Proposed 75 MW Kloofsig Solar PV Energy Facility, Northern Cape – Kloofsig 1

Draft Scoping Report

Report Prepared for

Kloofsig Solar (Pty) Ltd

Report Number 486618/2

Report Prepared by

srk consulting

August 2016

Proposed 75 MW Kloofsig Solar PV Energy Facility, Northern Cape – Kloofsig 1

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August 2016

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List of Abbreviations

AC	Alternating Current
AGRINC	Northern Cape Department of Agriculture, Land Reform and Rural Development
BA	Basic Assessment
BGIS	SANBI's Integrated Biodiversity Information System
BID	Background Information Document
BLMC	Biodiversity Land Management Classes
CBA	Critical Biodiversity Areas
CEMP	Construction Environmental Management Programme
CIGS	Copper Indium Gallium Selenide/ Sulphide
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CSP	Concentrated Solar Power
DAFF	Department of Agriculture, Forestry and Fisheries
DC	Direct Current
DEA	Department of Environmental Affairs (National)
DENC	Department of Environment and Nature Conservation – Northern Cape
DMR	Department of Mineral Resources
DOE	Department of Energy
DSR	Draft Scoping Report
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Impact Practitioners Association of South Africa
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
ESA	Early Stone Age
FSR	Final Scoping Report
GHG	Greenhouse Gas Emissions

GW	Gigawatt
HIA	Heritage Impact Assessment
IAPs	Interested and Affected Parties
IBA	Important Bird Areas of Southern Africa
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IPP	Independent Power Producer
IUCN	International Union for Conservation of Nature
kV	Kilovolt
LSA	Late Stone Age
LTMS	Long Term Mitigation Scenario
MSA	Middle Stone Age
MW	Megawatt
NCPSDF	Northern Cape Provincial Spatial Development Framework
NEMA	National Environmental Management Act
NEMBA	National Environmental Management: Biodiversity Act
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act
PGDS	Northern Cape Provincial Growth and Development Strategy
PPP	Public Participation Process
PV	Photovoltaic
REFIT	Renewable Energy Feed – in Tariff
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
SAHRA	South African Heritage Resource Agency
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency
SDF	Spatial development Framework
SPC	Spatial Planning Categories
SSC	Species of Special Concern
ToR	Terms of Reference
UNFCCC	United Nations Framework Convention on Climate Change
WULA	Water Use Licence Application
+ve	Positive
-ve	Negative

Glossary of Terms

Buffer Area / Zone	Areas that serve as buffers between core conservation areas and intensive land uses.
Critical Biodiversity Areas	Areas that are considered irreplaceable or important and necessary in terms of meeting targets for biodiversity pattern and process.
Environment	The external circumstances, conditions and objects that affect the existence and development of an individual, organism or group. These circumstances include biophysical, social, economic, historical and cultural aspects.
Environmental Impact Assessment (EIA)	A study of the environmental consequences of a proposed course of action.

Incremental Alternatives	Modifications or variations to the design of a project that provide different options to reduce or minimise environmental impacts
Independent Power Producer	Independent Power Producer is an entity, which is not a public electric utility, but which owns and or operates facilities to generate electric power for sale to a utility, central government buyer and end users.
Indigenous vegetation	Vegetation consisting of indigenous plant species occurring naturally in an area, regardless the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.
Interested and Affected Party	Any person, group of persons or organisation interested in or affected by an activity, and any Organ of State that may have jurisdiction over any aspect covered by the activity.
No-go Alternative	The no-go alternative assumes that the proposed development does not go ahead and the site remains in its current state
Photovoltaic	The conversion of light into electricity using semiconducting materials that exhibit the photovoltaic effect.
Plan of Study for EIA	A document which forms part of a Scoping Report and sets out how an Environmental Impact Assessment must be conducted.
Registered Interested and Affected Party (IAP)	An Interested and Affected Party whose name is recorded in the register opened for the application / project.
Renewable Energy Independent Power Producer Procurement Programme	As part of the rollout of renewable energy in South Africa the Department of Energy (DoE) has entered into a bidding process for the procurement of 3725 MW of renewable energy from independent power producers by 2016. This process is known as the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP)
Renewable Energy Feed – in Tariff	The National Energy Regulator of South Africa (NERSA) commissioned the development of a Renewable Energy Feed-in Tariff (REFIT) for South Africa, under its authority to regulate electricity tariffs in the country. The feed-in tariff requires the Renewable Energy Purchasing Agency (REPA), in this case the Single Buyer Office (SBO) of the national electricity utility Eskom, to purchase renewable energy from qualifying generators at pre-determined prices[
Scoping	A procedure to consult with stakeholders to determine issues and concerns and for determining the extent of and approach to an EIA, used to focus the EIA.
Scoping Report	A written report describing the issues identified to date for inclusion in an EIA.

Disclaimer

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

1 Background and Introduction

1.1 Background to the Study

Kloofsig Solar (Pty) Ltd proposes to develop a solar photovoltaic (PV) energy generation facility and associated infrastructure on the remaining extent (portion 0) of Farm 18, Kalkpoort in the vicinity of Petrusville in the Northern Cape (Figure 1-1). SRK Consulting (SRK) has been appointed by Kloofsig Solar, as the independent environmental consultants to assess the environmental impacts of the proposed development according in terms of the NEMA 2014 EIA Regulations. Due the size of the proposed Kloofsig Solar Facility, in accordance with the requirements of the NEMA 2014 EIA regulations the proponent needs to apply for environmental authorisation for the proposed activities via an Environmental Impact Assessment process in accordance with the procedure stipulated in GN R 982.

The proposed development consists of three project phases of 75 MW each (with a total power generation capacity of 225 MW should all phases be developed), covering a total area of approximately 970 ha. A preliminary layout plan indicating the location of each phase is shown in Figure 1-1 and described below, and a layout plan for **Kloofsig 1** (the subject of this report) is provided in Figure 2-3.

- Kloofsig 1 is at the centre of the site and includes a 132 kV powerline (approximately 8.5 km long) and a substation to enable connection to the grid at the existing 132 kV line running to the south-east of the site. An on-site substation and short connection to the 400 kV powerline crossing the site (this infrastructure will support all phases of the development, should they be developed) is also proposed**.**
- Kloofsig 2 is on the northern-most portion and includes the on-site substation and connection to the 400 kV powerline crossing the site as described for Kloofsig 1.
- Kloofsig 3 comprises the southern-most portion, connecting to the common infrastructure described above for Kloofsig 1.

For technical reasons associated with the Renewable Energy Independent Power Producer Procurement Program (REIPPPP), each of the three phases (Kloofsig 1, Kloofsig 2 and Kloofsig 3) require a separate environmental authorisation for the bidding process. The Department of Environmental Affairs (DEA) have specified that in order to obtain separate environmental authorisations, three separate EIA applications, and the associated reports, are required (see Application Forms in Appendix A). Consequently, three separate EIA process are being conducted concurrently for each of these projects.

It is important to note that the developer wishes to implement all three of the projects in order to improve the cost effectiveness of the shared infrastructure required to feed power into the nearby 400 kV powerlines. The possibility exists that DEA might authorise only one or two of the project phases and for this reason an order of preference (Kloofsig 1 being the first, and Kloofsig 3 the last) has been applied to these three EIA applications. During the course of this EIA process, the cumulative environmental impacts will be assessed incrementally in the sense that the significance of environmental impacts for Kloofsig 2 will be a combination of the impacts for Kloofsig 1 and Kloofsig 2, and the significance of environmental impacts for Kloofsig 3 will be a combination of the impacts for Kloofsig 1, Kloofsig 2, and Kloofsig 3.

*This report presents the findings for **Kloofsig 1**. Similar, and almost identical, reports are also available for Kloofsig 2, and Kloofsig 3. Key differences between these reports are highlighted by means of **bold text**.*

Note that the terms Phase 1, 2 and 3 are used interchangeably with the project names Kloofsig 1, 2 and 3 in this report, as the different projects are essentially different phases of the overall Kloofsig solar project.

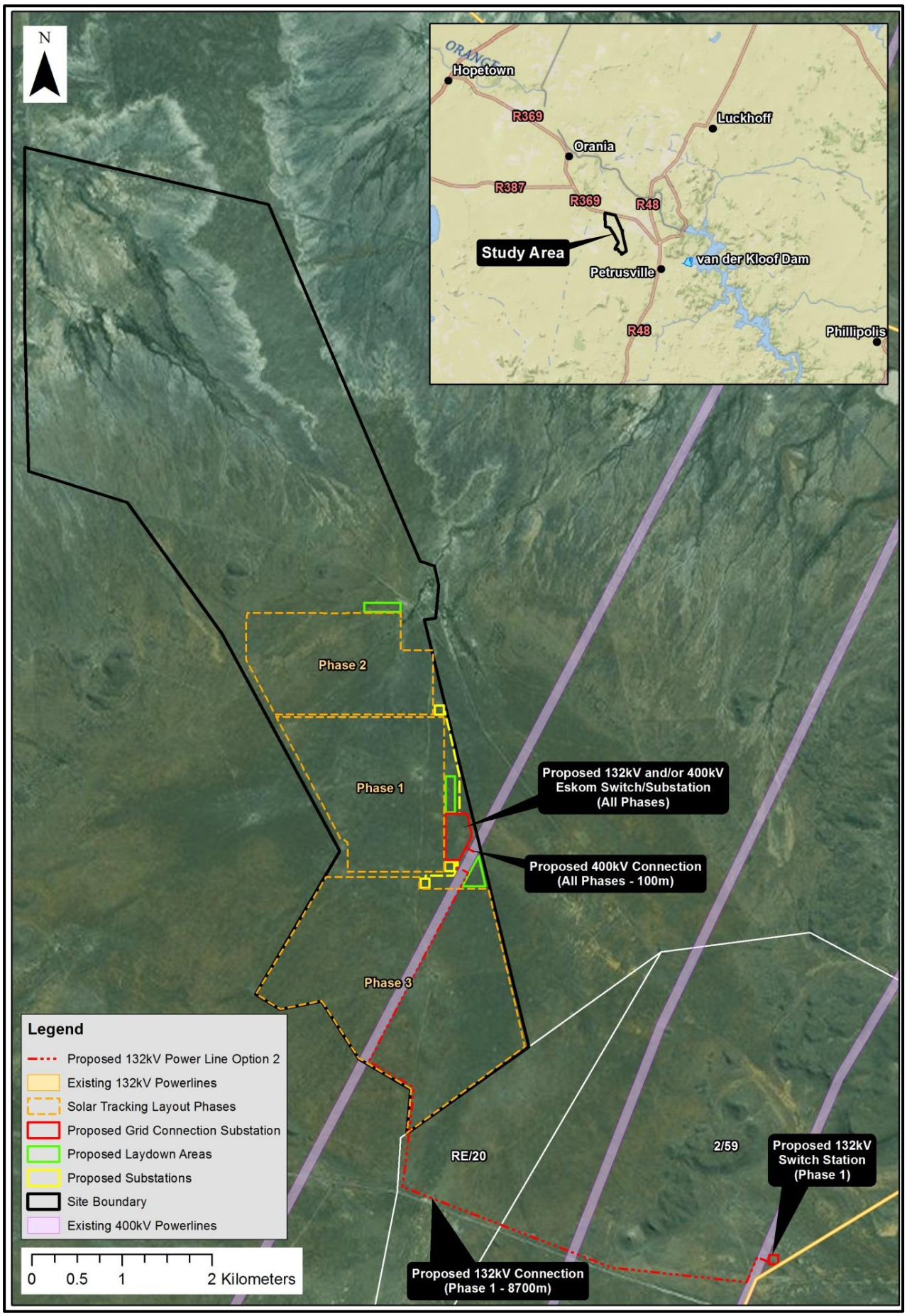

Figure 1-1: Site Locality Plan for all three phases

1.2 Specialist Studies

Certain baseline specialist studies (ecological, archaeological, and palaeontological) have been conducted during the scoping phase, with the aim of identifying any environmental constraints posed by the site at an early stage, and where possible accommodate them in the proposed layout. The results of these studies have informed the mapping of sensitive areas on and around the site, as shown on Figure 3-3.

Additional specialist studies, are proposed to be conducted during the EIA, however these are not anticipated to significantly influence project layout. Terms of reference (ToR) for all specialist studies are provided in the draft Plan of Study for EIA (Chapter 5 of this report). Details of the specialist team contracted to date are included in Table 1-1.

Table 1-1: Details of specialist study team

Study	Specialist
Biodiversity (including aquatic study)	Prof George Bredenkamp - EcoAgent
Avifauna	Dr Alan Charles Kemp
Palaeontology	Dr John Almond - Natura Viva
Archaeology	Ms Madelon Tusenius – Natura Viva
Agriculture Potential	To be confirmed
Visual Impact Assessment	Mr Keagan Allan - SRK Consulting

1.3 Details and Expertise of the Environmental Assessment Practitioners (EAPs)

The qualifications and experience of the independent Environmental Assessment Practitioners (EAPs) undertaking the EIA are detailed below and Curriculum Vitae provided in Appendix F.

Environmental Scientist: Karien Killian, MSc (Botany) Karien Killian is an Environmental Scientist and has been involved in environmental management for the past 2 years. Her experience includes Basic Assessments, Environmental Impact Assessments, Environmental Management Plans and Environmental Auditing.

Project Manager: Nicola Rump, MSc, EAPASA Nicola Rump is a Principal Environmental Scientist and EAPASA registered EAP, and has been involved in environmental management for the past 9 years working on South African and international projects including EIAs and ISO 14001 auditing for a variety of activities. Her experience includes Basic Assessments, Environmental Impact Assessments, Environmental Management Plans, Environmental Auditing and Stakeholder Engagement.

Project Director and Internal Reviewer: Rob Gardiner, MSc, MBA, Pr Sci Nat Rob Gardiner is the Principal Environmental Scientist and head of SRK's Environmental Department in Port Elizabeth. He has more than 22 years environmental consulting experience covering a broad range of projects, including Environmental Impact Assessments (EIA), Environmental Management Systems (EMS), Environmental Management Programmes (EMPr), and environmental auditing. His experience in the development, manufacturing, mining and public sectors has been gained in projects within South Africa, Lesotho, Botswana, Angola, Zimbabwe, Suriname and Argentina.

1.4 Statement of SRK Independence

Neither SRK nor any of the authors of this Report have any material present or contingent interest in the outcome of this Report, nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of SRK.

SRK's fee for conducting this EIA process is based on its normal professional daily rates plus reimbursement of incidental expenses. The payment of that professional fee is not contingent upon the outcome of the Report(s) or the EIA process.

As required by the legislation, SRK has completed and submitted a declaration of interest, as part of the EIA application form. A copy of this is included in Appendix A of this report and the qualifications and experience of the individual practitioners responsible for this project are detailed above.

1.5 Assessment of the Scoping Report

Before proceeding to the EIA phase, the Scoping Report and Plan of Study for EIA are assessed by the Department of Environmental Affairs (DEA).

In the spirit of cooperative governance, DEA will consult with other relevant organs of state before making a decision. These organs of state could include:

- National Department of Agriculture, Forestry and Fisheries (DAFF);
- Northern Cape Department of Water and Sanitation (DWS);
- Northern Cape Department of Agriculture, Land Reform and Rural Development (AGRINC);
- South African Heritage Resources Agency (SAHRA); and
- Department of Environment and Nature Conservation – Northern Cape (DENC).

SRK has distributed Background Information Documents (BIDs) to all the organs of state listed above, and will also give them an opportunity to comment on this report.

1.6 Legal Requirements Pertaining to the Proposed Project

The environmental legislation which is applicable to the authorisation of the proposed project is summarised in this Section.

National Environmental Management Act (Act No. 107 of 1998) (NEMA)

NEMA provides for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of the State, as well as to provide for matters connected therewith. Section 2 of NEMA establishes a set of principles that apply to the activities of all organs of state that may significantly affect the environment. These include the following:

- Development must be sustainable;
- Pollution must be avoided or minimised and remedied;
- Waste must be avoided or minimised, reused or recycled;
- Negative impacts must be minimised; and
- Responsibility for the environmental health and safety consequences of a policy, project, product or service exists throughout its life cycle.

Section 28(1) states that:

"Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring."

If such degradation/pollution cannot be prevented, then appropriate measures must be taken to minimise or rectify such pollution. These measures may include:

- Assessing the impact on the environment;
- Informing and educating employees about the environmental risks of their work and ways of minimising these risks;
- Ceasing, modifying or controlling actions which cause pollution/degradation;
- Containing pollutants or preventing movement of pollutants;
- Eliminating the source of pollution; and
- Remedying the effects of the pollution.

Legal Requirements for this Project

Kloofsig Solar has a responsibility to ensure that the proposed solar photovoltaic (PV) energy generation facility and associated infrastructure construction activities and the EIA process conform to the principles of NEMA. The proponent is obliged to take action to prevent pollution or degradation of the environment in terms of Section 28 of NEMA.

NEMA EIA Regulations

Sections 24 and 44 of NEMA make provision for the promulgation of regulations that identify activities which may not commence without an EA issued by the competent authority (DEA). In this context, the EIA Regulations, 2014 GN R982, which came into effect on 8 December 2014), promulgated in terms of NEMA, govern the process, methodologies and requirements for the undertaking of EIAs in support of EA applications. Listing Notices 1-3 in terms of NEMA list activities that require EA ("NEMA listed activities").

GN R82 of the EIA Regulations lays out two alternative authorisation processes. Depending on the type of activity that is proposed, either a Basic Assessment (BA) process or a S&EIR process is required to obtain EA. Listing Notice 1[1] lists activities that require a BA process, while Listing Notice 2[2] lists activities that require S&EIR. Listing Notice 3[3] lists activities in certain sensitive geographic areas that require a BA process.

The regulations for both processes – BA and S&EIR - stipulate that:

- Public participation must be undertaken as part of the assessment process;
- The assessment must be conducted by an independent EAP;
- The relevant authorities must respond to applications and submissions within stipulated time frames;
- Decisions taken by the authorities can be appealed by the proponent or any other Interested and Affected Party (IAP); and
- A draft EMP must be compiled and released for public comment.

GN R982 sets out the procedures to be followed and content of reports compiled during the BA and S&EIR processes.

[1] GN R983 of 2014
[2] GN R984 of 2014
[3] GN R985 of 2014

The NEMA National Appeal Regulations[4] make provision for appeal against any decision issued by the relevant authorities. In terms of the Regulations, an appeal must be lodged with the relevant authority in writing within 20 days of the date on which notification of the decision (EA) was sent to the applicant or IAP (as applicable). The applicant, the decision-maker, interested and affected parties and organ of state must submit their responding statement, if any, to the appeal authority and the appellant within 20 days from the date of receipt of the appeal submission.

The proposed project includes activities that are listed in terms of the EIA Regulations, 2014 (see Table 1-2).

Table 1-2: NEMA Listed Activities (2014) Applicable to the Proposed Project

No.	Listed activity
Listing Notice 1	
11 (i)	The development of facilities or infrastructure for the transmission and distribution of electricity –Outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.
24 (ii)	The development of a road with a reserve wider than 13.5 m, or where no reserve exists, where the road is wider than 8 m.
28 (ii)	….industrial developments where such land was used for agriculture on or after 1 April 1998 and where such development will occur outside an urban area, where the total land to be developed is bigger than 1 hectare.
56 (ii)	The widening of a road by more than 6 m, or the lengthening of a road by more than 1 km, where the existing road is wider than 8 m.
Listing Notice 2	
1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more.
15	The clearance of an area of 20 hectares or more of indigenous vegetation.

Legal Requirements for this Project

The proposed solar photovoltaic (PV) energy generation facility triggers activities listed in terms of GN R 983, GN R 984 and GN R 985, and as such the proponent is obliged to apply for environmental authorisation for the proposed activities via an Environmental Impact Assessment process in accordance with the procedure stipulated in GN R 982.

National Heritage Resources Act No. 25, 1999

The protection and management of South Africa's heritage resources is controlled by the National Heritage Resources Act (NHRA) 25 of 1999. The enforcing authority for this act is the South African Heritage Resources Agency (SAHRA).

In terms of the Act, historically important features such as graves, trees, archaeological artefacts/sites and fossil beds are protected. Similarly, culturally significant symbols, spaces and landscapes are also afforded protection. In terms of Section 38 of the National Heritage Resources Act, SAHRA can call for a Heritage Impact Assessment (HIA) where certain categories of development are proposed. The Act also makes provision for the assessment of heritage impacts as part of an EIA process and indicates that if such an assessment is deemed adequate, a separate HIA is not required.

[4] GN R993 of 2014, as amended by GN R2015 of 2015.

The Act requires that:

"…any person who intends to undertake a development categorised as the ... or any development or other activity which will change the character of a site exceeding 5 000 m² in extent or involving three or more existing erven or subdivisions thereof must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development..."

Legal Requirements for this Project

The proposed development triggers the requirement for an HIA in terms of the NHRA, and palaeontological and archaeological studies have therefore been completed as part of the EIA. SAHRA has been notified of the proposed project as per the requirement of the National Resources Heritage Act.

National Water Act No. 36 of 1998

The National Water Act 36 of 1998 provides for the promotion of efficient, sustainable and beneficial use of water in the public interest; for the facilitation of social and economic development; for the protection of aquatic and associated ecosystems and their biological diversity; and for the reduction and prevention of pollution and degradation of water resources. The Act also provides for emergency situations where pollution of water resources occurs. Section 21 of the Act describes activities that will require prior permitting before these activities may be implemented, including any changes to the river course and banks, changes to water flows and the discharge of water containing waste.

Legal Requirements for this Project

The development may include activities that are listed under Section 21 in which case Water Use Licence Applications (WULAs) would need to be prepared and submitted to the Department of Water Affairs for authorisation prior to development.

1.7 Approach to the Scoping Study

The approach taken in this study is guided by the principles of Integrated Environmental Management (IEM) as described in the IEM guidelines published by the Department of Environmental Affairs and Tourism in 1992 (now known as the Department of Environmental Affairs). The approach is therefore guided by the principles of transparency which are aimed at encouraging decision-making. The underpinning principles of IEM are:

- Informed decision making;
- Accountability for information on which decisions are made;
- A broad interpretation of the term "environment";
- Consultation with IAPs;
- Due consideration of feasible alternatives;
- An attempt to mitigate negative impacts and enhance positive impacts associated with the proposed project;
- An attempt to ensure that the social costs of the development proposals are outweighed by the social benefits;
- Regard for individual rights and obligations;
- Compliance with these principles during all stages of the planning, implementation, and decommissioning of the proposed development or activity; and
- Opportunities for public and specialist input in the decision-making process.

The study has also been guided by the requirements of the EIA Regulations set out in terms of the National Environmental Management Act (NEMA).

The EIA process consists of five phases, as depicted in Figure 1-2 below. The overall aim of the Scoping Phase is to determine whether there are environmental issues and impacts that require further investigation in the detailed EIA. More specifically, the objectives of the Scoping Phase for this EIA are to:

- Develop a common understanding of the proposed project with the authorities and IAPs;
- Identify stakeholders and notify them of the proposed activity and processes;
- Provide stakeholders with the opportunity to participate in the process and identify issues and concerns associated with the proposed activity;
- Identify potential environmental impacts that will require further study in the impact assessment phase of the EIA process; and
- Develop terms of reference for any studies that will be conducted in the impact assessment phase.

The activities that have been conducted to date as part of this Scoping Study are as follows:

- Placement of two on-site posters on 14 April 2015 (see Appendix B);
- Distribution of the Background Information Document (BID) for a 30 day comment period from 24 January 2016 to identified Interested and Affected Parties (IAPs), stakeholders and neighbouring residents. A copy of the BID is attached in Appendix C, and the list of notified IAPs and commenting institutions is given in Section 4.2.2 below;
- Distribution of the BID to the Ward 4 Councillor per registered mail on 18 February 2016.
- Collation of public and IAP comments on the BID and onsite posters, including responses to these issues;
- Inclusion in the Draft Scoping Report of issues that were raised (Section 4.2.2);
- Preparation of a Draft Scoping Report (this Report);
- Distribution of the Draft Scoping Report (this report) to public venues for review by IAPs;
- Distribution of an Executive Summary to all IAPs registered for this project.

The following activities are still to be conducted in the Scoping Study:

- Advertisement of the availability of the DSR in 'Die Volksblad';
- Provision of a 30 day comment period on the Draft Scoping Report (this report);
- Collation of public and IAP comments on the DSR, and incorporation of these into the Final Scoping Report;
- Distribution of the executive summary of the Final Scoping Report (including comments and responses report) to IAPs; and
- Submission of Final Scoping Report and Plan of Study for EIA to DEA for a decision regarding authorisation to proceed to the Impact Assessment phase of the EIA.

1.8 Purpose of this Draft Scoping Report

The Scoping process is aimed at identifying the issues and/ or impacts that may result from the proposed activities in order to inform the Impact Assessment phase of the EIA process. The Final Scoping Report (FSR) will form the basis of the Terms of Reference (ToR) for specialist studies, and it is therefore important that all issues and potential impacts that may be associated with the proposed development be identified and recorded.

The EIA process thus far has focussed on developing a more detailed description of the development proposal (which is expanded on in Chapter 2), and on identifying the potential impacts and issues and concerns of Stakeholders and IAPs.

IAPs are encouraged to review the DSR to ensure that their comments have been accurately recorded and understood.

These comments will be included in the FSR. The findings of the FSR will inform the Plan of Study for EIA.

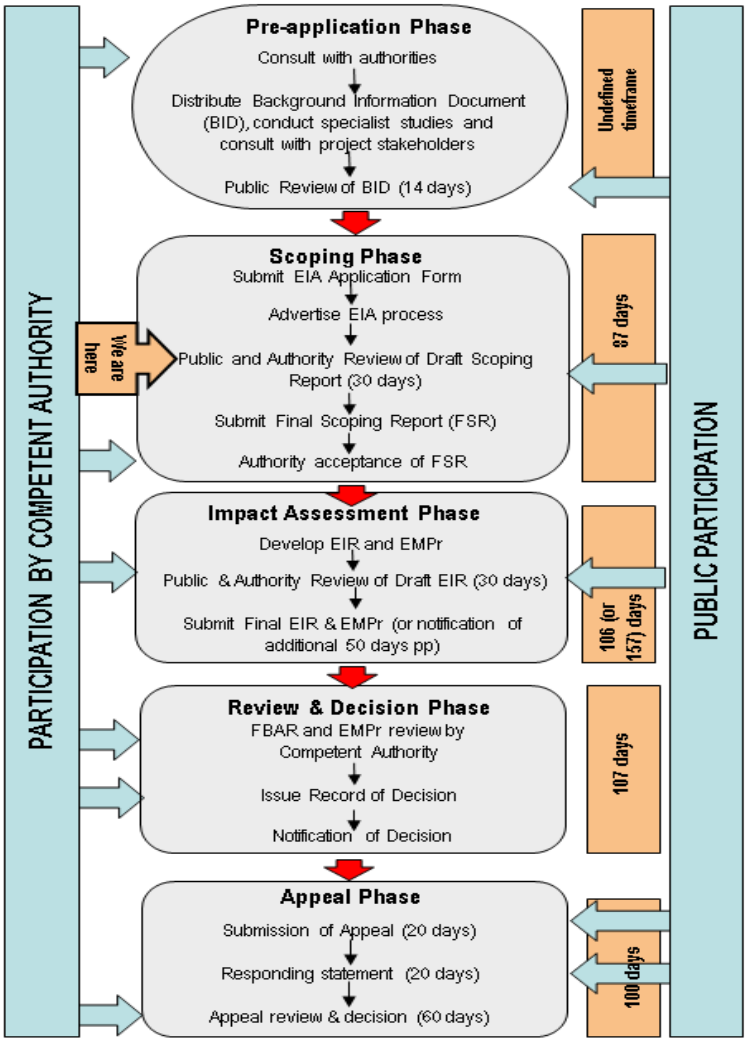

Figure 1-2: Environmental Impact Assessment (EIA) Process

1.9 Assumptions and Limitations

The following assumptions have been made during the Scoping Study and in the compilation of this document:

- That, due to the cost of preparing detailed designs and plans, such detailed design/planning information would only be developed in the event of environmental authorisation being granted. As such, it is anticipated that, as is typically the case in an EIA process, the EIA will assess broad land uses; and
- That the comments received in response to the public participation programme so far, are representative of comments from the broader community.

Notwithstanding these assumptions, it is our view that this Draft Scoping Report provides a good description of the potential issues associated with the proposed development, and a reasonable Plan of Study for EIA.

1.10 Structure of this Report

This report is divided into eight chapters:

Chapter 1 **Background and Introduction**

Introduces the Scoping Study and the legal context for the proposed photovoltaic energy facility.

Chapter 2 **Description of Development Proposal**

Describes the various components of, and the motivation for, the proposed photovoltaic energy facility.

Chapter 3 **Description of the Affected Environment**

Provides an overview of the affected biophysical and socio-economic environment in the Petrusville area.

Chapter 4 **The Public Participation Process**

Describes the Public Participation Process (PPP) followed, and the issues & concerns that have been raised by Interested and Affected Parties (IAPs).

Chapter 5 **Draft Plan of Study for EIA**

Provides an overview of the potential impacts that may result from the proposed development and a plan on how SRK proposes to address these impacts in the EIA phase.

Chapter 6 **The Way Forward**

Describes the next steps in the scoping process.

Chapter 7 **References**

Appendices Supporting information is presented in various appendices.

2 Description of Development Proposal

This chapter identifies the location and size of the site of the proposed Kloofsig PV Energy Facility, and provides a description of its various infrastructure components and arrangements on the site.

2.1 Need and Desirability

2.1.1 Electricity Supply

Two of the main rationales for the proposed solar facility are the need for additional energy generation as a result of increasing energy demand, as well as the contribution to the establishment of South Africa's renewable energy sector.

The White Paper of Renewable Energy (November 2003) recognises that South Africa's energy generation is predominately supported by coal-based energy generation (as a result of our large amount of coal resources) and has an extremely low market share of renewable energy generation. However, it is also recognised that the emissions of greenhouse gases, such as carbon dioxide, from the use of fossil fuels has led to increasing concerns about global climate change. The advancement of renewable energy resources is therefore recognised as a major contributor in countering climate change, protecting our natural resources, the biophysical environment as well as providing a range of environmental, economic and social benefits that will contribute towards long-term sustainability.

As reflected in the White Paper, the diversification of supply is an important element of improved energy security. South Africa is also well endowed with renewable energy resources, that can be sustainable alternatives to fossil fuels, but so far these have remained largely untapped.

According to the project proponent, the establishment of the proposed Kloofsig PV Energy Facility will aid the government in achieving its goal of a 30% share of all new power generation being derived from Independent Power Producers (IPPs). In addition to the above-mentioned potential benefits, the proposed project site was selected due to:

- Topographic suitability - the flat, generally level topography of the site;
- Existing power infrastructure in the area – 132 kV, 400 kV, and 765 kV powerlines run across and close to the site, allowing for relatively economical connection to the national power grid;
- The site is situated within a Central Transmission Corridor in terms of the Renewable Energy Development Zones (REDZ) and Transmission Corridors map published as part of the CSIR Strategic Environmental Assessment for Wind and Solar PV Energy in South Africa - Renewable Energy Development Zones (REDZs) (see Figure 2-1);
- Existing road access – the site can be accessed from two existing access route options, with minimal upgrades required;
- Most of the land comprising Kloofsig 1 has been previously disturbed;
- Low agricultural potential of the land;
- Relatively low environmental sensitivity of the land;
- There is a high need for economic development in the area;
- Good solar resource in the area and suitable climate; and
- High suitability for the technological solution of solar PV.

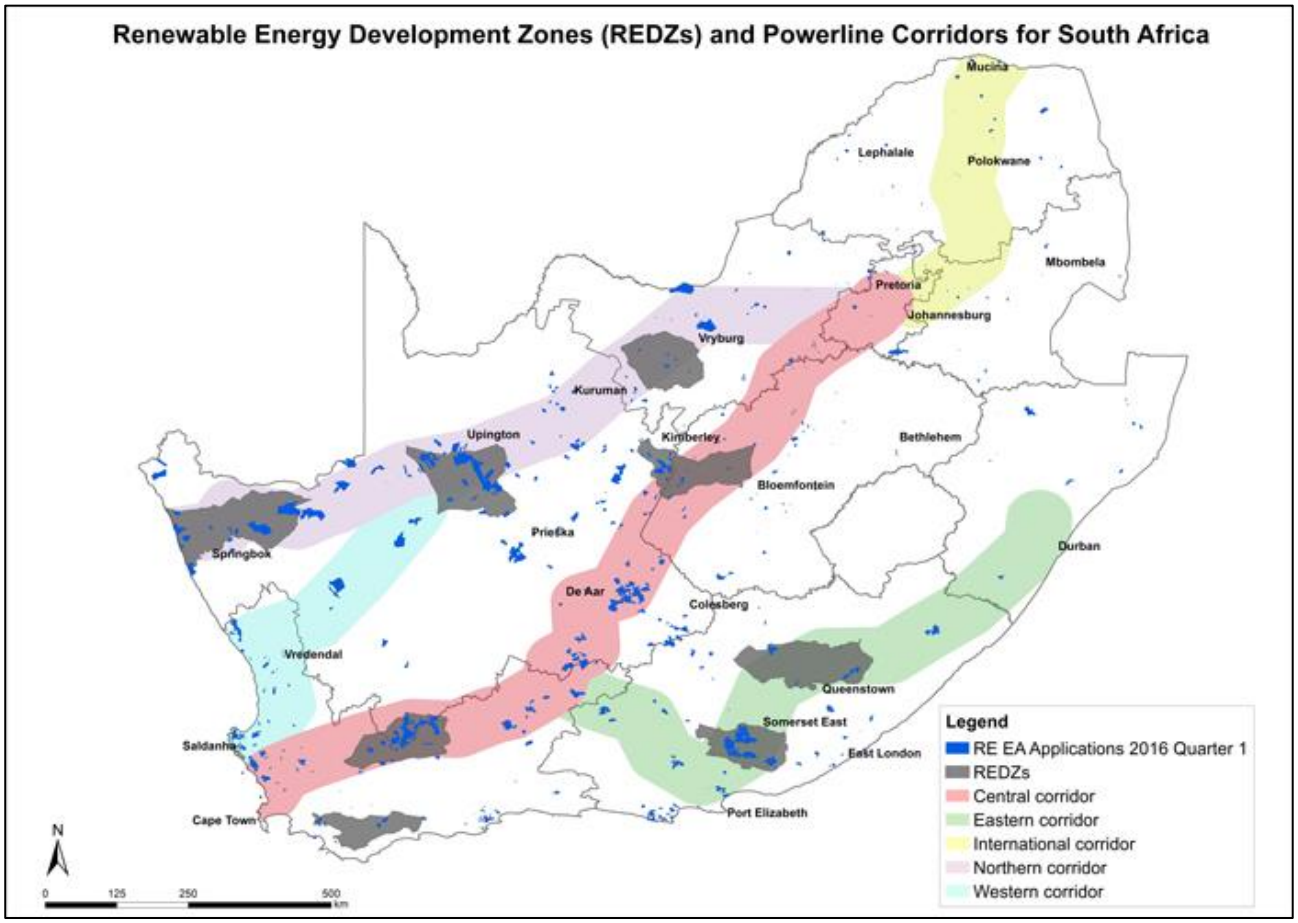

Figure 2-1: Map showing REDZ and transmission corridors (Source: https://redzs.csir.co.za/, 2016)

2.1.2 Social and Economic Development

Kloofsig PV Energy Facility intends to promote local economic growth and development through direct and indirect employment, as well as the identification and implementation of social development schemes during the projects operational phase.

The project will be subject to the REIPPPP bidding process, one of the key assessment criteria of which is likely to be a local economic development plan. This plan is currently not available.

2.1.3 Climate Change

Most of South Africa's energy comes from non-renewable sources like coal, petroleum, natural gas, propane, and uranium; however the proponents of renewable energy sources like biomass, geothermal energy, hydropower, solar energy, and wind energy is a major factor that the South African sector need to consider. It is estimated that approximately only 1% of the country's electricity is currently generated from renewable energy sources. The energy sector in South Africa alone emits approximately 380,988.415 Green House Gases (GHGs) (Eastern Cape Climate Change Conference, 2011). South Africa's total emissions was estimated to be 461 million tonnes CO^2 equivalent in the year 2000. Approximately 83% of these emissions were associated with energy supply and consumption, 7% from industrial processes, 8% from agriculture, and 2% from waste.

5 It is assumed this refers to carbon dioxide equivalents per annum. No attempt has been made to check this against the reference.

Eskom currently generates 95% of the electricity used in South Africa with an approximate 40.87 GW net maximum installed capacity.

By the year 2020 an additional 20 GW generation capacity would be required and up to 40 GW by 2030 to sustain the energy demands in the country. National energy policy has called for a change in the energy mix to reduce the dependency of the economy on fossil fuels and facilitate the uptake of renewable energy resources. This is in accordance with the prescriptions of the United Nations Convention on Climate Change 1994 (UNFCCC) and its associated Kyoto protocol of 1997, South Africa has put in place a long term mitigation scenario (LTMS) by which the country aims to develop a plan of action which is economically viable and internationally aligned to the world effort on climate change. During this period (2003-2050) South Africa will aim to take action to mitigate GHG emissions by 30% to 40% by the year 2050. This is a reduction of between 9000 tons and 17 500 tons of CO_2 by 2050. In January 2010, South Africa pledged to the UNFCCC, a 34% and 42% reduction against business as usual emissions growth trajectory by the year 2020 and 2025 respectively.

Due to concerns such as climate change, and the on-going exploitation of non-renewable resources, there is increasing international pressure on countries to increase their share of renewable energy generation. The South African Government (White Paper on Renewable Energy, 2003) has recognised the country's high level of untapped renewable energy potential and the equally high level of current fossil-fired power generation, and has placed targets of 10,000 GWh of renewable energy (biomass, wind, solar and small hydro) by 2013 in order to begin to redress the balance.

2.1.4 Planning Policy Framework

This section discusses a number of key formal planning policies relevant to the project. The policies and plans briefly discussed below include regional and local development and spatial plans, including the:

- Northern Cape Provincial Growth and Development Strategy (PGDS) (2011);
- Northern Cape Provincial Spatial Development Framework (SDF) (2012);
- Integrated Development Plans (IDPs) for the Pixley Ka Seme District and Renosterberg Local Municipalities, which formulate the specific needs in, and desirable developments for, municipalities; and
- SDF for the Renosterberg Local Municipality, which translates the aims of the IDP into a spatial dimension and, together with the IDP, aim to give effect to the national imperative to increase economic growth and promote social inclusion whilst ensuring that such growth is environmentally sustainable (DEA&DP, 2009).

This section implicitly examines the extent to which the proposed project is consistent with relevant plans, supported by an explicit analysis of need and desirability in Section 2.1

Northern Cape Provincial Growth and Development Strategy (2011)

The PGDS (Northern Cape Provincial Government, 2011) is a guiding tool for future development in the Northern Cape and identifies poverty as the most significant challenge facing the province. Long-term sustainable economic growth and development is recognised as a priority in order to ensure that challenges associated with poverty are addressed. The PGDS aims to guide and coordinate the allocation of government resources and private sector investment in order to facilitate sustainable development.

The PGDS defines a vision for the Northern Cape: 'building a prosperous, sustainable growing provincial economy to eradicate poverty and improve development for a caring society'. The

overarching objective of the PGDS is to ensure the integration of development processes and, in particular, to facilitate sustainable development throughout the province.

Northern Cape Provincial Spatial Development Framework (2012)

The Northern Cape Provincial SDF (Northern Cape Provincial Government, 2012) is a spatial planning document that guides district and local spatial initiatives such as IDPs and SDFs. The Provincial SDF is based on the principles of the PGDS and one of its overarching functions is to serve as a spatial land-use directive that aims to promote environmental, economic and social sustainability through sustainable development.

The SDF identifies a number of objectives, including the following:

- Provide a spatial rationale and directive for future development in terms of the principles of sustainability as advocated by the National Strategy for Sustainable Development;
- Give spatial effect to the provisions of the PGDS and guide the implementation of key projects;
- Provide guidance to public and private infrastructure investment in the province, taking cognisance of the growth and development potential of the various regions and settlements in the province; and
- Spatially co-ordinate and direct the activities and resources of provincial government departments.

The Provincial SDF identifies a number of Spatial Planning Categories (SPCs). These SPCs were formulated in terms of bioregional planning principles and collectively illustrate the desired matrix of land-use throughout the province. The SPCs are used to define a spatial vision for the province and are illustrated in a composite spatial vision of the Northern Cape Province (see Figure 2-2 for the south-eastern portion of the Province). The SPCs also provide a framework to guide decision-making regarding land-use at all levels of planning.

The proposed development area lies within the agriculture SPC. The agricultural areas in the project area are considered to be suitable for grazing with low to moderate grazing potential. According to the composite spatial vision for the Province, the N1 is identified as an important development corridor, located ~40 km to the north-west of the project site.

The site does not fall within a Buffer Area (i.e. areas that serve as buffers between core conservation areas and the intensive land uses (e.g. agriculture)). Buffer Zones provide an appropriate interim classification for conservation-worthy areas that do not have statutory protection, including ecological corridors, Critical Biodiversity Areas (CBAs), irreplaceable habitats and major wetland and catchment systems. The closest Buffer / Critical Biodiversity Area to the proposed site is approximately 200 km to the west (Figure 2-2 and CBA Map in Appendix G).

The Provincial SDF identifies a general approach to the investment of public and private funds. This is based on the business principle that investment should be directed where the best return on such investment can be generated. The Renosterberg Local Municipality, in which the Kloofsig development is located, is identified as having a generally high human needs index and a low development potential (NCPSDF, 2011). The surrounding area is therefore considered a high priority area for public and private investment and social development. Investment into social capital, infrastructure development and large scale capital investment, producing secondary economic and social benefits, are deemed appropriate in this area.

The closest settlement to the development, Petrusville's, economic base is categorised as a Service Centre which serves the daily needs of a surrounding farming community, e.g. providing educational,

religious, shopping and professional services. The area has a medium development potential and medium human need and the investment types required are social and infrastructure.

Pixley Ka Seme District Municipality Integrated Development Plan (2011-16)

The Pixley Ka Seme District Municipality's IDP (Pixley Ka Seme District Municipality, 2011) is a strategic plan that is used to guide the development of the District for a specific period, in this case 2011-2016. It guides the planning, budgeting, implementation, management and future decision making processes of the District Municipality. As district municipalities play an important role in the coordination of government actions across national, provincial and local government, the District IDP provides for strategic guidance, coordination and alignment of local municipality initiatives and national and provincial departments active in the district.

The main aims of development in the Pixley ka Seme District identified in the IDP are improving the quality of life of all people, promoting sustainable development in the region through effective and efficient service delivery, improving the health and living conditions of the poor and promoting local economic development and job creation. Addressing the following issues was identified as key to the long-term economic prospects of the District:

- Backlogs in the provision of basic services in rural areas and informal settlements;
- Limited availability of water in the district and its impact on economic and social activities;
- HIV/AIDS and its impact on regional demographics;
- Attracting international capital;
- Preservation of a pristine environment;
- Release and distribution of land to facilitate development;
- Spatial inequalities; and
- High levels of unemployment and poverty.

The IDP also identified opportunities in the region's location between South Africa's major cities (Bloemfontein, Cape Town, Johannesburg and Pretoria) and along several major national highways (N1, N12, N9 and N10) as well as in the rapid recent growth of renewable energy projects in the region.

Renosterberg Local Municipality Integrated Development Plan (2015-16)

The Renosterberg Local Municipality's IDP for 2015 – 2016 identifies various developmental needs. Key issues identified in the IDP from a municipal perspective include the following:

- Development of sites and building of subsides housing in Phillipstown and Keurtjieskloof;
- Construction of roads;
- Upgrading of gravel streets in Phillipvale;
- Upgrading of sports grounds in Philiipstown;
- Upgrading of the water network in Vanderkloof;
- Development of a taxi rank in Petrusville;
- Development of new erven in Petrusville;
- Ablution facilities in graveyards in Petrusville and Philipstown;
- Traffic testing station on Philipstown;
- Construction of libraries in Petrusville and Philipstown;
- Upgrading of sports facilities in Vanderkloof;
- Resurfacing of roads in Vanderkloof;
- Development of parks and open areas;

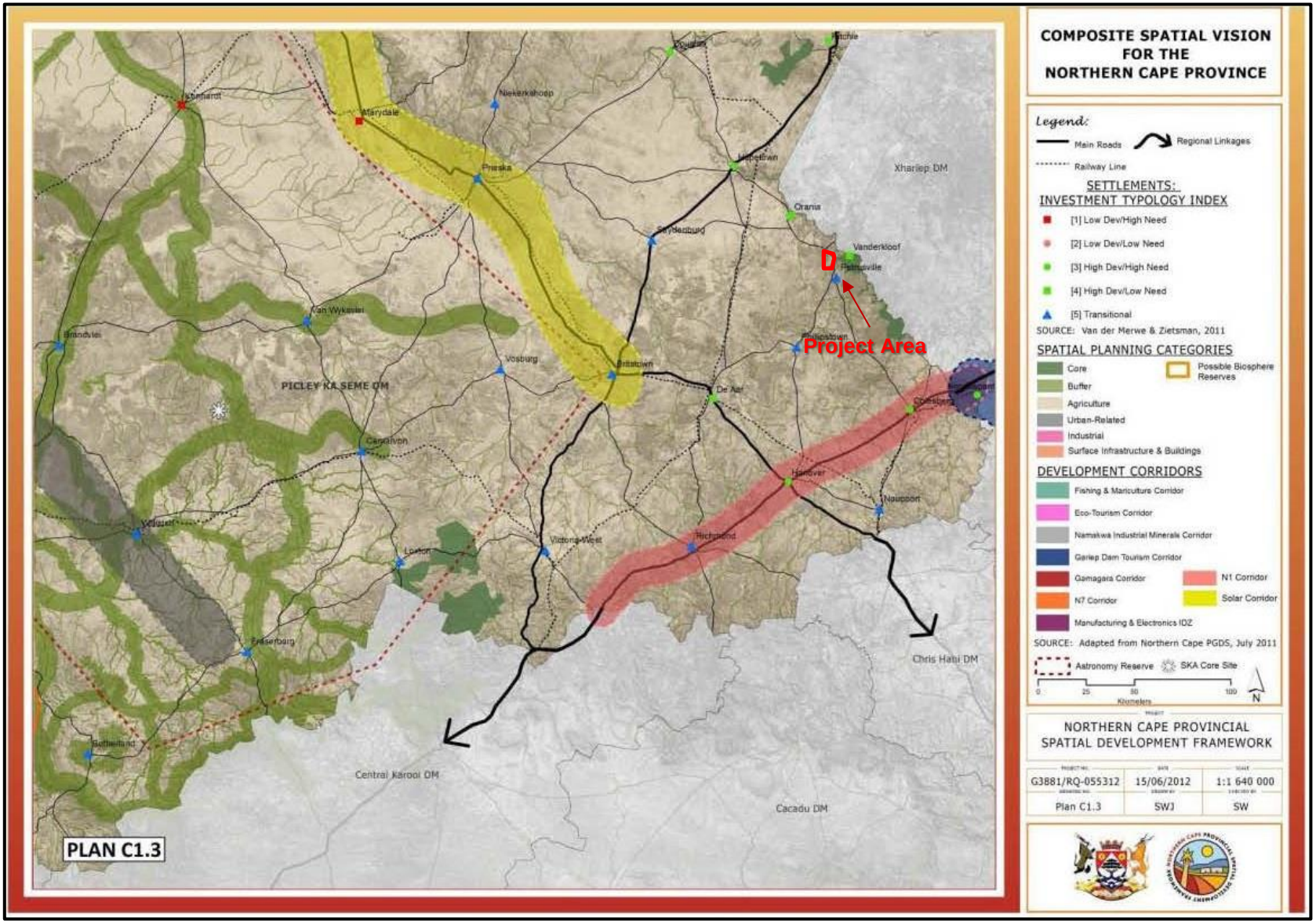

Figure 2-2: Provincial SDF Composite Spatial Plan for the project area (Source: SDF for the Northern Cape Province, 2012)

- Development of solar parks in Petrusville and Philipstown;
- SMME development training;
- Vanderkloof Holiday resort;
- Clay brick making in Petrusville;
- Poultry farming in Petrusville; and
- Aquaculture in Vanderkloof.

Renosterberg Local Municipality Spatial Development Framework

The SDF for the Renosterberg Local Municipality provides an overview of local socio-economic conditions and needs and largely re-affirms the planning principles and strategies expressed in the Pixley Ka Seme District SDF pertaining to the local municipality. Key spatial principles noted in the local SDF are:

- Give effect to the principles contained in Chapter 1 of the Development Facilitation Act, 1995 (Act No 67 of 1995).
- Preferential and focus areas for certain types of land uses.
- The location of projects identified as part of the integrated development planning process.
- Reflect the spatial objectives and strategies contained in the IDP.
- Indicate the desired direction of urban expansion and the most appropriate use of vacant land where appropriate and desirable.
- A business plan for implementation of the spatial development framework.

In a rural context it will be necessary also to deal specifically with:

- natural resource management issues,
- land rights and tenure arrangements,
- land capability,
- subdivision and consolidation of farms, and
- the protection of prime agricultural land.

2.2 Location and Site Description of the Proposed Project

The proposed solar farm is located on Portion 0 (Remaining Extent) of Farm 18, Kalkpoort in the Renosterberg Local Municipality within the Pixley Ka Seme District Municipality, Northern Cape Province, South Africa (Figure 1-1). The project has a total study area (for all three phases) of approximately 970 ha located on remaining portion of Farm 18, Kalkpoort. The closest towns to the proposed site are Petrusville, 11 km to the southeast, and Van Der Kloof, 16 km to the east. The Rolfontein Nature Reserve is situated approximately 20 km from the proposed site. The reserve covers an area of 8 400 ha and is located on the southern bank of the Vanderkloof Dam, on the Orange River.

Kloofsig 1 is located in the centre of the site and includes a 400 kV on-site substation and a 132 kV overhead powerline connection of approximately 8.6 km (crossing portion 0 of Farm 20, Alwyn Vlakte) connecting to a 132 kV substation on Portion 2 of the Farm 59, Doornfontein. This allows connection to the 132 kV Eskom powerline running to the south-east of the site, as shown on Figure 2-3. Relevant property details are provided in Table 2-1.

Table 2-1 Property details for Kloofsig 1

Farm Name/ Erf Number	Portion 0 (Remaining Extent) of Farm 18, Kalkpoort	Portion 0 (Remaining Extent) of Farm 20, Alwyn Vlakte	Portion 2 of Farm 59, Doornfontein
SG 21 Digit Code	C05700000000001800000	C05700000000002000000	C05700000000059000002
Physical Address	Kloofsig Petrusville 8770	Aalwyn Vlakte Petrusville 8770	Doornfontein Petrusville 8770
Coordinates	24° 32' 31.783" E ; 29° 59' 25.797" S	24° 33' 49.248" E; 30° 3' 7.366" S	24° 35' 31.729" E; 30° 3' 35.362" S

2.3 Detailed Description of the Proposed Project

2.3.1 Proposed Activities

The proposed development consists of three project phases of 75 MW each (with a total power generation capacity of approximately 225 MW should all phases be developed), each including a small on-site substation (converting 33 kV to 132 kV), and covering a combined area of approximately 970 ha.

This scoping report ('Kloofsig 1') is for the first of these three phases and includes a 132 kV overhead powerline (approximately 8.5 km) and a substation to allow connection to the existing 132 kV powerline running to the south-east of the site as well as a 132 kV switching station at the Eskom connection point. An additional on-site substation (converting 132 kV to 400 kV power) and short connection line to the existing 400 kV powerline crossing the site is also proposed, due to uncertainty regarding the future capacity of the 132 kV Eskom line to accept the connection from the proposed project at the time of development (capacity is however currently available). Although authorisation for both of the powerline connections described above is sought for Kloofsig 1 by the applicant, the intention is that only one of these would be developed, depending on the available grid capacity at the time of development. The total footprint of Kloofsig 1 is in the order or 270 ha and includes the 31 m servitude of the 132 kV powerline to the south of the site.

The main components of the proposed solar energy facility, which will be similar for each of the proposed phases (Kloofsig 1, 2 and 3) are listed as follows (as shown on Figure 2-3):

- Solar panels (fixed or tracking), mounted in arrays/modules;
- Arrays/modules of solar panels arranged in clusters;
- Underground low voltage cables linking solar panels within a cluster to an inverter (for converting DC to AC current);
- Substations – a 132 kV collector / step up substation for each phase (covering an area of 1 ha), as well as a central switching substation (covering an area of approximately 12.4 ha) servicing all three phases and allowing for connection to the nearby 400 kV Eskom overhead powerline. **Kloofsig 1 will also include a second switching substation to the south-east of the site;**
- Underground power cables (of a medium voltage) from inverter substations to a central collector/ step-up substation for each phase;
- A 132 kV above ground powerline with maximum tower height of 24 m, connecting the step-up substations with the switching substations (both on-site and **to the south-east of the site for Kloofsig 1**);

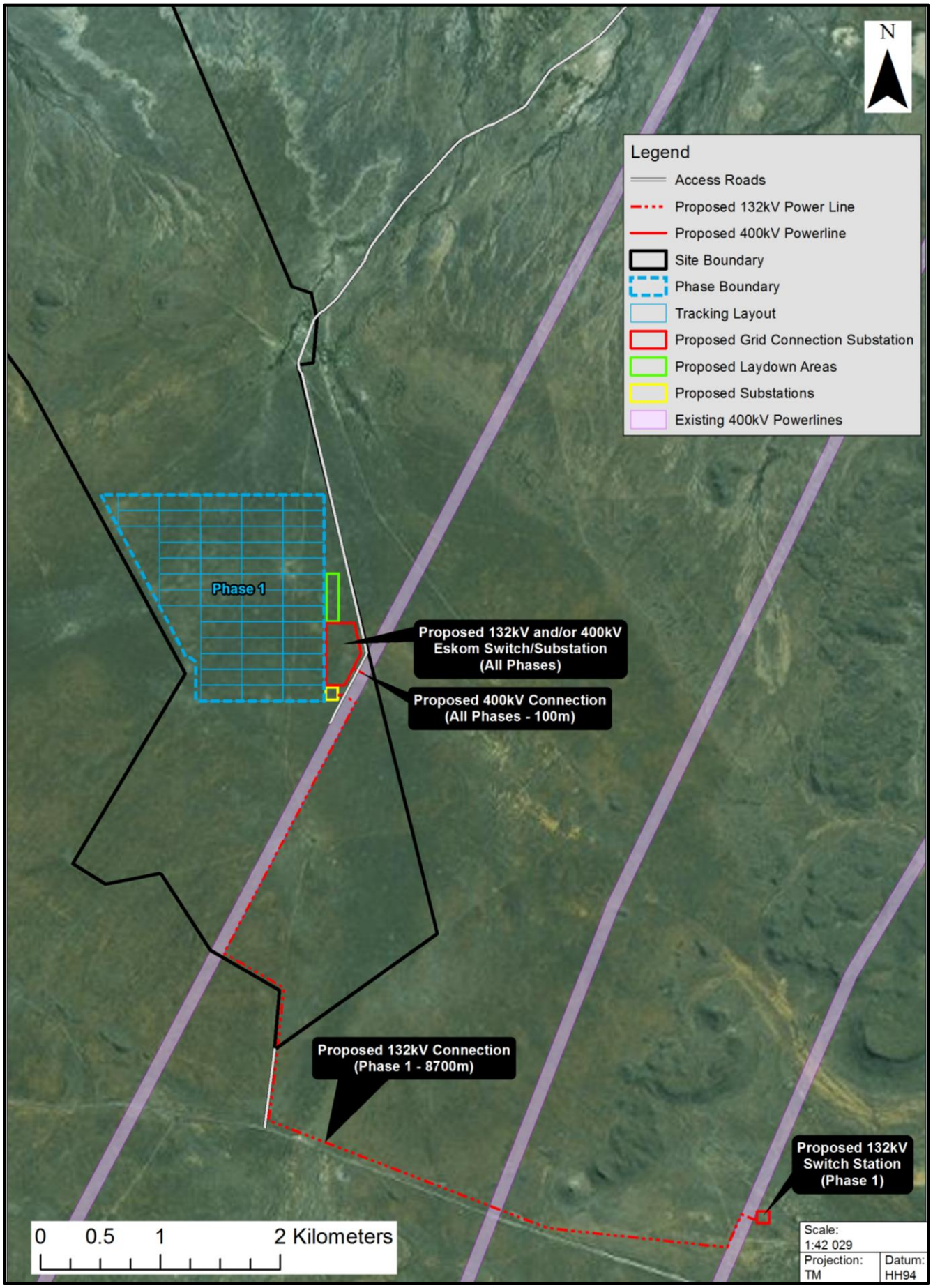

Figure 2-3: Preliminary layout plan for Kloofsig 1

- A 33 kV below ground powerline with Supervisory Control and Data Acquisition (SCADA) (a system for remote monitoring and control);
- Laydown areas and construction camp– a laydown area has been set aside for each phase;
- Offices, ablution facilities, store room- permanent office, ablution and store room facilities will be situated at the 1 ha on-site substation buildings for each phase.

2.3.2 Associated Infrastructure

In addition to the main components of the development proposal as listed in Section 2.3.1, a number of related infrastructure is required.

Roads (Access and Internal)

Access to the site from the R 369, between Van der Kloof and Orania, is via the existing Kalkpoort gravel road to the northeast of the site. The Kalkpoort gravel road will require maintenance (e.g. re-gravelling, and refurbishment of culverts) and expansion (both in length and width) to extend the road to the southern side of Kloofsig 1. A second access road (approximately 500 m long) to the south of the site, connecting to the existing secondary road running south of the site is also proposed. A network of internal roads (i.e. on the farm) would be required, and these are envisaged to be 4- 5 m in width.

Water Supply

It is proposed that the water requirements for the development are supplied by existing or new boreholes on the property. During the construction phase water may also be needed for dust suppression and building requirements. Water will be required for washing panels during the operational phase.

The anticipated water demand during construction is 53 m³/day, and during operation with fire suppression it is estimated to be 18 m³/day, and without fire suppression 11 m³/day. Water will be pumped from the boreholes into storage tanks until required.

Wastewater

Minor quantities of domestic sewage would be generated during the construction & operational phases and it is proposed that these would be discharged to a septic tank & soak away system. In the event that this is not technically feasible, then conservancy tank(s) would need to be installed.

Solid Waste Management

A number of waste streams are anticipated. These include:

- Considerable amounts of solid waste (mainly packaging material) during the construction phase. This waste stream, and the storage thereof, would be temporary and inert;
- Small quantities of domestic waste associated with the staff facilities during the construction and operational phases;
- Occasional scrapped equipment during the operation of the site (e.g. defective panels, tracking systems, etc.); and
- Occasional transformer oils from routine maintenance activity.

It is anticipated that these, and other waste streams can be readily managed, including any temporary on site storage, and transportation for off-site disposal. A considerable amount of the waste generated would be recyclable, and some of this would have high economic value.

2.4 Project Development Phases and Associated Physical Activities

The construction phase is expected to start within one year of successful application for preferred bidder status in the Department of Energy's REIPPPP programme, and take 12 to 18 months to complete. The operational phase is expected to have a lifespan of approximately 20 years after

which the facility would either be decommissioned or refurbished for an additional 20 year operating period.

The main physical activities that will take place during each of the phases of the development are summarised below.

2.4.1 Construction Phase (12 – 18 Months)

The following activities will take place during the construction phase:

- Conducting of surveys prior to construction (typically a hydrogeological survey, geotechnical survey, a site topographical survey etc.);
- Clearing of vegetation in selected areas (e.g. for roads and substations) and possible removal of topsoil that will be stock piled and backfilled/ spread on site after construction;
- Construction of internal access roads as well as maintenance/upgrading / extension of access road from the nearest provincial road;
- Transportation of equipment – most of the equipment could be transported in modules and would not need special arrangements, except for the transformers, which may be classified as abnormal loads;
- Construction of camp and temporary equipment lay down areas – equipment will be temporarily stored in the lay down area before installation;
- Installation of PV panels, which entails the drilling of holes into the ground in order to install round galvanised steel posts upon which modular frames (with the solar photovoltaic panels) are to be attached to;
- Installation of a security fence around the boundary of the site;
- Construction of inverter substations;
- Construction of a step-up substation. The substation will have transformers to step up the medium voltage (33 kV) to high voltage 132 kV. Switchgear and metering equipment will also be established in the substation;
- Installation of internal medium voltage underground power lines from the inverter substations to a central collector/ step-up substations;
- **Construction of a 132 kV overhead power lines (approximately 8.5 km long) - if the 132 kV connection south of the site is used - running from the on-site step-up substation to the Eskom 132 kV proposed switching substation**;
- **Construction of an Eskom 132 kV switching substation (off-site) and associated powerline grid connection, if this connection option is available;**
- Construction of a 400 kV Eskom step-up substation (on-site, **if the 132 kV connection south of the site is not available)**. The substation will have transformers to step up the high voltage (132 kV) to high voltage 400 kV. Switchgear and metering equipment will also be established in the substation;
- Construction of a 400 kV powerline between the 132 kV step-up substation and 400 kV substation **(if this connection option is required)**;
- Construction of Control room for the operation, maintenance personnel and equipment storage; and
- Site rehabilitation.

2.4.2 Operation and Maintenance Phase (± 20 years)

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

The following activities will take place during the operation and maintenance phase:

- Cleaning of panels – Staff will be on site to clean PV panels four times a year (in 90 day cycles);
- Security staff will be permanently on site; and
- Control/ maintenance staff will be on site as required.

2.4.3 Decommissioning Phase

The following activities will take place during the decommissioning phase:

- Site preparation – a laydown area will be required when disassembling the equipment;
- Disassembling and removal of equipment and infrastructure that does not have an ongoing use on the site, for re-use or recycling; and
- Rehabilitation of the site.

2.5 Project Alternatives

One of the objectives of an EIA is to investigate alternatives to the proposed project. The no-go alternative is included as the baseline against which the impacts of the other alternatives are assessed.

2.5.1 Activity Alternatives

The current zoning for the property is agriculture. The current development proposed is the production of renewable energy.

Alternative technologies for electricity generation on this site are not feasible. As such, the scope of this EIA process does not include an assessment of fundamental technology alternatives.

2.5.2 Site Alternatives

The proposed site for the Kloofsig development was identified based on its favourable climatic conditions for a solar facility, large, flat expanse of available land, close proximity to the existing 400 kV powerlines for connection to the Eskom grid, existing transport access onto the site, and availability of water (through existing boreholes).

Consideration was initially given to the development of the full extent of the Farm, consisting of approximately 2,606 hectares (see layout presented in Figure 2-3), however the proposed area for development has subsequently been reduced to approximately 970 hectares (the southern portion of the Farm) currently proposed for development (in three phases). A site sensitivity screening study (based on heritage and ecologically sensitive features), was undertaken prior to the scoping stage of the project and was used to identify the most suitable portion of the Farm for development (see environmental sensitivity map in Figure 3-3).

Based on the above, the scope of this EIA process does not include an assessment of site alternatives.

2.5.3 Layout and Technology Alternatives – PV panels

The two main technology options available with regard to solar energy generation are solar photovoltaic (PV), and concentrated solar power technology (CSP). CSP is not considered to be a viable option for the site due to the large volumes of water that are required for power generation, as well as its higher visibility compared to PV, and therefore will not be assessed further in this EIA.

A PV cell is made of silicone that acts as a semi-conductor used to produce electricity, and is positively charged on one side and negatively charged on the other, with electrical conductors attached to either side to form a circuit. A PV panel consists of a number of linked PV cells placed behind a protective glass sheet. An inverter must be used to change the direct current (DC) from the PV cells to alternating current (AC) to feed into a power line.

The following two PV technology alternatives, as determined by the panel mounting system, will be considered for the proposed project:

- Fixed mounted PV panels (static/ fixed-tilt panels); and
- Tracking PV panels (panels that follow the sun's movement through rotation on a fixed axis).

The precise layout of the facility is dependent on the environmental and technical factors associated with the site, as well as the type of technology used (fixed or tracking panels). Apart from slight differences in layout, these two technologies are not expected to result in significant differences in potential environmental or social impacts or mitigation measures required, however this will be confirmed during the Impact Assessment phase of the EIA.

The input of a variety of specialists has been used in defining preferred no-go and buffer areas from environmentally sensitive areas (water courses, sensitive plants/species, heritage features, etc.), and considerations of visibility and agricultural potential will also be taken into account as required. The preliminary layout presented in this report could accommodate either of two technology alternatives proposed – namely tracking or fixed panels, with relatively little adjustment. During final design the layout for the project will be refined based on the sun tracking technology alternative selected (taking into account site-specific sensitivity information).

Alternative 1: Fixed Panels

In a fixed mounted PV system (fixed-tilt), PV panels are installed at a pre-determined angle, which does not change. Advantages of this system include:

- Lower maintenance and installation costs compared to a tracking system, which is mechanically more complex given that PV mountings include moving parts;
- Established technology with proven reliability, and easier and more economical replacement of parts compared to tracking systems;
- Robust system that is designed to withstand greater exposure to winds than tracking systems;
- Occupy less space than tracking systems.

Under this alternative, modules of solar panels are supported on galvanised steel frames mounted into the ground. The proposed solar facility will be constructed in clusters, with a certain number of rows of solar panels per cluster, determined by the technology and power of the panels. Clusters will be connected by underground cables to inverter substations.

An array is the arrangement of fixed panels, typically 2 or 3 panels in each row, with a separation between arrays (see Figure 2-5). The area required for fixed systems is less than tracking, but the yield from each fixed panel is less than that obtained by means of tracking panels (tracking panels have a 20% higher yield). Fixed panels are thus advantageous in the extent of land required, but are not preferred economically. In this arrangement, panels are orientated along an east / west axis, facing to the north.

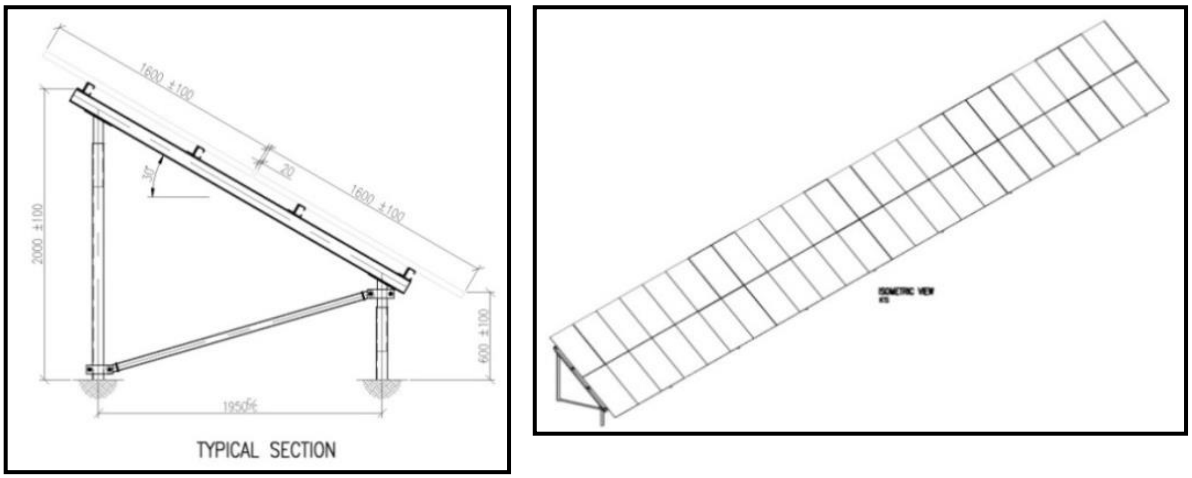

Figure 2-4 Typical section of fixed panels

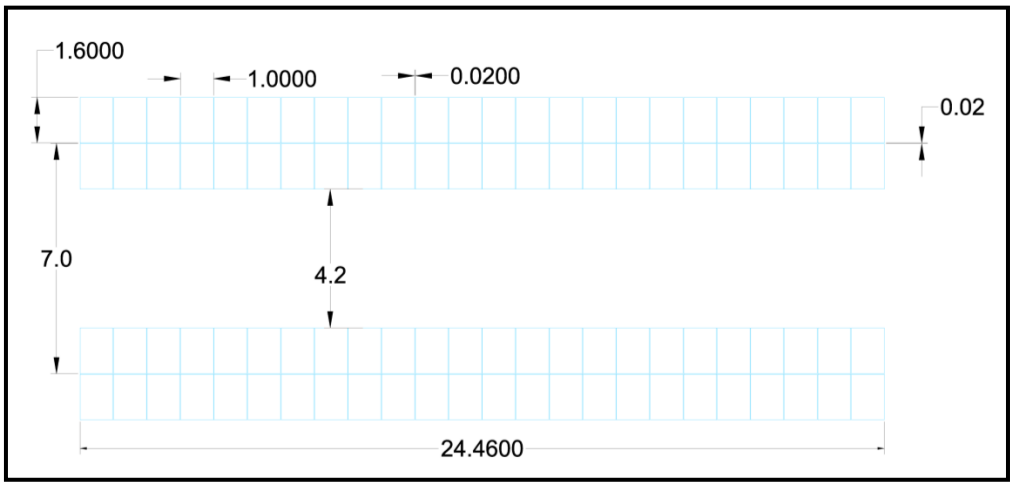

Figure 2-5 Typical arrangement of fixed panels

Alternative 2: Tracking Panels

Tracking PV Systems (single axis or dual axis trackers) are fixed to mountings which track the sun's movement, optimising panel orientation and thereby enabling it to maximise output power. A 'single axis tracker' tracks the sun from east to west, while a dual axis tracker is also equipped to account for seasonal waning of the sun. These systems utilise moving parts and more complex technology than fixed systems, 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 thereby enabling it to generate the maximum possible output power.

This layout alternative is also determined by the space and orientation requirements for the tracking system. Under this alternative, panels are arranged in continuous lines on a north-south axis and rotate around this axis to maintain a constant angle of incidence with solar radiation.

A typical arrangement of tracking frames is shown in Figure 2-6 and of each cluster in Figure 2-7. Clusters will be connected by underground cables to inverter substations, and separated from each other by a ±5 m wide road.

The tracking PV system offers the following advantages over fixed panels:

- Higher yield from panels (approximately 20% higher);
- Less shade under the panels, i.e. for any point of the surface, the amount of time that such a point is in the shadow of a panel is less than for fixed panels; and
- Less possibility of reflections to nearby receptors.

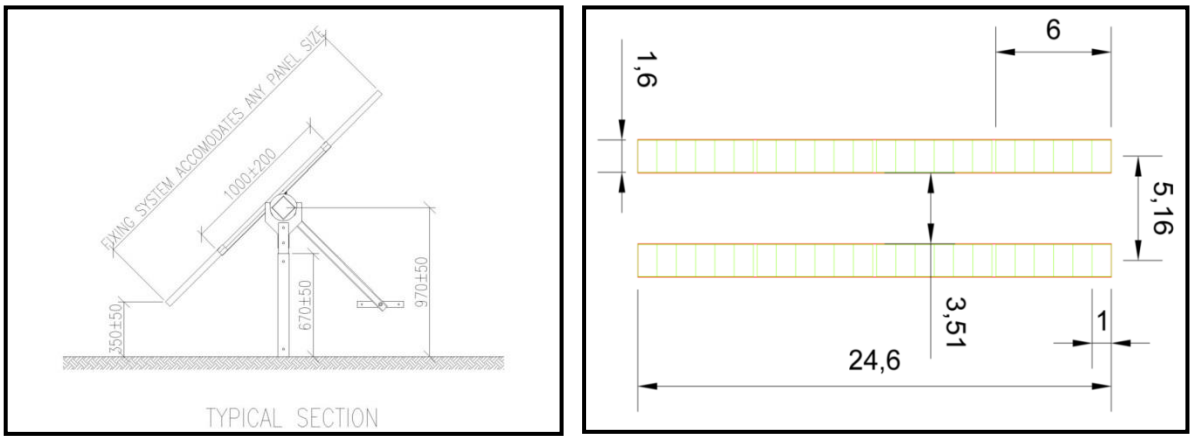

Figure 2-6 Typical section and arrangement of tracking panels

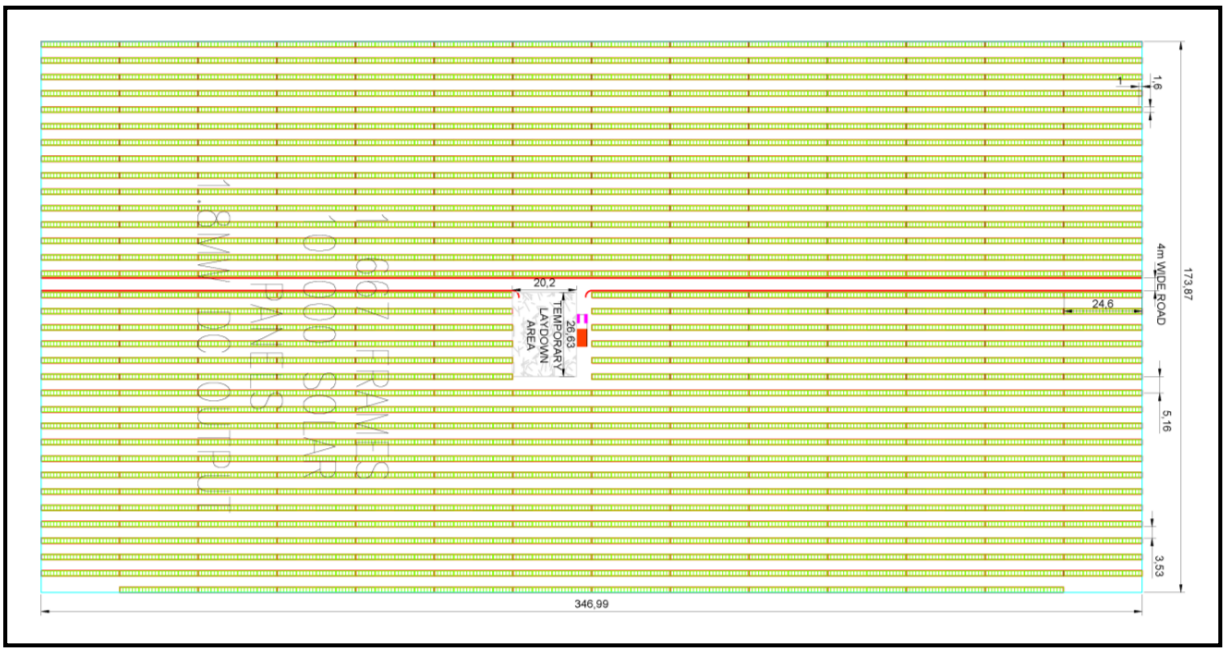

Figure 2-7: Typical block layout of tracking solar panels

2.5.4 Technology alternatives - 132 kV Power Lines

Generated electricity will be collected via a system of underground medium voltage cables, and then transformed into high (132 kV) voltage and reticulated to the point of connection on the 400 kV **or 132 kV** line. The length of the 132 kV line depends on the final layout, and the position of the internal substation, which is most energy efficient if in the centre of the PV panels. **For Kloofsig 1, the length of the 132 kV connection line to the South of the site will be in the order of 8.5 km, and for the on-site 400 kV connection option (if required for Kloofsig 1) this length will be substantially less.** The connection lines may require multiple strings of conductor. Above ground transmission is proposed due to initial cost, ease of maintenance, and ability to span environmentally sensitive areas and servitude areas. The following alternatives are considered for this 132 kV overhead line:

Alternative 1: Lattice Masts

The most economical; and technically preferred alternative is a 24 m high lattice mast. This design is similar to the existing Eskom lines used throughout South Africa.

Alternative 2: Monopoles

Monopoles are self-supporting steel structures with a much smaller footprint (between 0.5 m² and 8 m²) compared to lattice masts (between 36 m² and 64 m²).

2.5.5 Operational Alternatives

Cleaning of the panels (to optimise their operation) would be necessary from time to time (depending on the amount of dust in the air), and would require water.

For **Kloofsig 1**, it is assumed that panels will be washed with water, including small amount of biodegradable detergent, four times a year (90 day cycles). Approximately 11 m^3 of water per day (increased to 18m^3 with the inclusion of water for fire suppression) will be required to achieve this (per phase of the development). It is anticipated that existing boreholes within close proximity to the facility be used as the primary water source. The suitability of the potential yield and water quality from these boreholes will be confirmed later in the project planning process.

2.5.6 No-Go Alternative

The no development option assumes the site remains in its current state, i.e. agricultural land. The no-go alternative will be used as a baseline throughout the assessment process against which potential impacts will be compared.

Not implementing the activity would have the following socio-economic and environmental implications:

- Comparatively low value agricultural activity would continue;
- No power generation by means of renewable energy would mean that the benefits in terms of energy security at a national level would not be realised;
- The potential for job creation associated with the project would not be realised; and
- Additional social benefit schemes (such as job training and skills programs), linked to the development would not materialise.

3 Description of the Affected Environment

This chapter provides a description of the biophysical and socio-economic environments that could potentially be impacted by the proposed Kloofsig PV development.

Descriptions of the environment are based on a combination of on-site observations, GIS information, specialist studies, and a survey of the relevant literature to determine what could be expected on or near the site of the proposed development.

3.1 Biophysical Environment

3.1.1 Regional Planning Context

A map showing regional geographical information potentially relevant to the project site, based on the available information on SANBI's biodiversity information mapping tool, BGIS, is provided as Figure 3-1, and does not reveal any sensitivities relating to the site apart from the possible presence of watercourses.

According to the Birdlife South Africa and SANBI BGIS website, the entire farm (Kalkpoort) falls within the Platberg–Karoo Conservancy Important Bird Area (IBA), spanning approximately 1,250,000 ha (Figure 3-2). Important Bird and Biodiversity Areas (IBAs) are sites of international significance for the conservation of the world's birds and other biodiversity. They also provide essential benefits to people, such as food, materials, water, climate regulation and flood attenuation, as well as opportunities for recreation and spiritual fulfilment. The Platberg–Karoo Conservancy IBA is important because it provides habitat for a number of globally threatened large terrestrial species and raptors, such as the blue crane, various bustard species, secretary bird, black harrier and martial eagle (Birdlife SA website, accessed August 2016).

Critical Biodiversity Areas (CBAs) in terms of the Northern Cape Spatial Development Framework 2012 are also shown in Figure 3-2, confirming that the proposed project site does not fall within or close to any CBAs or conservation corridors. CBAs are areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan, and are intended to guide decision-making about where best to locate development. It should inform land-use planning, environmental assessment and authorisations, and natural resource management, by a range of sectors whose policies and decisions impact on biodiversity. It is the biodiversity sector's input into multi-sectoral planning and decision-making processes (SANBI, 2016). The closest CBA corridor is approximately 200 km west of Kalkpoort farm.

3.1.2 Site Sensitivity Assessment

Phase 1 archaeological and palaeontological, and biodiversity (including aquatic ecology) impact assessments were undertaken of the whole property, full specialist reports of which will be included as appendices to the Impact Assessment Report. The summary baseline description provided below of the baseline environment relating to heritage resources has been extracted from the specialists' reports. A sensitivity map indicating the locations of all sensitive features reported by the specialists (including wetlands, vegetation types and heritage features) is included as Figure 3-3, and was used to inform the site layout at an early stage in planning, so as to avoid these features where possible. The site sensitivity map (based on the specialist input) for **Kloofsig 1** is included as Figure 3-4.

3.1.3 Topography

The average elevation of the general area is about 1100-1400 meters above sea level (m a.s.l.), with some of the hills and mountains rising 200-300 m above the surrounding plains. The site and surrounding area consists of flat open plains, with gentle slopes in parts. Some small rocky koppies are located around the site, however these areas have been avoided in the proposed draft layout due to cost implications associated with levelling of the site.

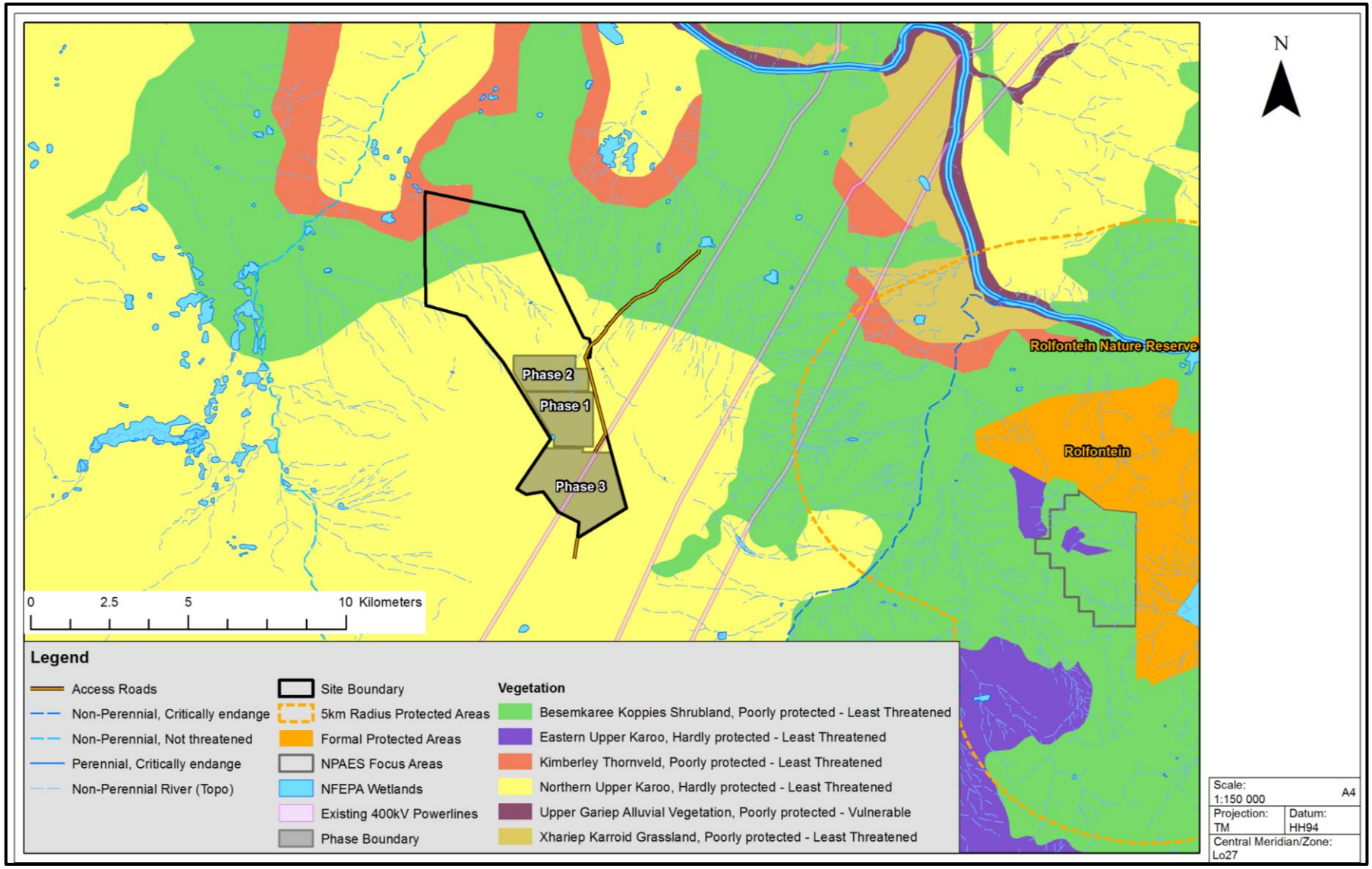

Figure 3-1: Geographical areas map for Kloofsig 1, 2 and 3, based on BGIS, July 2016

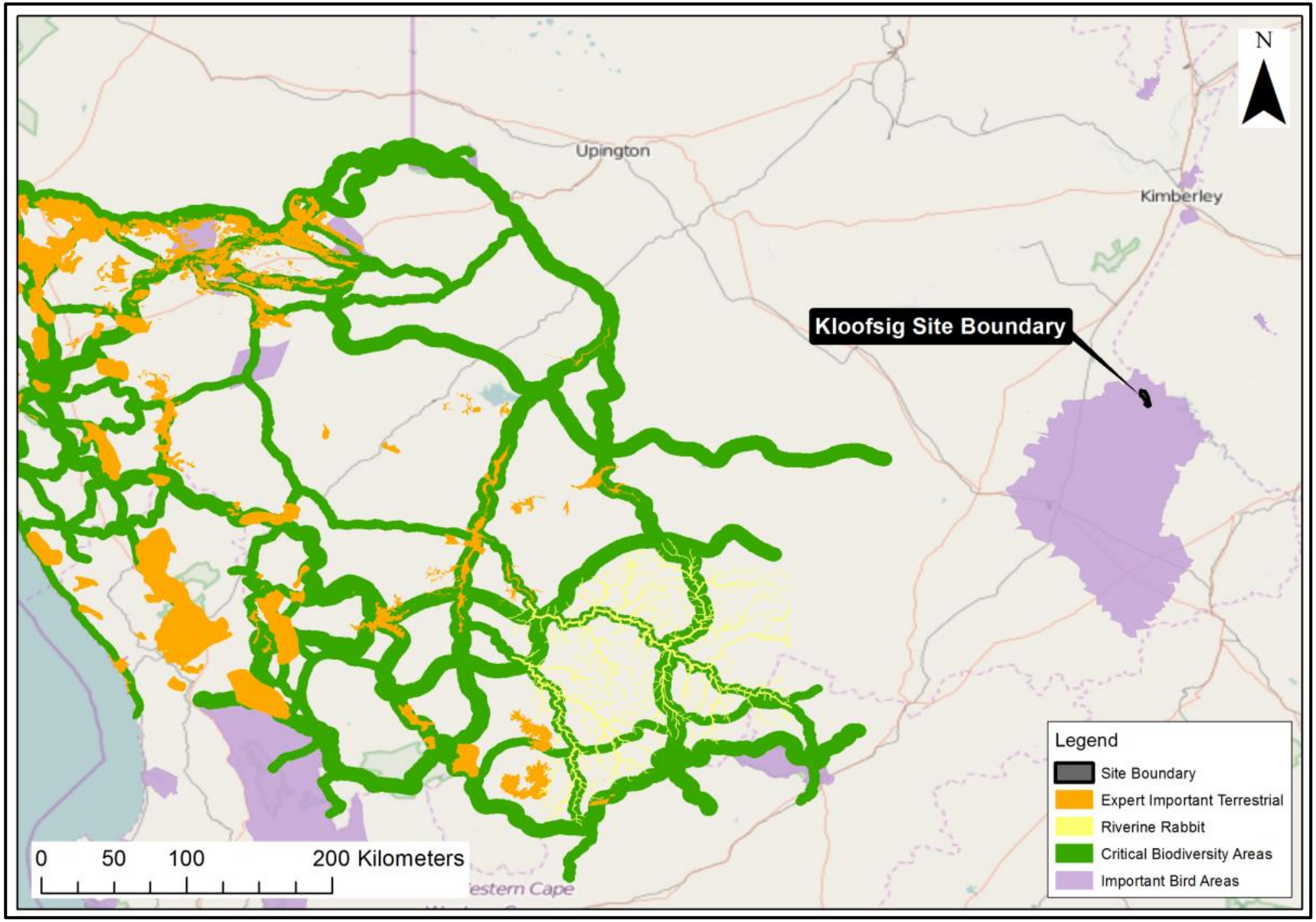

Figure 3-2: CBA and Important Bird Areas map for the Northern Cape Province (BGIS, July 2016)

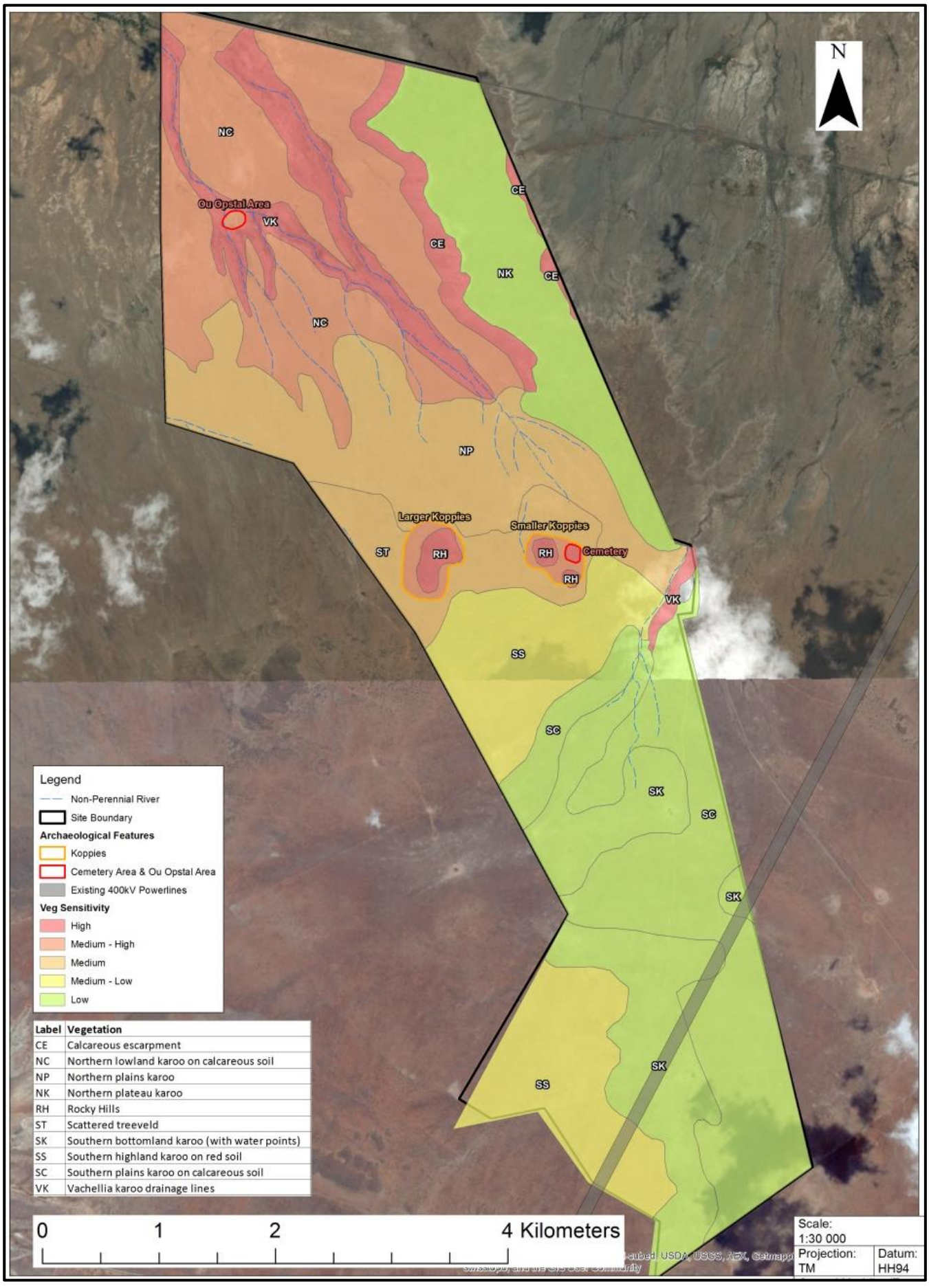

Figure 3-3: Sensitivity map of the Farm Kalkpoort, based on heritage and ecological features

3.1.4 Hydrology

All drainage in the area is directed eventually into the Gariep River, the largest watercourse in the area, reaching it before its confluence with the Vaal River. The generally flat to undulating terrain often produces long and meandering watercourses. **A wetland is present in the western corner of the site, within 500 m of Kloofsig 1,** and a number of non-perennial streams are present in the area surrounding the site as shown on Figure 3-4. During the specialist's site visit the watercourses around the site were mostly found to be dry, apart from small pools after recent light rains that filled at least two of the many small earth dams built across the larger drainage lines. Small pans existed on the western boundary and at the northernmost watering point, but were dry during the visit in April 2015. Underground water is sweet and apparently plentiful.

3.1.5 Geology

According to the Biodiversity assessment, historically the site must have been almost flat with shallow wind-blown soils over a hard calcrete base, but this base has been eroded by flows of rainwater making their way north to the Gariep River. The surface geology of the site appears mostly as shallow soils, but deeper below steep slopes around protruding hills and below calcrete shelves. Low rounded rocky hills in the west of the site and a ridge in the east protrude as dolerite intrusions across the centre of the site, part of the same mudstones, shales and dolerite boulders of the Rhenosterberg to the east and the other scattered hills and buttes across the western flats. Eroded alluvial washes, which come off the calcrete flats to the south, produce a build-up of grey sands in the steeper drainage lines heading north to the Gariep River. The calcrete base is penetrated at scattered spots by burrows of fossorial mammals and the whole area supports high densities of termite mounds, except on the isolated calcrete plateau in the north and adjacent drainage washes where densities are lower.

3.1.6 Climate

The weather of the Northern Cape is typically that of desert and semi-desert areas. It is a generally hot and dry region with fluctuating temperatures and generally low rainfall. Evaporation levels exceed the annual rainfall which varies between 50 mm and 400 mm (the average annual rainfall over the Province is 202 mm). The central, northern and eastern parts of the Province receive rain primarily during the summer months (December to February). Summer temperatures often top the 40°C mark in most of the Province, with temperatures as high as 48°C having been recorded along the Orange River. During winter (especially in June and August), average day temperatures are mild (approximately 22°C).

A key environmental phenomenon which represents an important potential comparative economic advantage is the high occurrence of sunny days which could be source of energy (NCPSDF, 2011)

3.1.7 Current Land Use

Most of the farms in the area conduct extensive livestock and game management on natural rangelands, and the proposed development site is used primarily for sheep farming. Closer to the river are farms with more intensive agriculture, based on crops irrigated by centre-point pivots with water from the river and a canal from the dam. Apparently, the area was suffering from the worst drought in 50 years during the time of the EAP's site visit, only slightly alleviated by modest recent rains, so the ground cover between the woody shrubs appears sparse and the stocking rates of livestock and game low.

3.1.8 Heritage

Heritage features of sensitivity as identified by the relevant specialists are described below and shown on Figure 3-4**.**

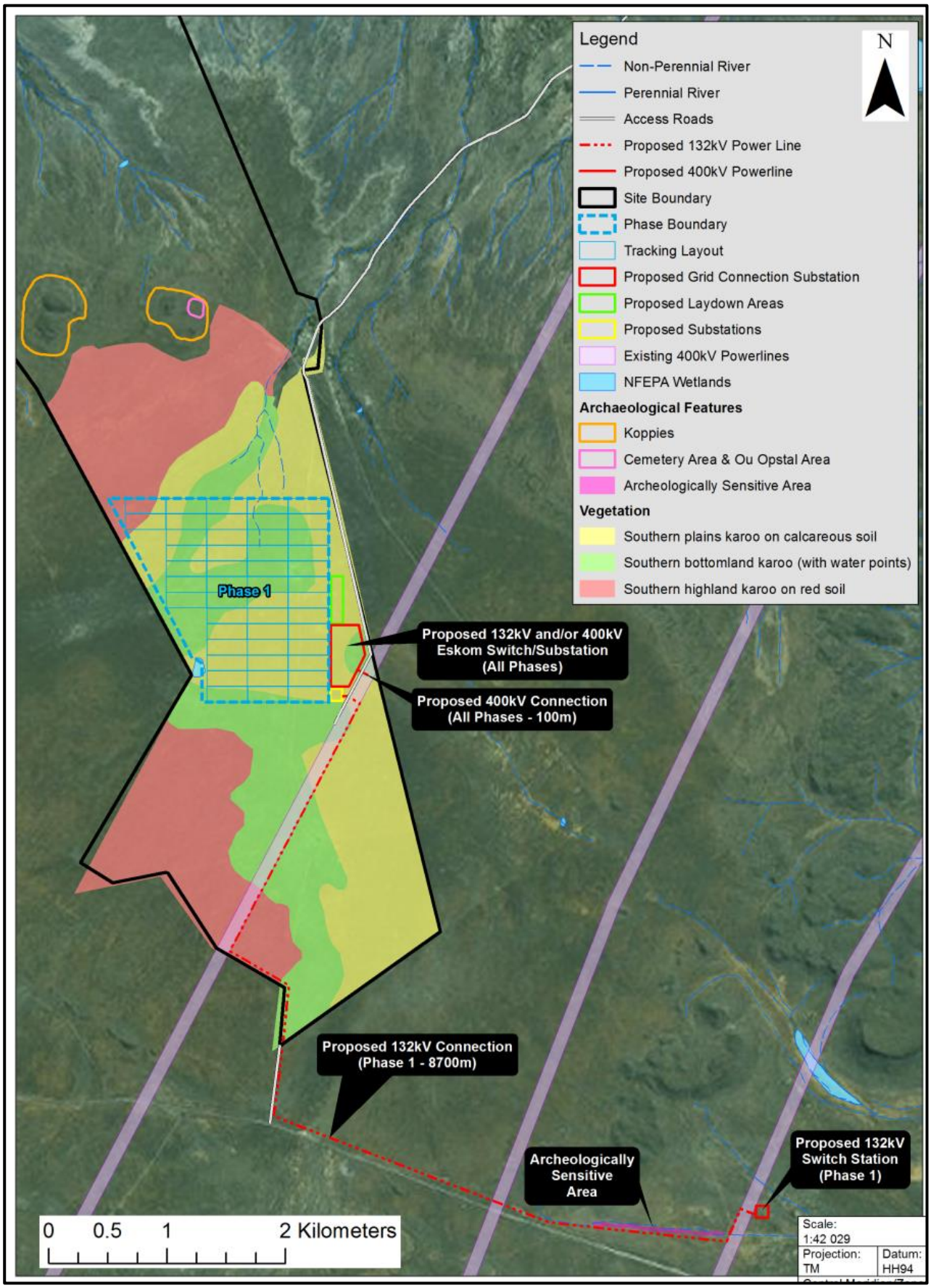

Figure 3-4: Sensitive areas on and around the site for Kloofsig 1 as determined by various baseline specialist studies

Most of the farm features dispersed Stone Age archaeological material in the form of a ubiquitous background scatter of stone artefacts within the surface gravels, rather than discrete concentrations of artefacts. This background scatter consists mainly of weathered and patinated mixed Middle Stone Age (MSA) / Later Stone Age (LSA) artefacts, mostly made of hornfels, although other raw materials were also noted. No organic material such as ostrich eggshell or bone was observed.

The major part of the affected area (which are likely to be the sites of the proposed development) is considered to be of relatively low archaeological significance due to the fact that most of the Stone Age artefacts occur within the ubiquitous background surface scatter of mixed MSA/LSA material, usually in a secondary context in areas affected by sheet erosion.

It is possible however, that construction activities (especially excavation and earth-moving activities) could expose and potentially damage or destroy concentrations of historical and pre-colonial archaeological heritage material, and or human remains.

The area of the proposed 132 kV power line to the south and southeast of the proposed solar energy facility is characterised by dispersed Stone Age archaeological material in the form of a background scatter of stone artefacts within the surface and sub-surface gravels of the study area. These gravels are partially calcretised and consist mainly of hornfels clasts. They are mostly exposed in disturbed areas close to the proposed power line - for example, the strip surrounding the two roughly east-west aligned telephone lines to the south of the proposed line, along shallow watercourses and in areas where sheet wash has removed some of the topsoil. The background scatter visible in this disturbed context consists of very weathered and patinated artefacts which appear to be of mixed Middle Stone Age (MSA) and Early Stone Age (ESA) origin, with less Later Stone Age (LSA) material. In the eastern half of the study area, in situ gravels with ESA material were exposed along the watercourse to the north of the proposed line.

The palaeontological specialist noted that the area is not known to contain paleontological resources of value. No sensitive or no-go areas have been identified within it during the specialist field assessment. Pending the discovery of substantial new fossil remains during development, no further specialist palaeontological studies or mitigation are considered necessary for this project.

3.1.9 Vegetation and Flora

According to the Biodiversity assessment (conducted in April 2015), most of the site is Nama Karoo, consisting of the Northern Upper Karoo vegetation unit (NKu 3 of Mucina & Rutherford 2006). As far as vegetation structure and floristic composition are concerned, the Northern Upper Karoo vegetation unit within the site is very homogeneous. Overall, the study site is dominated by small karroid shrubs, most below 50 cm high, with signs that sparse grass cover fills the bare areas between after sufficient rain. The plant species composition of the plant communities recognised is mostly quite similar, especially as far as dominant plant species are concerned.

The vegetation on the site can be divided into three sub-units, namely Southern plains karoo on calcareous soil, Southern bottomland karoo, and Southern highland karoo on red soil, all of which are classified as medium to low sensitivity. Key characteristics of each vegetation sub-unit are summarised in Table 3-1 and described in the subsections below.

Table 3-1: Summary table of characteristics of vegetation sub-units on the site

Southern highland karoo on red soil			
Status	Short karoo bossieveld		
Soil	Red and sandy loam	Rockiness %	0-5 mostly calcrete
Conservation priority:	Low	Sensitivity:	Medium-Low
Agricultural potential:	Low	Need for rehabilitation	Low
Dominant spp.	*Rhigozum trichotomum, Pentzia incana, Schmidtia pappophoroides, Eragrostis lehmanniana*		

Southern Plains Karoo on calcareous soil			
Status	Short karoo bossieveld		
Soil	Sandy loam, some limestone on soil surface	Rockiness %	1-15 limestone
Conservation priority:	Low	Sensitivity:	Low
Agricultural potential:	Low	Need for rehabilitation	Low
Dominant spp.	*Pentzia incana, Chrysocoma ciliata*		
Southern Bottomland Karoo			
Status	Somewhat trampled karoo bossieveld		
Soil	Sandy loam with lime	Rockiness %	1-15% calcrete
Conservation priority:	Low	Sensitivity:	Low
Agricultural potential:	Low	Need for rehabilitation	Low
Dominant spp.	*Lycium* spp, *Chrysocoma ciliata Pentzia* spp		

Southern Highland Karoo on red soil

This vegetation type is limited to the north-western corner and section of powerline to the south of the site for Kloofsig 1, as shown on Figure 3-4. The soil is deep red sand, with less calcrete visible on the soil surface (Figure 3-5).The vegetation is open bossieveld karoo with many bare patches. At the time of the survey the grass layer was poorly developed, very shortly grazed, with new growth commencing after the recent rains. Most of the general karroid dwarf shrubs and grass species occur in this area, though the somewhat taller-growing *Rhigosum trichotomum* is often prominent.

This vegetation type is widespread and not rare. The species richness is high, though none of these species is considered to be rare, threatened or protected. Sensitivity is considered to be medium-low.

Figure 3-5: Southern Highland Karoo on red soil

Southern Plains Karoo on Calcareous Soil

This vegetation occurs widely on the plains throughout the study site. The soil is shallow, light brown sandy loam over calcrete and much more calcrete is visible on the soil surface. The vegetation is very typical short bossieveld entirely dominated by karroid dwarf shrubs (Figure 3-6). At the time of the survey the vegetation was grazed by sheep. Very little grass was visible, though new grass growth just appeared after the recent rains.

Figure 3-6: Southern Plains Karoo on calcareous soil

This vegetation type is very widespread and not rare. The species richness is high, though none of these species are considered to be rare, threatened or protected. Sensitivity is considered to be low.

Southern Bottomland Karoo

This vegetation occurs in the somewhat lower-lying south-central parts of the study site and seems to form part of the drainage system of this area. The southern water holes are mostly located within this vegetation. The soil is reddish-brown with calcrete often abundant on the soil surface. At the time of the survey this area seemed to be moister than the adjacent, higher-lying plant communities. The vegetation is very similar to that of the Southern Plains Karoo described above, but seems to be more overgrazed by domestic livestock (Figure 3-7). Dwarf karroid shrubs are dominant and grass species are very short, just appearing after the recent rains.

Figure 3-7: Somewhat trampled Southern Bottomland Karoo

Although this plant community occurs widespread, it is restricted to the slightly bottomland situations within the slightly undulating landscape. These areas are also often more grazed than the upland areas. The species richness is high, though none of these species is considered to be rare, threatened or protected. Sensitivity is considered to be low.

3.1.10 Animal Species

Mammals

Habitat Assessment

The study site is situated at an interface between three biomes, i.e. Nama Karoo, grassland and savanna, and is limited to terrestrial habitat. The site is dry most of the year and does not support

wetland vegetation that is a prerequisite for discerning small mammals such as vlei rat and shrews. A number of manmade dams contained water during the time of the site visit, watering points and dry pans, but these too do not support wetland vegetation along their banks. At best the water bodies will benefit bats feeding on insect swarms rising at summer sunsets.

A prevailing perception is that mammal populations are at a nadir, probably as result of drought. Irrespectively of the drought the conservation status of the entire farm is rated as good due to good range management.

There are no caves suitable for cave bats, but there may be rock crevice, overhangs, culverts or even large aardvark burrows that harbour rhinolophids, hipposiderids or nycterids.

The 500 meters of adjoining properties are rather similar to that the veld conditions described for the study site. The low stranded fences on farms themselves are not a deterrent to connectivity, but jackal-fenced boundaries offer a barrier to some medium-sized species incapable of burrowing underneath the obstacle.

Species Richness:

Of the 53 mammal species expected to occur on the study site (predominantly arid-adapted species), 29 were confirmed during the site visit as indicated in Table 3-2 for all three Kloofsig project sites. Species like the round-eared elephant shrew, a number of gerbils, ground squirrels, dassie rats, two whistling rat species, bat-eared and Cape foxes, black-footed cats, suricates, springbuck and others are characteristic.

Most of the species of the resident diversity are common and widely distributed (e.g. scrub hares, mole rats, springhares, grass mice, multimammate mice, Highveld gerbils, the bats listed, genets, yellow and slender mongooses, duiker, steenbok and others). However, some species are not common: a number of gemsbok has been reintroduced and there are a number of red Data mammals as listed in Table 3-2 below. Many of the medium-sized mammals persist on the farm such as aardvarks, baboons, monkeys, warthog, springbuck, kudu, duikers, steenbuck, mountain reedbuck and grey rhebuck.

Bat species diversity and population densities were found to be low. Relatively high species richness is due to the extensive size of the remaining natural areas on the Farm and of adjoining natural areas, enhanced by a high connectivity allowing near-to-natural migration. Veld fires are avoided meaning that the quality of environmental conservation from a mammal perspective can be ranked as good. Connectivity with neighbouring areas is high and migration is virtually unhindered.

All Red Data species listed in Table 3-2 are discerning species and became endangered as result of the deterioration of their preferred habitats.

The following mammals are protected by the Biodiversity Act No 10 of 2004:

- South African hedgehog
- Black-footed cat
- Brown hyena
- Honey badger

All indigenous species are protected and are differentially listed in Schedule 1 of the Northern Cape Conservation Act 9 of 2009 (specially protected species), Schedule 2 (Protected species) and Schedule 3 (common indigenous species). Schedule 4 list vervet monkeys, baboons, caracals and black-backed jackals as Damage Causing Mammals. Schedule 6 lists Invasive Species, none of which are recorded on the study site.

Table 3-2: Observed and potential mammal species diversity, with Red Data Book status.

Common English name	Scientific name	Occurrence on Site	Red Data Book Status
Round-eared elephant shrew	*Macroscelides proboscideus*	*	

Common English name	Scientific name	Occurrence on Site	Red Data Book Status
Western rock elephant shrew	*Elephantulus rupestris*	√	
Aardvark	*Orycteropus afer*	√	
Rock dassie	*Procavia capensis*	√	
Cape hare	*Lepus capensis*	√	
Scrub hare (ribbok haas)	*Lepus saxatilis*	√	
Smith's red rock rabbit	*Pronolagus rupestris*	√	
African mole rat	*Cryptomys hottentotus*	√	
Cape porcupine	*Hystrix africaeaustralis*	√	
Springhare	*Pedetes capensis*	√	
Dassie rat	*Petromus typicus*	?	
South African ground squirrel	*Xerus inaurus*	√	
Spectacled dormouse	*Graphiurus ocularis*	**?**	DD
Four-striped grass mouse	*Rhabdomys pumilio*	*****	
Southern multimammate mouse	*Mastomys coucha*	*****	
Namaqua rock mouse	*Aethomys namaquensis*	√	
Brant's whistling rat	*Parotomys brantsii*	*****	
Littledale's whistling rat	*Parotomys littledalei*	*****	
Cape short-tailed gerbil	*Desmodillus auricularis*	*****	
Hairy-footed gerbil	*Gerbillurus paeba*	√	
Highveld gerbil	*Gerbilliscus brantsii*	√	
Pouched mouse	*Saccostomus campestris*	*****	
Gerbil mouse	*Malacothrix typica*	*****	
Grey pygmy climbing mouse	*Dendromus melanotis*	**?**	
Chacma baboon	*Papio hamadryas*	√	
Vervet monkey	*Cercopithecus pygerythrus*	√	
Lesser red musk shrew	*Crocidura hirta*	*****	DD
Southern African hedgehog	*Atelerix frontalis*	√	NT
Egyptian free-tailed bat	*Tadarida aegyptiaca*	**?**	
Egyptian slit-faced bat	*Nycteris thebaica*	**?**	
Dent's horseshoe bat	*Rhinolophus denti*	**?**	
Aardwolf	*Proteles cristatus*	√	
Brown hyena	*Parahyaena brunnea*	**?**	NT
Caracal	*Caracal caracal*	√	
African wild cat	*Felis silvestris*	√	
Black-footed cat	*Felis nigripes*	√	
Small-spotted genet	*Genetta genetta*	√	
Suricate	*Suricata suricatta*	√	
Yellow mongoose	*Cynictis penicillata*	√	
Slender mongoose	*Galerella sanguinea*	√	
Bat-eared fox	*Otocyon megalotis*	√	

Common English name	Scientific name	Occurrence on Site	Red Data Book Status
Cape fox	*Vulpes chama*	√	
Black-backed jackal	*Canis mesomelas*	√	
Honey badger	*Mellivora capensis*	**?**	
Striped polecat	*Ictonyx striatus*	**?**	
Common warthog	*Phacochoerus africanus*	√	
Kudu	*Tragelaphus strepsiceros*	√	
Gemsbok	*Oryx gazella*	√	
Common duiker	*Sylvicapra grimmia*	√	
Mountain reedbuck	*Redunca fulvorufula*	√	
Grey rhebuck	*Pelea capreolus*	√	
Springbok	*Antidorcas marsupialis*	√	
Steenbok	*Raphicerus campestris*	√	

√ Definitely there or have a high probability to occur;
***** Medium probability to occur based on ecological and distributional parameters;
? Low probability to occur based on ecological and distributional parameters.

Red Data species rankings as defined in Friedmann and Daly's S.A. Red Data Book / IUCN (World Conservation Union) (2004) are indicated in the last column: CR= Critically Endangered, En = Endangered, V = Vulnerable, LR/cd = Lower risk conservation dependent, LR/nt = Lower Risk near threatened, DD = Data Deficient. All other species are deemed of Least Concern.

Avifauna

Observed and potentially occurring bird species for the whole of the Kloofsig property, as reported by the specialist following a site visit in April 2015 (after most Palaearctic and intra-African migrant bird species had departed) are listed in Table 3-3, indicating red data book status.

As mentioned in Section 3.1.1, Kloofsig 1, 2 and 3 fall within the Platberg–Karoo Conservancy Important Bird Area (IBA). The Important Bird and Biodiversity Area Programme aims to identify, document, monitor and protect a network of sites for the conservation of birds, other biodiversity and wider ecosystems and their services. A site is recognised as an IBA only if it meets certain criteria, based on the occurrence of key bird species that are vulnerable to global extinction or whose populations are otherwise irreplaceable.

Table 3-3: Observed and potential bird species diversity on site, with Red Data Book status.

Common English name	Scientific name	Occurrence on Site	Red Data Book Status
*Orange River francolin	*Scleroptila levaillantoides*	√	
*Swainson's Spurfowl	*Pternistis swainsonii*	√	
*Common Quail	*Coturnix coturnix*	√	
Helmeted Guineafowl	*Numida meleagris*	√	
Lesser Honeyguide	*Indicator minor*		
Cardinal Woodpecker	*Dendropicos fuscescens*		
Acacia Pied Barbet	*Tricholaema leucomelas*		
African Hoopoe	*Upupa africana*		
Common Scimitarbill	*Rhinopomastus cyanomelas*		
Swallow-tailed Bee-eater	*Merops hirundineus*		

Common English name	Scientific name	Occurrence on Site	Red Data Book Status
European Bee-eater	*Merops apiaster*		
White-backed Mousebird	*Colius colius*		
Red-faced Mousebird	*Urocolius indicus*	√	
Diderick Cuckoo	*Chrysococcyx caprius*		
Alpine Swift	*Tachymarptis melba*		
Common Swift	*Apus apus*		
Bradfield's Swift	*Apus bradfieldi*		
Little Swift	*Apus affinis*		
White-rumped Swift	*Apus caffer*		
Barn Owl	*Tyto alba*		
Spotted Eagle-Owl	*Bubo africanus*	√	
Rufous-cheeked Nightjar	*Caprimulgus rufigena*		
Rock Dove	*Columba livia*	√	
Speckled Pigeon	*Columba guinea*	√	
Laughing Dove	*Streptopelia senegalensis*	√	
Cape Turtle-Dove	*Streptopelia capicola*	√	
Red-eyed Dove	*Streptopelia semitorquata*	√	
Namaqua Dove	*Oena capensis*	√	
Ludwig's Bustard	*Neotis ludwigii*	√	EN,EN
*Kori Bustard	*Ardeotis kori*	√	NT,NT
Northern Black Korhaan	*Afrotis afraoides*	√	
Karoo Korhaan	*Eupodotis vigorsii*		NT,LC
Blue Korhaan	*Eupodotis caerulescens*		LC,NT
*Blue Crane	*Anthropoides paradiseus*	√	NT,VU
Namaqua Sandgrouse	*Pterocles namaqua*	√	
Marsh Sandpiper	*Tringa stagnatilis*		
Common Greenshank	*Tringa nebularia*		
Wood Sandpiper	*Tringa glareola*		
Common Sandpiper	*Actitis hypoleucos*		
Ruff	*Philomachus pugnax*		
Spotted Thick-knee	*Burhinus capensis*		
Black-winged Stilt	*Himantopus himantopus*		
Pied Avocet	*Recurvirostra avosetta*		
Kittlitz's Plover	*Charadrius pecuarius*		
Three-banded Plover	*Charadrius tricollaris*		
Blacksmith Lapwing	*Vanellus armatus*		
Crowned Lapwing	*Vanellus coronatus*		
Double-banded Courser	*Rhinoptilus africanus*		NT,LC
Burchell's Courser	*Cursorius rufus*		VU,LC
Black-shouldered Kite	*Elanus caeruleus*		

Common English name	Scientific name	Occurrence on Site	Red Data Book Status
Yellow-billed Kite	*Milvus aegyptius*		
White-backed Vulture	*Gyps africanus*		EN,EN
Cape Vulture	*Gyps coprotheres*		EN,VU
Lappet-faced Vulture	*Aegypius tracheliotos*		EN,VU
Black-chested Snake-Eagle	*Circaetus pectoralis*		
Black Harrier	*Circus maurus*		EN,VU
Southern Pale Chanting Goshawk	*Melierax canorus*	√	
Gabar Goshawk	*Melierax gabar*		
Steppe Buzzard	*Buteo buteo*		
Jackal Buzzard	*Buteo rufofuscus*	√	
Tawny Eagle	*Aquila rapax*		EN,LC
Verreaux's Eagle	*Aquila verreauxii*		VU,LC
Martial Eagle	*Polemaetus bellicosus*		EN,VU
*Secretarybird	*Sagittarius serpentarius*	√	VU,VU
Lesser Kestrel	*Falco naumanni*		
Rock Kestrel	*Falco rupicolus*		
Greater Kestrel	*Falco rupicoloides*	√	
Lanner Falcon	*Falco biarmicus*		VU,LC
Black-headed Heron	*Ardea melanocephala*	√	
Cattle Egret	*Bubulcus ibis*		
*Hadeda Ibis	*Bostrychia hagedash*	√	
*African Sacred Ibis	*Threskiornis aethiopicus*	√	
African Spoonbill	*Platalea alba*		
Black Stork	*Ciconia nigra*		VU,LC
Abdim's Stork	*Ciconia abdimii*		NT,LC
*White Stork	*Ciconia ciconia*	√	
Fork-tailed Drongo	*Dicrurus adsimilis*		
Crimson-breasted Shrike	*Laniarius atrococcineus*	√	
Bokmakierie	*Telophorus zeylonus*		
Pririt Batis	*Batis pririt*		
Cape Crow	*Corvus capensis*		
Pied crow	*Corvus albus*	√	
Red-backed Shrike	*Lanius collurio*		
Lesser Grey Shrike	*Lanius minor*		
Common Fiscal	*Lanius collaris*	√	
Cape Penduline-Tit	*Anthoscopus minutus*		
Ashy Tit	*Parus cinerascens*	√	
Barn Swallow	*Hirundo rustica*		
Greater Striped Swallow	*Cecropis cucullata*		
South African cliff-Swallow	*Petrochelidon spilodera*		

Common English name	Scientific name	Occurrence on Site	Red Data Book Status
Rock Martin	*Hirundo fuligula*		
African Red-eyed Bulbul	*Pycnonotus nigricans*	√	
Fairy Flycatcher	*Stenostira scita*		
Long-billed crombec	*Sylvietta rufescens*		
Yellow-bellied Eremomela	*Eremomela icteropygialis*	√	
Karoo Eremomela	*Eremomela gregalis*		
Layard's Tit-Babbler	*Sylvia layardi*	√	
Chestnut-vented Tit-Babbler	*Sylvia subcaerulea*	√	
Orange River White-eye	*Zosterops pallidus*		
Grey-backed Cisticola	*Cisticola subruficapilla*		
Desert Cisticola	*Cisticola aridulus*		
Black-chested Prinia	*Prinia flavicans*		
Karoo Prinia	*Prinia maculosa*		
Rufous-eared Warbler	*Malcorus pectoralis*	√	
Cinnamon-breasted Warbler	*Euryptila subcinnamomea*		
Eastern clapper Lark	*Mirafra fasciolata*	√	
Sabota Lark	*Calendulauda sabota*	√	
Spike-heeled Lark	*Chersomanes albofasciata*	√	
Karoo Long-billed Lark	*Certhilauda subcoronata*		
Grey-backed Sparrowlark	*Eremopterix verticalis*		
Red-capped Lark	*Calandrella cinerea*	√	
Stark's Lark	*Spizocorys starki*		
Pink-billed Lark	*Spizocorys conirostris*		
Large-billed Lark	*Galerida magnirostris*	√	
Short-toed Rock-Thrush	*Monticola brevipes*		
Karoo Thrush	*Turdus smithi*	√	
Chat Flycatcher	*Bradornis infuscatus*		
Fiscal Flycatcher	*Sigelus silens*		
Spotted flycatcher	*Muscicapa striata*		
Cape Robin-Chat	*Cossypha caffra*		
Kalahari Scrub-Robin	*Erythropygia paena*	√	
Karoo Scrub-Robin	*Erythropygia coryphoeus*	√	
African StoneChat	*Saxicola torquatus*		
Mountain Wheatear	*Oenanthe monticola*	√	
Capped Wheatear	*Oenanthe pileata*	√	
Sickle-winged Chat	*Cercomela sinuata*	√	
Familiar Chat	*Cercomela familiaris*	√	
Ant-eating Chat	*Myrmecocichla formicivora*	√	
Pale-winged Starling	*Onychognathus nabouroup*	√	
Cape Glossy Starling	*Lamprotornis nitens*	√	

Common English name	Scientific name	Occurrence on Site	Red Data Book Status
Pied Starling	*Lamprotornis bicolor*		
Wattled Starling	*Creatophora cinerea*		
Malachite Sunbird	*Nectarinia famosa*		
Dusky Sunbird	*Cinnyris fuscus*	√	
Scaly-feathered Finch	*Sporopipes squamifrons*		
White-browed Sparrow-Weaver	*Plocepasser mahali*	√	
Southern Masked-Weaver	*Ploceus velatus*	√	
Red-billed Quelea	*Quelea Quelea*		
Southern Red Bishop	*Euplectes orix*	√	
African Quailfinch	*Ortygospiza fuscocrissa*		
Red-headed Finch	*Amadina erythrocephala*		
Common Waxbill	*Estrilda astrild*		
Red-billed Firefinch	*Lagonosticta senegala*		
Pin-tailed Whydah	*Vidua macroura*		
House Sparrow	*Passer domesticus*		
Cape Sparrow	*Passer melanurus*	√	
Southern Grey-headed Sparrow	*Passer diffuses*		
Cape Wagtail	*Motacilla capensis*	√	
African Pipit	*Anthus cinnamomeus*	√	
Buffy Pipit	*Anthus vaalensis*	√	
Cape Canary	*Serinus canicollis*		
Black-headed Canary	*Serinus alario*		
Black-throated Canary	*Crithagra atrogularis*		
Yellow Canary	*Crithagra flaviventris*	√	
White-throated Canary	*Crithagra albogularis*		
Lark-like Bunting	*Emberiza impetuani*	√	
Cinnamon-breasted Bunting	*Emberiza tahapisi*		
Cape Bunting	*Emberiza capensis*		

Red Status is from The Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland, Barnes (2001). T = Threatened; NT = Near-Threatened; Vul = Vulnerable; E = Endangered; CE = Critically Endangered; and RE = Regionally Extinct. * indicates species that were reported to have been seen by the landowner.

Based on the most recent assessment of the threatened status of South Africa's avifauna (Taylor 2015), a total of 16 Red Data avifaunal species are expected possibly to use the site and its surroundings, given the quantity and quality of the habitats available. One of these species (Ludwig's Bustard) has been reported for the pentad within which the site falls, and others within the surrounding pentads of the two QDGCs, 10 up to 1998 (SABAP1) but only eight so far during the period of the ongoing Southern African bird atlas project that started in 2009 (SABAP2).

Most of these threatened species fall into a few obvious categories by habitat preference and their likelihood of occurrence on site by habitat extent and quality, especially once one appreciates what use the habitats onsite are to their basic diurnal and annual requirements.

The majority of threatened species expected to make use primarily of the scrubland on calcrete. Generalist predators (Lanner Falcon, Tawny and Martial Eagles) are expected to seek prey over all habitats, while scavengers (White-backed, Cape and Lappet-faced Vultures) and terrestrial hunters (Abdim's Stork, Secretarybird) are also likely to locate food in the thornveld. The specialist Verreauxs' Eagle is expected only to visit for hunting hyrax on the rocky outcrops and the Black Stork aquatic prey in the water bodies. The Blue Crane is expected only to roost in the water bodies, when available.

The following species expected on Farm 18, Kalkpoort, are listed under Government Notice 2007 of the NEMBA 2004 Act:

- Endangered: Blue Crane, White-backed Vulture, Cape Vulture, Lappet-faced Vulture.
- Vulnerable: Tawny Eagle, Kori Bustard, Black Stork, Blue Korhaan, Lesser Kestrel, Ludwig's Bustard, Martial Eagle.

All indigenous species protected except those in Schedules 1 of the Northern Cape Conservation Act, 2009 (specially protected species), 3 (common indigenous species) & 6 (invasive species), which include none of the threatened species expected on site.

Herpetofauna

The site has several prominent topographical features, such as a few dolerite hills and drainage lines with a few man-made dams, and a few small pans. Near or in some of the drainage lines there are several trees which provide arboreal habitat. In general the study site is a homogenous environment that contains one large herpetofauna habitat, namely terrestrial karoo.

Of the 44 herpetofauna species recorded and/or expected on the remainder of portion 18 of the Farm Kalkpoort, one (the Giant Bullfrog, *Pyxicephalus adspersus*, which could potentially occur on the site) has threatened status. Note however that the high species richness inferred is for the general area and not only for the study site.

From a herpetological perspective, all drainage lines and water bodies like the temporary pans and the artificial water points must be regarded as sensitive, especially in an arid area such as the study site. The dolerite hills and trees along drainage lines on the study site should also be protected, as these provide habitat for many animal species.

This implies a buffer zone from the edge of the watercourses and pans (as usually prescribed for areas outside the urban edge).

3.2 Socio-Economic Profile

The proposed Kloofsig PV project is to be developed in the Renosterberg Local Municipality situated within the Pixley Ka Seme District Municipality, Northern Cape Province. The Renosterberg Municipality incorporates the towns of Petrusville, Phillipstown and Vanderkloof and is situated in the heart of the Karoo half way between Cape Town and Johannesburg on the N12.

The main activities in the area include high intensity irrigation farming, eco-tourism and game farming. The Renosterberg Municipality has a population of 10 978 people (StatsSA, 2011). The population is diversified across race groups and culture and is characterised by varying socio-economic levels of development. These are outlined in Table 3-4 to Table 3-6. These statistics show a predominantly coloured population with the majority of the population being employed or not economically active. Children constitute 32.8 % of Renosterberg’s population, the economically active population is at 61% and persons aged 65 and older at 6.2%. The largest industry in the area is agriculture followed by Community and Social Services (Table 3-7).

The Pixley Ka Seme District Municipality Integrated Development Plan (IDP) recognizes that although the electricity network within the District is generally regarded as reasonable, there are backlogs with respect to electricity provision that need to be addressed.

Table 3-4 Population distribution in the Renosterberg Local Municipality (Census, 2011)

Population Group	Percentage
Coloured	57.4
Black	32.9
White	8.6
Indian/Asian	0.5

Table 3-5 Employment status in the Renosterberg Local Municipality (Census, 2011)

Employment Status	Percentage
Employed	73.2
Unemployed	26.8
Not Economically Active	25.5

Table 3-6 Income groups in the Renosterberg Local Municipality (Census, 2011)

Annual average household income	Percentage
No income	11.2
R1 - R4,800	4
R4,801 – R9,600	6.4
R9,601 – R19,600	23.1
R19, 601- R38, 200	23.4
R38, 201 – R76, 400	13.5
R76, 401 - R153, 800	8.8
R153, 801 – R307,600	6,5
R307, 601 – R614, 400	1.8
R614, 401 - R1, 228, 800	0,7
R1, 228, 801 – R2, 457, 600	0,3
R2, 457, 601+	0,3

Table 3-7 Employment breakdown per industry in Pixley Ka Seme District Municipality (Pixley Ka Seme IDP 2011/16)

Industry	Percentage
Agriculture	38.9
Community Services	23.2
Trade	13.0
Private households	12.8
Transport	3.2
Manufacturing	2.8
Finance	2.8
Construction	2.5
Electricity	0.9
Mining	0.2

4 Public Participation

The Public Participation Process (PPP) forms a key component of the EIA process and has already resulted in the identification of a number of issues and concerns. The objectives of the PPP are outlined below, followed by a summary of the approach taken, and the issues raised.

4.1 Objectives and Approach

The overall aim of the PPP is to ensure that all Interested and Affected Parties (IAP's) have adequate opportunities to provide input into the process. More specifically, the objectives of the PPP are as follows:

- Identify IAP's and notify them of the proposed project and of the EIA process;
- Provide an opportunity for IAP's to raise issues and concerns; and
- Provide an opportunity for IAP's to review the Draft Scoping Report prior to its finalisation.

4.2 Public Participation Activities

The Public Participation Process that was undertaken to canvass public opinion regarding the proposed activity has included the following activities so far:

The activities that have been conducted to date as part of this Scoping Study are as follows:

- Placement of two on-site posters on 14 April 2015 (see Appendix B);
- Distribution of the Background Information Document (BID) for a 30 day comment period from 24 January 2016 to identified Interested and Affected Parties (IAPs), stakeholders and neighbouring residents. A copy of the BID is attached in Appendix C, and the list of notified IAPs and commenting institutions is given in Section 4.2.2. below;
- Distribution of the BID to the Ward 4 Councillor per registered mail on 18 February 2016.
- Collation of public and IAP comments on the BID and onsite poster, including responses to these issues;
- Inclusion in the Draft Scoping Report of issues that were raised (Section 4.2.2);
- Preparation of a Draft Scoping Report (this Report);
- Distribution of the Draft Scoping Report (this report) to public venues for review by IAPs;
- Distribution of an Executive Summary to all IAPs registered for this project.

The following activities are still to be conducted in the Scoping Study:

- Advertisement of the availability of the DSR in 'Die Volksblad';
- Provision of a 30 day comment period on the Draft Scoping Report (this report);
- Collation of public and IAP comments on the DSR, and incorporation of these into the Final Scoping Report;
- Distribution of the executive summary of the Final Scoping Report (including comments and responses report) to IAPs; and
- Submission of Final Scoping Report and Plan of Study for EIA to DEA for a decision regarding authorisation to proceed to the Impact Assessment phase of the EIA.

4.2.1 Availability of Draft Scoping Report

The Executive Summary of this DSR will be distributed to registered IAP's. A printed copy of this report will be available for public review at the following location:

- Van Der Kloof Public Library.

The report can also be accessed as an electronic copy on SRK Consulting's webpage via the 'Public Documents' link http://www.srk.co.za/en/page/za-public-documents. Written comment on this DSR should be sent by **17h00 on 16 September 2016** to:

Wanda Maras
SRK Consulting
PO Box 21842, Port Elizabeth, 6000
Email: wmarais@srk.co.za
Fax: (041) 509 4850

Issues raised will be integrated into the Final Scoping Report. Comments received to date are included in Appendix E of this report.

4.2.2 Registered IAPs and Issues Raised

Copies of written correspondence received are provided in Appendix D. A list of registered IAPs is given in Table 4-1, and the issues raised by IAP's to date are summarised in Table 4-2.

Table 4-1: Registered Interested and Affected Parties

Name	Organisation	Capacity	Notified	Registered
ME Tau	National Department of Agriculture, Forestry & Fisheries	Deputy Director General: Forestry & Natural Resources Management	✓	✓
L Bosoga	National Department of Agriculture, Forestry & Fisheries	Acting Chief Director: Forestry & Natural Resources Management		✓
H Lindeman	National Department of Agriculture, Forestry & Fisheries	Resources Auditor: Land Use & Soil Management		✓
M Marubini	National Department of Agriculture, Forestry & Fisheries	Directorate: Land Use & Soil Management		✓
M Ntlokwana	National Department of Agriculture, Forestry & Fisheries	Deputy Director: Resource Auditing		✓
DM Modisane	National Department of Agriculture, Forestry & Fisheries	Deputy Director General: Agricultural production, health & food safety	✓	✓
AB Abrahams	Northern Cape Department of Water & Sanitation	Northern Cape Regional Manager	✓	✓
WVD Mothibi	Northern Cape Department of Agriculture & Land Reform	Head Of Department	✓	✓
Philip Hine	South African Heritage Resources Agency	Impact assessor	✓	✓
D van Heerden	Northern Cape Department of Environment and Nature Conservation	Head of Department	✓	✓
Cllr J Niklaas	Renosterberg Local Municipality	Ward 4 Councillor	✓	✓
Z Kwinana	Renosterberg Local Municipality	Mayor	✓	✓
V Goodman	Renosterberg Local Municipality	Municipal Manager	✓	✓
R Pieterse	Pixley ka Seme District Municipality	Municipal Manager	✓	✓
D Fourie	Square Kilometre Array	SKA SA Site Manager (Karoo)	✓	
Tracey Cheetham	Square Kilometre Array	SKA SA General Manager: site operations and Infrastructure	✓	
General	Square Kilometre Array		✓	

Name	Organisation	Capacity	Notified	Registered
Piet Ferreira	Eskom	Network Development Planning Specialist,	✓	
Amanda Bester	Telkom	Wayleave Management	✓	
Nicole Abrahams	SANRAL	Environmental Co-ordinator		✓
Colene Runkel	SANRAL	Statutory control & land administration	✓	
Garth Julius	SANRAL	Project Manager		✓
Lizelle Stroh	South African Civil Aviation Authority	Obstacle specialist	✓	
K Taljaart	Private	Neighbouring Landowner	✓	
BC Spies	Private	Neighbouring Landowner	✓	
R Bester	Private	Neighbouring Landowner	✓	
H Du Toit	Private	Neighbouring Landowner	✓	
J de Swart	Private	Neighbouring Landowner	✓	
L van Vuuren	Private	Neighbouring Landowner	✓	
H Smit-Robinson	Birdlife SA	Terrestrial Bird Conservation	✓	
H Davies-Mostert	Endangered Wildlife Trust	Head of Conservation	✓	
K Mokubung	Rolfontein Nature Reserve	Facility Manager	✓	

Table 4-2: Comments Raised by Interested and Affected Parties on the BID

Commentator	Issue Raised	Response
L Bosoga (DAFF)	DAFF is commenting authority in terms of Conservation of Agricultural Resources Act 43 of 1983 (CARA) and competent authority in terms of Subdivision of Agricultural Land Act 70 of 1970 (SALA).	[SRK] At this stage, SRK is only corresponding with DAFF as commenting authority for the EIA. Any application in terms of SALA will be dealt with by the applicant directly.
J Vorster (DAFF)	Care should be taken to disturb as little as possible areas in terms of removal of vegetation for the purpose of constructing roads and/or infrastructure.	[SRK] Measures to minimise vegetation clearing will be included in the EMPr, and the significance to the clearing that would take place will be assessed in the EIR.
J Vorster (DAFF)	The occurrence of soil erosion in terms of water and / or wind must be prevented and mitigated immediately on identifying the potential or occurrence of soil erosion.	[SRK] Measures to minimise vegetation clearing will be included in the EMPr, and the significance to the clearing that would take place will be assessed in the EIR.
J Vorster (DAFF)	Sloping, landscaping, ripping and establishment of natural vegetation are essential during rehabilitation of resources impacts and needs to be done continuously during the development process.	[SRK] Recommendations regarding rehabilitation of the site will be included in the EMPr.
J Vorster (DAFF)	The occurrences and establishment of all declared weeds must be controlled in terms of Reg 15 and 16 of Act 43 of	[SRK] Control of alien invasive vegetation will form part of the standard

Commentator	Issue Raised	Response
	1983.	measures included in the EMPr.
N Abrahams (SANRAL)	Seems as if the proposed development will not have an impact on SANRAL due to distance away for the National Road N12.	[SRK] Noted. Any further input from SANRAL is welcomed.
G Julius (SANRAL)	SANRAL must be timeously informed regarding proposed route for the transportation and movement of any heavy loads on the national roads that involves this development. This is to ensure that appropriate planning is involved to ensure minimum impact to the road use and potential impact on any construction related activities on the national routes.	[SRK] This will be included as a condition in the draft EMPr.
BC Spies (Neighbouring Landowner)	According to the map, the proposed 132 kV connection will be traversing my farm. I am, however, in favour of the project.	[SRK] Correct and noted.
RC Bester (Neighbouring Landowner)	I need a more detailed map to see how development will affect me.	[SRK] This is addressed in Appendix G in the report (DSR).
RC Bester (Neighbouring Landowner)	Development will destroy natural beauty of area.	[SRK] A visual impact assessment is proposed as part of the EIA (see draft terms of reference in Section 5.3.6)
RC Bester (Neighbouring Landowner)	Who will be responsible for my losses in the event of poaching / theft / damages? My game camp is in the area.	[SRK] Measures to prevent and manage poaching, theft and damage will be included in the EMPr.
RC Bester (Neighbouring Landowner)	Will I be able to continue with my established farming practises?	[SRK] Potential impacts on surrounding land users will be assessed as part of the impact assessment report, and where required, mitigation measures will be recommended to minimise any impacts. To date, no impacts have been identified that could potentially affect neighbouring farming practices.

4.2.3 Key Environmental and Social Concerns Identified during the PPP

Based on the comments received from IAPs, the following key potential social and environmental concerns have been identified:

- Ecological impacts – loss of flora and soil erosion; and
- Visual impacts and change in visual character.

The Draft Plan of Study for EIA (Chapter 5) provides detail on how these concerns will be addressed via the EIA process.

5 Draft Plan of Study for EIA

5.1 Identification and Description of Potential Impacts

The identification of potential impacts of the proposed activity is based on the following factors:

- The legal requirements;
- The nature of the proposed activity;
- The nature of the receiving environment; and
- Issues raised during the public participation process.

Considering the factors listed above, the following categories of environmental impacts were identified which could potentially result from the proposed Kloofsig PV facility:

- Impacts on heritage resources;
- Impacts on terrestrial ecology (including birds);
- Socio-economic impacts;
- Impacts on aquatic environments;
- Impacts on agricultural potential;
- Waste management impacts;
- Visual impacts;
- Stormwater and erosion impacts; and
- Construction related impacts.

The above listed impacts and their relevance to the proposed project area are described in more detail in the sections below.

5.1.1 Impacts on Heritage Resources

Damage or destruction to archaeological resources on the site may occur due to site clearing, earthworks and excavations during construction.

Impacts relating to archaeological and palaeontological resources will be assessed via the relevant specialist studies (see draft Terms of Reference in Section 5.3). The recommendations of the specialists, will be included in the EMPr for construction (included as part of the EIR), outlining the procedure to be followed in the event of heritage remains being uncovered.

5.1.2 Impacts on Terrestrial Ecology

Indigenous vegetation will need to be cleared in order to prepare the site for installation of services infrastructure and solar PV panels, resulting in loss of habitat and possibly species of special concern. This is however largely limited to areas of low ecological sensitivity, and in the case of fauna and birds, it is anticipated that movement to adjacent undeveloped areas of similar habitat may result. Spread of invasive alien vegetation species may result from soil disturbance during construction, and will require management to prevent further impacts on indigenous habitat.

Impacts relating to destruction of habitat and loss of biodiversity will be assessed by the relevant specialists (see draft Terms of Reference in Section 5.3), and appropriate mitigation measures provided in the EMPr to avoid or minimise impacts on vegetation and habitat during construction and operation of the proposed development.

5.1.3 Socio-Economic Impacts

The proposed project could have a beneficial local economic effect, providing employment opportunities for local communities and suppliers (primarily during the construction phase, but also to a lesser extent during operation) and indirect benefits to local businesses. Improved power supply may further stimulate economic development in the area.

Negative impacts on surrounding land uses have also been raised as a concern by IAPs and will be considered as part of the impact assessment. It is proposed that socio-economic impacts (positive

and negative) are assessed by the EAP, and appropriate mitigation and enhancement measures will be included in the EMPr.

5.1.4 Impacts on Aquatic Environments

Impacts on water courses resulting from the proposed development may result in erosion and sedimentation of non-perennial streams or wetlands near development areas, pollution due to contaminated stormwater runoff (mainly during the construction phase), and changes in stormwater regime due to development of the site.

The specialist has reported on the potential for aquatic environments on or around the study site, and will assess impacts on these and propose mitigation measures as required (see draft Terms of Reference in Section 5.3), which will be provided in the EMPr.

5.1.5 Impacts on Agricultural Potential

The site and surrounding area is currently used for agriculture, and development of the proposed project will lead to reduction or loss of agricultural potential, both through the presence of physical surface infrastructure on the site, and indirect impacts such as erosion and loss of topsoil. It is recognised however that the existing agricultural potential of the site is low due to the arid environment.

Impacts on agricultural potential will be assessed by a specialist (see draft Terms of Reference in Section 5.3), and appropriate mitigation measures provided in the EMPr to avoid or minimise these impacts during construction of the proposed development.

5.1.6 Stormwater and Erosion Impacts

Vegetation clearing and disturbance of soils during construction will leave them vulnerable to erosion by water and wind. This could lead to increased sediment load in stormwater runoff. Loss of topsoil and erosion will also limit the potential for vegetation growth in these areas, leading to further erosion.

Stormwater impacts will be assessed by the EAP, and standard mitigation measures to manage erosion and stormwater will be included in the EMPr for both construction and operation.

5.1.7 Waste Management Impacts

Lack of adequate waste management could result in spread of litter, illegal dumping, pollution of soil and water resources, and increased prevalence of scavengers at the site, especially during construction.

Impacts relating to waste management will be assessed by the EAP, and if necessary additional mitigation measures will be provided in the EMPr to manage waste related impacts on the site and surrounding area during construction and operation.

5.1.8 Visual Impacts

The proposed development will cover an extensive area and due to the lack of topographic shielding may be visible from a great distance. It could also be considered to be out of character in a predominantly agricultural area, and reflection off the solar panels could potentially create a nuisance to onlookers. Dust generated during vegetation clearing and earthworks may also be visible over great distances during construction. Visual impacts may therefore result on nearby receptors such as surrounding residents, tourists to the area and motorists passing by, recognising that visual impacts are also subjective in nature.

Visual impacts on surrounding receptors will be assessed by a specialist (see draft Terms of Reference in Section 5.3), and where available, recommendations to mitigate these impacts will be included in the EMPr.

5.1.9 Impacts Related to Construction

Additional impacts during the construction phase could potentially relate to the following:

- Sanitation and water supply;
- Safety and security;
- Chemical pollution of soils and stormwater due to spills or leaks;
- Damage to other infrastructure (e.g. Fences, underground and above-ground cables);
- Veld fires and fire management; and
- Interruption to services supply.

The potential impacts above will be assessed by the EAP and should be minimised by standard well-managed construction procedures. However, specific mitigation measures for construction related impacts will be included in the EMPr in order to alleviate the effects of the identified impacts.

5.1.10 Cumulative Impacts

Cumulative impacts may result from the subsequent phases of the proposed development (i.e. Kloofsig 2 and 3), the EIAs for which will need to assess these potential impacts, as well as potentially from other developments in the area. These may relate to various of the impacts described in the sub-sections above, and where appropriate will be assessed either by the relevant specialists or by the EAP in the impact assessment phase.

5.2 Specialist Studies

A number of specialist studies are proposed in the Impact Assessment phase in order to investigate the potential environmental impacts associated with the proposed development. The proposed specialist studies to be conducted during the Impact Assessment phase are as follows:

- Ecological Impact Assessment, including aquatic environments;
- Avifaunal Impact Assessment;
- Visual Impact Assessment;
- Archaeological Impact Assessment;
- Paleontological Impact Assessment; and
- Agricultural Potential Assessment.

5.3 Draft Terms of Reference for Specialist Studies

Draft terms of reference for each of the proposed specialist studies are provided below, and a copy of SRK's standard impact rating methodology that will be used to rate all impacts is provided in Section 5.4. Where required, specialists have been asked to provide practical recommendations regarding mitigation measures, which will be incorporated into the EMPr, and where relevant, cumulative impacts should be included in the assessment.

5.3.1 Ecological Impact Assessment (Including Aquatic Ecology)

- Identify and delineate any riparian and wetland areas on and within 500 m of the proposed solar photovoltaic (PV) energy facility;
- Assess the Present Ecological State (PES) of any wetland identified;
- Comment on potential impacts on water resources resulting from the development;
- Make recommendations regarding the mitigation of any potential damage to wetlands;
- Desktop assessment of available data layers (vegetation types, red data book species, bioregional plans, etc.);
- Limited site assessment to ground truth desktop assessment;
- Identify and map the vegetation units and ecosystems that occur on the site;

- Assess the ecological sensitivity of these ecosystems and comment on ecologically sensitive areas, in terms of their biodiversity and where needed ecosystem function;
- Assess qualitatively and quantitatively the significance of the fauna habitat components and current general conservation status of the site;
- Comment on connectivity with natural vegetation and habitats on adjacent sites,
- Recommend suitable buffer zones, if relevant;
- List plant and vertebrate fauna species that do or might occur on site and that may be affected by the development, and to identify species of conservation concern;
- Describe potential impacts of the proposed development on vegetation, fauna and flora of the study site;
- Provide a significance rating of ecological impact which includes a rating of the ecological sensitivity of the site, and the effect of the development on the ecology of the site;
- Provide management recommendations that might mitigate negative and enhance positive impacts, should the proposed development be approved; and
- Comment on the ability of vegetation in the area to recover from trampling and dust during construction, and to accommodate increase shade as a result of the shadows of panels.

5.3.2 Avifauna Impact Assessment

- Conduct a site assessment and list those species observed and expected to occur on the site, also noting those of conservation concern (including Red Listed species);
- Review the available literature for the area relating to distribution of birds, including Important Bird Areas (IBAs);
- Assess the quantitative and qualitative condition of suitable habitat for the Red Listed species that may occur in the area;
- Assess the possibility of species of conservation concern being present on the study site;
- Discuss and assess potential impacts on bird species resulting from the proposed development and propose practical and implementable mitigation measures; and
- Identify, map if required, and describe particular ecologically sensitive areas.

5.3.3 Archaeological Impact Assessment

- Conduct a literature review of known archaeological resources within the area with a view to determining which of these resources are likely to occur within the development footprint;
- Assess the area of the proposed solar PV energy facility; and
- Describe and map any sensitive or no-go areas to inform the final layout.
- Comment on potential impacts on these resources resulting from the development;
- Make recommendations regarding the mitigation of any damage to archaeological resources identified, or that may be identified during the construction phase.

5.3.4 Paleontological Impact Assessment

- Conduct a literature review of known archaeological resources within the area with a view to determining which of these resources are likely to occur within the development footprint;
- Assess the area of the proposed solar PV energy facility; and
- Describe and map any sensitive or no-go areas to inform the final layout.
- Comment on potential impacts on these resources resulting from the development;
- Make recommendations regarding the mitigation of any damage to paleontological resources identified, or that may be identified during the construction phase.

5.3.5 Agricultural Potential Assessment

- Describe the soils, rainfall, water availability and subsequent agricultural potential of the study area and the relationship thereof with current land use and land capability (it is anticipated that this will require limited soil profiling);
- Determine the (livestock) carrying capacity of the study area and the potential for crop production;
- Specify the areas of viable agricultural potential and appropriate types of agricultural use in these areas;
- Using expert judgement, comment on the likelihood of such agricultural uses being economically viable without subsidisation;
- Comment on the economic value of existing agricultural activity; and
- Comment on cumulative impacts as applicable to each phase of the development.

5.3.6 Visual Impact Assessment

- Conduct a site visit to conduct fieldwork and to obtain a first-hand overview of the proposed development.
- Conduct a literature review to identify relevant reports and documentation relating to the development.
- The collection of baseline data to establish:
    - the receiving environment and define the view catchment area.
    - view corridors, viewpoints and receptors.
    - the identification of potential lighting impacts at night (if requested by Interested and Affected Parties (IAPs).
- Conduct a viewshed analysis including the following:
    - analysis of the potential visual impacts
    - investigate the effectiveness of the mitigation measures through the use of GIS 3D modelling packages to evaluate the possible effect the mitigation measures may have on the final visual impact ratings.
- Identify mitigation measures to reduce or eliminate any potential visual impacts identified.

5.4 Impact Rating Methodology

The assessment of impacts will be based on the professional judgement of specialists at SRK Consulting, fieldwork, and desk-top analysis. The significance of potential impacts that may result from the proposed development will be determined in order to assist DEA in making a decision.

The significance of an impact is defined as a combination of the consequence of the impact occurring and the probability that the impact will occur. The criteria that are used to determine impact consequences are presented in Table 5-1 below.

Table 5-1: Criteria used to determine the Consequence of the Impact

Rating	Definition of Rating	Score
A. Extent– the area over which the impact will be experienced		
None		0
Local	Confined to project or study area or part thereof (e.g. site)	1
Regional	The region, which may be defined in various ways, e.g. cadastral, catchment, topographic	2
(Inter) national	Nationally or beyond	3

B. Intensity– the magnitude of the impact in relation to the sensitivity of the receiving environment		
None		0
Low	Site-specific and wider natural and/or social functions and processes are negligibly altered	1
Medium	Site-specific and wider natural and/or social functions and processes continue albeit in a modified way	2
High	Site-specific and wider natural and/or social functions or processes are severely altered	3
C. Duration– the time frame for which the impact will be experienced		
None		0
Short-term	Up to 2 years	1
Medium-term	2 to 15 years	2
Long-term	More than 15 years	3

The combined score of these three criteria corresponds to a Consequence Rating, as follows:

Table 5-2: Method used to determine the Consequence Score

Combined Score (A+B+C)	0 – 2	3 – 4	5	6	7	8 – 9
Consequence Rating	Not significant	Very low	Low	Medium	High	Very high

Once the consequence has been derived, the probability of the impact occurring will be considered using the probability classifications presented in Table 5-3.

Table 5-3: Probability Classification

Probability– the likelihood of the impact occurring	
Improbable	< 40% chance of occurring
Possible	40% - 70% chance of occurring
Probable	> 70% - 90% chance of occurring
Definite	> 90% chance of occurring

The overall significance of impacts will be determined by considering consequence and probability using the rating system prescribed in the table below.

Table 5-4: Impact Significance Ratings

Significance Rating	**Possible Impact Combinations**		
	Consequence		**Probability**
Insignificant	Very Low	&	Improbable
	Very Low	&	Possible
Very Low	Very Low	&	Probable
	Very Low	&	Definite
	Low	&	Improbable
	Low	&	Possible
Low	Low	&	Probable
	Low	&	Definite
	Medium	&	Improbable

Significance Rating	Possible Impact Combinations		
	Consequence		Probability
	Medium	&	Possible
Medium	Medium	&	Probable
	Medium	&	Definite
	High	&	Improbable
	High	&	Possible
High	High	&	Probable
	High	&	Definite
	Very High	&	Improbable
	Very High	&	Possible
Very High	Very High	&	Probable
	Very High	&	Definite

Finally, the impacts will also be considered in terms of their status (positive or negative impact) and the confidence in the ascribed impact significance rating. The system for considering impact status and confidence (in assessment) is laid out in the table below.

Table 5-5: Impact status and confidence classification

Status of impact	
Indication whether the impact is adverse (negative) or beneficial (positive).	+ ve (positive – a 'benefit')
	– ve (negative – a 'cost')
Confidence of assessment	
The degree of confidence in predictions based on available information, SRK's judgment and/or specialist knowledge.	Low
	Medium
	High

The impact significance rating should be considered by authorities in their decision-making process based on the implications of ratings ascribed below:

- Insignificant: the potential impact is negligible and will not have an influence on the decision regarding the proposed activity/development.
- Very Low: the potential impact is very small and should not have any meaningful influence on the decision regarding the proposed activity/development.
- Low: the potential impact may not have any meaningful influence on the decision regarding the proposed activity/development.
- Medium: the potential impact should influence the decision regarding the proposed activity/development.
- High: the potential impact will affect the decision regarding the proposed activity/development.
- Very High: The proposed activity should only be approved under special circumstances.

Practicable mitigation measures will be recommended and impacts will be rated in the prescribed way both with and without the assumed effective implementation of mitigation measures. Mitigation measures will be classified as either:

- Essential: must be implemented and are non-negotiable; or
- Optional: must be shown to have been considered, and sound reasons provided by the proponent, if not implemented.

5.5 Programme of Activities

The key activities and the provisional timetable required to achieve the objectives of the Environmental Impact Assessment study are summarised in Table 5-6 below, and provided in the project schedule appended to the Application Form (Appendix A of the DSR).

Note that the intention is for the EIAs for Kloofsig 1, 2 and 3 to run concurrently, with separate but similar reports being issued for each project according to the estimated timeframes indicated below. Authorities and IAPs will therefore be provided with three separate reports for review and comment, and clearly indicate which of the project(s) their comments relate to. DEA reference numbers are not yet available for the applications, but will be provided with subsequent reports and IAP correspondence.

Table 5-6: Activities and Timetable

Stage / Activity	Target Dates	
	Start	**End**
Submission of Final Scoping Report and Plan of Study for EIA to DEA	September 2016	October 2016
DEA approval of Plan of Study for EIA (potentially including recommendations)	November 2016	December 2016
Conduct Specialist Studies and Compile Draft EIR	August 2016	September 2016
Issue Draft EIR for Public Comment	December 2016	-
Public Comment Period for Draft EIR	December 2016	January 2017
Submit Final EIR to DEA for a decision	February 2017	-

6 The Way Forward

The Draft Scoping Report is not a final report and will be amended in response to the comments received. The Final Scoping Report will be submitted to DEA, together with a Plan of Study for the EIA, for their approval. Comments on the Draft Scoping Report will assist in focussing the EIA and will be used to define the Terms of Reference for specialist studies. The public is therefore urged to submit comments, as these could influence the recommendation of the Final Scoping Report and decision taken by DEA.

The public participation programme has given IAPs an opportunity to assist with the identification of issues and potential impacts, and further opportunities are provided as indicated in this report.

The Executive Summary of this Draft Scoping Report will be distributed to registered IAP's for a 30 day comment period. A printed copy of this report will be available for public review at the following location:

- Van Der Kloof Public Library.

The report can also be accessed as an electronic copy on SRK Consulting's webpage via the 'Public Documents' link http://www.srk.co.za/en/page/za-public-documents. Written comment on this DSR should be sent by **17h00 on 16 September 2016** to:

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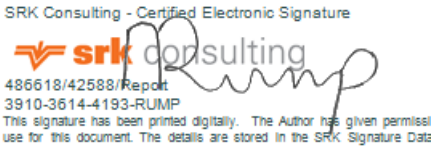

Nicola Rump CEAPSA

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All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

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Appendices

Appendix A: EIA Application Form and EAP Declaration of Interest

Appendix B: Onsite Poster

Appendix C: Background Information Document

Appendix D: Proof of IAP Notification

Appendix E: Original IAP correspondence

Appendix F: EAPs' CVs

Appendix G: Site Maps & Design Drawings

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