalities of low-flying and perching birds	The construction of overhead power lines and exposed electrical infrastructure could increase mortality rates of avifauna by: » Collision of low-flying birds with overhead power lines » Electrocution of birds perching on exposed electrical components It should be possible to prevent such mortalities by ensuring adequate protection of all electrical components, ensuring that electrical components do not provide perching or nesting sites as well as increasing the visibility of overhead power lines by suitable anti-collision devices. *Listed activity: GN 544 10, GN 545*	Local and regional	Saltpans and Inselbergs will be highly sensitive for avifauna, and flight paths between saltpans and around inselbergs need to be assessed. Potential terrestrial breeding areas may exist and need to be studied.

Issue	Nature of Impact and applicable listed activity	Extent of Impact	'No go' areas
	(15), GN 546 14(a)(i)		

Gaps in knowledge & recommendations for further study:

Sensitive features identified during scoping should be avoided as far as possible by alignment of power lines with existing linear infrastructure. More baseline information concerning the impact of construction within bird habitat and the significance of the risk of collision and electrocution of the target species (resulting in bird mortalities) is required to be collected before a suitable recommendation can be made in this regard. The EIA Phase activities to be undertaken are detailed in Chapter 9.

6.3.4 Potential impacts on Heritage and Paleontological Resources

Heritage:
Any area or linear, primary and secondary disturbance of surfaces in the development locales could have a destructive impact on heritage resources, where present. In the event that such resources are found, they are likely to be of a nature that potential impacts could be mitigated by documentation and/or salvage following approval and permitting by the South African Heritage Resources Agency and, in the case of any built environment features, by the Free State Provincial Heritage Resources Authority. Although unlikely, there may be some sites that could require preservation in situ and hence modification of intended placement of development features.

Power lines tend to be less destructive on Stone Age sites than roads since access along the route of the line during construction and maintenance tends to be by way of a 'twee-spoor' temporary roadway (not scraped, the surface not significantly modified). Individual tower positions might however be located on sites of high archaeological significance (e.g. a grave, or an engraving). Note: the impact of a 'twee-spoor' road could be far greater on Iron Age landscapes in other parts of South Africa, where stone walling might need to be breached.

Palaeontology:
The south-eastern part of the affected area lies within an outcrop area of Ecca Group sediments, which are considered being of low to moderate palaeontological significance. The rest of the site's surface area is covered by superficial deposits made up of Quaternary-aged calcretes and aeolian sands. The older surface calcretes (*Qc*) developed as valley sediments on pediments and flat surfaces during arid periods is generally favourable for the preservation of fossil remains

Table 6.5: Potential heritage and paleontological impacts

Issue	Nature of Impact and applicable listed activity	Extent of Impact	'No go' areas
Construction Phase			
Potential impacts on heritage resources	Construction of power lines impacting on heritage resources within the region. *Listed activity: GN 544 10, GN 545 (15), GN 546 14(a)(i)*	Local	None identified
Potential damage, or destruction of fossil material	Potential damage or destruction of fossil materials during the construction of project infrastructural elements *Listed activity: GN 544 10, GN 545 (15), GN 546 14(a)(i)*	Local	None identified

Comparison of Alternatives

» Option 1: Via a turn in and out configuration on the site - the likelihood of paleontological impact resulting from overhead power lines is considered low as the facility will connect to the Eskom grid via existing power lines traversing the site.
» Option 2: Via a new power line either to the Boundary Substation - the likelihood of paleontological impact resulting from new overhead power lines constructed between the affected area and the Boundary substation is considered moderate to high, as the new power line may impact on potentially sensitive paleontological areas, including pans and associated drainage lines.

Gaps in knowledge & recommendations for further study:

Heritage resources:

The location of any potential heritage sites and along the power line routes will be determined and assessed within a corridor approach during the EIA Phase once potential power line routes have been identified.

Paleontological resources:

» Option 1: the likelihood of paleontological impact resulting from overhead power lines is considered low as the facility will connect to the ESKOM grid via existing power lines traversing the site.
» Option 2: the likelihood of paleontological impact resulting from new overhead power lines constructed between the affected area and the Boundary substation is considered moderate to high, this option will require a Phase 1 impact assessment to assess potential paleontological impact of a proposed new the power line between the Blackwood PV solar facility and the Boundary substation

6.3.5 Potential Visual Impacts

It is envisaged that the power lines (where visible from shorter distances) would constitute a high visual prominence, potentially resulting in a high visual impact at a more localised scale.

Table 6.6: Potential visual impacts

Issue	Nature of Impact and applicable listed activity	Extent of Impact	'No go' areas
Construction Phase			
Potential visual impacts associated with the construction phase	Construction of the power lines. *Listed activity: GN 544 10, GN 545 (15), GN 546 14(a)(i)*	Local and regional	None
Operational Phase			
Visibility to observers and residences	The visibility of the power lines to, and potential visual impact on, observers travelling within the region and on observers residing at homesteads (farm residences) located within the study area and along power line routes.	Local and regional	None

Comparison of Alternatives

» Option 1: Loop in/loop out overhead power line within the site will result to a low-moderate visual impact, this option is preferred from a visual point of view.
» Option 2: Construction of a 20km new distribution line to the Boundary substation will result to a moderate visual impact.

Gaps in knowledge & recommendations for further study:

The potential impact of the proposed power lines will be addressed on identification of the route alternatives. The severity of the visual impact of power lines will then be assessed within the EIA phase of the project.

6.3.6 Potential Impacts on the Social Environment

The potential positive social impacts during the construction phase are largely linked to the creation of employment and skills development opportunities. The potential negative impacts associated with the power lines are linked to the impact on local communities and disruption to current farming activities.

Table 6.7: Potential social impacts

Issue	Nature of Impact and applicable listed activity	Extent of Impact	'No go' areas
Construction phase			
Impact on rural sense of place	Impact on sense of place closely linked to the visual impacts from the 132kV power lines *Listed activity: GN 544 10, GN 545 (15), GN 546 14(a)(i)*	Local and regional	N/A
Impact on farming activities	Safety and security impacts, stock losses, damage to farm infrastructure and damage to farm roads. *Listed activity: GN 544 10, GN 545 (15), GN 546 14(a)(i)*	Local and regional	N/A
Operational phase			
Impact on farming activities	Potential impact on farming operations and loss of productive land *Listed activity: GN 544 10, GN 545 (15), GN 546 14(a)(i)*	Local and regional	N/A

Gaps in knowledge & recommendations for further study:

Currently there is no evidence to suggest that power lines cannot be supported from a social perspective. However, the assessment of social issues needs to take into account landowner concerns the study area where connection to the grid will be required. This will be undertaken during the EIA Phase.

6.4 Decommissioning phase

Decommissioning activities would include removal of project infrastructure and site rehabilitation. The operational or economic life of the power lines is anticipated to be in the region of 40 years (with maintenance).

Similar to the construction phase, environmental issues associated with decommissioning activities may include, among others, noise impacts, soil erosion, and threats to biodiversity and ecological processes, including habitat alteration and impacts to fauna. Impacts are expected to be similar to those associated with the construction phase.

6.5 Cumulative impacts

There is an existing overhead power line that traverses the study area in the north-western corner of the farm portion, enabling a relatively short distance for the loop

in/loop out grid connection, depending on the eventual location of the proposed development area. There are other existing power lines in the vicinity of the project site i.e. the Jacobsdal-Kimberley No.1 132kV and Boundary-Perseus No.2 275kV power lines. In addition to the above, a railway line (going in the direction of Modderrivier and Petrusburg) runs parallel to the north-eastern boundary of the property.

The potential direct cumulative impacts associated with the power lines are expected to be associated predominantly with the potential visual impact and potential impacts on avifauna during operation. The significance of the cumulative impacts can only be adequately assessed once alternative routes/corridors are available for assessment, and will be considered in the detailed specialist studies to be undertaken in the EIA phase of the process.

CONCLUSIONS – PROPOSED BLACKWOOD SOLAR ENERGY FACILITY CHAPTER 7

This Scoping Report aimed at detailing the nature and extent of the Solar Energy Facility on the proposed study area, identifying potential issues associated with the proposed project, and defining the scope of the studies required within the EIA. This was achieved through an evaluation of the proposed project, involving the project proponent, specialist consultants, and a consultation process with key stakeholders that included relevant government authorities, stakeholders and interested and affected parties (I&APs). In accordance with the requirements of the EIA Regulations, feasible project-specific alternatives (including the "do nothing" option) have been identified for consideration within the EIA process.

The conclusions and recommendations of this Scoping Report are the result of limited on-site inspections, desk-top evaluations of impacts identified by specialists, and the parallel process of public participation. A summary of the conclusions of the evaluation of the potential impacts identified to be associated with the proposed Solar Energy Facility is provided below, with conclusions on the proposed grid connection (132kV power lines) drawn in Chapter 8.

Recommendations regarding investigations required to be undertaken within the EIA Phase for all components of the proposed project are provided within the Plan of Study for EIA, contained within Chapter 9 of this report.

7.1. Conclusions drawn from the Evaluation of the Proposed Site for Development of Solar Energy Facility

The proposed **Blackwood Solar Energy Facility** is expected to have a total generating capacity of up to 75 MW and includes the following associated infrastructure:

» Solar panels (fixed/tracking technology) with an export capacity of up to 75MW.
» Mounting structures for the solar panels to be rammed steel piles or piles with pre-manufactured concrete footings, alternative making use of ground screws to support the PV panels.
» Central invertor/transformer stations to collect all energy generated from the PV panels. The inverter's role is to convert direct current (DC) electricity to alternating current (AC) electricity at grid frequency.
» An on-site substation and overhead power line to facilitate the connection between the solar energy facility and the Eskom grid via one of the following options:

- A loop in/loop out of the Kimberley DS - Skietpan Switching Station 132kV power line which traverses the site;
- Construction of an overhead distribution power line of approximately 20km in length to the Boundary Substation

» Internal access roads and fencing
» Associated buildings including a workshop area for maintenance, storage, and control facility with basic services such as water and electricity

A development footprint of approximately 300ha will be required in order to accommodate the proposed infrastructure. The majority of potential impacts identified to be associated with the construction and operation of the proposed Solar Energy Facility are anticipated to be largely localised and restricted to the development footprint. A more accurate understanding of the final development footprint will be determined during the EIA Phase with the availability of a facility layout plan.

7.2. Summary of potential impacts and evaluation of the proposed project

Potential issues identified through this scoping study associated with the proposed Solar Energy Facility identified in Chapter 5 are summarised in Tables 7.1 and 7.2 below.

Table 7.1 Potential impacts associated with the construction phase

Potential Positive Impacts	Social Impacts » Generation of additional land use income makes a positive contribution to farming cash flow, and thereby improves the financial sustainability of agricultural activity » Skills development » Job and direct and indirect business opportunities » Improvement in opportunities for local and regional SMMEs
Potential Negative Impacts	Soil and agricultural impacts » Physical soil disturbance, erosion and disruption to current agricultural practices due to construction activities Ecological impacts » Disturbance to and loss of indigenous natural vegetation » Loss of protected trees » Loss of habitat for threatened and /or protected vertebrates » Impacts on water resources and wetland features » Establishment and spread of weeds and alien invader plants. Impact on birds » Destruction of bird habitat & disturbance of birds Heritage and palaeontology » Potential impacts on heritage resources » Potential movement, damage, or destruction of fossil material Visual impacts

	» Visual impacts associated with the construction of the facility and associated infrastructure Social impacts » Impacts on land use and grazing capacity » Influx of job seekers and associated social issues » Loss of sense of place » Impacts on property prices » Increased traffic » Increase crime in the study area

Table 7.2: Potential impacts associated with the operation phase

Potential Positive Impacts	Social Impacts » Creation of jobs opportunities and potential training and skills development opportunities » Renewable energy
Potential Negative Impacts	Soil and agricultural impacts » Soil erosion due to alteration of the land surface run-off characteristics Ecological impacts » Disturbance or loss of natural vegetation » Altered runoff patterns due to rainfall interception by PV panels and compacted areas » Disturbance to migration routes and associated impacts to species populations » Impacts on wetland features (ephemeral drainage lines, seepage areas, seasonal pans, salt pans) » Establishment and spread of declared weeds and alien invader plants. Impacts on birds » Increase in mortalities of low-flying and perching birds Heritage Impacts » Indirect impact on heritage sites and impact on cultural landscape and sense of place Visual impacts » The development (both the solar facility & associated infrastructures i.e. power lines) will be visible to people living and working within 2 to 5 km. People using transportation corridors, and local recreational and/or tourism users. » Secondary visual impacts » Effect of the removal and control of vegetation height within a PV installation. Social impacts » Potential localised negative impacts on farming activities and land use » Visual and sense of place impacts on existing receptors, including nearby rural and urban residences

As can be seen from the table above, the majority of potential impacts identified to be associated with the construction of the solar energy facility are anticipated to be localised and restricted to the proposed site itself (apart from social impacts – job creation which could have more of a regional positive impact), while operational phase impacts range from local to regional and national (being the positive impact of contribution of clean energy as part of the energy mix in South Africa). However, areas of potential environmental sensitivity were identified through the scoping phase. These are shown in Figure 7.1 and include depressions and wetlands such as dams and pans, and areas with a higher density of protected tree species which are considered sensitive in terms of soil erosion, vegetation and habitat for flora and fauna

A sensitivity map for the proposed development site has been developed to illustrate the sensitivities identified during the scoping phase studies (refer to Figure 7.1). This sensitivity has been further refined from that presented in the Draft Scoping Report through the ecological field survey in order to provide a clearer indication of the availability of low sensitivity areas for the development of the proposed project (refer to Figure 7.2).

These potentially sensitive areas will be further investigated and assessed through detailed specialist studies (including field surveys) during the EIA phase of the process in order to identify and confirm exclusion or no-go areas (refer to Chapter 9 for more details). The map will be further refined in the EIA phase on the basis of these specialist studies, in order to inform the final design of the facility. In order to assess potential impacts within sensitive areas, a preliminary layout for the solar energy facility will be considered in the EIA phase.

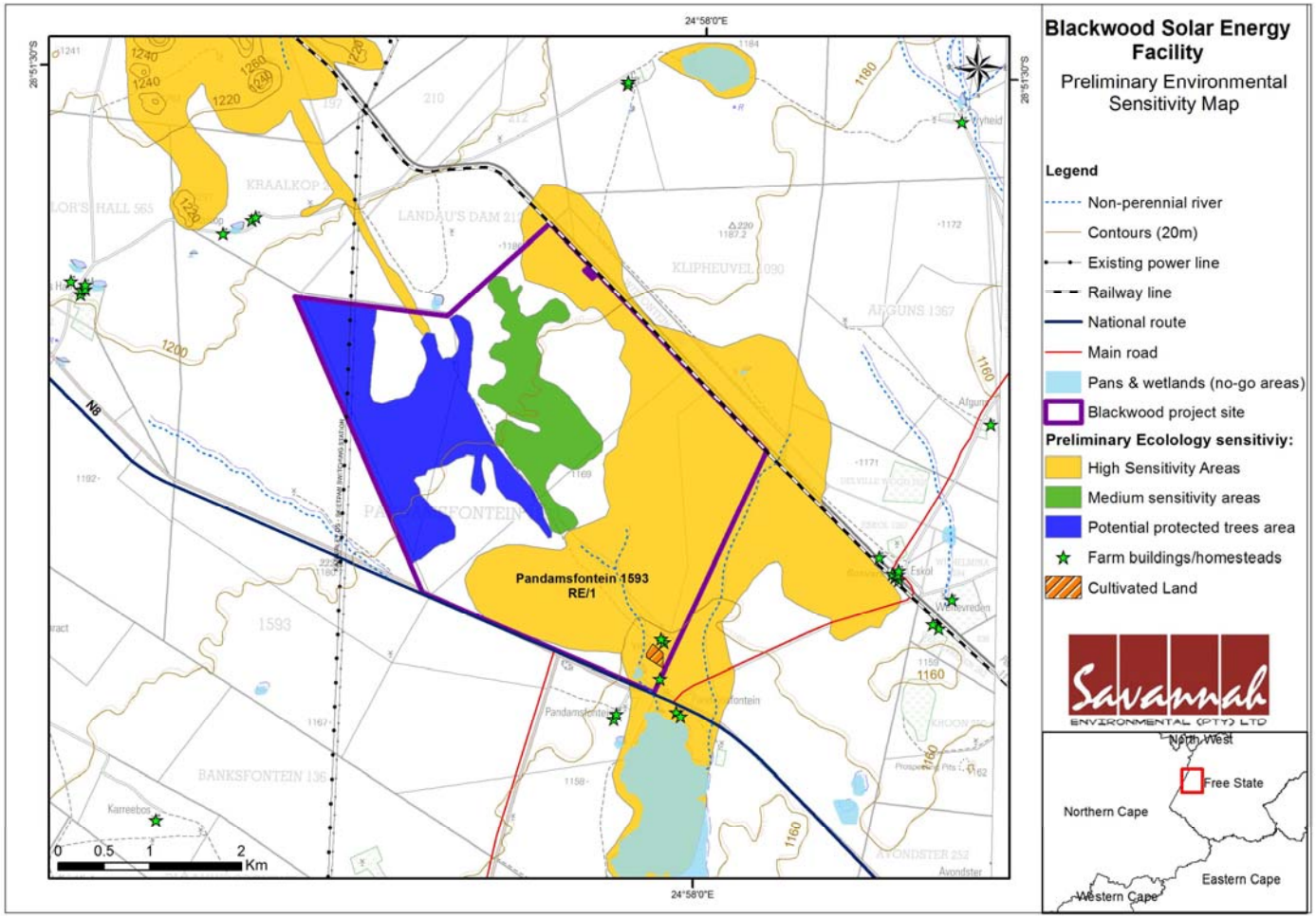

Figure 7.1: Preliminary sensitivity map of the Blackwood Solar Energy Facility development site showing high sensitive ecological areas and potential visual receptors.

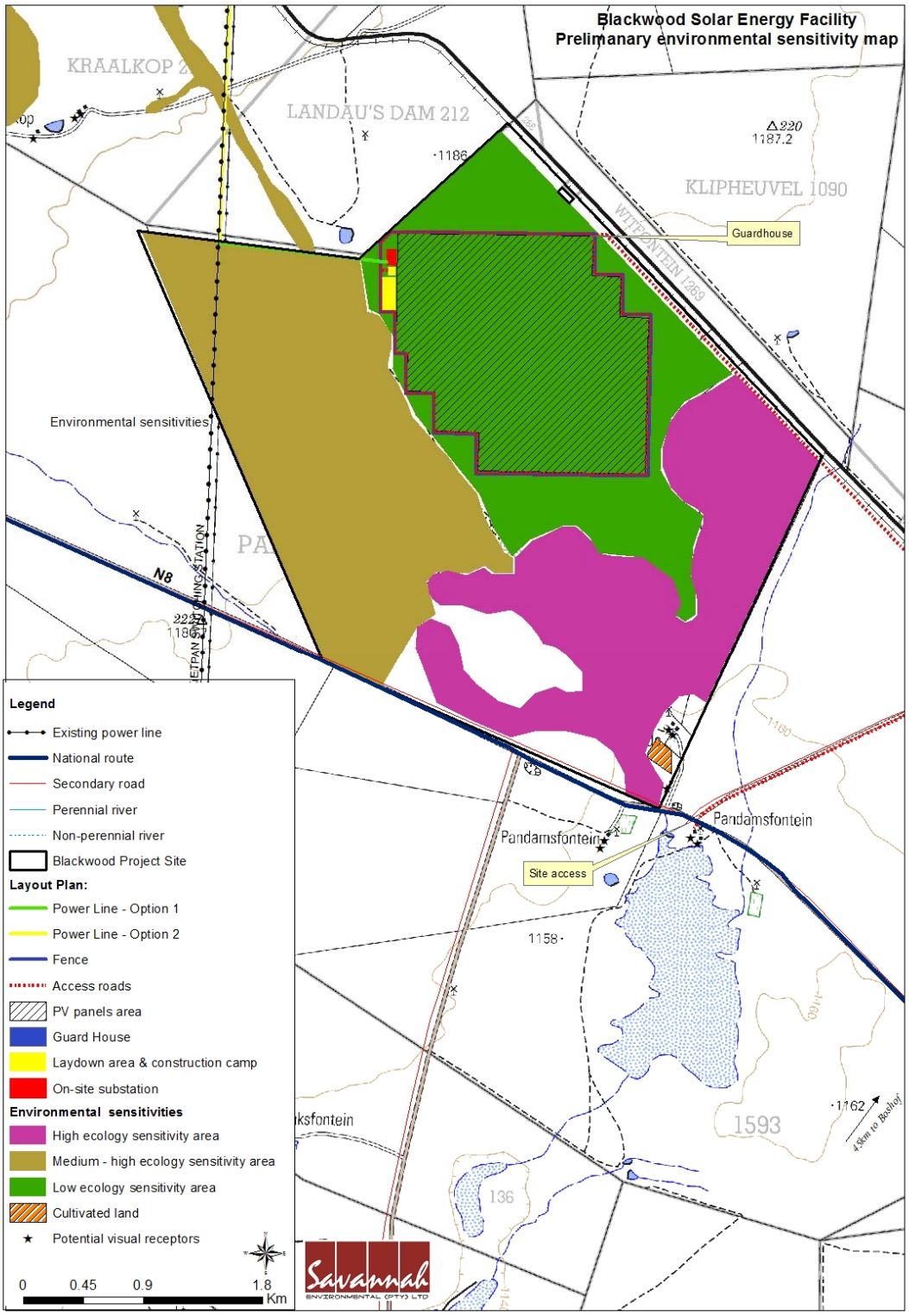

Figure 7.2: Sensitivity map of the Blackwood Solar Energy Facility development site showing high sensitive ecological areas (as confirmed through field surveys) and potential visual receptors.

The potentially sensitive areas/environmental features/issues that have been identified for further study include:

» **Ecologically sensitive areas –** The sensitivity analysis has been updated after a detailed field investigation. Overall findings can be summarised as depicted on Figure 7.2:
  * High Sensitivity Areas: This area contains depressions and edges with unique vegetation, higher productivity and red data species that is restricted to their specific habitats. Smaller pans detected within these areas and should be treated as Treat as No-Go Area
  * Medium-high Sensitivity: This area has the most productive agricultural land, many large old Acacia tortilis, which are essential for the functionality of this very dry ecosystem and may not be removed. Also essential to maintain future agricultural and game farming potential. Smaller pans detected within these areas and should be treated as Treat as No-Go Area
  * Low Sensitivity: The area is relatively dry karroid dwarf shrubveld with shallow soils over calcrete with low production potential. Protected plants and burrowing animals do occur, but these are relatively common and not threatened. Area is suitable for development - erosion control will be necessary, it will be desirable to re-establish a low grass/shrub layer in as many areas as possible after construction to prevent erosion and dust (fine loamy soil). This area is sufficient to accommodate the proposed solar energy facility, as shown in Figure 7.2.

» **Drainage within the site -** Smaller ephemeral drainage lines are visible from available Google-earth imagery within the farm portion. Most of these drain into larger salt pans just south of the farm, indicating that the drainage lines carry only small amounts of very localised, short-lived surface floods during the rainfall season. Higher volumes of water may move into the pans from below-ground seepage off surrounding plains, especially where soils may be shallow.

» **Visual / Social Receptors:** It is evident from the preliminary viewshed analyses that the proposed facility would have a fairly contained area of potential visibility (i.e. within a 3.5km radius of the site), especially to the south-east of the site. This area of exposure is generally restricted to vacant natural land, but may contain some potentially sensitive visual receptors such as dwellings and travellers on both the N8 and the railway line. The theoretical viewshed is arrived at from a combination of the type of infrastructure, its' possible height, the extent of the site and the long open views in this locality. This must be ground truthed during the EIA phase of the process.

» **Soils:** From an agricultural impact point of view, no sensitive areas (other than the 2 hectare cultivated area) were identified during scoping that should be avoided for inclusion in the development. Agricultural potential is fairly uniform

across the site and there are therefore no preferred locations for the development within the site.

This preliminary / desktop sensitivity analysis of the site should be considered by Blackwood Solar Energy Facility (Pty) Ltd in understanding which area of the site would be least impacted by the proposed development in order to inform the preliminary infrastructure layouts for consideration within the EIA phase. Through the EIA phase more detailed studies will be conducted, and further sensitive areas will be marked, more accurately and in more detail than in this Final Scoping Report.

Cumulative effects: The proposed Blackwood Solar Energy Facility is located in close proximity to authorised/proposed Solar Energy Facilities located within the region. Cumulative effects within approximately 30km from the study area (accounting primarily for visual, ecological, heritage, soil and agricultural potential and avifaunal impacts) will be addressed during the EIA phase once a preliminary layout is available.

Environmental fatal flaws: At this stage, there are no fatal flaws associated with the Blackwood Solar Energy Facility site on the Remainder of Portion 1 of Padamfontein 1593. Further investigation is required. It is recommended that the proposed site can be considered in an EIA phase assessment according to the Plan of Study contained in this report (refer to Chapter 9).

CONCLUSIONS – GRID CONNECTION INFRASTRUCTURE CHAPTER 8

This Chapter draws conclusions regarding the potential impact of the proposed grid connection infrastructure (power lines) proposed as essential supporting infrastructure, based on the findings of this Scoping Report and associated specialist studies. Recommendations regarding further investigations and actions required to be undertaken within the EIA Phase are provided within the Plan of Study for EIA, contained within Chapter 9 of this report.

8.1. Conclusions drawn from the Evaluation of the Proposed Grid Connection Infrastructure

The proposed 132kV power lines are essential infrastructure fundamental to the feasibility of the proposed solar energy project and without which the proposed project would be rendered entirely fatally flawed and could not be developed.

Grid connectivity alternatives: There are two power line options that have been considered in the scoping phase, these are:

» Option 1: loop in and loop out of the existing Eskom power line traversing the project site. This option involves a new power line over a relatively short distance, depending on the eventual location of the proposed development area within the project development site.
» Option 2: the construction of a new overhead power line to the Boundary Substation located north of the project site, a distance of approximately 20km (depending on the final alignment of the power line).

The majority of potential impacts identified to be associated with the construction and operation of the proposed 132kV power line option 1 are anticipated to be local and limited to the proposed solar development site. Impacts will therefore be consolidated into one area. This option is considered to be preferred from a technical and environmental perspective at this stage in the process.

For option 2, the impacts are anticipated to extend beyond the solar facility boundaries for a minimum of 20km to the Boundary substation, thereby extending the impacts associated with the proposed project. Although the majority of impacts will be localised and restricted to the power line servitude, impacts such as those on birds and visual impacts could be considered regional in extent. This option is less preferred than Option 1 at this stage in the process.

The final power line option and its exact alignment will be selected based on a combination of environmental and technical criteria, specifically relating to Eskom requirements in terms of grid connection. The environmental and social impact of the power line corridor(s) will be assessed in detail within the EIA process once the information is available. Impacts identified at this stage in the process have been summarised in Tables 8.1 and 8.2 below.

8.2. Summary of potential impacts and evaluation of the proposed project

Potential issues identified through this scoping study associated with the proposed power line options are summarised in Tables 8.1 and 8.2 below.

Table 8.1 Potential impacts associated with the construction phase

Potential Positive Impacts	Social Impacts » Generation of additional land use income makes a positive contribution to farming cash flow, and thereby improves the financial sustainability of agricultural activity » Skills development » Job and direct and indirect business opportunities » Improvement in opportunities for local and regional SMMEs
Potential Negative Impacts	Soil and agricultural impacts » Physical soil disturbance due to construction activities » Impacts on current land use and agricultural potential due to construction activities Ecological impacts » Degradation of ecosystems Impact on birds » Destruction of bird habitat & disturbance of birds, particularly if power lines are not aligned with existing linear infrastructure Heritage and palaeontology » Impacts on heritage resources » Impacts on paleontological resources (fossil material) Visual impacts » Visual impacts associated with the construction phase Noise impacts » Noise impacts due to movement of construction machinery and vehicles, traffic etc. Social impacts » Impact on rural sense of place » Impact on farming activities

Table 8.2 Potential impacts associated with the operation phase

Potential Positive Impacts	» Impact on property prices - generation of additional land use income makes a positive contribution to farming cash flow, and thereby improves the financial sustainability of agricultural activity.

Potential Negative Impacts	Soil and agricultural impacts » Potential social impacts ie. Loss of agricultural land use due to direct occupation by the power line towers and servitude for the duration of the project. Visual impacts » Visual exposure of the power lines on observers from roads, built-up areas, homesteads and farmsteads Ecological impacts » Disturbance to migration routes and associated impacts to species populations » Establishment and spread of declared weeds and alien invader plants. Impacts on birds » Increase in mortalities of low-flying and perching birds species occurring in the areas such as the Cape Vulture, White-backed Vulture, Kori Bustard, and the Ludwig's Bustard Heritage Impacts: » Loss of heritage sites and impact land surface disturbance associated Social impacts: » visual and sense of place impacts on existing receptors, including nearby rural and urban residence » Decrease in value of property due to reduced grazing capability

Sensitivity mapping: Although no environmental fatal flaws were identified to be associated with the proposed power line at this stage in the process, areas of potential environmental sensitivity were identified through the scoping phase. These are reflected in the sensitivity map generated from the scoping phase studies (refer to Figure 8.1). The sensitivity map is a rough-scale estimate of sensitivity on the site, and these areas will be subject to survey and ground-truthing during the EIA phase of the project.

The potentially sensitive areas/environmental features that have been mapped for the site sensitivity in Figure 8.1 include:

» Pans and ridges: Pans and ridges are of particular importance for birds in the study area. Routes between larger salt pans or over ridges should be regarded as possible migration routes to low-flying birds such as Flamingos or raptors, which could suffer higher mortality rates due to collisions with overhead power lines.
» Rivers & drainage lines: The study area between the Blackwood and Boundary Substation crosses several of these small seasonal drainage lines, these areas are important habitat for birds and are also used as flight paths for various bird species commuting around the area.

The potential impacts associated with the proposed power line and substation will be considered in detail within the EIA phase. Recommendations regarding a

preferred power line alignment and appropriate mitigation measures for the power line and substation site will be made

Cumulative effects: Potential cumulative impacts are associated with the presence of the proposed power lines are likely to be of low significant due to the presence of overhead power lines in the study area and in the immediate vicinity of the study area. There is an existing overhead power line that traverses the study area in the north-western corner of the farm portion, enabling a relatively short distance for the loop in/loop out grid connection, depending on the eventual location of the proposed development area. There are other existing power lines in the vicinity of the project site i.e. the Jacobsdal-Kimberley No.1 132kV and Boundary-Perseus No.2 275kV power lines. In addition to the above, a railway line (going in the direction of Modderrivier and Petrusburg) runs parallel to the north-eastern boundary of the property.

Environmental fatal flaws: No environmental fatal flaws were identified to be associated with the construction of the proposed grid connection infrastructure. Any regional (off-site) fatal flaws identified during the EIA phase for any of the power line alternatives will likely result in that alternative being excluded from the options available for grid connection.

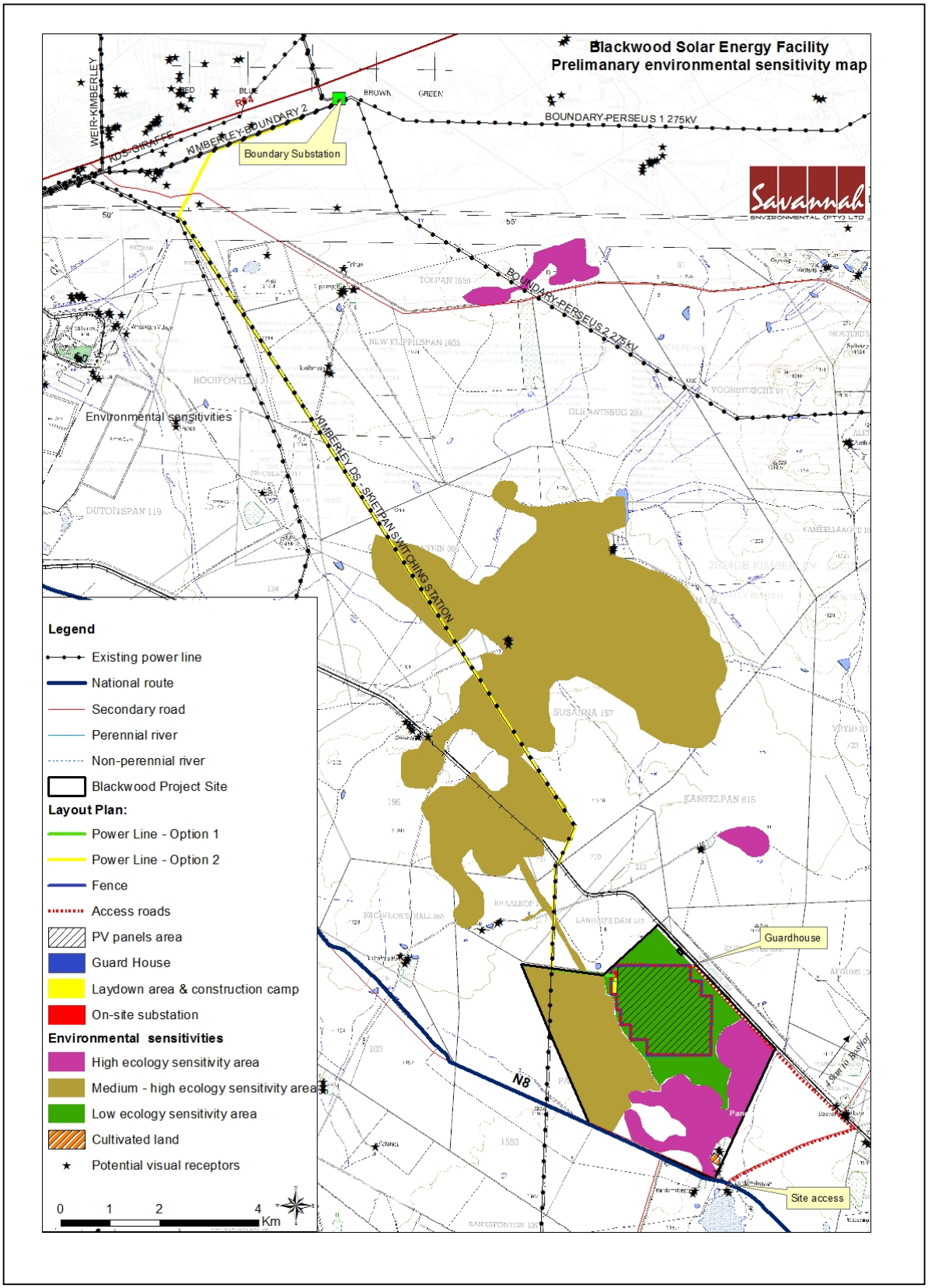

Figure 8.1: Preliminary sensitivity map of the power line study area

PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT CHAPTER 9

This Final Scoping Report includes a detailed description of the nature and extent of the proposed Blackwood Solar Energy facility and associated infrastructure with details regarding the Scoping Phase, as well as the issues identified and evaluated through the Scoping Phase. This chapter provides the context for a Plan of Study for the Environmental Impact Assessment (EIA) that is relevant to both the development of the solar energy facility and the proposed power lines.

The Plan of Study describes how the EIA Phase will proceed and includes details of the specialist studies required to be undertaken for those potential impacts recorded to be of potential significance. The key findings of the Scoping Phase includes inputs from authorities, the public, the proponent and the EIA specialist team and are used to inform the Plan of Study for EIA together with the requirements of the NEMA EIA Regulations of June 2010 and applicable guidelines.

9.1. Aims of the EIA Phase

The EIA Phase will aim to achieve the following:

» Provide an overall assessment of the social and biophysical environment affected by the Blackwood Solar Energy Facility (including associated infrastructure) and its associated power line alternatives.
» Assess potentially significant impacts (direct, indirect and cumulative, where required) associated with the Blackwood Solar Energy Facility (including infrastructure) and its associated power line alternatives.
» Identify and recommend appropriate mitigation measures for potentially significant environmental impacts.
» Undertake a fully inclusive public involvement process to ensure that I&APs are afforded the opportunity to participate, and that their issues and concerns are recorded.

The EIA will address potential environmental impacts and benefits (direct, indirect and cumulative impacts) associated with Blackwood Solar Energy Facility and its associated infrastructure, including design, construction, operation and decommissioning; and will aim to provide the environmental authorities with sufficient information to make an informed decision regarding the proposed project. All feasible alternatives (including the 'do nothing' alternative) will be assessed.

9.2. Authority Consultation

Consultation with the regulating authorities (i.e. DEA and the Free State Department of Economic Development, Tourism and Environmental Affairs (DETEA)) has been undertaken and will continue throughout the EIA process. On-going consultation and input from DEA and Free State DETEA will include the following:

» Submission of a Final Scoping Report following a 30-day public review period of this Draft Scoping report (and consideration of comments received).
» Submission of a Final EIA Report following a 30-day public review period of the draft EIA Report.
» A consultation meeting and site visit (if necessary) with DEA and DETEA in order to discuss the findings and conclusions of the EIA Report.

Should there be substantive changes between any draft reports and final reports, the final reports will be made available for public review for an additional 21 days prior to the submission to DEA.

9.3. Consideration of Alternatives

The following project alternatives will be investigated in the EIA Phase:

» **The 'do nothing' alternative:** Blackwood Solar Energy does not establish the proposed Blackwood Solar Energy Facility on the Remainder of Portion 1 of the farm Pandamsfontein 1593.
» **Layout/design alternatives:** in terms of the design of the facility, particularly the layout of the PV panels and corridors/servitudes for associated infrastructure such as the access roads and power line.
» **Alternative technology combinations:** The facility is proposed to consist of photovoltaic **(PV) panels** (the preferred technology (static or tracking) is to be confirmed in the EIA phase) with a net generating capacity of up to 75 MW.

9.4. Assessment of Potential Impacts and Recommendations regarding Mitigation Measures

Based on the findings of the Final Scoping Study, the following issues were identified as requiring further investigation within the EIA:

Table 9.1: Issues requiring further investigation during the EIA Phase and activities to be undertaken in order to assess the significance of these potential impacts relevant to Blackwood Solar Energy Facility & power line options

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
Ecology (Flora, fauna & Avifauna)	As part of the EIA process, a field survey of the vegetation will be undertaken, and results will include: » As part of the EIA process, a detailed field survey of the vegetation will be undertaken, preferably between February to April, and results will include: * A phytosociological classification of the vegetation found on the study area according to vegetation survey data and its TWINSPAN analysis * A corresponding description of all defined plant communities and their typical habitats, including a full species list for each plant community and a representative photographic record taken on site of each community * A map of all plant communities within the boundaries of the study area * A description of the sensitivity of each plant community, based on sensitivity criteria * A full assessment of impacts The proposed development is likely to pose impacts on birds predominantly through collision and electrocution on associated power lines. The EIA Phase will include the following activities: » Field survey to confirm habitats present on the site and along the power line route/s and record bird species present and/or likely to be present in the study area. » Based on data, the sensitivity map for the site and power line route options will be developed » The impacts identified in this scoping phase study will be assessed formally according to the supplied criteria. » Recommendations will be made for the management of identified impacts.	Marianne Strohbach of Savannah Environmental
Soils & Agricultural potential	The terms of reference for the EIA phase assessment will include the requirements for an agricultural study as described under point 4 of section C of the National Department of Agriculture, Forestry and Fisheries document: Regulations for the evaluation and review of applications pertaining to renewable energy on agricultural land, dated September 2011. The above requirements together with requirements for an EIA specialist report includes: » Identify and assess all potential impacts (direct, indirect and cumulative) and economic consequences of the proposed development on soils and agricultural potential.	Johann Lanz

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	» Describe and map soil types (soil forms) and characteristics (soil depth, soil colour, limiting factors, and clay content of the top and sub soil layers). » Map soil survey points. » Describe the topography of the site. » Do basic climate analysis and identify suitable crops and their water requirements. » Summarise available water sources for agriculture. » Describe historical and current land use, agricultural infrastructure, as well as possible alternative land use options. » Describe the erosion, vegetation and degradation status of the land. » Determine and map, if there is variation, the agricultural potential across the site. » Provide recommended mitigation measures, monitoring requirements, and rehabilitation guidelines for all identified impacts.	
Archaeology, Heritage and Palaeontology	The following methodology will be adopted for the EIA phase study: **Archaeology and Heritage:** » A site visit will be necessary to inspect various parts of the terrain on foot, focusing on areas of expected impact (construction of facility, sub-station, and secondary infrastructure such as roads, and power lines/alternative power line routes). » *Assumptions and constraints*: It would be assumed that, by and large in this landscape, with its sparse vegetation and generally shallow soil profiles, some sense of the archaeological traces to be found in the area would be readily apparent from surface observations (including assessment of places of erosion or past excavations of any kind exposing erstwhile below-surface features). » *Determining archaeological significance*: This is in addition to guidelines provided by the National Heritage Resources Act (Act No. 25 of 1999), a set of criteria based on Deacon (nd) and Whitelaw (1997) for assessing archaeological significance has been developed for Northern Cape settings (Morris 2000a). These criteria include estimation of landform potential (in terms of its capacity to contain archaeological traces) and assessing the value to any archaeological traces (in terms of their attributes or their capacity to be construed as evidence, given that evidence is not given but constructed by the investigator). **Palaeontology**:	David Morris of McGregor Museum & Lloyd Rossouw of Paleo Field Services

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	» The likelihood of palaeontological impact resulting from excavations and ground moving activities into surface calcretes and Ecca sediments during the construction phase of the solar facility and its associated infrastructure as well as for a new overhead power lines constructed between the affected area and the Boundary substation is considered moderate to high without on-site inspection of the affected area. Therefore, a Phase 1 Impact Assessment is recommended to substantiate the findings of the desktop study.	
Visual Impacts	Methodology for Assessing the potential environmental impacts in the EIA phase include: » Evaluation criteria: use the criteria specific for Visual Impact Assessments listed in the Department of Environmental Affairs and Development Planning guideline document "Guideline for involving visual and aesthetic specialists in EIA processes", and additionally: » Determine Visual Distance/Observer Proximity to the facility » Determine Viewer Incidence/Viewer Perception » Determine the Visual Absorption Capacity of the landscape » Determine the Visual Impact Index » A full assessment of all potential impacts (direct, indirect and cumulative) and proposed mitigation measures to include in the EMP	Karen Hansen of Karen Hansen Landscape Architects
Social Impacts	The identification and assessment of social impacts will be guided by the Guidelines for specialist SIA input into EIAs adopted by DEA&DP in the Western Cape in 2007. The Guidelines are based on accepted international best practice guidelines, including the Guidelines and Principles for Social Impact Assessment (Inter-organisational Committee on Guidelines and Principles for Social Impact Assessment, 1994) and are supported by the DEA. The approach will include: » Review of existing project information, including the Planning and Scoping Documents; » Collection and review of reports and baseline socio-economic data on the area (IDPs, Spatial Development Frameworks etc.); » Site visit and interviews with key stakeholders in the area including local land owners and authorities, local community leaders and councillors, local resident associations and residents, local businesses, community workers etc.; » Identification and assessment of the key social issues and opportunities; » Preparation of Draft Social Impact Assessment (SIA) Report, including identification of mitigation/optimization and management measures to be implemented; and finalisation of the	Tony Barbour of Environmental Consulting and Research

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	SIA Report.	
Cumulative Impacts	» Assess the potential for cumulative impacts associated with combined visibility for two or more solar facilities from one location. » Asses the sequential visibility (e.g. the effect of seeing two or more solar facilities along a single journey, e.g. road or walking trail) » Consider the potential impact of solar facilities on the landscape, specifically given South African's strong attachment to the land and the growing number of solar plant applications. » Identify significant positive cumulative impacts, specifically the establishment of a number of renewable energy facilities in the Sol Plaatje LM, will create a number of socio-economic opportunities for the region, which, in turn, will result in a positive social benefit. » Address the cumulative impacts associated with the construction of multiple facilities within approximately 30km from the study area on the ecological, heritage, soil and agricultural potential and avifaunal impacts of the area once a preliminary layout is available.	

9.5. Methodology for the Assessment of Potential Impacts

Direct, indirect and cumulative impacts of the above issues, as well as all other issues identified will be assessed in terms of the following criteria:

» 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:
  * Local extending only as far as the development site area – assigned a score of 1;
  * Limited to the site and its immediate surroundings (up to 10 km) – assigned a score of 2;
  * Will have an impact on the region – assigned a score of 3;
  * Will have an impact on a national scale – assigned a score of 4; or
  * Will have an impact across international borders – assigned a score of 5.
» The **duration**, wherein it will be indicated whether:
  * The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  * The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  * Medium-term (5–15 years) – assigned a score of 3;
  * Long term (> 15 years) - assigned a score of 4; or
  * Permanent - assigned a score of 5.
» The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  * 0 is small and will have no effect on the environment;
  * 2 is minor and will not result in an impact on processes;
  * 4 is low and will cause a slight impact on processes;
  * 6 is moderate and will result in processes continuing but in a modified way;
  * 8 is high (processes are altered to the extent that they temporarily cease); and
  * 10 is 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 on a scale, and a score assigned:
  * Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
  * Assigned a score of 2 is improbable (some possibility, but low likelihood);
  * Assigned a score of 3 is probable (distinct possibility);
  * Assigned a score of 4 is highly probable (most likely); and
  * Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).

» The **significance**, which shall be determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
» 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.*

The **significance** is determined by combining the criteria in the following formula:

S= (E+D+M) P; where

S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

» < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
» 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
» > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

As the developer has the responsibility to avoid and/or minimise impacts as well as plan for their management (in terms of the EIA Regulations), the mitigation of significant impacts will be discussed. Assessment of mitigated impacts will demonstrate the effectiveness of the proposed mitigation measures.

The results of the specialist studies and other available information will be integrated and synthesised by the Savannah Environmental project team. The EIA Report will be compiled, and will include:

» **Detailed description** of the proposed activity
» A description of the property(ies) on which the activity is to be undertaken and the location of the activity on the property(ies)
» A description of the **environment that may be affected by the activity** and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity
» Details of the **public participation process** conducted, including:
  * Steps undertaken in accordance with the plan of study for EIA;

    - A list of persons, organisations and Organs of State that were registered as interested and affected parties;
    - A summary of comments received from, and a summary of issues raised by registered interested and affected parties, the date of receipt of these comments and the response to those comments; and
    - Copies of any representations, objections and comments received from registered interested and affected parties
- A description of the **need and desirability** of the proposed project and identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity
- An indication of the methodology used in determining the **significance** of potential environmental impacts
- A description and comparative **assessment of all alternatives** identified during the environmental impact assessment process
- A summary of the findings and recommendations of **specialist reports**
- A description of all environmental issues for each phase of the project that were identified during the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures
- An assessment of each identified potentially significant impact
- A description of any assumptions, uncertainties and gaps in knowledge
- an environmental **impact statement** for each Phase of the project which contains:
    - A summary of the key findings of the environmental impact assessment; and
    - A comparative assessment of the positive and negative implications of the proposed activity and identified alternatives
- A draft **environmental management programme** for each phase of the project
- Copies of specialist reports

The Draft EIA Report will be released for a 30-day public review period. Should there be substantive changes between the draft EIA report and the final EIA report; the final EIA report will be made available for public review for a period of 21 days prior to submission to the DEA. The comments received from I&APs will be captured within a Comments and Response Report, which will be included within the Final EIA Report, for submission to the authorities for decision-making.

9.6. Public Participation Process

A public participation process will be undertaken by Savannah Environmental. Consultation with key stakeholders and I&APs will be on-going throughout the EIA Phase. Through this consultation process, stakeholders and I&APs will be

encouraged to identify additional issues of concern or highlight positive aspects of the project, and to comment on the findings of the EIA Phase. In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their inputs regarding the project, various opportunities will be provided for stakeholders and I&APs to be involved in the EIA Phase of the process, as follows:

» Focus group or public meetings (pre-arranged and stakeholders invited to attend).
» Telephonic consultation sessions (consultation with various parties from the EIA project team, including the project participation consultant, lead EIA consultant as well as specialist consultants).
» Written, faxed or e-mail correspondence.

The Draft EIA Report will be made available for public review for a 30-day period prior to finalisation and submission to the DEA for review and decision-making. In order to provide an overview of the findings of the EIA process and facilitate comments, a public feedback meeting will be held during this public review period.

9.7. Key Milestones of the Programme for the EIA

The envisaged key milestones of the programme for the EIA Phase are outlined in the following table.

Key Milestone Activities	Proposed timeframe[5]
Public review period for Draft Scoping Report	25 September 2013 – 24 October 2013
Finalisation of Scoping Report, release of the Final Scoping Report to the public, and submission of the Final Scoping Report to DEA	October/November 2013
Release of the Revised Final Scoping Report to the public, and submission of the Final Scoping Report to DEA	January-March 2014
Authority acceptance of the Final Scoping Report and Plan of Study to undertake the EIA	within 30 days of receipt of the Final Scoping Report
Undertake specialist studies and public participation process	October 2013 – March 2014
Make Draft EIA Report and Draft EMP available to the public, stakeholders and authorities	April 2014
Finalisation of EIA Report, release of the Final EIA Report to the public, and submission of the Final EIA Report to DEA	June 2014
Authority review period and decision-making	June 2014 – August 2014

[5] Indicative dates

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