ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

SCOPING REPORT

PAULPUTS CSP PROJECT, NEAR POFADDER, NORTHERN CAPE PROVINCE

SCOPING REPORT FOR PUBLIC REVIEW

13 November 2015 -14 December 2015

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PURPOSE OF THIS SCOPING REPORT

Paulputs CSP RF (Pty) Ltd is proposing the development of a Concentrated Solar Power (CSP) Project and associated infrastructure on Portion 4 of the Farm Scuitklip 92, located approximately 45km north-east of Pofadder within the Khai-Ma Local Municipality in the Northern Cape. The Paulputs Concentrated Solar Power (CSP) Project is proposed to be up to 200MW in capacity and will be constructed over an area of approximately 900ha in extent within the broader property. The project is to be developed by Abengoa Solar Power South Africa (Pty) Ltd, through Paulputs CSP RF (Pty) Ltd, a Special Purpose Vehicle (SPV) established to be the applicant for the project. The proposed project is to be known as the **Paulputs CSP** project.

This Scoping Report documents the evaluation of the potential environmental impacts of each proposed solar energy facility and forms part of the EIA process. The Scoping Phase was conducted in accordance with the requirements of the EIA Regulations in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998).

Paulputs CSP RF (Pty) Ltd. appointed Savannah Environmental as independent environmental consultants to undertake the requisite Environmental Impact Assessment (EIA) Process. The EIA process is being undertaken in accordance with the requirements of the National Environmental Management Act (NEMA; Act No. 107 of 1998).

This Scoping Phase aims to:

» Identify and evaluate potential environmental (biophysical and social) impacts and benefits of all phases of the proposed development (including design, construction, operation and decommissioning) within the broader study area through a desk-top review of existing baseline data and specialist studies.
» Identify potentially sensitive environmental features and areas on the site to inform the preliminary design process of the three facilities.
» Define the scope of studies to be undertaken within the EIA process.
» Provide the authorities with sufficient information in order to make a decision regarding the scope of issues to be addressed in the EIA process, as well as regarding the scope and extent of specialist studies that will be required to be undertaken as part of the EIA Phase of the process.

Within this context, the objectives of this Scoping Phase are to, through a consultative process:

» identify the relevant policies and legislation relevant to the project;

- motivate the need and desirability of the proposed project, including the need and desirability of the activity in the context of the preferred location;
- identify and confirm the preferred project and technology alternative through an impact and risk assessment and ranking process;
- identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
- identify the key issues to be addressed in the EIA phase;
- agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the project will impose on the preferred site through the life of the project, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored

This Scoping Report consists of 9 sections:

- **Chapter 1** provided background to the proposed project and the environmental impact assessment.
- **Chapter 2** describes the activities associated with the project (project scope) and provides insight of the available technologies.
- **Chapter 3** provides the Regulatory and Planning Context.
- **Chapter 4** outlines the process which was followed during the Scoping Phase of the EIA process, including the consultation programme that was undertaken and input received from interested and affected parties.
- **Chapter 5** describes the existing biophysical and socio-economic environment.
- **Chapter 6** provides an identification and evaluation of the potential issues associated with the proposed Paulputs CSP Project
- **Chapter 7** presents the conclusions of the scoping evaluation for the proposed Paulputs CSP Project.
- **Chapter 8** describes the Plan of Study for EIA.
- **Chapter 9** provides references used to compile the Scoping Report.

LEGAL REQUIREMENTS IN TERMS OF THE EIA REGULATIONS

Table 1 below details how the legal requirements of Appendix 2 and Regulation 21(1) of the 2014 EIA Regulations have been addressed within this report.

Table 1: Legal requirements in terms of the EIA regulations

EIA REGULATIONS 2014 GNR 982: Appendix 2 CONTENT OF THE SCOPING REPORT	**Cross-reference in this Scoping Report**
A Scoping Report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and includes -	
(a) details of— (i) the EAP who prepared the report; and (ii) the expertise of the EAP to carry out scoping procedures; including a curriculum vitae	Chapter 1 Section 1.2
(b) the location of the activity, including— (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (iv) is not available, the coordinates of the boundary of the property or properties;	Chapter 1 Section 1.2, Table 1.1
(c) a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is— (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Chapter 1 Section 1.2 and 1.3
(d) a description of the scope of the proposed activity, including— (i) all listed and specified activities triggered; (ii) a description of the activities to be undertaken, including associated structures and infrastructure;	Chapter 3 Section 3.1
(e) a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;	Chapter 3 Section 3.3
(f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Chapter 2 Section 2.1
(g) Missing as per the EIA REGULATIONS 2014 GNR 982:	Appendix 2; pg 58
(h) a full description of the process followed to reach the proposed preferred activity, site and location within the site, including—	
(i) details of all the alternatives considered;	Chapter 2 Section 2.3
(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Chapter 3 Appendix C
(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Chapter 3 To be included in the final Scoping Report

(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Chapter 4
(v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts—	
(aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	Chapter 5
(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Chapter 5
(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Chapter 5
(viii) the possible mitigation measures that could be applied and level of residual risk;	Chapter 5
(ix) the outcome of the site selection matrix;	Chapter 2 Section 2.1
(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and	Chapter 2
(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity	Chapter 2 Section 2.3
(i) a plan of study for undertaking the environmental impact assessment process to be undertaken	Chapter 8
(j) an undertaking under oath or affirmation by the EAP in relation to— (i) the correctness of the information provided in the report; (ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and (iii) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	Appendix A
(k) an undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment;	Appendix A
(l) where applicable, any specific information required by the competent authority.	To be included in the final Scoping Report

INVITATION TO COMMENT ON THE SCOPING REPORT

This **Scoping Report** has been made available for public review at the following places, which lie in the vicinity of the proposed project area from **13 November 2015 – 14 December 2015:**

» Pofadder Public Library

The report is also available for download on:

» www.savannahSA.com

Please submit your comments to
Gabriele of **Savannah Environmental** PO Box 148, Sunninghill, 2157 Tel: 011 656 3237 Fax: 086 684 0547 Email: gabriele@savannahsa.com
The due date for comments on the Scoping Report is **14 December 2015**

Comments can be made as written submission via fax, post or e-mail.

EXECUTIVE SUMMARY

Background and Project Overview

Paulputs CSP RF (Pty) Ltd is proposing the development of a Concentrated Solar Power (CSP) Project and associated infrastructure on Portion 4 of the Farm Scuitklip 92, located approximately 45km north-east of Pofadder within the Khai-Ma Local Municipality in the Northern Cape. The Paulputs Concentrated Solar Power (CSP) Project is proposed to be up to 200MW in capacity and will be constructed over an area of approximately 900ha in extent within the broader property. The project is to be developed by Abengoa Solar Power South Africa (Pty) Ltd, through Paulputs CSP RF (Pty) Ltd, a Special Purpose Vehicle (SPV) to be established as the applicant for the project. The proposed project is to be known as the Paulputs CSP project.

The Paulputs CSP Project is proposed to generate up to 200MW in capacity and will be constructed over an area of approximately 900ha in extent within the broader property.

The identified site is situated approximately 45 km north-east of Pofadder on Portion 4 of the Farm Scuit-Klip 92The site lies about 30 km south east of the Gariep River which forms the border with Namibia (Figure 1). The project site is accessed via the N14 and then ~17km along the R357 district road located to the east of the farm portion. Both roads are tarred. The MR73 minor road to the west of the farm portion bisects the site. The proposed site falls within the Khai Ma Local Municipality which has its administrative centre in Pofadder. This local municipality is one of seven local municipalities that fall within the greater Namakwa District Municipality Towns in the vicinity of the site include Pofadder which is 45km south west of the site and Onseepkans which is 30km north west of the site. Prominent features in the immediate vicinity include the KaXu One Solar Energy Facility and Xina Solar One located within Portion 4 of the Farm Scuitklip and Konkoonsies Solar I and Konkoonsies Solar II PV plants which located on the adjacent farmland within 2km south of the proposed site.

The proposed Paulputs CSP Project (within a contacted capacity of 200MW) will consist of a field of heliostats and a central receiver, known as a power tower.
Concentrated Solar Power (CSP) Tower technology uses thousands of mirrors to reflect and concentrate sunlight onto a central point to generate heat, which in turn is used to generate electricity. A tower system is comprised of two main component groups, i.e. a) a heat collection system, and b) a conventional generating plant portion. The heat collection system is comprised of mirrors which reflect concentrated sunlight onto a large heat exchanger called a receiver that sits on an up to 300m tower. Within the receiver, fluid flows through the piping that forms the external walls; this fluid absorbs the heat from the concentrated sunlight. The fluid

utilised is molten salt, which is heated from approximately 250° to 550° Celsius.

The collected energy is used to generate steam through a conventional heat exchanger system that is in turn used for electricity generation in a conventional steam turbine and generator.

The project will be constructed over an area of 900ha in extent, and include the following infrastructure:

» Power plant: Salt tower central receiver and tracking heliostats, including a power block with a steam turbine generator and thermal salt storage tanks.
» Associated infrastructure: power island with steam turbine generator, heat exchangers and steam vessels, access roads, on-site substation, power line, water abstraction point and supply pipeline, lined earth water reservoir, steel water storage tanks, packaged water treatment plant, lined evaporation ponds, salt storage vessels, auxiliary fossil fuel boilers and workshop and office buildings.

The overarching objective for the Paulputs CSP Project is to maximise electricity production through exposure to the solar resource, while minimising infrastructure, operational and maintenance costs, as well as social and environmental impacts. In order to meet these objectives, local level environmental and planning issues will be assessed through the EIA process, through site-specific studies in order to delineate areas of sensitivity within the broader site. This will serve to inform the design of the Paulputs CSP Project. It is anticipated that the molten salt technology (MST) Tower, heliostats and the associated infrastructure can be appropriately placed within the boundaries of the broader site to avoid identified environmental sensitivities or constraints identified through the EIA process.

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

Evaluation of the Proposed Project

The majority of potential impacts identified to be associated with the construction of the Paulputs CSP Project are anticipated to be localised and restricted to the proposed site itself (apart from social impacts – job creation which could have more of a

regional positive impact), while operational phase impacts range from local to regional and national (being the positive impact of contribution of clean energy as part of the energy mix in South Africa).

At a local level, the area has become a node for renewable energy projects due to the viability of the solar resource for the area and the availability of the Paulputs Substation, with the following constructed or preferred bidder projects located directly adjacent to, or in close proximity to, the project development site: Kaxu Solar One (CSP trough plant), Xina Solar One (CSP trough plant), Konkoonsies I Solar (PV plant), and Konkoonsies II Solar (PV plant). Key cumulative impacts associated with solar energy development within the immediate vicinity of the Paulputs CSP Project are expected to be associated with the construction impacts and resulting disturbance of the physical footprints of the facilities in one node/area, and the potential for a change in visual quality of the area.

No environmental fatal flaws or impacts of very high significance were identified to be associated with the proposed project on the identified site at this stage in the process. This conclusion must however be confirmed through a detailed investigation of the development footprint within the EIA Phase of the process.

The potentially sensitive areas which have been identified through the scoping study are summarised and illustrated in the sensitivity map in Figure 2. The scoping phase sensitivity map provides an informed indication of sensitivity within and around the larger site. The detail is based on the desktop review of the available baseline information for the study area (including information from detailed EIA studies previously undertaken for the property), as well as a 10-day ecological field survey. The sensitivity map is intended to inform the location and layout of the Paulputs CSP Project, and must be used as a tool by the developer to avoid those areas flagged to be of no-go areas or of potential high sensitivity (as far as possible)..

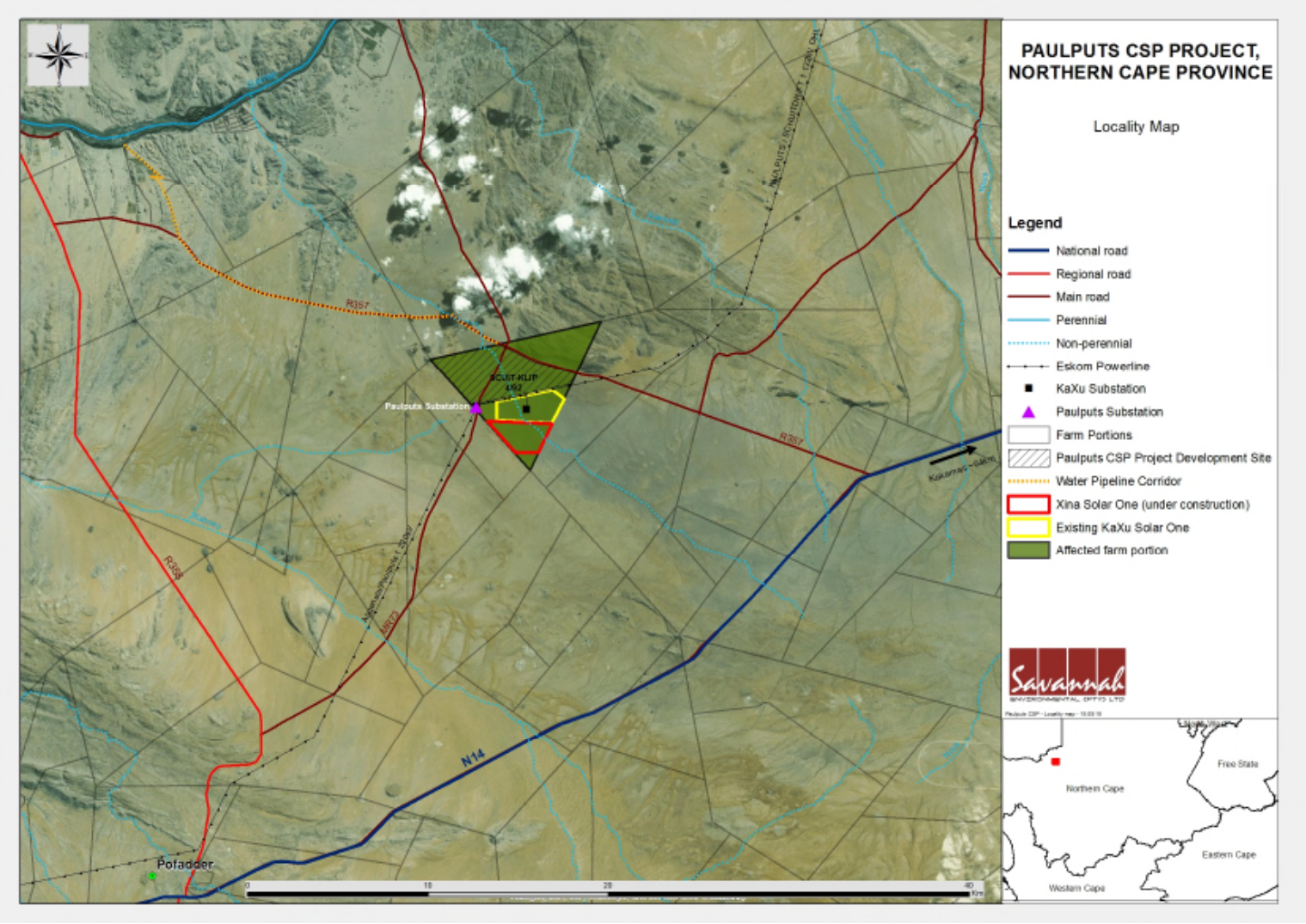

Figure 1: Locality Map of the Paulputs CSP Project(Refer to Appendix L for A3 Maps)

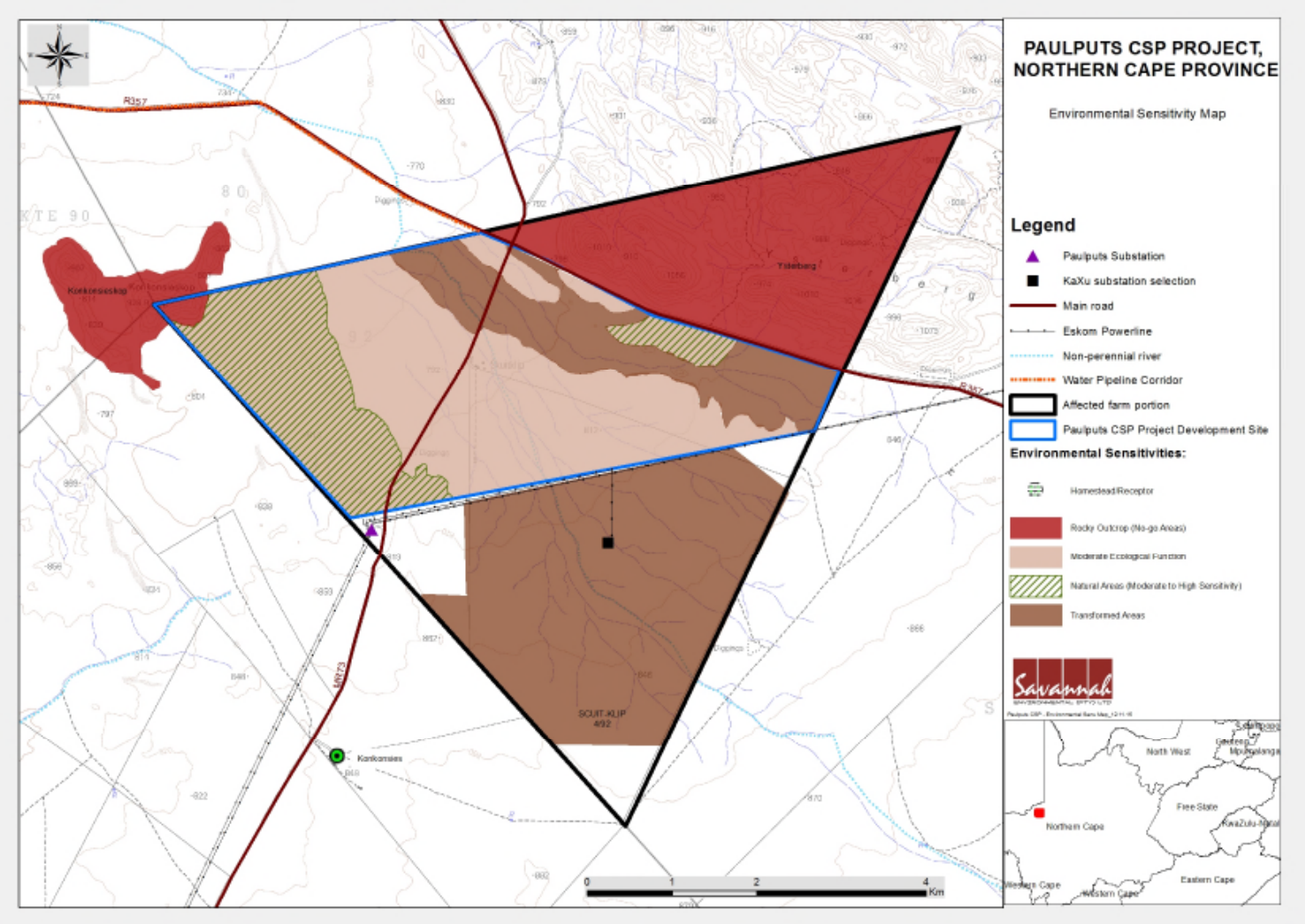

Figure 2: Environmental Sensitivity Map for the Paulputs CSP Project (Refer to Appendix L for A3 Maps)

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DEFINITIONS AND TERMINOLOGY

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

Concentrating solar power: Solar generating facilities use the energy from the sun to generate electricity. Concentrating Solar Power facilities collect the incoming solar radiation and concentrate it (by focusing or combining it) onto a single point, thereby increasing the potential electricity generation.

Commercial Operation date: The date after which all testing and commissioning has been completed and is the initiation date to which the seller can start producing electricity for sale (i.e. when the project has been substantially completed).

Commence: The start of any physical activity, including site preparation and any other activity on site furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

Commissioning: Commissioning commences once construction is completed. Commissioning covers all activities including testing after all components of the wind turbine are installed.

Construction: Construction means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity. Construction begins with any activity which requires Environmental Authorisation.

Cumulative impacts: Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period and can include both direct and indirect impacts.

Decommissioning: To take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned. This usually occurs at the end of the life of a facility.

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

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

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

Emergency: An undesired/ unplanned event that results in a significant environmental impact and requires the notification of the relevant statutory body, such as a local authority.

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

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

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

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

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

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

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

Hazardous waste: Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment (Van der Linde and Feris, 2010;pg 185).

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

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

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

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

Method statement: A written submission to the ECO and the site manager (or engineer) by the EPC Contractor in collaboration with his/her EO.

No-go areas: Areas of environmental sensitivity that should not be impacted on or utilised during the development of a project as identified in any environmental reports.

Pollution: A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted from any activity, including the storage or treatment or waste or substances.

Pre-construction: The period prior to the commencement of construction, this may include activities which do not require Environmental Authorisation (e.g. geotechnical surveys).

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

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

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

Waste: Any substance, whether or not that substance can be reduced re-used, recycled and recovered; that is surplus, unwanted, rejected, discarded, abandoned or disposed of which the generator has no further use for the purposes of production. Any product which must be treated and disposed of, that is identified as waste by the minister of Environmental affairs (by notice in the Gazette) and includes waste generated by the mining, medical or other sectors, but: A by-product is not considered waste, and portion of waste, once re-used, recycled and recovered, ceases to be waste (Van der Linde and Feris, 2010; p186).

ABBREVIATIONS AND ACRONYMS

BID	Background Information Document
CBOs	Community Based Organisations
CDM	Clean Development Mechanism
CSIR	Council for Scientific and Industrial Research
CO_2	Carbon dioxide
D	Diameter of the rotor blades
DAFF	Department of Forestry and Fishery
DEA	National Department of Environmental Affairs
DENC	Department of Economic Development and Nature Conservation
DME	Department of Minerals and Energy
DOT	Department of Transport
DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
GIS	Geographical Information Systems
GG	Government Gazette
GN	Government Notice
Ha	Hectare
I&AP	Interested and Affected Party
IDP	Integrated Development Plan

IEP	Integrated Energy Planning
km^2	Square kilometres
km/hr	Kilometres per hour
kV	Kilovolt
m^2	Square meters
m/s	Meters per second
MW	Mega Watt
NEMA	National Environmental Management Act (Act No 107 of 1998)
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act (Act No 25 of 1999)
NGOs	Non-Governmental Organisations
NIRP	National Integrated Resource Planning
NWA	National Water Act (Act No 36 of 1998)
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency Limited
SDF	Spatial Development Framework

INTRODUCTION CHAPTER 1

Paulputs CSP RF (Pty) Ltd is proposing the development of a Concentrated Solar Power (CSP) Project and associated infrastructure on Portion 4 of the Farm Scuitklip 92, located approximately 45km north-east of Pofadder within the Khai-Ma Local Municipality in the Northern Cape. The Paulputs Concentrated Solar Power (CSP) Project is proposed to be up to 200MW in capacity and will be constructed over an area of approximately 900ha in extent within the broader property. The project is to be developed by Abengoa Solar Power South Africa (Pty) Ltd, through Paulputs CSP RF (Pty) Ltd, a Special Purpose Vehicle (SPV) established to be the applicant for the project. The proposed project is to be known as the **Paulputs CSP** project.

The project is being proposed in response to the requirement for additional electricity generation capacity at a national level and in response to identified objectives of the local and district municipalities to develop renewable energy facilities. From a regional perspective, the greater Pofadder area is considered favourable for the development of commercial solar electricity generating facilities by virtue of the prevailing climatic conditions (primarily as the economic viability of a solar energy facility is directly dependent on the annual solar irradiation values for a particular area), relief and aspect, the extent of the site, and the availability of a direct grid connection (i.e. point of connection to the Eskom National grid).

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

This Scoping Report consists of the following sections:

» **Chapter 1** provided background to the proposed project and the environmental impact assessment.
» **Chapter 2** describes the activities associated with the project (project scope) and provides insight of the available technologies.
» **Chapter 3** provides the regulatory and planning context.
» **Chapter 4** outlines the process which was followed during the Scoping Phase of the EIA process, including the consultation programme that was undertaken and input received from interested and affected parties.
» **Chapter 5** describes the existing biophysical and socio-economic environment.
» **Chapter 6** provides an identification and evaluation of the potential issues associated with the proposed Paulputs CSP Project.
» **Chapter 7** presents the conclusions of the scoping evaluation for the proposed Paulputs CSP Project.
» **Chapter 8** describes the Plan of Study for EIA.
» **Chapter 9** provides references used to compile the Scoping Report.

It is the developer's intention to bid the Paulputs CSP project under the Department of Energy's (DoE) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme. The power generated from the Paulputs CSP Project will be sold to Eskom and will feed into the national electricity grid. Ultimately, the project is intended to be a part of the renewable energy projects portfolio for South Africa, as contemplated in the Integrated Resource Plan 2030.

1.1. Legal Requirements as per the EIA Regulations, 2014

This Scoping report has been prepared in accordance with the requirements of the EIA Regulations published on 08 December 2014 promulgated in terms of Chapter 5 of the National Environmental Management Act (Act No 107 of 1998). This chapter of the scoping report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(a)(i) the details of the EAP who prepared the report and (ii) the expertise of the EAP to carry out scoping procedures; including a curriculum vitae	The details and expertise of the EAP who has undertaken this scoping report is included in section 1.3 of the chapter and Appendix A of this scoping report.
(b) the location of the activity, including (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties	The location of the proposed facility is included in section 1.2, and within Table 1.1 of this chapter
(c) a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken	A locality map illustrating the proposed site for the development of the facility is included under section 1.2 as Figure 1.1 of this chapter.

1.2. Project Overview

Paulputs CSP RF (Pty) Ltd is proposing to develop a Concentrated Solar Power (CSP) Project and associated infrastructure on Portion 4 of the farm Scuitklip 92, in the Khai-Ma Local Municipality in the Northern Cape Province (refer to Figure 1.1 and Table 1.1). A broader study area of approximately 3508 ha (Portion 4 of the farm Scuitklip 92) was

considered through a feasibility level assessment in 2010, and the area was considered to be highly acceptable for the development of CSP facilities. This farm portion currently contains two CSP facilities owned by Abengoa Solar South Africa, known as KaXu Solar One (operational) and Xina Solar One (under construction). The development footprint for the Paulputs CSP Project (approximately 900 ha in extent) would be appropriately located within the remaining extent of the farm portion (approximately 1600ha in extent). The identified site is accessible via the R357 and MR73 existing access road, via the N14.

Table 1.1: Detailed description of the farm Scuitklip 92

Province	**Northern Cape Province**
District Municipality	Namakwa District Municipality
Local Municipality	Khai-Ma Local Municipality
Ward number(s)	1
Nearest town(s)	Pofadder and Kakamas
Farm name(s) and number(s)	The Farm Scuitklip 92
Portion number(s)	Portion 4
SG 21 Digit Code (s)	C03600000000009200004
Landowner	Abengoa Solar South Africa Pty Ltd
Land use	Zoned Special Solar

The proposed Paulputs CSP Project will have a contracted capacity of up to 200MW. Molten salt technology will be utilised to allow for at least 5hours of storage to meet the requirements of the REIPPPP. The Paulputs CSP Project will consist of a field of heliostats and a central receiver, known as a power tower. The Paulputs CSP project will be constructed over an area of approximately 900 ha in extent, and include *inter alia* the following infrastructure:

» Molten salt tower up to 260m in height with surrounding heliostat field
» Power island including salt storage tanks, steam turbine generator, heat exchangers, and dry cooled condenser
» On-site project substation, and short 132 kV power line to Eskom's existing Paulputs Transmission Substation
» Water supply abstraction point located at the Gariep River close to Onseepkans
» Filter and booster station at abstraction point
» Water supply pipeline along R357 Onseepkans Road to the site
» On-site lined ground water storage reservoir and various steel water tanks
» Lined evaporation ponds
» Packaged water treatment plant and associated chemical store
» Auxiliary wet cooled chiller plant
» Control room and office building
» Heliostat assembly building and workshop.

The overarching objective for the Paulputs CSP Project is to maximise electricity production through exposure to the solar resource, while minimising infrastructure, operational and

maintenance costs, as well as social and environmental impacts. In order to meet these objectives, local level environmental and planning issues will be assessed through the EIA process, through site-specific studies in order to delineate areas of sensitivity within the broader site. This will serve to inform the design of the Paulputs CSP Project. It is anticipated that the molten salt technology (MST) Tower, heliostats and the associated infrastructure can be appropriately placed within the boundaries of the broader site to avoid identified environmental sensitivities or constraints identified through the EIA process.

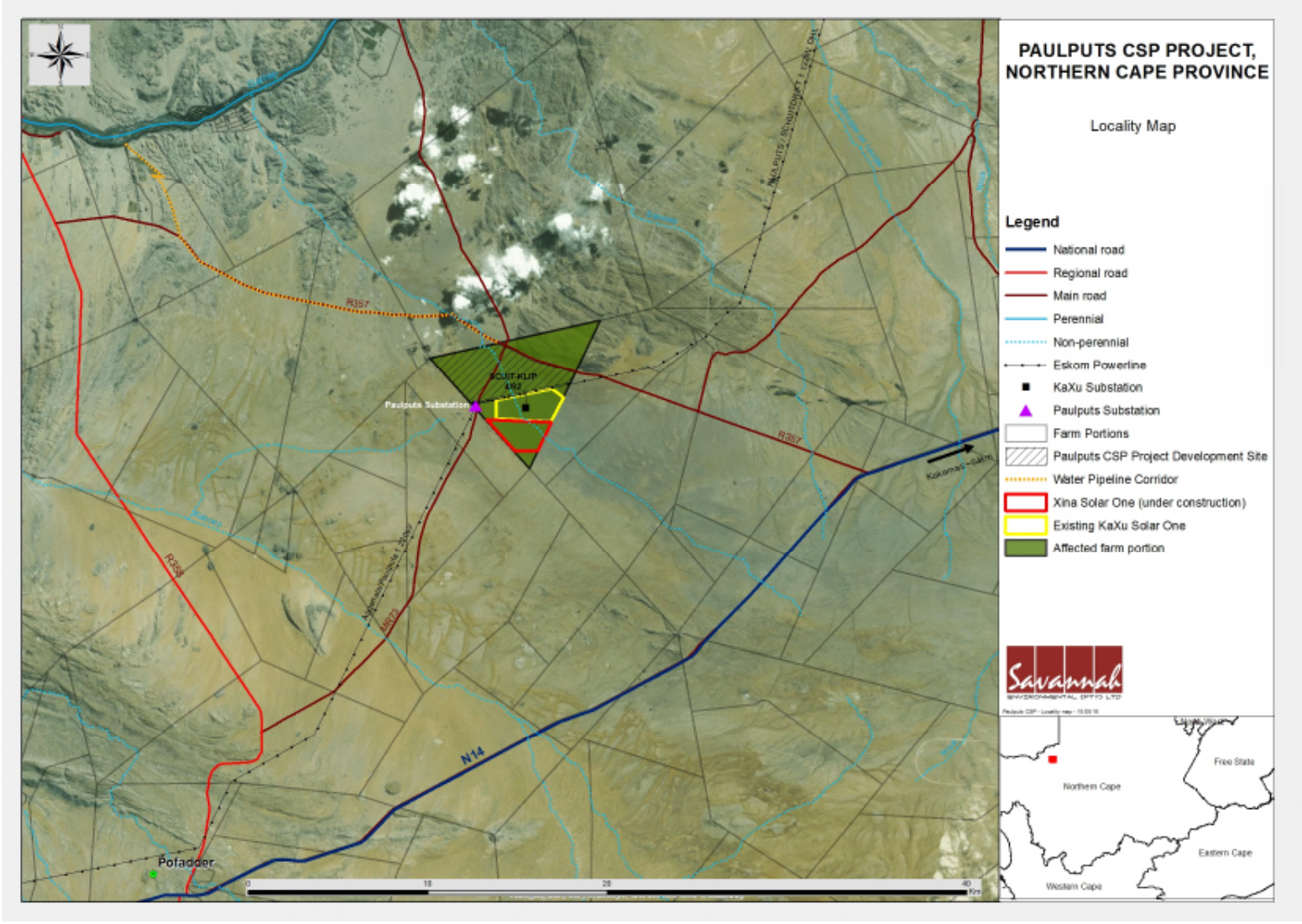

Figure 1.1: Locality map showing the extent of Portion 4 of the Farm Scuitklip and the proposed location of Paulputs CSP project within the extent of the farm portion.

1.3. Requirement for an Environmental Impact Assessment Process

The construction and operation of the proposed Paulputs CSP project is subject to the requirements of the EIA Regulations published in terms of Section 24(5) of the National Environmental Management Act (NEMA) 107 of 1998. This section provides a brief overview of the EIA Regulations and their application to this project.

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

The need to comply with the requirements of the EIA Regulations ensures that the competent authority is provided with the opportunity to consider the potential environmental impacts of a project early in the project development process and to assess if potential environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental studies are required in accordance with the EIA Regulations to provide the competent authority with sufficient information in order to make an informed decision. Paulputs CSP RF (Pty) Ltd has appointed Savannah Environmental as the independent Environmental Assessment Practitioner (EAP) to conduct an EIA process for the proposed project.

An EIA is also an effective planning and decision-making tool for the project developer as it allows for the identification and management of potential environmental impacts. It provides the opportunity for the developer to be forewarned of potential environmental issues, and allows for resolution of the issues reported on in the Scoping and EIA Reports as well as dialogue with interested and affected parties (I&APs).

The EIA process comprises two phases – i.e. Scoping and Impact Assessment - and involves the identification and assessment of environmental impacts though specialist studies, as well as public participation. The process followed in these two phases is as follows:

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

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

1.4. Details of the Environmental Assessment Practitioner

Savannah Environmental was contracted by Paulputs CSP RF (Pty) Ltd as the independent environmental assessment practitioner to undertake both Scoping and EIA Phases for the proposed Paulputs CSP Project. Neither Savannah Environmental nor any of its specialist sub-consultants on this project are subsidiaries of or are affiliated to Paulputs CSP RF (Pty) Ltd or Abengoa Solar Power South Africa (Pty) Ltd in any way. Furthermore, Savannah Environmental does not have any interests in secondary developments that could arise out of the authorisation of the proposed projects.

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

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

» *Michelle Moodley* the principle author of this report an Environmental Consultant, holds a BSc Honours degree in Biodiversity and Conservation and has 4 years of experience in environmental consulting.
» *Karen Jodas* is a registered Professional Natural Scientist and holds a Master of Science degree and is the registered EAP on the proposed project. She has

more than 17 years of experience consulting in the environmental field. Her key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and guideline development. She is currently responsible for the project management of EIAs for several renewable energy projects across the country.

» *Gabriele Wood* holds an Honours Degree in Anthropology. She has 6 years consulting experience in public participation and social research. Her experience includes the design and implementation of public participation programmes and stakeholder management strategies for numerous integrated development planning and infrastructure projects. Her work focuses on managing the public participation component of Environmental Impact Assessments and Basic Assessments undertaken by Savannah Environmental.
» *Sheila Muniongo* holds an Honours Bachelor degree in Environmental Management and 4 years of experience in the environmental field. Her key focus is on environmental impact assessments, public participation, environmental management programmes, and mapping through ArcGIS for variety of environmental projects. She is currently involved in several EIAs for renewable energy projects EIAs across the country.

In order to adequately identify and assess potential environmental impacts associated with the proposed project, the following specialist sub-consultants have provided input into this scoping report:

» Ecology (Flora and Fauna) – Adrian Hudson, Hudson Ecology
» Avifauna - Adrian Hudson of Hudson Ecology
» Soils and Agricultural Potential – Jaco Jansen, Savannah Environmental (with external review by Professor Dreyer of the University of Potchefstroom)
» Heritage – David Morris, McGregor Museum Department of Archaeology
» Palaeontology – John Pether, Geological and Palaeontological Consultant
» Visual – Quinton Lawson, MLB Architects and Bernard Oberholzer from Bernard Oberholzer Landscape Architects
» Social – Candice Hunter, Savannah Environmental (with external review by Neville Bews)
» Noise - Morné de Jager, Enviro-Acoustic Research
» Water Resources: Brian Colloty – Scherman Colloty and Associates

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

DESCRIPTION OF THE PAULPUTS CSP PROJECT CHAPTER 2

This chapter provides an overview of the Paulputs CSP Project and details the project scope which includes the planning/design, construction, operation and decommissioning activities. This chapter also explores site and technology alternatives as well as the 'do nothing' option. The use of solar energy as a means of power generation is explained. An overview of the construction, operation and decommissioning activities are also discussed.
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This chapter of the scoping report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location	The need and desirability for the development of the CSP Project within Portion 4 of the farm Scuitklip 92 is included within section 2.2 of this chapter.
(h)(i) details of all the alternatives considered	The details of all alternatives considered (including site alternatives, layout and design alternatives, technology alternatives, grid connection alternatives, access road(s) alternatives and the 'Do-nothing' alternatives) are included within section 2.3 of this chapter.
(h)(ix) the outcome of the site selection matrix	The outcome of the site selection process is supported by the assessment of the receptiveness of the study area for the development of a CSP Project. This outcome is included within section 2.2.1 of this chapter
(h)(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such	All information regarding alternatives considered or not considered as included within section 2.3 of this chapter.

2.1. Nature and extent of the Paulputs CSP Project

The project is to be developed by Abengoa Solar Power South Africa (Pty) Ltd, through Paulputs CSP RF (Pty) Ltd, a Special Purpose Vehicle (SPV) to be established as the applicant for the project. The project is proposed to be developed on Portion 4 of the Farm Scuitklip 92 located approximately 45km north-east of Pofadder and 90 km south west of Kakamas in the Khai-Ma Local Municipality (Namakwa District Municipality), of the Northern Cape. Abengoa Solar Power South Africa is the owner of the property, and their two solar thermal energy parabolic trough plants are also located on the greater property (Kaxu Solar One is under full commercial operation while Xina Solar One is currently under

construction and expected to be fully operational beginning 2017). This site is highly preferred by virtue of climatic conditions, relief and aspect, the availability of land, and proximity to a viable point of connection to the National grid through Eskom's Paulputs Transmission Substation (located on the same property). The site is within 4km of two PV projects on adjacent properties, one constructed and one a preferred bidder in Round 4 of the REIPPPP Programme. The site is therefore located within a solar energy hub developing around Eskom's Paulputs Transmission Substation.

2.2. Components of the Proposed Project

The Paulputs CSP Project will consist of heliostats and a molten salt tower system with a generation capacity of ~200MW. Infrastructure associated with the project includes:

» Molten salt tower up to 300m in height with surrounding heliostat field
» Power island including salt storage tanks, steam turbine generator, heat exchangers, and dry cooled condenser
» On-site project substation, and short 132 kV power line to Eskom's existing Paulputs Transmission Substation
» Water supply abstraction point located at the Gariep River close to Onseepkans
» Filter and booster station at abstraction point
» Water supply pipeline along R357 Onseepkans Road to the site
» On-site lined ground water storage reservoir and various steel water tanks
» Lined evaporation ponds
» Packaged water treatment plant and associated chemical store
» Auxiliary wet cooled chiller plant
» Control room and office building
» Heliostat assembly building and workshop.

2.3. Need and Desirability of the Development at the Preferred Site Location

The overarching objective for the Paulputs CSP Project is to maximise electricity production through exposure to the solar resource, while minimising infrastructure, operational and maintenance costs, as well as social and environmental impacts. From a regional site selection perspective, this region is considered to be preferred for solar energy development by virtue of its annual solar irradiation values being comparable to the Atacama desert in Chile which has the highest solar resource in the world (refer to Figure 2.1). From a local perspective, the site has specifically been identified by Paulputs CSP RF (Pty) Ltd as being highly desirable for the development of a CSP Project due to its suitable topography (i.e. in terms of slope and local topography), site access (i.e. to facilitate the movement of machinery during the construction phase and operations staff in the long-term), land availability (i.e. the land is secured for the intended use), the extent of the site (i.e. the land parcel is able to accommodate the 900ha required for the facility), and enabling optimal placement of the infrastructure considering potential environmental sensitivities or technical constraints, as well as the consolidation of

renewable projects within an already identified node (i.e. the only site presently in South Africa with two adjacent CSP facilities). These favourable characteristics are further explored in the sections below.

At a local level, the project development site is situated approximately 30 km north-east of Pofadder in the Northern Cape, on Portion 4 of the Farm Scuit-Klip 92 and is located within an area which has become a node for renewable energy projects due to the viability of the solar resource for the area and the availability of the Paulputs Eskom Transmission Substation, with the following preferred bidder projects (PB) located directly adjacent to, or in close proximity to, the project development site: Kaxu Solar One, Xina Solar One, Konkoonsies I Solar, and Konkoonsies II Solar.

The Paulputs CSP project is proposed to be constructed outside of the Pofadder urban edge. Portion 4 of the Farm Scuitklip 92 itself has not been considered for an alternative land use owing to its current zoning and the two other renewable projects located on the same land parcel.

At a Provincial level, the Northern Cape has been identified as the area with highest potential for solar renewable energy generation, with high solar radiation levels and the availability of vast tracts of land (refer to Chapter 3). There are already a number of CSP projects (and solar PV facilities) constructed and planned in the region. The development of another CSP project in the study area will be in line with the objectives of the Khai-Ma Local Municipality Integrated Development Plan (IDP) (2012-2017) as well as the Namakwa District Municipality IDF (2012-2016), as the need for the development of the renewable sector has been identified in both Municipal plans. A more detailed description of the mandates set out by the Municipalities has been explained further in Chapter 3 of this Scoping Report.

2.3.1. Receptiveness of the site to development of a CSP Project

Paulputs CSP RF Pty (Ltd) considers this area, and specifically the demarcated farm, Portion 4 of the farm Scuitklip 92, to be highly preferred for the development of a concentrated solar power project.

Phased sensitivity analysis of the site:

Extent of the site: Availability of relatively level land of sufficient extent can be a restraining factor to CSP development, as a 200 MW solar tower system and associated infrastructure requires up to 1000 ha of land space. The larger farm portion owned by the project developer is approximately 3507 ha in extent, of which ~900 ha is allocated for the siting of the proposed Paulputs CSP project and associated infrastructure. This is approximately 27% of the land surface area within the farm portion. The two existing CSP plant within the same portion occupy approximately 900ha, with the remainder of the farm portion available for future development. This site is, therefore, considered sufficient for

the installation of the Paulputs CSP Project allowing for avoidance of sensitivities within the greater study area.

***Power transmission considerations*:** There is an existing Eskom transmission substation on site known as the Paulputs Transmission Substation and allows for direct connection of the Paulputs CSP Project. In addition the proposed project site is situated within the Central Corridor defined in terms of Eskom's Electricity Grid Infrastructure Strategic Environmental Assessment (SEA) conducted by the CSIR (refer to Figure 2.2.)

***Site access*:** The site can be accessed via the existing tarred access road off the R357 Onseepkans Road via the N14.The existing tarred access road is currently being used for access to the other two CSP facilities on the farm portion. .

Current land use considerations: There is no cultivated agricultural land or other commercial agricultural activities within the farm portion which could be impacted upon by the proposed development. Two CSP facilities, Kaxu Solar One and Xina Solar One are located in the southern portion of the site. The landowner, KaXu CSP South Africa (Pty) Ltd (another Abengoa company, have rezoned the entire the farm parcel south of the R357 for Special Solar use, which is consistent with the current and intended land use.

Climatic conditions and solar irradiation: Climatic conditions determine the economic viability of a concentrated solar power project as it is directly dependent on the annual direct solar irradiation values for a particular area. The Northern Cape receives the highest average daily direct normal and global horizontal irradiation in South Africa which indicates that the regional location of the project is appropriate for a concentrated solar power project. In addition, the area which lies to the west of Upington exhibits the best solar irradiation in South Africa, and the world (refer to Figure 2.1). Direct normal irradiation (DNI) for the Pofadder region is more than 2900 kWh/m^2/annum. The DNI for the Paulputs CSP project site is more than 3000 kWh/m^2/annum as confirmed by long term actual ground station measurements. Factors contributing to the preferred location of the project include the relatively high number of daylight hours and the low number of rainy days experienced in this region.

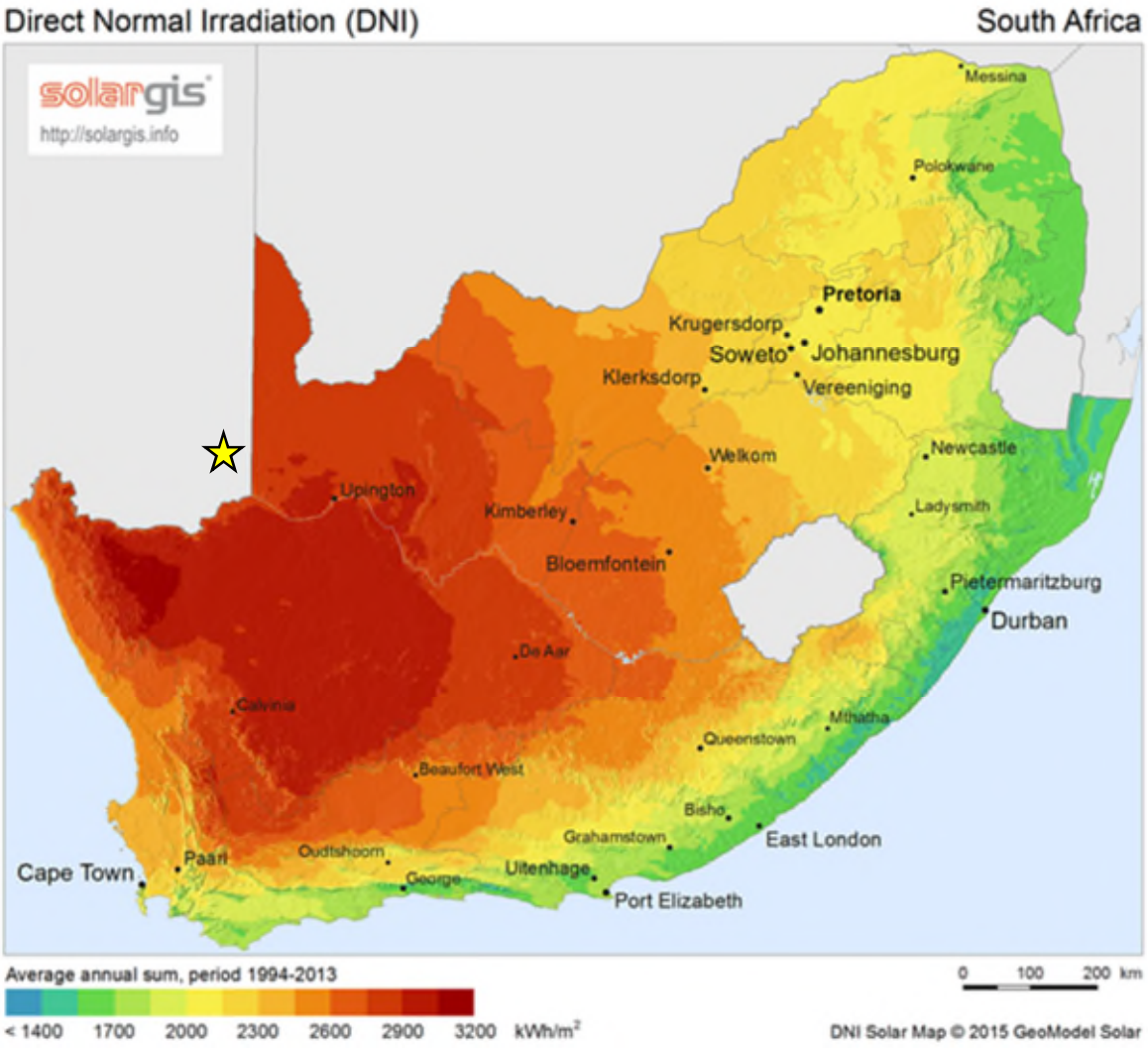

Figure 2.1: Solar irradiation map for South Africa; the proposed Paulputs CSP project position is shown by the yellow star on the map.
(Source: adapted from GeoModel Solar, 2011).

Topography: The site is located on a series of plains which slope in a north-westerly direction. The site is generally flat to gently undulating and lies at a height of approximately 800m - 850m above sea level. The study area includes a single hill in the north-western corner (i.e. Konkonsieskop) and a range of steep hills in the north-eastern corner (i.e. Ysterberg), both of which fall outside of the area of interest considered for the CSP project.

Access to the Grid: Ease of access into the Eskom electricity grid is vital to the viability of a CSP project. Projects which are in close proximity to a connection point and/or demand center are favourable, and reduce the losses associated with power transmission. Eskom Transmission's substation known as Paulputs Transmission Substation is located on the same farm portion, and allows for direct connection to the grid via a short connection. In addition, Eskom's '2040 Transmission Network Study' has drawn on various scenarios to determine the grid's development requirements, as well as to identify critical

power corridors for future strategic development, of which the Northern corridor is one of these. The national power corridors have been refined and consolidated into five transmission power corridors of 100 km in width, which are being used by the Department of Environmental Affairs for a strategic environmental assessment (SEA) which will seek to identify environmentally acceptable routes over which long-term environmental impact assessment (EIA) approvals can be secured. The Paulputs CSP project site falls into the Northern corridor (refer to Figure 2.2).

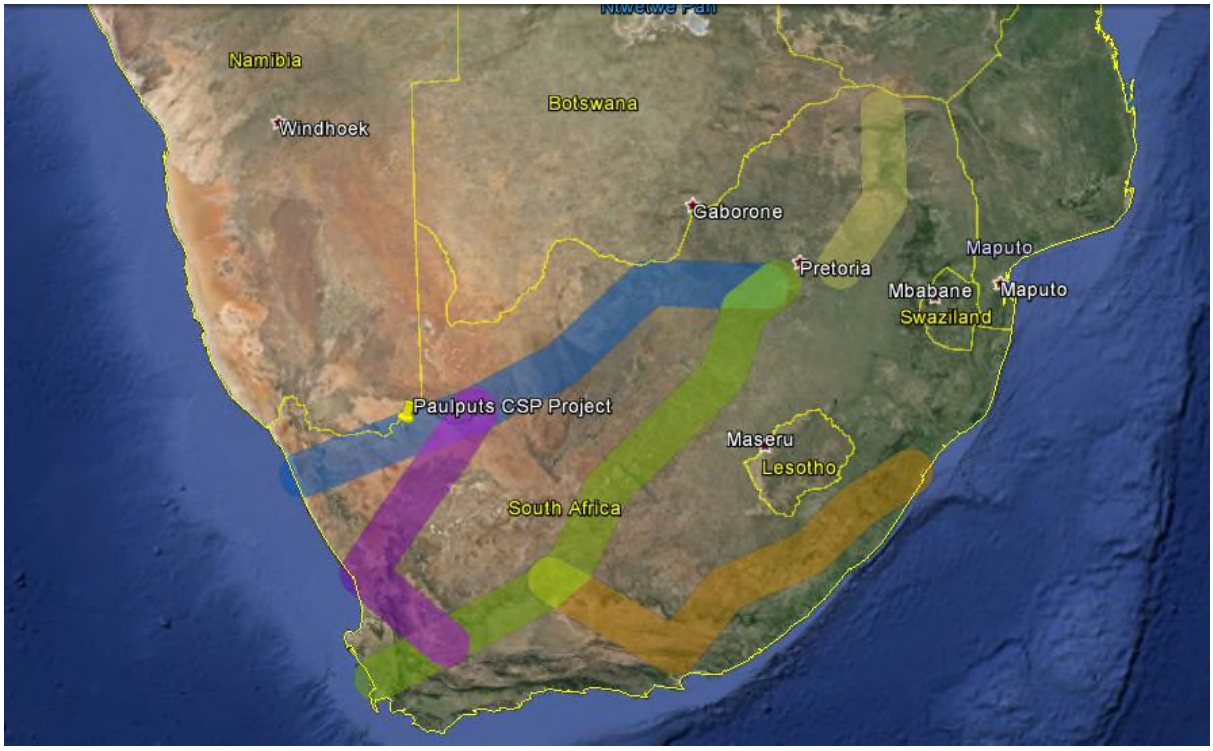

Figure 2.2: Eskom "Critical Power" Corridors as identified through the Eskom SEA. The Paulputs CSP project site is within the northern corridor as shown.

The project proponent has also consulted with local Eskom technical departments as well as the Eskom planning and transmission expansion departments to understand the future demand centers as well as strategic plans to upgrade and strengthen any local networks. These discussions have been informed to a large extent by the recently published Eskom Transmission Development Plan ("TDP") 2015 – 2024.

Proximity to Towns with a Need for Socio-Economic Upliftment:

The Northern Cape Province, like most of South Africa, is marred by unemployment, inequalities and poverty. To this extent the Paulputs CSP project is situated approximately 30 km north-east of Pofadder. 45 km south east of Onseepkans and consequently, local labour would be easy to source, which fits in well with the REIPPPP economic development criteria for socio-economic upliftment. Owing to its proximity to preferred bidder projects which are in various stages of the development and construction cycles, the project would

present a new opportunity for local labour skilled through previous work experience on the preferred bidder plants.

Proximity to Access Road for Transportation of Material and Components: The proximity of the site to the N14 decreases the impact on secondary roads from traffic during the construction and operation phases as the site is readily accessed via the existing tarred access road off the R357 Onseepkans Road via the N14. As material and components would need to be transported to the project site during the construction phase of the project, the accessibility of the site was a key factor in determining the viability of the project, particularly taking transportation costs (direct and indirect) into consideration and the impact of this on project economics and therefore the ability to submit a competitive bid under the DoE's REIPPPP programme.

2.3.2. Benefits of Renewable Energy

The generation of electricity from renewable energy resources offers a range of potential socio-economic and environmental benefits for South Africa. These benefits include:

Increased energy security: The current electricity crisis in South Africa highlights the significant role that renewable energy can play in terms of power supplementation. In addition, given that renewables can often be deployed in a short timeframe and in a decentralised manner close to consumers, they offer the opportunity for improving grid strength and supply quality in the short-term, while reducing expensive distribution losses. As a result of the power constraints in the first half of 2015, power generators meant to be the "barely-ever-used" safety net for the system (diesel-fired gas turbines) were running at > 30% average load factor in the first half of 2015. Load shedding occurred during 82 days in the first half of 2015 (out of 181 days). Results of a CSIR Energy Centre study for the period January to June 2015 (CSIR, August 2015), concluded that the already implemented renewable projects (wind and solar) within the country avoided 203 hours of so-called 'unserved energy'. During these hours the supply situation was so tight that some customers' energy supply would have had to be curtailed ('unserved') if it had not been for the renewables. The avoidance of unserved energy cumulated into the effect that during 15 days from January to June 2015 load shedding was avoided entirely, delayed, or a higher stage of load shedding prevented due to the contribution of renewable projects
(http://ntww1.csir.co.za/plsql/ptl0002/PTL0002_PGE157_MEDIA_REL?MEDIA_RELEASE_NO=7526896).

Resource saving: It is estimated that the achievement of the targets in the Renewable Energy White Paper will result in water savings of approximately 16.5 million kilolitres per annum. This also translates into revenue savings of R26.6 million per annum, as fuel for renewable energy facilities is free while compared to the continual purchase of fuel for conventional power stations. As an already water-stressed nation, it is critical that South Africa engages in a variety of water conservation measures, particularly due to the

detrimental effects of climate change on water availability. Renewable energy also translates into revenue savings, as fuel for renewable energy facilities is free while compared to the continual purchase of fuel for conventional power stations. Results of a CSIR Energy Centre study for January – June 2015 (CSIR, August 2015) have quantified the contribution from renewable energy to the national power system and the economy over the first 6 months of 2015 compared to the 12 months of 2014:

2015 (6 months)	**2014 (12 months)**
R3.60 billion saving in diesel and coal fuel costs	R3.64 billion saving in diesel and coal fuel costs
200 hours of unserved energy avoided, saving at least an additional R1.20 billion–R4.60 billion for the economy	120 hours of unserved energy avoided, saving at least an additional R1.67 billion for the economy
Generated R4.0 billion more financial benefits than cost	Generated R0.8 billion more financial benefits than cost

Exploitation of South Africa's significant renewable energy resource: At present, valuable renewable resources including biomass by-products, solar radiation and wind power remain largely unexploited. The use of these energy flows will strengthen energy security through the development of a diverse energy portfolio in South Africa.

Economics: As a result of the excellent solar resource within South Africa and competitive procurement processes, both concentrated solar power and solar PV power are now proven in South Africa as cheaper forms of energy generation than coal power. Renewables offer excellent value for money to the economy and citizens of South Africa.

Pollution reduction: The releases of by-products through the burning of fossil fuels for electricity generation have a particularly hazardous impact on human health and contribute to ecosystem degradation. The use of solar radiation for power generation is a non-consumptive use of a natural resource which produces zero emissions during its operation.

Climate friendly development: The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner and thereby allows South Africa to contribute towards mitigating climate change through the reduction of greenhouse gas (GHG) emissions. South Africa is estimated to be currently responsible for approximately 1% of global GHG emissions (and circa half of those for which Africa is responsible) and is currently ranked 9th worldwide in terms of per capita carbon dioxide emissions. The renewable energy sector saved South Africa 1.4 million tons of carbon emissions over the first 6 months of 2015 (http://www.iol.co.za/capetimes/renewable-energy-saving-sa-billions-csir-1.1903409#.VkNjdJq6FeU).

Support for international agreements: The effective deployment of renewable energy provides a tangible means for South Africa to demonstrate its commitment to its

international agreements under the Kyoto Protocol, and for cementing its status as a leading player within the international community.

Employment creation: The development, procurement, installation, maintenance and management of renewable energy facilities have significant potential for job creation and skills development in South Africa. Employment for South African citizens including people from communities local to the IPP operations in the Northern Cape were 11 652 job years as at the end of June 2015 (Department of Energy. 2015).

Acceptability to society: Renewable energy offers a number of tangible benefits to society including reduced pollution concerns, improved human and ecosystem health and climate friendly development.

Support to a new industry sector: The development of renewable energy offers the opportunity to establish a new industry within the South African economy, which will create jobs and skill local communities which have potential for further renewable energy projects.

Protecting the natural foundations of life for future generations: Actions to reduce the country's disproportionate carbon footprint can play an important part in ensuring our role in preventing dangerous anthropogenic climate change; thereby securing the natural foundations of life for generations to come. This is the basis of sustainable development.

2.4. Alternatives Considered in the Scoping Phase

In accordance with the requirements outlined in Appendix 2 of the EIA Regulations 2014, the consideration of alternatives including site and technology alternatives, as well as the "do-nothing" alternative should be undertaken.

2.4.1 Site Alternatives

No site alternatives are proposed for this project because in investigating a suitable site for the proposed CSP Plant, a 'funnel-down approach' was used and commenced with the consideration of the larger 3507 ha farm portion. The full extent of the 3507.6 ha farm portion was considered in the EIA undertaken for the Pofadder Solar Thermal Facility, under which both the KaXu Solar One and Xina Solar One projects were authorised. In investigating the location of the proposed Paulputs CSP project the same approach was adopted where potentially sensitive areas identified through the environmental scoping study for Xina Solar One, KaXu Solar One were considered in order to define the areas which a) are to be avoided (i.e. no development considered acceptable), b) areas of some considered sensitivities which can be mitigated to acceptable environmental levels, and c) areas which are considered to be acceptable loss. The potentially sensitive areas already identified through the scoping study provided No-Go areas (i.e. avoidance of identified

ecologically sensitive areas). These areas were excluded from the developable area, allowing for the current, location of Paulputs CSP.

Furthermore, the placement of a CSP project is strongly dependent on several factors including climatic conditions (solar radiation levels), topography, the location of the site; grid connection, the extent of the site and the need and desirability for the project. Based on the findings as described in Sections 2.1 and 2.2 above, Paulputs CSP RF Pty Ltd consider the proposed site alternative to be highly favourable and the most suitable site for the development of the Paulputs CSP project due to the following site characteristics:

» **Climatic Conditions**: The economic viability of a concentrated solar power project is directly dependent on the annual direct solar irradiation values. The DNI for the Paulputs CSP project site is in the region of approximately 3000 kWh/m^2/annum.
» **Water availability**: CSP facilities require water as the heat transfer medium for the generation of high temperature steam which is used to drive a conventional turbine and generator. Water sources in this area of Northern Cape include a) water from the Gariep River (direct abstraction); b) water from a local municipality (who abstract from the Gariep River); or c) groundwater (direct abstraction). Groundwater resources are scarce, typically used by local farmers for livestock watering when available, and the water is brackish. Groundwater is not considered a viable water source. Water will, therefore, be required to be abstracted from the Gariep River directly.
» **Topography**: A surface area with favourable topography facilitates the work involved in construction and maintenance of the Paulputs CSP project.
» **Extent of site:** The larger farm portion is approximately 3507.6 ha in extent, with 1600ha available for the Paulputs CSP Project which requires just 900ha therefore the extent of the site is sufficient for the installation of the Paulputs CSP Project allowing for avoidance of site sensitivities. The development footprint of Project would comprise approximately 25% of the total extent of the farm portions.
» **Power transmission considerations:** The site is located in close proximity to Eskom's Paulputs Transmission Substation (which has sufficient spare capacity to receive the generated power), thereby providing a direct connection point to the National Electricity Grid, and eliminating the need for construction of extensive overhead power lines. The power will subsequently be evacuated from the Paulputs Transmission Substation to the Aggeneis Transmission Substation (approximately 90 km south-west via existing 220 kV transmission line).
Site access: the site can be accessed via the existing tarred access road off the R357 Onseepkans Road via the N14.

The site is also located within an area which has become a node for renewable energy projects, with the following preferred bidder projects located directly adjacent to, or in close proximity to, the project development site: Konkoonsies Solar I, Konkoonsies II Solar Project Xina Solar One and KaXu Solar One.

Portion 4 of the Farm Scuitklip 92 was purchased by the developer for development. The development portion of the property has been rezoned for this intended use. In addition, following the successful development and construction of the KaXu Solar One and Xina Solar One projects on the same farm), Abengoa Solar Power South Africa (Pty) Ltd is constructing an additional CSP Project on the remainder of the farm portion.

Based on these considerations, Paulputs CSP RF (Pty) Ltd considers the proposed site as *highly preferred* in terms of the development of CSP projects and able to draw on synergies with the projects currently under construction. No site alternatives are available for assessment.

2.4.2. Layout and Design Alternatives

A broader study area of approximately 3507.6 ha is being considered, within which the development footprint for the Project of approximately 900 ha in extent would be appropriately located. The site can adequately accommodate the proposed CSP Project with a contracted capacity of 200 MW, as permitted under the DoE's REIPPPP programme. It is anticipated that the Project and its associated infrastructure (i.e. on-site substation and internal roads, etc.) can be appropriately positioned to avoid areas of environmental sensitivity. The development footprint of the Project would comprise 27% of the total extent of the farm portions. Therefore, the extent of the site allows for the identification of layout design and site-specific alternatives.

The Scoping Phase aims to identify the environmentally sensitive areas on the site which should be avoided by the proposed development as far as possible. These areas will need to be considered in greater detail during the EIA Phase through further site-specific specialist studies. The information from these studies will be used to inform layout alternatives for the proposed development site and inform recommendations regarding a preferred alternative.

During the EIA Phase feasible layout alternatives will be considered in order to maximise the production of electricity on the site while minimising the environmental impact.

2.4.3. Technology Options

The following technology alternatives have been considered though prefeasibility assessments. Details of the technology alternatives considered and the decision of technology for this project are explained below:

CSP technology options

Abengoa Solar is the only solar company that commercially implements all CSP technological solutions in projects worldwide. As such, projects are designed to most optimally suit the techno-economic needs of the specific situation or customer. Paulputs

CSP RF (Pty) Ltd considered two CSP technology types for implementation on the site in order to maximise the capacity and land available on the site, namely: heliostats and a power tower system (Solar Tower technology) and parabolic trough technology (Trough technology).

Both CSP technologies[2] are based on the operating principle that the power gained from the sun can be maximised if the radiant energy of the sun is gathered and concentrated on a single point. By concentrating the sun's rays, CSP technologies maximise the amount of sunlight that can be converted into electricity, thereby reducing wastage and increasing output. Technological similarities between power tower and parabolic trough plants include:

» Both technologies operate on a steam turbine system to generate electricity.
» The energy can be stored to enhance despatchability for both technologies.

Technological differences between solar tower and parabolic trough plants include:

» Parabolic troughs are typically 8m to 10m in height and a heat transfer fluid is heated within the trough receiver tubes (i.e. has no 'central receiver', but rather a continuous loop at approximately 5m from ground level).
» Heliostats are mirrors which reflect the sunlight onto one 'central receiver' which is located on top of the power tower which is up to 300m in height.
» Both technologies result in a change in land use. Trough plants, however, require absolute levelling of the land as the troughs are required to be level (heat transfer fluid moves through the receiver tubes), therefore there the site is terraced and may have excessive cut-and-fill operations. A heliostat field does not require terracing, and has a lower impact as a result of direct footprint alteration.
» Molten salt towers have a 5% -10% overall efficiency advantage over parabolic troughs, with an associated *5% -10% less water consumed per MW generated* - estimated to be as much as 50 000 m^3 of water saved annually for a 200MW plant.

The Renewable Energy Independent Power Producer Procurement (REIPPP) Programme selection process (details of which are not yet finalised for future bidding rounds), IRP from Government, and the economics of the concentrated solar power project are key factors in determining the final technology combination and the schedule of implementation for the Project. The preferred/optimal technology option (from a technical, financial and socio-economic perspective) for Paulputs CSP project is considered by the Applicant to be a Solar Thermal Energy (STE) Molten Salt Tower (MST). The progress achieved by molten salt tower technology in recent years has resulted in Abengoa Solar considering this technology choice a preferred technology for application in South Africa to meet the specific requirements as outlined by the DoE (and the REIPPP Programme).

[2] CSP tower and CSP trough technologies are not considered to be alternative technology choices as they are fundamentally different solar thermal power technologies.

Molten salt towers have become the CSP technology of choice for implementation in markets requiring *significant energy storage* by Abengoa and other CSP developers due to significant technology advances occurring over the last couple of years. This is illustrated in projects that are currently being developed and constructed in markets such as Chile, North Africa and the Middle East.

The molten salt tower technology provides an optimal techno socio-economic solution when considering CSP alternatives, highlighted by the salient indicators of higher efficiency, associated reduced water consumption per MW generated and lower direct footprint alteration (the heliostat field does not require absolute levelling of the land as trough plants do with the associated terracing and cut-and-fill operations).

The recent international preference for molten salt towers, prompted the National Renewable Energy Laboratory in the USA (NREL), to conduct a comparative analysis of molten salt tower and parabolic trough with storage technology and the findings in the study titled "Estimating the performance and economic value of multiple CSP technologies in a production cost model" dated December 2013, found that parabolic trough CSP-TES plants may require a higher capacity, at a greater expense, than a similar rated molten salt power tower to achieve the same annual output largely due to a larger seasonal variation in output, lower thermal efficiency, and greater storage losses, which support the findings as presented here.

Abengoa Solar South Africa's estimations indicate that molten salt tower plants will have a 5%-10% overall efficiency advantage over parabolic trough plants, with the associated 5%-10% less water consumed per MW generated, estimated to be as much as 50 000 m^3 annually for a 200MW plant. The socio-economic benefit resulting from the tower technology has been highlighted by the possibility to achieve a higher local content per MW installed of around 40%-60%, confirmed by actual data obtained from the construction of the Khi Solar One tower plant near Upington, compared to the KaXu Solar One trough plant constructed on the Scuitklip site (both REIPPPP round 1 projects owned and operated by Abengoa Solar).

Paulputs CSP RF (Pty) Ltd consider the CSP salt tower technology choice to meet the requirements of the DOE and deliver the greatest value to the country as a whole through maximising electricity production utilising the available solar resource while minimising associated infrastructure, O&M costs as well as social and environmental impacts. Therefore no alternative technology is considered for the Paulputs CSP project.

CSP cooling technology alternatives

CSP plants are designed to use water for cooling at the back-end of the thermal cycle. There are different types of cooling technologies available (discussed below for comparative purposes). Dry cooled technology is, however, the cooling technology that will be used for the Paulputs CSP Project.

Dry Cooling

Dry cooling by air cooled condensers (ACC) consists of large sections of finned air cooled heat exchangers (with mechanical draft), and the turbine exhaust steam passes through the heat exchangers forming condensate. This arrangement uses no cooling water, and therefore requires no makeup for evaporation losses. ACC cooling can reduce the total make-up water demand considerably, leaving only the process consumption and service water as major users, but is limited by its sensitivity to ambient temperature, negative effect on performance and capital expenditure. Water requirements would be approximately 400 000m^3 per annum utilising this technology.

Hybrid Cooling Tower

A hybrid cooling tower is an option that uses cooling coils with a regular cooling tower to condense a portion of the plume. This serves two purposes: a) to reduce the overall make up water by reclaiming evaporated water and b) plume abatement by reducing the humidity of the exiting air, preventing the formation of visible plume.

Air enters from the side, heats up as it passes across the coils, and then is mixed via baffles with the rest of the tower draft, lowering the draft to below saturation, thus eliminating the visible plume. This type of tower has the ability to reduce the evaporative losses by 20% to 30%. This type of tower reduces the water load with minor impact on performance, but cannot reduce the evaporation to meet the make-up demand requirement. A consideration for this type of tower is that at higher ambient temperatures the amount of cooling coils necessary to achieve the desired reduction can become cost prohibitive.

This, like all cooling towers, operates more efficiently at lower ambient temperatures, and as the ambient temperature rises, less condensation occurs across the coils. The hybrid tower is less expensive than the ACC, and has aesthetic and water reduction benefits, but is unable to meet the total make-up demand requirement.

Water requirements would be approximately 800 000m^3 per annum utilising this technology. This technology is not preferred based on efficiencies at high temperatures and water requirements.

Wet cooling system

A wet cooling tower is a conventional design and is the most common and economic alternative. This form of technology application and system design is based on the one hand by convective heat transfer, and on the other hand, evaporation of the water (increase in the air's humidity). As a result, the cooling water temperature that can be obtained from a wet cooling tower is not solely operative from the ambient temperature but also from the air humidity (air with 100% humidity). This type of technology results in severe water loss of which the primary reasons for loss of water in the cooling tower.

Water requirements would be approximately 1 200 000m^3 per annum utilising this technology. This technology is not preferred based on water requirements and the need for cooling towers.

Dry cooled technology is the cooling technology that will be used for the Paulputs CSP Project. This is also consistent with the Department of Water and Sanitation requirements. Therefore no alternative technology is considered.

2.4.4. Grid connection Alternatives

The following grid connection alternatives have been considered though prefeasibility assessments. The grid connection for the project will be finalised based on input from Eskom and the environmental assessment. Due to the proximity of the Paulputs Transmission Substation (less than 3km away), only one viable option is considered at this point of the assessment process: i.e., a direct connection to the proposed plant substation (50m x 50m in extent) and an up to 3km 132kV overhead power line to Eskom's existing Paulputs Transmission Substation.

The Paulputs Transmission Substation currently has the capacity to take the power from the Paulputs CSP project. Therefore no connection alternative is required. However, an alternative point of connection for the project would be the Aggeneis Substation located 90km west of the site at Aggeneys. This grid connection alternative is not preferred or considered further based on the need for a new power line nothing less than 90km in length, and the availability restrictions at the Aggeneis Substation.

2.4.5. Access Road(s) Alternatives

The following site access alternatives have been considered though prefeasibility assessments.

1. Access road 1: Access to site from the N14 national road via the existing R357 Onseepkans road used to access the farm, and the CSP facilities on this farm. This road is to the east of the farm portion. The access point to the site is 17km from the N14, with a formal entrance to the existing CSP facilities off of this public road. This section of the R357 is a tarred road.
2. Access road 2: Access to site from the N14 national road via the existing R358 and minor road MR73. This road is to the west of the farm portion. The access point to the site is 30km from the N14.

Two alternative access routes to access the site will be further considered through the environmental studies. The final design for the access road will be finalised during the EIA phase. A realignment of the MR37 road where it traverses the Scuitklip farm is proposed and discussions regarding the realignment are underway with the Northern Cape Department of Roads and Public Works (NC DR & PW

2.4.6. Water source alternatives

The CSP technologies function through the generation of steam to drive a conventional steam turbine and generator. Therefore, suitable and sufficient water resources will be required. During its operation the Paulputs CSP Project will require approximately 400 000m^3 of water per annum. During its 3 year construction phase 200 000m^3 to 300 000 m^3 per annum will be required.

For the proposed project, Paulputs CSP RF (Pty Ltd) will investigate abstraction from a point on the Gariep River and conveyed via a water pipeline. The abstraction point would be located adjacent to the existing abstraction point which is utilised by commercial fruit farming activities. Potential water sources that were considered but proved to be unfeasible included:

» Abstraction from boreholes located within the study site or on adjacent farms *however* previous Scoping and EIA studies for KaXu Solar One and Xina Solar One revealed that boreholes would not meet the water requirements for the Paulputs CSP project.
» Purchase of water from the Khai Ma Municipality *however* previous Scoping and EIA studies for KaXu Solar One and Xina Solar One revealed that purchase of water from the Municipality would not be not a viable source for the Paulputs CSP project.

The Gariep River is considered to have sufficient availability of water to provide the annual water requirement for the Paulputs CSP project. Therefore no water source alternative is to be assessed. However, an alternative point of abstraction on the Gariep River for the project could be considered.

2.4.7. The 'Do-Nothing' Alternative

The 'do-nothing' alternative is the option of not constructing the proposed Paulputs CSP project. Should this alternative be selected then the benefits of this renewable energy project will not be realised, even though the generation of electricity from renewable energy resources offers a range of socio-economic and environmental benefits for South Africa. These benefits include:

» **Increased energy security:** The current electricity crisis in South Africa highlights the significant role that renewable energy can play in terms of power supplementation, and specifically CSP as it uses conventional steam generation coupled to storage which enhances despatchability, i.e. being capable of supplying energy during the peak demand periods when it is most needed. In addition, given that renewables can often be deployed in a decentralised manner close to consumers, they offer the opportunity for improving grid strength and supply quality, while reducing expensive transmission and distribution losses.

- **Exploitation of our significant renewable energy resource:** At present, valuable national resources including biomass by-products, solar radiation and wind power remain largely unexploited. The use of these energy flows will strengthen energy security through the development of a diverse energy portfolio.
- **Pollution reduction:** The releases of by-products through the burning of fossil fuels for electricity generation have a particularly hazardous impact on human health and contribute to ecosystem degradation.
- **Climate friendly development:** The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner and thereby allows South Africa to contribute towards mitigating climate change through the reduction of greenhouse gas (GHG) emissions. South Africa is estimated to be responsible for ~1% of global GHG emissions and is currently ranked 9th worldwide in terms of per capita CO_2 emissions.
- **Support for international agreements:** The effective deployment of renewable energy provides a tangible means for South Africa to demonstrate its commitment to its international agreements under the Kyoto Protocol, and for cementing its status as a leading player within the international community.
- **Employment creation:** The sale, development, installation, maintenance and management of renewable energy facilities have significant potential for job creation in South Africa.
- **Acceptability to society:** Renewable energy offers a number of tangible benefits to society including reduced pollution concerns, improved human and ecosystem health and climate friendly development.
- **Support to a new industry sector:** The development of renewable energy offers the opportunity to establish a new industry within the South African economy.
- **Protecting the natural foundations of life for future generations:** Actions to reduce our disproportionate carbon footprint can play an important part in ensuring our role in preventing dangerous anthropogenic climate change, thereby securing the natural foundations of life for generations to come.

2.5. Concentrated Solar Power as a Power Generation Technology

Concentrated Solar Power (CSP) systems use mirrors or lenses to collect and concentrate the incoming solar radiation (or solar thermal energy (STE) onto a small area. Electricity is produced when the concentrated light is converted to heat and steam, which drives a steam turbine connected to an electrical power generator. The sections below describe the technology and infrastructure comprising the facility.

2.5.1. Heliostats and Power Tower Technology proposed for the 200MW Project

The proposed Paulputs CSP Project (within a contacted capacity of 200MW) will consist of a field of heliostats and a central receiver, known as a power tower. The project will be constructed over an area of 900ha in extent, and include the following infrastructure:

» Power plant: Salt tower central receiver and tracking heliostats, including a power block with a steam turbine generator and thermal salt storage tanks.
» Associated infrastructure: power island with steam turbine generator, heat exchangers and steam vessels, access roads, on-site substation, power line, water abstraction point and supply pipeline, lined earth water reservoir, steel water storage tanks, packaged water treatment plant, lined evaporation ponds, salt storage vessels, auxiliary fossil fuel boilers and workshop and office buildings.

Concentrated Solar Power (CSP) Tower technology uses thousands of mirrors to reflect and concentrate sunlight onto a central point to generate heat, which in turn is used to generate electricity. A tower system is comprised of two main component groups, i.e. a) a heat collection system, and b) a conventional generating plant portion. The heat collection system is comprised of mirrors which reflect concentrated sunlight onto a large heat exchanger called a receiver that sits on an up to 300m tower. Within the receiver, fluid flows through the piping that forms the external walls; this fluid absorbs the heat from the concentrated sunlight. The fluid utilised is molten salt, which is heated from approximately 250° to 550° Celsius.

The collected energy is used to generate steam through a conventional heat exchanger system that is in turn used for electricity generation in a conventional steam turbine and generator[3].

Molten salt is an ideal heat capture medium, as it maintains its liquid state up to 600° Celsius, allowing the system to operate at low pressure for convenient energy capture and storage. After passing through the receiver, the molten salt then flows down the piping inside the tower and into a thermal storage tank, where the energy is stored as high-temperature molten salt until electricity is needed.

This technology leverages liquid molten salt as both the energy collection and the storage mechanism, which allows it to separate energy collection from electricity generation. When electricity is generated, the high-temperature molten salt flows into the steam generator (heat exchanger), as water is piped in from the condensate storage tank, to generate steam. Once the hot salt is used to create steam, the cooled molten salt is then piped back into the cold salt storage tank where it will then flow back up the receiver to be reheated as the process continues.

[3] Water is heated, turns into steam and spins a steam turbine which drives an electrical generator. After it passes through the turbine, the steam is condensed in a condenser and recycled to where it was heated; this is known as a Rankine cycle.

After the steam is used to drive the steam turbine, it is condensed back to water and returned to the condensate holding tank, where it will flow back into the steam generator (heat exchanger) when needed. After the molten salt passes though the steam generator, it flows back to the cold tank and is re-used throughout the life of the project. The hot molten salt generates high-quality superheated steam to drive a standard steam turbine at maximum efficiency to generate reliable, non-intermittent electricity during peak demand hours.

A conceptual illustration showing the power tower operating system is shown in Figure 2.3.

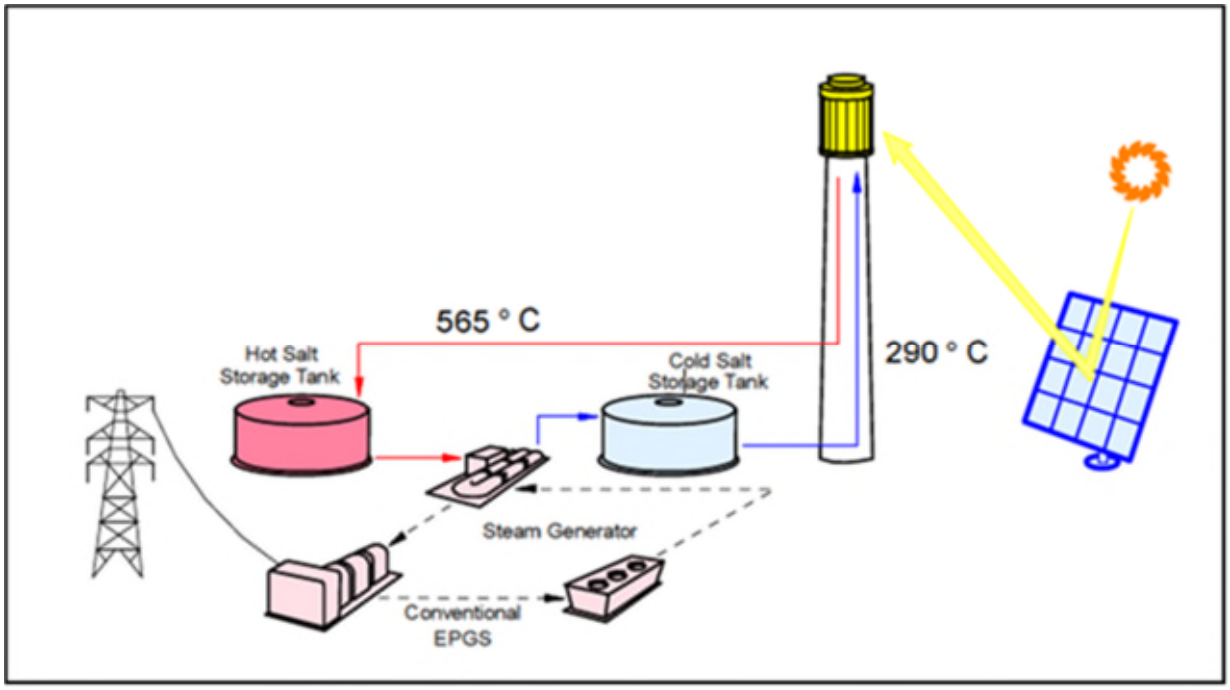

Figure 2.3 Illustration of the CSP system

In a typical installation, solar energy collection occurs at a rate that exceeds the maximum required to provide steam to the turbine. The thermal storage system can, therefore, be charged at the same time that the plant is producing power at full capacity. The ratio of the thermal power provided by the heliostat field and receiver to the peak thermal power required by the turbine generator is called the solar multiple. A power tower could potentially operate for 40% - 80% of the year (as from such storage, the system could provide energy, even in cloudy conditions or at night) without the need for a back-up fuel source. However, without energy storage, solar technologies are limited to annual capacity factors near 25% - 30%. Today, the most used solution is the usage of steam or molten salt storage vessels that store the energy to then be distributed when required. Determining the optimum storage size to meet power-dispatch requirements is an

important part of the system design process. Storage vessels can be designed with sufficient capacity to power a turbine for up to 8 to 10 hours economically.

The final waste product from the entire plant will be a water treatment plant effluent (brine) that will be handled in a zero discharge method, i.e. the final effluent will be evaporated by means of an evaporation pond. A series of evaporation ponds will be constructed over an area of approximately 6 to 10 ha.

Figure 2.4: Photograph illustrating one of Abengoa Solar's CSP tower plants close to Upington in the Northern Cape, courtesy of Abengoa Solar S.A.

2.5.2. Description of the Associated Infrastructure

Associated infrastructure includes the power island with steam turbine generator, heat exchangers and steam vessels, access roads, on-site substation, power line, water abstraction point and supply pipeline, lined earth reservoir and steel water storage tanks, packaged water treatment plant, lined evaporation ponds, salt storage vessels, auxiliary fossil fuel boilers and workshop and office buildings.

A summary of the details and dimensions of the planned infrastructure associated with the Project is provided in Table 2.1.

Table 2.1: Details or dimensions of typical structures required for the Paulputs CSP project

Infrastructure	Footprint and dimensions
Salt Tower	~10ha

	Up to 300m (maximum height)
Heliostat field	up to 800 ha up to 10m pedestal
Power island and steam turbine and generator	6.5ha
Molten salt storage tanks	4 tanks each 40m diameter
Auxiliary boilers	10m x 10m
Water storage reservoir and tanks (combined capacity up to 15 000m^3) and associated infrastructure	Tanks 15m to 20m diameter
Substation	50m x 50m
132 kV power line	32 m wide servitude, up to 3km in length 25 - 35m high towers
Workshop building (maintenance) and office buildings	20m x 50m each
Packaged waste treatment plant	30m x 30m
Lined evaporation ponds	6 ha - 6 ponds at 1ha each
Mirror assembly facility	100m x 50m
Internal access roads	8m wide, 1.5km in length
Water abstraction point located at the Gariep River, plus filter station	20m x 30m
Water supply pipeline	30km in length
Temporary laydown area and construction camp.	200m x 200m

2.6. Proposed Activities during the Project Development Stages

In order to construct the concentrated solar power project and its associated infrastructure, a series of activities will need to be undertaken during the design, pre-construction, construction, operation, and decommissioning phases which are discussed in more detail below.

2.6.1. Design and Pre-Construction Phase

Conduct Surveys

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

» Geotechnical survey - the geology and topography of the development footprint will be surveyed. The geotechnical study will focus on topographical constraints, foundation conditions, potential for excavations, and the availability of natural construction materials. The geotechnical examination will include surface and subsurface exploration, soil sampling and laboratory analysis.

» Site survey - will be done for the finalisation of the design layout of the heliostat field and the other associated infrastructure. The micro-siting footprint will consider any

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

2.6.2. Construction Phase

Establishment of Access Roads to the Site

The site is traversed by the R357 (a secondary road to Onseepkans) branching off the N14. Within the site itself, existing access exists from this existing secondary road to the individual proposed Project components for construction purposes (and later limited access for maintenance). Access track construction would normally comprise of compacted rock-fill with a layer of higher quality surfacing stone on top. The strength and durability properties of the rock strata at the proposed site are not known at this stage, this will need to be assessed via a geotechnical study. Depending on the results of these studies, it may be possible, in some areas, to strip off the existing vegetation and ground surface and level the exposed formation to form an access track surface.

Depending on the technology choices there will be a 1.5 km internal tarred access road of approximately 8 m wide which will lead directly to the power island. Between the heliostats there will be a stabilised dirt track that would be used for maintenance purposes during the operational phase. The final layout of the access roads will be determined following the identification of site related sensitivities.

Undertake Site Preparation

Site preparation activities will include clearance of vegetation at the footprint of each component and the establishment of internal access roads. These activities will require the stripping of topsoil which will need to be stockpiled, backfilled and/or spread on site.

Transport of Components and Equipment to Site

The components for the proposed Project will be transported to site in sections by road. Some of the Project components may be defined as abnormal loads in terms of the Road Traffic Act (Act No. 29 of 1989)[4] by virtue of the dimensional limitations (i.e. length and weight). Components of various specialised construction and lifting equipment are required (e.g. for the tower construction) and will need to be transported to site. In addition to the specialised lifting equipment/cranes, the typical civil engineering construction equipment will need to be brought to the site (e.g. excavators, trucks, graders, compaction equipment, cement trucks, etc.) as well as components required for the establishment of the substation and power line.

The equipment will be transported to the site using appropriate National, Provincial and local roads, and then the dedicated access/haul road to the site itself. In some instances, the dimensional requirements of the loads to be transported during the construction phase (length/height) may require alterations to the existing road infrastructure (e.g. widening

[4] A permit will be required for the transportation of these abnormal loads on public roads.

on corners), and protection of road-related structures (i.e. bridges, culverts, etc.) as a result of abnormal loading.

Establishment of Laydown and Assembly Areas on Site

Laydown and assembly (including the mirror assembly area) areas including storage areas of approximately 10ha will be required for the typical construction equipment which will be required on site. Hardstand areas will need to be established for operation of cranes used on the site.

Handling and storage of materials

The construction phase will require the handling and storage of materials including hydraulic oil, fuel, cement and fly ash (for use in concrete batching plant) with an estimated volume of 300-400 m^3 (cubic meters) at any one time (mainly made up of the batching material).

Construct Power Island and Substation

A steam turbine and generator will be housed in the power island. A generator transformer and a small substation will be established outside the building. The position of the power island and substation within the site footprint will be informed by the final positioning of the solar generating components.

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

Establishment of Ancillary Infrastructure

Ancillary infrastructure includes water abstraction point and supply pipeline, packaged waste treatment plant, a water treatment plant and water storage facilities on the site, and a blow down or evaporation pond (for wastewater from the generation process). A heliostat assembly plant, temporary storage area, control room, office area, chemical storage area, security gate building, contractor's temporary offices, and critical staff accommodation, will also be required. The location and number will be determined during the EIA phase.

The establishment of these facilities/buildings will require the clearing of vegetation and levelling of the development site and the excavation of foundations prior to construction.

Water Usage Associated with the Paulputs CSP Project

A water treatment works will be required, as well as blow down brine handling. The water treatment works will include a primary treatment or basic sand filtration plant at the supply source, as well as a reverse osmosis and deionisation packaged water treatment plant at the site. A water supply pipeline will be established from the extraction point on the Gariep

River to the site. Abstracted water will be pumped to a holding reservoir for supply buffering. A second storage reservoir will be located on the identified site itself.

Connect Substation and Power line to Power Grid

A 132 kV distribution line of up to 3km will cross the site and will connect to Eskom's existing Paulputs Transmission Substation, which lies within the Scuitklip farm portion.

Undertake Site Remediation

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

2.6.3. Operational Phase

The proposed CSP Project is expected to be operational for a minimum of 20 years with a typical design life of 35 years plus. The project will operate continuously, 7 days a week, mainly during daylight hours. While the project will be largely self-sufficient upon completion of construction, monitoring and periodic, as needed maintenance activities will be required. Key elements of the Operation and Maintenance plan include monitoring and control of all components, reporting the performance of the project, conducting preventative and corrective maintenance, receiving visitors, and maintaining security of the project.

The operational phase is discussed in more detail below. A simplified flow chart of the general operation of a CSP Plant showing inputs and outputs of the process is shown in the table below.

Table 2.2: Process Flow for a Solar Thermal Plant – Operational Phase Only

INPUT	PROCESS	OUTPUT
Solar energy	**Solar thermal energy generation process**	*Positive outputs:* Energy / electricity
Water		*Negative outputs:* Wastewater
Fossil fuel to start up		*Negative outputs:* Exhaust fumes / CO_2
Dosing chemicals for water treatment plant		*Negative outputs:* Waste water / brine stream to evaporation ponds

Water Usage Associated with the Paulputs CSP Project

A water treatment works will be required, as well as blow down brine handling. The water treatment works will include a primary treatment or basic sand filtration plant at the supply source, as well as a reverse osmosis and deionisation packaged water treatment plant at

the site. A water supply pipeline will be established from the extraction point on the Gariep River to the site. Abstracted water will be pumped to a holding reservoir for supply buffering. A second storage reservoir will be located on the identified site itself. The water use of the Project for the 200MW CSP Plant will include:

» Makeup water for the steam generator
» Water for mirror washing
» Service water
» Potable water
» Fire protection water

Table 2.3: Estimated water consumption for a 200MW CSP Plant

Description: consumption	**Approximate annual use (m^3/year)**
Raw water consumption	Up to 400 000
Description: water uses	**Approximate annual use (m^3/year)**
Mirror washing	75 000
Boiler makeup	80 000
Potable and other	10 000
Evaporation losses	85 000
Wastewater to evaporation ponds	Up to 150 000

In order to reduce the overall water consumption and the requisite sizing of the evaporation ponds, service water will first be used as makeup. Water conditioning chemicals may be fed into the makeup water to minimise corrosion and to inhibit mineral scale formation. The blow down from the circulating water will be continually treated by lime-softening clarification and filtration processes and then delivered to a clear well where the water will be treated by reverse osmosis prior to being used for other plant requirements. Prior to the reverse osmosis process, ion-exchange softeners will be used to remove any dissolved hardness minerals that remain after the clarifier. The discard brine stream will be delivered to the evaporation ponds

Handling and storage of materials

The operation phase will require the handling and storage of materials such as sodium hydroxide, hydrochloric acid, sulphuric acid, ferric chloride, lubrication oil, amine, phosphate, carbohydrazide, closed corrosion inhibitor with an approximate total of 150m^3 (cubic meters) at any one time, fuel for the auxiliary steam boiler with an estimated total of 50m^3 (cubic meters) at any one time.

2.6.4. Decommissioning Phase

The CSP Project is expected to have a design lifespan of approximately 35 years (extendable with appropriate refurbishment), and the power plant infrastructure would only be decommissioned once it has reached the end of its economic life. It is most likely

that decommissioning activities of the infrastructure of the Project discussed in this EIA would comprise the disassembly and replacement of the individual components with more appropriate technology/infrastructure available at that time.

The following decommissioning activities will form part of the project scope.

Site Preparation

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

Disassemble and Replace Existing Components

When the project is ultimately decommissioned, the equipment to be removed will depend on the proposed land use for the site at that time. At this time, all above ground facilities that are not intended for future use at the site will be removed. Underground equipment (e.g. foundation, wiring) will be, and the surface restored to the original contours. Much of the above ground wire and steel, of which the system is comprised are recyclable materials and would be recycled to the extent feasible. The components of the plant would be deconstructed and recycled or disposed of in accordance with regulatory requirements. The site will be rehabilitated and can be returned to the agricultural or other beneficial land-use.

Future plans for the site and infrastructure after decommissioning

The plant will have the opportunity to generate power for a Merchant Market operation (i.e. the client would sell power on bid basis to the market.

REGULATORY AND PLANNING CONTEXT CHAPTER 3

This chapter contains the following in terms of the EIA Regulations 2014, Appendix 2

(e) a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process	Legislation, policies, plans, guidelines, municipal development planning frameworks and instruments associated and considered with the development of the Project are included within section 3.1 -3.6 of this chapter

3.1. Strategic Electricity Planning in South Africa

The need to expand electricity generation capacity in South Africa is based on national policy and is informed by on-going strategic planning undertaken principally by the Department of Energy (DoE), who in turn are supported by many other organs of government. The hierarchy of policy and planning documentation that support the development of renewable energy projects such as the Paulputs CSP Project is illustrated in **Figure 3.1**.

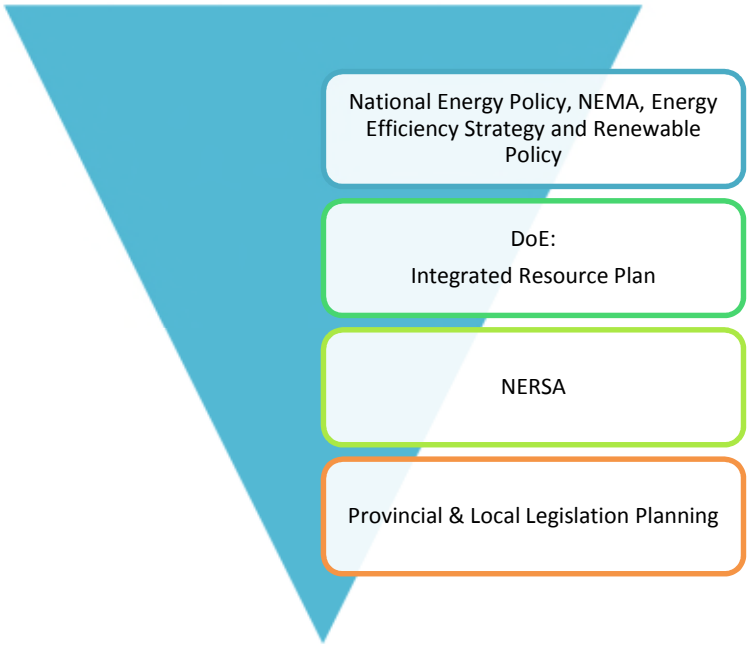

Figure 3.1: Hierarchy of electricity policy and planning documents

The regulatory hierarchy for an energy generation project of this nature consists of three tiers of authority who exercise control through both statutory and non-statutory instruments – that is National, Provincial and local levels.

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

» *Department of Energy (DoE)*: This Department is responsible for policy relating to all energy forms, including renewable energy, and is responsible for forming and approving the IRP (Integrated Resource Plan for Electricity).
» *National Energy Regulator of South Africa (NERSA):* This body is responsible for regulating all aspects of the electricity sector, and will ultimately issue licenses for renewable energy developments to generate electricity.
» *Department of Environmental Affairs (DEA):* This Department is responsible for environmental policy and is the controlling authority in terms of NEMA and the EIA Regulations. The DEA is the competent authority for this project, and charged with granting the relevant environmental authorisation.
» *The South African Heritage Resources Agency (SAHRA):* SAHRA is a statutory organisation established under the National Heritage Resources Act, No 25 of 1999, as the national administrative body responsible for the protection of South Africa's cultural heritage.
» *Department of Transport – South African Civil Aviation Authority (SACAA):* This department is responsible for aircraft movements and radar, which are aspects that influence solar thermal energy development location and planning.
» *South African National Roads Agency Limited (SANRAL):* This Agency is responsible for the regulation and maintenance of all national routes.
» *Department of Water and Sanitation:* This Department is responsible for water resource protection, water use licensing and permits.
» *The Department of Agriculture, Forestry and Fisheries (DAFF):* This Department is the custodian of South Africa's agriculture, fisheries and forestry resources and is primarily responsible for the formulation and implementation of policies governing the Agriculture, Forestry and Fisheries Sector. This Department is also responsible for the issuing of permits for impacts on protected tree species.
» *The Department of Science and Technology:* This department is the administrating authority for the Astronomy Geographical Advantage Act (Act 21 of 2007).

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

» *Provincial Government of the Northern Cape – Department of Environment and Nature Conservation (Northern Cape DENC).* This department is the commenting authority for the EIA process for this project, as well as being responsible for issuing of other biodiversity and conservation-related permits.
» *Department of Transport and Public Works - Northern Cape.* This department is responsible for roads and the granting of exemption permits for the conveyance of abnormal loads on public roads.
» *Northern Cape Department of Agriculture and Rural Development:* This is the provincial authority responsible for matters affecting agricultural land.

» *Ngwao Boswa ya Kapa Bokone (Northern Cape Heritage Authority):* This body is responsible for commenting on heritage related issues in the Northern Cape Province.

At **Local Level** the local and municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. In the Northern Cape, the Khai Ma Local Municipality and the Namakwa District Municipality play a role.

» In terms of the Municipal Systems Act (Act No 32 of 2000) it is compulsory for all municipalities to go through an Integrated Development Planning (IDP) process to prepare a five-year strategic development plan for the area under their control.

3.2. National Policy and Planning

3.2.1 The Kyoto Protocol, 1997

Currently Africa's electricity is mainly generated from coal-based technologies. South Africa accounts for ~38 % of Africa's CO2 (a greenhouse gas contributing to climate change) from burning of fossil fuels and industrial processes. The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. South Africa ratified the Kyoto Protocol in 2002. The Kyoto Protocol requires developing countries to reduce its greenhouse gas emissions through actively cutting down on using fossil fuels, or by utilising more renewable resources. Therefore certain guidelines and policies (discussed further in the sections below) were put in place for the Government's plans to reduce greenhouse gas emissions. The development of renewable energy projects (such as the proposed Paulputs CSP Project) is therefore in line with South Africa's international obligations in terms of the Kyoto Protocol. A second commitment period commenced from 1 January 2013, and extends to 31 December 2020.

3.2.2. White Paper on the Energy Policy of the Republic of South Africa, 1998

The White Paper on Renewable Energy Policy supplements the Government's overarching policy on energy as set out in its White Paper on the Energy Policy of the Republic of South Africa (DME, 1998). The White Paper on Renewable Energy Policy recognises the significance of the medium and long-term potential of renewable energy. The main aim of the policy is to create the conditions for the development and commercial implementation of renewable technologies. The position of the White Paper on Renewable Energy is based on the integrated resource planning criterion of:

> *"Ensuring that an equitable level of national resources is invested in renewable technologies, given their potential and compared to investments in other energy supply options."*

The White Paper on Renewable Energy sets out Government's vision, policy principles, strategic goals and objectives for promoting and implementing renewable energy in South Africa. South Africa relies heavily on coal to meet its energy needs because it is well-endowed with coal resources in particular. However South Africa is endowed with renewable energy resources that can be sustainable alternatives to fossil fuels, but which have so far remained largely untapped. This White Paper fosters the uptake of renewable energy in the economy and has a number of objectives that include:

- ensuring that equitable resources are invested in renewable technologies;
- directing public resources for implementation of renewable energy technologies;
- introducing suitable fiscal incentives for renewable energy and;
- creating an investment climate for the development of renewable energy sector.

The objectives of the White Paper are considered in six focal areas, namely: financial instruments, legal instruments, technology development, awareness raising, capacity building and education, and market based instruments and regulatory instruments. The policy supports the investment in renewable energy facilities as they contribute towards ensuring energy security through the diversification of energy supply, reducing GHG emissions and the promotion of renewable energy sources.

The White Paper set a target of 10 000GWh to be generated from renewable energy by 2013.

3.2.3. The National Energy Act (2008)

The National Energy Act was promulgated in 2008 (Act No 34 of 2008). One of the objectives of the Act was to promote diversity of supply of energy and its sources. In this regard, the preamble makes direct reference to renewable resources, including solar thermal energy:

"*To ensure that diverse energy resources are available, in sustainable quantities, and at affordable prices, to the South African economy, in support of economic growth and poverty alleviation, taking into account environmental management requirements (…); to provide for (…) increased generation and consumption of renewable energies*…(Preamble)."

The National Energy Act aims to ensure that diverse energy resources are available, in sustainable quantities and at affordable prices, to the South African economy in support of economic growth and poverty alleviation, taking into account environmental management requirements and interactions amongst economic sectors, as well as matters relating to renewable energy. The Act provides the legal framework which supports the development of renewable energy facilities for the greater environmental and social good.

3.2.4. Renewable Energy Policy in South Africa

Internationally there is increasing development of the use of renewable technologies for the generation of electricity due to concerns such as climate change and exploitation of resources. In response, the South African government ratified the United Nations Framework Convention on Climate Change (UNFCCC) in August 1997 and acceded to the Kyoto Protocol, the enabling mechanism for the convention, in August 2002. In addition, national response strategies have been developed for both climate change and renewable energy.

Investment in renewable energy initiatives, such as the proposed Paulputs CSP Project, is supported by the National Energy Policy (DME, 1998). This policy recognises that renewable energy applications have specific characteristics which need to be considered. The Energy Policy is "*based on the understanding that renewables are energy sources in their own right, and are not limited to small-scale and remote applications, and have significant medium- and long-term commercial potential*." In addition, the National Energy Policy states that "*Renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future*".

The support for the Renewable Energy Policy is guided by a rationale that South Africa has a very attractive range of renewable resources, particularly solar and wind, and that renewable applications are, in fact, the least cost energy service in many cases from a fuel resource perspective (i.e. the cost of fuel in generating electricity from such technology); more so when social and environmental costs are taken into account. In spite of this range of resources, the National Energy Policy acknowledges that the development and implementation of renewable energy applications has been neglected in South Africa.

Government policy on renewable energy is therefore concerned with meeting the following challenges:

» Ensuring that economically feasible technologies and applications are implemented;
» Ensuring that an equitable level of national resources is invested in renewable technologies, given their potential and compared to investments in other energy supply options; and
» Addressing constraints on the development of the renewable industry.

3.2.5 National Development Plan

The National Development Plan (NDP) contains a plan aimed at eliminating poverty and reducing inequality by 2030. The NDP identifies 9 key challenges and associated remedial plans. Managing the transition towards a low carbon national economy is identified as one of the 9 key national challenges. Expansion and acceleration of commercial renewable energy is identified as a key intervention strategy.

The Paulputs CSP Project will support many of the objectives of the National Development Plan (NDP). Some of these objectives are:

» Create 11 million jobs by 2030; and
» Procuring about 20 000MW of renewable electricity by 2030.

Infrastructure is a key priority of the NDP, which identifies the need for South Africa to invest in a strong network of economic infrastructure to support the country's medium- and long-term economic and social objectives. The NDP has been approved and adopted by government and has received strong endorsement from broader society. The plan sets out steps that aim to ensure that, in 20 years, South Africa's energy system looks very different to the current situation: coal will contribute proportionately less to primary-energy needs, while gas and renewable energy resources – especially wind, solar and imported hydroelectricity – will play a much larger role.

2.2.6. Integrated Energy Plan (IEP)

The development of a national Integrated Energy Plan (IEP) was envisaged in the White Paper on Energy Policy of 1998 and the Minister of Energy, as entrenched in the National Energy Act of 2008, is mandated to develop and publish the IEP on an annual basis. The IEP takes existing policy into consideration and provides a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development.

The IEP takes into consideration the crucial role that energy plays in the entire economy of the country and is informed by the output of analyses founded on a solid fact base. It is a multi-faceted, long-term energy framework which has multiple aims, some of which include:

» To guide the development of energy policies and, where relevant, set the framework for regulations in the energy sector.
» To guide the selection of appropriate technologies to meet energy demand (i.e. the types and sizes of new power plants and refineries to be built and the prices that should be charged for fuels).
» To guide investment in and the development of energy infrastructure in South Africa.
» To propose alternative energy strategies which are informed by testing the potential impacts of various factors such as proposed policies, introduction of new technologies, and effects of exogenous macro-economic factors.

Eight key objectives for energy planning were identified:

» Objective 1: Ensure the security of supply
» Objective 2: Minimise the cost of energy
» Objective 3: Increase access to energy

» Objective 4: Diversify supply sources and primary sources of energy
» Objective 5: Minimise emissions from the energy sector
» Objective 6: Promote energy efficiency in the economy
» Objective 7: Promote localisation and technology transfer and the creation of jobs
» Objective 8: Promote the conservation of water

The IEP recognises the potential of renewable energy for power generation.

2.2.7. Final Integrated Resource Plan 2010 - 2030

The Integrated Resource Plan (IRP) 2010-30 was promulgated in March 2011. The primary objective of the IRP 2010 is to determine the long term electricity demand and detail how this demand should be met in terms of generating capacity, type, timing and cost. However, the IRP 2010 also serves as input to other planning functions, *inter alia* economic development, and funding, environmental and social policy formulation. The accuracy of the IRP 2010 is to be improved by regular reviews and updates. The IRP 2010 projected that an additional capacity of up to 56 539MW of generation capacity will be required to support the country's economic development and ensure adequate reserves over the next 20 years. The required expansion is more than two times the size of the existing capacity of the system.

The current iteration of the Integrated Resource Plan (IRP) for South Africa, initiated by the Department of Energy (DoE) after a first round of public participation in June 2010, led to the Revised Balanced Scenario (RBS) that was published in October 2010. The document outlines the proposed generation new build fleet for South Africa for the period 2010 to 2030. This scenario was derived based on the cost-optimal solution for new build options (considering the direct costs of new build power plants), which was then "balanced" in accordance with qualitative measures such as local job creation. In addition to all existing and committed power plants, the RBS included a nuclear fleet of 9.6 GW; 6.3 GW of coal; 17.8 GW of renewables (including wind and solar); and 8.9 GW of other generation sources. This means that 75% of new generation capacity by 2030 will be derived from energy sources other than coal.

3.2.6 Strategic Integrated Projects

The South African Government adopted a National Infrastructure Plan in 2012 with the objective that government aims to transform South Africa's economic landscape whilst simultaneously creating significant numbers of new jobs, and strengthening the delivery of basic services. The plan also supports the integration of African economies. Socio-economic issues identified within the National Development Plan were placed under 18 different Strategic Integrated Projects (SIPs) to address the spatial imbalances of the past by addressing the needs of the poorer provinces and enabling socio-economic development. The SIPs cover social and economic infrastructure across all nine provinces

(with an emphasis on lagging regions). The SIPs include catalytic projects that can fast-track development and growth.

Amongst these is SIP 8 - *Green energy in support of the South African economy).* This SIP aims at supporting sustainable green energy initiatives on national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP, 2010). The proposed Paulputs CSP Project falls within the ambit of this SIP.

3.3. Provincial and Local Level Developmental Policy

3.3.1. Northern Cape Province Provincial Growth and Development Strategy

The Northern Cape Provincial Growth and Development Strategy (PGDS) sets the tone for development planning and outlines the strategic planning direction in the province. Planning for the promotion of economic growth and social development lies at the core of the Government's responsibility to provide a better life for the nation. It is essential to ensure that planning is integrated across disciplines, coordinated within and between different planning jurisdictions and aligned with the budgeting processes of national, provincial and local government. The core purpose of the Northern Cape PGDS is to enable stakeholders from public and private sectors, together with labour and civil society, to determine a plan for sustainable growth and development of the Northern Cape. The main objectives set by the Northern Cape PGDS for development planning in the province are as follows:

» Promoting growth, diversification and transformation of the provincial economy
» Poverty reduction through social development
» Developing requisite levels of human and social capital
» Improving the efficiency and effectiveness of governance and other development institutions
» Enhancing infrastructure for economic growth and social development

The Northern Cape PGDS aims at building a prosperous, sustainable, growing provincial economy to eradicate poverty and improve social development. The proposed solar energy facility will contribute to growth and development of the province by expanding the economic base, diversifying the economy and creating employment opportunities, which will contribute towards reducing poverty.

3.3.2. Northern Cape Provincial Local Economic Development (LED) Strategy (2009)

The Northern Cape Local Economic Development (LED) strategy is intended to build a shared understanding of LED in the province and put into context the role of local economies in the provincial economy. It seeks to mobilise local people and local resources in an effort to fight poverty. The Northern Cape LED strategy investigated the options and opportunities available to broaden the local economic base of the province in order to

promote the creation of employment opportunities and the resultant spin-off effects throughout the local economy. Areas of opportunity include:

» Livestock products
» Game farming
» Horticulture
» Agriculture
» Ago-related industries
» Tourism
» Manganese and iron Ore
» Beneficiation of minerals
» Renewable energy

The purpose of the LED is to build up the economic capacity of a local area to improve its economic future and quality of life for all. The LED provides local municipalities with leadership and direction in policy making, in order to administer policy, programmes and projects, and to be the main initiator of economic development programmes through public spending. It is noted in the LED that renewable energy is an area of opportunity to broaden the local economic base and promote the creation of employment opportunities as well as local economy spin-off effects.

3.3.3. *Northern Cape Provincial Development and Resource Management Plan/ Provincial Spatial Development Framework (PSDF) (2012)*

The PSDF not only gives effect to national spatial development priorities but it also sets out a series of provincial, district and local development priorities for the space economy of the Northern Cape.

The Northern Cape PSDF is premised upon and gives effect to the following five strategic objectives of the National Strategy for Sustainable Development (NSSD 2011-2014):

» Enhancing systems for integrated planning and implementation
» Sustaining our ecosystems and using natural resources efficiently
» Towards green economy
» Building sustainable communities
» Responding effectively to climate change

The PSDF makes reference to the need to ensure the availability of energy. Under the economic development profile of the Northern Cape PSDF, the White Paper on Renewable Energy Policy (2003) discussed a target of 10 000GWh of energy to be produced from renewable energy sources. It was also stated that the total area of high radiation in South Africa amounts to approximately 194 000km^2, of which the majority falls within the Northern Cape. It is estimated that, if the electricity production per km^2 of mirror surface in solar thermal power stations were 30.2MW and only 1% of the area of high radiation were available for solar generation, then generation potential would equate to

approximately 64GW. A mere 1.25% of the area of high radiation could therefore meet projected South African electricity demand in 2025 (80GW). It was also stated in the Northern Cape PSDF that the implementation of large Concentrating Solar Power (CSP) plants has been proposed as one of the main contributors to reducing greenhouse gas emission in South Africa. One of the policies in the NC PSDF is for renewable energy sources to comprise 25% of the Province's energy capacity by 2020. Therefore the proposed development will assist in contributing to the Province's renewable energy capacity.

3.4. District and Local Authority Level Developmental Policy

These strategic policies at the district and local level have similar objectives for the respective areas, namely to accelerate economic growth, create jobs, uplift communities and alleviate poverty. The proposed development is considered to align with the aims of these policies, even if contributions to achieving the goals therein are only minor.

3.4.1 Namakwa District Municipality Integrated Development Plan (IDP)

The vision for the Namakwa DM as set out in the Namakwa District Municipality (NDM) Integrated Development Plan (IDP) (2012-2016) is for the "The establishment of a development-orientated and economically viable district through sustainable growth".

In order to comply with the vision, the mission statement concentrates on certain key focus areas, namely: Promotion of the quality of life of the Namakwa community through purposeful and quality service, and the effective and optimal utilisation of resources, focussing especially on:

» Economic development;
» Development, upgrading and maintenance of basic infrastructure;
» Development of human resources;
» Sustainable management and optimal utilisation of operational and natural resources;
» Creating of a safe, healthy and investment-friendly environment;
» Development of opportunities for local entrepreneurs; and
» Ensuring friendly, credible and transparent services and client satisfaction.

The NDM IDP also identifies a number of key performance areas (KPA). The KPA that is relevant to the proposed project is KPA 3: Local Economic Development. A number of projects are listed under the Local Economic Development KPA of these the following are of specific relevance to the project:

» Project No. LE02: Renewable Energy Cluster: The Development of a synergy between the energy resources within Namakwa Region.
» Project No. LE05: SMME Development Cluster: The development of a Management support system for SMME'S.

The objective of Project No: LEO2 is to ensure the participation of the NDM in the development of a synergy between wind energy, natural gas, solar, bio-fuel and wave energy so that the energy sector can enhance competitive and comparative advantage of the Namakwa region. The performance indicators listed in the IDP include the facilitation of quarterly Local Economic Development Forum (LED) Forum meetings with stakeholders/future partners in solar, wave and natural gas (Forest International) in order to exchange information. The key outputs of the project listed in the IDP include:

» Establishment of renewable energy resources like natural gas, wind, bio-fuel, waves, solar, hydro and waste recycling in the key municipalities and the NDM as whole.

The proposed Paulputs CSP Project is therefore supported by and supports the energy related objectives set out in the NDM IDP.

3.4.2 Khai Ma Integrated Development Plan (IDP)

The vision set out in the Khai Ma Local Municipality IDP 2012-2017 is "Creating an economically viable and fully developed municipality, which enhances the standard of living of all the inhabitants / community of Khai Ma through good governance, excellent service delivery and sustainable development." The vision of the LM is "Improved and sustainable standard of living for all". Linked to the Vision is the Mission statement, which is the "Provision of transparent, accountable and sustainable service delivery." The IDP identifies a number of Key Performance Areas (KPAs). The KPAs that are relevant to the proposed project include:

» KPA 1: Service Delivery and Infrastructure Development
» KPA 2: Local Economic Development

The priority issues identified in the IDP that are relevant to the project and are linked to the KPAs include:
» Lack of Basic Services
» Poverty and Unemployment
» Lack of sport and recreational facilities and services
» Lack of sufficient and proper health services

The renewable energy sector is also recognised as a key sector. The IDP notes that a number of new opportunities have opened up for LM area since the need to facilitate the generation of sustainable energy was introduced in South Africa by Eskom and the South African government. The IDP notes that there are a number of solar projects proposed in the area and that the economic benefits from these projects are eagerly anticipated.

3.5. Legislation and Guidelines

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

- National Environmental Management Act (Act No. 107 of 1998)
- EIA Regulations, published under Chapter 5 of NEMA (GNR R982 in Government Gazette No 38282 of December 2014)
- Guidelines published in terms of the NEMA EIA Regulations, in particular:
  - Public Participation in the EIA Process (DEA, 2010)
  - Integrated Environmental Management Information Series (published by DEA);
- Namakwa District Municipality Integrated Development Plan (IDP) (2012-2016);
- Khai Ma Local Municipality Integrated Development Plan (2012-2017);
- International guidelines – the Equator Principles and the International Finance Corporation and World Bank Guidelines;

Several other Acts, standards or guidelines have also informed the project process and the scope of issues evaluated in the scoping report, and to be addressed in the EIA.

Namakwa District Municipality Environmental Management Framework (EMF) and Strategic Environmental Management Plan (SEMP) (2011)

The Namakwa District Municipality Environmental Management Framework (EMF) and Strategic Environmental Management Plan (SEMP) was developed in order to provide a high level plan for sustainable development in the. The management acknowledges the need for social and economic development and provides strategic issues which should be addressed to take advantage of environmental goods and services. The EMF and SEMP does not prohibit development. The focus of the EMF is to restrict development in zones with the greatest sensitivity and allow development in the zones of low sensitivity. The report makes reference to the fact that large portions of land need to be cleared for energy generation projects. The need for sustainable energy is acknowledged in the EMF and it is recommended that energy generation projects be limited to Environmental Management Zone (EMZ) D (medium sensitivity area) – G (very low to not applicable sensitivity) area.

3.6. Relevant legislative permitting requirements

Table 3.1 overleaf provides an outline of the legislative permitting requirements applicable to the Paulputs CSP Project as identified at this stage in the project process.

Table 3.1: Relevant legislative permitting requirements applicable to the Paulputs CSP Project

Legislation	Applicable Requirements
National Environmental Management Act (Act No 107 of 1998)	The EIA Regulations have been promulgated in terms of Chapter 5 of the Act. Listed activities which may not commence without an environmental authorisation are identified within these Regulations. In terms of S24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation. In terms of GN R982, R983, R984 and R985 of December 2014, a Scoping and EIA Process is required to be undertaken for the proposed project.
Environment Conservation Act (Act No 73 of 1989)	Developments are required to comply with the limits set within the National Noise Control Regulations (GN R154 dated 10 January 1992)
National Water Act (Act No 36 of 1998)	Water uses under Section 21 of the Act must be licensed, unless such water use falls into one of the categories listed in S22 of the Act or falls under the general authorisation (and then registration of the water use is required). Consumptive water uses may include the taking of water from a water resource and storage - Sections 21a and b. Non-consumptive water uses may include impeding or diverting of flow in a water course - Section 21c; and altering of bed, banks or characteristics of a watercourse - Section 21i.
Minerals and Petroleum Resources Development Act (Act No 28 of 2002)	A mining permit or mining right may be required where a mineral in question is to be mined (e.g. materials from a borrow pit) in accordance with the provisions of the Act. Requirements for Environmental Authorisation of mining related activities are as detailed within the NEMA EIA Regulations (GNR982 – 985).

Legislation	Applicable Requirements
	Section 53 Department of Mineral Resources: Approval from the Department of Mineral Resources (DMR) may be required to use land surface contrary to the objects of the Act in terms of section 53 of the Mineral and Petroleum Resources Development Act, (Act No 28 of 2002): In terms of the Act approval from the Minister of Mineral Resources is required to ensure that proposed activities do not sterilise a mineral resource that might occur on site.
National Environmental Management: Air Quality Act (Act No 39 of 2004)	No air emissions will result from the proposed project and therefore no air emissions license is required to be obtained. Reporting to the Air Emissions Licensing Authority (AELA) on emissions from small boilers (such as may be used for auxiliary power supply sources) would be required. Dust control Regulations have been promulgated under the Air Quality Act. In this regard, a dust monitoring plan may be required to be implemented if required by the AELA.
National Heritage Resources Act (Act No 25 of 1999)	This Act provides for the protection of all archaeological and palaeontological sites, and meteorites (S35), the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority (S36), and lists activities which require developers any person who intends to undertake to notify the responsible heritage resources authority and furnish it with details regarding the location, nature, and extent of the proposed development (S38). A heritage permit is required should any sites of heritage significance be impacted by the proposed project.
National Environmental Management: Biodiversity Act (Act No 10 of 2004)	» Provides for the MEC/Minister to identify any process or activity in such a listed ecosystem as a threatening process (S53) » A list of threatened and protected species has been published in terms of S 56(1) - Government Gazette 29657. » Three government notices have been published, i.e. GN R 150 (Commencement of Threatened and Protected Species Regulations, 2007), GN R 151 (Lists of

Legislation	Applicable Requirements
	critically endangered, vulnerable and protected species) and GN R 152 (Threatened or Protected Species Regulations). » Provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (G 34809, GN 1002), 9 December 2011). » This Act also regulates alien and invader species. » A permit is required to be obtained to impact on any species listed in terms of this Act or associated Regulations.
Conservation of Agricultural Resources Act (Act No 43 of 1983)	» No permitting requirements in terms of this Act are applicable to the project under investigation. » Prohibition of the spreading of weeds (S5) » Classification of categories of weeds and invader plants (Regulation 15 of GN R1048) and restrictions in terms of where these species may occur. » Requirement and methods to implement control measures for alien and invasive plant species (Regulation 15E of GN R1048).
National Forests Act (Act No. 84 of 1998)	» According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that 'no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister'. » A permit is required to be obtained to impact on any species listed in terms of this Act or associated Regulations.

Legislation	Applicable Requirements
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)	The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. The Minister may amend the list by – » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. In terms of the Regulations published in terms of this Act (GN 921 of November 2013), a Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities in support of an application for a waste license. Although no waste license is expected to be applicable to the project under investigation, one may be required should it be the intention of the developer to establish permanent spoil stockpile areas on the site. Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that: » The containers in which any waste is stored, are intact and not corroded or in any other way rendered unlit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise; and » Pollution of the environment and harm to health are prevented.
National Road Traffic Act (Act No 93 of 1996)	» The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the

Legislation	Applicable Requirements
	transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. » Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. » The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations. » A permit is required to be obtained for the transportation of abnormal loads.
Astronomy Geographic Advantage Act (Act No. 21 of 2007)	» The Astronomy Geographic Advantage Act (No. 21 of 2007) provides for the preservation and protection of areas within South Africa that are uniquely suited for optical and radio astronomy; for intergovernmental co-operation and public consultation on matters concerning nationally significant astronomy advantage areas and for matters connected thereto. » Chapter 2 of the act allows for the declaration of astronomy advantage areas while Chapter 3 pertains to the management and control of astronomy advantage areas. Management and control of astronomy advantage areas include, amongst others, the following: * Restrictions on use of radio frequency spectrum in astronomy advantage areas; * Declared activities in core or central astronomy advantage area; * Identified activities in coordinated astronomy advantage area; and * Authorisation to undertake identified activities.

Legislation	Applicable Requirements
Northern Cape Nature Conservation Act, Act No. 9 of 2009	This Act provides for the sustainable utilisation of wild animals, aquatic biota and plants; provides for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; provides for offences and penalties for contravention of the Act; provides for the appointment of nature conservators to implement the provisions of the Act; and provides for the issuing of permits and other authorisations. Amongst other regulations, the following may apply to the current project: » Boundary fences may not be altered in such a way as to prevent wild animals from freely moving onto or off of a property; » Aquatic habitats may not be destroyed or damaged; » The owner of land upon which an invasive species is found (plant or animal) must take the necessary steps to eradicate or destroy such species. » The Act provides lists of protected plant and animal species for the Province. » A permit is required to be obtained to impact on any species listed in terms of this Act or associated Regulations.

APPROACH TO UNDERTAKING THE SCOPING PHASE CHAPTER 4

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

Figure 4.1: The Phases of an EIA Process

The Scoping Phase for the proposed Paulputs CSP project is undertaken in accordance with the sections 24(5) of the National Environmental Management Act (No 107 of 1998). In terms of the EIA Regulations (2014) of GN R982 as well as GN R983, GN R984 and GN R985, a Scoping and EIA Study are required to be undertaken for this proposed project. In accordance with these Regulations, this scoping process aimed at identifying potential issues associated with the proposed project, and defining the extent of studies required within the EIA. This was achieved through an evaluation of the proposed project involving desk-top specialist studies, limited field surveys, as well as a consultation process with key stakeholders (including relevant government authorities) and interested and affected parties (I&APs). This chapter serves to outline the process which was followed during the Scoping Phase of the EIA process.

4.1. Relevant Listed Activities

Listing Notices 1, 2 and 3 under the EIA Regulations, 2014 (GN R983, GN R984 and GN R985) identify activities that would require environmental authorisation prior to commencement of such activities. The following 'listed activities' are triggered by the proposed Paulputs CSP Project:

Table 4.1: Listed activities triggered by the proposed Paulputs CSP project

GN983, activity 9 (i) The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water – (i) With an internal diameter of 0.36 metres or more;	The proposed development will include the construction of a water supply pipeline to the facility on the Gariep River, approximately 30km in length.
GN983, activity 11 (i) The development of facilities or infrastructure for the transmission and distribution of electricity- (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts	The proposed facility will be required to evacuate electricity into the national grid and include the construction of an on-site substation and a 132 kV power line to Eskom's existing Paulputs Substation.
GN983, activity 12 (xii) (a) (c) The development of (xii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- (a) within a watercourse; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.	Access road, water supply pipeline and abstraction point exceeding 100 m^2 will be required to be constructed within or within 32m of watercourse features.
GN983, activity 13 The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.	Ancillary infrastructure includes water storage reservoir/s (for clean water storage) and evaporation ponds, (wastewater from the generation process and water treatment plant) on the site. The combined capacity of these exceeds 50 000 m^3.
GN983, activity 19 (i) The infilling or depositing of any material of more than 5 cubic metres	Construction activities associated with the access road, water supply pipeline and abstraction point will

into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from- (i) a watercourse.	require the infilling or excavation, removal or moving of any material into or from a watercourse.
GN983, activity 24(ii) The development of- (ii) a road with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres	Access and internal roads of ~8m in width are required to be constructed in order to access the project site and power block from the public road.
GN 983, activity 27 The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation.	An area of 1 ha or more of indigenous vegetation will need to be cleared.
GN 983, activity 28 (ii) Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;	The Paulputs CSP Project will be constructed over an area of 900ha.
GN984, activity 1 The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more.	The Paulputs CSP Project will consist of heliostats and a molten salt tower system with a contracted capacity of 200MW.
GN984, activity 6 The development of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent.	Evaporation ponds require a Water Use License for the release of effluent from the energy generation process into a lined lagoon.

GN985, activity 2 (a) (iii) (bb) and (dd) The development of reservoirs for bulk water supply with a capacity of more than 250 cubic metres (a) In the Northern Cape (ii) outside urban areas (bb) in sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority (dd) critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; .	Ancillary infrastructure includes water storage reservoir/s on the site will be in a sensitive area (Ecological Support Area) as identified in the Environmental Management Framework (EMF) for the Namakwa District Municipality and the Namakwa District Biodiversity Sector Plan (Critical Biodiversity Area) (which is in the process of being gazetted)
GN985, activity 4 (a) (ii) (cc) and (ee) The development of a road wider than 4 metres with a reserve less than 13.5 metres. (a) in the Northern Cape (ii) Outside urban areas (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority. (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	A road wider than 4 m will need to be constructed in a sensitive area (Ecological Support Area) as identified in the Environmental Management Framework (EMF) for the Namakwa District Municipality and the Namakwa District Biodiversity Sector Plan (Critical Biodiversity Area) (which is in the process of being gazetted)
GN 985 Item 10 (a) (ii) (cc) and (ee): The development of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres (a) in the Northern Cape, (ii) outside urban areas in	Fuel and dangerous good with a combined capacity of 30m^3 but not exceeding 80 m^3 will be stored on-site in a sensitive area (Ecological Support Area) as identified in the Environmental Management Framework (EMF) for the Namakwa District Municipality and the Namakwa District Biodiversity Sector Plan

(cc) sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority. (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans	(Critical Biodiversity Area) (which is in the process of being gazetted)
GN 985, activity 14 (a) (xii) (dd) and (ff) The development of (xii) infrastructure covering 10 square metres or more where such construction occurs within a watercourse or within 32m measured from the edge of the watercourse; in a) Northern Cape (ii) Outside urban areas, in (dd) sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adapted by the competent authority or in bioregional plans.	Infrastructure covering an area greater than 10 m^2 which occur within 32 m of a drainage line or a watercourse will be required to be built in an ecosystem service area (Ecological Support Area) as identified in the Environmental Management Framework (EMF) for the Namakwa District Municipality and the Namakwa District Biodiversity Sector Plan (Critical Biodiversity Area) (which is in the process of being gazetted)
GN 985, 18 (a) (ii) (cc) and (ee) The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. (a) In the Northern Cape (ii) Outside urban areas, in: (cc) sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority (ee) Critical biodiversity areas as identified in systematic biodiversity	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre in a sensitive area (Ecological Support Area) as identified in the Environmental Management Framework (EMF) for the Namakwa District Municipality and the Namakwa District Biodiversity Sector Plan (Critical Biodiversity Area) (which is in the process of being gazetted)

plans adopted by the competent authority or in bioregional plans.	

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

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

4.2. Objectives of the Scoping Phase

This Scoping Report documents the evaluation of the potential environmental impacts of the proposed Paulputs CSP Project and forms part of the EIA process. The Scoping Phase was conducted in accordance with the requirements of the EIA Regulations in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998).

This Scoping Phase aims to:

» Identify and evaluate potential environmental (biophysical and social) impacts and benefits of all phases of the proposed development (including design, construction, operation and decommissioning) within the broader study area through a desk-top review of existing baseline data and specialist studies.
» Identify potentially sensitive environmental features and areas on the site to inform the preliminary design process of the facility.
» Define the scope of studies to be undertaken within the EIA process.
» Provide the authorities with sufficient information in order to make a decision regarding the scope of issues to be addressed in the EIA process, as well as regarding the scope and extent of specialist studies that will be required to be undertaken as part of the EIA Phase of the process.

The following objectives of the scoping process, through the undertaking of a consultative process and with the assistance of specialist input, have been met.

The identification of relevant policies and legislation regarding the activities to be undertaken have been identified and considered within this scoping report. Activities to be undertaken for the development of the Paulputs CSP Project have been identified and motivated in terms of the need and desirability for the activities to take place. Impacts associated with the undertaking of the identified activities and technologies have been identified and has resulted in the identification of suitable and preferable location and technology alternatives associated with the development of the Paulputs CSP Project. The preferred site (Portion 4 of the Scuitklip 92) for the development of the Paulputs CSP Project has been identified by the applicant through a site selection process. Preferred areas for the development, which are areas associated with a low environmental sensitivity, for the Paulputs CSP Project have been identified within the site through a consultative and specialist informed site identification process which includes an impact assessment process (on a desktop level and limited field work), locations of the preferred areas through the consideration of various aspects have been identified. Key issues associated with the Paulputs CSP Project to be addressed within the assessment phase for further detailed study and ground-truthing has been identified and listed within this scoping report. The level of assessment, expertise and the extent of further consultation to be undertaken, with the aim of determining the extent of associated impacts of the activities through the life cycle of the Paulputs CSP Project, have been identified and included within this Scoping report.

4.3. Overview of the Scoping Phase

The Scoping Phase has been undertaken in accordance with the EIA Regulations published in Government Gazette No 38282 in December 2014, in terms of NEMA. Key tasks undertaken within the scoping phase included:

- Consultation with relevant decision-making and regulating authorities (at National, Provincial and local levels).
- Submission of the completed application form for authorisation to the competent authority (DEA) in terms of Regulations 5 and 16 of Government Notice R982 of 2014.
- Undertaking a public involvement process throughout the Scoping process in accordance with Chapter 6 of Government Notice R982 of 2014 in order to identify issues and concerns associated with the proposed project.
- Undertaking of independent specialist studies in accordance with Appendix 6 of Government Notice R982 of 2014.
- Preparation of a Scoping Report and Plan of Study for EIA in accordance with the requirements of Appendix 2 of Government Notice No R982 of 2014.
- Preparation of a Comments and Response Report detailing key issues raised by I&APs as part of the EIA Process.

The tasks are discussed in detail below.

4.3.1. Authority Consultation and Application for Authorisation in terms of GNR982 of 2014

In terms of the Energy Response Plan, the National Department of Environmental Affairs (DEA) is the competent authority for all energy related projects. As the project falls within the Northern Cape, the Department of Environment and Nature Conservation (DENC) is the commenting authority for the project. Consultation with these authorities will be undertaken throughout the Scoping process. This consultation included the following:

» Submission of the application for authorisation to DEA;
» Submission of the Scoping Report for review.

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

4.3.2. Public Participation

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

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

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

i. Stakeholder identification

The first step in the public involvement process was to initiate the identification of relevant stakeholders and interested and affected parties (I&APs). This process was undertaken through existing contacts and databases, as well as through the process of networking. Stakeholders identified are listed in Table 4.2 below:

Table 4.2: List of Stakeholders identified during the Scoping Phase

Organs of State
National Government Departments
Department of Agriculture, Forestry and Fisheries
Department of Communications
Department of Energy
Department of Mineral Resources
Department of Public Works
Department of Rural Development and Land Reform
Department of Water and Sanitation
Department of Science and Technology
Government Bodies and Institutions
Eskom
National Energy Regulator of South Africa (NERSA)
Sentech
South African Civil Aviation Authority (CAA)
South African Heritage Resources Agency (SAHRA)
Square Kilometre Array: Southern Africa
Telkom SA Ltd
Provincial Government Departments
Ngwao-Boswa Ya Kapa Bokone (Northern Cape Provincial Heritage Resources Authority)
Northern Cape Department of Agriculture, Land Reform and Rural Development
Northern Cape Department of Environment and Nature Conservation (DENC)
Northern Cape Department of Roads and Public Works
Local Government Departments
Khai-Ma Local Municipality
Namakwa District Municipality
Conservation Authorities
BirdLife South Africa
Landowners
Affected landowner
Neighbouring landowners and tenants

ii. Stakeholder Database

All relevant stakeholder and I&AP information has been recorded within a database of affected parties (refer to Appendix C for a listing of recorded parties). While I&APs have been encouraged to register their interest in the project from the start of the process, the identification and registration of I&APs will be on-going for the duration of the EIA process. The project database will be updated on an on-going basis throughout the project process, and will act as a record of the parties involved in the public involvement process.

iii. Adverts and Notifications

In order to notify and inform the public of the proposed project and invite members of the public to register as I&APs for the project and EIA process, an advert has been placed in the Volksblad and Gemsbok newspapers which are read in the study area. The advertisements have been placed in both English and Afrikaans in order to inform the wider community. The advert provides information on the following (in terms of Regulation 41): as follows

» Provides the details of the project;
» Confirms that Scoping and EIR procedures are being undertaken and confirms the availability of the Scoping Report
» Provides the location and nature of the activity
» Provides contact details and the manner in which where further information can be obtained

Site notices (in English and Afrikaans) were placed at visible points at the entrance to Portion 4 of the farm Scuitklip 92 as well as at the Paulputs Substation, in accordance with the requirements of the EIA Regulations. Further notices were placed on the Pofadder KLK notice board and on the notice board outside Pofadder Save Right Shipping, which are most frequented area by the public within the area. In addition to the advertisements and site notices, key stakeholders and registered I&APs were notified in writing of the commencement of the EIA process, the availability of the Scoping Report and the date of public meeting. Copies of all the advertisements, site notices and written notifications are included within **Appendix C**.

iv. Public Involvement and Consultation

In order to provide information regarding the proposed project and the EIA process, a background information document (BID) for the project was compiled at the outset of the process (refer to Appendix C). The BID was distributed to identified stakeholders and I&APs, and posted electronically on the Savannah Environmental website.

Through consultation with key stakeholders and I&APs, issues for inclusion within the issues-based scoping study have been identified and all comments included prior to the submission of the final scoping report. In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their views, issues and

concerns regarding the project, various opportunities have and will be provided in order for I&APs to have their issues noted. I&APs will be consulted through one-on-one consultation meetings during the EIA process (for example with directly affected or surrounding landowners), telephonic consultation sessions, and written, faxed or e-mail correspondence.

v. Identification and Recording of Issues and Concerns

All comments received from stakeholders and I&APs on the proposed project have been included in the Scoping Report. A Comments and Responses Report has been compiled be compiled to include all comments received during the scoping phase of the process, and will be updated to include those comments received during the review period of the Scoping Report.

4.3.3. Public Review of Scoping Report

The Scoping Report will be made available for public review from 13 November 2015 – 14 December 2015 at the following locations:

» Pofadder Public Library
» www.savannahSA.com

All registered I&APs have, at the commencement of the review period, have been notified of the availability of the Scoping Report for review via email and registered post (refer to Appendix C).

4.3.4. Authority comments on the Scoping Report

Organs of State/Authorities who have jurisdiction over matters relating to the environment, as identified in Table 4.2, have been invited to comment on the Scoping Report (refer to Appendix C).

4.3.4. Evaluation of Issues Identified through the Scoping Process

Issues (both direct and indirect environmental impacts) associated with the proposed project identified within the scoping process have been evaluated through desk-top studies as well as field surveys. In evaluating potential impacts, Savannah Environmental has been assisted by the following specialist consultants as outlined in Table 4.3 below.

Table 4.3: Specialist consultants appointed to evaluate the potential impacts associated with the Paulputs CSP Project

Specialist (Company)	Area of Expertise	Refer Appendix
Adrian Hudson from Hudson Ecology	Ecology (flora and fauna) and Avifauna	Appendix D

Brian Colloty from Scherman Colloty & Associates	Water resources (Surface and Groundwater)	Appendix E
Jaco Jansen from Savannah Environmental and Japer Dreyer from NWU	Soils and agricultural potential	Appendix F
Quinton Lawson from MLB Architects and Bernard Oberholzer from Bernard Oberholzer Landscape Architects	Visual	Appendix G
David Morris from McGregor Museum Department of Archaeology	Heritage	Appendix H
John Pether from Geological and Palaeontological Consultant	Palaeontology	Appendix I
Morné de Jager from Enviro-Acoustic Research	Noise	Appendix J
Candice Hunter from Savannah Environmental and Neville Bews from Neville Bews and Associates	Social	Appendix K

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

» *the nature,* which includes a description of what causes the effect, what will be affected and how it will be affected
» *the extent,* wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional or national.

The evaluation of the issues resulted in a description of the nature, significance, consequence, extent, duration and probability of the identified issues, as well as recommendations regarding further studies required within the EIA phase.

Specialist Scoping Reports are includes within Appendices D – K.

4.3.5. Scoping Report for submission to DEA

The final stage in the Scoping Phase will entail the capturing of comments from stakeholders and I&APs on the Scoping Report in order to finalise and submit the Scoping Report to the DEA for consideration. A decision to accept or reject the undertaking of the EIA Phase of the process is made by the DEA based on the final Scoping Report.

DESCRIPTION OF THE AFFECTED ENVIRONMENT CHAPTER 5

This section of the Scoping Report provides a description of the environment that may be affected by the Paulputs CSP Project. This information is provided in order to assist the reader in understanding the possible effects of the proposed project on the environment. Aspects of the biophysical, social and economic environment that could be directly or indirectly affected by, or could affect, the proposed development have been described. This information has been sourced from both existing information available for the area as well as collected field data, and aims to provide the context within which this EIA is being conducted.

This chapter of the scoping report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(h)(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	The environmental attributes associated with the development of the CSP Project is included as a whole within this chapter. The environmental attributes that are assessed within this chapter includes the following:
	• The regional setting referring to the location of the site. This is included in section 5.1.
	• The climatic conditions associated with the area, as well as the site. This is included in section 5.3.1.
	• The biophysical characteristics of the area including topography, soil types, agricultural potential and ecological profile. This is included within this chapter.
	• The visual quality of the area, as well as the effect of the development of the Project on the visual characteristics. This is included in section 5.1.4
	• Available access and transportation routes in the region of the study area and surrounding the site. This is included in section 5.1
	• The social characteristics, including the socio-economic profiles of the regional context and local context. This is included in section 5.8

Requirement	Relevant Section
	• Heritage features that occur in the region, including archaeological and palaeontological resources. This is included in section 5.4.

The farm Portion 4 of Scuitklip 92 was assessed in 2010 for the siting of the existing CSP facilities known as KaXu Solar One (operational) and Xina Solar One (under construction). The 2010 studies found no environmental flaws for the siting of KaXu Solar I and Xina Solar I. For the Paulputs CSP Project updated studies have been undertaken on Portion 4 of Scuitklip 92 to ensure that the siting of the proposed project is environmentally acceptable for the proposed development.

A more detailed description of each aspect of the affected environment is included within the specialist scoping reports contained within **Appendices D - K**

5.1.1. Location of the study area

The identified site is situated approximately 45 km north-east of Pofadder on Portion 4 of the Farm Scuit-Klip 92The site lies about 30 km south east of the Gariep River which forms the border with Namibia. The project site is accessed via the N14 and then ~17km along the R357 district road located to the east of the farm portion. Both roads are tarred. The MR73 minor road to the west of the farm portion bisects the site. The proposed site falls within the Khai Ma Local Municipality which has its administrative centre in Pofadder. This local municipality is one of seven local municipalities that fall within the greater Namakwa District Municipality Towns in the vicinity of the site include Pofadder which is 45km south west of the site and Onseepkans which is 30km north west of the site. Prominent features in the immediate vicinity include the KaXu One Solar Energy Facility and Xina Solar One located within Portion 4 of the Farm Scuitklip and Konkoonsies Solar I and Konkoonsies Solar II PV plants which located on the adjacent farmland within 2km south of the proposed site.

5.1.2. Physical landscape

The general area is known as the Bushmanland peneplain, an eroded plain punctured by rocky inselbergs. The general area forms part of the Gariep River basin, an arid landscape with red sand dunes drained by numerous dry tributaries. The land slopes gently from about 800m above MSL at the site towards the Gariep River at about 500m. The site is divided by the R357 district road, with the proposed development located on the south-west portion, the Ysterberg rock outcrop being on the north-east portion.

5.1.3. Land use

The area is sparsely vegetated and combined with the variable low rainfall there is limited agricultural potential in the desert-like landscape. Farm portions tend to be large in area and settlements far apart. An existing east-west powerline runs through the site to the Paulputs Transmission Substation. A PV facility is located immediately to the west of the site (Konkoonsies Solar One). On the farm portion there are two existing CSP trough developments - KaXu Solar One (operational) and Xina Solar One (under construction). Also located on the farm portion is the Eskom Paulputs Transmission Substation on the property.

5.1.4. Visual influence

A number of farmsteads are located in the broader area (refer to Figure 5.1) ranging from 5 to 20km distance from the proposed Paulputs CSP Project. Pofadder is approximately 35km south east of the site and out of visual range of the proposed CSP development. The Augrabies National Park is more than 50km north east of the site and would also not be affected. The wilderness character of the area has been altered to some degree by the existing CSP trough developments, substation and Eskom powerline on the property.

The site is fairly remote and in an arid, sparsely populated area. The CSP tower would potentially be visible from the N14 National Road 20km to the south, but distance would be a mitigating factor. The CSP tower is also 30km from the Gariep River, but the river is in a low-lying area and visibility is unlikely to be an issue.

Visually sensitive landscape features include prominent rocky terrain and rock outcrops, and the R357 view corridor.

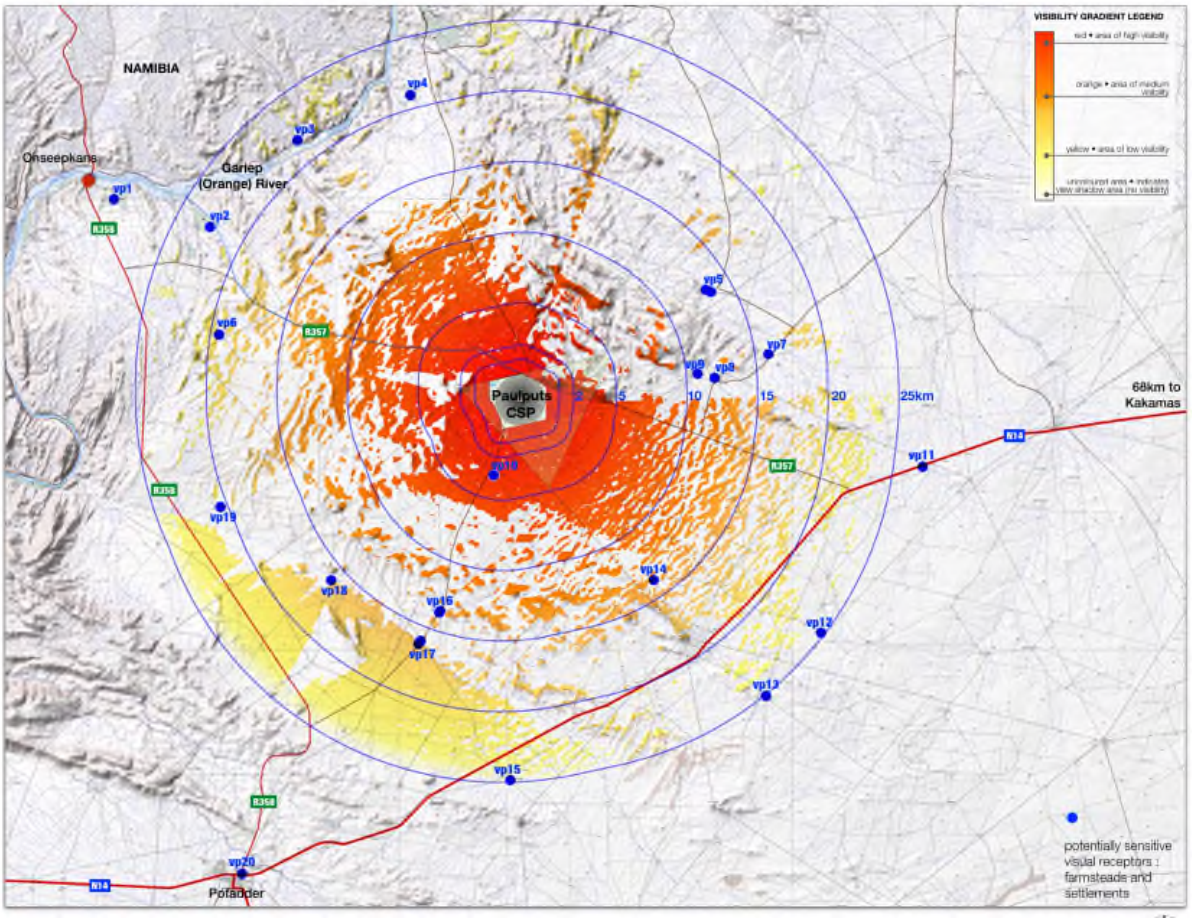

Figure 5.1: Viewpoints, viewsheds, and distance radii in relation to the Paulputs CSP Project site

5.1. Noise

5.2.1. Topographical influence

There are two hills on the study area, one (north-east) approximately 100m high and the other (west) 50m high. The land falls gently in a north-westerly direction towards the Gariep River. There are little natural features that could act as noise barriers considering practical distances at which sound propagates.Traffic in the area is used infrequently by the surrounding farmers. Excluding the scattered farming residences, there are no formal communities within 5 000m from the facility.

5.2.2. Existing Ambient sound levels

Ambient sound levels were measured at two locations during day-light hours in April 2010 following the SANS 10103 methodology. These measurements were recorded before any construction activities started for the existing renewable projects in the area. Audible sounds were mainly insects and noises induced due to wind blowing in the background. The area was very quiet, with very low equivalent sound levels and maximum noises never exceeding 38 dBA. As measurements were collected far from any homesteads the sound

levels represents the sound character of a very natural and rural area. It can be assumed that sound levels will also be very low during the night.

5.2.3. Potentially sensitive receptors, also known as noise-sensitive developments (NSDs)

A potential noise-sensitive receptor is located almost 2000m from the boundary of portion 4 of the farm Scuit-Klip 92 and more than 4500m from the operational noise generating activities of the Paulputs CSP Project. This potential receptor in relation of the noise generating activities is presented on Figure 5.2 with Figure 5.3 illustrating receptors staying close to the abstraction point on the Gariep River.

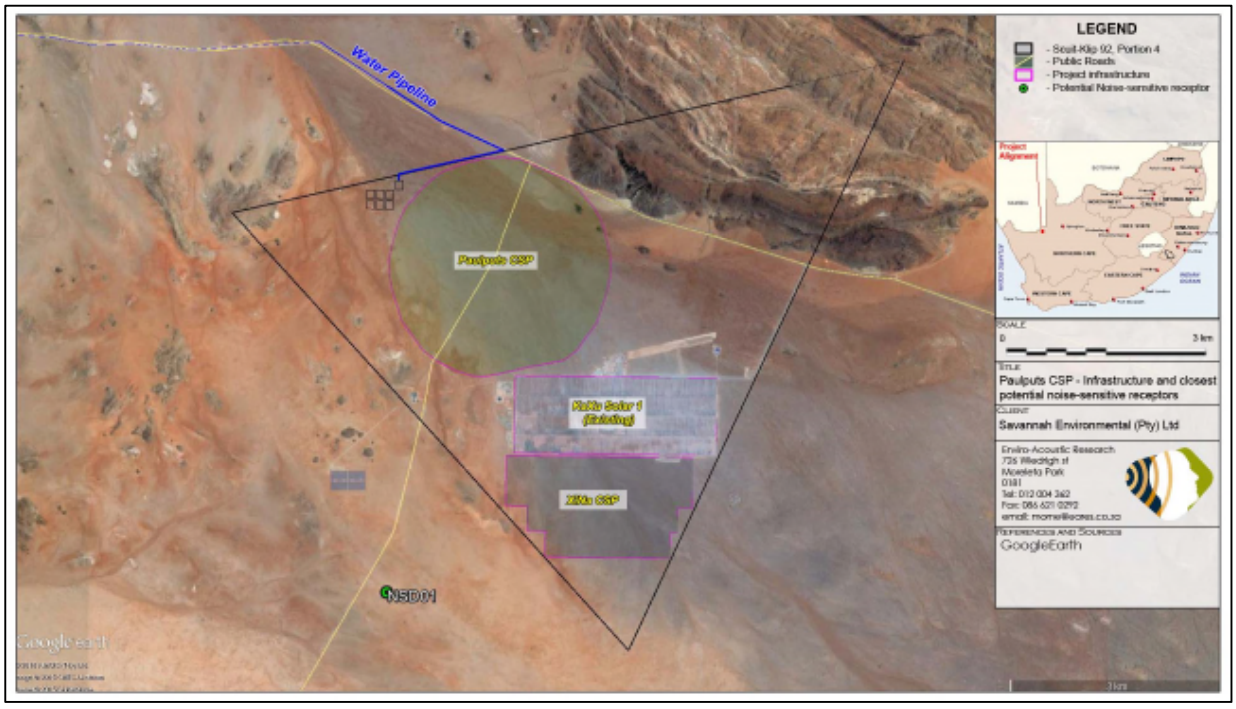

Figure 5.1: Aerial image indicating potentially noise-sensitive receptors close to proposed development

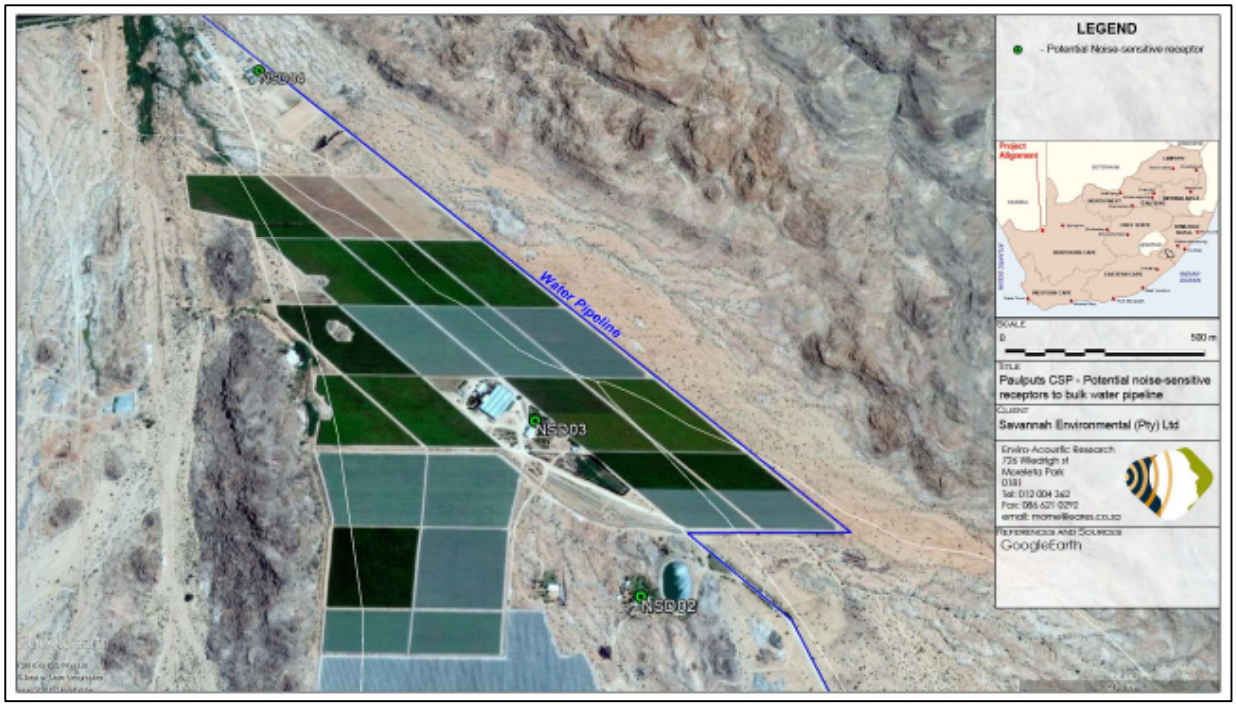

Figure 5.3: Aerial image indicating potentially noise-sensitive receptors close to bulk water pipeline

5.2. Ecological Environment

The description of the ecological environment is supported by desk-top data as well as 10 days of field work undertaken during the Scoping Phase. The ecological environment is described holistically, and encompasses all aspects of the biophysical environment, including flora, fauna and avifauna.

5.3.1. Physical setting

Climatic conditions

The study area is characterised by an arid climate. The Mean Annual Rainfall (MAR) is approximately 100 mm to 150 mm per year; primarily through summer rainfall, however due to the moderating effect of the Gariep River Valley, winter rainfall is able to extend up the valley into the interior. The area also experiences fog up the river valley and high evapotranspiration rates are experienced in summer ranging from 1 400 mm- 1 800 mm. The mean maximum summer temperatures are 38°C while the mean minimum winter temperatures are -1°C

Biome and vegetation types

The study area falls within the Karoo Biome and contains two major vegetation types, namely Bushmanland Arid Grassland (i.e. the plains within the study site) and Lower Gariep Broken Veld (i.e. the hills/koppies within the study site), (refer to Figure 5.4) both of which are classified as Least Threatened. Bushmanland Arid Grassland occurs on extensive, relatively flat plains and is sparsely vegetated by tussock grasses as well as

abundant displays of annual herbs following heavy rain). This vegetation type contains endemic species belonging to the Griqualand West or Gariep Centres of Endemism. At a national scale this vegetation type has been transformed to a slight degree and approximately 27% is conserved within the Augrabies Falls National Park; it is not therefore considered to be a threatened vegetation type. Lower Gariep Broken Veld consists of sparse vegetation dominated by shrubs, dwarf shrubs, annuals and to a lesser degree by perennial grasses and herbs. This vegetation type contains endemics belonging to the Griqualand West or Gariep Centres of Endemism). At a national scale this vegetation type has also been transformed to a slight degree and is also conserved within the Augrabies Falls National Park.

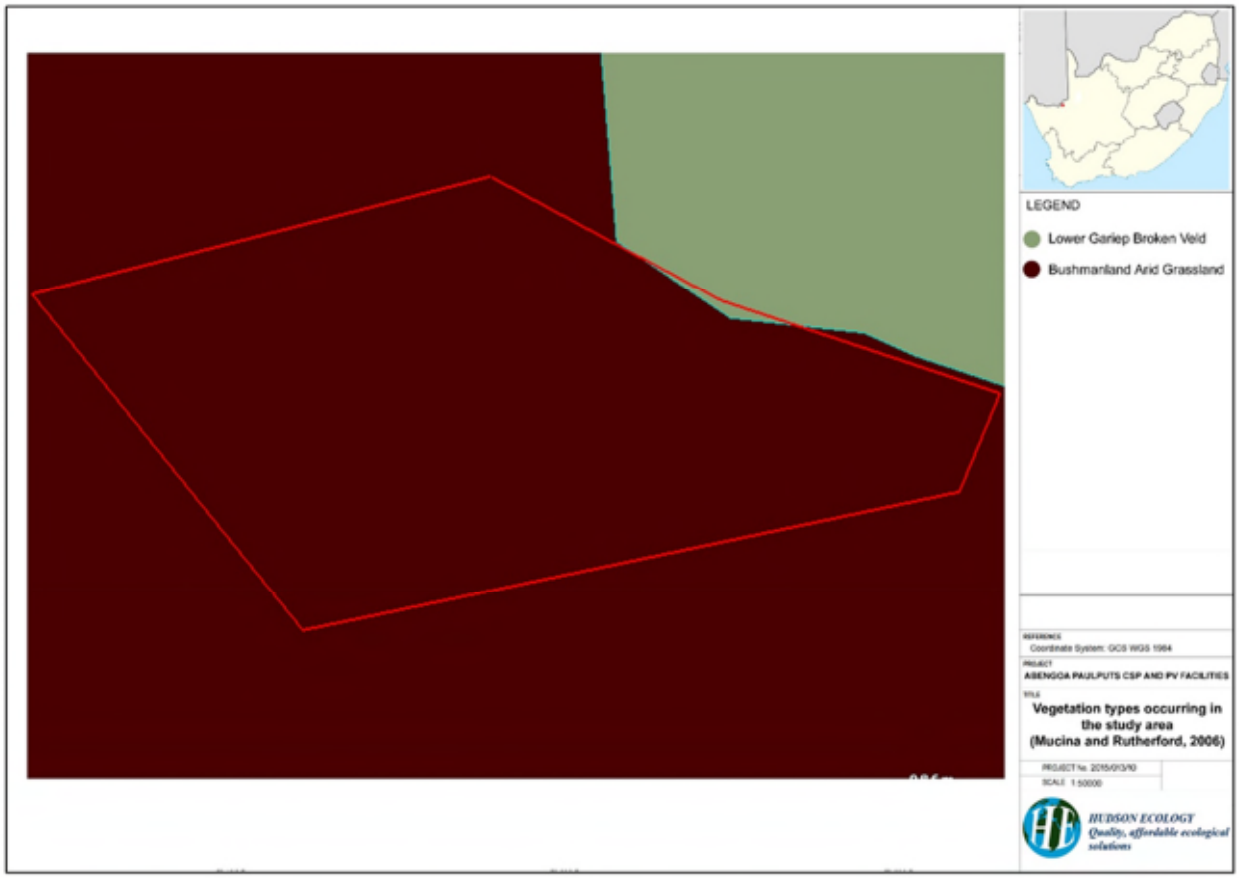

Figure 5.4.: Vegetation types occurring in the study area (Mucina and Rutherford, 2006)

5.3.2. Floral profile

A floral survey was conducted in August 2015 (the dry season survey). Based on species composition, physiognomy, moisture regime, rockiness, slope and soil properties, four main vegetation communities were recognised (refer to Figure 5.5). These are described below. The majority of the site is covered by Vegetation Community 4-: Calcrete, shrubby grassland.

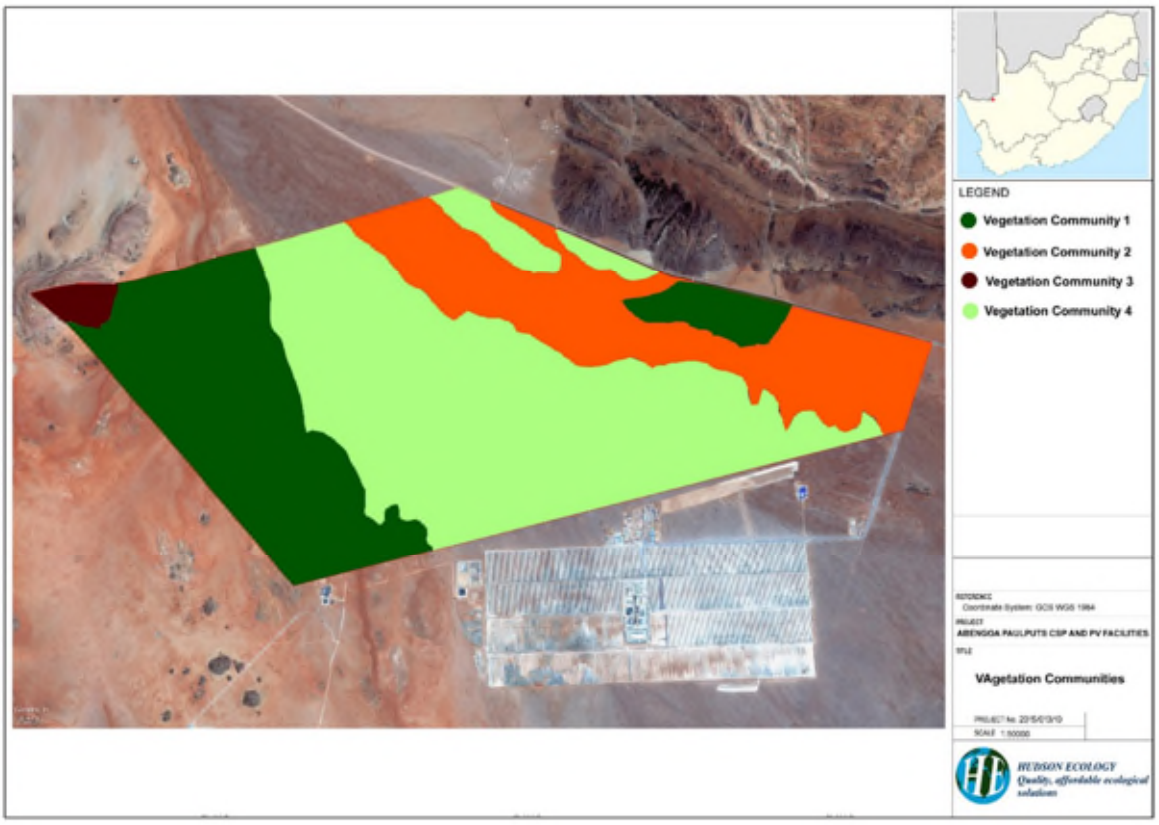

Figure 5.5: Paulputs CSP Project site showing distribution of the identified vegetation communities

Vegetation Community 1 (Sandy Grassland)

The area is typically covered by sparse open grassland, with *Stipagrostis* species and *Schmidtia kalahariensis* prominent, with scattered, drought resistant dwarf shrubs or small trees, e.g. *Rhigozum trichotomum*, *Boscia albitrunca, Parkinsonia africana* and *Lycium cinereum* (refer to Figure 5.5).

Figure 5.5: Sandy Grassland in the northern part of the study area

Vegetation Community 2 (Wash shrubby grassland)

The drainage lines within the plains of the study area are regarded as washes, as water will only flow after good rains, and soon they will be dry again. These washes are wide and sandy, and blend into the landscape, merging with the adjacent grassland vegetation, but are nevertheless visible due to their microtopography and change in species composition (refer to Figure 5.6).

The vegetation is often somewhat heterogeneous and with weeds, due to the disturbance of the periodic flooding.

Washes are of conservation concern and regarded as sensitive ecosystems, due to the ecosystem processes linked to provision and transport of water in the landscape.

Figure 5.6: Wash shrubby grassland running from left to right in the central part of the photo

Vegetation Community 3 (Rocky outcrop vegetation)

The vegetation on the slopes and crests of the mountains and hills is a shrubland with both succulent and non-succulent bushes and a sparse grassy layer. The geology is varied and complex with metamorphic rocks consisting of clastic sediments, volcanic and intrusive rocks of Mokolian age. The land type is mostly Ib and Ic, indicating the shallow rocky or gravelly soils (refer to Figure 5.7*).*

Figure 5.7: Rocky outcrop vegetation

Vegetation Community 4 (Calcrete shrubby grassland)

The flat sandy plains are covered with shallow sand with calcrete exposed locally. The open, sparse grassland is dominated by *Stipagrostis brevifolia* and *S. ciliata*. The shrubby *Rhigozum trichotomum* is prominent on the sandy localities while *Salsola aphylla* is more prominent where calcrete is exposed (refer to Figure 5.8).

Figure 5.8: Calcrete shrubby vegetation

Naming of the vegetation communities was made difficult due to the poor vegetation cover, during the dry season, and inability to identify dominant species with any confidence therefore naming will only be conducted after the wet season, during the EIA phase.

5.3.3. Terrestrial Faunal profile

The faunal survey was conducted in in August 2015 (the dry season survey).

Reptiles

Reptile diversity in the area is high with approximately 45 reptile species occurring in the area and reptile endemism is especially high in the region with 19 species (42%) being endemic. Eight were confirmed during the site visit. Most of the expected species in the area (refer to Table 5.1) are common and widespread, with only the Black-necked spitting Cobra (*Naja nigricollis*) being classified as rare.

Table 5.1: Reptile species recorded during the August 2015 surveys

Biological Name	**Common Name**	**Status**
Lamprophis fuliginosus	Brown House Snake	
Naja nivea	Cape Cobra	Endangered
Naja nigricollis	Black-necked Spitting Cobra	Rare
Bitis arietans	Puff Adder	
Bitis caudalis	Horned Adder	

Mabuya striata	Striped Skink	
Mabuya variegata	Variegated Skink	
Cordylus polyzous	Karoo Girdled Lizard	Endangered

Amphibians

The study area is a fair distance from any permanent open water bodies and therefore, as expected amphibian diversity is low. Only seven species are expected to occur in the study area and during the study no amphibian species were recorded. Due to the dry conditions, distance from any open water bodies and distance from the Gariep River, the lack of amphibian species in the study area was expected. The study site area falls outside the natural range of giant bullfrogs, desert rain frog and the Karoo caco, and these species should not occur on the study site.

Mammals

Of the 67 mammal species expected to occur in the study area only 16 were confirmed during the site survey (refer to Table 1.2).

Table 1.2: Mammal species recorded during the site survey in August 2015

Family	Biological Name	Common Name
MACROSCELIDIDAE (Sengis/Elephant Shrews)	*Elephantulus rupestris*	Western Rock Sengi
SORICIDAE (Shrews)	*Crocidura cyanea*	Reddish-grey Musk Shrew
LEPORIDAE (Hares and Rabbits)	*Lepus saxatillis*	Scrub Hare
BATHYERGIDAE (Rodent Moles / Mole Rats)	*Cryptomys hottentotus*	Common (African) Mole-rat
HYSTRICIDAE (Porcupine)	*Hystrix africaeaustralis*	Cape Porcupine
MURIDAE (Rats and Mice)	*Saccostomus campestris*	Pouched Mouse
MURIDAE (Rats and Mice)	*Michaelamys namaquensis*	Namaqua Rock Mouse
MURIDAE (Rats and Mice)	*Rhabdomys pumilio*	Four-striped Grass Mouse
MURIDAE (Rats and Mice)	*Mastomys natalensis*	Natal Multimammate Mouse
CANIDAE	*Otocyon megalotis*	Bat Eared Fox
HERPESTIDAE	*Galerella pulverulenta*	Small Grey Mongoose
HERPESTIDAE	*Suricata suricatta*	Suricate (Meerkat)
ORYCTEROPODIDAE	*Orycteropus afer*	Aardvark
PROCAVIIDAE	*Procavia capensis*	Rock Dassie (Hyrax)
RUMINANTIA	*Raphicerus campestris*	Steenbok
RUMINANTIA	*Sylvicapra grimmia*	Common Duiker

Mammals reliant on wetland and arboreal habitats are absent from the study site as these habitat-types do not occur. All 16 species recorded are robust and widespread, mostly with the proviso that suitable habitat and sufficient space to maintain home ranges / territories are available. The nearby roads are obviously a main source of fatalities – several carcasses were recorded during transit to and from the study area.

5.3.4. Avifauna

Avifauna diversity in the area is high with approximately 171 avifauna species occurring in the region. Of these species 13 (9%) are listed as endemic and 11 (7%) are listed as being Red Data species. During the study, avifauna species diversity and abundance was low with only 27 species being during the site visit (refer to Table 5.3).

Table 5.3: Avifauna species diversity on site during the dry season survey in August 2015

Full Name	***Scientific Name***	**RD (Regional, Global)**
South African Shelduck	*Tadorna cana*	
Maccoa Duck	*Oxyura maccoa*	NT, NT
Lanner Falcon	*Falco biarmicus*	VU, LC
Namaqua Sandgrouse	*Pterocles namaqua*	
Rock Dove	*Columba livia*	
Speckled Pigeon	*Columba guinea*	
Cape Turtle Dove	*Streptopelia capicola*	
Laughing Dove	*Streptopelia senegalensis*	
Namaqua Dove	*Oena capensis*	
Red-faced Mousebird	*Urocolius indicus*	
Red-capped Lark	*Calandrella cinerea*	
Sabota Lark	*Calendulauda sabota*	
Spike-heeled Lark	*Chersomanes albofasciata*	
Pied crow	*Corvus albus*	
Familiar Chat	*Cercomela familiaris*	
Ant-eating Chat	*Myrmecocichla formicivora*	
Karoo Scrub Robin	*Erythropygia coryphoeus*	
Chestnut-vented Tit-Babbler	*Sylvia subcaerulea*	
Zitting Cisticola	*Cisticola juncidis*	

Full Name	*Scientific Name*	RD (Regional, Global)
African Pied Wagtail	*Motacilla aguimp*	
Bokmakierie	*Telophorus zeylonus*	
Cape Sparrow	*Passer melanurus*	
Southern Grey-headed Sparrow	*Passer diffusus*	
White-browed Sparrow-Weaver	*Plocepasser mahali*	
Sociable Weaver	*Philetairus socius*	
Yellow Canary	*Crithagra flaviventris*	

Red Data (RD); Regional*, Global; CR = Critically Endangered; EN = Endangered; VU = Vulnerable; NT = Near Threatened; LC = Least Concern; EX = Extinct (regionally); DD= Data Deficient; NR= Not Recognised by BirdLife International; NA = Not Assessed; § = Refer to footnote

The only Red Data avifauna species recorded during the survey were the Maccoa Duck, which are resident on the KaXu Solar One evaporation ponds and Lanner Falcon recorded outside of the Paulputs CSP Project site/study area. Only one exotic avifauna species is expected to occur in the study area, namely the House Sparrow (*Passer domesticus*).

Table 5.5 describes the habitat requirements and probability of occurrence of bird species of concern identified as likely to occur in the study area

Table 5.5: Probability of occurrence of avifauna species of concern

Common name	Taxon	Habitat	Status	Likelihood of occurrence
Martial Eagle	*Polemaetus bellicosus*	The Martial Eagle is widespread but uncommon throughout South Africa and neighbouring countries. It tolerates a wide range of vegetation types, being found in open grassland, scrub, Karoo and woodland. It relies on large trees (and electricity pylons) to provide nest sites. It is found typically in flat country and is rarer in mountains and forests. One of the main reason it is declining is because of persecution on private land. This species has been recorded from the study area and many surrounding areas.	VU	**LOW, breeding, MEDIUM, foraging**
Kori Bustard	*Ardeotis kori*	Semi-arid regions, within the 100 - 600 mm rainfall isohyet. Also occurs throughout dryer west, particularly in the Nama-Karoo. Diet consists of insects, reptiles, rodents	VU	**MEDIUM, breeding,**

		and vegetable matter. Breeding peaks from October to January. In the semi-arid western parts of South Africa, favours tree-lined watercourses.		**MEDIUM, foraging**
Ludwig's Bustard	*Neotis ludwigii*	This is a near-endemic to southern Africa, with its range centred on the Nama Karoo and Succulent Karoo biomes. It occurs in western grasslands of the Eastern Cape, but supposedly as a nonbreeding visitor. The most important threat to this species is collisions with overhead powerlines and telephone wires. It inhabits the open plains of the semi-arid Karoo and especially in areas where extensive sheep farming is prevalent.	VU A1a; A2b	**MEDIUM, breeding, MEDIUM, foraging**
Maccoa Duck	*Oxyura maccoa*	Maccoa Duck's breeding habitat is shallow fresh waters, and it is also found in brackish and saline lakes in winter. Rarer than previously believed, it was uplisted from a species of Least Concern to Near Threatened status in the 2007 IUCN Red List.	NT	**HIGH RECORDED**
Lanner Falcon	*Falco biarmicus*	The lanner falcon is a bird of open country and savanna. It usually hunts by horizontal pursuit, rather than the peregrine falcon's stoop from a height, and takes mainly bird prey in flight. It lays three to four eggs on a cliff ledge nest, or occasionally in an old stick nest in a tree.	VU	**HIGH RECORDED**
Sclater's Lark	*Spizocorys sclateri*	Sclaters Lark is found in Namibia and South Africa. Its natural habitat is subtropical or tropical dry shrubland. It is threatened by habitat loss.	NT	**HIGH, breeding HIGH, foraging**

* Conservation Status Category assessment according to IUCN Ver. 3.1 (IUCN, 2001), as evaluated by the Threatened Species Programme of the South African National Biodiversity Institute in Pretoria. *IUCN (3.1) Categories: VU = Vulnerable, EN = Endangered, CR = Critically Endangered, NT = Near Threatened

Of the 21 species of concern that may occur in the study area, 1 has no probability of occurrence, 5 have a low probability of occurrence, 9 have a medium probability of occurrence and 6 have a high probability of occurrence. Three of the species with a high probability of occurrence, the Black-necked spitting Cobra, Maccoa Duck and Lanner Falcon, were recorded during the broader study.

5.3.5. Ecological Integrity

The ecological function of the study area can generally be described as moderate for the majority of the study area, although this does vary from low (in the highly transformed areas due to slash and burn cropping techniques) to high in the more inaccessible or unutilisable areas. Areas in which overgrazing and clearing have taken place, as well as areas in which settlements have been established are considered as areas where ecological function is reduced. The ecological function of the study area is indicated in Figure 5.9. Majority of the site is of moderate ecological integrity.

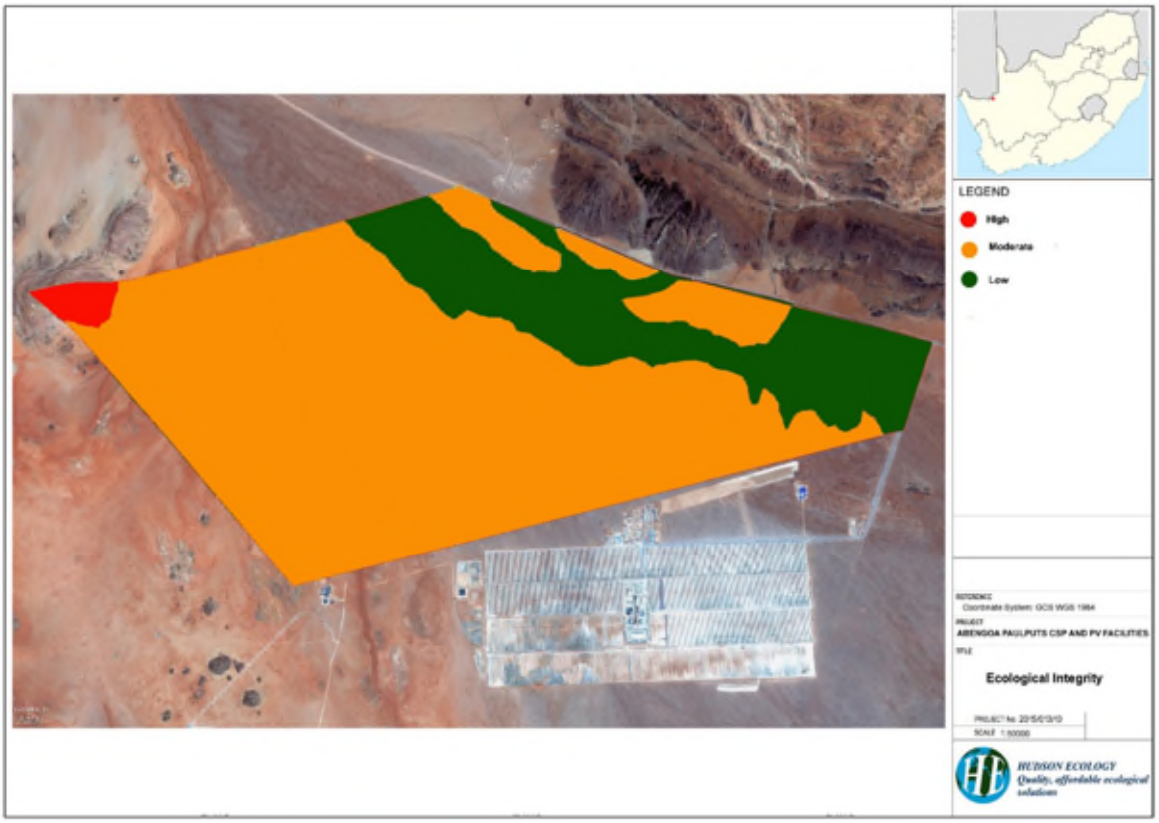

Figure 5.9: Ecological integrity within the study area

5.3.6. Areas of conservation importance

Areas that have been severely disturbed such as settlements are considered of low conservation importance. These areas are, however, quite small in relation to the overall

study area (<30% of the study area). Areas that have been disturbed by farming are considered of moderate conservation importance due to the fact that rehabilitation of these areas is possible. The natural areas are considered of very high conservation importance due to the presence of Red Data species in these areas and the intrinsic importance of these areas. The majority of the site is of moderate conservation importance.

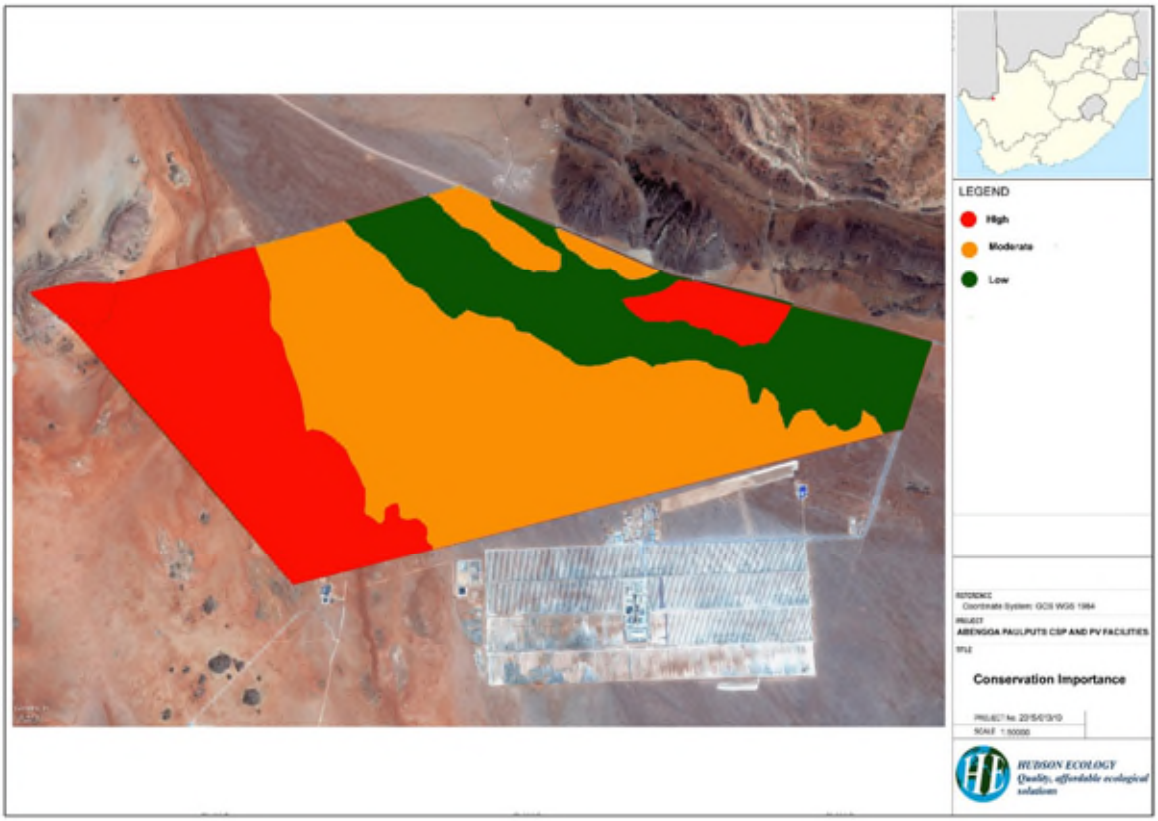

Figure 5.10: Conservation importance within the study area

Ecological support area (ESA)

The Namakwa Environmental Management Framework (NEMF) and Strategic Environmental Management Plan (SEMP) (final dated March 2011) was developed in order to provide a high level plan for sustainable development in the Namakwa District Municipality. The Environmental Management Framework is presented as a map showing the Environmental Management Zones in the Namakwa District Municipality (Appendix B in the NDM EMF and SEMP, Nemai Consulting, 2011). The Namakwa District Biodiversity Sector Plan (Marsh et al, 2008) has informed the EMF. The Namakwa Bioregional Plan (2008) locates the Ecological Support Area (ESA) as a horse-shoe shaped band stretching from Onseepkans in the west to Augrabies in the east spanning a width of approximately 14km. The northern portion of Portion 4 of the farm Scuitklip 92 is located on the southern edge of this band (refer to Figure 5.11). It is understood that the ESA is assigned an Environmental Sensitivity Index which in terms of the NEMF, should ensure adequate provision is made for the protection of environmental features, and a fully inclusive participation process should be

conducted for development within this zone. The main corridors within the Biodiversity Sector Plan (and the NEMF) have been buffered by 5km to create a 10km wide corridor. The development site fell within the buffer area of the NEMF corridor, and could still fall within the edge of the buffer of the observed ESA.

1.

The EIA report acknowledges the importance of the ESA, and undertook to verify the spatial location of the ESA. A fully inclusive participation process has been conducted for development within this zone.

Definition and purpose of ESAs

According to the Biodiversity Sector Plan, ESAs are defined as "*areas that are not essential for meeting biodiversity representation targets/thresholds but which nevertheless play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The degree of restriction on land use and resource use in these areas may be lower than that recommended for critical biodiversity areas*".

The main corridors within the Biodiversity Sector Plan (and the NEMF) have been buffered to create a wider corridor. The development site falls within the southern edge of the buffer area of the NEMF corridor. And therefore would not result in hindrance of the corridor activities

Mapping Scale of the Namakwa Biodiversity Sector Plan

The mapping scale within the Biodiversity Sector Plan (and the NEMF), including the study area, is very coarse and has not been verified in the field. The Sector Plan states "*The level of accuracy is not cadastral, and an on-site investigation to verify the CBA map is always necessary. The map does not replace the site-assessment. The mapping is based on out-dated imagery and as a result, some changes and inaccuracies will be evident. It is therefore crucial that users verify conditions on-site prior to making final decisions in land-use planning and decision-making procedures*". Therefore it is understood that the Namakwa Bioregional Plan (2008) is mapped at a coarse scale and, in the Plan, calls for on-site investigation to verify the mapped data. Such investigations will be undertaken during the EIA Phase

The NEMF defines Ecological Supporting Areas (ESA) as one of the six Environmental Management Zones: The principal goal of corridor-planning is to maintain or restore connectivity across the landscape.

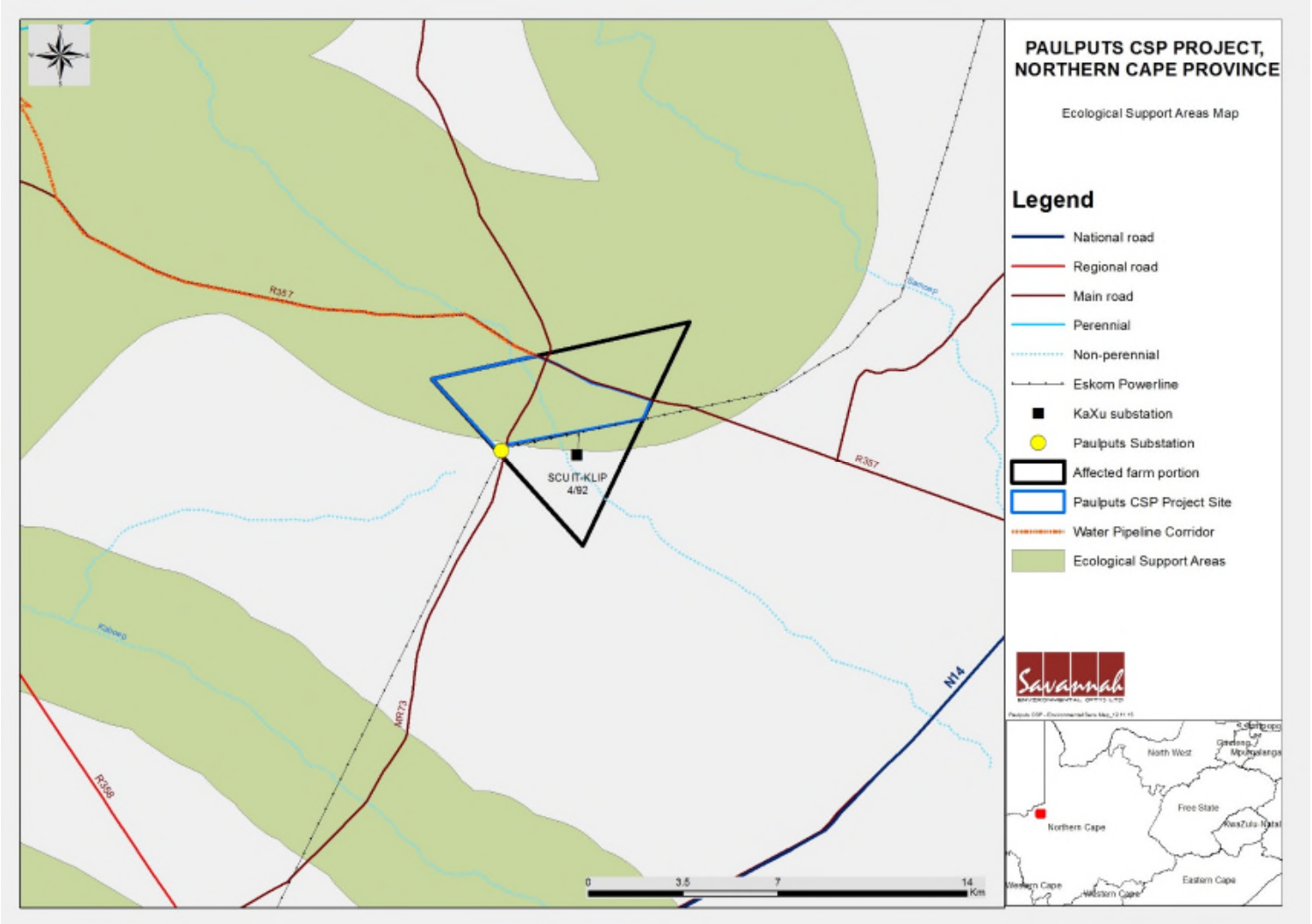

Figure 5.11: Map indicating the environmentally sensitive areas as coarsely mapped in the Namakwa Bioregional Plan (2008) in relation to the Paulputs CSP project site

5.3. Soil, land use, land capability and agricultural potential

5.4.1. Terrain type

The proposed development is located on the terrain type D5: low mountains, and A3: Open plains or plateaus with low hills or ridges. The area has a gradient below 5% except for the north-eastern corner. Average annual rainfall in the region of 100 mm and frequent droughts give the area an arid, desert-like climate.

5.4.2. Soils

Land type Ag covers the largest area. Red and yellow well-drained sandy soil with high base status occur. Deeper Hutton soil forms occur which are clearly distinct from Mispah. Soil-rock complexes cover a large percentage of the area. Mispah forms are the dominant soil form. An Orthic A horizon rarely deeper than 200mm is found directly on top of hard rock with a fair amount of pebble sized fragments in the transition zone

Land type Ic covers mountainous areas and is similar to Ag although it is occupied by >85% rock outcrop with very limited soil coverage.

There are only two land types in the area and the surrounding buffer zone (refer to Figure 5.12).. Small differences may occur within the site boundaries with regards to topography, soil depth and erodibility. These uncertainties will be cleared up during the EIA phase field inspection.

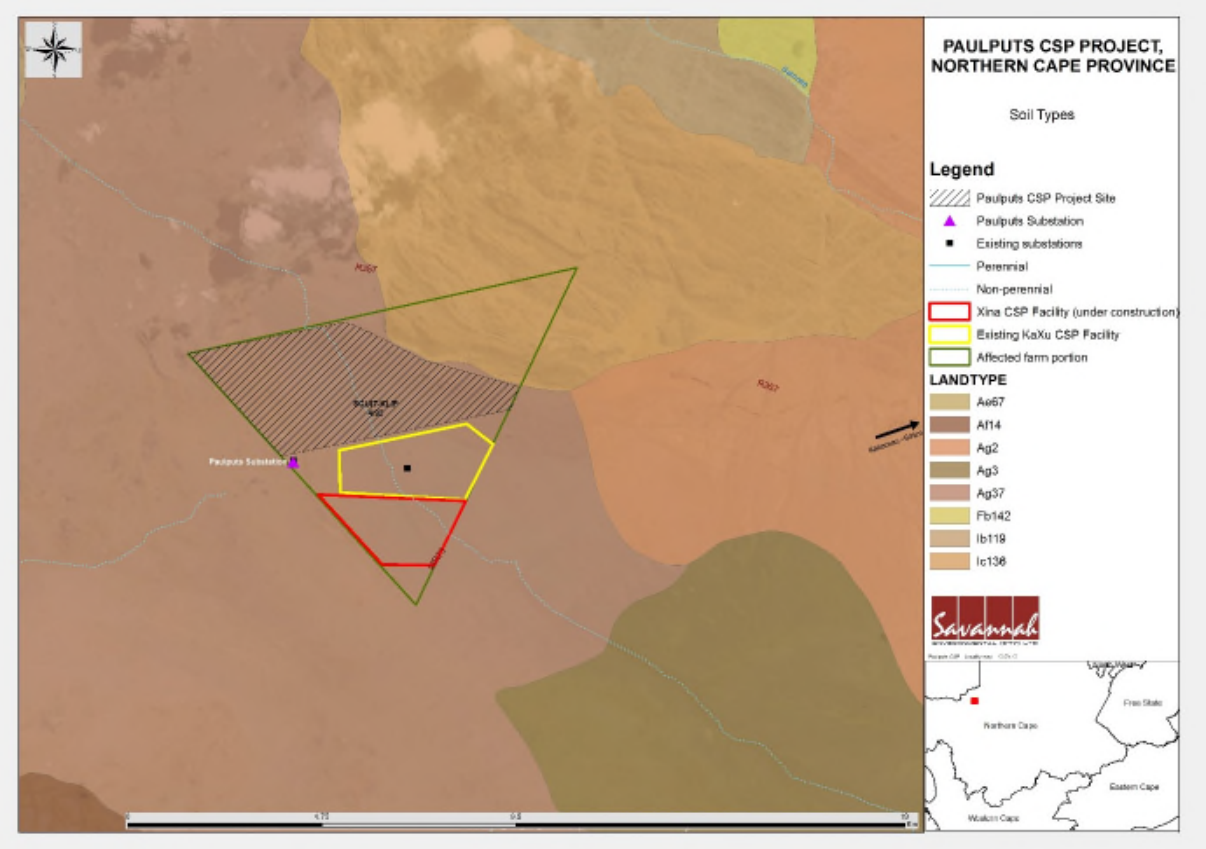

Figure 5.12: Land types of the proposed area for the Paulputs CSP Project site

5.4.3. Geology

The study area is located within the Namaqualand Metamorphic Belt which comprises very old and very highly deformed sedimentary (Khesian Group) and igneous (Namaquan Group) rocks of the Mokolian Erathem (2100 - 1200Ma) that form part of the Southern African Basement Complex rocks. The upland area in the north-eastern portion of the study area is underlain by Koenap Formation meta-pelitic rocks; Polisiehoek gneiss and the Skuitklip granite suite (refer to Figure 5.13). Thick accumulations of transported red sands, scree and gravelly sands are deposited below the western slopes of this upland area. The central, western and southern lowland areas of the study area are dominantly underlain by thick deposits of Quaternary soils of residual and transported origin. The central area is dominated by residual coarse grained, pink feldspathic gravels weathered from the Skuitklip granite suite. The western-most portion is dominated by red aeolian sands which form lenticular dune cordons. Protruding through this aeolian sand cover is Oupvlakte Formation granulites and Gemsbokvlakte gneiss. These rocks are intensely deformed due to a shear zone that runs along the western boundary of the study area. This shear zone is considered inactive, based on available historic seismic data.

Rocky outcrops are likely to be limited to the north-eastern portion and, to a lesser extent, the western portion of the study area. Talus/scree (gravelly soils

transported downslope due to gravity) are expected to exist on slopes in these rocky areas. It is estimated that 20% of the study area has rock outcropping at surface, 10% is underlain by shallow rock, and the remaining 70% has relatively thick soil.

The Erosion Index for South Africa indicates that the site is ranked between 11 and 15 on a scale from 1 (highest potential) to 19 (lowest). This means that the erodibility potential is moderate to low. A wide braided non-perennial stream exists as a feature across the central portion of the study site where thick Quaternary soils occur, and moderate erosion can be expected in this area during heavy downpours (which are generally very rare).

5.4.4. Agricultural potential

The entire area indicates very severe limitations that make it unsuited to cultivation and which restrict its use mainly to grazing and habitat for wildlife. Main restrictions present are very steep slopes, erosion, shallow soil, stones, salts or sodicity.

5.4.5. Susceptibility to erosion

Soils on the site have below 5% dominant clay in the top soils. The soils are moderately susceptibility to water erosion which varies across the site. The general assumption is that the erosion susceptibility increases with an increase in the slope angle and/if the slope length is constant.

Figure 5.13: Geology of the site

Q-s1: Aeolian sand; Q-r2: Feldspathic gravelly sands; Q-s2: Colluvium. Scree, gravelly soil and red sand.

Jd: Jurassic Karoo Dolerite. Namaquan Intrusives: Nkon: Konkonsies Granite; Nsku: Skuitklip Granite. Ngv: Gemsbokvlakte Gneiss; Npo: Polisiehoek Gneiss; Nbn: Beenbreek Gneiss. Arribees Group – Kheisian supracrustal metasediments: Kkn: Koenap Formation. Kinzigite*, calc-silicate rocks, marble; Kop: Oupvlakte Formation. Two-pyroxene granulite: in places amygdaloidal or garnetiferous; metapelitic granulite, minor quartz-feldspar gneiss and calc-silicate rocks.

5.4. Heritage

5.5.1. Probability of occurrence of sites

The environment is arid, comprising relatively flat drainage plains with dunes to the west of the proposed development and several outcropping rocky features in the north eastern part of the development footprint. The landscape is sparsely vegetated, hence any surface archaeological traces are likely to be highly visible.

5.5.2. Heritage features of the region

The environment is arid, comprising relatively flat drainage plains with dunes to the west of the proposed development and several outcropping rocky features in the north eastern part of the development footprint. A water pipeline is to be situated westwards to the Gariep River. The landscape is sparsely vegetated, hence any surface archaeological traces are likely to be highly visible.

Archaeological remains dating to the following periods can be expected within the study area

Colonial Frontier: Genocide against the indigenous San people is documented in this area with certain mountainous areas being the likely settings of massacre sites. An isolated grave of a member of the Northern Border Police, which has yet to be relocated has been recorded and located on the Farm Scuit-Klip, there is a road-side twentieth century grave

Later Stone Age: Later Sone Age (LSA) sites are the predominant archaeological trace noted in surveys in the Aggeneys-Pofadder region. Surveys have located signs of human occupation, ample pottery near Aggeneys and, east of Pofadder and fairly minimal traces of LSA on dunes immediately west of the KaXu Solar One project

Middle and Earlier Stone Age: A handaxe and isolated large flakes were previously found near a rocky outcrop in the Kaxu Solar One footprint

Potential areas of heritage sensitivity include:

- The terrain close to hills or rocky features, particularly sandy spots near sheltering rocks, may tend to have traces of precolonial Stone Age occupation/activity.
- Minimal evidence of LSA occupation has been noted on a dune between the KaXu Solar 1. A handaxe and a few large ESA/MSA flakes were found adjacent to a rock outcrop north of the KaXu Solar 1 development
- The open plains have been found to have sparsely scattered artefacts (such as at Konkoonsies near the Paulputs Substation site. These areas are expected to be less significant. An exception to this is where rocky outcrops at the surface on the plains with traces of artificial grinding grooves in the bedrock and ample evidence of stone artefacts and pottery.
- The sand dunes in the north western part of the area may also have been a focus for past human occupation.
- Colonial era sites or features within the study area include the known road-side grave below Ysterberg, a presently unknown grave recorded by Dunn of a member of the Northern Border Police (near Zwart Modder), and a farm cemetery and homestead/kraal ruins at the old Skuit-Klip farm between the study area and Zwart Modder. Strauss and Esterhuizen family graves in the cemetery date between 1914 and 1974.

5.6. Palaeontological Environment

In December 2010, a Palaeontological Impact Assessment (PIA) was prepared for the existing Kaxu Solar One facility, which is located on the same farm portion as the proposed Paulputs CSP Project. The 2010 PIA findings remain consistent, and have been referenced for the Paulputs CSP Project Palaeo Scoping Statement (refer to Appendix I) as follows:

The property is a triangular area straddling a sediment-choked drainage line that traverses the gentle decline from the Bushmanland Plateau down towards the Gariep River. The area is an almost flat plain crossed by ephemeral, braided stream flows that converge in the north and smaller-scale local flow features produced in a sheetflood and flashflood sediment-transport regime.

The area would have been more regularly active for periods in the past and may well have a sparse fossil content. Freshwater clams and snail fossils have often been found in such "near-abandoned" areas, as well as bones occasionally, but the contexts have seldom been properly described. Deposits are poorly fossiliferous, but abraded bone fragments and loose teeth may occur sparsely in channel lags. The history of these vast tracts of sands, gravels and pedocrete is very poorly known, with very few fossils to rely on (e.g. Kangnas dinosaur, Areb *Hipparion* (three-toed ancestor of the horse). Hence, though of low probability, any find will be considerable importance.

5.7. Water resources

5.7.1. Lower Gariep sub-basin

The study area falls within the Lower Gariep River sub-basin, which comprises the Gariep River from the confluence with the Vaal River to the Gariep River Mouth (Figure 5.14). The major river systems that contribute to flows in the Gariep River include the Ongers and Sak rivers from the northern Karoo; the Kuruman and Molopo rivers from the Northern Cape Province, north of the Gariep and the southern part of Botswana; and the Fish River from Namibia. Rainfall within the sub-basin is low with the mean annual rainfall varying from 100 mm to 400 mm, while the climate is further dominated by high temperatures in the summer.

Figure 5.14: Major rivers and transfer schemes in the Lower Gariep sub-basin.

The Gariep River system as a whole is relatively poor in indigenous freshwater fish species diversity. Presently, eight fish families are represented by 22 species. Five of the six endemic Gariep River fish species occur in this lower river section, of which one, Namaqu Barb (*Barbus hospes*), is unique to the Gariep River section between Aughrabies Falls and the Gariep River Mouth. Three of the five endemic species, *B. hospes*, Largemouth yellowfish (*Labeobarbus kimberleyensis*) and Rock catfish (*Austroglanis sclateri*) are Red Data listed. Although the other two endemics, Smallmouth Yellowfish (*Labeobarbus aeneus*) and Gariep River mudfish (*Labeo capensis*), are fairly abundant and thus appear not to be threatened, they remain of concern because of their endemic status.

The invertebrate populations appear to be rather homogenous throughout the entire length of the Gariep River and are described as mostly unpredictable, due to the erratic nature of the system

5.7.2. Potential abstraction resources

Surface water resources

The study area site is situated within quaternary catchment D81E and is dominated by highly ephemeral river systems. Potential runoff would flow in a north westerly direction towards the Gariep River, while runoff from the elevated portions of the Scuitklip ridges flows in a northerly direction towards the Kaboep River, which then

flows into the Gariep River. Surface water runoff would therefore not meet the water demands of the proposed project (2.5 million m^3/a) and water would have to be sourced from the Gariep River as is the case with the existing CSP developments on the farm portion - KaXu Solar One and Xina Solar One.

Local water resources

Three major areas within the vicinity of the study area receive water directly from the Gariep River, namely Pofadder, Witbank and Onseepkans. Both Pofadder and Aggeneys are supplied by the Pelladrift Water Supply scheme of the Pelladrift Water Board. The combined projected water requirements for Aggeneys, Pella and Pofadder for the year 2030 is 5 640 000 kl per year, which is less than the allocation of 16 060 000 m^3/annum for which Pelladrift Water Board are authorised to abstract from the Gariep River. The Onseepkans irrigation area is supplied through a canal on the left bank of the Gariep River. Witbank is supplied with raw water, which is abstracted from the Gariep River using submersible pumps and then purified using a solar/diesel powered package water treatment plant.

5.8. Social economic profile

The proposed site for the Paulputs CSP Project is located in the Khai-Ma Local Municipality which falls within the greater Namakwa District Municipality in the Northern Cape Province.

5.8.1. Regional context:

Northern Cape Province: The vast and arid Northern Cape is the largest province in South Africa. The capital is Kimberley. Other important towns are Upington, Springbok, Kuruman, and De Aar. The province lies to the south of its most important asset, the Gariep River. The Northern Cape is rich in minerals, with mining contributing nearly a quarter of the GDP. The economy of a large part of the Northern Cape, the interior Karoo, depends on sheep-farming. In the Gariep River Valley, especially at Upington, Kakamas and Keimoes, grapes and fruit are cultivated intensively. Wheat, fruit, peanuts, maize and cotton are produced at the Vaalharts Irrigation Scheme near Warrenton. The Northern Cape has been identified as the area with highest potential for solar renewable energy generation, with high solar radiation levels and the availability of vast tracts of land.

Namakwa District Municipality (NDM: Namakwa District Municipality is one of five districts in the Northern Cape Province. Geographically, the NDM constitutes a large area of approximately 126 747km^2, making it the largest District in South Africa. Namakwa DM is characterised by an undiversified economy, with over reliance on a primary sector activity being mining at 52.36% Wholesale and retail trade, catering and accommodation is the next largest GDP contributor, at 13.2%, followed by finance and business services (7.87%), general government services (6.74%) and community, social and personal services (5.96%). The area also has

a competitive advantage in the renewable energy industry, in that wind, solar, wave and nuclear power have all been identified as potentially successful in the District

5.8.2. Local context

The proposed site falls within the Khai-Ma Local Municipality (KMLM). The main towns in the KMLM include Pofadder, Aggeneys, Pella, Witbank, and Onseepkans. The KMLM has four main economic sectors: livestock grazing, mining, agriculture and tourism. The two emerging sectors are renewable energy and conservation and ecological restoration. The main economic activities is in Aggeneys, granite works and farming along the Gariep River.

Baseline description of the social environment in the KMLM

» Population

The population for KMLM is estimated at 12 465 people. The municipality is sparsely populated (+/- 0.7 person/km2); most people are settled in its five towns (Aggeneys, Onseepkans, Pella, Pofadder and Witbank). Pofadder, the main town located near the proposed site in the KMLM is a very small town with an important local economic centre in the region

» Population groups

KMLM has a total population of 12 465, of which the population breakdown consists of 75.1% coloured and 17.6% are black African. Afrikaans is the most prominent spoken language in the KMLM.

» Age composition and gender differentiation

The age structure of a population is extremely important for planning purposes. Table 5.6 indicates the age and sex profile of citizens living in the KMLM.

Table 5.6: Age distribution

2011	KMLM		
	Male	**Female**	**Total**
0-14	13.4%	12.3%	**25.9%**
15-24	9.7%	8.7%	**18.4%**
25-64	27%	23.4%	**50.4%**
65+	2.2%	3.3%	**5.5%**

Generally the population can be regarded as having a high dependency ratio; with 7.39% of the population over the age of 65 and 25% are under 15 years. The latter youth group will be demanding education, housing and jobs in the near future

» Education levels

Education plays a pivotal role in community development. It provides a set of basic skills for development, creativity and innovative abilities. The level of education influences growth and economic productivity of a region. Table 5.7 indicates the adult education levels (individuals aged 20 years and older) of citizens residing in the KMLM.

Table 5.7: Education levels

2011	KMLM
No Schooling	2%
Some Primary	43.1%
Completed Primary	7.1%
Some Secondary	34.4%
Completed Secondary	9.8%
Higher Education	1.2%
Not Applicable	2.5%

» **Employment:**

There is an unemployment rate of 22.1% in the KMLM. There is also a total of 23.6% youth unemployment rate in KMLM. Table 5.8 demonstrates that there is human capital available for any kind of work in the KMLM, there is also room for training and developing young and economically active people in occupations in the relevant fields needed. This could increase the employment level of the area.

Table 5.8: Employment status

2011	KMLM
Employed	4600
Unemployed	1304
Discouraged work seeker	322
Not economically active	2327

» Income levels:

The average household incomes of the LM are as follows:

- » Within the KMLM 56% of household income falls within the poverty level
- » 39.1% of the KMLM households earn a middle income salary;
- » 4.9% of the KMLM households earn a high income.

The high poverty level has social consequences such as not being able to pay for basic needs and services. The skill levels are less likely to improve unless education levels improve which will lead to more skilled people which will in turn lead to the opportunity to earn higher income levels.

» Health

NDM official figures show that 5.1% of the population have HIV/AIDS and this is continually growing as well as the statistics may be higher due to a lack of accessible testing facilities in the municipality. According to the Department of Health, Namakwa District the satellite facilities are understaffed and only three professional nurses serve all the clinics within the area.

» Households and access to Services

There are 3 796 households in the KMLM, with an average household size of 3.2 persons per household. According to the KMLM IDP 2012-2017 there is a backlog of basic service delivery and improvement of existing infrastructure is required.

» Economic Profile

The main economic activities within the NDM are agriculture and mining. Stock farming in the District includes sheep, cattle and goat farming and is the key contributor to the agricultural sector. The Gariep River plays a key role in the regions agricultural activities and alluvial diamond mining activities. The highest number of individuals in the NDM is employed within the agriculture, hunting, forestry and fishing sector followed by the mining and quarrying sector. The KMLM has four main economic sectors: livestock grazing, mining, agriculture and tourism. The two emerging sectors are renewable energy and conservation and ecological restoration.

Areas of influence around the site

The direct area of influence is a project's area of influence that extends to a 50km radius from the project site. Renewable energy projects under the Renewable Energy Independent Power Producer Procurement programme (REIPPP) are obliged to make a real contribution to local economic development in the area. The settlements within the project's direct area of influence include Onseepkans, Pofadder and Pella.

The indirect areas of influence extends to all areas that will be indirectly affected by the proposed development. These include road users that use the N14 or R358 on a frequent basis as well as road users that utilise the secondary access road to access their farms. Construction vehicles and trucks will be utilising these roads during the construction phase of the development, which will increase the traffic and may increase the wear and tear on these roads. The development will also have an indirect effect on the town's local residents; with influx of in-migrants and growth in the local economy. Another indirect area of influence may be the tourism industry in the local area. The area is developed around sense of place, natural beauty and natural resources. The most significant tourism activities in the area include eco-tourism and heritage sites.

5.8.3. Study area context

The study area has a low agricultural potential and is characterised by livestock (cattle and sheep) farming. Majority of the study area has a low number of farmsteads that are sparsely populated. Farmsteads occur within the study area and within the surrounding areas. Prominent features in the immediate study area include the KaXu One Solar Energy Facility and Xina Solar One located within Portion 4 of the Farm Scuitklip, Konkoonsies Solar I and Konkoonsies Solar II PV plants are located on the adjacent farmland 5km south west of the proposed site.

SCOPING OF ISSUES ASSOCIATED WITH THE PAULPUTS CSP PROJECT CHAPTER 6

This chapter serves to describe environmental issues and potential impacts (direct, indirect and cumulative impacts) that have been identified to be associated with the proposed Paulputs CSP Project and associated infrastructure, and to make recommendations for further studies required to be undertaken in the EIA phase. The scoping process has involved review of existing information (including previous detailed studies undertaken), field work and site surveys, input from the project proponent, stakeholders, and the public.

This chapter of the scoping report includes the following information required by Appendix 2: Content of the Scoping Report of the EIA Regulations, 2014 (GNR982):

Requirement	Relevant Section
(h)(v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts (aa) can be reversed (bb) may cause irreplaceable loss of resources and (cc) can be avoided, managed or mitigated.	The impacts and risks identified for both the construction and operation phases are included within the Section 6.1 – 6.2
(h)(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives	The methodology used for the assessment of potential impact and risks is detailed in Section 6.2.
(h)(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	The impacts and risks identified for both the construction and operation phases is included within the Tables 6.1 – 6.2

(h)(viii) the possible mitigation measures that could be applied and level of residual risk	Possible mitigation measures and the level of residual risk associated with the impacts is included within sections 6.1 – 6.2

Environmental issues associated with **construction and decommissioning** activities associated with the Paulputs CSP Project and associated infrastructure may include, among others, soil erosion, impacts on biodiversity (fauna, flora and ecological integrity), loss of habitat, and impacts on the social environment and current land use. Environmental issues specific to the **operation** of the Paulputs CSP Project could include visual impacts, avifauna mortality and disturbance to other faunal species, soil erosion, impacts on water resources (Gariep River) and social impacts.

The significance of impacts associated with a CSP project and its associated infrastructure is dependent on site-specific factors, and therefore impacts can be expected to vary significantly from site to site. Sections 6.4 and 6.5 provide a summary of the findings of the scoping study undertaken for the construction and operation phases of the proposed Paulputs CSP Project. Impacts of the proposed facility are described and evaluated, and recommendations are made regarding further studies required within the EIA Phase of the process.

The Paulputs CSP Project is proposed to utilise the salt tower and heliostats technology, using superheated steam, with a generation capacity of up to 200MW[5]. The Paulputs CSP Project will consist of the following associated infrastructure:

» Molten salt tower up to 300m in height with surrounding heliostat field
» Power island including salt storage tanks, steam turbine generator, heat exchangers, and dry cooled condenser
» On-site project substation, and short 132 kV power line to Eskom's existing Paulputs Transmission Substation
» Water supply abstraction point located at the Gariep River close to Onseepkans
» Filter and booster station at abstraction point
» Water supply pipeline along R357 Onseepkans Road to the site
» On-site lined ground water storage reservoir and various steel water tanks
» Lined evaporation ponds
» Packaged water treatment plant and associated chemical store
» Auxiliary wet cooled chiller plant
» Control room and office building

[5] Note that a it is the intention of the applicant to develop this project together with an already authorised 50MW facility, thereby resulting in a total capacity of 150MW

» Heliostat assembly building and workshop.

During **construction,** an area within the study area of approximately 1600 ha could experience some level of disturbance and impact as a result of the required activities on site. However, once construction is complete, it is expected that approximately 900ha of this area will be permanently impacted by infrastructure associated with the Project.

The **cumulative impacts** associated with the proposed facility are expected to be associated with two other CSP facilities on the same farm portion as well as the presence of two other smaller PV developments within the area. The potential cumulative impacts associated with the project are expected to be associated predominantly with the visual impact, potential for noise impacts, impacts on ecology and avifauna (birds) in the surrounding area due to loss of habitat, and the social environment within the vicinity of the project and the other similar developments within the region.

This Chapter present the potential issues identified for the Paulputs CSP Project, and serves to describe the identified potential environmental impacts associated with the proposed project, and to make recommendations for further studies required to be undertaken in the EIA phase, and/or recommendations for the management of these impacts for inclusion in the Environmental Management Programme (EMPr) to be prepared as part of the EIA Phase.

Specialist scoping reports are included within **Appendix D to K** wherein the potential issues relating to the project are identified. A discussion of the potential cumulative impacts associated with the proposed project at this stage of the process is presented in Section 6.3.

6.1. Legal Requirements as per the EIA Regulations, 2014

This chapter of the scoping report includes the following information required by Appendix 2: Content of the Scoping Report of the EIA Regulations, 2014 (GNR982):

Requirement	Relevant Section
(h)(v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts (aa) can be reversed (bb) may cause irreplaceable loss of resources and (cc) can be avoided, managed or mitigated.	The impacts and risks identified for both the construction and operation phases are included within Section 6.1 and 6.2.
(h)(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives	The methodology used for the assessment of potential impact and risks is detailed in Section 6.2.
(h)(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	The impacts and risks identified for both the construction and operation phases is included within Section 6.1 and 6.2.
(h)(viii) the possible mitigation measures that could be applied and level of residual risk	Possible mitigation measures and the level of residual risk associated with the impacts is included within Section 6.1 and 6.2.

6.2. Methodology for Impact and Risk Assessment during the Scoping Phase

The following methodology was used to describe and evaluate the main issues and potential risks and impacts associated with the proposed facility during the scoping phase:

» The identification of potential sensitive environments and receptors that may be impacted on by the proposed facilities and the types of impacts (i.e. direct, indirect and cumulative[6]) that are most likely to occur. This was achieved

[6] A cumulative impact refers to the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities (Environmental Impact Assessment Regulations, 2014).

through a review of existing baseline information, previous studies undertaken, desk-top investigations and limited field work.

» Description of the nature, significance, consequence, extent, duration and probability of potential impacts, as well as the degree to which these impacts are reversible, may cause irreplaceable loss of resources and can be avoided, managed or mitigated during the construction and operation phases.
» The identification of potential risks to the development and the environment, and identification of 'No-Go' areas within the broader site, where applicable.
» The compilation of a summary of the potential impacts that will be considered further in the EIA Phase through specialist assessments.

6.3. Assumptions made during the Evaluation of Potential Impacts

While evaluating potential impacts associated with the development of the proposed facility, it was assumed that the development footprint (~900ha) (the area that will be affected during the operation phase) will include the footprints of the CSP components (i.e. molten salt tower, power island, and heliostat field), associated infrastructure (i.e. substation, internal access roads, evaporation ponds, ancillary buildings and laydown areas).

6.1. Evaluation of potential impacts associated with the construction and decommissioning of the Paulputs CSP Project

The tables below provide an indication of the potential direct and indirect environmental issues and impacts which have been identified during the Scoping phase of the EIA process, and which may be relevant during the construction (and decommissioning) phase of the Paulputs CSP project.

6.1.1. Impacts on Terrestrial Fauna, Flora and Ecology

Impacts on Fauna, Flora and Ecology

The study area falls within the Karoo Biome and includes two major vegetation types, namely Bushmanland Arid Grassland (>90% of the project site) and Lower Gariep Broken Veld, both of which are classified as Least Threatened. At a national scale Bushmanland Arid Grassland has been transformed to a slight degree and approximately 27% is conserved within the Augrabies Falls National Park.

The ecological function of the study area can generally be described as moderate for the majority of the study area, although this does vary from low (in the highly transformed areas) to high in the more inaccessible or unutilisable areas. Areas in which overgrazing and clearing have taken place, as well as areas in which settlements have been established are considered as areas where ecological function is reduced.

Areas that have been severely disturbed such as settlements are considered of low conservation importance. These areas are, however, quite small in relation to the overall study area (<30% of the study area). Areas that have been disturbed by farming are considered of moderate conservation importance due to the fact that rehabilitation of these areas is possible. The natural areas are considered of very high conservation importance due to the presence of Red Data species in these areas.

Impacts on vegetation and protected plant species
The most significant impact as a result of construction activities will be on the vegetation and habitat through direct loss. Consequences of the impact occurring may include:

- general loss of habitat for sensitive species;
- loss in variation within sensitive habitat due to loss of portions of it;
- general reduction in biodiversity;
- increased fragmentation (depending on location of impact);
- disturbance to processes maintaining biodiversity and ecosystem goods and services; and
- loss of ecosystem goods and services

The impacts can be largely mitigated through avoidance of potential sensitive areas and listed species, by allowing a minimum clearance of vegetation (restricted to the absolute necessary areas).

Red Data Species

Of the 15 terrestrial faunal species of concern that may occur in the study area, 1 has no probability of occurrence, 4 have a low probability of occurrence, 7 have a medium probability of occurrence and 3 have a high probability of occurrence. One of the species with a high probability of occurrence, the Black-necked spitting Cobra, were recorded during the study.

A total of 11 species flora species of concern were determined to possibly be occurring in the study area. The species, listed as possibly occurring in the study area, were evaluated to determine the probability of occurrence in the study area based on habitat suitability. Of the species that are considered to occur within the area under investigation, there were five species that could occur in habitats that are available in the study area. According to IUCN two of these are listed as Vulnerable, one as Near Threatened and two as Declining. One of the vulnerable species, *Aloe dichotoma*, was recorded in the study area and could occur anywhere within the hills in the study area, or in rocky areas in Bushmanland Arid Grassland. The other vulnerable species, *Lithops olivaea*, occurs only in white translucent quartzite patches. This habitat was not found in the study area during the field survey, and although the species has been recorded 30 km away and has a wide distribution within the area, it will only occur on site if available habitat is present. The Near Threatened species, *Conophytum limpidum*, is found on inselbergs in Bushmanland in vertical crevices in rocks, generally preferring shaded situations. If it occurs in the study area, it is most likely to be found on the hills or rocky areas, which are considered no-go areas for this development. *Acacia erioloba*, also a protected tree, has a high probability of occurring in the study area, while *Hoodia gordonii* was recorded in the study area in a number of places.

Loss of a population or individuals could lead to a direct change in the conservation status of the species. This may arise if the proposed infrastructure is located where it will impact on such individual or populations. Consequences may include:

» fragmentation of populations of affected species;
» reduction in area of occupancy of affected species; and
» loss of genetic variation within affected species.

Alien Plant Invasion

Several invasive species have a distribution centred on arid regions of the country. Major factors contributing to invasion by alien invader plants includes habitat disturbance and associated destruction of indigenous vegetation. Consequences of this may include:

» further loss and displacement of indigenous vegetation;
» change in vegetation structure leading to change in various habitat characteristics;
» change in plant species composition;
» change in soil chemistry properties;
» loss of sensitive habitats;
» loss or disturbance to individuals of rare, endangered, endemic and/or protected species;
» fragmentation of sensitive habitats;
» change in flammability of vegetation, depending on alien species;
» hydrological impacts due to increased transpiration and runoff.

Although the potential severity of this impact may be high, it can be easily mitigated through regular alien control.

Direct Faunal impacts

Faunal species will primarily be affected by the overall loss of habitat. Increased levels of noise, pollution, disturbance and human presence will be detrimental to fauna. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species and species confined and dependant on specified habitats would not be able to avoid the construction activities and might be killed. Some mammals and reptiles would be vulnerable to illegal collection or poaching during the construction phase as a result of the large number of construction personnel that are likely to be present. This impact is highly likely to occur during the construction-phase and would also potential occur with resident fauna within the facility after construction.

Threatened species (red data species) include those listed as critically endangered, endangered or vulnerable. For any other species a loss of individuals or localised populations is unlikely to lead to a change in the conservation status of the species. This may arise if the proposed infrastructure is located where it will impact on such individual or populations. Consequences may include:

» fragmentation of populations of affected species;
» reduction in area of occupancy of affected species; and
» loss of genetic variation within affected species

Disturbance of faunal species can be maintained to a minimum and low significance by implanting effective mitigation measures.

Construction related activities which could impact on the fauna, flora and overall ecology of the study site include:
» Land clearing
» Construction of access roads
» Establishment of power lines and cables
» Establishment of borrow pits and spoil areas
» Chemical contamination of the soil by construction activities
» Operation of construction camps and storage of materials required for construction

Potential impacts associated with these activities include *inter alia:*
» Impacts on biodiversity
» Impacts on sensitive habitats
» Impacts on ecosystem function
» Impacts on the economic use of vegetation
» Direct or indirect impacts on individual organisms

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Impacts on threatened plant species	Plant species are especially vulnerable with respect to infrastructure development due to direct loss and loss of habitat. Threatened species include those classified as critically endangered, endangered, or vulnerable. For any other species a loss of individuals or localised populations is unlikely to lead to a change in the conservation status of the species. However, in the case of threatened plant species, loss of a population or individuals could lead to a direct change in the conservation status of the species, possibly extinction. This may arise if the proposed infrastructure is located where it will affect such individuals or populations. These consequences may include fragmentation of populations of affected species, reduction in area of occupancy of affected species, and loss of genetic variation within affected species. This may all lead to a negative change in the conservation status of the affected species, which implies a reduction in the chance of survival of the species.	Local - Regional The impact will occur at the site of the facility footprint (Local). Impacts to the conservation status of species (Regional)	High sensitivity rocky outcrop areas on western and eastern boundaries of the property
Impacts on threatened animal species	Threatened animal species are indirectly affected through habitat loss since direct construction impacts can often be avoided due to movement of individuals from the path of construction activities. Threatened species include those classified as critically endangered, endangered, or vulnerable. Loss of a population or individual could lead to a direct change in the conservation status of the species. This may arise if the proposed facility infrastructure is located where it will affect the habitat that these populations or individuals depend on. Consequences of these impacts include fragmentation of populations of affected species, reduction in area of occupancy of affected species and loss of genetic variation within affected species. This may all lead to a negative change in conservation status of the affected species, which implies a reduction in the chances of the species overall survival chances.	Local - Regional The impact will occur at the site of the facility footprint (Local). Impacts to the conservation status of species (Regional).	None at this stage in the process High sensitivity rocky outcrop areas on western and eastern boundaries of the property
Impacts on indigenous natural vegetation	The construction of the facility and associated infrastructure will lead to a direct loss in natural vegetation. The occurrence of vegetation which has already been stressed due to degradation and transformation at a regional level may aggravate this potential	Local The impact will occur at the site	No No-Go areas have been identified to date following a dry

	impact. Consequences of the potential impact of loss of indigenous natural vegetation occurring may include: » Negative change in conservation status of habitat » Increased vulnerability of remaining portions to future disturbance » General loss of habitat for sensitive species » Loss in variation within sensitive habitats due to loss of portions of it » General reduction in biodiversity » Increased fragmentation (depending on location of impact) » Disturbance to processes maintaining biodiversity and ecosystem goods and services » Loss of ecosystem goods and services	of the facility footprint (Local).	season survey. This must be verified during a wet season survey as part of the EIA phase. High sensitivity rocky outcrop areas on western and eastern boundaries of the property
Impacts on protected tree species	Any of the tree species which have a geographical distribution that includes the study area.	Local	None at this stage in the process
Establishment and spread of declared weeds and alien invader plants	Major factors contributing to invasion by alien invader plants includes high disturbance activities such as construction. Exotic species are often more prominent near infrastructural disturbances than further away. Consequences of the proliferation of alien invasive species may include: » Change in vegetation structure leading to change in various habitat characteristics » Change in soil chemical properties » Fragmentation of sensitive habitats » Change in flammability of vegetation, depending on alien species » Impairment of wash function	Local	None at this stage in the process
Change in runoff patterns	Infrastructure crossing landscapes cause local hydrological and erosion effects resulting in major peak-flow and sediment impacts. This may occur around construction sites, but also in areas where the infiltration rates of the landscape are changed due to an impermeable surface being constructed. Increased runoff associated with infrastructure may increase the rates and extent of erosion, reduce percolation and aquifer recharge	Local The impact will occur at the site of the proposed	None at this stage in the process

	rates, alter channel morphology, and increase stream discharge rates. Consequences if this include: » Increased soil loss » Loss of or disturbance to indigenous vegetation, » Change in channel morphology in washes, potentially leading to loss of wash shrubby grassland vegetation » Reduction in water quality in areas downstream	facility, but could also affect downstream and down-slope areas.	
Impact on the ESA corridor	The proposed development may impact the Ecological Support Area (ESA) delineated in terms of the Namakwa District Municipality Environmental Management Framework (NEMF) and described as a faunal migratory corridor.	Local-Regional	None at this stage in the process

Description of the significance of the impacts

The area is generally homogenous and given the extensive amount of potentially intact vegetation in the area, there is likely to be little overall disruption to the broad-scale connectivity of the landscape. A significant local impact is likely for Portion 4 of the Farm Scuitklip as up to 1800ha has already been disturbed through construction activities, but it is expected that there would remain sufficient intact habitat in the broader area to retain the overall ecological functioning of the landscape.

Some habitat loss for faunal species is an inevitable consequence of the development but is not likely to be of broader significance (to be confirmed during EIA phase). Faunal disturbance and human presence would be highest during the construction phase and terrestrial faunal impacts are also likely to be largely concentrated to this phase of the development.

With mitigation measures including regular monitoring and effective eradication and management methods in place the significance of Invasive Alien Plants is expected to be low and local.

The potential impacts are expected to be negative, probable, with a moderate intensity. Impacts during the construction phase will be short term. However, impacts on the ecological environment will be long-term within the development footprint. Ecological impacts have a moderate significance; this will be confirmed during the EIA phase following a wet season survey. Reversibility of impacts is low, but there is no irreplaceable loss of resources associated with the potential impact. The potential impact may be mitigated with possible mitigation measures which will be elaborated in the EIA phase.

Gaps in knowledge and Recommendations for further study during the EIA Phase

The following activities will be included as part of the Ecological Study during the EIA Phase:

» Second field survey in the wet season.

- Establish the condition of the vegetation and the relative distribution of habitats in moderate to good condition following a wet season survey. General vegetation condition will be assessed during the second field survey in order to identify areas that are in good condition versus those areas in poor condition.
- The presence and functioning of a wash feature on site will be confirmed. The upper reaches of the remaining wash feature are impacted by the Xina and Kaxu facilities.
- A detailed sensitivity map will be produced and will include mapping and incorporation of any sensitive features that may occur on site.
- The presence of species of concern will be evaluated. For plant species this will be done by searching for populations that could occur in the study area based on habitat requirements and historical collection records. For animal species this will be done by assessing habitat suitability for those species that have been assessed as potentially occurring in the area. Particular attention will be paid to those species classified as Red Data Species .

6.1.2. Impacts on Avifauna

Impacts on Avifauna

Commercial-scale solar technologies are relatively new, with a limited number of significant developments worldwide. Some studies have been conducted on the effects of CSP facilities on avifauna, most notably The Solar One plant in the Mojave Desert in the United States (McCrary, et al., 1986).
Although there may be considerable impact due to the clearing of vegetation and the large footprint required for commercial-scale energy production, which would refer to the habitat loss and disturbance created during the construction phase of the facility, birds are the most mobile of vertebrate species and there is considerable amount of the same vegetation in adjacent areas to which avifauna will move. Furthermore, in this case, the vegetation of the area is very low and with revegetation the area of the heliostat field, thereby recovering some of the lost vegetation. Secondary impacts relate to the operation of the facility and include avian mortality due to direct interactions with the facilities and their associated infrastructure.
Based on the information gathered, several impacts have been identified and will be quantified in sections below:

- Impact on local bird community due to habitat loss;
- Impact on local bird community due to disturbance;

These impacts are to be quantified using the data collected during the dry season survey (already conducted) and the wet season survey (to be conducted in 2016 in the EIA phase).

The construction phase will potentially cause temporary damage or permanent destruction of habitat within the broader site, which may be of lasting significance in cases where critical areas for restricted range, endemic and/or threatened species exists. Local, migratory, and red data book species which were recorded to occur on the site (recorded during the dry season survey) included Maccoa Duck and Lanner Falcon. During the study, avifauna species diversity and abundance was low with only 27 species being during the dry season survey.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Habitat loss	In order for solar energy facilities to be commercially viable, they require large tracts of land, in this case ±900ha. It can therefore be assumed that a habitat will be lost during the establishment of the facility and its associated infrastructure (including clearing for access roads and power lines). Habitat loss reduces the carrying capacity of a habitat, often resulting in localised population declines. Such habitat loss can impact on local as well as, to a lesser degree, migratory species. The general nature of the study area (already relatively disturbed, and extremely uniform throughout wider area) means that this is not likely to impact significantly on the avifauna of the area	Local	No No-Go areas have been identified to date following a dry season survey. This must be verified during a wet season survey as part of the EIA phase. High sensitivity rocky outcrop areas on western and eastern boundaries of the property
Disturbance	Disturbance from human activity, during the construction phase, has the potential to modify bird behaviour on site. For shy and sensitive species, this may result in displacement or exclusion. Construction and maintenance activities associated with the power facility as well as the power line impact on birds through disturbance, particularly during the breeding season.	Local	No No-Go areas have been identified to date following a dry season

			survey. This must be verified during a wet season survey as part of the EIA phase. High sensitivity rocky outcrop areas on western and eastern boundaries of the property

Description of the significance of the impact

During the study, avifauna species diversity and abundance was low with only 27 species being during the dry season survey. The potential impacts are expected to be negative, probable, with a moderate intensity. Impacts during the construction phase will be short term. However, impacts on the environment will be long-term within the development footprint. Impacts have a moderate significance due to low species diversity and abundance recorded on the site; this will be confirmed during the EIA phase following a wet season survey. Reversibility of impacts is low, but there is no irreplaceable loss of resources associated with the potential impact. The potential impact may be mitigated with possible mitigation measures which will be elaborated in the EIA phase.

Gaps in knowledge and Recommendations for further study during the EIA Phase

The following activities will be included as part of the Avifauna Study during the EIA Phase:

» Second field survey in the wet season. Methodology to include:
  - Vantage point surveys;
  - Drainage line transects; and
  - Investigation of the tower facility, associated infrastructure and heliostat field.

» A detailed sensitivity map will be produced and will include mapping and incorporation of any sensitive features that may occur on site.

» The presence of species of concern will be evaluated.
» Based on the information gathered, several impacts have been identified and will be quantified in sections below:
    - Impact on local bird communities due to habitat loss
    - Impact on local bird community due to disturbance created by the construction of the facility

6.1.3. Impacts on Agricultural Potential

Impacts on Agricultural Potential

Much of the study area is comprised of shallow to very shallow soils or surface rock outcrops, and only a very small portion of deep soils. The very low rainfall in the area means that the only means of cultivation would be by irrigation and aerial imagery shows no signs of agricultural infrastructure or of irrigation. The climatic restrictions mean that this part of the Northern Cape is suited at best for grazing and here the grazing capacity the footprint would occupy the same area that could be grazed by 25 small stock units or 10 large stock units. This is not regarded as viable commercial farming site.

Construction related activities which could affect the agricultural potential of the study site include land clearing activities and through the usage of construction related equipment.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Loss of agricultural potential	A loss of agricultural land may occur during the construction phase.	Local	None identified

Description of significance of the impact

The potential impacts are expected to be negative, probable, with a low intensity. Impacts during the construction phase will be short term. However, impacts on the environment will be long-term within the development footprint. Reversibility of impacts is low, but there is no irreplaceable loss of resources associated with the potential impact due to the low agricultural potential of the site.

Gaps in Knowledge and Recommendations for further study during the EIA Phase

Due mainly to the prevailing unfavourable climatic conditions for arable agriculture, as well as the prevalence of soils with limited depth, it is not envisaged that further detailed soil investigation will be required.

6.1.4. Impacts on Soils, Erosion Potential and Geomorphology

Impacts on Soils, Erosion Potential and Geomorphology

The study area is located within the Namaqualand Metamorphic Belt. Rocky outcrops are likely to be limited to the north-eastern portion and, to a lesser extent, the western portion of the study area. Talus/scree (gravelly soils transported downslope due to gravity) are expected to exist on slopes in these rocky areas. It is estimated that 20% of the study area has rock outcropping at surface, 10% is underlain by shallow rock and the remaining 70% has relatively thick soil. The Erosion Index for South Africa indicates that the site is ranked between 11 and 15 on a scale from 1 (highest potential) to 19 (lowest) which means that the erodibility potential is moderate to low.

Construction related activities which could impact on the overall geology of the study site include:

» Excavation activities
» Land clearing
» Construction of access roads
» Stockpiling
» Mixing
» Wetting

Potential impacts associated with these activities include *inter alia:*

» Soil degradation - through the removal, alteration or damage to soil and soil-forming processes
» Soil erosion - the process of the lowering of the natural ground level by wind or water and may occur because of *inter alia* chemical processes and/or physical transport on the land surface. Soil erodibility potential is the likelihood that erosion will occur when soils are exposed to water (and/or wind) during or as a result of land-disturbing activities (i.e. construction activities). Erodibility potential is increased where low-plasticity, fine-grained soils occur, such as those within this study area. However, according to the Erosion Index for South Africa the site has a low erodibility potential primarily by virtue of the slope gradients and geology of the site.
» Displacement of soils
» Compaction of soils
» Pollution of soils

The most important issues are the direct impacts of degradation and specifically, accelerated erosion of soil from the area of activity. Wind erosion in disturbed areas where soil is loosened will probably be the more common form of erosion due to the low precipitation in this region. This would affect the ecosystems operating in the soil and the plant and animal species that depend on it for growth and survival.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Soil degradation	Soil degradation may occur during the construction phase through the following activities: » Excavations » Wetting and compaction » Pollution through spillage of hazardous chemicals such as fuel on construction sites » Erosion of soil in areas of activity as approximately 70% of the study area is presently susceptible to potentially moderate levels of erosion (wind and water) » Siltation arising from accelerated erosion associated with construction activity	Local	None identified
Description of significance of the impact The potential impacts are expected to be negative, probable, with a low intensity. Impacts during the construction phase will be short term. However, impacts on the environment will be long-term within the development footprint. Impacts can be mitigated. Reversibility of impacts is high, and there is no irreplaceable loss of resources.			
Gaps in knowledge and Recommendations for further study during the EIA Phase The following activities will be included as part of the Soil Study during the EIA Phase: » Conduct a site visit to confirm the physical and geological information used in this report and to collect visual information pertaining to the soil types and their geotechnical engineering properties. » Assess the present state of erosion, identify critical areas in terms of erosion, and produce a map identifying these areas. » Provide achievable mitigation measures to erosion during the construction phase.			

6.1.5. Impacts on Water Resources

Impacts on Water Resources
The study area falls within the Lower Orange River sub-basin, which comprises the Gariep River from the confluence with the Vaal River to the Gariep River mouth. The study area site is situated within the D81E quaternary catchment. Potential runoff from the study area would flow in a north-westerly

direction towards the Gariep River, while runoff from the elevated areas portions of the Skuitklip ridges would flow in a northerly direction to the Gariep River.

No wetland features occur on the site. Only the riparian systems found along the Gariep River are shown on the South African National Botanical Institute (SANBI) Wetlands Map for the study area.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Impacts on the physical environment	The establishment of the proposed solar facility may impact on the following physical characteristics of the environment: » The water quality/quantity of the region » Dry riverbeds and localised washes » Riparian systems (form and function) » Riverine and in stream habitats	Local - Regional	None identified
Impacts on dry river beds	These systems are unique to the region and due to their locality within the landscape will pose a flood risk to the development.	Local - Regional	None identified

Description of significance of the impact

The potential impacts are expected to be negative, probable, with a low intensity. Impacts during the construction phase will be short term, however, impacts on the environment will be permanent within the development footprint. Impacts can be mitigated. Reversibility of impacts is low, where impacts occur.

Gaps in knowledge and Recommendations for further study during the EIA Phase

The EIA Phase must include:

» An assessment of the aquatic biodiversity of the study area. This will cover the development footprint in relation to available ecological information related to wetland and riverine ecosystems functioning within the region. Even though these are limited within the study region, the cumulative impact and mitigations need to be addressed when considering the increase in hard surface areas.

» A map demarcating the relevant local drainage area of the respective waterbodies, within a 500m radius of the study area. This will demonstrate, from a holistic point of view the connectivity between the site and the surrounding regions, i.e. the zone of influence.

» The determination of the ecological state of any aquatic areas, estimating their biodiversity, conservation and ecosystem function importance with regard ecosystem services. Note that this determination will not include avifaunal, herpetological or invertebrate studies; however possible habitat for species of special concern would be commented on.

- Recommend buffer zones and No-go areas around any delineated aquatic areas based on the relevant legislation, e.g. any bioregional plans of conservation guidelines or best practice.
- Assess the potential impacts
- Provide mitigations regarding project related impacts
- Recommend specific actions that could enhance the aquatic functioning in the areas, allowing the potential for a positive contribution by the project, e.g. useful of artificial wetlands in stormwater control.

6.1.6. Impacts on Heritage and Palaeontological Resources

Impacts on Heritage and Palaeontological Resources

Any spatial or linear development which potentially displaces or destroys heritage (archaeological) resources occurring on or below the present surface. Potentially much of the footprint of the development will be affected but to be determined during an EIA phase heritage survey. Construction related activities which could impact on the heritage resources of the study site include:

- Land clearing and excavation activities for both linear (i.e. power line and access roads) and area developments (i.e. substation, energy storage plant, turbine and generator etc.)
- Establishment of spoil areas (if deemed necessary)

Potential impacts associated with these activities include *inter alia:*

- Disturbance and/or destruction of unique and non-renewable heritage resources. In the event of archaeological materials being present such activities would alter or destroy their context (even if the artefacts themselves are not destroyed). Without context, archaeological traces are of much reduced significance. It is the contexts as much as the individual items that are protected by the heritage legislation.

Heritage resources including archaeological sites are in each instance unique and non-renewable resources. Area and linear developments such as those envisaged can have a permanent destructive impact on these resources. The destructive impacts that are possible in terms of heritage resources would tend to be direct, once-off events occurring during the initial construction period. In the long term, the proximity of operations in a given area could result in secondary indirect impacts resulting from the movement of people or vehicles in the immediate or surrounding vicinity.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Disturbance and loss of heritage resources (archaeology)	Displacement from context or destruction of the resource where it occurs.	Impact could be local/regional or national depending on the nature of material if and where it occurs.	Not possible to predict ahead of EIA phase site inspection.
Impacts on palaeontology	Physical disturbance of the material itself and its context may occur during the construction phase which may affect its significance. Miocene fossils are known from sites along the nearby Koa palaeo river valley.	Local to Regional	None identified

Description of the significance of the impact

The potential impact is expected to be negative, improbable, and permanent, with a negligible intensity and have a medium- low significance; this will be confirmed during the EIA phase. The potential impact cannot be reversed and there are irreplaceable loss of resources associated with the potential impact. The potential impact may be avoided with possible mitigation measures which will be elaborated in the EIA phase.

Gaps in knowledge and Recommendations for further study during the EIA Phase

The EIA Process needs to fulfil the requirements of a Heritage Impact Assessment as defined in section 38 of the National Heritage Resources Act (Act No. 25 of 1999). In order to do so, the following will be required during the EIA Phase:

» A site visit will be carried out to inspect various parts of the terrain on foot, focusing on areas of expected impact (construction of plant, substation, and secondary infrastructure such as roads, pipelines, and power lines). While surveys have been conducted in the region providing an idea of what heritage resources to anticipate, the specific area of proposed development has not been surveyed for heritage (archaeological) resources.
» Once sites are plotted they would be assessed in terms of the significance of the site relative to the known heritage of the region. This will provide a quantifiable measure for defining significance as a basis for recommendations to be made.
» Nineteenth- and twentieth-century cultural history and intangible heritage values attached to places would need to be assessed but may be difficult to recover owing to the sparse population.

No survey by a palaeontologist is required to be undertaken.

6.1.7. Noise Impacts

Noise Impacts:

Rural area with daytime acceptable rating level of 45 dBA.

Construction activities include:

- Establish internal access roads - the internal road alignment is governed by the positioning of the Heliostats and other infrastructure
- Site preparation activities will include clearance of vegetation at the footprint of the infrastructure (buildings, mirror heliostats). These activities may require the stripping of topsoil which will need to be stockpiled, backfilled and/or spread on site;
- Construct foundations. Due to the volume of concrete that will be required, an on-site batching plant could be required to ensure a continuous concreting operation. The source of aggregate is yet undefined;
- Construction of the bulk water pipeline;
- Transport of components & equipment to site. Additionally, various specialized construction and lifting equipment are required (to erect the troughs/heliostats) that must be transported to site. The typical civil engineering construction equipment needed on the site for the civil works includes; excavators, trucks, graders, compaction equipment, cement trucks, etc.;
- Establishment of ancillary infrastructure - A workshop as well as a contractor's equipment camp may be required. The establishment of these facilities/buildings will require the clearing of vegetation and levelling of the development site and the excavation of foundations prior to construction. A laydown area for building materials and equipment associated with these buildings may also be required;
- Site rehabilitation - once construction is completed and once all construction equipment is removed, the site will be rehabilitated where practical and reasonable.

Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Increase in noise level at NSD01 Disturbing noises.	Increased noises or disturbing noises may increase annoyance levels with project.	Multiple construction activities taking place simultaneously may impact an area within 1,000m from the activities	None identified
Increases in noise levels at NSD02, 03 and 04.	Increased noises or disturbing noises may increase annoyance levels with project.	Multiple construction activities taking place simultaneously may impact an area within 1,000m from the activities.	None identified
Description of the significance of the impact			

The potential impact is expected to be negative, probable, long term, with a negligible intensity and have a low significance. The potential impact can be reversed and there are no irreplaceable loss of resources associated with the potential impact.
Gaps in Knowledge an Recommendations: Due to the limited period of and the localised nature of potential impacts, the noise scoping impact assessment sufficiently identified and quantified the significance of potential noise impacts on the surrounding environment. Therefore, no further noise impact assessment is required to be conducted in the EIA Phase. Sufficient information available to allow a relative high confidence in the projected noise levels. No noise impact is projected.

6.1.8. Visual Impacts

Visual Impacts

Construction related activities which could affect the overall visual aesthetics of the study site include construction of access roads and foundations, and establishment of the power line.

As a function of the topography of the study area and the nature of the proposed facility, the potential visual receptors especially within (but not restricted to) a 16 km buffer zone from the facility, include:

» Observers travelling along major routes in the area (i.e. the N14 national road and the R358 main road) as well as the major secondary roads.
» Individual/isolated landowners/homesteads identified within the study area. Some of these include: Kwessie, Konkoonsies, Oupvlakte, Scuitklip, Nongcaip, etc.

Given the remote context of the site for the proposed CSP development, the large distances to surrounding settlements, and the fact that sensitive landscape or scenic features can feasibly be avoided, the preliminary indication is that the overall visual impact is not expected to be significant.
Furthermore the existing CSP trough developments (KaXu Solar One and Xina Solar One CSP facilities), substation and powerline already exist on the property resulting in a change in character of the area. The proposed CSP development on the same property would achieve the clustering of solar energy facilities within a compact area.
Based on the preliminary layout provided, it is expected that any visual impacts will be local in extent. The visibility of the proposed tower structure and the potential cumulative visual impacts will need to be assessed in the EIA Phase.
Given the scale and industrial nature of the proposed CSP facility, a Level 4 visual input study would be required at the VIA stage, (Oberholzer, 2005).

The site lies outside the Upington Focus Area, being one of eight focus areas identified for the development of wind and solar energy, as part of an SEA being conducted by the CSIR. However, the site is only about 130km from the Focus Area and lies within a similar landscape type. This general area is considered to be eminently suitable for solar energy development.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Potential effect on landscape features and scenic resources.	The solar energy facilities would be located on an expansive plain with a number of prominent landscape features.	Local	Rock outcrop features and drainage lines.
Potential effect on local inhabitants, visitors to the area and on tourism.	The proposed facilities, especially the tower, could be visible to a number of farmsteads, and to travellers on the N14 and R357.	Local	Visual buffer areas along routes.
Potential effect of lights at night.	Security and navigational lights at night could have an effect on the 'dark skies' characteristic of the area.	Local	n/a

Description of expected significance of impact

The potential impact is expected to be negative, probable, short term, with a moderate intensity and have a low significance; this will be confirmed during the EIA phase. The potential impact can be reversed and there are no irreplaceable loss of resources associated with the potential impact. The potential impact may be avoided with possible mitigation measures which will be elaborated in the EIA phase.

Recommendations for further study during the EIA Phase

Knowledge of the area is based on a desktop study only and findings are subject to a field trip involving ground-truthing, which will form part of the EIA Phase. A detailed site development plan, including the layout of related infrastructure, would be required for the EIA Phase.

6.1.9. Social impacts

Social impact: Direct employment opportunities and skills development:

The construction of the proposed project will require a workforce and therefore direct employment will be generated. The proposed development will create employment opportunities for the local community. This is therefore a positive social impact. Although the exact number of employment opportunities has not been finalised at this stage, it is estimated that the 200MW CSP Facility will create on average around 600 employment opportunities

(however the size of the workforce will vary during the different phases of construction, for example during the second year of construction the number of employees will peak to 1400 people). Therefore not all of these employment opportunities will be fulfilled for the entire duration of the constructions phase, it will fluctuate between 600-1400 employees over a period of 27-30 months. The proponent has indicated that training will be provided to employees with the proposed development. The construction of the Paulputs CSP Tower facility could have a low to medium positive impact on a local area in terms of the job opportunities generated for a temporary duration.

Desktop Sensitivity Analysis of the Site:

People from the KMLM and nearby towns (Onseepkans, Pofadder and Pella) are most likely going to benefit the most from this positive impact due to the requirements stipulated in the REIPPP Programme.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Direct employment opportunities and skills development	The creation of employment opportunities and skills development opportunities during the construction phase for the country and local economy	Local-regional	None

Description of expected significance of impact

The potential impact is expected to be positive, probable, short term, with a moderate intensity and have a low - medium significance; this will be confirmed during the EIA phase. The potential impact may be enhanced with possible enhancement measures which will be elaborated in the SIA EIA phase.

Social Impact: Economic multiplier effects:

There are likely to be opportunities for local businesses to provide services and materials for the construction phase of the development. The local service sector will also benefit from the proposed development. The economic multiplier effects from the use of local goods and services opportunities will include, but is not limited to, construction materials and equipment and workforce essentials such as services, safety equipment, ablution, accommodation, transportation and other goods. The total construction capital expenditure associated with the establishment of the Paulputs CSP Tower facility is estimated to be in the region of R8-10 billion. About 40-60% of the capital expenditure will be spent locally on goods and services required for the development of the CSP facility (as dictated by the REIPPP). In terms of business opportunities for local companies, expenditure during the construction phase will create business opportunities for the regional and local economy. Also the injection of income into the area in the form of wages will represent an opportunity for the local economy and businesses in the area.

Desktop Sensitivity Analysis of the Site:

The KMLM and nearby towns (Onseepkans, Pofadder and Pella) are most likely going to benefit the most from this positive impact due to the requirements stipulated in the REIPPP.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Economic multiplier effects	Significance of the impact from the economic multiplier effects from the use of local goods and services	Local-regional	None

Description of expected significance of impact

The potential impact is expected to be positive, probable, short term, with a low intensity and have a low - medium significance; this will be confirmed during the EIA phase. In terms of reversibility of the impact and irreplaceable loss of resources, this is not applicable to this type of impact. The potential impact may be enhanced with possible enhancement measures which will be elaborated in the SIA EIA phase.

Social Impact: Safety and security impacts:

An increase in crime is often associated with construction activities. The perceived loss of security during the construction phase of the proposed project due to the influx of workers and/or outsiders to the area (as influxes of construction workers, newcomers or jobseekers are usually associated with an increase in crime), may have indirect effects, such as increased safety and security issues for neighbouring properties and damage to property, such as the risk of veld fire, stock theft, crime and so forth.

Desktop Sensitivity Analysis of the Site:

Areas of concern include the impacted farmland and adjacent farming areas where livestock farming may take place.

Issue	Nature	Extent of Impact	No-Go Areas
Safety and security impacts	Temporary increase in safety and security concerns associated with the influx of people in the study area during the construction phase	Local	None at this stage

Description of expected significance of impact

The potential impact is expected to be negative, improbable, short term, with a low intensity and have a low significance; this will be confirmed during the EIA phase. The potential impact can be reversed and there are no irreplaceable loss of resources associated with the potential impact. The potential impact may be avoided with possible mitigation measures which will be elaborated in the SIA EIA phase.

Social Impact: Impacts on daily living and movement patterns

An increase in traffic due to heavy vehicles could create short-term disruptions and safety hazards for current road users. Transportation of project components and equipment to the proposed site will be transported using vehicular / trucking transport. The existing secondary access road is off the N14 and the R358. It is a tarred road called the R357 (Onseepkans road), it is the same access road that is utilized to access the KaXu Solar One Facility and Xina Solar One plant.

Desktop Sensitivity Analysis of the Site:
Farmers/residents residing in the study area that currently utilize the access road to access their farms

Issue	Nature	Extent of Impact	No-Go Areas
Impacts on daily living and movement patterns	Temporary increase in traffic disruptions impacting local communities movement patterns and increased safety risks for road users	Local	None

Description of expected significance of impact
The potential impact is expected to be negative, probable, short term, with a moderate intensity and have a low-medium significance; this will be confirmed during the EIA phase. The potential impact can be reversed and there are no irreplaceable loss of resources associated with the potential impact. The potential impact may be mitigated with possible mitigation measures which will be elaborated in the SIA EIA phase.

Impact: Pressure on economic and social infrastructure impacts from an in-migration of people:
The in-migration of people to the area as either non-local workforce of construction workers and/or jobseekers could result in pressure on economic and social infrastructure (municipal services) due to in migration of construction workers and jobseekers and pressure on local population (rise in social conflicts and social dynamics). Influx of people into the area, especially by job seekers, could further lead to a temporary increase in the level of crime, cause social disruption and put pressure on municipal services.

Desktop Sensitivity Analysis of the Site:
Sensitive areas in the KMLM include nearby towns such as Onseepkans, Pofadder and Pella

Issue	Nature	Extent of Impact	No-Go Areas
Pressure on economic and social infrastructure impacts from an in-migration of people	Added pressure on economic and social infrastructure during construction phase as a result of in-migration of people	Local-regional	None

Description of expected significance of impact

The potential impact is expected to be negative, improbable, short term, with a low intensity and have a low significance; this will be confirmed during the EIA phase. The potential impact can be reversed and there are no irreplaceable loss of resources associated with the potential impact. The potential impact may be mitigated with possible mitigation measures which will be elaborated in the SIA EIA phase.

Social Impact: Nuisance Impacts (noise & dust):
Impacts associated with construction related activities include noise, dust and disruption to adjacent properties is a potential issue.

Desktop Sensitivity Analysis of the Site:

Areas of concern include the impacted farmland and adjacent farming areas where livestock farming may takes place.

Issue	Nature	Extent of Impact	No-Go Areas
Nuisance Impacts (noise & dust)	Nuisance impacts in terms of temporary increase in noise and dust, on site and on farm roads for access to the site	Local	None

Description of expected significance of impact

The potential impact is expected to be negative, probable, short term, with a moderate intensity and have a low significance; this will be confirmed during the EIA phase. The potential impact can be reversed and there are no irreplaceable loss of resources associated with the potential impact. The potential impact may be mitigated with possible mitigation measures which will be elaborated in the SIA EIA phase.

Gaps in knowledge & recommendations for further study

Consultations with key stakeholders (including impacted and adjacent landowners) will be required in the EIA phase in order to determine the extent of the identified impacts.
Impacts will be assessed through the following activities:

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

6.2. Evaluation of potential impacts associated with the operation of the Paulputs CSP Project

The text and tables below provide an indication of the potential direct and indirect environmental issues and impacts which have been identified during the Scoping phase of the EIA process and which may be relevant during the operational phase of the Paulputs CSP project.

6.2.1. Impacts on Terrestrial Fauna, Flora and Ecology

Impacts on Flora, Fauna, and Ecology

The flora, fauna, and ecology of the study site may be impacted on during the operational phase as a result of certain site-specific characteristics such as the presence of red data and/or endemic species and the location of the site within a potential ESA. The ecological function of the study area can generally be described as moderate for the majority of the study area, although this does vary from low (in the highly transformed areas) to high in the more inaccessible or unutilisable areas. Areas in which overgrazing and clearing have taken place, as well as areas in which settlements have been established are considered as areas where ecological function is reduced.

Operation related activities which could impact on the fauna, flora and overall ecology of the study site in terms of site specific characteristics include:

» Maintenance of surrounding vegetation as part of management of the facility
» Presence of the linear infrastructure, including the overhead power line, water supply pipeline etc.
» Presence of impermeable surfaces

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Impacts on threatened plant species in surrounding areas	During the operational phase plant species are generally affected by overall loss of habitat and disturbances from maintenance and management staff. Threatened species include those classified as critically endangered, endangered, or vulnerable.	Local The impact will occur at the site of the facility footprint (Local).	None at this stage in the process

Disturbance daily movement and/or to migration routes and associated impacts to species populations.	Daily movement or search for food and water for fauna may be impacted. Fauna may be attracted to infrastructure (e.g. evaporation ponds) in search of water. All components of the proposed development may interfere with established migration routes of fauna species. This may lead to: » Reduced ability of species to move between breeding an foraging grounds, reducing breeding success rates; » Increased mortality rates due to fatal collisions with infrastructure; » Reduced genetic variation due to reduced ability of especially smaller organisms to have individual interaction	Site and surroundings Local The impact will occur at the site of the facility footprint (Local).	No No-Go areas have been identified to date following a dry season survey. This must be verified during a wet season survey as part of the EIA phase
Change in runoff and drainage patterns	Infrastructure and roads crossing landscapes cause local hydrological and erosion effects resulting in major peak-flow and sediment impacts. This may occur around in areas where the infiltration rates of the landscape are changed due to an impermeable surface being constructed. Increased runoff may increase the rates and extent of erosion, reduce percolation and aquifer recharge rates, alter channel morphology, and increase stream discharge rates. The annual rainfall on site is very low. The potential effect on the hydrology of the landscape is therefore relatively small. Indications from aerial photography are that existing infrastructure, even within the bottomlands of the plains where the deepest soils occur, has had negligible impacts on drainage patterns.	Local - Regional The impact will occur at the site of the proposed facility, but could also affect downstream and downslope areas.	None at this stage in the process
Establishment and spread of declared weeds and alien invader plants	Lack of control mechanisms contribute to the continued spread of alien invader plants following high disturbance activities (i.e. construction). Exotic species are often more prominent near infrastructural disturbances than further away.	Local	None at this stage in the process
Impact on the ESA corridor	The operational phase may impact the Ecological Support Area (ESA) delineated in terms of the Namakwa District Municipality Environmental	Local-Regional	None at this stage in the process

	Management Framework (NEMF) and described as a faunal migratory corridor.		

Description of the significance of the impact

The area is generally homogenous and given the extensive amount of potentially intact vegetation in the area, there is likely to be little overall disruption to the broad-scale connectivity of the landscape. Some habitat loss for faunal species is an inevitable consequence of the development but is not likely to be of broader significance (to be confirmed during EIA phase). From the dry season survey and the results from the previous ecological study done on the authorised sites no important faunal migratory routes (usually along extensive and well wooded valley floors and ephemeral streams) seem to be present within the development footprint areas. This will be confirmed through a wet season survey in the EIA Phase.

The potential impacts are expected to be negative, probable, short term, with a moderate intensity and have a low-medium significance; this will be confirmed during the EIA phase. The potential impact can be reversed and there are no irreplaceable loss of resources associated with the potential impact. The potential impact may be mitigated with possible mitigation measures which will be elaborated in the EIA phase.

Gap in knowledge and Recommendations for further study during the EIA Phase

The following activities will be included as part of the Ecological Study during the EIA Phase:

» Second field survey in the wet season.
» Establish the condition of the vegetation and the relative distribution of habitats in moderate to good condition following a wet season survey. General vegetation condition will be assessed during the second field survey in order to identify areas that are in good condition versus those areas in poor condition.
» The presence and functioning of a wash feature on site will be confirmed. The upper reaches of the remaining extent of the wash feature are impacted by the Xina and Kaxu facilities.
» A detailed sensitivity map will be produced and will include mapping and incorporation of any sensitive features that may occur on site.
» The presence of species of concern will be evaluated. For plant species this will be done by searching for populations that could occur in the study area based on habitat requirements and historical collection records. For animal species this will be done by assessing habitat suitability for those species that have been assessed as potentially occurring in the area. Particular attention will be paid to those species classified as Red Data Species.

6.2.2. Impacts on Avifauna

Impacts on Avifauna

Commercial-scale solar technologies are relatively new, with a limited number of significant developments worldwide. Some studies have been conducted on the effects of CSP facilities on avifauna, most notably The Solar One plant in the Mojave Desert in the United States (McCrary, et al., 1986).
Although there may be considerable impact due to the clearing of vegetation and the large footprint required for commercial-scale energy production, which would refer to the habitat loss and disturbance created during the construction phase of the facility, birds are the most mobile of vertebrate species and there is considerable amount of the same vegetation in adjacent areas to which avifauna will move. Furthermore, in this case, the vegetation of the area is very low and with revegetation the area of the heliostat field, thereby recovering some of the lost vegetation. Secondary impacts relate to the operation of the facility and include avian mortality due to direct interactions with the facilities and their associated infrastructure.
Based on the information gathered, several impacts have been identified and will be quantified in sections below:

- Impact on local bird community due to habitat loss;
- Impact on local bird community due to disturbance;
- Impact on birds attracted to solar thermal plant infrastructure;
- Birds may be singed or killed flying into the focal point;
- Collision of birds with infrastructure associated with the CSP facilities;
- Collision of birds with the associated power line; and
- Electrocution of birds on associated power line tower structures.

These impacts are to be quantified using the data collected during the dry season survey (already conducted) and the wet season survey (to be conducted in 2016 in the EIA phase).

The operation phase could potentially affect avifauna species through disturbance (i.e. through maintenance activities), and the potential for collisions with the power tower and/or power line as well as potential electrocution events with the power line. Local, migratory, and red data book species which were recorded to occur on the site (recorded during the dry season survey) included Maccoa Duck and Lanner Falcon. During the study, avifauna species diversity and abundance was low with only 27 species being observed during the dry season survey.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Habitat loss	In order for solar energy facilities to be commercially viable, they require large tracts of land, in this case ±900ha. It can therefore be assumed that a habitat will be lost during the establishment of the facility and its associated infrastructure	Local	No No-Go areas have been identified to date following a dry season survey. This

	(including clearing for access roads and power lines). Habitat loss reduces the carrying capacity of a habitat, often resulting in localised population declines. Such habitat loss can impact on local as well as, to a lesser degree, migratory species. The general nature of the study area (already relatively disturbed, and extremely uniform throughout wider area) means that this is not likely to impact significantly on the avifauna of the area		must be verified during a wet season survey as part of the EIA phase. High sensitivity rocky outcrop areas on western and eastern boundaries of the property
Disturbance	Disturbance from human activity, during the operational phase, has the potential to modify bird behaviour on site. For shy and sensitive species, this may result in displacement or exclusion. Maintenance activities associated with the facility as well as the power line impact on birds through disturbance, particularly during the breeding season. Certain bird species could also choose to nest on the towers or the proposed power line. In this arid and largely treeless landscape any form of available nesting substrate will probably be utilised by medium sized birds. The proposed power line is likely to be built on a monopole structure, which does not present the most conducive structure for nesting.	Local	No No-Go areas have been identified to date following a dry season survey. This must be verified during a wet season survey as part of the EIA phase. High sensitivity rocky outcrop areas on western and eastern boundaries of the property
Impacts on birds attracted to solar thermal infrastructure	The facility will cover an area of ±900ha and will include a series of heliostats/mirrors which will reflect sunlight. The infrastructure of the development will seem as attractive nesting sites for birds, may result in collisions of birds, provide perching spots, attract birds to the evaporation ponds, increase the likelihood of singeing or killing birds. In order to reduce the possible impacts of the development on avian species the infrastructure of the development should be made as unattractive as possible for avian species.	Local -Regional	No No-Go areas have been identified to date following a dry season survey. This must be verified during a wet season survey as part of the EIA phase. High sensitivity rocky outcrop areas on western and eastern boundaries of the property
Electrocution	Power lines have a range of bird related impacts one of which is electrocution events whereby a bird perches on an electrical structure and causes an electrical	Local - Regional	No No-Go areas have been identified to date following

	short circuit by bridging the gap between live components and or live and earthed components.		a dry season survey. This must be verified during a wet season survey as part of the EIA phase.

Description of the significance of the impacts

During the study, avifauna species diversity and abundance was low with only 27 species being during the dry season survey. The potential impacts are expected to be negative, probable, with a moderate intensity. Impacts during the operation phase will be long term. Impacts have a moderate significance due to low species diversity and abundance recorded on the site; this will be confirmed during the EIA phase following a wet season survey. Reversibility of impacts is low, but there is no irreplaceable loss of resources associated with the potential impact. The potential impact may be mitigated with possible mitigation measures which will be elaborated in the EIA phase.

Gaps in knowledge and Recommendations for further study during the EIA Phase

The following activities will be included as part of the Avifauna Study during the EIA Phase:

» Second field survey in the wet season. Methodology to include:
  - Vantage point surveys;
  - Drainage line transects; and
  - Investigation of the tower facility, associated infrastructure and heliostat field.

» A detailed sensitivity map will be produced and will include mapping and incorporation of any sensitive features that may occur on site.

» The presence of species of concern will be evaluated.

» Based on the information gathered, several impacts have been identified and will be quantified in sections below:
  - Impact on local bird communities due to habitat loss created by the facility
  - Impact on local bird community due to disturbance created by the construction and operation of the facility
  - Collision of birds with facilities associated with the development and in particular Species of Special Concern
  - Impacts on birds attracted to the solar infrastructure
  - Electrocution of birds on the power line infrastructure

6.2.3. Impacts on Agricultural Potential

Impacts on Agricultural Potential

Much of the study area is comprised of shallow to very shallow soils or surface rock outcrops, and only a very small portion of deep soils. The very low rainfall in the area means that the only means of cultivation would be by irrigation and aerial imagery shows no signs of agricultural infrastructure or of irrigation. The climatic restrictions mean that this part of the Northern Cape is suited at best for grazing and here the grazing capacity the footprint would occupy the same area that could be grazed by 25 small stock units or 10 large stock units. This is not regarded as viable commercial farming site and would be suited to house the facility.

Construction related activities which could affect the agricultural potential of the study site include land clearing activities and through the usage of construction related equipment.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Loss of agricultural potential	A loss of agricultural land and altering of land use.	Local	None identified

Description of significance of the impact

The potential impacts are expected to be negative, probable, with a low intensity. Impacts on the environment will be long-term within the development footprint. Reversibility of impacts is low, but there is no irreplaceable loss of resources associated with the potential impact due to the low agricultural potential of the site.

Gaps in Knowledge and Recommendations for further study during the EIA Phase

Due mainly to the prevailing unfavourable climatic conditions for arable agriculture, as well as the prevalence of soils with limited depth, it is not envisaged that further detailed soil investigation will be required.

6.2.4. Impacts on Soils, Erosion Potential and Geomorphology

Impacts on Soils, Erosion Potential and Geomorphology

The study area is located within the Namaqualand Metamorphic Belt. Rocky outcrops are likely to be limited to the north-eastern portion and, to a lesser extent, the western portion of the study area. Talus/scree (gravelly soils transported downslope due to gravity) which are expected to exist on slopes in these rocky areas. It is estimated that 20% of the study area has rock outcropping at surface, 10% is underlain by shallow rock and the remaining 70% has relatively thick soil.

The Erosion Index for South Africa indicates that the site is ranked between 11 and 15 on a scale from 1 (highest potential) to 19 (lowest). This means that the erodibility potential is moderate to low.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Soil degradation due to accelerated erosion (water or wind)	Soil degradation may occur during the operational phase through erosion and/or siltation. The loss of soil and damage to associated ecosystems may occur due to erosion of soil in areas of activity (i.e. 70% of the study area is presently susceptible to potentially moderate levels of erosion (wind and water). Furthermore, damage of soil and associated ecosystems due to siltation arising from accelerated erosion.	Local - Regional	None identified

Description of significance of the impact

The potential impacts are expected to be negative, probable, with a low intensity. Impacts on the environment will be long-term within the development footprint. Impacts can be mitigated. Reversibility of impacts is high, and there is no irreplaceable loss of resources.

Recommendations for further study during the EIA Phase

The following activities will be included as part of the Soil Study during the EIA Phase:

» Conduct a site visit to confirm the physical and geological information used in this report and to collect visual information pertaining to the soil types and their geotechnical engineering properties.
» Assess the present state of erosion, identify critical areas in terms of erosion, and produce a map identifying these areas.
» Provide achievable mitigation measures to erosion during the operation phase.

6.2.5. Impacts on Water Resources

Impacts on Water Resources

The study area site is situated within the D81E quaternary catchment of the Gariep River and is dominated by highly ephemeral river systems. Potential runoff from the study area would flow in a north-westerly direction towards the Gariep River, while runoff from the elevated areas portions of the Scuitklip ridges would into the Gariep River.

Potential impacts on aquatic ecosystems are primarily associated with the abstraction of water from the Gariep River. Abstraction of water may result in modification of instream habitats which may in turn result in changes to the aquatic communities which includes species and ecosystems of conservation importance.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Abstraction of water may result in modification of instream habitats	During the operational phase the water quality/quantity of the region may be affected. This may, in turn, affect sensitive features such as Onseepkans Falls and on the occurrence of conservation worthy fish species (i.e. endemic fish species occurring in the lower section of the Gariep River).	Local - Regional	None
Impacts on the social environment	The social environment may be affected during this stage of the development in terms of human needs (i.e. by affecting water quality/quantity of the region).	Local - Regional	None

Description of significance of the impact

Changes in aquatic habitat due to abstraction, i.e. reduction of flow, may result in changes in the aquatic faunal as well as riparian and wetland vegetation communities of the Gariep River. Impacts are expected to be moderate at a local to regional level, are likely to occur in the long-term (for duration of operation) and may not be reversible in all respects. Impacts can be minimised through the implementation of appropriate mitigation measures, to be determined during the EIA Phase.

Impacts on the environment during the operation phase will be permanent within the development footprint. Impacts can be mitigated. Reversibility of impacts is low, where impacts occur on the site.

Gaps in knowledge and Recommendations for further study during the EIA Phase

The following activities will be included as part of the Water Resources Study during the EIA Phase:

» During the Water Use licensing process for the proposed project and during the EIA Phase, a detailed assessment of the available water supply will have to be made.
» Further studies need to focus on the degree of change in aquatic habitats associated with the proposed abstraction for the Paulputs CSP facility. Based on this the potential impacts on aquatic fauna and flora needs to be extrapolated.

6.2.6. Noise related impacts

Noise related impacts

Rural area with night-time acceptable rating level of 35 dBA.
The main noise source associated with the operation of the facility relates to the fans used to assist with the condensing of the steam/water used in the power generation circuit. The following noise source will be evaluated during the operational phase:

1. Noises from the conventional electrical power generating plant (steam generation, steam storage, steam turbine and cooling system),
2. Plant-generated traffic (maintenance crew, cleaning crew(s), etc.)
3. Ancillary equipment such as pumps and pressure release valves,
4. Possible general noise from the maintenance/workshop.

With the steam turbine and generators situated within a building (that will significantly reduce the noise generation from these sources) noises from the cooling fans will be the dominating noise in the area. The scoping-level impact assessment therefore would focus on the noise generated by the fans and no other equipment.
It is not foreseen that traffic will contribute to noise from and to the site during the operational phase. In additional there will be minimal traffic noise on the site. It will therefore not be considered during the operational phase.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Increases in noise levels at NSD01 at night.	Increased noises or disturbing noises may increase annoyance levels with project.	Operational activities will cumulatively increase noise levels in area.	Non identified

		Assessed scenario project a cumulative noise impact of 35 dBA at NSD01.	

Description of the significance of the impacts

The potential impact is expected to be negative, probable, long term, with a negligible intensity and have a low significance. The potential impact can be reversed and there are no irreplaceable loss of resources associated with the potential impact.

Gaps in knowledge & recommendations for further study

Due to the limited period of and the localised nature of potential impacts, the noise scoping impact assessment sufficiently identified and quantified the significance of potential noise impacts on the surrounding environment. Therefore, no further noise impact assessment is required to be conducted in the EIA Phase. Sufficient information available to allow a relative high confidence in the projected noise levels. No noise impact is projected.

6.2.7. Visual Impacts

Visual Impacts

The site is located adjacent to the KaXu Solar One and Xina Solar One CSP facilities. The facilities already have a visual impact in this landscape. As a function of the topography of the study area and the nature of the proposed facility, the potential visual receptors include:

» Observers travelling along major routes in the area (i.e. the N14 national road and the R358 main road) as well as the major secondary roads
» Individual/isolated landowners/homesteads identified within the study area. Some of these include: Kwessie, Konkoonsies, Oupvlakte, Scuitklip, Nongcaip, etc
» Those receptors that may be affected using night lighting of the facility.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Potential visual intrusion on sense of place.	The CSP facility site is located adjacent to other CSP facilities, in an industrial landscape, but also adjacent to open farmlands.	Local	Rocky terrain on the north-east portion of the property.

Potential effect on local inhabitants, visitors to the area and on tourism.	The proposed facilities, especially the tower, could be visible to a number of farmsteads, and to travellers on the N14 and R357.	Local	Visual buffer areas along routes.
Potential effect of related infrastructure.	The facility includes a salt tower up to 300m in height. Other infrastructure is much lower in height but could have a negative visual effect on the surroundings.	Local	Visually prominent ridges or skylines.
Potential effect of lights at night.	Security and navigational lights at night could have an effect on the 'dark skies' characteristic of the area.	Local	n/a
Description of expected significance of impact The potential impact is expected to be negative, probable, short term, with a moderate intensity and have a low -medium significance; this will be confirmed during the EIA phase. The potential impact can be reversed and there are no irreplaceable loss of resources associated with the potential impact. The potential impact may be avoided with possible mitigation measures which will be elaborated in the EIA phase**.**			
Recommendations for further study during the EIA Phase Knowledge of the area is based on a desktop study only and findings are subject to a field trip involving ground-truthing, which will form part of the EIA Phase. A detailed site development plan, including the layout of related infrastructure, would be required for the EIA Phase.			

6.2.8. Social Impacts

Impact: Direct employment opportunities and skills development:
The operation phase (20-35years) of the proposed development will require a workforce and therefore direct employment will be generated. Approximately ~60-70 jobs will be generated during the operation phase for the 200MW CSP Tower facility. Primarily skilled and high skilled personal will be required during the operation phase. The proponent has also indicated that training will be provided for employees during the operation phase.
Desktop Sensitivity Analysis of the Site:
None at this stage

Issue	Nature	Extent of Impact	No-Go Areas
Direct employment opportunities and skills development	The creation of long term employment opportunities and skills development opportunities during	Local-regional	None

	the operation phase for the country and local economy		

Description of expected significance of impact

The potential impact is expected to be positive, probable, long term, with a minor intensity and have a low - medium significance; this will be confirmed during the EIA phase. In terms of reversibility of the impact and irreplaceable loss of resources, this is not applicable to this type of impact. The potential impact may be enhanced with possible enhancement measures which will be elaborated in the SIA EIA phase.

Impact: Economic multiplier effects

There are likely to be opportunities for local businesses to provide services and materials for the operation phase of the development. The local service sector will also benefit from the proposed development. In terms of business opportunities for local companies, expenditure during the operation phase will create business opportunities for the regional and local economy. Also the injection of income into the area in the form of wages will represent an opportunity for the local economy and businesses in the area.

Desktop Sensitivity Analysis of the Site:

The KMLM, nearby towns (Onseepkans, Pofadder and Pella) and local community members are most likely going to benefit from this positive impact.

Issue	Nature	Extent of Impact	No-Go Areas
Economic multiplier effects	Significance of the impact from the economic multiplier effects from the use of local goods and services	Local-regional	None

Description of expected significance of impact

The potential impact is expected to be positive, probable, long term, with a minor intensity and have a low significance; this will be confirmed during the EIA phase. In terms of reversibility of the impact and irreplaceable loss of resources, this is not applicable to this type of impact. The potential impact may be enhanced with possible enhancement measures which will be elaborated in the SIA EIA phase.

Impact: Socio-Economic Development (SED), Enterprise Development (ED) and share ownership in the project company with local communities:

Renewable energy projects under the Renewable Energy Independent Power Producer Procurement programme (REIPPP) are obliged to make a real contribution to local economic development in the area. Awarded projects are required to spend a certain amount of their generated revenue on Socio-Economic Development (SED) and Enterprise Development (ED) and share ownership in the project company with local communities. These criteria, as well as the creation of a specific number of jobs, are incentivised through awarding higher scoring to projects that realise such criteria within a 50km radius to the project site during the evaluation process. Additionally, projects add value to the local economy through targeted procurement from local

businesses. Job creation requirements target national and local citizens. Between 12% and 20% of the people employed on each project have to be residents of local communities located within 50km of the project site. The settlements within the project's direct area of influence include Onseepkans, Pofadder and Pella.

Desktop Sensitivity Analysis of the Site:

The KMLM and local people from the nearby towns are most likely going to benefit from job opportunities and SED/ ED.

Issue	Nature	Extent of Impact	No-Go Areas
Socio-Economic Development (SED), Enterprise Development (ED) and share ownership in the project company with local communities	Positive long-term impact from Socio-Economic Development (SED), Enterprise Development (ED) and local share ownership in the project company	Local	None

Description of expected significance of impact

The potential impact is expected to be positive, probable, long term, with a moderate intensity and have a medium significance; this will be confirmed during the EIA phase. The potential impact can be reversed and there are no irreplaceable loss of resources associated with the potential impact. The potential impact may be enhanced with possible enhancement measures which will be elaborated on in the SIA EIA phase.

Impact:

Development of clean, renewable energy infrastructure

The use of solar radiation for power generation is considered a non-consumptive use of a natural resource which produces zero greenhouse gas emissions. The generation of renewable energy will contribute to South Africa's electricity market. The advancement of renewable energy is a priority for South Africa. Bringing in the renewable energy sector to the local economy may contribute to the diversification of the local economy and provide greater economic stability.

Issue	Nature	Extent of Impact	No-Go Areas
Development of clean, renewable energy infrastructure	Positive long-term impacts from the generation of renewable energy	Local-regional-national	None

Description of expected significance of impact

The potential impact is expected to be positive, probable, long term, with a moderate intensity and have a medium significance; this will be confirmed during the EIA phase. The potential impact can be reversed and there are no irreplaceable loss of resources associated with the potential impact.

Impact: Visual impact and impacts on sense of place:

The sense of place is developed over time as the community embraces the surrounding environment, becomes familiar with its physical properties, and creates its own history. The sense of place is created through the interaction of various characteristics of the environment, including atmosphere, visual resources, aesthetics, climate, lifestyle, culture and heritage. Importantly though it is a subjective matter and is dependent on the demographics of the population that resides in the area and their perceptions regarding trade-offs. An impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light. The social impacts associated with the impact on sense of place relate to the change in the landscape character and visual impact from the proposed CSP Tower Facility.

Desktop Sensitivity Analysis of the Site:

Sensitive receptors include the immediate area of influence; landowners in the study area, commuters utilising the R357 (Onseepkans road), N14, R358, tourism attractions (such as the Quiver tree forest and eco-tourism).

Issue	Nature	Extent of Impact	No-Go Areas
Visual impact and impacts on sense of place	Visual impacts and sense of place impacts associated with the operation phase of the project	Local	None

Description of expected significance of impact

The potential impact is expected to be negative, probable, long term, with a moderate intensity and have a low-medium significance; this will be confirmed during the EIA phase. The potential impact can be reversed and there are no irreplaceable loss of resources associated with the potential impact. The potential impact may be mitigated with possible mitigation measures which will be elaborated in the SIA EIA phase.

Impact: Impacts associated with the loss of agricultural land

The activities associated with the operation phase of the CSP Tower facility will result in a loss of farmland available for grazing and potential loss of agricultural production for the operation period of 20-35 years. The proposed site is located within an agricultural area.

Desktop Sensitivity Analysis of the Site:

Sensitive area is the proposed site and development footprint area.

Issue	Nature	Extent of Impact	No-Go Areas
Impacts associated with the loss of agricultural land	Impacts associated with loss of farmland available for agricultural use due to occupation of land by the CSP Tower facility for 20-35 years	Local (Site)	None

Description of expected significance of impact

The potential impact is expected to be negative, probable, long term, with a low intensity and have a low-medium significance; this will be confirmed during the EIA phase. The potential impact can be reversed and there are no irreplaceable loss of resources associated with the potential impact. The potential impact may be mitigated with possible mitigation measures which will be elaborated on in the SIA EIA phase.
Gaps in knowledge & recommendations for further study An additional in-depth community needs assessment (CNA) will need to be carried out at a later stage to make sure that the real needs of communities are addressed (in line with the local government) by development programmes in order to significantly contribute towards local economic growth, Socio-Economic Development (SED) and Enterprise Development (ED). Consultations with key stakeholders (including impacted and adjacent landowners) will be required in the EIA phase in order to determine the extent of the identified impacts. Impacts will be assessed through the following activities: • Review of existing project information, including the Planning and Scoping Documents • Collection and review of reports and baseline socio-economic data on the area • Site visit and interviews with key stakeholders in the area including local land owners and authorities, local community leaders and councillors, local resident associations and residents, local businesses, community workers etc. • Identification and assessment of the key social issues and opportunities • Preparation of Social Impact Assessment Report, including identification of mitigation/optimisation and management measures to be implemented

6.3. Evaluation of potential Cumulative impacts associated with the Paulputs CSP and Other Solar Projects in the Area

Cumulative impacts in relation to an activity are defined in the Environmental Impact Assessment Regulations (GN R543) as meaning "the impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area".

There has been a steady increase in renewable energy developments recently in South Africa as legislation is evolving to facilitate the introduction of Independent Power Producers (IPPs) and renewable energy into the electricity generation mix. The Department of Energy has, under the REIPPP Programme released requests for proposals to contribute towards Government's renewable energy target of 3725 MW and to stimulate the industry in South Africa.

For cumulative effects analysis to help the decision-maker and inform interested parties, it must be limited to effects that can be evaluated meaningfully (DEAT, 2004). Boundaries must be set so analysts are not attempted to measure effects on everything.

Cumulative effects are commonly understood as the impacts which combine from different projects and which result in significant change, which is larger than the sum of all the impacts (DEAT, 2004). The complicating factor is that the projects that need to be considered are from past, present and reasonably foreseeable future development. Cumulative effects can be characterised according to the pathway they follow. One pathway could be the persistent additions from one process. Another pathway could be the compounding effect from one or more processes. Cumulative effects can therefore occur when impacts are:

- additive (incremental);
- interactive;
- sequential; or
- synergistic.

Canter and Sadler (1997) describe a three step process for addressing cumulative effects in an EIA:

- delineating potential sources of cumulative change (i.e. GIS to map the relevant renewable energy facilities in close proximity to one another).
- identifying the pathways of possible change (direct impacts)
- indirect, non-linear or synergistic processes; and
- classification of resultant cumulative changes.

The proposed development site for the Paulputs CSP Project is proposed on Portion 4 of the Farm Scuitklip 92. Table 6.15 and Figure 6.1 below shows the known solar energy projects (both CSP facilities and PV facilities) in the broader area.

Table 6.15: The other projects/ developments within 30km from the Paulputs CSP Project

Project Name	Approximate distance from the Paulputs CSP Project site	Project Status
Konkoonsies II Solar Facility	PV facility located <1km south-west of the development footprint	Preferred Bidder Round 4
Konkoonsies I Solar Facility	PV facility located ~2km south-west of the development footprint	Constructed
Xina Solar One	CSP facility located on Portion 4 of the farm Scuitklip 92 located ~1km south-east of development footprint	Under construction
KaXu Solar One	CSP facility located on Portion 4 of the farm Scuitklip 92 located ~1.5km south-east of the development footprint	Constructed and operational

The cumulative effect or impacts are to be considered as follows:

» Cumulative impacts potentially occurring due to the cumulative effects of the Paulputs CSP Plant added to all other renewable energy facilities under construction in the area surrounding Eskom's Paulputs Transmission Substation. These impacts may require mitigation through planning at a regional level.
» Cumulative impacts potentially occurring due to the cumulative effects of the Paulputs CSP Plant, the operational Kaxu Solar One and Xina Solar One under construction, which are all proposed to be located on different areas within Portion 4 of the Farm Scuitklip 92. These impacts will be registered within the boundaries of the greater farm portion.

At a local level, the area has become a node for renewable energy projects due to the viability of the solar resource for the area and the availability of Eskom's Paulputs Transmission Substation, with the following preferred bidder projects (PB) located directly adjacent to, or in close proximity to, the project development site: Kaxu Solar One, Xina Solar One, Konkoonsies I Solar, and Konkoonsies II Solar. Potential cumulative impacts associated with solar energy development within the immediate vicinity of the Paulputs CSP Project are expected to be associated with the following aspects:

» *Ecology* – The study area falls within the Karoo Biome and is dominated by the Bushmanland Arid Grassland vegetation type, classified as Least Threatened. At a national scale Bushmanland Arid Grassland has been transformed to a slight degree and approximately 27% is conserved within the Augrabies Falls National Park. The ecological function of the study area can generally be described as

moderate for the majority of the study area, although this does vary from low (in the highly transformed areas) to high in the more inaccessible or unutilisable areas. Areas in which overgrazing and clearing have taken place, as well as areas in which settlements have been established are considered as areas where ecological function is reduced. Within this renewable project node, within 5km of the site, vegetation clearance has been undertaken for the projects already constructed. It could be possible to avoid significant impact through the careful placement of infrastructure outside of natural vegetation and sensitive habitats. However, cumulative habitat loss and fragmentation in the area can be expected to the extent of the areas required for infrastructure development.

» *Avifauna*– Avifauna diversity in the area is reported to be high, with approximately 171 avifauna species recorded to be occurring in the region. Of these species 13 (9%) area listed as endemic and 11 (7%) are listed as being Red Data species. During the survey undertaken for the Paulputs project, avifauna species diversity and abundance was recorded to be low, with only 27 species being observed during the site visit. Cumulative habitat loss and fragmentation in the area can be expected for the extent of the areas required for infrastructure development. The potential for cumulative impact on birds as a result of the development of the tower facility and new power lines within the study area is required to be investigated further.

» *Water abstraction* - Potential impacts of additional water use as a cumulative impact of the project considering the adjoining facilities and the overall impact on the water availability within the Gariep River. During the EIA Phase particular emphasis will be placed on the cumulative impacts on the local and more importantly the regional hydrology related to the water use requirements.

» *Visual impacts* – Cumulative visual impacts would occur when the CSP project is seen in conjunction with existing and other proposed energy projects in the area. The cumulative impacts associated with CSP and PV facilities are largely linked to the visual impact on the areas sense of place and landscape character. The construction of the Paulputs CSP Plant and the other solar facilities in close proximity to one other will increase the cumulative visual impact of industrial type infrastructure within the region. This is especially relevant in light of the other CSP facilities already constructed on the same farm portion. Of note is that should enough alternative energy facilities exist within a region, it begins to be defined by such. Therefore, considering those facilities already constructed, the anticipated cumulative impact on the visual quality of the landscape and the sense of place of the region will be of medium significance. Given the vastness of the area, the significance of the impact on the areas sense place and character is likely to be moderate. The cumulative impact on the areas landscape character will also be reduced by the concentration of a number of solar energy facilities in one area as opposed to being spread out over a larger area. The visibility of the

proposed tower structure and the potential cumulative visual impacts will need to be assessed in the EIA Phase.

» *Noise* – The noise level from the Paulputs CSP will be approximately 28.4 dBA, with the cumulative impact with all three CSP facilities operating being approximately 35 dBA. Because the area is naturally quiet the facilities may be audible at one of the Noise Sensitive Developments within the vicinity of the site, but the noise levels will be within the acceptable Rural Rating level. Therefore the cumulative impact is of low significance.

» *Social*: The positive cumulative impacts include creation of employment, skills development and training opportunities, and downstream business opportunities. The significance of this impact is rated as a high positive with enhancement. Benefits to the local, regional and national economy through employment and procurement of services could be substantial should many renewable energy facilities proceed. Negative impacts and change to the local economy with an in-migration of labourers, businesses and jobseekers to the area.

Potential cumulative impacts associated with numerous solar energy developments within the study area are also positive and these too need to be considered, for instance:

» The development of renewable energy facilities will have a positive impact at a national and international level through the generation of "green energy" which would lessen South Africa's dependency on coal generated energy and the impact of such energy sources on the bio-physical environment.
» The proposed project would be in line with the government's aim to implement renewable energy projects as part of the country's energy generation mix over the next 20 years as committed to by government and as detailed in the Integrated Resource Plan (IRP), *inter alia*.
» The development of renewable energy facilities will have a positive impact at a regional and local level through increased work and skills development opportunities and the associated reduced poverty levels.
» More projects within a single area will enhance the shareholding benefits that flow to the local community and will create cumulative positive impacts via the increased socio-economic and enterprise obligations that benefit the local community.
» Renewable energy, specifically solar energy, is the cheapest form of energy available to the country and hence the exploitation of high solar resource areas so as to reduce electricity tariffs is of direct benefit to the national economy and all South Africa's citizens.

Cumulative impacts will be fully assessed in the EIA phase. Each specialist study will consider and assess the cumulative impacts of proposed, approved and authorised renewable projects in the area.

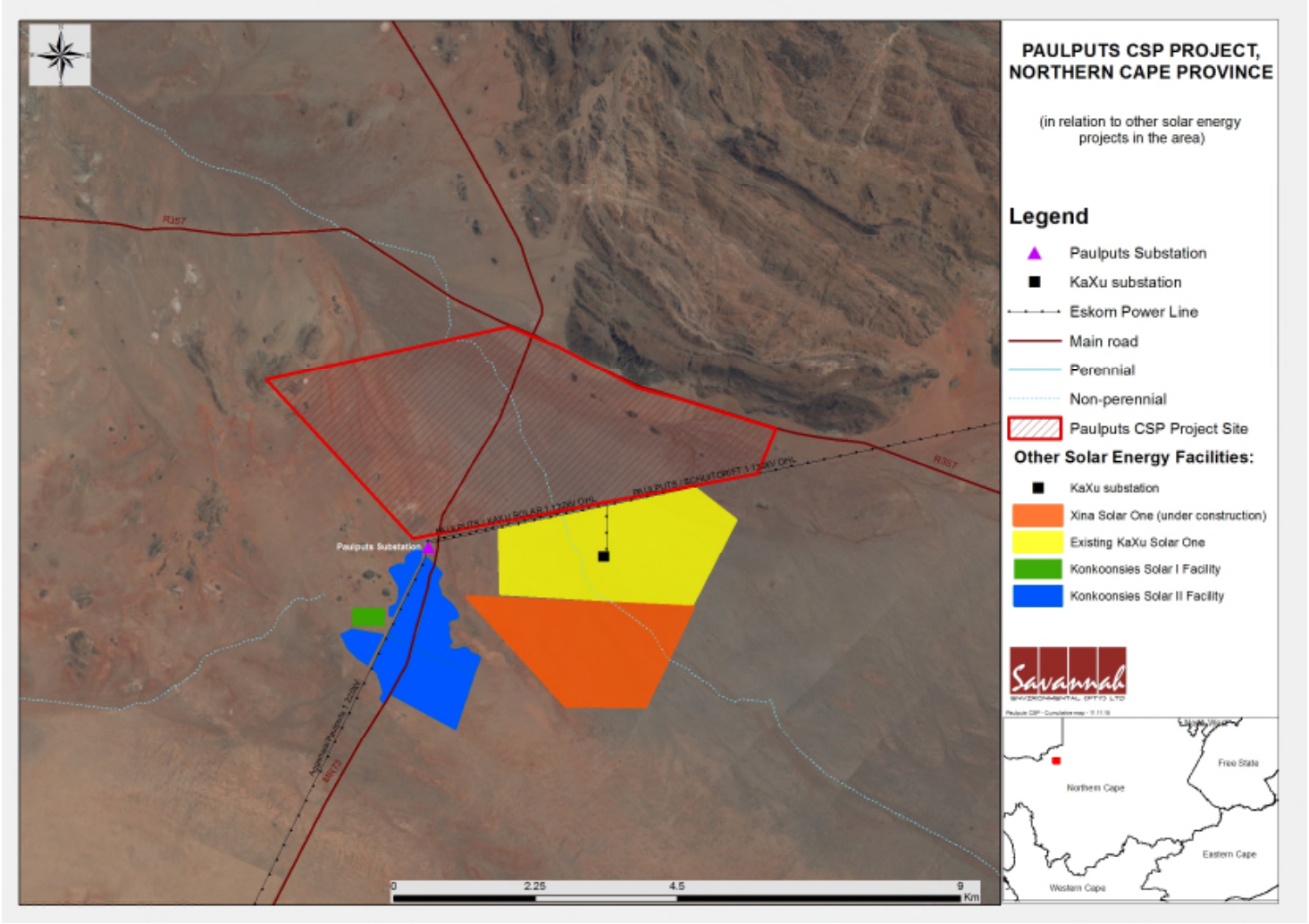

Figure 6.1: Map showing the location of the four solar projects in the study area in relation to the Paulputs CSP project

CONCLUSIONS
CHAPTER 7

Paulputs CSP RF (Pty) Ltd is proposing the development of a Concentrated Solar Power (CSP) Project and associated infrastructure on Portion 4 of the Farm Scuitklip 92, located approximately 45km north-east of Pofadder within the Khai-Ma Local Municipality in the Northern Cape. The Paulputs Concentrated Solar Power (CSP) Project is proposed to be up to 200MW in capacity and will be constructed over an area of approximately 900ha in extent within the broader property. The project is to be developed by Abengoa Solar Power South Africa (Pty) Ltd, through Paulputs CSP RF (Pty) Ltd, a Special Purpose Vehicle (SPV) to be established as the applicant for the project. The proposed project is to be known as the Paulputs CSP project.

The Scoping Report for the proposed Paulputs CSP Project has been undertaken in accordance with the EIA Regulations published in Government Notice 38282 of 4 December 2014, in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998).

This Scoping Report is aimed at detailing the nature and extent of this facility, identifying potential issues associated with the proposed project, and defining the extent of studies required within the EIA. This was achieved through an evaluation of the proposed project, involving the project proponent, specialist consultants, and a consultation process with key stakeholders (including relevant government authorities) and interested and affected parties (I&APs). The public consultation process is extensive and on-going, and every effort is being made to include representatives of all stakeholder groupings in the study area and the Province. This chapter concludes the Scoping Report and provides an evaluation of the identified potential environmental risks and impacts associated with the construction and operation phases of the Paulputs CSP Project. Recommendations regarding investigations required to be undertaken within the EIA are provided within the Plan of Study for EIA, contained within Chapter 8 of this scoping report.

The conclusions and recommendations of this Scoping Report are the result of the review of existing information (including previous detailed studies for the site), desk-top evaluations, on-site inspections of impacts identified by specialists and limited field work, with the aim of identifying risks and sensitivities on the proposed development site. The public consultation process is extensive and every effort is being made to include representatives of all stakeholder groupings in the study area and the Province.

7.1. Legal Requirements as per the EIA Regulations, 2014

This chapter of the scoping report includes the following information required in terms of Appendix 2: Content of the Scoping Report of the EIA Regulations, 2014:

Requirement	Relevant Section
(h)(xi) a concluding statement indicating the preferred alternatives, including the preferred location of the activity.	A concluding statement regarding the Paulputs the CSP Project is included within this chapter.

7.2. Conclusions drawn from the Evaluation of the Paulputs CSP Project

The Paulputs CSP Project is proposed to generate up to 200MW in capacity and will be constructed over an area of approximately 900ha in extent within the broader property. The Paulputs CSP Project will consist of the following infrastructure:

» Molten salt tower up to 300m in height with surrounding heliostat field
» Power island including salt storage tanks, steam turbine generator, heat exchangers, and dry cooled condenser
» On-site project substation, and short 132 kV power line to Eskom's existing Paulputs Transmission Substation
» Water supply abstraction point located at the Gariep River close to Onseepkans
» Filter and booster station at abstraction point
» Water supply pipeline along R357 Onseepkans Road to the site
» On-site lined ground water storage reservoir and various steel water tanks
» Lined evaporation ponds
» Packaged water treatment plant and associated chemical store
» Auxiliary wet cooled chiller plant
» Control room and office building
» Heliostat assembly building and workshop.

The majority of potential impacts identified to be associated with the construction of the Paulputs CSP Project are anticipated to be localised and restricted to the proposed site itself (apart from social impacts – job creation which could have more of a regional positive impact), while operational phase impacts range from local to regional and national (being the positive impact of contribution of clean energy as part of the energy mix in South Africa).

At a local level, the area has become a node for renewable energy projects due to the viability of the solar resource for the area and the availability of the Paulputs Substation, with the following constructed or preferred bidder projects located directly adjacent to, or in close proximity to, the project development site: Kaxu Solar One (CSP trough plant), Xina Solar One (CSP trough plant), Konkoonsies I Solar (PV plant), and Konkoonsies II Solar (PV plant). Key cumulative impacts associated with solar energy development within the immediate vicinity of the Paulputs CSP Project are expected to be associated with the construction impacts and resulting disturbance of the physical footprints of the facilities in one node/area, and the potential for a change in visual quality of the area.

No environmental fatal flaws or impacts of very high significance were identified to be associated with the proposed project on the identified site at this stage in the process. This conclusion must however be confirmed through a detailed investigation of the development footprint within the EIA Phase of the process.

7.3. Sensitivity analysis and Risks Associated with the Proposed Project

The potentially sensitive areas which have been identified through the scoping study are summarised and illustrated in the sensitivity map in **Figure 7.1**. The scoping phase sensitivity map provides an informed indication of sensitivity within and around the larger site. The detail is based on the desktop review of the available baseline information for the study area (including information from detailed EIA studies previously undertaken for the property), as well as a 10-day ecological field survey. The sensitivity map is intended to inform the location and layout of the Paulputs CSP Project, and must be used as a tool by the developer to avoid those areas flagged to be of no-go areas or of potential high sensitivity (as far as possible). Specific sensitivities identified within the scoping study are summarised below.

7.3.1. *Ecological Sensitivity*

The project site is restricted to the Bushmanland Arid Grassland vegetation type, which is the second most extensive vegetation type in South Africa and occupies an area of 45 478 km^2. The Bushmanland Arid Grassland is classified as Least Threatened, and has been minimally impacted by transformation as more than 99% of the original extent of the vegetation type is still intact. Loss or clearance in this vegetation type is therefore considered acceptable. On a local/site level, areas of high ecological function include the more inaccessible or unutilisable areas such as rocky outcrops should be regarded as no-go areas. These areas of high ecological function include Konkoonsieskop in the north western corner of the farm portion as well as Ysterberg located on the north eastern portion of the farm portion. The natural areas are considered to be of conservation importance due to the presence of Red Data species in these areas and should be avoided as far is reasonably possible. Such natural areas are located on the south western portion of the farm and to the eastern portion of the farm closer to Ysterberg (refer to Figure 7.1). The impacts for the construction and operational phase range from local to regional level. The most significant potential impacts expected are:

* Reduction of a stable vegetation cover and associated below-ground biomass that currently increases soil surface porosity, water infiltration rates and therefore improves the soil moisture availability. Without this vegetation, the soil will be prone to extensive surface capping, leading to accelerated erosion and further loss of organic material and soil seed reserves from the local environment.

* A loss of habitats, or the presence of protected plant species.
* Disturbed vegetation in the study area carries a high risk of invasion by alien invasive plants.

7.3.2. *Avifauna*

Sensitive avifaunal habitats on the site are linked to landform and habitat. The areas of high ecological function including the rocky outcrops (Konkoonsieskop in the north western corner of the farm portion as well as Ysterberg located on the north eastern portion of the farm portion) should be regarded as no-go areas. Other areas of high avifauna abundance will be confirmed following the completion of the seasonal monitoring at the site. The dry-season monitoring has confirmed 27 species on the site and the occurrence of two Red Data species – the Maccoa Duck and Lanner Falcon. Further monitoring will confirm habitat availability and occurrence of other local, migratory, and red data book species which could potentially occur on site. The impacts for the construction and operational phase range from local to regional level. The most significant potential impacts expected are:

* Disturbance or loss of habitat.
* Impact on birds attracted to solar thermal plant infrastructure and/or power line infrastructure.

7.3.3. *Water Resources*

No wetland features or defined drainage channels occur on the site. A dry wash feature is evident in the landscape, but has been impacted through development to the south of the site. Dry river beds may pose a flood risk to the development and are required to be managed through mitigation. Water abstraction to fulfil the water requirement of the facility may result in indirect impacts on water resources, i.e. the potential changes in water quantity within the Gariep (Orange) River which could impact on the water needs/allocations of downstream users. The impacts for the construction and operational phase range from local to regional level. The most significant potential impacts expected are:

* Impact on flow depth and velocity - Depth and velocity patterns may change under conditions of abstraction, which in turn may affect the quality of aquatic habitat.
* Impacts on downstream users - Abstractions may affect water availability for downstream users, especially under low river flow conditions.

7.3.4. *Soil, land use, land capability and agricultural potential*

The Paulputs CSP Project will not have a significant impact on the agricultural potential of the area. The current land use of the property is for two CSP projects, and the developer owns and manages the remaining extent. The primary use for

this land parcel is limited to grazing, and has very severe limitations to agricultural potential because the area is dominated by shallow soils without the properties needed to support sustainable agriculture. There are no identified highly sensitive areas with regards to agricultural potential and soil. There is the potential for the loss of soil resources through erosion, particularly during the construction phase. The most significant potential impacts at a local level are:

* Soil degradation during the construction phase.
* Loss of grazing land due to the direct impact by the infrastructure's footprint during all phases of the project.
* Loss of soil resources as a result of erosion during all phases of the project.

7.3.5. *Heritage and Palaeontology*

Potential areas of heritage sensitivity on the site include terrain close to hills or rocky features and the known road-side grave below Ysterberg. The open plains have been found to have sparsely scattered artefacts. The construction of the project could have a low impact on a local scale. Limited impact on palaeontological resources are envisaged due to the poor fossil assemblage in the local lithology. The most significant potential impact expected is:

* Disturbance and destruction of archaeological sites and graves.

7.3.6. *Noise*

A farmstead is located approximately 3 km north of the affected farm portion. Due to the limited period of and the localised nature of potential impacts, the noise scoping impact assessment sufficiently identified and quantified the significance of potential noise impacts on the surrounding environment. Therefore, no further noise impact assessment is required to be conducted in the EIA Phase. Sufficient information available to allow a relative high confidence in the projected noise levels. No noise impact is predicted.

7.3.7. *Visual sensitive receptors*

The site for the proposed CSP development is fairly remote and in an arid, sparsely populated area. The tower would potentially be visible from the N14 National Road 20km to the south, but distance would be a mitigating factor. The CSP tower is also 30km from the Gariep River, but the river is in a low-lying area and visibility is unlikely to be an issue.

A number of farmsteads occur, ranging from 5 to 20km distance from the proposed CSP tower. Pofadder is ~35km from the site and out of visual range of the proposed CSP development. The Augrabies National Park is more than 50km away and would also not be affected. The wilderness character of the area has been altered to some degree by the existing Kaxu CSP trough development, the Xina CSP project under construction, the Paulputs Substation and Eskom power line on the property. Visually sensitive landscape features include prominent rocky terrain and rock outcrops, and the R357 view corridor. The impacts for the construction and operational phase will be at a local to regional level. The most significant potential impacts expected are:

* Potential visual impact on users of roads in close proximity to the development node.
* Potential visual impact on residents of settlements and homesteads in close proximity to the solar energy facilities.
* Potential lighting impacts.

7.3.8. *Social*

The impacts for the construction and operational phase range from local to regional level. The most important potential social benefits associated with the construction and operation of the proposed project includes job opportunities and possible socio-economic spin-offs created. The most significant negative potential impacts expected are:

* Safety and security impacts.
* Pressure on economic and social infrastructure impacts from an in-migration of people.
* Visual impact and impacts on sense of place.
* The impacted farmland and adjacent farming areas where livestock farming may take place.
* Farmers/residents residing in the study area that currently utilize the access road to access their farms
* Nearby towns such as Onseepkans, Pofadder and Pella

7.3.9. Linear infrastructure: 132 kV power line and pipeline to the abstraction point

In order to connect the CSP plant to the Paulputs Substation, an overhead power line (132 kV distribution line) will be required from the facility's substation to the existing Eskom Paulputs Substation. It is proposed that the ~2 km line will traverse the site following a route adjacent/parallel to the existing linear infrastructure, where feasible.

Potential issues identified to be associated with the proposed power line includes impacts on flora, fauna and ecological processes, impacts on avifauna as a result of collisions and electrocutions, impacts on heritage sites and visual impacts. The alignment of the power line adjacent/parallel to existing linear infrastructure may partially mitigate the potential for negative impacts from the linear infrastructure.

The power line corridor will be identified within the EIA Phase in order to assess potential impacts and in order to make recommendations regarding a preferred alternative alignment and appropriate mitigation measures.

A water supply pipeline is proposed from the abstraction point on the Gariep River to the CSP site, a distance of 30km. It is proposed that the pipeline will follow a route adjacent/parallel to the existing linear infrastructure, that is, the Kaxu facility pipeline in the Onseepkans road reserve, where feasible.

Potential issues identified to be associated with the proposed pipeline corridor includes impacts on intact flora within the road reserve, and impacts on heritage

sites. The alignment of the pipeline within the Onseepkans road reserve, and adjacent/parallel to existing linear infrastructure will mitigate the potential for negative impacts from the linear infrastructure.

The pipeline corridor will be identified within the EIA Phase in order to assess potential impacts and in order to make recommendations regarding a preferred alternative alignment and appropriate mitigation measures.

7.4. Recommendations

At this stage in the process, there are no environmental fatal flaws associated with Paulputs CSP Project within the Portion 4 of the farm Scuitklip 92, and there is no reason for the Paulputs CSP Project not to be evaluated further. It is however recommended that the focus areas for the development of the facility be considered outside of the identified areas of a high sensitivity as far as possible.

With an understanding of which areas within the site are considered sensitive to the development of the proposed facility, Paulputs CSP RF (Pty) Ltd can prepare the detailed infrastructure layout for consideration within the EIA Phase. During the EIA phase more detailed environmental studies will be conducted in line with the Plan of Study contained in Chapter 8 of this report. These studies will consider the detailed layouts produced by the developer and make recommendations for the implementation of avoidance strategies (if required), mitigation and management measures to ensure that the final assessed layout retains an acceptable environmental impact.

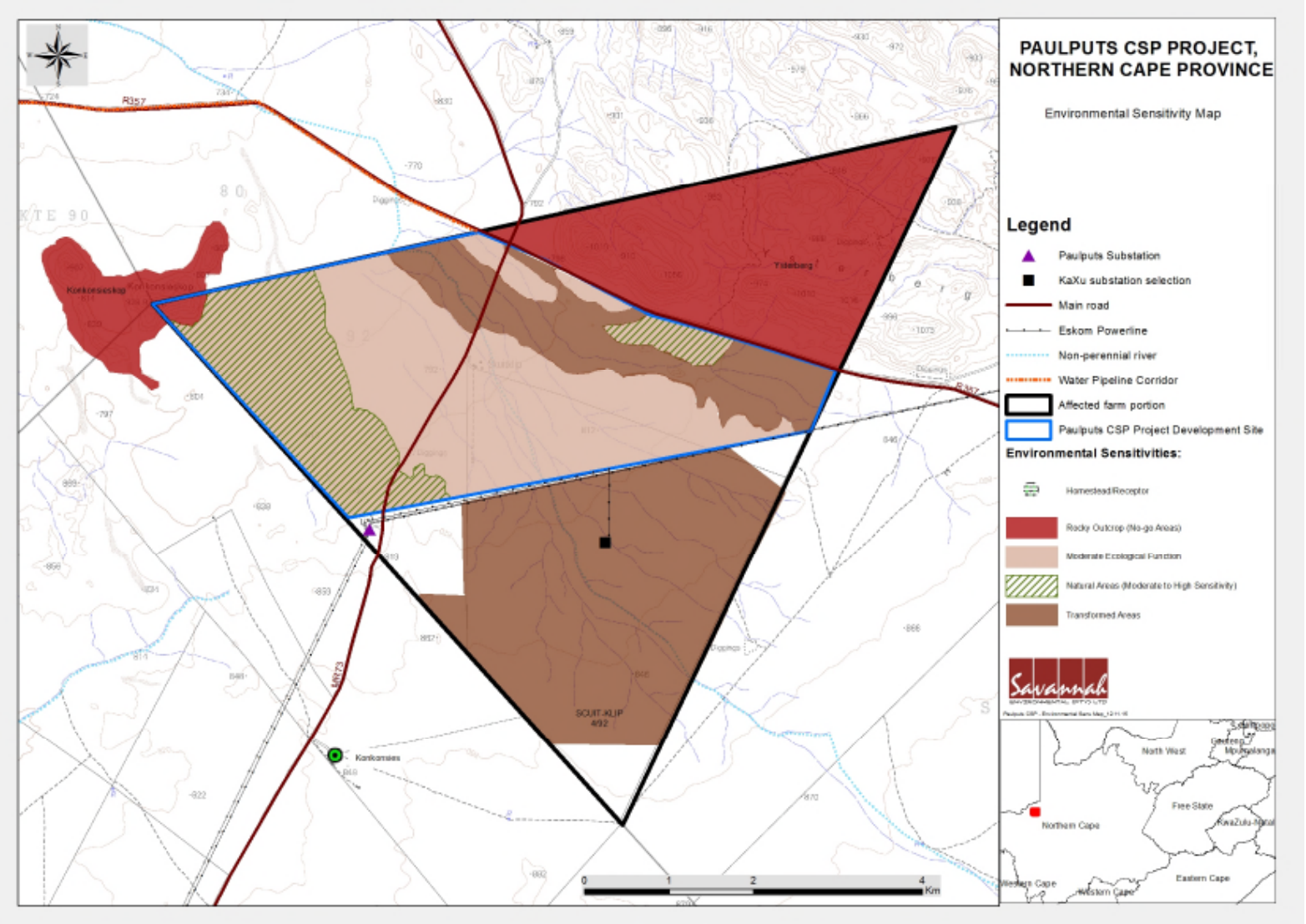

Figure 7.1: Preliminary sensitivity map of the Paulputs CSP Project based on sensitivities identified at Scoping Phase

PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT

CHAPTER 8

This Scoping Report includes a description of the nature and extent associated with the development of the proposed Paulputs CSP Project with details regarding the Scoping Phase, as well as the issues identified, described and evaluated. This chapter provides the Plan of Study for the Environmental Impact Assessment (EIA) which is relevant to the development phase for the CSP facility, based on the outcomes of the Scoping Study and associated specialist investigations.

The key findings of the Scoping Phase includes inputs from authorities, the public, the proponent and the EIA specialist team, and are used to inform the Plan of Study for EIA together with the requirements of the NEMA EIA Regulations of 2014 and applicable guidelines. The Plan of Study describes how the EIA Phase will proceed and includes details of the detailed specialist studies required to be undertaken for those potential impacts recorded to be of potential significance.

8.1 Legal Requirements as per the EIA Regulations, 2014

This chapter of the scoping report includes the following information required in terms of Appendix 2: Content of the Scoping Report of the EIA Regulations, 2014:

Requirement	Relevant Section
(i) a plan of study for undertaking the environmental impact assessment process to be undertaken	A plan of study for the undertaking of the EIA phase for the CSP facility is included within this chapter.

8.2 Aims of the EIA Phase

The EIA Phase to be undertaken for the CSP facility will aim to achieve the following:

» Provide an overall description of the social and biophysical environment affected by the development of the proposed CSP facility.
» Assess potentially significant impacts (direct, indirect and cumulative, where required) associated with the proposed CSP facility.
» Identify and recommend appropriate mitigation measures for potentially significant environmental impacts.
» Undertake a fully inclusive public involvement process to ensure that I&APs are afforded the opportunity to participate, and that their issues and concerns are recorded.

The EIA will address potential environmental impacts and benefits (direct, indirect and cumulative impacts) associated with each life-cycle stage of the development including design, construction, and operation and decommissioning; and will aim to provide the environmental authorities with sufficient information to make an informed decision regarding the proposed projects. The detailed facility layout will be assessed through detailed specialist studies. As required in terms of the EIA Regulations the assessment will include consideration of the 'do nothing' alternative.

8.3 Authority Consultation

Consultation with the regulating authorities (i.e. DEA and DENC) has been undertaken in the Scoping phase and will continue throughout the EIA process. On-going consultation will include the following:

» Submission of a Final Scoping Report following a 30-day review period (and consideration of comments received).
» Submission of an EIA Report for review and comment.
» Submission of a Final EIA Report following a 30-day review period.
» Consultation and a site visit with DEA and DENC (if required) in order to discuss the findings and conclusions of the EIA Report.

8.5 Assessment of Potential Impacts and Recommendations regarding Mitigation Measures

Through the Scoping Study, the following issues were concluded to have impacts of negligible to low significance:

» Impacts on agricultural potential
» Impacts on palaeontological resources
» Noise impacts

As concluded by the specialists, no further studies in this regard are required to be undertaken. Mitigation measures recommended within these studies are however required to be included within the project Environmental Management Programme (EMPr), which is to be compiled in the EIA Phase of the process.

A summary of the issues which require further investigation within the EIA phase, as well as the proposed activities to be undertaken in order to assess and ground-truth the significance of these potential impacts is provided within **Table 8.1**. The specialists involved in the EIA Phase are also reflected within this table. These specialist studies will consider the development footprints proposed for the facility and all associated infrastructure, as well as feasible and reasonable alternatives identified for the project.

Table 8.1: Summary of the issues which require further investigation within the EIA phase and activities to be undertaken in order to assess the significance of these potential impacts relevant to the Paulputs CSP Project

Issue	Terms of Reference for EIA study: Activities to be undertaken in order to assess significance of impacts	Specialist
Soils,	The EIA Phase will include the following activities: » Soil erosion potential: o Conduct a site visit to confirm the physical and geological information used in this report and to collect visual information pertaining to the soil types and their geotechnical engineering properties. o Assess the present state of erosion, identify critical areas in terms of erosion, and produce a map identifying these areas. o Provide achievable mitigation measures to erosion during the construction phase. Assessment of Impacts for the EIA: This methodology assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. Environmental Management Programme: For each overarching anticipated impact, management recommendations for the design, construction, and operational phase will be drafted.	Jaco Jansen (Savannah Environmental) and Jasper Dreyer (North West University)
Ecology (flora and fauna)	The EIA Phase will include the following activities: Ecological field study and report (flora and fauna) » Second field survey in the wet season.	Adrian Hudson (Hudson Ecology)

Issue	Terms of Reference for EIA study: Activities to be undertaken in order to assess significance of impacts	Specialist
	» Establish the condition of the vegetation and the relative distribution of habitats in moderate to good condition following a wet season survey. General vegetation condition will be assessed during the second field survey in order to identify areas that are in good condition versus those areas in poor condition. » The presence and functioning of a wash feature on site will be confirmed. The upper reaches of the remaining wash feature are impacted by the Xina and Kaxu facilities. » be evaluated. For plant species this will be done by searching for populations that could occur in the study area based on habitat requirements and historical collection records. For animal species this will be done by assessing habitat suitability for those species that have been assessed as potentially occurring in the area. Particular attention will be paid to those species classified as Red Data Species. » Undertake a field study including a detailed assessment of sensitive, protected and red data species (flora and fauna) affected by the proposed CSP development footprint including the potential impact on slow growing protected trees (if any) and where possible avoidance of such trees. » Assessment the impact on riparian vegetation at the water abstraction point at the Gariep (locally known as the Orange) River. The riparian Lower Gariep Alluvial Vegetation type is classified as 'endangered' and the NFA listed protected and rare Ebony tree (*Euclea pseudebenus*) species is associated with this vegetation type in the vicinity of Onseepkans. » Generate a habitat association map of the project site within the larger solar park based on field observations. » A detailed sensitivity map will be produced and will include mapping and incorporation of any sensitive features that may occur on site. » The presence of species of concern will consider the nature of impacts specific to the CSP technology and associated infrastructure including proposed power lines, substations, evaporation ponds, access roads, pipelines etc. » Confirm and map the spatial relationship of the ESA with the project site and larger solar park study area based on fine scale ecological processes, field observations and habitat suitability. » Investigate the alien species on site and provide input into the Invasive Plant Management Plan for inclusion in the EMPr. » Identification and assessment of all potential impacts (direct, indirect and cumulative) identified in the scoping phase report.	

Issue	Terms of Reference for EIA study: Activities to be undertaken in order to assess significance of impacts	Specialist
	» Recommendations for the management of identified site-specific and project-specific impacts. Bio-regional planning and Ecological Support Area (ESA) confirmation » Determine the impact of the proposed project on the Ecological Support Area (ESA) delineated in terms of the Namakwa District Municipality Environmental Management Framework (NEMF) and described as a faunal migratory corridor. » Initiate a meeting with the Provincial Conservation Authority (Department of Environment and Nature Conservation - DENC) to discuss the relationship of the proposed project to the ESA. » Determine, in consultation with DENC, any specific requirements with respect to the methodology or scope of the ecological field study to be performed prior to initiating the field study. <u>Assessment of Impacts for the EIA:</u> This methodology assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. <u>Environmental Management Programme:</u> For each overarching anticipated impact, management recommendations for the design, construction, and operational phase will be drafted.	
Avifauna	<u>The EIA Phase will include the following activities:</u> » Second field survey in the wet season. Methodology to include: o Vantage point surveys; o Transects during bird-active hours; and o Investigation of the tower facility, associated infrastructure and heliostat field.	Adrian Hudson (Hudson Ecology)

Issue	Terms of Reference for EIA study: Activities to be undertaken in order to assess significance of impacts	Specialist
	o All species will be identified where possible using binoculars, and the number of individual birds and the perpendicular distance to them recorded. o Calculate the density (birds per unit area and km) and the species richness in each area using the survey data recorded. o Record the position of all active nests found through the project site. o Survey each habitat type independently for bird species richness and bird abundance » A detailed sensitivity map will be produced and will include mapping and incorporation of any sensitive features that may occur on site. » The presence of species of concern will be evaluated. » Based on the information gathered, several impacts have been identified and will be quantified in sections below: o Impact on local bird communities due to habitat loss o Impact on local bird community due to disturbance created by the construction of the facility » Consider the nature of impacts specific to the CSP technology and associated infrastructure including proposed power lines, substations, evaporation ponds, access roads, pipelines etc. » Confirm the identified habitats supporting birdlife on the project site. » Where possible, describe the seasonal variation in the presence of threatened and endemic species. » Identify and map areas of impacts or risk areas for birds resulting from construction and operational phase activities (including power line collisions, habitat loss, and singeing). » Consider whether identified risk areas could affect the siting of the facility. » Provide recommendations for the mitigation of impacts associated with the construction and operational phases of the proposed development. <u>Assessment of Impacts for the EIA:</u> This methodology assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected.	

Issue	Terms of Reference for EIA study: Activities to be undertaken in order to assess significance of impacts	Specialist
	For each anticipated impact, recommendations will be made for desirable mitigation measures. Environmental Management Programme: For each overarching anticipated impact, management recommendations for the design, construction, and operational phase will be drafted.	
Water Resources assessment	The EIA Phase will include the following activities: » An assessment of the aquatic biodiversity of the study area. This will cover the development footprint in relation to available ecological information related to wetland and riverine ecosystems functioning within the region. Even though these are limited within the study region, the cumulative impact and mitigations need to be addressed when considering the increase in hard surface areas. » A map demarcating the relevant local drainage area of the respective waterbodies, within a 500m radius of the study area. This will demonstrate, from a holistic point of view the connectivity between the site and the surrounding regions, i.e. the zone of influence. » The determination of the ecological state of any aquatic areas, estimating their biodiversity, conservation and ecosystem function importance with regard ecosystem services. Note that this determination will not include avifaunal, herpetological or invertebrate studies; however possible habitat for species of special concern would be commented on. » Recommend specific actions that could enhance the aquatic functioning in the areas, allowing the potential for a positive contribution by the project, e.g. useful of artificial wetlands in stormwater control Assessment of Impacts for the EIA: This methodology assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected.	Brian Colloty (Scherman Colloty & Associates)

Issue	Terms of Reference for EIA study: Activities to be undertaken in order to assess significance of impacts	Specialist
	For each anticipated impact, recommendations will be made for desirable mitigation measures. Environmental Management Programme: For each overarching anticipated impact, management recommendations for the design, construction, and operational phase will be drafted.	
Heritage Resources	The EIA Phase will include the following activities: The EIA Process needs to fulfil the requirements of a Heritage Impact Assessment as defined in section 38 of the National Heritage Resources Act (Act No. 25 of 1999). In order to do so, the following will be required during the EIA Phase: » A site visit will be carried out to inspect various parts of the terrain on foot, focusing on areas of expected impact (construction of plant, substation, and secondary infrastructure such as roads, pipelines, and power lines). While surveys have been conducted in the region providing an idea of what heritage resources to anticipate, the specific area of proposed development has not been surveyed for heritage (archaeological) resources. » Once sites are plotted they would be assessed in terms of the significance of the site relative to the known heritage of the region. This will provide a quantifiable measure for defining significance as a basis for recommendations to be made. » Nineteenth- and twentieth-century cultural history and intangible heritage values attached to places would need to be assessed but may be difficult to recover owing to the sparse population. Assessment of Impacts for the EIA: In addition to guidelines provided by the National Heritage Resources Act (Act No. 25 of 1999), a set of criteria based on Deacon (nd) and Whitelaw (1997) for assessing archaeological significance has been developed for Northern Cape settings (Morris 2000a). These criteria include estimation of landform potential (in terms of its capacity to contain archaeological traces) and assessing the value to any archaeological traces (in terms of their attributes or their capacity to be construed as evidence, given that evidence is not given but constructed by the investigator). This methodology assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The	David Morris (McGregor Museum Department of Archaeology)

Issue	Terms of Reference for EIA study: Activities to be undertaken in order to assess significance of impacts	Specialist
	significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. <u>Environmental Management Programme:</u> For each overarching anticipated impact, management recommendations for the design, construction, and operational phase will be drafted.	
Visual	<u>The EIA Phase will include the following activities:</u> A field investigation and more detailed visual assessment of the proposed development and related infrastructure will be made of the preferred layout during the EIA Phase of the project. Given the scale and industrial nature of the proposed CSP facility, a Level 4 visual input study would be required at the VIA stage » A visual survey of the site and surroundings including a photographic record. » Identification of important landscape / scenic features, viewpoints, view corridors and visually sensitive receptors in relation to the proposed CSP development. » Updated viewshed mapping, based on the preferred layout, to determine the visual exposure of the proposed development. » The use of 3D modelling and photographic montages to determine the visual effect of the proposed development. » The assessment of potential visual impacts / benefits using the visual criteria outlined in Section 13 above. » The rating of visual impacts and benefits, and overall visual significance, using the required standardized format and significance weightings. » The formulation of visual mitigation measures to form part of the Environmental Management Programme, (EMPr).	Quinton Lawson, MLB Architects and Bernard Oberholzer (Bernard Oberholzer Landscape Architects)

Issue	Terms of Reference for EIA study: Activities to be undertaken in order to assess significance of impacts	Specialist
	» The identification of the preferred alternative and any residual visual impacts, including cumulative impacts. Assessment of Impacts for the EIA: This methodology assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. Environmental Management Programme: For each overarching anticipated impact, management recommendations for the design, construction, and operational phase will be drafted. The following visual mitigation measures should be employed in the layout design of the proposed CSP facility: » Prominent rocky terrain, isolated rock outcrop features and drainage courses should be avoided. A visual buffer of 250m should be provided between the development and the R357 district road. » Internal powerlines should be underground as far as possible. Overhead powerlines could make use of monopoles. Powerline trenches should ideally follow the same alignment as the access roads to minimise disturbance. » Substations and maintenance buildings should be sited in unobtrusive, low-lying areas, away from the R357 district road. Structures, including staff accommodation, should be grouped to avoid a visually scattered effect. » Internal access roads should avoid drainage courses and kept as narrow as possible to minimise their visual effect on the landscape.	
Social	The EIA Phase will include the following activities:	Candice Hunter, (Savannah

Issue	Terms of Reference for EIA study: Activities to be undertaken in order to assess significance of impacts	Specialist
	» Describing and obtaining an understanding of the proposed development (type, scale, location), the communities likely to be affected and determining the need and scope of the SIA; » Collecting baseline data on the current social environment and historical social trends; » Identifying and collecting data on the Social Impact Assessment variables and social change processes related to the proposed intervention. This requires consultation with affected individuals and communities; » Assessing and documenting the significance of social impacts associated with the proposed project; » Assessing the project (including any feasible alternatives) and identifying potential mitigation and enhancement measures; » A site visit will be undertaken. Observations will also be made while on site and within the study area. » Meetings will be undertaken to collect information from representatives of key stakeholder groups. These included individuals both directly and indirectly associated with the proposed development. The meetings will mostly be undertaken face-to-face and where not possible telephonically. A project specific questionnaire will be developed and utilized for the semi-structured interviews. These meetings will form the basis of the primary data collection and assisted with the gathering of baseline information as well as establishing the stakeholder's perceptions, interests and concerns on the proposed development. Secondary data collection methods mostly centred on desktop study will be gathered and analysed for the purpose of the study, in which the following documents will be examined: » Other technical specialist studies undertaken for the Scoping and EIA will feed into the SIA. » The comments and responses report (compiled from the public participation process completed as part of the scoping phase) » Data primarily retrieved from Census data, the 2011 Census Survey. » Planning documentation such as District Municipality (DM) Integrated Development Plans (IDPs), Spatial Development Framework (SDF) and Environmental Management Framework (EMF) as well as Local Municipality (LM) IDPs and policies.	Environmental with external review by Neville Bews)

Issue	Terms of Reference for EIA study: Activities to be undertaken in order to assess significance of impacts	Specialist
	» Review of relevant guidelines, policies and plan frameworks in relation to the project and in relation to the area will be utilised. <u>Assessment of Impacts for the EIA:</u> This methodology assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. <u>Environmental Management Programme:</u> For each overarching anticipated impact, management recommendations for the design, construction, and operational phase will be drafted.	

8.3. Consideration of Alternatives

The following project alternatives will be investigated in the EIA:

» **The 'do nothing' alternative:** The applicant does not establish the Paulputs CSP Project or associated infrastructure (maintain status quo).
» **Site-specific alternatives:** The following site access alternatives have been considered though prefeasibility assessments.
»
» Access road 1: Access to site from the N14 national road via the existing R357 Onseepkans road used to access the farm, and the CSP facilities on this farm. This road is to the east of the farm portion. The access point to the site is 17km from the N14, with a formal entrance to the existing CSP facilities off of this public road. This section of the R357 is a tarred road.
» Access road 2: Access to site from the N14 national road via the existing R358 and minor road MR73. This road is to the west of the farm portion. The access point to the site is 30km from the N14.

» Two alternative access routes to access the site will be further considered through the environmental studies. The final design for the access road will be finalised during the EIA phase. A realignment of the MR37 road where it traverses the Scuitklip farm is proposed and discussions regarding the realignment are underway with the Northern Cape Department of Roads and Public Works (NC DR & PW).

8.4. Assessment of Potential Impacts and Recommendations regarding Mitigation Measures

A summary of the issues which require further investigation within the EIA phase, as well as the proposed activities to be undertaken in order to assess the significance of these potential impacts is provided in Table 8.1. The specialists which have been involved in the Scoping Phase and are to be involved in the EIA Phase are also reflected in this table. These specialist studies will consider the study area proposed for the development of the project components and will assess all project components and feasible alternatives.

8.6 Methodology for the Assessment of Potential Impacts

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

» The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.

- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional:
  - local extending only as far as the development site area – assigned a score of 1;
  - limited to the site and its immediate surroundings (up to 10 km) – assigned a score of 2;
  - will have an impact on the region – assigned a score of 3;
  - will have an impact on a national scale – assigned a score of 4; or
  - will have an impact across international borders – assigned a score of 5.
- The **duration**, wherein it will be indicated whether:
  - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - medium-term (5–15 years) – assigned a score of 3;
  - long term (> 15 years) - assigned a score of 4; or
  - permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  - 0 is small and will have no effect on the environment;
  - 2 is minor and will not result in an impact on processes;
  - 4 is low and will cause a slight impact on processes;
  - 6 is moderate and will result in processes continuing but in a modified way;
  - 8 is high (processes are altered to the extent that they temporarily cease); and
  - 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** *of occurrence*, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale, and a score assigned:
  - Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
  - Assigned a score of 2 is improbable (some possibility, but low likelihood);
  - Assigned a score of 3 is probable (distinct possibility);
  - Assigned a score of 4 is highly probable (most likely); and
  - Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- the **significance**, which shall be determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- the **status**, which will be described as either positive, negative or neutral.
- the degree to which the impact can be reversed.
- the degree to which the impact may cause irreplaceable loss of resources.
- the *degree* to which the impact can be *mitigated.*

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

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

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

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

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

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

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

» The details and expertise of the **EAP** who prepared the report.
» The **location** of the activity and a locality map illustrating the location of the proposed activity.
» A **description** of the scope of the proposed activity including all listed activities triggered and a description of associated structures and infrastructure.
» The **policy and legislative** context within which the development is located and an explanation of how the development complies and responds to the legislation and policy context.
» The **need and desirability** of the proposed development of the activity in the context of the preferred location.
» A motivation for the **preferred development footprint** within the approved site.
» A description of the **process** followed to reach the proposed development footprint within the approved site, including:
  * details of the development footprint considered;

- details of the public participation process undertaken in terms of Regulation 41 of the 2014 EIA Regulations, including copies of supporting documents;
- a summary of issues raised by interested and affected parties and the manner in which the issues were incorporated;
- the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;
- the impacts and risks identified including the nature, significance, consequence extent, duration and probability of the impacts, including the degree to which these impacts can be reversed, may cause irreplaceable loss of resources and can be avoided, managed or mitigated;
- the methodology used for determining and ranking the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks;
- positive and negative impacts that the activity and alternatives will have on the environment and the community;
- possible mitigation measures to be applied and the level of residual risk;
- a motivation for not considering alternative development locations (if applicable);
- a concluding statement indicating the preferred alternative development location; and
- a full description of the process followed to identify, assess and rank impacts of the activity and associated infrastructure on the preferred location including all environmental issues and risks that have been identified and an assessment of the significance of each issue and risk and the extent to which the issue/risk can be avoided or mitigated.

» An **assessment** of the identified potentially significant impacts and risks.
» A summary of the **findings and recommendations** of any specialist report and an indication as to how these findings and recommendations have been included.
» An **environmental impact assessment** containing a summary of key findings, an environmental sensitivity map and a summary of the positive and negative impacts and risks of the proposed activity.
» **Recommendations** from specialist, the recording of proposed impact management **objectives** and the impact management **outcomes** for inclusion in the **EMPr** as well as inclusion as conditions of authorisation.
» The final **alternatives** which respond to the impact management measures, avoidance and mitigation measures identified.
» Any aspects which were **conditional** to the findings of the assessment.
» Description of the assumptions, uncertainties and gaps in knowledge relating to the assessment and mitigation measures proposed.
» An **opinion** as to whether the proposed activity should or should not be authorised and the conditions thereof.

» An undertaking under **affirmation** by the EAP in relation to the correctness of the information, the inclusion of comments and inputs from stakeholders and Interested and affected parties, the inclusion of inputs and recommendations from the specialists and any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties.
» Any specific information that may be required by the competent authority.

The Draft EIA Report will be released to the public and relevant Organs of State for a 30-day review period. The comments received from I&APs will be captured within a Comments and Response Report, which will be included within the Final EIA Report, for submission to the authorities for decision-making.

8.7 Public Participation Process

A public participation process will be undertaken by Savannah Environmental during the EIA phase. Consultation with key stakeholders and I&APs will be on-going throughout the EIA Phase. Through this consultation process, stakeholders and I&APs will be encouraged to verify that their issues were recorded in the Scoping Phase and to identify additional issues of concern or highlight positive aspects of the Paulputs CSP Project and to comment on the findings of the EIA Phase. In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their inputs, various opportunities will be provided for stakeholders and I&APs to be involved in the EIA Phase of the process, as follows:

» Focus group or public meetings (pre-arranged and I&APs invited to attend).
» One-on-one consultation meetings (for example with directly affected and surrounding landowners).
» Telephonic consultation sessions (consultation with various parties from the EIA project team, including the public participation consultant, lead EIA consultant as well as specialist consultants).
» Written, faxed or e-mail correspondence.

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

8.8 Key Milestones of the Programme for the EIA

The envisaged key milestones of the programme for the EIA Phase are outlined in the following table (and include indicative dates):

Key Milestone Activities	Proposed timeframe
Make Scoping Report available to the public, stakeholders and authorities (30 days)	13 November 2015 to 14 December 2015
Finalisation of Scoping Report, and submission of the Final Scoping Report to DEA	December 2015
Authority acceptance of the Final Scoping Report and Plan of Study to undertake the EIA	February 2016
Undertake specialist studies and public participation process	January 2016 to March 2016
Make Draft EIA Report and EMPr available to the public, stakeholders and authorities	March 2016
Finalisation of EIA Report, and submission of the Final EIA Report to DEA	April 2016
Authority review period and decision-making (107 calendar days)	April 2016 – August 2016

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