KOTULO TSATSI ENERGY PV3

Northern Cape Province

Final Scoping Report

November 2020

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PROJECT DETAILS

Title : Environmental Impact Assessment Process: Final Scoping Report for the Kotulo Tsatsi Energy PV3, Northern Cape Province

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Client : Kotulo Tsatsi Energy (Pty) Ltd

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When used as a reference this report should be cited as: Savannah Environmental (2020), Final Scoping Report for the Kotulo Tsatsi Energy PV3, Northern Cape Province.

PURPOSE OF THE SCOPING REPORT AND INVITATION TO COMMENT

The Applicant, **Kotulo Tsatsi Energy (Pty) Ltd**, is proposing the construction of a photovoltaic (PV) solar energy facility (known as the Kotulo Tsatsi Energy PV3) located on a site located approximately 70km south-west of the town of Kenhardt and 60km north east of Brandvlei in the Northern Cape Province. The solar energy facility will comprise several arrays of PV panels and associated infrastructure and will have a contracted capacity of up to 200MW. The facility will be located within the farm Portion 2 of Farm Styns Vley 280. The project site falls under the Hantam Local Municipality which is part of Namakwa District Municipality. The solar PV facility will be connected to the grid via a previously authorised grid connection solution, which consists of a collector substation switching station and a power line to the Eskom Aries Substation located north-east of the project site. The site is accessible via an existing gravel farm road (known as Soafskolk Road) which provides access to the farm off of the R27 which is located east of the project site.

Kotulo Tsatsi Energy (Pty) Ltd appointed Savannah Environmental as the independent environmental consultant to undertake the Environmental Impact Assessment (EIA) for the proposed project. The EIA process is being undertaken in accordance with the requirements of the 2014 EIA Regulations, as amended, promulgated in terms of the National Environmental Management Act (NEMA; Act No. 107 of 1998).

This Final Scoping Report represents the findings of the Scoping Phase of the EIA process and contains the following chapters:

- **Chapter 1** provides background to the Kotulo Tsatsi Energy PV3 project and the environmental impact assessment.
- **Chapter 2** provides a project description of the Kotulo Tsatsi Energy PV3 project.
- **Chapter 3** describes identified project alternatives.
- **Chapter 4** outlines strategic regulatory and legal context for energy planning in South Africa and specifically relating to the project.
- **Chapter 5** describes the need and desirability of Kotulo Tsatsi Energy PV3.
- **Chapter 6** outlines the approach to undertaking the Scoping/EIA process.
- **Chapter 7** describes the existing biophysical and social environment within and surrounding the study and development area.
- **Chapter 8** provides an identification and evaluation of the potential issues associated with the proposed solar PV facility and associated infrastructure.
- **Chapter 9** presents the conclusions of the scoping evaluation for the Solar PV Facility.
- **Chapter 10** describes the Plan of Study (PoS) for the EIA phase.
- **Chapter 11** provides references used to compile the Final Scoping report.

The Scoping Report was made available for review from **23 October 2020 – 23 November 2020** at http://www.savannahsa.com/public-documents/energy-generation/kotulo-tsatsi-solar-development/. All comments received and recorded during the 30-day review and comment period have been included, considered and addressed within this Final Scoping report for the consideration of the National Department of Environment, Forestry and Fisheries (DEFF).

EXECUTIVE SUMMARY

Kotulo Tsatsi Energy (Pty) Ltd is proposing the development of a solar energy facility. PV technology is proposed to be utilised for the generation of electricity, and the Kotulo Tsatsi Energy PV3 facility will have a contracted capacity of up to 200MW. Infrastructure associated with the solar PV facility will include:

- Solar PV array comprising PV modules and mounting structures.
- Inverters and transformers.
- Cabling between the project components.
- On-site facility substation to facilitate the connection between the solar PV facility and the Eskom electricity grid.
- Battery Energy Storage System (BESS).
- Site offices and maintenance buildings, including workshop areas for maintenance and storage.
- Laydown areas and temporary man camp area.
- Access roads, internal distribution roads and fencing around the development area.

The PV facility is planned to be located adjacent to the authorised 100MW Kotulo Tsatsi PV2 facility, and within an area previously authorised for CSP project infrastructure. Site-specific studies and assessments will delineate areas of potential sensitivity within the identified project site. Once constraining factors have been confirmed, the layout of the solar PV facility can be planned to minimise social and environmental impacts. Two (2) additional 200MW PV facilities (Kotulo Tsatsi Energy PV1 and Kotulo Tsatsi Energy PV4) are concurrently being considered adjacent to the project site (on Portion 2 of Farm Kopjes Vley 281, and Portion 3 of Farm Styns Vley 280) and are to be assessed through separate Environmental Impact Assessment (EIA) processes.

From a regional perspective, the Kenhardt area is considered favourable for the development of a commercial solar energy facility by virtue of prevailing climatic conditions, relief, aspect, the extent of the affected property, the availability of a direct grid connection (i.e. a point of connection to the national grid) and the availability of land on which the development can take place. Furthermore, other authorised solar facilities are located within the study area to the west of the development area.

Kotulo Tsatsi Energy PV3 is planned to be bid into the Department of Mineral Resource and Energy's (DMRE) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme with the aim of evacuating the generated power into the national grid. This will aid in the diversification and stabilisation of the country's electricity supply with Kotulo Tsatsi Energy PV3 set to inject up to 200MWAC into the national grid.

The majority of potential impacts identified to be associated with the construction of Kotulo Tsatsi Energy PV3 are anticipated to be localised and restricted to the identified development envelope itself, while operation phase impacts/benefits range from local to regional. No environmental fatal flaws were identified to be associated with the development area. Features within the larger area have, however, been identified as 'no-go' areas or areas of high ecological impact that should be avoided by the development footprint. A development envelope has been identified to avoid these areas of sensitivity present within the development area and therefore avoidance of sensitive features is considered a necessity for the placement of infrastructure early in the EIA process (**Figure 1**). The development envelope will be fully assessed during the EIA Phase.

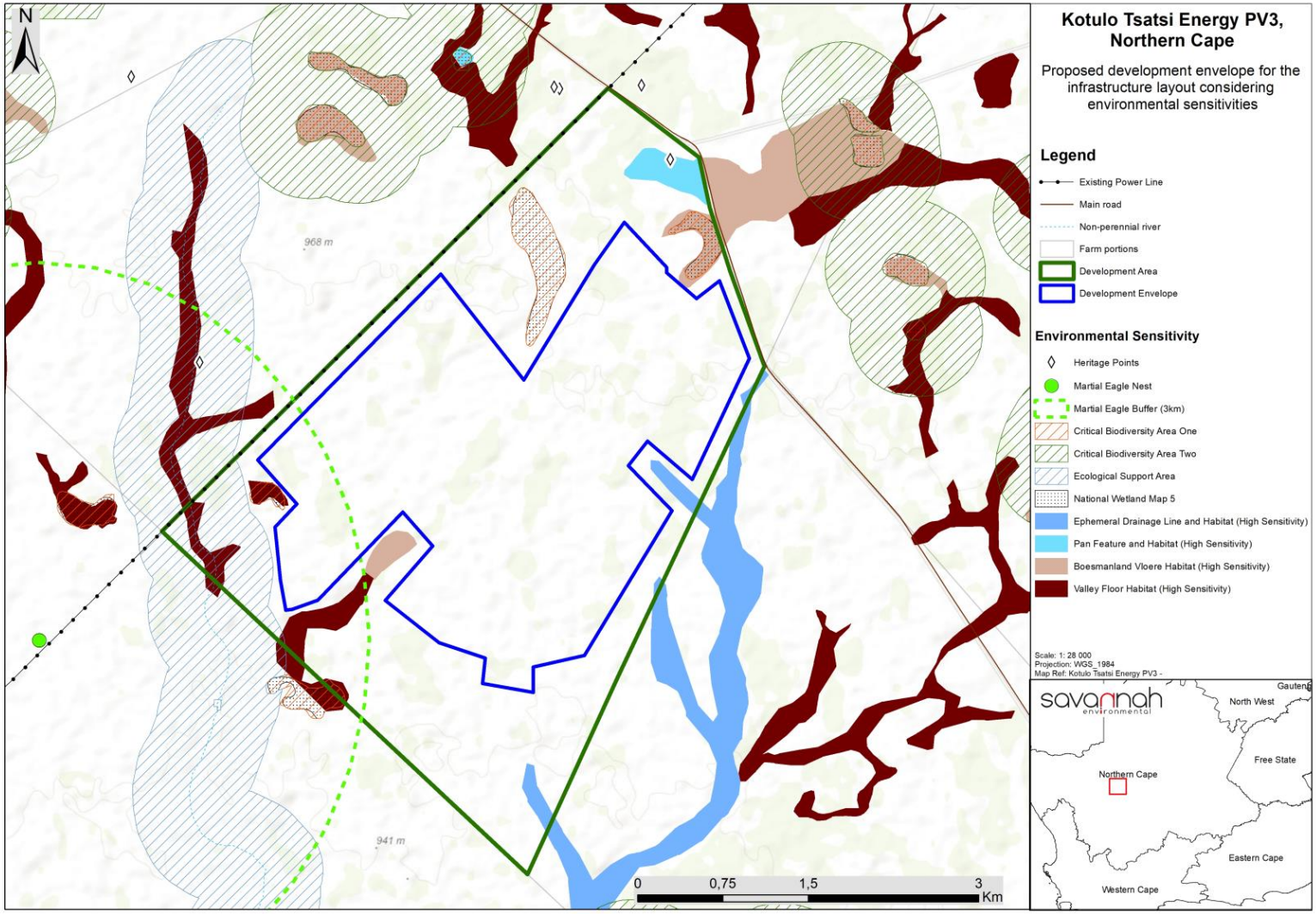

Figure 1: Environmental Sensitivity Map from the results of the scoping evaluation for the Kotulo Tsatsi Energy PV3, indicating the recommended development envelope to be assessed within the EIA Phase

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APPENDICES LIST

CHAPTER 1 INTRODUCTION

The Applicant, Kotulo Tsatsi Energy (Pty) Ltd, is proposing the construction of a photovoltaic (PV) solar energy facility (known as the Kotulo Tsatsi Energy PV3) located on a site located approximately 70km south-west of the town of Kenhardt and 60km north east of Brandvlei in the Northern Cape Province (refer to **Figure 1.1**). The solar energy facility will comprise several arrays of PV panels and associated infrastructure and will have a contracted capacity of up to 200MW. The facility will be located within the farm Portion 2 of Farm Styns Vley 280. The project site[8] falls under the Hantam Local Municipality which is part of Namakwa District Municipality. The solar PV facility will be connected to the grid via a previously authorised grid connection solution[9], which consists of a collector substation, switching station and a power line to the Eskom Aries Substation located north-east of the project site. The site is accessible via an existing gravel farm road (known as Soafskolk Road) which provides access to the farm off of the R27 which is located east of the project site.

The PV facility is planned to be located adjacent to the authorised 100MW Kotulo Tsatsi PV2 facility, and within an area previously authorised for CSP project infrastructure. Site-specific studies and assessments will delineate areas of potential sensitivity within the identified project site. Once constraining factors have been confirmed, the layout of the solar PV facility can be planned to minimise social and environmental impacts. Two (2) additional 200MW PV facilities (Kotulo Tsatsi Energy PV1 and Kotulo Tsatsi Energy PV4) are concurrently being considered adjacent to the project site (on Portion 2 of Farm Kopjes Vley 281, and Portion 3 of Farm Styns Vley 280) and are to be assessed through separate Environmental Impact Assessment (EIA) processes. The location of the development areas is indicated in **Figure 1.2**.

From a regional perspective, the Kenhardt area is considered favourable for the development of a commercial solar energy facility by virtue of prevailing climatic conditions, relief, aspect, the extent of the affected property, the availability of a direct grid connection (i.e. a point of connection to the national grid) and the availability of land on which the development can take place. Furthermore, other authorised solar facilities are located within the study area to the west of the development area.

Kotulo Tsatsi Energy PV3 is planned to be bid into the Department of Mineral Resource and Energy's (DMRE) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme with the aim of evacuating the generated power into the national grid. This will aid in the diversification and stabilisation of the country's electricity supply with Kotulo Tsatsi Energy PV3 set to inject up to 200MW_{AC} into the national grid.

[8] The project site is defined as Portion 2 of Farm Styns Vley 280, which has the extent of ~ 4935ha.

9 A CSP facility plus associated infrastructure, including a complete grid connection to Aries Substation was previously authorised on the site. This PV facility replaces the CSP facility infrastructure, and will retain the authorized grid connection solution and other associated infrastructure.

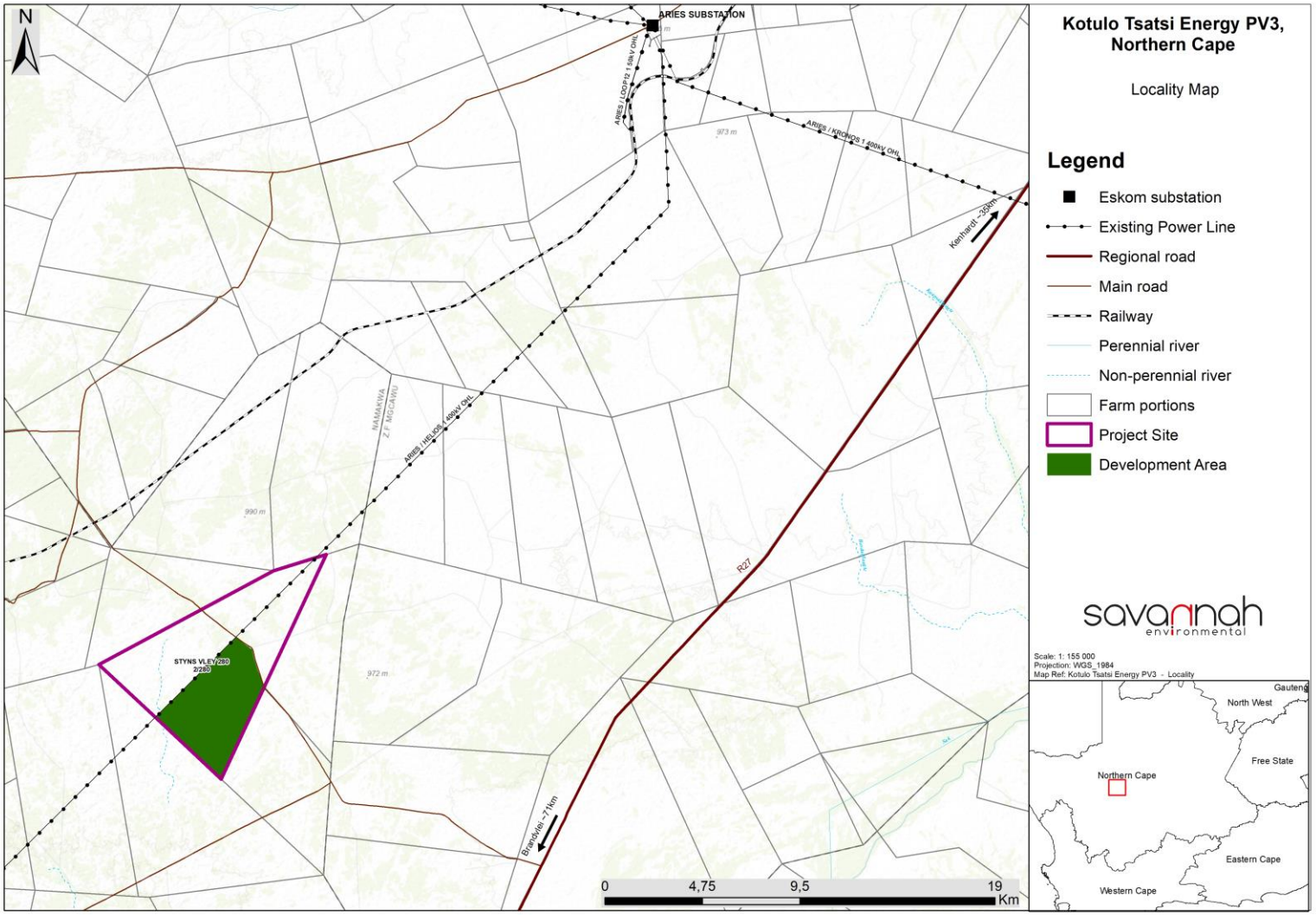

Figure 1.1: Locality map illustrating the location of the Kotulo Tsatsi Energy PV3 project site on Portion 2 of Farm Styns Vley 280 (refer to **Appendix D** for A3 map).

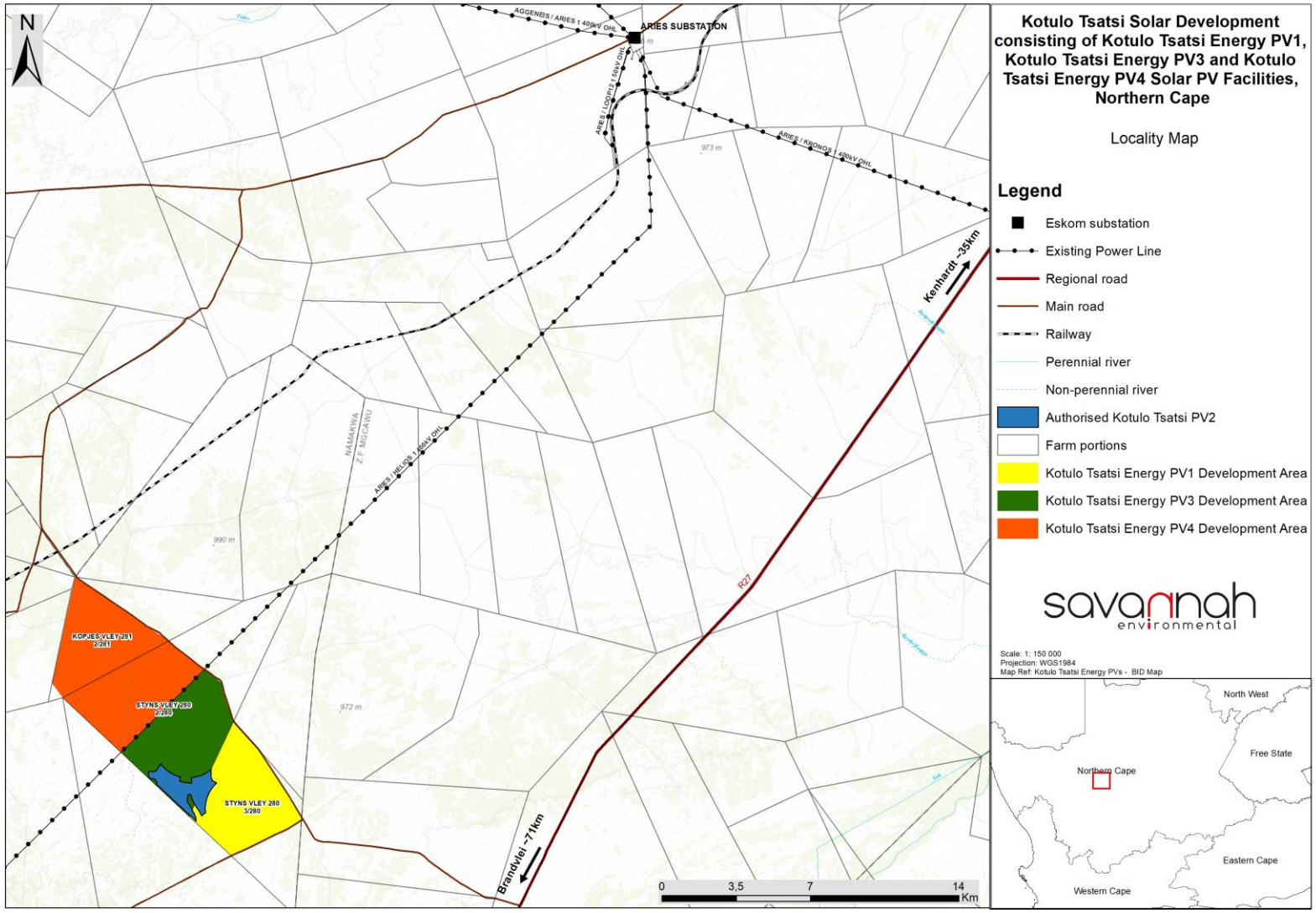

Figure 1.2: Locality map illustrating the locations of the Kotulo Tsatsi Energy PV3, Kotulo Tsatsi Energy PV1 and Kotulo Tsatsi Energy PV4 development areas.

1.1 Project Overview

The project site has been identified by the applicant as a technically feasible site which has the potential for the development of a solar PV facility, including a Battery Energy Storage System (BESS). A development area[3] of approximately 1832ha has been identified within the project site by the proponent for the development of Kotulo Tsatsi Energy PV3. The full extent of the development area has been considered within this Final Scoping Report with the aim of determining the suitability from an environmental and social perspective, and identifying areas that should be avoided in development planning. Within this identified development area, a development footprint[4] or facility layout will be defined for assessment in the EIA Phase. The development footprint/facility layout is estimated to require an area of approximately 600ha in extent (for the 200MW PV facility, including a BESS, and all associated infrastructure), however the extent of the development footprint will be confirmed in the EIA Phase once the layout design is available. The development area is larger than the area needed for the development footprint of a 200MW PV facility, and therefore provides the opportunity for the optimal placement of the infrastructure, ensuring avoidance of major identified environmental sensitivities or constraints identified through this Scoping and EIA process.

On the basis of the findings of the Scoping Study, the PV facility and associated infrastructure can be appropriately designed and sited taking environmental and any other identified constraints into consideration. Therefore, the exact location of the development footprint within the development area for the Kotulo Tsatsi Energy PV3 facility is not defined at this stage but will be positioned based on sensitivities identified in the Scoping Phase, and this will be further assessed during the EIA Phase.

Table 1.1: A detailed description of the project.

Province	**Northern Cape Province**
District Municipality	Namakwa District Municipality
Local Municipality	Hantam Local Municipality
Ward Number (s)	Ward 3
Nearest town(s)	Kenhardt (~70km north-east) and Brandvlei (~72km south)
Farm name(s) and number(s) of properties affected by the Solar Facility	Farm Styns Vley 280
Portion number(s) of properties affected by the Solar Facility	Portion 2 of Farm Styns Vley 280
SG 21 Digit Code (s)	C03600000000002800002
Current zoning	Agricultural (grazing of cattle)
Site Coordinates (centre of affected property)	29°47'16.37"S ; 20°34'21.50"E

[3] The development area is that identified area (located within the project site) where the Kotulo Tsatsi Energy PV3 facility is planned to be located. This area has been selected as a practicable option for the facility, considering technical preference and constraints. The development area is ~1832ha in extent.

[4] The development footprint is the defined area (located within the development area) where the PV panel array and other associated infrastructure for Kotulo Tsatsi Energy PV3 is planned to be constructed. This is the actual footprint of the facility, and the area which would be disturbed.

The development area was previously authorised for the development of Concentrated Solar Power (CSP) technology (DEFF Ref.: 14/12/16/3/3/2/694/2), known as Kotulo Tsatsi Concentrated Solar Plant 2. However, this project is no longer being considered for the site as the development of CSP no longer forms part of the energy mix of the Country as indicated in the IRP.

PV technology is proposed to be utilised for the generation of electricity, and the Kotulo Tsatsi Energy PV3 facility will have a contracted capacity of up to 200MW. Infrastructure associated with the solar PV facility will include:

» Solar PV array comprising PV modules and mounting structures.
» Inverters and transformers.
» Cabling between the project components.
» On-site facility substation to facilitate the connection between the solar PV facility and the Eskom electricity grid.
» Battery Energy Storage System (BESS).
» Site offices and maintenance buildings, including workshop areas for maintenance and storage.
» Laydown areas and temporary man camp area.
» Access roads, internal distribution roads and fencing around the development area.

The key infrastructure components proposed as part of the Kotulo Tsatsi Energy PV3 facility are described in greater detail in Chapter 2 of this Final Scoping Report.

A new Application for Environmental Authorisation has been submitted to the Department of Environment, Forestry and Fisheries for the Kotulo Tsatsi PV3 facility. The use of solar PV technology will replace the authorised use of Solar CSP technology on Portion 2 of Farm Styns Vley 280, which was previously authorised for implementation within the development area. A full Scoping/EIA process is being undertaken for the change to the use of PV technology at the site. Through an amendment process, the valid EA for the development area will be amended to remove the CSP technology[5] - that is the:

» Solar tower
» Heliostat field
» Evaporation ponds

The overarching objective for the Kotulo Tsatsi Energy PV3 facility is to maximise electricity production through exposure to the available solar resource, while minimising infrastructure, operational and maintenance costs, as well as potential social and environmental impacts. In order to meet these objectives, local level environmental and planning issues will be assessed through the EIA process with the aid of site-specific specialist studies in order to delineate areas of sensitivity within the identified project site; this will serve to inform and optimise the design of the solar PV facility.

[5] All other components including the substations and grid lines, water pipeline and water reservoirs, access roads, laydown areas and associated infrastructure will be retained, removing the need for these to be authorised a second time. The amendment process will commence once the new application for EA for the PV facility is in the EIA phase.

1.2 Requirement for an Environmental Impact Assessment Process

Section 24 of South Africa's National Environmental Management Act (No. 107 of 1998) (NEMA) pertains to Environmental Authorisations (EA), and requires that the potential consequences for, or impacts of, listed or specified activities on the environment be considered, investigated, assessed, and reported on to the Competent Authority (CA). The 2014 Environmental Impact Assessment (EIA) Regulations, as amended (GNR 326) published under NEMA prescribe the process to be followed when applying for Environmental Authorisation (EA), while the Listing Notices (Listing Notice 1 (GNR 327), Listing Notice 2 (GNR 325), and Listing Notice 3 (GNR 324)) contain those activities which may not commence without EA from the CA.

In terms of NEMA, the 2014 EIA Regulations (GNR 326), and Listing Notices (Listing Notice 1 (GNR 327), Listing Notice 2 (GNR 325), and Listing Notice 3 (GNR 324)), the proposed development of Kotulo Tsatsi Energy PV3 requires Environmental Authorisation (EA) from the National Department of Environment, Forestry and Fisheries (DEFF) subject to the completion of a full Scoping and Environmental Impact Assessment (S&EIA), as prescribed in Regulations 21 to 24 of the 2014 EIA Regulations (GNR 326). The need for EA subject to the completion of a full Scoping&EIA is triggered by the inclusion of, amongst others, Activity 1 of Listing Notice 2 (GNR 325)[6], namely:

"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20MW or more."

In terms of GNR 779 of 01 July 2016, the National DEFF has been determined as the Competent Authority (CA) for all projects which relate to the Integrated Resource Plan for Electricity (IRP) 2010 – 2030, and any updates thereto. Through the decision-making process, the DEFF will be supported by the Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform as the commenting authority.

1.3 Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of an Impact Assessment Report

This Final Scoping Report has been prepared in accordance with the requirements of the EIA Regulations published on 08 December 2014 (as amended) promulgated in terms of Chapter 5 of the National Environmental Management Act (Act No 107 of 1998). This chapter of the Final Scoping Report includes the following information required in terms of Appendix 2: Content of 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 of the EAP who prepared the report is included in **Section 1.5**. The Curriculum vitae of the Savannah Environmental team has been included as **Appendix A**.

[6] Refer to **Chapter 6** for a full list of applicable listed activities.

(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 Kotulo Tsatsi Energy PV3 has been included under **Section 1.1** and within **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	A locality map illustrating the location of the Kotulo Tsatsi Energy PV3 has been included as **Figure 1.1** in this chapter.

This Final Scoping Report consists of nine chapters, which include:

» **Chapter 1** provides background to the Kotulo Tsatsi Energy PV3 project and the environmental impact assessment.
» **Chapter 2** provides a project description of the Kotulo Tsatsi Energy PV3 project.
» **Chapter 3** describes identified project alternatives.
» **Chapter 4** outlines strategic regulatory and legal context for energy planning in South Africa and specifically relating to the project.
» **Chapter 5** describes the need and desirability of Kotulo Tsatsi Energy PV3.
» **Chapter 6** outlines the approach to undertaking the Scoping/EIA process.
» **Chapter 7** describes the existing biophysical and social environment within and surrounding the study and development area.
» **Chapter 8** provides an identification and evaluation of the potential issues associated with the proposed solar PV facility and associated infrastructure.
» **Chapter 9** presents the conclusions of the scoping evaluation for the Solar PV Facility.
» **Chapter 10** describes the Plan of Study (PoS) for the EIA phase.
» **Chapter 11** provides references used to compile the Final Scoping report.

1.4 Overview of this Environmental Impact Assessment (EIA) Process

An EIA is an effective planning and decision-making tool for the project developer as it allows for the identification and management of potential environmental impacts. It provides the opportunity for the developer to be forewarned of potential environmental issues and allows for the 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 of two (2) phases (i.e. Scoping and Impact Assessment) and involves the identification and assessment of potential environmental impacts through the undertaking of independent specialist studies, as well as public participation. The processes followed in these two phases is as follows:

» The **Scoping Phase** includes the identification of potential issues associated with the project through a desktop study (considering existing information) and consultation with affected parties and key stakeholders. This phase considers the broader project site in order to identify and delineate any environmental fatal flaws, no-go and / or sensitive areas. Following a public review period of the

Scoping report, this phase culminates in the submission of a final Scoping Report and Plan of Study for the EIA to the CA for consideration and acceptance.

» The **EIA Phase** involves a detailed assessment of the potentially significant positive and negative impacts (direct, indirect, and cumulative) identified in the Scoping Phase. This phase considers a proposed development footprint within the project site and includes detailed specialist investigations as well as public consultation. Following a 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 CA for final review and decision-making.

1.5 Appointment of an Independent Environmental Assessment Practitioner (EAP)

In accordance with Regulation 12 of the 2014 EIA Regulations (GNR 326), the applicant has appointed Savannah Environmental (Pty) Ltd as the independent environmental consultants responsible for managing the Application for EA and supporting Scoping and Environmental Impact Assessment (S&EIA) process; inclusive of comprehensive, independent specialist studies. The application for EA and S&EIA process will be managed in accordance with the requirements of NEMA, the 2014 EIA Regulations (GNR 326), and all other relevant applicable legislation.

Neither Savannah Environmental nor any of its specialists are subsidiaries of, or are affiliated to the applicant. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed facility.

Savannah Environmental is a leading provider of integrated environmental and social consulting, advisory and management services with considerable experience in the fields of environmental assessment and management. The company is wholly woman-owned (51% black woman-owned) and is rated as a Level 2 Broad-based Black Economic Empowerment (B-BBEE) Contributor. Savannah Environmental's team have been actively involved in undertaking environmental studies since 2006, for a wide variety of projects throughout South Africa, including those associated with electricity generation and infrastructure development.

The Savannah Environmental team for this project includes:

» **Lisa Opperman** is the principle the author of this report. She holds a Bachelor degree with Honours in Environmental Management and has five years of experience in the environmental field. Her key focus is on environmental impact assessments, public participation, environmental management plans and programmes, as well as mapping using ArcGIS for a variety of environmental projects. She has completed numerous EIA processes for renewable energy projects and associated grid connection infrastructure.

» **Karen Jodas** is a Director at Savannah Environmental (Pty) Ltd. Karen holds a Master of Science Degree from Rhodes University and is registered as a Professional Natural Scientist (400106/99) with the South African Council for Natural Scientific Professions (SACNASP). She has gained extensive knowledge and experience on potential environmental impacts associated with electricity generation and transmission projects through her involvement in related EIA processes over the past 20 years. She

has successfully managed and undertaken EIA processes for infrastructure development projects throughout South Africa.

» **Nicolene Venter** – holds a Higher Secretarial Diploma and has over 20 years of experience in public participation, stakeholder engagement, awareness creation processes and facilitation of various meetings (focus group, public meetings, workshops, etc.). She is responsible for project management of public participation processes for a wide range of environmental projects across South Africa and neighbouring countries.

Curricula Vitae (CVs) detailing Savannah Environmental team's expertise and relevant experience are provided in **Appendix A**.

In order to adequately identify and assess potential impacts associated with the project, a number of independent specialist consultants will provide specialist input into the EIA process. The specialists will prepare an assessment report, which will inform and be appended to the EIA Report to be undertaken as part of the EIA Phase.

CHAPTER 2 PROJECT DESCRIPTION

This Chapter provides a description of the proposed Kotulo Tsatsi Energy PV3 and associated infrastructure proposed for development. It must be noted that the project description presented in this Chapter may change to some extent based on the outcomes and recommendations of detailed engineering and other technical studies, the findings and recommendations of the EIA and supporting specialist studies, and any licencing, permitting, and legislative requirements.

2.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of an Impact Assessment Report

This chapter of the Final Scoping Report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(d)(ii) a description of the activities to be undertaken including associated structures and infrastructure	A description of the associated structures and infrastructure is included in **Section 2.5**. Activities to be undertaken during the various project development phases is included in **Section 2.6**.
(g)(ix) the outcome of the site selection matrix	Refer to **Section 2.3** for a description of the selection of the proposed project site and development area.

2.2 Project Site Overview

The project is to be developed on the Portion 2 of the Farm Styns Vley 280, located approximately 70km south-west of the town of Kenhardt in the Northern Cape Province. The project site falls in Ward 3 of the Hantam Local Municipality and within the greater Namakwa District Municipality. The full extent of the project site (i.e. approximately 4935ha) has been considered within this Scoping Phase of the EIA process, within which the development area[7] for the project (approximately 1832ha in extent) has been appropriately located from a technical perspective.

Based on the existing information available for the project site and development area, sensitive areas considered as undevelopable have been identified within the development area. In order to avoid these areas of potential sensitivity and to ensure that potential detrimental environmental impacts are minimised as far as possible, the developer has identified a suitable development envelope within the development area within which the infrastructure of Kotulo Tsatsi Energy PV3 is proposed to be located and fully assessed during the EIA Phase. The extent of the development envelope is ~ 951ha.

[7] The development area (~1832ha in extent) is a smaller focus area within the project site which has been selected as the best practicable option for the facility, considering the Soalskolk road, technical preferences and environmental constraints identified in the area. The development envelope has been identified within the development area which is the area to be assessed during the EIA Phase for the placement of the layout.

From a technical perspective, the Kenhardt area is considered favourable for the development of commercial solar energy 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 project site and development area, the availability of a direct grid connection (i.e. point of connection to the national Eskom grid), and the availability of land on which development can take place.

The development envelope will accommodate the development footprint and associated infrastructure which will include:

- Solar PV array comprising PV modules and mounting structures
- Inverters and transformers
- Cabling between the project components
- On-site facility substation to facilitate the connection between the solar PV facility and the Eskom electricity grid
- Battery Energy Storage System (BESS)
- Site offices and maintenance buildings, including workshop areas for maintenance and storage.
- Laydown areas and temporary man camp area
- Access roads, internal distribution roads and fencing around the development area.

Table 2.1 provides information regarding the proposed project site identified for Kotulo Tsatsi Energy PV3.

Table 2.1: A description of the project site identified for Kotulo Tsatsi Energy PV3

Province	Northern Cape Province		
District Municipality	Namakwa District Municipality		
Local Municipality	Hantam Local Municipality		
Ward Number(s)	3		
Nearest Town(s)	Kenhardt (~70km north-east) and Brandvlei (~60km south)		
Farm Portion(s), Name(s) and Number(s) associated with the Facility	Portion 2 of Farm Styns Vley 280		
SG 21 Digit Code (s)	Portion 2 of Farm Styns Vley 280	C03600000000002800002	
Current Zoning	Agriculture		
Current land use	Grazing (mainly cattle)		
Site Extent (project site)	~4935ha		
Site Co-ordinates (project site)		**Latitude:**	**Longitude:**
	Northern point	29°45'32.38"S	20°34'57.14"E
	Eastern point	29°46'52.23"S	20°35'48.55"E
	Southern point	29°49'15.04"S	20°34'30.22"E
	Western point	29°47'37.73"S	20°32'31.87"E
	Centre point	29°47'16.37"S	20°34'21.50"E

2.3 Summary of Site Selection Process and Pre-Feasibility Analysis

The broader study area (i.e. the greater Kenhardt area) was identified by the applicant as having the potential for the installation of PV panels on the basis of key technical criteria being met, including the

solar resource, accessibility of the site, accessibility to the Eskom grid, and local site topography. The development area was also previously authorised for the development of Concentrated Solar Power (CSP) technology (DEFF Ref.: 14/12/16/3/3/2/694/2) which contributes to the selection of the development area for the development of a solar PV energy facility. The development of the CSP project (known as Kotulo Tsatsi Concentrated Solar Plant 2) is no longer being considered for the site as the development of CSP no longer forms part of the energy mix of the country, as indicated in the IRP.

Considering the fact that the development area was previously authorised for the development of CSP technology, the selection of the site for development of a PV facility is linked to the previous process. The 'funnel down' approach was followed during site selection and the impact assessment process in order to allow the environmental sensitivity investigation to inform the siting and preliminary layout design. The EIA report for the Kotulo Tsatsi Concentrated Solar Plant 2 considered alternative sites within a larger 55 000ha area following a reasonable methodology, and due consideration of the sensitivity of the site. Ultimately, the site selection was based on the application of a mitigation hierarchy which considered:

1. First, avoidance of adverse impacts as far as possible by use of preventative measures (in this instance a sensitivity analysis assisted in the identification of a Project site and the avoidance of identified ecologically sensitive areas).
2. Second, minimisation or reduction of adverse impacts to 'as low as practicable' (in this instance minimisation of impact on identified ecologically sensitive areas through facility micro-siting and implementing mitigation)
3. Third, remedy or compensation for adverse residual impacts, which are unavoidable and cannot be reduced further (in this instance, the implementation of mitigation, or consideration of acceptable loss).

Considering the above, the project site was identified and considered acceptable in terms of the investigations which have come before. The development area has been identified by the developer as a suitable area within which the solar PV facility can be placed from a technical perspective.

A development envelope has been sited within the development area through consideration and avoidance of the environmental sensitivities identified during the EIA process of the Kotulo Tsatsi Concentrated Solar Plant 2, as well as the most recent Northern Cape Provincial conservation data (including conservation targets), such as Critical Biodiversity Areas and Wetlands.

The detail regarding site-specific characteristics, and how these provide further motivation for the selection of the specific site for this project is provided below:

Project site extent, conditions and land availability: Availability of relatively level land of sufficient extent can be a restraining factor to PV development, as a 200 MW solar PV development and associated infrastructure requires sufficient land space. The development envelope, within which the project development footprint will be located, is ~ 951ha. This area is considered to be sufficient for the planned 200MW PV facility, and provides an opportunity for the avoidance of sensitive environmental features and areas.

The following are key considerations in this regard:

» The project site and development area conditions are optimal for a development of this nature, with the site being of a suitable gradient for the development of a PV facility.

- The region within which the project site is located can be described flat and homogenous. Elevation across the area ranges from 940m above sea level in the west to 950m above sea level in the east. There are no prominent hills within the project site with the highest areas of elevation situated to the north east of the project site.
- The property is considerably larger than the area planned for the PV facility. The development area is approximately 1832ha (~37% of the total extent of the farm portion). The development envelope, which considers and avoids environmental sensitivities, is approximately 46% of the development area.

Site access: The site can be readily accessed via an existing gravel access road (known as the Soafskolk Road) branching off of the R27 between Kenhardt and Brandvlei, with only minor improvements to the turnoff onto the access road from the R27 considered appropriate to improve road safety.

Land use considerations: There is no cultivated agricultural land in the project site or directly adjacent to it, which could be impacted upon by the proposed development. The farm portion is not optimal for agricultural land use activities owing to restrictions by the arid climate and shallow soils, limiting the overall agricultural potential of the site to very low and rendering a low carrying capacity for livestock. Considering the limitations of the area from an agricultural perspective, the development of Kotulo Tsatsi Energy PV3 provides opportunity for an alternative land use which will not be in conflict with the existing land use, and which will provide a productive and economically viable solution. The development of Kotulo Tsatsi Energy PV3 will therefore not result in a reduction of the sustainability of the current land use and is considered to be appropriate.

Grid connection considerations: Ease of access into the Eskom national electricity grid is vital to the viability of a solar energy facility, and addresses Eskom's concerns for lower cost connection alternatives given current funding constraints. The project site is situated within the Central Corridor of the Strategic Transmission Corridors (GNR 113) and south of the existing Aries-Helios 400kV power line and approximately 50km south-west from the Eskom Aries Substation. In addition to the existing grid connection infrastructure available in the area, grid infrastructure components were also authorised as part of the Kotulo Tsatsi Concentrated Solar Plant 2 which includes an Eskom collector substation, switching station, and grid connection power line to the Aries Substation. These authorised components will also be used by Kotulo Tsatsi Energy PV3 to connect the project to the national grid.

A locality map illustrating the location of the project site, development area and authorised grid connection infrastructure is provided in **Figure 2.1**.

2.4 Technology considered for the Solar Energy Facility and the Generation of Electricity

Kotulo Tsatsi Energy PV3 will have a contracted capacity of 200MW and will make use of PV technology. Solar energy facilities, which utilise PV technology, use the energy from the sun to generate electricity through a process known as the Photovoltaic Effect. This effect refers to photons of light colliding with electrons, and therefore placing the electrons into a higher state of energy to create electricity (refer to **Figure 2.2**).

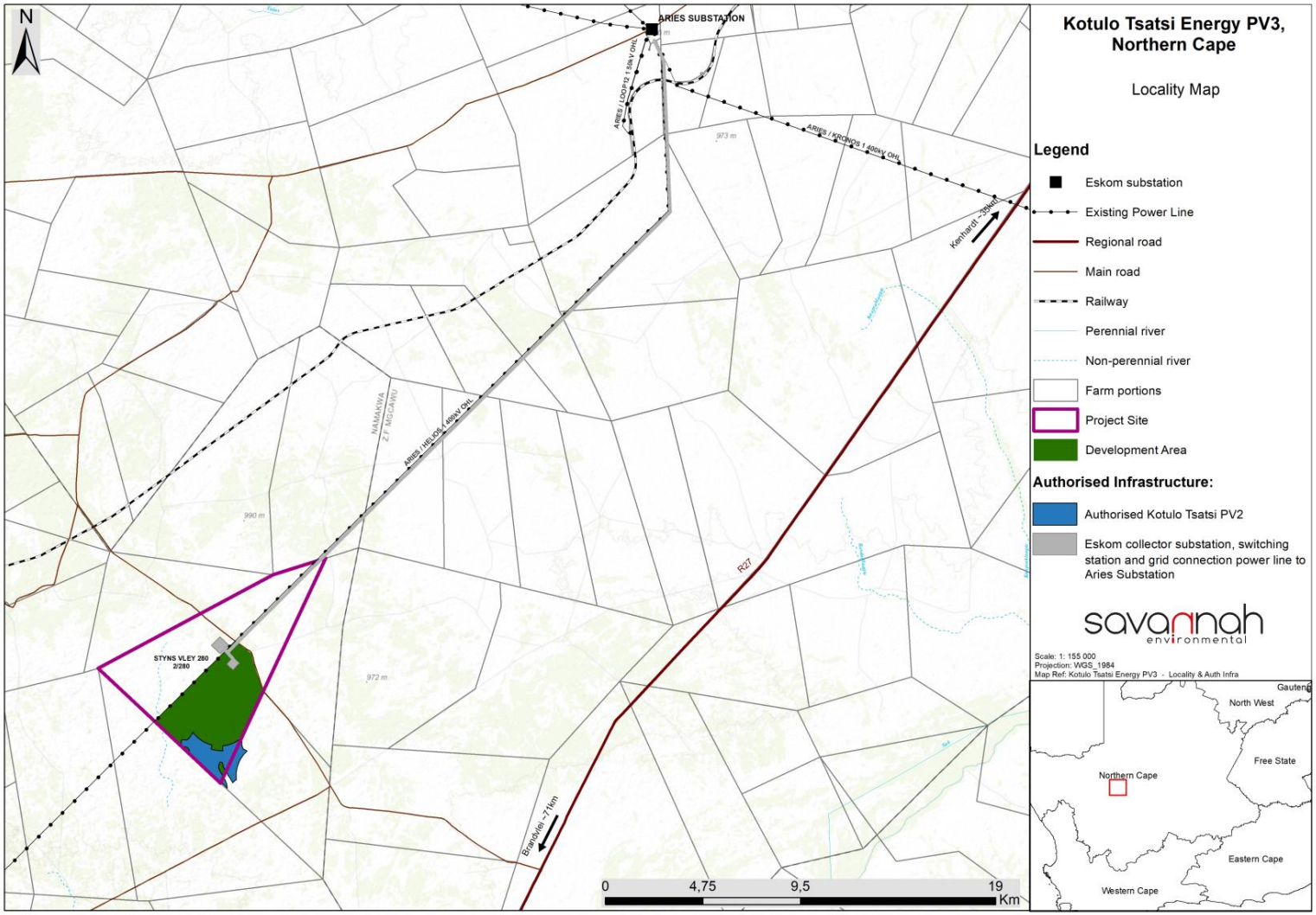

Figure 2.1: Map illustrating the development area within the project site, and the authorised Kotulo Tsatsi Concentrated Solar Plant 2 grid connection infrastructure considered for Kotulo Tsatsi Energy PV3.

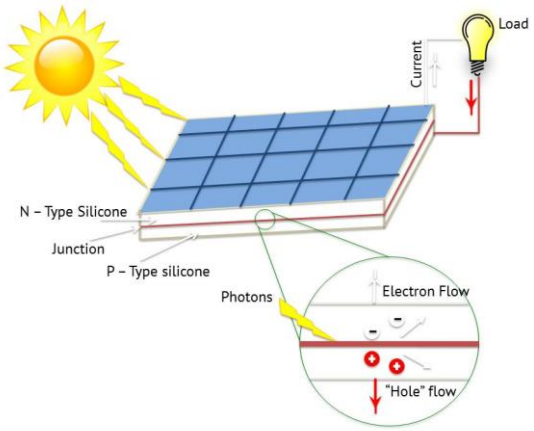

Figure 2.2: Diagram illustrating the Photovoltaic Effect (Source: Centre for Sustainable Energy)

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

Photovoltaic Cells

A PV cell is made of silicone that acts as a semi-conductor used to produce the Photovoltaic Effect. PV cells are arranged in multiples / arrays and placed behind a protective glass sheet to form a PV panel (refer to **Figure 2.3**). Each PV cell is positively charged on one side and negatively charged on the opposite side, with electrical conductors attached to either side to form a circuit. This circuit captures the released electrons in the form of an electric current (i.e. Direct Current (DC[8])).

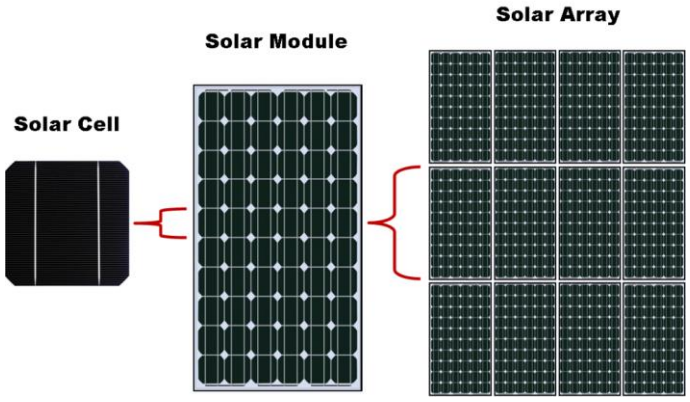

Figure 2.3: Overview of a PV cell, module and array / panel (Source: pveducation.com)

[8] DC (direct current) is the unidirectional flow or movement of electric charge carriers (which are usually electrons). The intensity of the current can vary with time, but the general direction of movement stays the same at all times. As an adjective, the term DC is used in reference to voltage whose polarity never reverses. In a DC circuit, electrons emerge from the negative, or minus, pole and move towards the positive, or plus, pole. Nevertheless, physicists define DC as traveling from plus to minus. (sourced from https://whatis.techtarget.com/definition/DC-direct-current).

Support Structures

PV panels will be fixed to a support structure. PV panels can either utilise fixed/static support structures, or single or double axis tracking support structures (refer to **Figure 2.4**). PV panels which utilise fixed/static support structures are set at an angle (fixed-tilt PV system) so as to optimise the amount of solar irradiation. With fixed/static support structures the angle of the PV panel is dependent on the latitude of the proposed development and may be adjusted to optimise for summer and winter solar radiation characteristics. PV panels which utilise tracking support structures track the movement of the sun throughout the day so as to receive the maximum amount of solar irradiation.

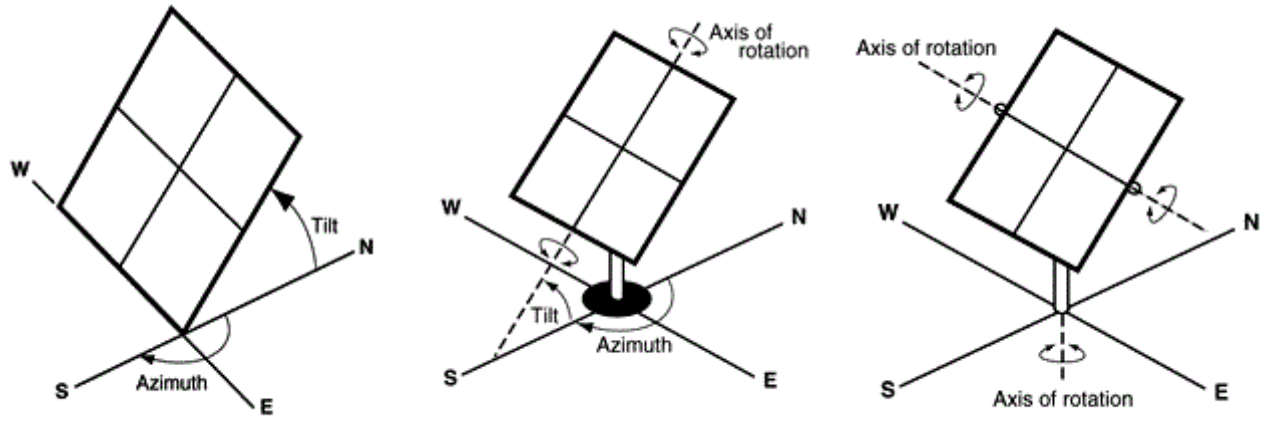

Figure 2.4: Overview of different PV tracking systems (from left to right: fixed-tilt, single-axis tracking, and double-axis tracking (Source: pveducation.com)).

PV panels are designed to operate continuously for more than 25 years, mostly unattended and with low maintenance.

Description of the Associated Infrastructure

A summary of the planned infrastructure proposed as part of Kotulo Tsatsi Energy PV3 is provided in **Table 2.2**, and described in more detail under the sub-headings below.

Table 2.2: Planned infrastructure proposed as part of Kotulo Tsatsi Energy PV3. Specific details to be confirmed in the EIA Phase

Infrastructure	Dimensions/ Details
Solar Facility	» 200MW photovoltaic (PV) technology utilising solar panels.
Supporting Infrastructure	» Battery energy storage area. » Gate house and security building. » Maintenance building. » Office building. » Batching plant. » Man Camp. » Laydown area. » Perimeter fencing.
On-site substation	» On-site facility substation with a 132kV capacity.
Grid Connection	» A single 132kV powerline is required for grid connection.
Access road	» The construction of a new access road off of the Soafskolk Road, which

Infrastructure	Dimensions/ Details
	traverses the northern boundary of the development area.
Services required	» Refuse material disposal - all generated refuse material will be collected by a private contractor and will be disposed of at a licensed waste disposal site off site. This service will be arranged with the municipality when required. » Sanitation – due to the location of the site it is proposed that the project will construct and utilise its own sanitation services as Municipal services do not service the project site. All sewage/effluent water will be managed utilising temporary portable chemical toilets and portable modular sewage treatment facilities (package plants). These facilities will be maintained and serviced regularly by an appropriate waste contractor. » Water supply – due to the location of the site it is proposed that the project will utilise and develop its own water provision services based on the fact that these services do not reach the project site. Accordingly, construction water may need to be sourced from municipal supply (by truck or via pipeline), or from groundwater abstraction. » Electricity supply – approximately 15MW of power may be required during the construction phase. It is proposed that this power be sourced from the existing power lines and/or diesel generators. The necessary applications for the connection to the grid will be submitted to Eskom for approval. » The man camp will require the necessary services such as potable water, electricity and a package plant for waste.

2.5.1 Project Footprint

The development envelope has an extent of ~951ha within which the development footprint will be placed. The confirmed extent of the development footprint can only be provided in the EIA Phase once the layout design has been undertaken. The development footprint will include PV structures/modules, and supporting infrastructure such as internal roads, auxiliary buildings, and an on-site facility substation. During construction, a temporary laydown area will be required.

The type of technology selected for implementation, outcomes of the EIA process, and the completion of additional technical studies (e.g. geotechnical and other surveys) to be conducted as part of the detailed design phase will ultimately influence the final project layout and development footprint. The extent of the project site under investigation allows for layout design and site-specific alternatives to be identified considering the environmental sensitivities present.

2.5.2 Details of the proposed project infrastructure

Kotulo Tsatsi Energy PV3 will be designed to have a contracted capacity of up to 200MW. The project will make use of fixed-tilt, single-axis tracking, and/or double-axis tracking PV technology. Monofacial or bifacial panels are both considered. PV technology forms part of the energy mix as indicated in the latest IRP for South Africa.

The project will comprise solar panels which, once installed, will stand less than 5m above ground level. The solar panels will include centralised inverter stations, or string inverters mounted above ground. If centralised inverter stations are used, Mega Volt (MV) distribution transformers are located internally, whereas string inverters are containerised with switchgear. The main transformer capacity varies according to detailed design and project-specific requirements.

2.5.3 Water Supply

Kotulo Tsatsi Energy PV3 will utilise water during both the construction and operation phases of development. Water is required during construction for dust suppression, and potable water will be required on site for the construction crew. During operations, water is required to clean the PV panels, for human consumption, and for use in the auxiliary buildings (i.e. for use in the office building, ablutions, and canteen). Approximately 10 000m³ of water per year may be required over a 12 to 18-month period during construction, and approximately 50 000m³ of water per year may be required per year over the 25-year operational lifespan of the project.

Due to the location of the site it is proposed that the project will utilise and develop its own water provision services based on the fact that these services do not reach the project site. Accordingly, construction water may need to be sourced from municipal supply (by truck or via pipeline) or groundwater abstraction.

2.5.4 Energy Storage

The general purpose and utilisation of the Battery Energy Storage System (BESS) will be to save and store excess electrical output from the facility as it is generated, allowing for a timed release to the national grid when the capacity is required. The BESS will, therefore, provide flexibility in the efficient operation of the electricity grid through decoupling of the energy supply and demand and will allow for longer generating periods of the solar PV facility. Furthermore, the development of the BESS for the project is of importance as the system will ensure that electricity is fed into the national grid when required and excess amounts stored. This will allow for extended hours of generation from the 200MW solar energy facility. The BESS will be contained within insulated containers and will connect to the on-site facility substation via underground cabling which will follow the internal access roads of the facility. **Figure 2.5** provides a general illustration of a BESS.

Figure 2.5: Example of battery storage units installed by Tesla (Source: fastcompany.com)

2.5.5 Panel Cleaning

It is anticipated that the PV panels will be washed twice a year during operation. Only clean water (i.e. with no cleaning products), or non-hazardous biodegradable cleaning products will be utilised for the washing of panels. Wastewater generated by washing panels will either be collected and recycled for future use, or alternatively, in the event that an environmentally friendly non-hazardous biodegradable cleaning product is utilised, wastewater can be allowed to run-off under the panels.

2.5.6 Effluent and Wastewater

During construction, chemical toilets will be used. These will be serviced regularly and effluent will be disposed of at a registered wastewater treatment works. Any other effluent discharge during construction will be collected in sealed containers/tanks and collected by a registered service provider (i.e. the Local Municipality/Contractor) to be disposed of at an approved facility off-site.

Due to the location of the site it is proposed that the project will construct and utilise its own sanitation services as Municipal services do not service the project site. All sewage/effluent water will be managed utilising temporary portable chemical toilets and portable modular sewage treatment facilities (package plants). These facilities will be maintained and serviced regularly by an appropriate waste contractor.

2.5.7 Waste

Solid waste generated during construction will mainly be in the form of construction material, excavated substrate and domestic solid waste. Waste will be disposed of in either waste skips and/or scavenger proof recycling bins (where possible) and temporarily placed in a central location for removal by an appropriate contractor. Where possible, waste will be recycled. Non-recyclable solid construction waste will be temporarily held in skips or other appropriate waste containers to be disposed of at an appropriately licensed landfill site. Any other waste and excess material will be removed once construction is complete and disposed of at a registered waste facility.

During construction, use of the following hazardous substances are anticipated: paint, grease, petrol / diesel for trucks, cranes, bulldozers etc. Limited amounts of transformer oils and chemicals. Dangerous goods required to be stored during construction (e.g. limited quantities of fuel, oil, lubricants etc.) will be stored in compliance with relevant legislation (i.e. stored on covered and bunded areas / bin, and disposed of at a registered hazardous waste site). Hazardous waste will be appropriately stored and disposed of.

2.6 Activities during the Project Development Stages

A series of activities are proposed as part of the design, pre-construction, construction, operation, and decommissioning phases associated with the development of Kotulo Tsatsi Energy PV3. These are discussed in more detail under the respective sub-headings below.

2.6.1 Design and Pre-Construction Phase

Planning: Several post-authorisation factors are expected to influence the final design of the solar energy facility and could result in small-scale modifications of the PV array and/or associated infrastructure. An

objective of the Engineering, Procurement and Construction (EPC) Contractor, who will be responsible for the overall construction of the project, will be to comply with the approved facility design as far as possible. It should be understood however, that the construction process is dynamic and that unforeseen changes to the project specifications may take place. This Scoping Report therefore describes the project in terms of the best available knowledge at the time. The final facility design is required to be approved by the DEFF. Importantly, should there be any substantive changes or deviations from the original scope or layout of the project, the DEFF will need to be notified and where relevant, environmental approval obtained.

Conduct Surveys: Prior to initiating construction, a number of surveys will be required including, but not limited to, confirmation of the micro-siting footprint (i.e. the precise location of the PV panels, on-site facility substation and the associated infrastructure) and a geotechnical survey. Geotechnical surveys acquire information regarding the physical characteristics of soil and rocks underlying a proposed project site and informs the design of earthworks and foundations for structures.

2.6.2 Construction Phase

The construction phase will take approximately 12 to 18 months to complete, and will entail a series of activities including:

Procurement and employment

At the peak of construction, the project is likely to create a maximum of 500 employment opportunities. These employment opportunities will be temporary and will last for a period of approximately 12 to 18 months (i.e. the length of construction). Employment opportunities generated during the construction phase will include low skilled, semi-skilled, and skilled opportunities. Solar PV projects make use of high levels of unskilled and semi-skilled labour so there will be good opportunity to use local labour, where available. Employment opportunities will peak during the construction phase and significantly decline during the operation phase. 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.

The majority of the labour force is expected to be sourced from the surrounding towns, with the proposed man camp housing the employees during the construction phase.

Establishment of an Access Road

Access to the development area will be established for the construction and operation of Kotulo Tsatsi Energy PV3. Access to the project site is possible through the use of the existing Soafskolk Road (gravel) which is linked to the R27 located to the east of the development area. Within the development footprint itself, access will be required from new/existing roads for construction purposes (and limited access for maintenance during operation). The final layout will be determined following the identification of site related sensitivities.

Undertake Site Preparation

Site preparation activities will include clearance of vegetation. 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 national, regional, secondary and proposed internal access roads will be used to transport all components and equipment required during the construction phase. Some of the components (i.e. substation transformer) may be defined as abnormal loads in terms of the National Road Traffic Act (No. 93 of 1996) (NRTO)[9] by virtue of the dimensional limitations. Typical civil engineering construction equipment will need to be brought to the project site (e.g. excavators, trucks, graders, compaction equipment, cement trucks, etc.) as well as components required for the mounting of the PV support structures, construction of the on-site facility substation and site preparation.

Establishment of Laydown Areas on Site

Laydown and storage areas will be required for typical construction equipment. Once the required equipment has been transported to site, a dedicated equipment construction camp and laydown area will need to be established adjacent to the workshop area. The equipment construction camp serves to confine activities and storage of equipment to one designated area, to limit the potential ecological impacts associated with this phase of the development. The laydown area will be used for the assembly of the PV panels, and the general placement/storage of construction equipment. It is anticipated that the temporary laydown area will be included within development footprint of the solar energy facility.

Erect PV Panels and Construct Substation and Invertors

The construction phase involves installation of the PV solar panels, structural and electrical infrastructure required for the operation of Kotulo Tsatsi Energy PV3. In addition, preparation of the soil and improvement of the access roads are likely to continue for most of the construction phase. For array installations, vertical support posts will be driven into the ground. Depending on the results of the geotechnical report, a different foundation method, such as screw pile, helical pile, micropile or drilled post/piles could be used. The posts will hold the support structures (tables) on which the PV modules would be mounted. Brackets will attach the PV modules to the tables. Trenches are to be dug for the underground AC and DC cabling, and the foundations of the inverter enclosures and transformers will be prepared. While cables are being laid and combiner boxes are being installed, the PV tables will be erected. Wire harnesses will connect the PV modules to the electrical collection systems. Underground cables and overhead circuits will connect the Power Conversion Stations (PCS) to the on-site AC electrical infrastructure, and ultimately the on-site facility substation.

The construction of the on-site facility substation will require a survey of the footprint, site clearing and levelling and construction of access road(s) (where applicable), 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.

[9] A permit will be required in accordance with Section 81 of the National Road Traffic Act (No. 93 of 1996) (NRTA) which pertains to vehicles and loads which may be exempted from provisions of Act.

Establishment of Ancillary Infrastructure

The establishment of the ancillary infrastructure and support buildings will require the clearing of vegetation and levelling of the development footprint, and the excavation of foundations prior to construction. Laydown areas for building materials and equipment associated with these buildings will also be required.

Undertake Site Rehabilitation

Once construction is completed and all construction equipment has been removed, the development enveloped will be rehabilitated where practical and reasonable. In addition, on full commissioning of Kotulo Tsatsi Energy PV3, any access points which are not required during operation must be closed and rehabilitated accordingly.

2.6.3 Operation Phase

Kotulo Tsatsi Energy PV3 is expected to operate for a minimum of 25 years. The facility will operate continuously, 7 days a week, and will include battery storage. While the solar facility will be largely self-sufficient, monitoring and periodic maintenance activities will be required. Key elements of the Operation and Maintenance (O&M) plan include monitoring and reporting the performance of the solar energy facility, conducting preventative and corrective maintenance, receiving visitors, and maintaining security.

The operation phase will create approximately 65 full-time equivalent employment positions which will include low-skilled, semi-skilled and skilled personnel. Employees that can be sourced from the local municipal area include the less skilled and semi-skilled personnel (such as safety and security staff and certain maintenance crew). Highly skilled personnel may need to be recruited from outside the local area where these resources are not available within the area.

2.6.4 Decommissioning Phase

Depending on the continued economic viability of Kotulo Tsatsi Energy PV3 following the initial 25-year operation lifespan, the solar energy facility will either be decommissioned, or the operation phase will be extended. If it is deemed financially viable to extend the operation phase, existing components would either continue to operate or be dissembled and replaced with new, more efficient technology / infrastructure available at the time. If the decision is made to decommission the facility, the following decommissioning activities will take place:

Site Preparation

Site preparation activities will include confirming the integrity of the access to the site to accommodate the required decommissioning equipment.

Disassembly and removal of existing components

When the solar energy facility is ultimately decommissioned, the equipment to be removed will depend on the land use proposed for the project site at the time. All above ground facilities that are not intended for future use will be removed. Much of the above ground wire, steel, and PV panels of which the system is comprised are recyclable materials and would be recycled to the extent feasible. The components of the solar energy facility would be de-constructed and recycled, or disposed of in accordance with applicable regulatory requirements. The site will be rehabilitated where required and can potentially be returned to a beneficial land-use.

Future plans for the site and infrastructure after decommissioning

The generation capacity of the facility would have degraded by approximately 15% over the 25-year operational lifespan. The solar energy facility will potentially have the opportunity to generate power for a Merchant Market operation (i.e. the client would sell power on a bid basis to the market). Another option for the site after decommissioning is for agricultural activities to resume.

CHAPTER 3 CONSIDERATION OF ALTERNATIVES

This Chapter provides an overview of the various alternatives considered for Kotulo Tsatsi Energy PV3 as part of the Scoping Process.

3.1 Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of an Impact Assessment Report

This chapter of the Final Scoping Report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(g)(i) details of all the alternatives considered	The details of the alternatives considered as part of the Kotulo Tsatsi Energy PV3 and as part of the Scoping Phase have been included in **Section 3.2**.
(g)(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such	The details of the alternatives considered as part of the Kotulo Tsatsi Energy PV3 and as part of the Scoping Phase have been included in **Section 3.2**. Where no alternatives are being considered a motivation has been included

3.2 Alternatives Considered during the BA Process

In accordance with the requirements of Appendix 2 of the 2014 Environmental Impact Assessment (EIA) Regulations (GNR 326), reasonable and feasible alternatives including but not limited to site and technology alternatives, as well as the "do-nothing" alternative should be considered. Several other solar renewable energy facilities are planned within the broader study area, supporting the suitability of the area for solar PV projects.

The DEFF Guideline for determining alternatives states that the key criteria for consideration when identifying alternatives are that they should be "practicable", "feasible", "relevant", "reasonable" and "viable". Essentially there are two types of alternatives:

» Incrementally different (modifications) alternatives to the project.
» Fundamentally (totally) different alternatives to the project.

In this instance, 'the project' refers to Kotulo Tsatsi Energy PV3, a solar PV facility with capacity of up to 200MW_{AC} and associated infrastructure proposed to be developed by an Independent Power Producer (IPP) and intended to form part of the DMRE's REIPPP Programme.

3.2.1 Consideration of Fundamentally Different Alternatives

Fundamentally different alternatives are usually assessed at a strategic level and, as a result, project-specific EIAs are therefore limited in scope and ability to address fundamentally different alternatives. At a strategic level, electricity generating alternatives have been addressed as part of the DMRE's current Integrated Resource Plan for Electricity 2010 – 2030 (IRP)[10], and will continue to be addressed as part of future revisions. In this regard, the need for renewable energy power generation from solar PV facilities has been identified as part of the technology mix for power generation in the country for the next 20 years. Therefore, fundamentally different alternatives to the proposed project are not considered within this EIA process.

3.2.2 Consideration of Incrementally Different Alternatives

Incrementally different alternatives relate specifically to the project under investigation. "Alternatives", in relation to a proposed activity, means different ways of meeting the general purposes and requirements of the activity, which may include alternatives for:

- The property on which, or location where the activity is proposed to be undertaken.
- The type of activity to be undertaken.
- The design or layout of the activity.
- The technology to be used in the activity.
- The operational aspects of the activity.

In addition, the option of not implementing the activity (i.e. the "do-nothing" alternative) must also be considered.

These alternatives are discussed under the respective sub-headings below and where no alternatives are applicable, a motivation has been included.

i. <u>Property or Location Alternatives</u>

Previously, one solar PV and three CSP facilities were authorised within the study area, which included the farm Portion 2 of Farm Styns Vley 280. As a result of the affected property being previously authorised for a development of a similar nature, the suitability of the land for the development of solar PV facilities has, therefore, been confirmed.

The placement of a solar PV facility is also dependent on several other factors including land suitability, climatic conditions (solar irradiation levels), topography, the location and extent of the study area, availability of grid connection infrastructure and the need and desirability of the project. Kotulo Tsatsi Energy (Pty) Ltd as the Applicant, considers the preferred development area placed within the study area

[10] The Integrated Resource Plan (IRP) is legislated policy which regulates power generation planning.

as being highly favourable and suitable for the establishment of a solar PV facility due to the following site-specific favourable characteristics:

» **Land suitability:** The development area is currently used for grazing; however, this farming practice can continue in tandem with the operations of the solar PV facility once the construction and commissioning phases of the facility are complete. Sites that facilitate easy construction conditions (i.e. relatively flat topography, lack of major outcrops etc.) are also favoured due to the reduced construction activities. Based on the suitability of the development area, no alternative locations are considered.

» **Solar resource**: The economic viability of a solar PV facility is directly dependent on the annual direct solar irradiation values of the area within which it will operate. The Global Horizontal Irradiation (GHI) for the study area is in the region of approximately 2240 kWh/m^2/annum. The Northern Cape Province is considered to have the highest solar irradiation values of the country and therefore enables the development of solar energy projects and the successful operation thereof. Kotulo Tsatsi Energy (Pty) Ltd has also confirmed the solar resource of the site through a meteorological and solar weather station which has been measuring the conditions of the area over the past 7 years. Based on the solar resource available, no alternative locations are considered.

» **Topography**: The region within which the project site is located can be described flat and homogenous. Elevation across the area ranges from 940m above sea level in the west to 950m above sea level in the east. There are no prominent hills within the project site with the highest areas of elevation situated to the north east of the project site. The flat topography of the study area under investigation is considered as beneficial in terms of the construction activities that will be required. Based on the suitable and preferable topography present, no location alternatives are considered for the development.

» **Site extent:** The affected property (i.e. Portion 2 of Farm Styns Vley 280) is approximately 4935ha in extent, which is sufficient for the installation of a solar PV facility with a contracted capacity of up to 200MW$_{AC}$, while allowing for the avoidance of environmental site sensitivities. A development area of ~1832ha has been identified within the project site within which the solar PV facility will be located. The development envelope (within which the development footprint for the Kotulo Tsatsi Energy PV3 PV array plus associated infrastructure) has been demarcated as an area of ~951ha, which is equivalent to 46% of the extent of the development area. The site extent is sufficient for the proposed development and therefore eliminates the need to consider alternative locations for the development. The size of the development footprint within the development envelope will be confirmed in the EIA phase once the facility layout is available for assessment.

» **Site access**: The site can be readily accessed via an existing gravel access road branching off of the R27 between Kenhardt and Brandvlei, with only minor improvements to the turnoff onto the access road from the R27 required. Based on the sufficient access available for the development no alternative locations are considered.

» **Grid access:** A key factor in the siting of any energy generation project, is a viable grid connection. The Aries Substation is located approximately 50km north-east of the development area and is proposed as the preferred grid connection point for Kotulo Tsatsi Energy PV3. The necessary grid

infrastructure required to connect the project to the national grid via the Aries Substation has been assessed within a separate process[11].

» **Geographic location**: The proposed project site is located within an area which has become a node for renewable energy projects, with one PV and three CSP solar facilities authorised on and in close proximity to the project site. The proposed project site is in close proximity to a planned node for solar development, and therefore compliments planned future land use.

» **Landowner support**: The selection of a site where the landowner is supportive of the development of renewable energy is essential for ensuring the success of the project. The landowner does not view the development as a conflict with their current land use practices. The support from the landowner for the development to be undertaken on the affected property has been solidified by the provision of consent for the project to proceed on the property through the signing of a land lease agreement with the proponent as well as a landowners consent as per the requirements of the EIA Regulations, 2014. Furthermore, the landowner had previously consented to the development of a CSP facility on the property, which this project would replace. Therefore, with the affected landowner in support of the development, no location alternatives are considered.

Based on above site-specific attributes, the proponent considers the development area located within the project site as highly preferred in terms of the development of a solar PV facility, and expects that Kotulo Tsatsi Energy PV3 will be able to draw on synergies with the projects proposed and / or currently authorised within the vicinity of the study area. As a result, no property/location alternatives are proposed as part of this EIA process.

ii. Design and Layout Alternatives

The affected property (i.e. Portion 2 of Farm Styns Vley 280) is approximately 4935ha in extent, which is sufficient for the installation of a solar PV facility with a contracted capacity of up to 200MWAC, while allowing for the avoidance of environmental site sensitivities. A development area of ~1832ha has been identified within the project site within which the solar PV facility will be located. The development envelope (within which the development footprint for the Kotulo Tsatsi Energy PV3 PV array plus associated infrastructure) has been demarcated as an area of ~951ha, which is equivalent to 46% of the extent of the development area. Findings from previous specialist field surveys and assessments were considered through this Scoping process in order to provide site specific information regarding the development area and development envelope considered for the Kotulo Tsatsi Energy PV3.

Areas to be avoided by the development were identified, specifically relating to ecological and hydrological features and sensitivities present within the project site. The identified sensitivities were utilised as a tool by the developer to identify and locate the development envelope of the PV facility (~951ha)

[11] The grid connection solution to connect Kotulo Tsatsi Energy PV3 to the Aries Substation has been assessed and authorised within a separate process. The grid connection will include a collector substation, with a switching station component and a power line of up to 132kV in capacity.

within the development area (1832ha). This was undertaken with the aim of avoiding possible sensitive areas within the project site so as to limit impacts associated with the development which would result in unacceptable loss.

The site extent is sufficient for the proposed development and therefore reduces the need to consider alternative locations for the PV facility and the associated infrastructure. Potential environmentally sensitive areas have been identified as part of the Scoping Phase (refer to Chapter 8) for further detailed consideration (through site-specific specialist studies) during the EIA Phase. The environmental sensitivity identification process will inform the layout design for the PV facility, avoiding sensitive areas as far as possible, and thereby ensuring that the layout plan taken forward for consideration during the EIA Phase is the most optimal from an environmental perspective.

3.2.3 Technology Alternatives

The Kenhardt area has been identified for the development of solar and wind energy renewable facilities. Few technology options are available for solar facilities, and the use of those that are considered are usually differentiated by weather and temperature conditions that prevail in the area, so that optimality is obtained by the final site selection. Solar energy is considered to be the most suitable renewable energy technology for this area, based on the site location, ambient conditions and energy resource availability.

Solar PV was determined as the most suitable option for further assessment. The IRP (2019), excludes the procurement of power from CSP facilities until 2030, whereas new additional capacity of approximately 6 000MW will be required from solar PV facilities. Therefore, PV technology was identified as being the preferred option for the study area and consists of a lower visual profile and limited water requirements when compared to the CSP technology alternative. Given the allocations in the IRP (2019), solar PV is considered as the most appropriate technology option. Furthermore, the development of Kotulo Tsatsi Energy PV3 provides an opportunity to optimally use a site that is currently earmarked for energy generation through making use of solar PV technology, but with reduced visual intrusion and/or impacts and reduced water use requirements.

Therefore, considering the above, no other technology alternatives are being assessed for the development of Kotulo Tsatsi Energy PV3. The development of the solar PV facility on the site is considered as the best option for the area considering the current proposed technology on the site, the ample solar resource available and the potential resource saving in terms of water requirements in an area experiencing extreme conditions.

Several solar PV technology alternatives are available, including *inter alia*:

- Bifacial PV panels
- Monofacial PV panels
- Fixed mounted PV systems (static / fixed-tilt panels).
- Single-axis tracking or double-axis tracking systems (with solar panels that rotate around a defined axis to follow the sun's movement).

The primary difference between PV technologies available relate to the extent of the facility, as well as the height of the facility (visual impacts), however the potential for environmental impacts remain similar in magnitude. Fixed mounted PV systems are able to occupy a smaller extent and have a lower height

when compared to tracking PV systems, which require both a larger extent of land, and are taller in height. However, both options are considered to be acceptable for implementation from an environmental perspective. Bifacial solar PV panels offer many advantages over monofacial PV panels, as power can be produced on both sides of the module, increasing total energy generation. The preference will therefore be determined on the basis of technical considerations and the site conditions.

The PV panels are designed to operate continuously for more than 20 years, mostly unattended and with low maintenance. The impacts associated with the construction, operation, and decommissioning of the facility are anticipated to be the same irrespective of the PV panel selected for implementation.

3.2.4 The 'Do-Nothing' Alternative

The 'Do-Nothing' alternative is the option of not constructing Kotulo Tsatsi Energy PV3. Should this alternative be selected, there would be no environmental impacts or benefits as a result of construction and operation activities associated with a solar PV facility. The 'do-nothing' alternative will therefore likely result in minimising the cumulative impact on the land, although it is expected that pressure to develop the site for renewable energy purposes will be actively pursued due to the same factors which make the site a viable option for renewable energy development. This alternative will be assessed within the EIA Phase of the process.

CHAPTER 4 POLICY AND LEGISLATIVE CONTEXT

This Chapter provides an overview of the policy and legislative context within which the development of a solar PV facility, such as Kotulo Tsatsi Energy PV3, is proposed. It identifies environmental 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 which may be applicable to or have bearing on the proposed project.

4.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of an Impact Assessment Report

This chapter of the Final Scoping Report includes the following information required in terms of Appendix 2: Content of Scoping Report:

Requirement	Relevant Section
(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 4, as a whole, provides an overview of the policy and legislative context which is considered to be associated with the development of the solar energy facility. The regulatory and planning context has been considered at national, provincial and local levels. A description of the policy and legislative context within which Kotulo Tsatsi Energy PV3 is proposed is included in **sections 4.3, 4.4, 4.5** and **4.6.**

4.2 Strategic Electricity Planning in South Africa

The need to expand electricity generation capacity in South Africa is based on national policy and informed by on-going strategic planning undertaken by the Department of Mineral Resources and Energy (DMRE). The hierarchy of policy and planning documentation that support the development of renewable energy projects such as a solar energy facility is illustrated in **Figure 4.1**. These policies are discussed in more detail in the following sections, along with the provincial and local policies or plans that have relevance to the development of Kotulo Tsatsi Energy PV3.

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

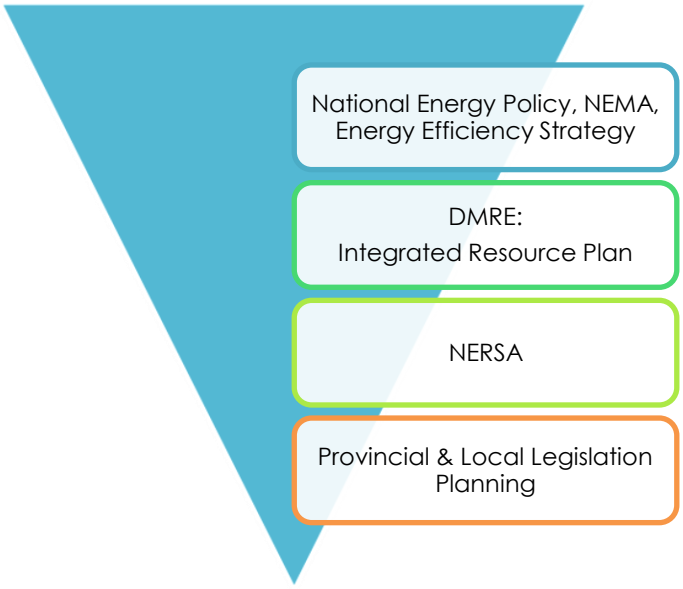

Figure 4.1: Hierarchy of electricity and planning documents

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

- **Department of Mineral Resources and Energy (DMRE):** This Department is responsible for policy relating to all energy forms and for compiling and approving the Integrated Resource Plan (IRP) for electricity. Furthermore, the Department is also responsible for granting approvals for the use of land which is contrary to the objects of the Mineral and Petroleum Resource Development Act (Act No. 28 of 2002) (MPRDA) in terms of Section 53 of the Act. Therefore, in terms of the Act, approval from the Minister is required to ensure that proposed activities do not sterilise mineral resources that may occur within the project site and development area.
- **National Energy Regulator of South Africa (NERSA):** NERSA is responsible for regulating all aspects of the electricity sector and will ultimately issue licenses for IPP projects to generate electricity.
- **Department of Environment, Forestry and Fisheries (DEFF):** This Department is responsible for environmental policy and is the controlling authority in terms of NEMA and the EIA Regulations, 2014 (GN R326) as amended. DEA is the Competent Authority for this project (as per GN R779 of 01 July 2016), and is charged with granting the EA for the project under consideration.
- **The South African Heritage Resources Agency (SAHRA):** SAHRA is a statutory organisation established under the National Heritage Resources Act (No. 25 of 1999) (NHRA), as the national administrative body responsible for the protection of South Africa's cultural heritage.
- **South African National Roads Agency Limited (SANRAL):** This Agency is responsible for the regulation and maintenance of all national road routes.
- **Department of Water and Sanitation[12]:** This Department is responsible for effective and efficient water resources management to ensure sustainable economic and social development. This Department is

[12] The Department of Water and Sanitation (DWS) is soon to be known as the Department of Human Settlements, Water and Sanitation (DHSWS).

also responsible for evaluating and issuing licenses pertaining to water use (i.e. Water Use Licenses (WUL) and General Authorisation).

» **The Department of Agriculture, Forestry and Fisheries (DAFF)[13]:** This Department is the custodian of South Africa's agricultural resources and is primarily responsible for the formulation and implementation of policies governing the agriculture sector. Furthermore, the Department is also responsible for issuing permits for the disturbance or destruction of protected tree species listed under Section 15 (1) of the National Forest Act (No. 84 of 1998) (NFA).

»

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

» **Provincial Government of the Northern Cape – Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARD&LR):** This Department is the commenting authority for the EIA process for the project and is responsible for issuing of biodiversity and conservation-related permits.

» **Northern Cape Department of Transport, Safety and Liaison:** This Department provides effective co-ordination of crime prevention initiatives, provincial police oversight, traffic management and road safety towards a more secure environment.

» **Ngwao-Boswa Ya Kapa Bokone (NBKB):** This Department identifies, conserves and manages heritage resources throughout the Northern Cape Province.

At the **Local Level,** the local and district municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. In the Northern Cape Province, both the local and district municipalities play a role. The local municipality includes the Hantam Local Municipality which forms part of the Namakwa District Municipality. In terms of the Municipal Systems 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.

4.3 National Policy

Further to the South African government's commitment in August 2011 to support the development of renewable energy capacity, the DMRE initiated the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) to procure renewable energy from the private sector in a series of rounds. To date, the Department has procured 6 422MW of renewable energy capacity from 102 independent power producers (IPPs), with 3 876MW operational and made available to the grid[14]. National policies have to be considered for the construction and operation of the solar PV facility to ensure that the development is in line with the planning of the country.

[13] The Department of Agriculture, Forestry and Fisheries (DAFF) is soon to be known as the Department of Agriculture, Rural Development and Land Reform.

[14]https://www.cliffedekkerhofmeyr.com/en/news/publications/2019/Corporate/energy-alert-22-october-The-Integrated-Resource-Plan-2019-A-promising-future-roadmap-for-generation-capacity-in-South-Africa.html

A brief review of the most relevant national policies is provided below in **Table 4.1**. The development of Kotulo Tsatsi Energy PV3 is considered to align with the aims of these policies, even if contributions to achieving the goals therein are only minor.

Table 4.1: Relevant national legislation and policies for Kotulo Tsatsi Energy PV3

Relevant legislation or policy	Relevance to Kotulo Tsatsi Energy PV3
Constitution of the Republic of South Africa, 1996	Section 24 of the Constitution pertains specifically to the environment. It states that everyone has the right to an environment that is not harmful to their health or well-being, and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. The Constitution outlines the need to promote social and economic development. Section 24 of the Constitution therefore requires that development be conducted in such a manner that it does not infringe on an individual's environmental rights, health, or well-being. This is especially significant for previously disadvantaged individuals who are most at risk to environmental impacts.
National Environmental Management Act (No. 107 of 1998) (NEMA)	This piece of legislation is South Africa's key piece of environmental legislation and sets the framework for environmental management in South Africa. NEMA is founded on the principle that everyone has the right to an environment that is not harmful to their health or well-being as contained within the Bill of Rights. The national environmental management principles state that the social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment. The need for responsible and informed decision-making by government on the acceptability of environmental impacts is therefore enshrined within NEMA.
White Paper on the Energy Policy of the Republic of South Africa (1998)	The White Paper on Energy Policy places emphasis on the expansion of energy supply options to enhance South Africa's energy security. This can be achieved through increased use of RE and encouraging new entries into the generation market. The policy states that the advantages of RE include, minimal environmental impacts during operation in comparison with traditional supply technologies, generally lower running costs, and high labour intensities. Disadvantages include, higher capital costs in some cases, lower energy densities, and lower levels of availability, depending on specific conditions, especially with sun and wind-based systems. Nonetheless, renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future.
White Paper on the Renewable Energy Policy of the Republic of South Africa (2003)	The White Paper on Renewable Energy Policy supplements Government's predominant policy on energy as set out in the White Paper on the Energy Policy of the Republic of South Africa (DME, 1998). The policy recognises the potential of RE and aims to create the necessary conditions for the development and commercial implementation of RE technologies. The White Paper on RE sets out Government's vision, policy principles, strategic goals, and objectives for promoting and implementing RE in South Africa. The country relies heavily on coal to meet its energy needs due to its abundant, and fairly accessible

Relevant legislation or policy	Relevance to Kotulo Tsatsi Energy PV3
	and affordable coal resources. However, massive RE resources that can be sustainable alternatives to fossil fuels, have so far remained largely untapped. The White Paper on Renewable Energy of 2003 set a target of 10 000GWh to be generated from RE by 2013 to be produced mainly from biomass, wind, solar and small-scale hydro. The target was subsequently reviewed in 2009 during the RE summit of 2009. The policy supports the investment in RE facilities as they contribute towards ensuring energy security through the diversification of energy supply, reducing GHG emissions and the promotion of RE sources.
National Energy Act (No. 34 of 2008)	The purpose of the National Energy Act (No. 34 of 2008) is 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, while taking environmental management requirements into account. In addition, the Act also provides for energy planning, and increased generation and consumption of Renewable Energies (REs). The Act provides the legal framework which supports the development of RE facilities for the greater environmental and social good and provides the backdrop against which South Africa's strategic planning regarding future electricity provision and supply takes place.
The Electricity Regulation Act (No. of 2006)	The Electricity Regulation Act of 2006, replaced the Electricity Act (No. 41 of 1987), as amended, with the exception of Section 5B, which provides funds for the energy regulator for the purpose of regulating the electricity industry. The Act establishes a national regulatory framework for the electricity supply industry and introduces the National Energy Regulator (NERSA) as the custodian and enforcer of the National Electricity Regulatory Framework. The Act also provides for licences and registration as the manner in which the generation, transmission, distribution, trading, and import and export of electricity are regulated.
Integrated Energy Plan (IEP), 2015	The Integrated Energy Plan (IEP) (which was developed under the National Energy Act (No. 34 of 2008)), recognises that energy is essential to many human activities, and is critical to the social and economic development of a country. The purpose of the IEP is essentially to ensure the availability of energy resources, and access to energy services in an affordable and sustainable manner, while minimising associated adverse environmental impacts. Energy planning therefore needs to balance the need for continued economic growth with social needs, and the need to protect the natural environment.
Integrated Resource Plan for Electricity (IRP) 2010-2030 (2019)	The Integrated Resource Plan (IRP) for Electricity 2010 – 2030 is a subset of the IEP and constitutes South Africa's National electricity plan. The primary objective of the IRP 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. The IRP also serves as input to other planning functions, including amongst others, economic development and funding, and environmental and social policy formulation. On 27 August 2018, the then Minister of Energy published a draft IRP which was issued for public comment. The lengthy public participation and consultation process has culminated in the issue of the overdue IRP 2019 which updates the energy forecast from the current period to the year 2030. Since the promulgated IRP 2010, the following capacity developments have taken place: » A total of 6 422MW has been procured thus far under the REIPPP Programme, with

Relevant legislation or policy	Relevance to Kotulo Tsatsi Energy PV3
	3 876MW being currently operational and made available to the grid. In addition, IPPs have commissioned 1005MW from two (2) Open Cycle Gas Turbines (OCGT) peaking plants; and » Under the Eskom Build Programme, 1 332MW has been procured from the Ingula Pumped Storage Project, 1 588MW and 800MW from the Medupi and Kusile power stations and 100MW from the Sere Wind Farm. Provision has been made for the following new capacity by 2030: » 1 500MW of coal; » 2 500MW of hydro; » 6 000MW of solar PV; » 14 400MW of wind; » 1 860MW of nuclear; » 2 088MW of storage; » 3 000MW of gas/diesel; and » 4 000MW from other distributed generation, co-generation, biomass and landfill technologies. Based on the IRP 2019, 1 474MW has been installed for solar PV facilities, whereas, 814MW has already been procured. In addition, 1 000MW has been allocated for solar PV facilities from 2022 to 2030. This will bring the total installed capacity of solar PV facilities by 2030 to 8 288MW. Therefore, the development of the Kotulo Tsatsi Energy PV3 is supported by the IRP 2019.
National Development Plan 2030 (2012)	The National Development Plan (NDP) 2030 is a plan prepared by the National Planning Commission in consultation with the South African public which is aimed at eliminating poverty and reducing inequality by 2030. In terms of the Energy Sectors role in empowering South Africa, the NDP envisages that, by 2030, South Africa will have an energy sector that promotes: » Economic growth and development through adequate investment in energy infrastructure. The sector should provide reliable and efficient energy service at competitive rates, while supporting economic growth through job creation. » Social equity through expanded access to energy at affordable tariffs and through targeted, sustainable subsidies for needy households. » Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change. The NDP aims to provide a supportive environment for growth and development, while promoting a more labour-absorbing economy. The development of Kotulo Tsatsi Energy PV3 supports the NDP through the development of energy-generating infrastructure which will not lead to the generation of GHGs and will result in economic development and growth of the area surrounding the development area.
Strategic Integrated Projects (SIPs)	The Presidential Infrastructure Coordinating Commission (PICC) is integrating and phasing investment plans across 18 Strategic Integrated Projects (SIPs) which have 5 core functions, including to unlock opportunity, transform the economic landscape, create new jobs, strengthen the delivery of basic services and support the integration of African economies. SIP 8 of the energy SIPs supports the development of RE projects as follows:

Relevant legislation or policy	Relevance to Kotulo Tsatsi Energy PV3
	Green energy in support of the South African economy: Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010) and supports bio-fuel production facilities. The development of Kotulo Tsatsi Energy PV3 is aligned with SIP 8 as it constitutes a green energy initiative that would contribute clean energy in accordance with the IRP 2010 – 2030.
National Climate Change Response Policy, 2011	The Conference of the Parties (COP) 21 was held in Paris from 30 November to 12 December 2015. From this conference, an agreement to tackle global warming was reached between 195 countries. This Agreement is open for signature and subject to ratification, acceptance or approval by States and regional economic integration organisations that are Parties to the Convention from 22 April 2016 to 21 April 2017. Thereafter, this Agreement shall be open for accession from the day following the date on which it is closed for signature. The agreement can only be sanctioned once it has been ratified by 55 countries, representing at least 55% of emissions. South Africa signed the Agreement in April 2016 and ratified the agreement on 01 November 2016. The Agreement was assented to by the National Council of Provinces on 27 October 2016, and the National Assembly on 1 November 2016. The Agreement was promulgated on 04 November 2016, thirty days after the date on which at least 55 Parties to the Convention, which account for at least 55% of the total global greenhouse gas emissions have deposited their instruments of ratification, acceptance, approval or accession with the Depositary. South Africa's National Climate Change Response Policy (NCCRP) establishes South Africa's approach to addressing climate change, including adaptation and mitigation responses. The NCCRP formalises Government's vision for a transition to a low carbon economy, through the adoption of the 'Peak, Plateau and Decline' (PPD) GHG emissions trajectory whereby South Africa's emissions should peak between 2020 and 2025, plateau for approximately a decade, and then decline in absolute terms thereafter, and based on this the country has pledged to reduce emissions by 34% and 42% below Business As Usual (BAU) emissions in 2020 and 2025, respectively. The policy provides support for Kotulo Tsatsi Energy PV3 , which will contribute to managing climate change impacts, supporting the emergency response capacity, as well as assist in reducing GHG emissions in a sustainable manner.
Climate Change Bill, 2018	On 08 June 2018, the Minister of Environmental Affairs published the Climate Change Bill ("the Bill") for public comment. The Bill provides a framework for climate change regulation in South Africa aimed at governing South Africa's sustainable transition to a climate resilient, low carbon economy and society. The Bill provides a procedural outline that will be developed through the creation of frameworks and plans. Kotulo Tsatsi Energy PV3 consists of a renewable energy generation facility and would not result in the generation or release of emissions during its operation.

4.4 Provincial Planning and Context

A brief review of the most relevant provincial policies is provided below in **Table 4.2**. The proposed development is considered to align with the aims of these policies, even if contributions to achieving the goals therein are only minor.

Table 4.2: Relevant provincial legislation and policies for Kotulo Tsatsi Energy PV3

Relevant policy	Relevance to Kotulo Tsatsi Energy PV3
Northern Cape Provincial Spatial Development Framework (PSDF) 2012	The Northern Cape Provincial Spatial Development Framework (PSDF) 2012 states that the overarching goal for the province is to enable sustainability through sustainable development. The province considers social and economic development as imperative in order to address the most significant challenge facing the Northern Cape, which is poverty. The PSDF identifies key sectoral strategies and plans which are considered to be the key components of the PSDF. Sectoral Strategy 19 refers to a provincial renewable energy strategy. Within the PSDF a policy has been included which states that renewable energy sources (including the utilisation of solar energy) are to comprise 25% of the province's energy generation capacity by 2020. The overall energy objective for the province also includes promoting the development of renewable energy supply schemes which are considered to be strategically important for increasing the diversity of domestic energy supply and avoiding energy imports, while also minimising the detrimental environmental impacts. The implementation of sustainable renewable energy is also to be promoted within the province through appropriate financial and fiscal instruments. The development of Kotulo Tsatsi Energy PV3 supports the overall energy objective of the province to have 25% of its electricity from renewable energy sources.
Northern Cape Provincial Spatial Development Framework (PSDF) 2018 Review - Executive Summary	The review of the Northern Cape PSDF (2018) refers to infrastructure investment and that a balance must be maintained between investments aimed at meeting the social needs of communities and investment aimed at promoting economic development and job creation. The Spatial Development Strategy identified in the PSDF for basic infrastructure includes the achieving the provision of green infrastructure which includes renewable energy. As part of the Vision 2040 of the PSDF key opportunities are identified for the Province. The strengthening of the development triangle that is formed by the linking of Kimberley, Vryburg, Upington and De Aar. The development triangle sustains a diverse economy with strong mining, agricultural and renewable energy sectors. It is stated in the PSDF that a sustainable and viable economic network must be driven within the development triangle to improve the return of public investment in the Province. The development of Kotulo Tsatsi Energy PV3 will contribute to the economic network of the province specifically in terms of the renewable sector, albeit it does not fall within the development triangle.
The Northern Cape Climate Change Response Strategy	The key aspects of the Northern Cape Climate Change Response Strategy (NCCCRS) Report are summarised in the MEC's (NCPG: Environment and Nature Conservation) 2011 budget speech: "*The Provincial Climate Change Response Strategy will be underpinned by specific critical sector climate change adaptation and mitigation strategies that*

Relevant policy	Relevance to Kotulo Tsatsi Energy PV3
	include the Water, Agriculture and Human Health sectors as the 3 key Adaptation Sectors, the Industry and Transport alongside the Energy sector as the 3 key Mitigation Sectors with the Disaster Management, Natural Resources and Human Society, livelihoods and Services sectors as 3 remaining key. Sectors to ensure proactive long-term responses to the frequency and intensity of extreme weather events such as flooding and wildfire, with heightened requirements for effective disaster management". Key points from the MEC address include the NCPG's commitment to develop and implement policy in accordance with the National Green Paper for the National Climate Change Response Strategy (2010), and an acknowledgement of the Northern Cape Province's extreme vulnerability to climate-change driven desertification. The development and promotion of a provincial green economy, including green jobs, and environmental learnership is regarded as an important provincial intervention in addressing climate change. The renewable energy sector, including solar and wind energy (but also biofuels and energy from waste), is explicitly indicated as an important element of the Provincial Climate Change Response Strategy. The development of Kotulo Tsatsi Energy PV3 will assist in achieving (although only to a limited extent) the promotion of the provincial green economy of the Northern Cape.

4.5 Local Policy and Planning Context

The local tiers of government relevant to the Kotulo Tsatsi Energy PV3 project are the Hantam Local Municipality and the Namakwa District Municipality. Instruments and/or policies at both the district and local level contain objectives which align with the development of Kotulo Tsatsi Energy PV3. These include, economic growth, job creation, community upliftment and poverty alleviation.

Table 4.3: Relevant district and local legislation and policies for Kotulo Tsatsi Energy PV3

Relevant policy	Relevance to Kotulo Tsatsi Energy PV3
Namakwa District Municipality (NDM) Integrated Development Plan (2017-2022)	The mission statement for the NDM is summarised by the following aspects: » The stimulation of radical economic and social transformation; » The fostering of partnership with relevant role-players; » Supporting and capacitating of local municipalities; » Transparent and accountable processes; and » Providing of local leadership The key priority issues listed in the Namakwa District Municipality's Integrated Development Plan (NDM:IDP) include: » Basic service delivery; » Municipal institutional development and transformation; » Local economic development; » Municipal financial viability and management; » Good governance and public participation. The development goals listed in the IDP that are relevant to the development of Kotulo Tsatsi Energy PV3 include: » To deliver a positive contribution to the sustainable growth and development within its boundaries and the rest of the Northern Cape; » The creation of a healthy and environmentally friendly environment within and outside of the Councils' district boundaries, must be attempted;

Relevant policy	Relevance to Kotulo Tsatsi Energy PV3
	» The promotion of human resources within and outside the organisation through training and the implementation of new technological aids. Linked to the developmental goals are a number of developmental objectives. The following objectives are relevant to the development of Kotulo Tsatsi Energy PV3: » Promotion of SMMEs in order to strengthen the Local Economic Sector; » Promote the infrastructure development, including electricity.
Hantam Local Municipality Integrated Development Plan (IDP) 2020/2021 (Final, May 2020)	The Hantam LM IDP indicates that there has been a significant increase in the electricity, gas and water sector due to the establishment of renewable energy generation facilities in the municipal area. The IDP also reports that there has been an increase in the construction and transport sectors due to strong linkages with the establishment of renewable energy facilities. The municipality considers that the establishment of renewable energy projects in the region will positively impact on the economy of the municipal area. Therefore, the development of Kotulo Tsatsi Energy PV3 is desirable by the local municipality due to the alignment with the IDP.

4.6 International Policy and Planning Context

A brief review of the most relevant international policies relevant to the establishment of Kotulo Tsatsi Energy PV3 are provided below in **Table 4.4**. Kotulo Tsatsi Energy PV3 is considered to align with the aims of these policies, even if contributions to achieving the goals therein are only minor.

Table 4.4: International policies relevant to Kotulo Tsatsi Energy PV3

Relevant policy	Relevance to Kotulo Tsatsi Energy PV3
United Nations Framework Convention on Climate Change (UNFCCC) and Conference of the Party (COP)	Following COP24 held in Katowice, Poland, and Chile's announcement that they could not host the next COP, nearly 27 000 delegates met in Madrid, Spain for COP25 with the intention to finalise the 'rulebook' of the Paris Agreement. The Conference also intended to communicate to the global community that the efforts of the United Nations (UN) to curb climate change remained relevant and that the UN recognised the yawning gap between current progress and global goals to limit global warming. The UNFCCC Secretariat announced[15] on 29 May 2020 that COP 26, originally scheduled for 9 – 19 November 2020 was postponed for 1 – 12 November 2021 and will be held in Glasgow, Scotland. In the previous COP, talks between the parties were unable to reach consensus in many areas, with a lot of issues being postponed to COP26 in 2021. Although COP26 has been postponed, the provision in the 2015 Climate Treaty that each Party must take a more ambitious commitment in 2020 to reduce greenhouse emissions has not been postponed. The UN at COP25 expressed their dissatisfaction with the results of the Conference and that the global community lost out on an opportunity to show

[15] https://cei.org/blog/cop-26-un-climate-conference-delayed%C2%A0until-november-2021

Relevant policy	Relevance to Kotulo Tsatsi Energy PV3
	increased ambition on mitigation, adaptation and finance to tackle the climate crisis [16]. The policy provides support for Kotulo Tsatsi Energy PV3 which will contribute to managing climate change impacts, supporting the emergency response capacity, as well as assist in reducing GHG emissions in a sustainable manner.
The Equator Principles III (June 2013)	The Equator Principles (EPs) III constitute a financial industry benchmark used for determining, assessing, and managing project's environmental and social risks. The EPs are primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making. The EPs are applicable to large infrastructure projects (such as Kotulo Tsatsi Energy PV3) and apply globally to all industry sectors. Such an assessment should propose measures to minimise, mitigate, and offset adverse impacts in a manner relevant and appropriate to the nature and scale of Kotulo Tsatsi Energy PV3. In terms of the EPs, South Africa is a non-designated country, and as such the assessment process for projects located in South Africa evaluates compliance with the applicable IFC Performance Standards on Environmental and Social Sustainability, and Environmental Health and Safety (EHS) Guidelines. Kotulo Tsatsi Energy PV3 is currently being assessed in accordance with the requirements of the EIA Regulations, 2014 as amended (GN R326), published in terms of Section 24(5) of the National Environmental Management Act (No. 107 of 1998) (NEMA), which is South Africa's national legislation providing for the authorisation of certain controlled activities. Through this assessment, all potential social and environmental risks are identified and assessed, and appropriate mitigation measures proposed.
International Finance Corporation (IFC) Performance Standards and Environmental and Social Sustainability (January 2012)	The International Finance Corporation's (IFC) Performance Standards (PSs) on Environmental and Social Sustainability were developed by the IFC and were last updated on 1 January 2012. Performance Standard 1 requires that a process of environmental and social assessment be conducted, and an ESMS appropriate to the nature and scale of the project, and commensurate with the level of its environmental and social risks and impacts, be established and maintained. The above-mentioned standard is the overarching standard to which all the other standards relate. Performance Standard 2 through to 8 establish specific requirements to avoid, reduce, mitigate or compensate for impacts on people and the environment, and to improve conditions where appropriate. While all relevant social and environmental risks and potential impacts should be considered as part of the assessment, the standards 2 and 8 describe potential social and environmental impacts that require particular attention specifically

[16] https://www.carbonbrief.org/cop25-key-outcomes-agreed-at-the-un-climate-talks-in-madrid

Relevant policy	Relevance to Kotulo Tsatsi Energy PV3
	within emerging markets. Where social or environmental impacts are anticipated, the developer is required to manage them through its ESMS consistent with Performance Standard 1. Given the nature of Kotulo Tsatsi Energy PV3 , it is anticipated (at this stage of the process) that Performance Standards 1, 2, 3, 4, 6, and 8 may be applicable to the project.

CHAPTER 5 NEED AND DESIRABILITY

Appendix 2 of the 2014 EIA Regulations (GNR 326) requires that a Scoping Report includes a motivation for the need and desirability of the proposed development, including the need and desirability of the activity in the context of the preferred location. The need and desirability of the development needs to consider whether it is the right time and the right place for locating the type of land-use/activity being proposed. The need and desirability of a proposed development is, therefore, associated with the wise use of land, and should be able to respond to the question such as, but not limited to, what the most sustainable use of the land may be.

This Chapter provides an overview of the projected suitability of Kotulo Tsatsi Energy PV3 being developed at the preferred project location from an international, national, regional, and site-specific perspective. It provides an overview of the need and desirability, and perceived benefits of the project specifically.

5.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of an Impact Assessment Report

This chapter includes the following information required in terms of Appendix 2: Content of a 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 Kotulo Tsatsi Energy PV3 is included and discussed as a whole within this chapter. The need and desirability for the development of the solar PV facility has been considered from an international, national, regional and site-specific perspective.

5.2 Need and Desirability from an International Perspective

The need and desirability of Kotulo Tsatsi Energy PV3, from an international perspective, can be described through the project's alignment with internationally recognised and adopted agreements, protocols and conventions. South Africa is a signatory to a number of international treaties and initiatives, including the United Nation's Development Programme's (UNDP's) Sustainable Development Goals (SDGs). The SDGs address global socio-economic challenges such as poverty, hunger, health, education, climate change, gender equality, water, sanitation, energy, urbanisation, environment and social justice. The SDGs consist of 17 global goals set by the United Nations. The 17 SDGs are characterised by 169 targets, and 304 indicators.

Goal 7 of the SDGs relates to "Affordable and Clean Energy", with the aim of the goal being to ensure access to affordable, reliable, sustainable and modern energy for all. The following targets and indicators have been set for Goal 7:

Targets	Indicators
7.1 By 2030, ensure universal access to affordable, reliable and modern energy services.	7.1.1 Proportion of population with access to electricity. 7.1.2 Proportion of population with primary reliance on

Targets		Indicators	
			clean fuels and technology.
7.2	By 2030, increase substantially the share of renewable energy in the global energy mix.	7.2.1	Renewable energy share in the total final energy consumption.
7.3	By 2030, double the global rate of improvement in energy efficiency.	7.3.1	Energy intensity measured in terms of primary energy and GDP.
7.A	By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology.	7.A.1	Mobilised amount of United States dollars per year starting in 2020 accountable towards the $100 billion commitment.
7.B	By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support.	7.B.1	Investments in energy efficiency as a percentage of GDP and the amount of foreign direct investment in financial transfer for infrastructure and technology to sustainable development services.

The development of Kotulo Tsatsi Energy PV3 would contribute positively towards Goal 7 of the SDGs through the following:

- By generating up to 200MW_{AC} of affordable and clean energy.
  - A study published by the CSIR on 14 October 2016 ("Cost of new power generators in South Africa Comparative analysis based on recent Independent Power Producer (IPP) announcements", Dr Tobias Bischof-Niemz and Ruan Fourie) which took into consideration the results of the cost prices bid successfully under the Department of Mineral Resources and Energy's Renewable Energy (RE) IPP and Coal Baseload IPP Procurement Programmes, found that solar PV and wind were 40% cheaper than new baseload coal (i.e. R0.62/kWh for PV and wind vs R1.03 for coal).
  - PV technology is one of the cleanest electricity generation technologies, as it does not result in the release of emissions during its operation.
- By contributing towards South Africa's total generation capacity, specifically through the utilisation of renewable energy resources.

5.3 Need and Desirability from a National Perspective

Kotulo Tsatsi Energy PV3 is proposed in specific response to a National Government initiative, the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). This programme was initiated in order to give effect to the requirements of the IRP with regards to renewable energy targets. As a result, the need and desirability of Kotulo Tsatsi Energy PV3 from a national perspective can largely be linked from the project's alignment with national government policies, plans, and programmes which have relevance to energy planning and production (as discussed in detail in **Chapter 4**). The following key plans have been developed by National Government to consider South Africa's current energy production, projected future demands, and provides the necessary framework within which energy generation projects can be developed:

» Integrated Energy Plan (IEP)
» Integrated Resource Plan (IRP)

The above-mentioned energy plans have been extensively researched and are updated on an on-going basis to take into consideration changing scenarios, new information, developments in new technologies, and to reflect updated demands and requirements for energy production within the South African context. These plans form the basis of South Africa's energy generation sector and dictate national priorities for energy production.

The IEP is intended to provide a roadmap of South Africa's future energy landscape and guide future energy infrastructure investments and policy development. The Plan considered the three pillars of sustainable development, and list the following as the eight key energy planning objectives:

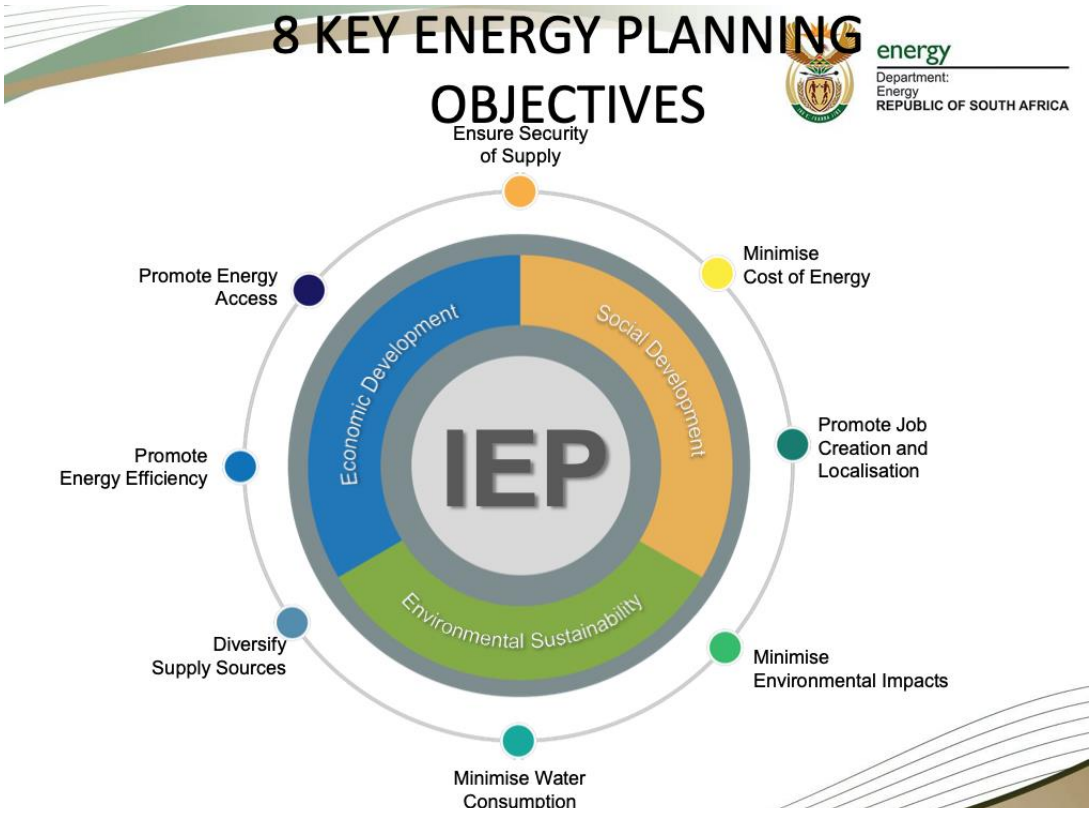

Figure 5.1: Eight key energy objectives as listed in the IEP, 2016 (extract from DOE presentation, December 2016)

The latest iteration of the IEP (25 November 2016) contained the following statement regarding solar power in South Africa:

"*South Africa experiences some of the highest levels of solar radiation in the world and this renewable resource holds great potential for the country. The daily solar radiation in South Africa varies between 4.5 and 6.5 kilowatt hours per square meter (kWh/m²) (16 and 23 mega joules per square meter [MJ/m²]) (Stassen, 1996), compared to about 3.6 kWh/m² in parts of the United States and about 2.5 kWh/m² in Europe and the United Kingdom. The total area of high radiation in South Africa amounts to approximately 194 000 km², including the Northern Cape, which is one of the best solar resource areas in the world. With electricity production per square kilometre of mirror surface in a solar thermal power*

station being 30.2 MW, and just 1% of the high radiation area in the country being made available for solar power generation, the generation potential is approximately 64 GW. Solar energy has the potential to contribute quite substantially to South Africa's future energy needs. This would, however, require large investments in transmission lines from the areas of high radiation to the main electricity consumer centres."

In terms of electricity generation, the IEP states that South Africa should continue to pursue a diversified energy mix which reduces reliance on a single or a few primary energy sources, and includes the following statement regarding solar energy's contribution to the diversified energy mix:

- *Solar should play a much more significant role in the electricity generation mix than it has done historically and constitutes the greatest share of primary energy (in terms of total installed capacity) by 2050. The contribution of solar in the energy mix comprises both CSP and solar PV. Solar PV includes large scale installations for power generation which supply to the grid and individual, off-grid solar home systems and rooftop panels.*
- *Several interventions which could enhance the future solar energy landscape are recommended as follows: – Large scale CSP projects with proven thermal storage technologies and hybridisation / industrial steam application projects should be incentivised in the short to medium term. In the long term, the existing incentives could be extended to promote locally developed CSP technology storage solutions and large-scale solar fuel projects.*
- *A thorough solar resource assessment for South Africa should continue to be undertaken in the Northern Cape Province and extended to other provinces deemed to have high solar radiation levels.*
- *Investments should be made to upgrade the grid in order to accommodate increasing solar and other renewable energy contributions.*

The Integrated Resource Plan 2019 is South Africa's current gazetted energy plan. The purpose of the plan is to ensure sustainable electricity development which takes into consideration technical, economic, and social constraints, and identifies investments in the electricity sector which are required to meet the country's forecasted electricity demands at minimum costs. The consideration of GHG emissions in the determination of the energy generation mix indicates government's commitment to international obligations under the Paris Agreement.

A number of IPP Procurement Programmes have been initiated to secure electricity generated from a range of resources from the private sector (i.e. from Independent Power Producers, or IPPs). Under these Programmes, IPPs are invited to submit proposals for the finance, construction, operation, and maintenance of electricity generation facilities for the purpose of entering into an Implementation Agreement with the DMRE and a Power Purchase Agreement (PPA) with Eskom as the buyer. Provision has been made for new additional capacities in the IRP 2019 (refer to **Table 5.1**).

Table 5.1: Overview of the total installed capacity expected by 2030

IPP Procurement Programme	Technology	MW	Total
Renewables	Wind	17 742MW	31 320MW
	Solar CSP	600MW	
	Solar Photovoltaic	8 288MW	
	Hydro	4 600MW	
Coal	Coal	33 364MW	33 364MW
Nuclear	Nuclear	1 860MW	1 860MW
Gas & Diesel	Gas & Diesel	3 000MW	3 000MW

Other (Distributed Generation, CoGen, Biomass, Landfill)	Other (Distributed Generation, CoGen, Biomass, Landfill)	4 000MW	4 000MW

Renewable resources are valuable in contributing towards electricity generation and diversifying South Africa's electricity mix, while contributing towards South Africa's response to Climate Change. Under the REIPPPP , the DMRE intends to secure 14 725MW of electricity from renewable energy generation facilities utilising either onshore wind, concentrated solar thermal, solar photovoltaic (PV), biomass, biogas, landfill gas, or hydro across a number of bidding windows, while simultaneously contributing towards socio-economic development. A total of 1 474MW[17] of PV generated electricity has been awarded to preferred bidders across four (4) rounds of bidding to date, with 814MW still remaining to be allocated in subsequent bidding rounds. Preferred bidders identified under any IPP Procurement Programme, including the REIPPPP, are required to satisfy a number of economic development requirements, including amongst others, job creation, local content, skills development, enterprise and supplier development, and socio-economic development. In addition to electricity generation and supply, IPP Procurement Programmes also contribute positively towards socio-economic development of a region, over and above job creation.

The need for new power generation from solar PV facilities has been identified and assessed by government at a national scale considering the national energy requirements as well as international commitments under the Paris Agreement; therefore, provision has been made for the inclusion of new PV power generation capacity in South Africa's energy mix. The implementation of Kotulo Tsatsi Energy PV3 has the potential to contribute positively towards the identified need, while simultaneously contributing to job creation and socio-economic development, identified as a need for the country within the National Development Plan (NDP).

Kotulo Tsatsi Energy PV3 will make use of renewable energy technology and would contribute positively towards reducing South Africa's GHG emissions and ensure compliance with all applicable legislation and permitting requirements. In addition, by making use of PV technology, Kotulo Tsatsi Energy PV3 would have reduced water requirements when compared with some other generation technologies in alignment with one of the vision 2030 themes of the then-Department of Water and Sanitation's (now the Department of Human Settlements, Water and Sanitation) National Water Resource Strategy 2 (2013) (i.e. transitioning to a low carbon economy through stimulating renewable energy and retrofitting buildings).

5.4 Need and Desirability of the project from a Regional Perspective

South Africa's electricity generation mix has historically been dominated by coal. However, up to 2030 a new capacity demand will be driven by the decommissioning of existing coal-fired power stations. A further 24 100MW (**Figure 5.2**) of coal power is expected to be decommissioned in the period 2030 to 2050. Therefore, additional capacity will be required from renewable energy sources, particularly solar with 6 000MW being allocated for the period up to 2030.

[17] https://www.cliffedekkerhofmeyr.com/en/news/publications/2019/Corporate/energy-alert-22-october-The-Integrated-Resource-Plan-2019-A-promising-future-roadmap-for-generation-capacity-in-South-Africa.html

	Coal	Coal (Decommis-sioning)	Nuclear	Hydro	Storage	PV	Wind	CSP	Gas & Diesel	Other (Distributed Generation, CoGen, Biomass, Landfill)
Current Base	37,149		1 860	2,100	2 912	1 474	1 980	300	3 830	499
2019	2,155	-2,373					244	300		Allocation to the extent of the short term capacity and energy gap.
2020	1,433	-557				114	300			
2021	1,433	-1403				300	818			
2022	711	-844			513	400 1,000	1,600			
2023	750	-555				1000	1,600			500
2024			1,860				1,600		1000	500
2025						1000	1,600			500
2026		-1,219					1,600			500
2027	750	-847					1,600		2000	500
2028		-475				1000	1,600			500
2029		-1,694			1575	1000	1,600			500
2030		-1,050		2,500		1000	1,600			500
TOTAL INSTALLED CAPACITY by 2030 (MW)	33,364		1,860	4,600	5,000	8,288	17,742	600	6,380	
% Total Installed Capacity (% of MW)	43		2.36	5.84	6.35	10.52	22.53	0.76	8.1	
% Annual Energy Contribution (% of MWh)	58.8		4.5	8.4	1.2*	6.3	17.8	0.6	1.3	

Installed Capacity
Committed/Already Contracted Capacity
Capacity Decommissioned
New Additional Capacity
Extension of Koeberg Plant Design Life
Includes Distributed Generation Capacity for own use

- 2030 Coal Installed Capacity is less capacity decommissioned between years 2020 and 2030.
- Koeberg power station rated/installed capacity will revert to 1,926MW (original design capacity) following design life extension work.
- Other/ Distributed generation includes all generation facilities in circumstances in which the facility is operated solely to supply electricity to an end-use customer within the same property with the facility.
- Short term capacity gap is estimated at 2,000MW.

Figure 5.2: A snapshot of the updated Energy Mix as per the IRP 2019

Although the majority of South Africa's electricity generation infrastructure (coal-fired power stations) is currently located within Mpumalanga due to the location of coal resources within this province, the Northern Cape Province has been identified as an area where electricity generation from solar energy facilities is highly feasible and a viable option. The location of the study area and project site within the Northern Cape is therefore considered to support the Province/Region's generation targets. The Kenhardt area is also considered as a hub for the development of solar energy projects due to the viability of the solar resource for the area and the number of projects proposed in the area.

The overarching objective for the solar energy facility is to maximise electricity production through exposure to the solar resource, while minimising infrastructure, operational and maintenance costs, as well as social and environmental impacts. 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. The GHI for the area derived from the World Bank Group's Global Solar Atlas is approximately 2 240 kWh/m^2/annum, equivalent to the highest GHI values in the country (refer to **Figure 5.3**).

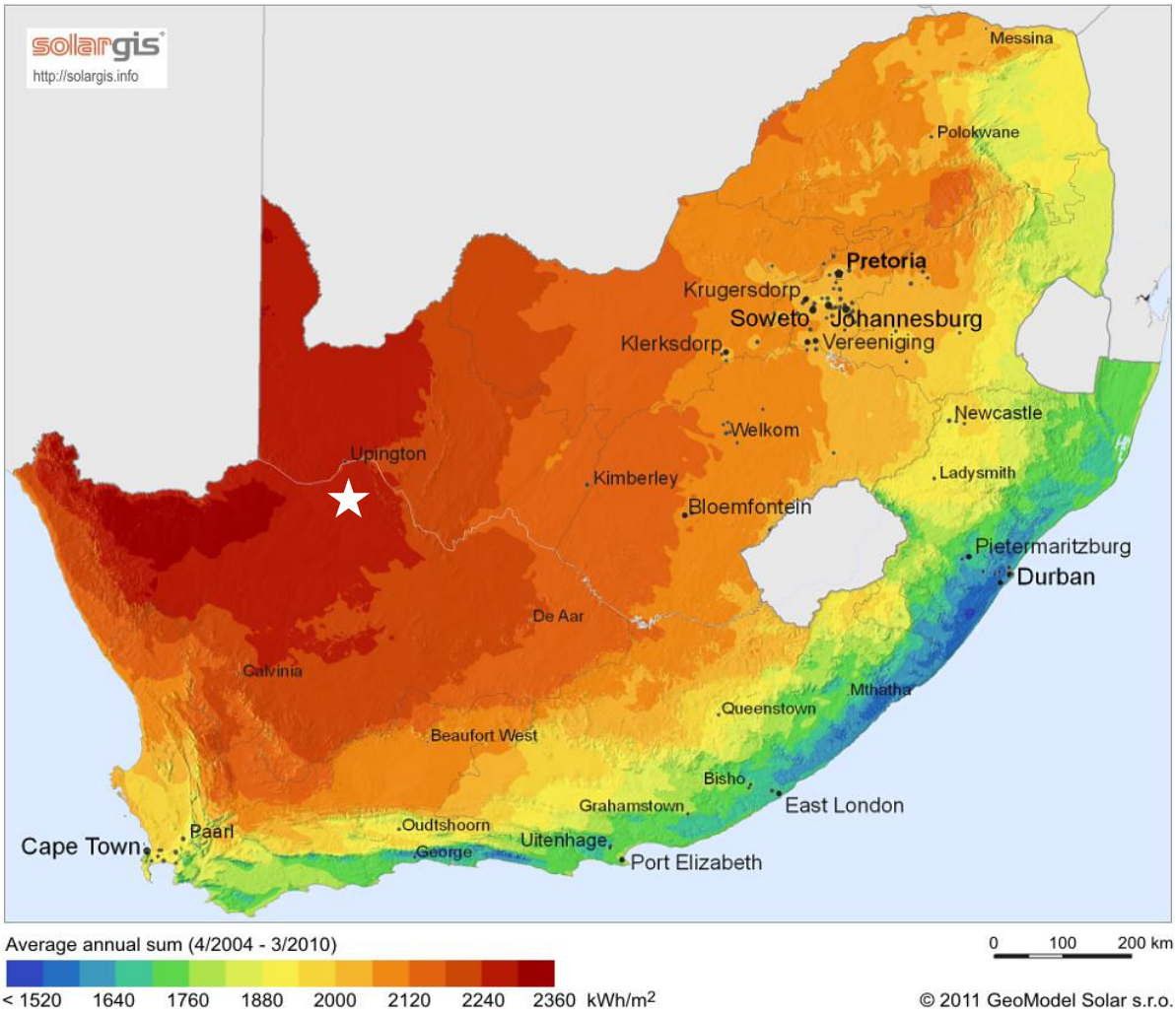

Figure 5.3: Solar irradiation map for South Africa, with the position of Kotulo Tsatsi Energy PV3 shown by the white star (Source: GeoModel Solar)

5.5 Receptiveness of the proposed development area for the establishment of Kotulo Tsatsi Energy PV3

The placement of a solar PV facility is strongly dependent on several factors including climatic conditions (solar irradiation levels), topography, the location of the site, and in particular the location in a node for renewable projects, availability of grid connection, the extent of the site and the need and desirability for the project. From a local level perspective, the project site and development area have specifically been identified by the proponent as being highly desirable from a technical perspective for the development of a solar PV facility due to the following site characteristics:

» **Solar resource**: The economic viability of a solar PV facility is directly dependent on the annual direct solar irradiation values. The Global Horizontal Irradiation (GHI) for this geographic location is in the region of approximately 2 240kWh/m^2/annum, which is considered favourable for the development of a solar PV facility.

» **Topography**: Sites that facilitate easy construction conditions, (i.e. relatively flat topography, lack of major rock outcrops, limited watercourse crossings, etc.) are favoured by developers during the site

selection process. As a result, the development area for Kotulo Tsatsi Energy PV3 consists of a flat and homogenous area. Elevation across the area ranges from 940m above sea level in the west to 950m above sea level in the east. There are no prominent hills within the project site with the highest areas of elevation situated to the north east of the project site. These characteristics are preferred for the construction and operation of a solar PV facility such as Kotulo Tsatsi Energy PV3.

» **Site extent and land availability:** Availability of relatively level land of sufficient extent can be a restraining factor to solar facility development, as a 200MW PV facility and associated infrastructure requires ~600ha of land space. The affected property (i.e. project site) is approximately 4935ha in extent, which is sufficient for the development of a solar PV facility with a contracted capacity of up to 200MW, while allowing for the avoidance of environmental sensitivities. A development area of ~ 1832ha has been identified within the project site within which the solar PV facility will be sited. The development envelope (within which the development footprint for the Kotulo Tsatsi Energy PV3 PV array plus associated infrastructure will be placed) has been demarcated as an area of ~951ha, which is equivalent to 46% of the extent of the development area. The extent of land available for the construction and operation of Kotulo Tsatsi Energy PV3, and the opportunity provided for the avoidance of environmental sensitivities contributes to the need and desirability of the development of Kotulo Tsatsi Energy PV3 in the proposed location. Furthermore, taking into consideration that the authorised Kotulo Tsatsi PV2 solar PV facility is located within the same project site and directly to the south of the Kotulo Tsatsi Energy PV3 development area, also adds to the desirability of the proposed development in the proposed location.

» **Access to Road Infrastructure and Site access**: The development area can be readily accessed via an existing gravel access road (Soafskolk road) branching off of the R27 between Kenhardt and Brandvlei, with only minor improvements to the turnoff onto the access road from the R27 required. The R27 road provides access to the town of Kenhardt via the N14 from Upington. The proximity of the development area to the R27 road (refer to **Figure 5.4**) decreases the impact on secondary roads from traffic during the construction and operation phases. As material and components would need to be transported to the development area during the construction phase, accessibility to the project site is a key factor in determining the viability of Kotulo Tsatsi Energy PV3, particularly taking transportation costs (direct and indirect) into consideration and the impact of this on the project economics and the ability to submit a competitive bid under the DMRE's REIPPP Programme.

Figure 5.4: Existing road infrastructure within the vicinity of the development area for Kotulo Tsatsi Energy PV3. This infrastructure will primarily be used to gain access to the development area.

» **Grid access:** A key factor in the siting of any solar PV facility is that the project must have a viable grid connection in order to evacuate the generated electricity to the national grid. The grid connection point for Kotulo Tsatsi Energy PV3 will be the existing Aries Substation. The solar PV facility will be connected to the grid via the previously authorised grid connection solution (**Figure 5.5**), which consists of a collector substation, switching station and a power line to the Aries Substation located 50km north-east of the site.

» **Land suitability and land use activities:** The current land use of the development area is an important consideration in site selection in terms of limiting disruption to existing land use practices. The project site is currently used for grazing, which is generally preferred for developments of this nature as the grazing activities can continue on the project site in tandem with the operation of the solar PV facility. There is no cultivated agricultural land in the project site or directly adjacent which could be impacted upon by the proposed development. The development area is not optimal for agricultural land use activities restricted by the arid climate and shallow soils, limiting the overall potential of the site to very low and rendering a low carrying capacity for livestock. The landowner is currently considering alternative land uses based on the challenges and limitations experienced within the area from a climatic perspective. Other land uses present within the vicinity of the development area include power line servitudes (including the existing Aries-Helios 400kV line), and the future development of other renewable solar energy facilities which have received environmental authorisations from DEFF. The proposed development is compatible with the surrounding land uses and does not present a conflicting land use.

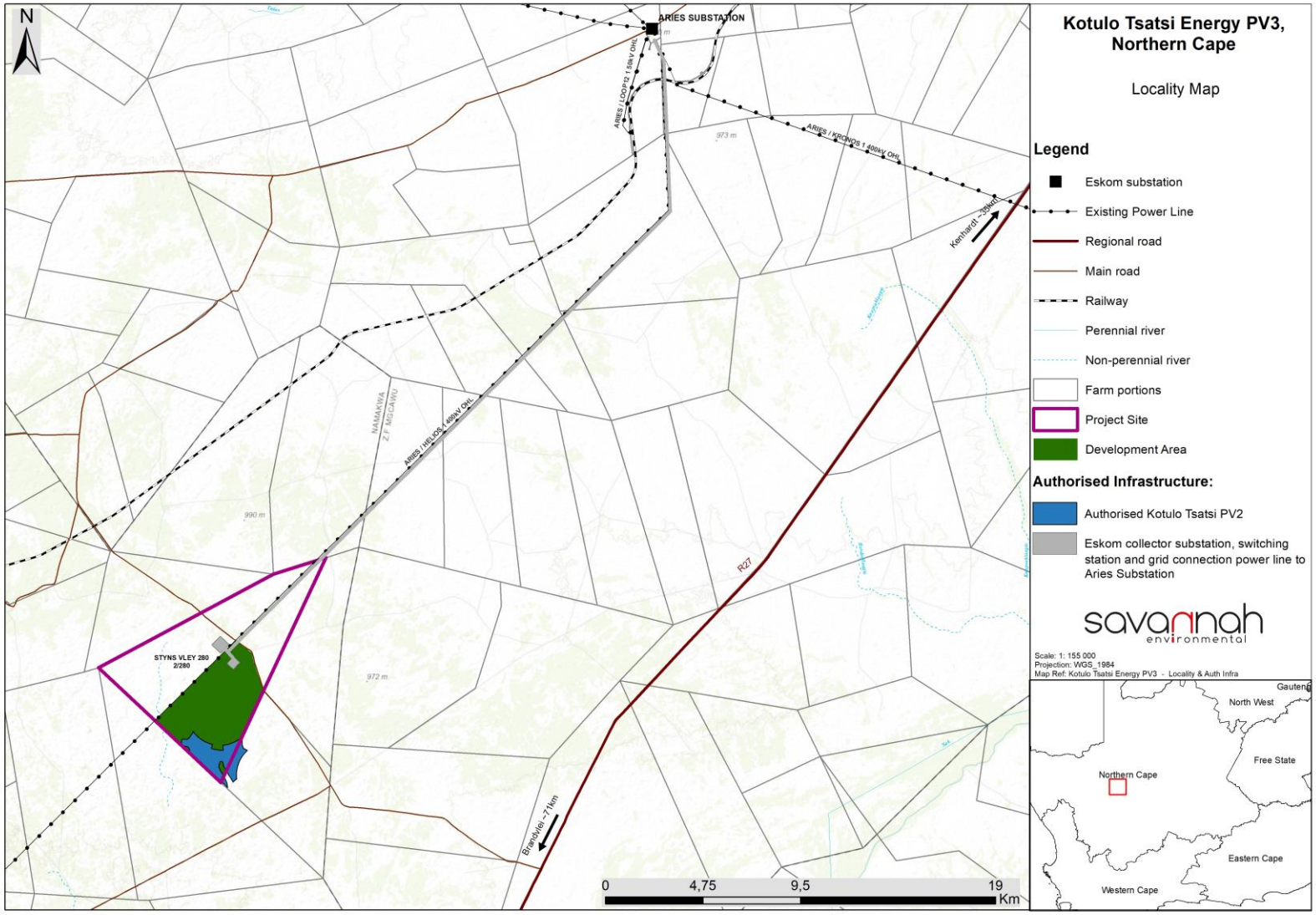

Figure 5.5: Previously authorised grid connection solution to cater for the connection of Kotulo Tsatsi Energy PV3 to the national grid (**Appendix D**)

» **Landowner Support:** The selection of a site where the landowner is supportive of the development of renewable energy is essential for ensuring the success of the project. The landowner does not view the development as a conflict with their current land use practices. The support from the landowner for the development to be undertaken on the affected property has been solidified by the provision of consent for the project to proceed on the property through the signing of a land option to lease agreement with the proponent.

Taking into consideration the solar resource, grid access, land suitability, landowner support, access to road infrastructure, the current land use of the project site and development area, in conjunction with other large-scale solar PV and CSP projects that have been authorised within the vicinity of the project site, the development of Kotulo Tsatsi Energy PV3 is therefore considered to be desirable and will ultimately contribute to, and further develop the successful power generation activities already being undertaken within the area.

Therefore, the development of Kotulo Tsatsi Energy PV3 within the project site and development area is considered to be desirable considering the characteristics of the area.

5.6 Benefits of Renewable Energy and the Need and Desirability

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

Socio-economic upliftment of local communities: Kotulo Tsatsi Energy PV3 has the potential to create much needed employment for unskilled locals during the construction phase. Training opportunities will also be afforded to qualified local people who can be upskilled to undertake certain roles during the construction and operation phases. In terms of the needs of the local community, the Local and District municipality IDPs identified the need to facilitate economic development by creating an environment that is conducive for business development, economic growth, sustainable employment opportunities and growth in personal income levels of communities; unlock opportunities to increase participation amongst all sectors of society in the mainstream economy to create decent job opportunities; promote Local Economic Development; and enhance rural development and agriculture. A study undertaken by the Department of Mineral Resource and Energy (DMRE), National Treasury and the Development Bank of Southern Africa (DBSA) in June 2017 found that employment opportunities created during the construction phase of the projects implemented to date had created 40% more jobs for South African citizens than anticipated. The study also found that significantly more people from local communities were employed during construction than was initially planned, confirming the potential benefits for local communities associated with the implementation of renewable energy projects.

Kotulo Tsatsi Energy PV3 also has the potential to make a positive contribution towards the identified community needs. In terms of the economic development requirements of the REIPPPP, the project will commit benefits to the local community in the form of job creation, localisation, and community ownership. In accordance with the DMRE's bidding requirements of the REIPPP, a percentage of the revenue generated per annum during operation will be made available to local communities through a social beneficiation scheme. Therefore, the potential for creation of employment and business opportunities, and the opportunity for skills development for local communities is significant. Secondary social benefits can be expected in terms of additional spend in nearby towns due to the increased

demand for goods and services. These socio-economic benefits would include an increase in the standard of living for local residents within the area as well as overall financial and economic upliftment.

Increased energy security: 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 such that some customers' energy supply would have had to be curtailed ('unserved') had it not been for the renewables. The avoidance of unserved energy cumulated into the effect that for 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 wind and PV projects[18]. More recently, power generated from renewable energy sources have assisted Eskom in alleviating the need for rolling black-outs when aging power stations have been offline for maintenance.

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. 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 significant renewable energy resource: At present, valuable renewable resources including biomass by-products, solar irradiation 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.

[18] (http://ntww1.csir.co.za/plsql/ptl0002/PTL0002_PGE157_MEDIA_REL?MEDIA_RELEASE_NO=7526896)

Economics: As a result of the available renewable energy resources and the competitive renewable energy procurement process, both wind power and solar PV power have now been proven as cheaper forms of energy generation in South Africa than fossil fuel (coal) generated power. The IRP 2019 gazetted by the Minister of Mineral Resources and Energy in October 2019, updates the energy forecast for South Africa from the current period until the year 2030 and has made an allocation of 6000MW in addition to the already installed/committed capacity of 2 288MW from solar PV facilities which will be developed from 2022 – 2030.

Pollution reduction: The release 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 irradiation or wind 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 GHG emissions. South Africa is estimated to currently be 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. Since its inception, the REIPPPP has achieved carbon emission reductions[19] of 25.3 million tonnes of CO_2 (IPP Office, March 2018). The development of Kotulo Tsatsi Energy PV3, and the associated electricity generated as a result of the facility, will result in considerable savings on tons of 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 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. In the short 8-year period, the REIPPPP has attracted R209.4 billion in committed private sector investment, resulting in 38 701 jobs for the youth and women from surrounding communities[20].

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.

[19] Carbon emission reduction is calculated based on a displacement of power, from largely coal-based to more environmentally friendly electrical energy generation, using a gross Eskom equivalent emissions factor of 1.015 tons CO_2/MWh.
[20] https://www.sanews.gov.za/south-africa/renewable-energy-programme-attracts-r2094-billion-sa-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; this is the basis of sustainable development. The development of renewable energy facilities contributes to the protection of the foundations.

CHAPTER 6 APPROACH TO UNDERTAKING THE SCOPING PHASE

In terms of the EIA Regulations of December 2014 (as amended) published in terms of the NEMA (Act No. 107 of 1998) as amended, the construction and operation of Kotulo Tsatsi Energy PV3 is a listed activity requiring Environmental Authorisation (EA). The application for EA is required to be supported by an Environmental Impact Assessment (EIA) process based on the contracted capacity of the facility being 200MW and Activity 1 of Listing Notice 2 (GNR 325).

An EIA process refers to the process undertaken in accordance with the requirements of the relevant EIA Regulations (the 2014 EIA Regulations (GNR 326), as amended), which involves the identification and assessment of direct, indirect, and cumulative environmental impacts associated with a proposed project or activity. The EIA process comprises two main phases: i.e. **Scoping** and **EIA Phase**.

South Africa is subject to the enforcement of Government Gazette 43096 which places the country in a national state of disaster limiting the movement of people to curb the spread of the COVID-19 virus. Considering the limitations in place, a comprehensive consultation process was designed and implemented to cater for the undertaking of a full-scale, innovative public participation process which included I&APs, the competent authority, directly impacted landowners/occupiers, adjacent landowners/occupiers, relevant Organs of State departments, ward councillors and other key stakeholders, while remaining within the limits as stipulated by the National Government. This chapter outlines the process that was followed during the Scoping Phase of the EIA process.

The EIA process is illustrated in **Figure 6.1**.

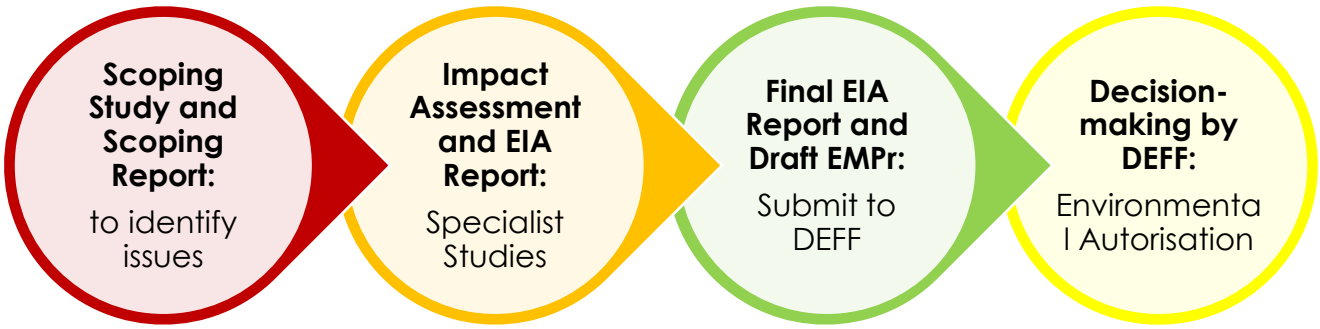

Figure 6.1: The Phases of an Environmental Impact Assessment (EIA) Process

6.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of an Impact Assessment Report

This chapter includes the following information required in terms of Appendix 2: Content of a Scoping report:

Requirement	Relevant Section
(d)(i) a description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for and (ii) a description of the activities to be undertaken, including associated structures and infrastructure.	All listed activities triggered and applied for are included in **Section 6.2**.
(g)(ii) details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs.	The public participation process followed throughout the EIA process of Kotulo Tsatsi Energy PV3 is included in **Section 6.5.2** and copies of the supporting documents and inputs are included in **Appendix C**.
(g)(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.	The main issues raised through the undertaking of the public participation process, including consultation with I&APs, are included in the Comments and Responses Report in **Appendix C8**.
(g)(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 in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives are included in **Section 6.5.3**.

6.2 Relevant legislative permitting requirements

The legislative permitting requirements applicable to Kotulo Tsatsi Energy PV3, as identified at this stage in the process and considered within this EIA process, are described in more detail under the respective sub-headings. Additional permitting requirements are detailed within **Section 6.6**.

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

NEMA (No. 107 of 1998) is South Africa's key piece of national environmental legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of NEMA, the potential impact on the environment associated with listed activities must be considered, investigated, assessed and reported on to the Competent Authority (the decision-maker) charged by NEMA with granting of the relevant Environmental Authorisation (EA). Due to the fact that Kotulo Tsatsi Energy PV3 is a power generation project and therefore relates to the IRP for Electricity 2010 – 2030, the National Department of Environment, Forestry and Fisheries (DEFF) has been determined as the Competent Authority (CA) in terms of GNR 779 of 01 July 2016. The Provincial Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARD & LR) is a Commenting Authority on the project.

The need to comply with the requirements of the EIA Regulations published under NEMA ensures that developers are provided the opportunity to consider the potential environmental impacts of their activities early in the project development process, and also allows for an assessment to be made as to whether

environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental studies are required to be undertaken in accordance with the EIA Regulations to provide the Competent Authority with sufficient information in order for an informed decision to be taken regarding the Application for EA.

The EIA process being conducted for Kotulo Tsatsi Energy PV3 is undertaken in accordance with Section 24(5) of the NEMA, which defines the procedure to be followed in applying for EA, and requires that the potential consequences for, or impacts of, listed or specified activities on the environment be considered, investigated, assessed, and reported on to the competent authority. Listed Activities are activities identified in terms of Section 24 of the NEMA which are likely to have a detrimental effect on the environment, and which may not commence without an EA from the competent authority subject to the completion of an environmental assessment process (either a Basic Assessment (BA) or full Scoping and EIA).

Table 6.1 contains all the listed activities identified in terms of NEMA, the 2014 EIA Regulations (GNR 326), and Listing Notice 1 (GNR 327), Listing Notice 2 (GNR 325), and Listing Notice 3 (GNR 324) which may be triggered by the proposed development of Kotulo Tsatsi PV3, and for which EA has been applied:

Table 6.1: Listed activities identified in terms of the Listing Notices (GNR 327, 325 and 324).

Notice Number	Activity Number	Description of listed activity
Listing Notice 1 (GNR 327) 08 December 2014 (as amended)	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 275kV or more. ***The project entails the construction of a new 132kV power line and on-site substation to evacuate electricity generated by the project into the national electricity grid via an already authorised Substation and Switching Station. The power line and on-site substation will have a capacity of more than 33kV and will be located outside of an urban area.***
Listing Notice 1 (GNR 327) 08 December 2014 (as amended)	12(ii)(c)	The development of – (ii) Infrastructure or structures with a physical footprint of 100 square metres or more Where such development occurs- (c) within 32 metres of a watercourse. ***The construction and operation of the solar PV facility and associated infrastructure will occur within 32m of an ephemeral drainage line located directly outside and along the north-western boundary of the development envelope. The infrastructure will have a physical footprint of more than 100 square metres.***
Listing Notice 1 (GNR 327) 08 December 2014 (as amended)	14	The development and related operation of facilities and infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres. ***Dangerous goods such as fuel will be required to be stored and handled on site. The combined capacity of storage containers will be***

Notice Number	Activity Number	Description of listed activity
		more than 80 cubic metres but will not exceed 500 cubic metres during the construction and operation phases.
Listing Notice 1 (GNR 327) 08 December 2014 (as amended)	24 (ii)	The development of a road – (ii) with a reserve wider than 13.5m, or where no reserve exists where the road is wider than 8m. ***The construction of the solar PV facility will require the construction of new access roads up to 8m in width to provide access to the facility.***
Listing Notice 1 (GNR 327) 08 December 2014 (as amended)	28 (ii)	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes 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 1ha. ***The total area of land to be developed for the solar PV facility is larger than 1 hectare. The site is currently used for agricultural purposes. The total extent of the development envelope is ~951ha.***
Listing Notice 2 (GNR 325) 08 December 2014 (as amended)	1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20MW or more. ***The project comprises a renewable energy generation facility, which will utilise photovoltaic (PV) technology and will have a generation capacity of up to 200MW. The development is located outside of an urban area.***
Listing Notice 2 (GNR 325) 08 December 2014 (as amended)	15	The clearance of an area of 20ha or more of indigenous vegetation[21]. ***The facility is located on agricultural land where the predominant land use is livestock grazing, and is therefore likely to comprise indigenous vegetation. The project would therefore result in the clearance of an area of land greater than 20ha of indigenous vegetation.***
Listing Notice 3 (GNR 324) 08 December 2014 (as amended)	4(g)(ii)(ee)	The development of a road wider than 4 metres with a reserve less than 13,5 meters, (g) in the Northern Cape, (ii) outside urban areas; (ee) within critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. ***The construction of the solar PV facility will require the construction of new access roads up to 8m in width to provide access to the facility. The development area is located outside of any urban areas and contains areas identified as CBA1 as per the Namakwa Bioregional Plan***

[21] "Indigenous vegetation" as defined by the 2014 EIA Regulations (GNR 326) refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.

Notice Number	Activity Number	Description of listed activity
		Draft 1, published in 2010 by the Namakwa District Municipality.
Listing Notice 3 (GNR 324) 08 December 2014 (as amended)	10(g)(ii) & (iii)(ee)	The development and related operation 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 meters, (g) in the Northern Cape, (ii) in areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland and (iii) outside urban areas and (ee) within critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. ***Dangerous goods such as fuel will be required to be stored and handled on site. The combined capacity of storage containers will be more than 80 cubic metres but will not exceed 500 cubic metres during the construction and operation phases. The construction and operation of the solar PV facility and associated infrastructure will occur within 32m of an ephemeral drainage line located directly outside and along the north-eastern boundary of the development envelope. The development area contains areas identified as CBA1 as per the Namakwa Bioregional Plan Draft 1, published in 2010 by the Namakwa District Municipality.***
Listing Notice 3 (GNR 324) 08 December 2014 (as amended)	12(g)(ii)	The clearance of an area of 300 square meters or more of indigenous vegetation, (g) in the Northern Cape, (ii) within critical biodiversity areas identified in bioregional plans. ***The project would result in the clearance of an area of land greater than 20ha of indigenous vegetation. The development area contains areas identified as CBA1 as per the Namakwa Bioregional Plan Draft 1, published in 2010 by the Namakwa District Municipality.***
Listing Notice 3 (GNR 324) 08 December 2014 (as amended)	14(ii)(a)(c)(g)(ii)(ff)	The development of (ii) infrastructure or structures with a physical footprint of 10 square metres or more where such development occurs (a) within a watercourse, or (c) within 32 meters of a watercourse, measured from the edge of a watercourse, in (g) the Northern Cape, (ii) outside urban areas, (ff) within critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. ***The construction and operation of the solar PV facility and associated infrastructure will occur within 32m of an ephemeral drainage line located directly outside and along the north-eastern boundary of the development envelope. The infrastructure will have a physical footprint of more than 10 square metres. The development area contains areas identified as CBA1 as per the Namakwa Bioregional Plan Draft 1, published in 2010 by the Namakwa District Municipality.***
Listing Notice 3 (GNR 324) 08 December 2014 (as amended)	18(g)(ii)(ee)(ii)	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre, (g) in the Northern Cape, (ii) outside urban areas, within (ee) within critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans, and within (ii) a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland.

Notice Number	Activity Number	Description of listed activity
		The Soatskolk Road may need to be widened by more than 4m for the construction phase of the PV facility. The development area contains areas identified as CBA1 as per the Namakwa Bioregional Plan Draft 1, published in 2010 by the Namakwa District Municipality. The construction and operation of the solar PV facility and associated infrastructure will occur within 32m of an ephemeral drainage line located directly outside and along the north-eastern boundary of the development envelope.

The listed activities included in **Table 6.1** above have been updated to match the listed activities included in the Application for Environmental Authorisation submitted to DEFF.

6.2.2 National Water Act (No. 36 of 1998) (NWA)

In accordance with the provisions of the National Water Act (No. 36 of 1998) (NWA), all water uses must be licensed with the Competent Authority (i.e. the Regional Department of Water and Sanitation (DWS) or the relevant Catchment Management Agency (CMA)). Water use is defined broadly, and includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation.

Table 6.2 contains Water Uses associated with the proposed project and identified in terms of the NWA which require licensing either in the form of a General Authorisation (GA), or in the form of a Water Use License (WUL). The table also includes a description of those project activities which relate to the applicable Water Uses.

Table 6.2: List of Water Uses published under Section 21 of NWA, as amended.

Notice No.	Activity No.	Description of Water Use
NWA (No. 36 of 1998)	Section 21 (c)	Impeding or diverting the flow of water in a watercourse ***Infrastructure associated with Kotulo Tsatsi PV3 will be located within the GN 509 regulated area of a watercourse (100m zone surrounding the identified ephemeral drainage line).***
NWA (No. 36 of 1998)	Section 21 (i)	Altering the bed, banks, course or characteristics of a watercourse. ***Infrastructure associated with Kotulo Tsatsi PV3 will be located within the GN 509 regulated area of a watercourse (100m zone surrounding the identified ephemeral drainage line).***

Due to the development envelope of Kotulo Tsatsi Energy PV3 being located within the regulated area of an ephemeral drainage line located along the eastern boundary, an application for a water use authorisation in accordance with the requirements of the Regulations Regarding the Procedural Requirements for Water Use License Applications and Appeals (GN R267), or a GA registered in accordance with the GN R509 of 2016. The water use authorisation process for Kotulo Tsatsi PV3 will only be completed once a positive EA has been received and the project selected as Preferred Bidder. This is line with the requirements of the Department of Human Settlements, Water and Sanitation.

6.2.3 National Heritage Resources Act (No. 25 of 1999) (NHRA)

The National Heritage Resources Act (No. 25 of 1999) (NHRA) provides an integrated system which allows for the management of national heritage resources, and to empower civil society to conserve heritage resources for future generations. Section 38 of NHRA provides a list of activities which potentially require the undertaking of a Heritage Impact Assessment.

Section 38: Heritage Resources Management

1). Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as –

a. the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

b. the construction of a bridge or similar structure exceeding 50m in length;

c. any development or other activity which will change the character of a site –

i). exceeding 5 000m² in extent; or

ii). involving three or more existing erven or subdivisions thereof; or

iii). involving three or more erven or divisions thereof which have been consolidated within the past five years; or

iv). the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

Must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

In terms of Section 38(8), approval from the heritage authority is not required if an evaluation of the impact of such development on heritage resources is required in terms of any other legislation (such as NEMA), provided that the consenting authority ensures that the evaluation of impacts fulfils the requirements of the relevant heritage resources authority in terms of Section 38(3) and any comments and recommendations of the relevant resources authority with regard to such development have been taken into account prior to the granting of the consent. However, should heritage resources of significance be affected by the proposed development, a permit is required to be obtained prior to disturbing or destroying such resources as per the requirements of Section 48 of the NHRA, and the South African Heritage Resources Agency (SAHRA) Permit Regulations (GNR 668).

6.3 Overview of the Scoping and EIA (S&EIA) Process being undertaken for Kotulo Tsatsi Energy PV3

In terms of NEMA, the 2014 EIA Regulations (GNR 326), and Listing Notices (Listing Notice 1 (GNR 327) and Listing Notice 2 (GNR 325) the development of Kotulo Tsatsi Energy PV3 requires EA from DEFF subject to the completion of a full Scoping and Environmental Impact Assessment (S&EIA), as prescribed in Regulations 21 to 24 of the 2014 EIA Regulations (GNR 326). The need for a full S&EIA process to be conducted in support of the application for EA is based on listed activities triggered which are contained within Listing Notice 2 (GNR 325).

The S&EIA process is to be undertaken in two phases as follows:

» The **Scoping Phase** includes the identification and description of potential issues associated with the project through a desktop study and consultation with I&APs and key stakeholders through a Public

Participation process. The entire development area and development envelope are considered within this process. Through this study, areas of sensitivity within the broader site are identified and delineated in order to identify any environmental fatal flaws, and environmentally sensitive, or no-go areas which need to be considered. In accordance with Regulation 21(1) of the 2014 EIA Regulations (GNR 326) the Scoping Report prepared for the project was subject to a 30-day review and comment period during which any Interested and Affected Party (I&AP) or Authority were invited to review and provide comment on the findings (refer to **Figure 6.2**). This Final Scoping Report which incorporates all comments received during the 30-day public review and comment period, has been prepared and submitted to DEFF for its consideration. Following receipt of the Final Scoping Report DEFF has 43 days within which to either accept the Scoping Report, and advise the applicant to proceed or continue with the tasks contemplated in the Plan of Study for EIA, or refuse the Application for EA in the event that the proposed activity is in conflict with a prohibition contained in legislation, or the Scoping Report does not substantially comply with Appendix 2 of the 2014 EIA Regulations (GNR 326).

» The **EIA Phase** involves a detailed assessment of potentially significant positive and negative direct, indirect, and cumulative impacts identified during the Scoping Phase. This phase includes detailed specialist investigations and a Public Participation process, and results in the compilation of an EIA Report and Environmental Management Programme (EMPr). In accordance with Regulation 23(1)(a) of the 2014 EIA Regulations (GNR 326) the EIA Report and EMPr prepared for the project will also be subject to a 30-day public review and comment period during which members of the public, I&APs, and authorities will be invited to review and provide comment on the EIA Report and EMPr. Following the conclusion of this review period a Final EIA Report and EMPr which incorporates all comments received during the 30-day review and comments period, will be prepared and submitted to DEFF for its consideration. Following receipt of the Final EIA Report and EMPr, DEFF has 107 days within which to either grant or refuse the EA.

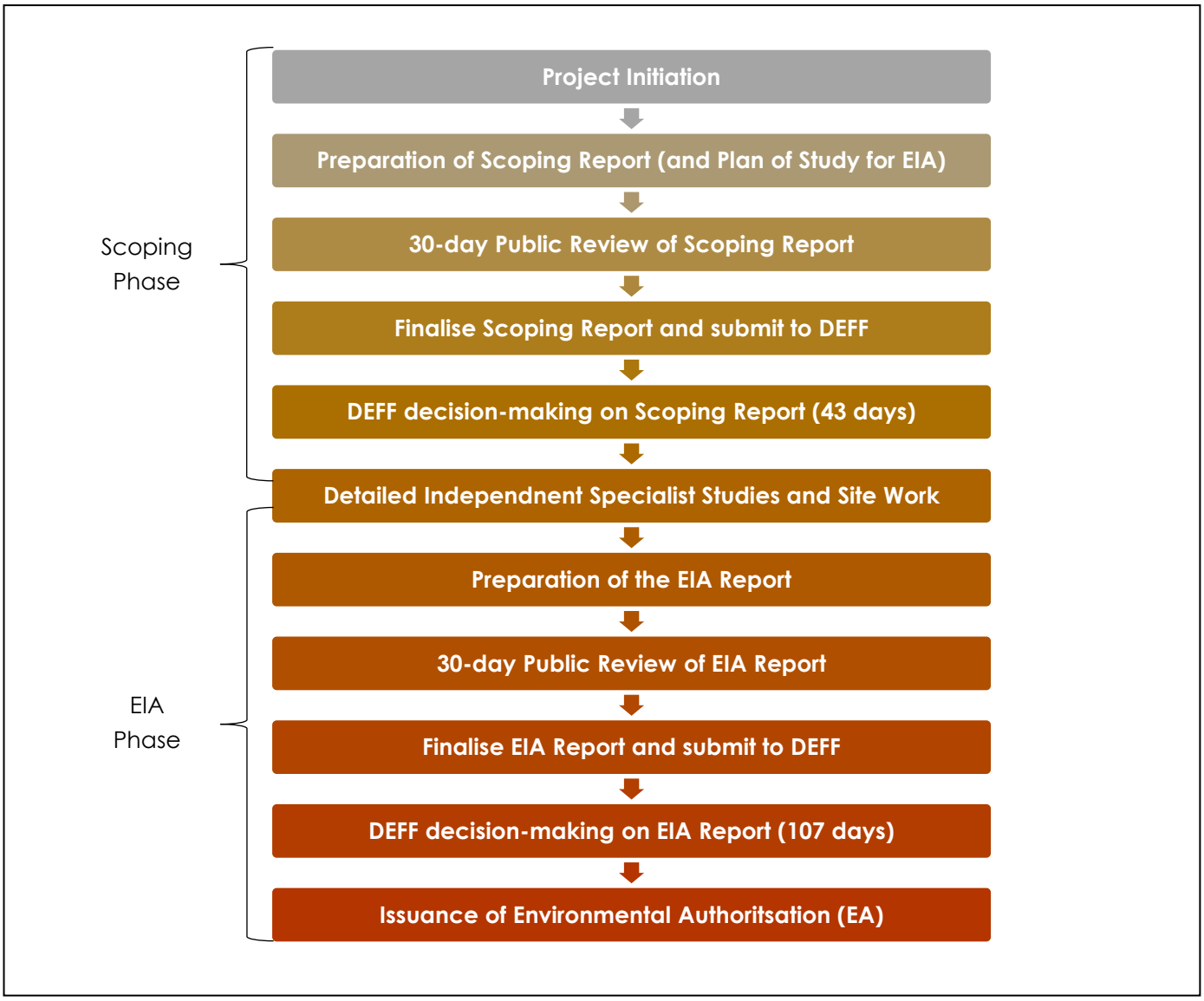

Figure 6.2: Regulated timeframe of an Environmental Impact Assessment (EIA) Process

6.4 Objectives of the Scoping Phase

This Final Scoping Report documents the evaluation of potential environmental impacts of Kotulo Tsatsi Energy PV3 and forms part of the EIA process being conducted in support of an Application for EA for the project. The Scoping Phase has been conducted in accordance with the requirements of the 2014 EIA Regulations (GNR 326), and therefore 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 project site and development area through a review of existing baseline data, including specialist studies which were undertaken within the project area.
- Identify potentially sensitive environmental features and areas within the broader project site and development area in order to inform the preliminary design process of the facility.
- Define the scope of studies to be undertaken during 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 Phase, as well as regarding the scope and extent of specialist studies that will be required to be undertaken.

The following objectives of the Scoping Phase (in accordance with Appendix 2 of the 2014 EIA Regulations (GNR 326)) have been met, through the undertaking of a consultative process.

» The identification of relevant policies and legislation regarding the activities to be undertaken have been identified and considered within this Final Scoping Report.
» Activities to be undertaken for the development of Kotulo Tsatsi PV3 have been identified and motivated in terms of the need and desirability for the activities to take place.
» Potential impacts associated with the undertaking of the identified activities and technology have been identified and described.
» Identification of areas of high sensitivity to be avoided by the preferred development envelope.
» Preferred areas for the development in the form of a development envelope, which are areas associated with low to medium environmental sensitivity, have been identified within the development area through a desktop level impact assessment process and on-going consultative process. Areas of high sensitivity (i.e. the north, north-western, eastern and southern portions of the development area) have been avoided by the development envelope which will be assessed within the EIA Phase, within which the development footprint will be placed.
» Key issues associated with the project to be addressed during the EIA Phase for further detailed study and ground-truthing have been identified and listed within this Final Scoping Report.
» The level of assessment, expertise and the extent of further consultation to be undertaken in the EIA Phase of the process, with the aim of determining the extent of impacts associated with the activities through the life cycle of the project (i.e. construction, operation and decommissioning), have been identified and included within this Final Scoping Report.

6.5 Overview of the Scoping Phase

Key tasks undertaken within the Scoping Phase include:

» Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
» Submission of the completed Application for EA to the competent authority (DEFF) in terms of Regulations 5 and 16 of the 2014 EIA Regulations (GNR 326).
» Undertaking a public participation process (in line with the approved public participation plan submitted to DEFF) in accordance with Chapter 6 of GNR326, and the Department of Environmental Affairs (2017), Public Participation guidelines in terms of NEMA EIA Regulations, Department of Environmental Affairs, Pretoria, South Africa (hereinafter referred to as "the Guidelines") in order to identify issues and concerns associated with the proposed project.
» Preparation of a Scoping Report and Plan of Study for EIA in accordance with the requirements of Appendix 2 of the 2014 EIA Regulations (GNR 326).
» Preparation of a Comments and Response (C&R) Report detailing all comments raised by I&APs and responses provided as part of the Scoping Phase.
» Submission of a Final Scoping Report, including a Plan of Study for the EIA, to DEFF for review and approval.

6.5.1 Authority Consultation and Application for Authorisation in terms of the 2014 EIA Regulations (as amended)

In terms of GNR 779 of 1 July 2016, the National DEFF has been determined as the competent authority for all projects which relate to the IRP and any updates thereto. As the project is proposed within the Northern Cape Province, the Northern Cape DAEARD & LR is the provincial commenting authority for the project. Consultation with these authorities is being undertaken throughout the Scoping Phase. To date, this consultation has included the following:

- Requesting of a Pre-Application Meeting with DEFF on 08 September 2020 to discuss the process to be followed for the project, the proposed Public Participation Plan and project details. The Pre-Application Meeting was held on 29 September via Microsoft Teams. The DEFF requested that the Public Participation Plan be submitted to the Department via email for approval. Following submission of the plan, the DEFF provided approval of the submitted Plan via email on 16 October 2020.
- Submission of the Application for Environmental Authorisation to the DEFF via the use of the DEFF Novell Filr System.
- Submission of the Scoping Report for review and comment by:
  - The competent and commenting authorities.
  - State departments that administer laws relating to a matter affecting the environment relevant to an Application for EA.
  - Organs of State which have jurisdiction in respect of the activity to which the application relates.

The submissions, as listed above, were undertaken electronically, as required by the DEFF (in line with the directions for new Applications for Environmental Authorisations provided for in GNR650 of 05 June 2020). A record of all authority correspondence undertaken during the Scoping Phase is included in **Appendix B** and **Appendix C**.

6.5.2 Public Participation Process

Public participation is an essential and regulatory requirement for an environmental authorisation process and is guided by Regulations 41 to 44 of the EIA Regulations 2014 (GN R326) (as amended). The purpose of public participation is clearly outlined in Regulation 40 of the EIA Regulations 2014 (GN R326) (as amended) and is being followed for this proposed project.

The Public Participation Process for Kotulo Tsatsi Energy PV3 has been run in tandem with the public consultation for Kotulo Tsatsi Energy PV1 and Kotulo Tsatsi Energy PV4, located directly to the west and east of the site. The benefit to the stakeholder is that all information relevant to all related applications has been made available for review together, and not only for comments to be raised across the three applications at one time, but also provided a complete picture of the potential for impacts and/or benefits related to the suite of projects located in close proximity to one another.

The Public Participation Process undertaken for Kotulo Tsatsi PV3 considers the restrictions and limitations imposed by Government through section 27 (2) of the Disaster Management Act (Act No. 57 of 2002) of 2002 and the Directions issued by the Minister of Forestry and Fisheries (DEFF) in terms of consultations with I&APs. A Public Participation Plan was prepared and submitted to DEFF for approval. Approval of the Plan was provided by the DEFF Case Officer via email on 16 October 2020 (**Appendix B**).

The alternative means of undertaking consultation have been designed and implemented by Savannah Environmental to ensure that I&APs are afforded sufficient opportunity to access project information and raise comments on the project through an interactive web-based platform (i.e. online stakeholder engagement platform) readily available and accessible to any person registering their interest in the project, and ensures that the public participation process is undertaken in line with Regulations 41 to 44 of the EIA Regulations, 2014 as amended. The Public Participation Plan (**Appendix C9**) considers the limitations applied by the Disaster Management Act Regulations prohibiting the gathering of people, as well as limitations which certain I&APs may have in terms of access to computers and internet as well as access to public spaces currently not open for operation that inhibits access to hard copy documentation. The online stakeholder engagement platform implemented by Savannah Environmental for the project allowed the EAP to visually present details regarding the project as well as consultation documentation, including project maps and plans, presentations and posters. The platform also contained the Scoping Report available for review. The use of an online tool enables stakeholders and I&APs to explore the project-specific content in their own time, and still enables them to participate in a meaningful way in the consultation process. The online platform allows for instant feedback and comments to be submitted, in so doing saving time for the stakeholder and also giving the assurance that their comments have been submitted for inclusion in the project reporting.

The sharing of information forms the basis of the public participation process and offers the opportunity for I&APs to become actively involved in the EIA process from the outset. The public participation process is designed to provide sufficient and accessible information to I&APs in an objective manner. The public participation process affords I&APs opportunities to provide input into and receive information regarding the EIA process in the following ways:

- During the **Scoping Phase**:
  - provide an opportunity to submit comments regarding the project;
  - assist in identifying reasonable and feasible alternatives, where required;
  - identify issues of concern and suggestions for enhanced assessment;
  - contribute relevant local information and knowledge to the environmental assessment;
  - allow registered I&APs to verify that their comments have been recorded, considered and addressed, where applicable, in the environmental investigations;
  - foster trust and co-operation;
  - generate a sense of joint responsibility and ownership of the environment;
  - comment on the findings of the Scoping Phase results; and
  - identify issues of concern and suggestions for enhanced benefits.

- During the **EIA Phase**:
  - contribute relevant local information and knowledge to the environmental assessment;
  - verify that issues have been considered in the environmental investigations as far as possible as identified within the Scoping Phase;
  - comment on the findings of the environmental assessments; and
  - attend a Focus Group Meeting to be conducted for the project.

- During the **decision-making phase**:
  - to advise I&APs of the outcome of the competent authority's decision, and how and by when the decision can be appealed.

The Public Participation process therefore aims to ensure that:

- Information containing all relevant facts in respect of the application is made available to potential stakeholders and I&APs for their review;
- The information presented during the public participation process is presented in such a manner, i.e. local language and technical issues, that it avoids the possible alienation of the public and prevents them from participating;
- Public participation is facilitated in such a manner that I&APs are provided with a reasonable opportunity to comment on the project;
- A variety of mechanisms are provided to I&APs to correspond and submit their comments i.e. fax, post, email, telephone, text message (SMS and WhatsApp); and
- An adequate review period is provided for I&APs to comment on the findings of the Scoping and EIA Reports.

In terms of the requirement of Chapter 6 of the EIA Regulations of December 2014, as amended, the following key public participation tasks are required to be undertaken:

- Fix a notice board at a place conspicuous to the public at the boundary or on the fence of—
  - (i) the site where the activity to which the application relates is or is to be undertaken; and
  - (ii) any alternative site mentioned in the application.
- Give written notice to:
  - (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
  - (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  - (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  - (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
  - (v) the municipality which has jurisdiction in the area;
  - (vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
  - (vii) any other party as required by the competent authority.
- Place an advertisement in one local newspaper.
- Open and maintain a register of I&APs and Organs of State.
- Release of a Scoping Report for a 30-day review and comment period.
- Prepare a Comments and Responses (C&R) report which documents the comments received on the EIA process and during the 30-day review and comment period of the Scoping Report and the responses provided by the project team.

In compliance with the requirements of Chapter 6: Public Participation of the EIA Regulations, 2014 (as amended), and the approved Public Participation Plan, the following summarises the key public participation activities implemented. The schematic below provides an overview of the tools that are available to I&APs and stakeholders to access project information and interact with the public participation team to obtain project information and resolve any queries that may arise, and to meet the requirements for public participation.

i. Stakeholder identification and register of I&APs	•Register as an I&AP on the online platfrom via completion of a form and provison of contact information, by responding to an advert, or sending a 'please call me' which will be responded to •State interest in the project •Receive all project related information via email
ii. Advertisments and notifications	•Advertisements, site notices and/or radio live reads and notifications provide information and details on where to access project information •Notifications regarding the EIA proceses and availability of project reports for public review to be sent via email, post or SMS notifications
iii. Public Involvement and consultation	•Distribution of a BID providing details on the project and how I&APs can become involved in the process •Submission of comments or queries via the online platform to the PP team •Virtual presentations (both English and Afrikaans) available via the online platform •Availability of project information via the online platform •An opportunity for I&APs and stakeholders to request virtual meetings with the project team. •Direct in-person consultation will only take place in limited numbers and where sanitary conditions can be maintained at all times.
iv. Comment on the Scoping and EIA Reports	•Availability of the project reports via the online platform for 30-day comment period •Submission of comments via the online platform, email or post to the PP team •Comments recorded and responded to, as part of the process
v. Identification and recording of comments	•Comments and Responses Report, including all comments received, and included within the final Report for decision-making

i. Stakeholder identification and Register of Interested and Affected Parties

42. A proponent or applicant must ensure the opening and maintenance of a register of I&APs and submit such a register to the competent authority, which register must contain the names, contact details and addresses of –
    (a) All persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP;
    (b) All persons who have requested the proponent or applicant, in writing, for their names to be placed on the register; and
    (c) All organs of state which have jurisdiction in respect of the activity to which the application relates.

I&APs have been identified through a process of networking and referral, obtaining information from Savannah Environmental's existing stakeholder database, liaison with potentially affected parties in the

greater surrounding area and a registration process involving the completion of a reply form. Key stakeholders and affected and surrounding landowners have been identified and registered on the project database. Other stakeholders were required to formally register their interest in the project through either directly contacting the Savannah Environmental Public Participation team via phone, text message (SMS and WhatsApp), email or fax, or registering their interest via the online stakeholder engagement platform. An initial list of key stakeholders identified and registered is listed in **Table 6.3**.

Table 6.3: Initial list of Stakeholders identified for the inclusion in the project database during the public participation process for Kotulo Tsatsi Energy PV3

Organs of State
National Government Departments
Department of Environment, Forestry and Fisheries (DEFF)
Department of Mineral Resources and Energy (DMRE)
Department of Agriculture Forestry and Fisheries (DAFF)
Department of Human Settlements, Water and Sanitation
Government Bodies and State-Owned Companies
Eskom Holdings SOC Limited
National Energy Regulator of South Africa (NERSA)
South African Civil Aviation Authority (CAA)
South African Heritage Resources Agency (SAHRA)
South African National Roads Agency Limited (SANRAL)
South African Radio Astronomy Observatory (SARAO)
Telkom SA SOC Limited
Transnet SA SOC Limited
Provincial Government Departments
Northern Cape Department of Agriculture
Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARD&LR)
Northern Cape Department of Roads and Public Works
Ngwao Boswa Kapa Bokone (NBKB) – provincial Heritage Authority
Local Government Departments
Namakwa District Municipality
Hantam Local Municipality – including the Ward Councillor, ward committee members, community representative or local community forum members
Commenting Stakeholders
BirdLife South Africa
Endangered Wildlife Trust (EWT)
SENTECH
Landowners
Affected landowners, tenants and occupiers
Neighbouring landowners, tenants and occupiers

As per Regulation 42 of the EIA Regulations, 2014 (as amended), all relevant stakeholder and I&AP information has been recorded within a register of I&APs (refer to **Appendix C1** for a listing of the recorded parties). In addition to the above-mentioned EIA Regulations, point 4.1 of the Public Participation Guidelines has also been followed. The register of I&APs contains the names[22] of:

- all persons who requested to be registered on the database through the use of the online stakeholder engagement platform or in writing and disclosed their interest in the project;
- all Organs of State which hold jurisdiction in respect of the activity to which the application relates; and
- all persons who submitted written comments or attended virtual meetings (or in-person consultation where sanitary conditions can be maintained) and viewed the presentations on the Savannah Environmental online platform during the public participation process.

I&APs were encouraged to register their interest in the EIA process from the onset of the project, and the identification and registration of I&APs will be on-going for the duration of the EIA process. The database of I&APs will be updated throughout the EIA process and will act as a record of all I&APs involved in the public participation process.

ii. Advertisements and Notifications

40.(2)(a)	Fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of –
	(i) The site where the activity to which the application or proposed application relates is or is to be undertaken; and
	(ii) Any alternative site.
40.(2)(b)	Giving written notice, in any of the manners provided for in section 47Dof the Act, to –
	(i) The occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;
	(ii) Owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;
	(iii) The municipal councillor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area;
	(iv) The municipality which has jurisdiction in the area;
	(v) Any organ of state having jurisdiction in respect of any aspect of the activity; and
	(vi) Any other party as required by the competent authority.
40.(2)(c)	Placing an advertisement in –
	(i) One local newspaper; or
	(ii) Any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;
40.(2)(d)	Placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or

[22] Contact details and addresses have not been included in the I&AP database as this information is protected by the Protection of Personal Information Act (No 4 of 2013).

may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph (c)(ii); and

40.(2)(e) Using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desirous of but unable to participate in the process due to –

(i) Illiteracy;
(ii) Disability; or
(iii) Any other disadvantage.

The EIA process was announced with an invitation to the Organs of State, potentially affected and neighbouring landowners and general public to register as I&APs and to actively participate in the process. This was achieved via the following:

- Compilation of a background information document (BID) (refer to **Appendix C3**) providing technical and environmental details on the project and how to become involved in the EIA process. The BID and the process notification letter announcing the EIA process, notifying Organs of State, potentially affected and neighbouring landowners, as well as registered stakeholders/IAPs of Kotulo Tsatsi Energy PV3, and providing background information of the project and inviting I&APs to register on the project's database were distributed via email on **16 October 2020**. The evidence of the distribution is contained in **Appendix C** of this Final Scoping Report. The BID was also available electronically on the Savannah Environmental website (http://www.savannahsa.com/public-documents/energy-generation/kotulo-tsatsi-solar-development/).
- Placement of site notices announcing the EIA process at visible points along the boundary of the development area (i.e. the boundaries of the affected property), in accordance with the requirements of the EIA Regulations on **24 October 2020**. Photographs and the GPS co-ordinates of the site notices are contained in **Appendix C2** of this Final Scoping Report.
- Placement of an advertisement in the Gemsbok Newspaper on **21 October 2020** announcing the 30-day review and comment period (**Appendix C2**). This advert:
  - announced the project and the associated EIA process,
  - announced the availability of the Scoping report, the review period, and where it is accessible for review,
  - invited comment on the Scoping Report, and
  - provided all relevant details to access the Savannah Environmental online stakeholder engagement platform.
- A copy of the newspaper advert as sent to the newspaper and the newspaper advert tear sheet is included in **Appendix C2** of this Final Scoping Report.
- A Live Read on RSG on **15 November 2020** as a reminder of the 30-day review and comment period and the availability of the Scoping Report (**Appendix C2**). RSG is one of the local radio stations accessible in the study area.
- The Scoping Report was made available for review by I&APs for a 30-day review and comment period from **23 October 2020** to **23 November 2020**. The full Scoping Report was made available on the Savannah Environmental website. The evidence of distribution of the Scoping Report is included in **Appendix C** of this Final Scoping Report, as submitted to the DEFF.

iii. Public Involvement and Consultation

In order to accommodate the varying needs of stakeholders and I&APs within the surrounding area, as well as capture their views, comments, issues and concerns regarding the project, various opportunities have been provided to I&APs to note their comments and issues during the Scoping Phase. I&APs are being consulted through the following means:

Table 6.4: Public involvement for Kotulo Tsatsi Energy PV3

Activity	Date
Distribution of the BID, process notification letters and stakeholder reply form announcing the EIA process and inviting I&APs to register on the project database. The BID and electronic reply form was also made available on the online stakeholder engagement platform.	16 October 2020
Placement of site notices.	24 October 2020
Advertising of the availability of the Scoping Report for a 30-day review and comment period in Gemsbok Newspaper, including details on how to access the Scoping Report via the online stakeholder engagement platform.	21 October 2020
Radio Live Read by RSG regarding the Scoping report comment period, and the details of how to get involved and how contact with Savannah Environmental can be made.	15 November 2020
Distribution of notification letters announcing the availability of the Scoping Report for a 30-day review and comment period. These letters were distributed to Organs of State, Government Departments, Ward Councillors, landowners within the surrounding area (including neighbouring landowners) and key stakeholder groups.	23 October 2020
30-day review and comment period of the Scoping Report.	23 October 2020 – 23 November 2020
Virtual meetings through the use of virtual platforms as determined through discussions with the relevant stakeholder group: » Landowners » Authorities and key stakeholders (including Organs of State, local municipality and official representatives of community-based organisations). » Where an I&AP does not have access to a computer and/or internet to participate in a virtual meeting telephonic discussions (including WhatsApp video call) will be set-up and minuted for inclusion. The preferred language of the I&AP has been considered when setting up these discussions. » Direct in-person consultation will only take place in limited numbers and where sanitary conditions can be maintained at all times.	Virtual Focus Group Meetings were held with various key stakeholder groups on 12 November 2020. The meetings held included: » Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform and Northern Cape Department of Agriculture, Forestry and fisheries » Hantam Local Municipality and Namakwa District Municipality » Affected and Adjacent Landowners
On-going consultation (i.e. telephone liaison; e-mail communication) with all I&APs.	Throughout the EIA process

iv. Registered I&APs entitled to Comment on the Scoping Report

43.(1) A registered I&AP is entitled to comment, in writing, on all reports or plans submitted to such party during the public participation process contemplated in these Regulations and to bring to the attention of the proponent or applicant any issues which that party believes may be of significance to the consideration of the application, provided that the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.

(2) In order to give effect to section 24O of the Act, any State department that administers a law relating to a matter affecting the environment must be requested, subject to regulation 7(2), to comment within 30 days.

44.(1) The applicant must ensure that the comments of interested and affected parties are recorded in reports and plans and that such written comments, including responses to such comments and records of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these Regulations.

(2) Where a person desires but is unable to access written comments as contemplated in subregulation (1) due to –

(a) A lack of skills to read or write;
(b) Disability; or
(c) Any other disadvantage;

Reasonable alternative methods of recording comments must be provided for.

I&APs registered on the database were notified by means of a notification letter of the release of the Scoping Report for a 30-day review and comment period, invited to provide comment on the Scoping Report, and informed of the manner in which, and timeframe within which such comment must be made. The report was made available in soft copies to I&APs due to restrictions and limitations on public spaces and limitations in ensuring sanitary conditions of hard copy documents during the national state of disaster related to COVID-19. No hard copies of the report were made available for review and comment.

The Scoping Report was also made available on the Savannah Environmental website (i.e. online stakeholder engagement platform) (https://www.savannahsa.com/public-documents/energy-generation/kotulo-tsatsi-solar-development/). The notification was distributed prior to commencement of the 30-day review and comment period, on **23 October 2020**. Where I&APs were not able to provide written comments (including SMS and WhatsApp), other means of consultation, such as telephonic discussions were used to provide the I&APs with a platform to verbally raise their concerns and comments on the proposed development. Submission of comments were enabled through the use of the Savannah Environmental online stakeholder engagement platform.

All comments raised as part of the discussions and written comments submitted during the 30-day review and comment period have been recorded and included in **Appendix C6** and **Appendix C7** of this Final Scoping Report.

v. Identification and Recording of Comments

Comments raised by I&APs over the duration of the Scoping Phase have been synthesised into a Comments and Responses (C&R) Report which is included in **Appendix C8** of this Final Scoping Report. These include comments raised through the use of the Savannah Environmental online stakeholder engagement platform and any other written comments received. The C&R Report includes detailed responses from members of the EIA project team and/or the project proponent to the issues and comments raised during the public participation process.

Meeting notes of all the telephonic discussions and virtual meetings conducted during the 30-day review and comment period of the Scoping Report have been included in **Appendix C7** of the Final Scoping Report.

The C&R Report has been updated with all comments received during the 30-day review and comment period and included as **Appendix C8** in this Final Scoping Report submitted to the DEFF for approval.

During the 30-day review and comment period and the consultation undertaken with I&APs (including the Focus Group Meetings) the following main comments were raised, which need to be considered in the EIA phase of the project. These include:

- Safety and secturity concerns
- Impacts to roads
- Consideration of the need and desirability of the project wihtin the proposed location
- Cumualtive impacts
- Heritage impacts
- Impacts on CBAs and ESAs
- Project water requirements

6.5.3 Evaluation of Issues Identified through the Scoping Process

Direct, indirect, and cumulative environmental impacts associated with the project identified during the Scoping Phase have been evaluated through consideration of existing information available for the Kotulo Tsatsi Energy PV3 development area.

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

- The ***nature***, which includes a description of what causes the impact, 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.
- Identify ***sensitive receptors*** that may be impacted on by the proposed development and the types of impacts that are most likely to occur.
- The ***significance*** of potential impacts in terms of the requirements of the 2014 EIA Regulations (including (nature, significance, consequence, extent, duration and probability of the impacts, the degree to which these impacts:
  (a) Can be reversed;
  (b) May cause irreplaceable loss of resources; and
  (c) Can be avoided, managed or mitigated.
- Identify the potential impacts that will be considered further in the EIA Phase through detailed investigations.

The evaluation of the proposed project 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.

6.6 Assumptions and Limitations of the EIA Process

The following assumptions and limitations are applicable to the EIA process of Kotulo Tsatsi Energy PV3:

- All information provided by the developer and I&APs to the environmental team was correct and valid at the time it was provided.
- It is assumed that the development area for the solar PV facility identified by the developer represents a technically suitable site for the establishment of Kotulo Tsatsi Energy PV3 which is based on the design undertaken by technical consultants for the project.
- The development footprint (the area that will be affected during the operation phase) will include the footprint for the PV facility and associated infrastructure (i.e. internal access roads, BESS and grid connection infrastructure).
- The Scoping Phase evaluation of impacts has been largely based on desktop studies as well as the findings of studies which have been completed previously for this specific site. Specialists assessments, including detailed field investigations were undertaken for the full extent of the development area during the Environmental Impact Assessment undertaken for Kotulo Tsatsi CSP2. This information has been used to inform this Final Scoping report and will be verified by specialists in the EIA phase to assess the project development footprint for Kotulo Tsatsi Energy PV3.
- Previously authorised grid connection infrastructure, including the Eskom collector substation, switching station and grid connection power line to Aries Substation will provide the grid connection solution for the facility, and is not required to be reassessed through this process.

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

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

- National Environmental Management Act (Act No. 107 of 1998);
- EIA Regulations of December 2014, published under Chapter 5 of NEMA (as amended);
- Department of Environmental Affairs (2017), Public Participation guidelines in terms of NEMA EIA Regulations;
- Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation; and
- International guidelines – the Equator Principles, the IFC Performance Standards, the Sustainable Development Goals, World Bank Environmental and Social Framework, and the and World Bank Group Environmental, Health, and Safety Guidelines (EHS Guidelines).

Several other Acts, standards or guidelines have also informed the project process and the scope of issues addressed and assessed in this Final Scoping Report. A review of legislative requirements applicable to the proposed project is provided in **Table 6.5**.

Table 6.5: Relevant legislative permitting requirements applicable to Kotulo Tsatsi Energy PV3

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Legislation			
Constitution of the Republic of South Africa (No. 108 of 1996)	In terms of Section 24, the State has an obligation to give effect to the environmental right. The environmental right states that: "*Everyone has the right –* » *To an environment that is not harmful to their health or well-being, and* » *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:* * *Prevent pollution and ecological degradation,* * *Promote conservation, and* * *Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development*."	Applicable to all authorities	There are no permitting requirements associated with this Act. The application of the Environmental Right however implies that environmental impacts associated with proposed developments are considered separately and cumulatively. It is also important to note that the "right to an environment clause" includes the notion that justifiable economic and social development should be promoted, through the use of natural resources and ecologically sustainable development.
National Environmental Management Act (No 107 of 1998) (NEMA)	The 2014 EIA Regulations have been promulgated in terms of Chapter 5 of NEMA. Listed activities which may not commence without EA are identified within the Listing Notices (GNR 327, GNR 325 and GNR 324) which form part of these Regulations (GNR 326). In terms of Section 24(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. Considering the capacity of the proposed Kotulo Tsatsi Energy PV3 project (i.e. contracted capacity of 200MW) and the triggering of Activity 1 of Listing Notice 2 (GNR 325) a full	DEFF – Competent Authority Northern Cape DAEARD&LR – Commenting Authority	The listed activities triggered by the proposed project have been identified and are being assessed as part of the EIA process currently underway for the project.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	Scoping and EIA process is required in support of the Application for EA.		
National Environmental Management Act (No 107 of 1998) (NEMA)	In terms of the "Duty of Care and Remediation of Environmental Damage" provision in Section 28(1) of NEMA every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment. In terms of NEMA, it is the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.	DEFF Northern Cape DAEARD&LR	While no permitting or licensing requirements arise directly by virtue of the proposed project, this section finds application through the consideration of potential cumulative, direct, and indirect impacts. It will continue to apply throughout the life cycle of the project.
Environment Conservation Act (No. 73 of 1989) (ECA)	The Noise Control Regulations in terms of Section 25 of the ECA contain regulations applicable for the control of noise in the Provinces of Limpopo, North West, Mpumalanga, Northern Cape, Eastern Cape, and KwaZulu-Natal Provinces. The Noise Control Regulations cover the powers of a local authority, general prohibitions, prohibitions of disturbing noise, prohibitions of noise nuisance, use of measuring instruments, exemptions, attachments, and penalties. In terms of the Noise Control Regulations, no person shall make, produce or cause a disturbing noise, or allow it to be made, produced or caused by any person, machine, device or apparatus or any combination thereof (Regulation 04).	DEFF Northern Cape DAEARD&LR Hantam Local Municipality	Noise impacts are expected to be associated with the construction phase of the project. Considering the location of the development area in relation to residential areas and provided that appropriate mitigation measures are implemented, construction noise is unlikely to present a significant intrusion to the local community. There is therefore no requirement for a noise permit in terms of the legislation.
National Water Act (No. 36 of 1998) (NWA)	A water use listed under Section 21 of the NWA must be licensed with the Regional DWS, unless it is listed in Schedule 1 of the NWA (i.e. is an existing lawful use), is permissible under	Regional Department of Water and Sanitation	The Kotulo Tsatsi Energy PV3 development envelope is located within the regulated area of an ephemeral drainage line present within

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	a GA, or if a responsible authority waives the need for a licence. Water use is defined broadly, and includes consumptive and non-consumptive water uses, taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation. Consumptive water uses may include taking water from a water resource (Section 21(a)) and storing water (Section 21(b)). Non-consumptive water uses may include impeding or diverting of flow in a water course (Section 21(c)), and altering of bed, banks or characteristics of a watercourse (Section 21(i)).		the development area to the east. As a result, a water use authorisation for the project will be required from DWS; however, the process will only be completed once a positive EA has been received and the project selected as Preferred Bidder by the DMRE. This is in line with the requirements from DWS.
Minerals and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA)	In accordance with the provisions of the MPRDA a mining permit is required in accordance with Section 27(6) of the Act where a mineral in question is to be mined, including the mining of materials from a borrow pit.	Department of Mineral Resources and Energy (DMRE)	Any person who wishes to apply for a mining permit in accordance with Section 27(6) must simultaneously apply for an Environmental Authorisation in terms of NEMA. No borrow pits are expected to be required for the construction of the project, and as a result a mining permit or EA in this regard is not required to be obtained.
	Section 53 of the MPRDA states that any person who intends to use the surface of any land in any way which may be contrary to any object of the Act, or which is likely to impede any such object must apply to the Minister for approval in the prescribed manner.		In terms of Section 53 of the MPRDA approval is required from the Minister of Mineral Resources and Energy to ensure that the proposed development does not sterilise a mineral resource that might occur on site.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM:AQA)	The National Dust Control Regulations (GNR 827) published under Section 32 of NEM:AQA prescribe the general measures for the control of dust in all areas, and provide a standard for acceptable dustfall rates for residential and non-residential areas. In accordance with the Regulations (GNR 827) any person who conducts any activity in such a way as to give rise to dust in quantities and concentrations that may exceed the dustfall standard set out in Regulation 03 must, upon receipt of a notice from the air quality officer, implement a dustfall monitoring programme. Any person who has exceeded the dustfall standard set out in Regulation 03 must, within three months after submission of the dustfall monitoring report, develop and submit a dust management plan to the air quality officer for approval.	Northern Cape DAEARD&LR / Namakwa District Municipality	In the event that the project results in the generation of excessive levels of dust the possibility could exist that a dustfall monitoring programme would be required for the project, in which case dustfall monitoring results from the dustfall monitoring programme would need to be included in a dust monitoring report, and a dust management plan would need to be developed.
National Heritage Resources Act (No. 25 of 1999) (NHRA)	Section 07 of the NHRA stipulates assessment criteria and categories of heritage resources according to their significance. Section 35 of the NHRA provides for the protection of all archaeological and palaeontological sites, and meteorites. Section 36 of the NHRA provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority. Section 38 of the NHRA lists activities which require developers or any person who intends to undertake a listed activity to notify the responsible heritage resources authority and furnish it with details regarding the location, nature, and	South African Heritage Resources Agency (SAHRA) Ngwao Boswa Kapa Bokone (NBKB) – provincial heritage authority	A Heritage Impact Assessment will be undertaken for the project as per the requirements of Section 38 of the NHRA. The Heritage Impact Assessment will be made available in the EIA Phase. Should a heritage resource be impacted upon, a permit may be required from SAHRA or Ngwao Boswa Kapa Bokone (NBKB) in accordance with of Section 48 of the NHRA, and the SAHRA Permit Regulations (GN R668).

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	extent of the proposed development. Section 44 of the NHRA requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction.		
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)	Section 53 of NEM:BA provides for the MEC / Minister to identify any process or activity in such a listed ecosystem as a threatening process. Three government notices have been published in terms of Section 56(1) of NEM:BA as follows: » Commencement of TOPS Regulations, 2007 (GNR 150). » Lists of critically endangered, vulnerable and protected species (GNR 151). » TOPS Regulations (GNR 152). It provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), and 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 (NEM:BA: National list of ecosystems that are threatened and in need of protection, (Government Gazette 37596, GNR 324), 29 April 2014).	DEFF Northern Cape DAEARD&LR	Under NEM:BA, a permit would be required for any activity that is of a nature that may negatively impact on the survival of a listed protected species. An Ecological Impact Assessment will be undertaken as part of the EIA Phase to identify the presence of any listed protected species present on site which will require a permit.
National Environmental Management: Biodiversity Act (No.	Chapter 5 of NEM:BA pertains to alien and invasive species, and states that a person may not carry out a restricted	DEFF	An Ecological Impact Assessment will be undertaken as part of the EIA Phase to identify

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
10 of 2004) (NEM:BA)	activity involving a specimen of an alien species without a permit issued in terms of Chapter 7 of NEM:BA, and that a permit may only be issued after a prescribed assessment of risks and potential impacts on biodiversity is carried out. Applicable, and exempted alien and invasive species are contained within the Alien and Invasive Species List (GNR 864).	Northern Cape DAEAR&LR	the presence of any alien and invasive species present on site.
Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA)	Section 05 of CARA provides for the prohibition of the spreading of weeds. Regulation 15 of GN R1048 published under CARA provides for the classification of categories of weeds and invader plants, and restrictions in terms of where these species may occur. Regulation 15E of GN R1048 published under CARA provides requirement and methods to implement control measures for different categories of alien and invasive plant species.	Department of Agriculture, Land Reform and Rural Development (DALRD)	CARA will find application throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies need to be developed and implemented. In addition, a weed control and management plan must be implemented. In terms of Regulation 15E (GN R1048) where Category 1, 2 or 3 plants occur a land user is required to control such plants by means of one or more of the following methods: » Uprooting, felling, cutting or burning. » Treatment with a weed killer that is registered for use in connection with such plants in accordance with the directions for the use of such a weed killer. » Biological control carried out in accordance with the stipulations of the Agricultural Pests Act (No. 36 of 1983), the ECA and any other applicable legislation. » Any other method of treatment recognised by the executive officer that has as its object the control of plants

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			concerned, subject to the provisions of sub-regulation 4. » A combination of one or more of the methods prescribed, save that biological control reserves and areas where biological control agents are effective shall not be disturbed by other control methods to the extent that the agents are destroyed or become ineffective.
National Forests Act (No. 84 of 1998) (NFA)	According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. Notice of the List of Protected Tree Species under the National Forests Act (No. 84 of 1998) was published in GNR 734. 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".	Department of Agriculture, Land Reform and Rural Development (DALRD)	A licence is required for the removal of protected trees. It is therefore necessary to conduct a survey that will determine the number and relevant details pertaining to protected tree species present in the development footprint for the submission of relevant permits to authorities prior to the disturbance of these individuals. An Ecological Impact Assessment will be undertaken as part of the EIA Phase to identify the presence of any protected trees present on site which will require a permit.
National Veld and Forest Fire Act (No. 101 of 1998) (NVFFA)	Chapter 4 of the NVFFA places a duty on owners to prepare and maintain firebreaks, the procedure in this regard, and the role of adjoining owners and the fire protection association. Provision is also made for the making of firebreaks on the international boundary of the Republic of South Africa. The applicant must ensure that firebreaks are wide and long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land, it does not cause soil erosion, and it is reasonably free of inflammable material capable of carrying a veldfire across it.	DEFF	While no permitting or licensing requirements arise from this legislation, this Act will be applicable during the construction and operation of Kotulo Tsatsi Energy PV3, in terms of the preparation and maintenance of firebreaks, and the need to provide appropriate equipment and trained personnel for firefighting purposes.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	Chapter 5 of the Act places a duty on all owners to acquire equipment and have available personnel to fight fires. Every owner on whose land a veldfire may start or burn or from whose land it may spread must have such equipment, protective clothing and trained personnel for extinguishing fires, and ensure that in his or her absence responsible persons are present on or near his or her land who, in the event of fire, will extinguish the fire or assist in doing so, and take all reasonable steps to alert the owners of adjoining land and the relevant fire protection association, if any.		
Hazardous Substances Act (No. 15 of 1973) (HAS)	This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger, to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products. » Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared as Group I or Group II substance » Group IV: any electronic product, and » Group V: any radioactive material. The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate	Department of Health (DoH)	It is necessary to identify and list all Group I, II, III, and IV hazardous substances that may be on site and in what operational context they are used, stored or handled. If applicable, a license would be required to be obtained from the DoH.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	license being in force.		
National Environmental Management: Waste Act (No. 59 of 2008) (NEM:WA)	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 NEM:WA (GNR 912), a BA or EIA is required to be undertaken for identified listed activities. 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.	DEFF – Hazardous Waste Northern Cape DAEARD&LR – General Waste	No waste listed activities are triggered by Kotulo Tsatsi Energy PV3, therefore, no Waste Management License is required to be obtained. General and hazardous waste handling, storage and disposal will be required during construction and operation. The National Norms and Standards for the Storage of Waste (GNR 926) published under Section 7(1)(c) of NEM:WA will need to be considered in this regard.
National Road Traffic Act (No. 93 of 1996) (NRTA)	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	South African National Roads Agency (SANRAL) – national roads	An abnormal load / vehicle permit may be required to transport the various components to site for construction. These include route

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits 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.	Northern Cape Department of Transport, Safety and Liaison	clearances and permits required for vehicles carrying abnormally heavy or abnormally dimensioned loads and transport vehicles exceeding the dimensional limitations (length) of 22m. Depending on the trailer configuration and height when loaded, some of the on-site substation and BESS components may not meet specified dimensional limitations (height and width) which will require a permit.
Provincial Policies / Legislation			
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;	Northern Cape DAEARD&LR	A collection/destruction permit must be obtained from Northern Cape DAEARD&LR for the removal of any protected plant or animal species found on site. Should these species be confirmed within the development footprint during any phase of the project, permits will be required. An Ecological Impact Assessment will be undertaken as part of the EIA Phase to identify the presence of any listed species present on site which will require a permit.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	» 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 species for the Province.		

6.7.1 Best Practice Guidelines Birds & Solar Energy (2017)

The Best Practice Guidelines Birds & Solar Energy (2017) proposed by the Birds and Renewable Energy Specialist Group (BARESG) (convened by BirdLife South Africa and the Endangered Wildlife Trust) contain guidelines for assessing and monitoring the impact of solar generation facilities on birds in Southern Africa. The guidelines recognise the impact that solar energy may have on birds, through for example the alteration of habitat, the displacement of populations from preferred habitat, and collision and burn mortality associated with elements of solar hardware and ancillary infrastructure; and the fact that the nature and implications of these effects are poorly understood.

The guidelines are aimed at Environmental Assessment Practitioners (EAPs), avifaunal specialists, developers and regulators and propose a tiered assessment process, including:

(i) Preliminary avifaunal assessment – an initial assessment of the likely avifauna in the area and possible impacts, preferably informed by a brief site visit and by collation of available data; also including the design of a site-specific survey and monitoring project should this be deemed necessary.
(ii) Data collection – further accumulation and consolidation of the relevant avian data, possibly including the execution of baseline data collection work (as specified by the preliminary assessment), intended to inform the avian impact study.
(iii) Impact assessment – a full assessment of the likely impacts and available mitigation options, based on the results of systematic and quantified monitoring if this was deemed a requisite at preliminary assessment.
(iv) Monitoring – repetition of baseline data collection, plus the collection of mortality data. This helps to develop a complete before and after picture of impacts, and to determine if proposed mitigation measures are implemented and are effective, or require further refinement. Monitoring may only be necessary for projects with the potential for significant negative impacts on birds (i.e. large area affected and / or vulnerable species present).

In terms of the guidelines the quantity and quality of baseline data required to inform the assessment process at each site should be set in terms of the size of the site and the predicted impacts of the solar technology in question, the anticipated sensitivity of the local avifauna (for example, the diversity and relative abundance of priority species present, proximity to important flyways, wetlands or other focal sites) and the amount of existing data available for the area.

Data collection could vary from a single, short field visit (Regime 1, for e.g. at a small or medium sized site with low avifaunal sensitivity), to a series of multi-day survey periods, including the collection of various forms of data describing avian abundance, distribution and movement and spread over 12 months (Regime 3, for e.g. at a large developments located in a sensitive habitat, or which otherwise may have significant impacts on avifauna). **Table 6.6** is taken from the best practise guidelines and provides a summary of the recommended assessment regimes in relation to proposed solar energy technology, project size, and likely risk).

Table 5.3: Recommended avian assessment regimes in relation to proposed solar energy technology, project size, and known impact risks.

Type of technology*	Size**	Avifaunal Sensitivity***		
		Low	Medium	High
All except CSP power tower	Small (< 30ha)	Regime 1	Regime 1	Regime 2
	Medium (30 – 150ha)	Regime 1	Regime 2	Regime 2
	Large (> 150ha)	Regime 2****	Regime 2	Regime 3
CSP power tower	All	Regime 3		

Regime 1: One site visit (peak season); minimum 1 – 5 days.
Regime 2: Pre- and post-construction; minimum 2 – 3 x 3 – 5 days over 6 months (including peak season); carcass searches.
Regime 3: Pre- and post-construction; minimum 4 – 5 x 4 – 8 days over 12 months, carcass searches.

* Different technologies may carry different intrinsic levels of risk, which should be taken into account in impact significance ratings

** For multi-phased projects, the aggregate footprint of all the phases should be used. At 3ha per MW, Small = < 10MW, Medium = 10 – 50MW, Large = > 50MW.

*** The avifaunal sensitivity is based on the number of priority species present, or potentially present, the regional, national or global importance of the affected area for these species (both individually and collectively), and the perceived susceptibility of these species (both individually and collectively) to the anticipated impacts of development. For example, an area would be considered to be of high avifaunal sensitivity if one or more of the following is found (or suspected to occur) within the broader impact zone:

1) Avifaunal habitat (e.g. a wetlands, nesting or roost sites) of regional or national significance.
2) A population of a priority species that is of regional or national significance.
3) A bird movement corridor that is of regional or national significance.
4) A protected area and / or Important Bird and Biodiversity Area.

An area would be considered to be of medium avifaunal sensitivity if it does not qualify as high avifaunal sensitivity, but one or more of the following is found (or suspected to occur) within the broader impact zone

1) Avifaunal habitat (e.g. a wetland, nesting or roost sites) of local significance.
2) A locally significant population of a priority species.
3) A locally significant bird movement corridor.

An area would be considered to be of low avifaunal sensitivity if it is does not meet any of the above criteria.

**** Regime 1 may be applied to some large sites, but only in instances where there is abundant existing data to support the assessment of low sensitivity.

The bird monitoring which was previously conducted for the Kotulo Tsatsi properties was undertaken in line with a Regime 2 classification. Two sets of monitoring (i.e. a dry and a wet monitoring season) was adhered to as part of the independent avifauna assessment. The results from the monitoring will be used to inform both the development footprint as well as Avifauna Impact Assessment report, to be completed for the EIA Report.

6.7.2 The IFC Environmental Health and Safety (EHS) Guidelines

The IFC EHS Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice (GIIP). The following IFC EHS Guidelines have relevance to the proposed project:

» IFC EHS General Guidelines
» IFC EHS Guidelines for Electric Power Transmission and Distribution

The General EHS Guidelines are designed to be used together with the relevant Industry Sector EHS Guidelines, however no Industry Sector EHS Guidelines have been developed for PV solar power to date. The application of the General EHS Guidelines should be tailored to the hazards and risks associated with a project, and should take into consideration site-specific variables which may be applicable, such as host country context, assimilative capacity of the environment, and other project factors. In instances where host country regulations differ from the standards presented in the EHS Guidelines, whichever is the more stringent of the two in this regard should be applied.

The General EHS Guidelines include consideration of the following:

- Environmental:
  - Air Emissions and Ambient Air Quality
  - Energy Conservation
  - Wastewater and Ambient Water Quality
  - Water Conservation
  - Hazardous Materials Management
  - Waste Management
  - Noise
  - Contaminated Land
- Occupational Health and Safety:
  - General Facility Design and Operation
  - Communication and Training
  - Physical Hazards
  - Chemical Hazards
  - Biological Hazards
  - Radiological Hazards
  - Personal Protective Equipment (PPE)
  - Special Hazard Environments
  - Monitoring
- Community Health and Safety:
  - Water Quality and Availability
  - Structural Safety of Project Infrastructure
  - Life and Fire Safety (L&FS)
  - Traffic Safety
  - Transport of Hazardous Materials
  - Disease Prevention
  - Emergency Preparedness and Response
- Construction and Decommissioning:
  - Environment
  - Occupational Health & Safety
  - Community Health & Safety

6.7.3 IFC's Project Developer's Guide to Utility-Scale Solar Photovoltaic Power Plants (2015)

While no Industry Sector EHS Guidelines have been developed for PV Solar Power, the IFC has published a Project Developer's Guide to Utility-Scale Solar Photovoltaic Power Plants (IFC, 2015). Chapter 8 of the Project Developer's Guide pertains to Permits, Licensing and Environmental Considerations, and states that in order to deliver a project which will be acceptable to international lending institutions, environmental and social assessments should be carried out in accordance with the requirements of the key international standards and principles, namely the Equator Principles and IFC's Performance Standards (IFC PS).

Some of the key environmental considerations for solar PV power plants contained within the Project Developer's Guide include:

- Construction phase impacts (i.e. OHS, temporary air emissions from dust and vehicle emissions, noise related to excavation, construction and vehicle transit, solid waste generation and wastewater generation from temporary building sites and worker accommodation).
- Water usage (i.e. the cumulative water use requirements).
- Land matters (i.e. land acquisition procedures and the avoidance or proper mitigation of involuntary land acquisition / resettlement).
- Landscape and visual impacts (i.e. the visibility of the solar panels within the wider landscape and associated impacts on landscape designations, character types and surrounding communities).
- Ecology and natural resources (i.e. habitat loss / fragmentation, impacts on designated areas and disturbance or displacement of protected or vulnerable species).
- Cultural heritage (i.e. impacts on the setting of designated sites or direct impacts on below-ground archaeological deposits as a result of ground disturbance during construction).
- Transport and access (i.e. impacts of transportation of materials and personnel).
- Drainage / flooding (i.e. flood risk associated with the site).
- Consultation and disclosure (i.e. consultating with key authorities, statutory bodies, affected communities and other relevant stakeholders as early as possible).
- Environmental and Social Management Plan (ESMP) (i.e. compile an ESMP to ensure that mitigation measures for relevant impacts are identified and incorporated into project construction procedures and contracts).

CHAPTER 7 DESCRIPTION OF THE RECEIVING ENVIRONMENT

This chapter provides a description of the local environment. This information is provided in order to assist the reader in understanding the possible effects of the project on the environment within which it is proposed to be developed (that is, Portion 2 of Farm Styns Vley 280). Aspects of the biophysical, social and economic environment that could be directly or indirectly affected by, or could affect, Kotulo Tsatsi Energy PV3 have been described. This information has been sourced from both existing information available for the area as well as collected field data by specialist consultants and aims to provide the context within which this BA process is being conducted.

7.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of an Impact Assessment Report

This chapter includes the following information required in terms of Appendix 2: Content of a Scoping report:

Requirement	Relevant Section
(g)(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 Kotulo Tsatsi Energy PV3 is included as a whole within this chapter. The environmental attributes that are assessed within this chapter includes the following: » The regional setting of the broader study area and the project site indicates the geographical aspects associated with Kotulo Tsatsi Energy PV3. This is included in **Section 7.2**. » The climatic conditions for the Kenhardt area have been included in **Section 7.3**. » The biophysical characteristics of the project site and the surrounding areas are included in **Section 7.4**. The characteristics considered are topography and terrain, geology, soils and agricultural potential and the ecological profile which includes the vegetation patterns, listed plant species, critical biodiversity areas and broad-scale processes, freshwater resources, terrestrial fauna and avifauna. » The heritage and cultural aspects (including archaeology and palaeontology) has been included in **Section 7.5**. » The social and socio-economic characteristics associated with the broader study area and the project site has been included in **Section 7.6**

A more detailed description of each aspect of the affected environment will be included in the specialist reports to be included in the EIA report.

7.2. Regional Setting

The Kotulo Tsatsi Energy PV3 development area is located approximately 70km south west of Kenhardt and 60km north east of Brandvlei in the Northern Cape Province. The Province is situated in the north-western corner of South Africa and has a land area of 372,889 km^2, therefore occupying approximately 30% of South Africa's land area and making it the largest province in South Africa even though it has the smallest population.

The town of Kenhardt is located to the north-east of the study area and is the closest town. Other towns within the surrounding area of the study area include Brandvlei to the south, and Upington, located ~ 170km to the north-east. Kenhardt offers various activities and sights which includes the Giant Camelthorn Tree which is about 600 years old, an old library which is declared as a national monument, the Quiver Tree Forest and Hiking Trail which leads into a forest of about 5000 kokerbome, a San Trail which include San engravings and the Verneuk Pan. The development area for Kotulo Tsatsi Energy PV3 falls within Ward 3 of the Hantam Local Municipality, under the Namakwa District Municipality. A regional map of the study area and the development area is provided in Figure 7.1.

The closest main access road to the proposed site is the R27 which is a Regional Route that consists of two disjointed segments. The first segment, also known as the West Coast Highway, connects Cape Town with Velddrif along the West Coast. The second runs from Vredendal via Vanrhynsdorp, Calvinia, Brandvlei and Kenhardt to Keimoes on the N14 near Upington. The larger site can be accessed from public gravel roads off the R27 with the most direct access provided by Soafskolk Road. The Sishen/Saldanha freight railway line bypasses the site to the north west.

The development area is situated south of the Soafskolk Road and east of the Aries-Helios 400kV overhead servitude line, which connects to the Aries Substation located ~50km to the north-east. The site is characterised by a barren flat to uneven surface bisected by a number of shallow drainage basins. Land use in the general area is dominated by low intensity sheep farming and the affected farms are divided into livestock camps. A single abandoned farmhouse (known as Valsvlei) and associated buildings is located on the property.

The 10MW Aries PV Solar Energy Facility is the only operational solar PV facility within the vicinity of the study area. The solar PV facility is located ~39km north-east of the study area, adjacent to the Aries Substation. The Aries Transmission Substation is located approximately 40km north-east of the development area, and the existing Aries-Helios 400kV power line is west of the development area.

Figure 7.1: Regional map showing the location of the development area for Kotulo Tsatsi PV3

7.3. Climatic Conditions

The climate for the study site is expected to be most similar to that of Kenhardt, located approximately 70km north east of the study area. The area receives on average between 123 mm to 248 mm of rain per year. Moisture availability, which is the ratio of rainfall to evapotranspiration is one of the most important climate parameters for agriculture, and in this area is described as presenting a very severe limitation to agriculture. Rainfall amounts can vary significantly from year to year, and thunderstorms are typical during the early rainy season (Namakwa Bioregional Plan, 2008).

The average midday temperatures for Kenhardt range from 19.3°C in July to 35.5°C in January. The region is the coldest during July when the temperatures on average drop to 2.2°C during the night, but can go below 0˚C. The first occurrence of frost may be experienced as early as May and marks the end of the growing season (if not brought on earlier due to a lack of moisture availability).

7.4. Biophysical Characteristics of the Study Area and Development Area

7.4.1. Topographical profile

The larger study area is described as moderately undulating (slopes 3-5%) to flat with few isolated outcrops, draining south-east into ephemeral water washes that drain into the Verneuk Pan System located 18 km to 45 km southeast and east of the study area. The topography of the Project Site area however is flat and homogenous. Elevation across the Project Site ranges from 940m above sea level in the west to 950m above sea level in the east of the Project Site. There are no prominent hills within the Project Site with the highest areas of elevation situated to the north east of the development area.

7.4.2. Geology, Soils and Agricultural Potential

The site is underlain by mudstone, sandstone and shale of the Prince Albert Formation and post Karoo dolerite intrusives. These occur over much of the site and are overlain by recent Kalahari deposits comprising wind-blown sand and dunes, and red brown sand. This area is known for having thick aeolian (wind-blown) deposits. Aeolian deposits are renowned for having a collapsible grain structure and being highly compressible, with a great reduction in shear strength when saturated.

Calcretes and duripans are common in the area. Calcrete might be found in seasonal watercourses, pans or areas where shallow water tables are present.

i. <u>Soils and agricultural capability</u>

Existing soil information was obtained from the Land Type database (Land Type Survey Staff, 1972 – 2002). A land type is an area with similar climate, topography and soil distribution patterns which can be demarcated on a scale of 1:250 000. One land type dominates the development area, namely Fc137.

F-land types are generally young landscapes where the dominant pedological processes have been weathering, clay illuviation and formation of orthic A horizons. Although the dominant soil forms are normally shallow Glenrosa and Mispah forms, any other soil forms can be accommodated in F-land types provided that they do not qualify the area for inclusion in other land types. The dominant soils in these land types are often shallow, thereby limiting the suitability for crop production.

In land type Fc137, shallow Mispah and Glenrosa soils as well as rock outcrops dominates and covers approximately 70% of the area. Slightly deeper Clovelly and Oakleaf soils cover the remaining 30%. Although the land type database is invaluable to provide background to the study site, it was created on a 1:250 000 scale does not necessary reflect the actual soils on the site.

A predictive mapping approach, instead of traditional grid survey, to capture the variability in soils and soil associations, was undertaken. Based on field work, a soil distribution map (Figure 7.2) has been generated and the following soil associations distinguished:

- Ag: Augrabies soils (orthic A/neocarbonate B) occurred in the majority of the drainage lines which were covered with large shrubs. These soils are relatively deep (>850 mm) due to alluvial deposits.
- Cv/Ag: These soils are deep (>1 000 mm) apedal soils occurring in valley bottom pans. The surface and subsurface colours were bright yellow (10YR4/4). The clay content of these soils is slightly higher than the rest of the site (approximately 25% in the B1 horizon). The absence or presence of carbonates classified these soils either as Clovelly or Augrabies soils. This soil association occur on relatively small isolated patches.
- Ms/Ag/R: Large parts of the study area are covered by rock outcrops or shallow Mispah (orthic A/rock) and Coega (orthic A/harpan carbonate). Due to the shallow depths and hence limited storage capacity, erosion might be a problem on steeper slopes.
- Pr: Prieska soils consists of orthic A on neocarbonate horizons on harpan carbonate horizons. These soils are generally shallow (approximately 450 mm). The soils are sandy with a clay content of less than 12% and 15% in the A and B horizons respectively.

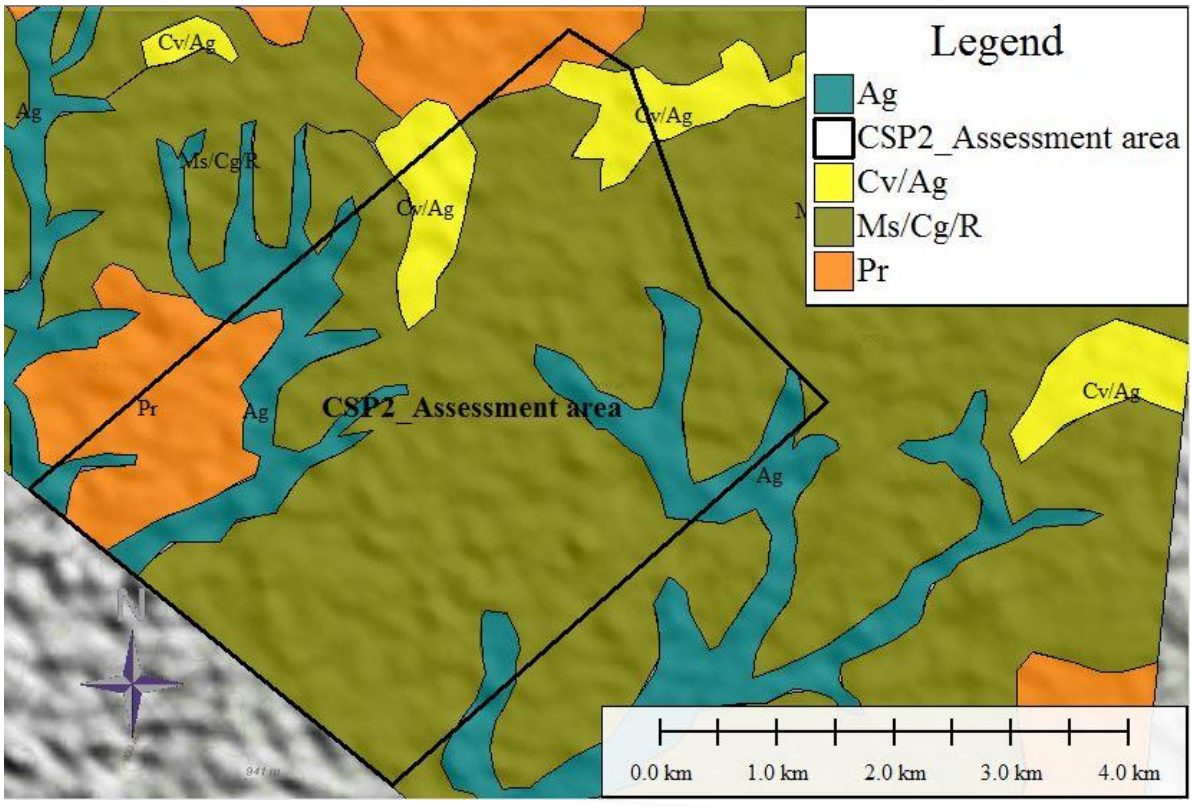

Figure 7.2: The soil association map of the project development area

The overall agricultural potential of the site is very low, largely restricted by the arid climate conditions and shallow soils. The Cv/Ag and Ag soil associations are the only areas of the site suitable for crop production should adequate water for irrigation be available.

ii. Land use and carrying capacity

The current land-use is restricted to low intensity grazing. The natural grazing capacity of the larger farm is between 41 and 60 ha per stock unit. For the project development area, this figure is approximately 45 ha per stock unit (or 7.5 ha per Small Stock Unit (SSU) i.e. about 107 sheep for the total development area of the project). The low rainfall, high potential evaporation, high maximum and low minimum temperatures, coupled with shallow soils covering most of the site, limits any alternative land-use activities. A number of non-perennial drainage lines are present, but the dominant source of water for agricultural purposes is groundwater.

7.4.3. Ecological Profile of the Study Area and the Development Area

i. Vegetation description and associated habitats

Overall, the vegetation consists of the following vegetation types:

- Lower Gariep Broken Veld (Least Threatened)
- Bushmanland Basin Shrubland (Least Threatened)
- Inland Azonal Wetland type Bushmanland Vloere (Least Threatened) with riparian vegetation on the banks of few small ephemeral water washes that drain mostly into lower-lying pan-systems beyond the study area.

Mucina and Rutherford describe these vegetation types as follows:

The Lower Gariep Broken Veld is found on rugged terrain consisting of boulder hills and low mountains to plains with numerous large boulders, small outcrops and/or inselbergs. Vegetation is sparse – dominated by shrubs and dwarf shrubs, with a variable display of grasses and herbs most visible after rains. Within the study area, these outcrops and boulders consist mainly of dolerite and quartzite.

Occasionally, sparse to extensive stands of the quiver tree, *Aloe dichotoma*, can be found within these landscapes. Other high shrubs include *Acacia mellifera* subsp *detinens, Ziziphus mucronata, Rhigozum trichotomum, Cadaba aphylla, Ehretia rigida, Nymania capensis, Phaeoptilum spinosum* and *Searsia burchellii*. The low shrub layer is relatively diverse, dominated by shrubby species of the genera *Aptosimum, Blepharis, Barleria, Hermannia, Monechma, Tetragonia* and *Zygophyllum*. Prominent grass species include *Enneapogon desvauxii* and *E. scaber, Eragrostis nindensis, E. annulata, E. lehmanniana, Schmidtia kalahariensis* and *Stipagrostis* species. The most prominent herbs include *Chascanum garipense, Cleome angustifolia, Codon royenii, Rogeria longiflora* and *Trichodesma africanum*.

Currently, this vegetation type is regarded as least threatened, with about 4% of its surface area protected in the Augrabies National Park. Only a very low portion of this vegetation type is transformed.

The Bushmanland Basin Shrubland is centered around Brandvlei and Van Wyksvlei, with Kenhardt on its northern periphery. This vegetation is found on irregular, dissected plains and consists mostly of dwarf shrubland, with a high component of spiny species. Occasional bands of taller shrubs are dominated by

Lycium cinereum, L. bosciifolium, Rhigozum trichotomum, Phaeoptilum spinosum and, in the study area, *Parkinsonia africana* with *Cadaba aphylla*. The dwarf shrub component is very variable and relatively diverse, with species such as *Aptosimum spinescens, Hermannia spinosa, Pentzia spinescens, Eriocephalus* species, *Osteospermum armatum, O. spinescens, and Pteronia* species prominent. More succulent low shrubs include *Zygophyllum (Roepera) microphyllum, Salsola species, Aridaria noctiflora, Sarcocaulon* species and *Ruschia intricata*. The herbaceous layer is very variable from year to year depending on rainfall, with graminoids dominated by *Stipagrostis* and *Enneapogon* species. Other common herbs include species of the genera *Sesamum, Tribulus, Monsonia, Indigastrum* and *Dicoma*.

The Bushmanland Basin Shrubland is currently considered as least threatened, despite none of its surface statutorily protected. The most serious threat at this stage consists of localised scattered to dense infestations of *Prosopis glandulosa*.

The Bushmanland Vloere are wetlands, which are created and maintained by seasonal accumulation of runoff water rather than flowing waters, leading to either seasonal waterlogging with little to no surface water, or seasonal slow-flowing or stagnant water, and in the case of these 'intrazonal inland' wetlands, are associated with high concentrations of salt in the environment (Azonal and Intrazonal referring to vegetation composition dictated by localised soil characteristics rather than general climatic conditions). The Bushmanland Vloere therefore consist of flat and relatively even surfaces of salt pans, beds to very broad bottoms and tributaries of intermittent rivers or just isolated depressions where runoff and sediment will accumulate, but where floods as such rarely occur. The centre of these areas is occasionally devoid of vegetation, becoming denser towards the periphery, depending on the pH and salinity of the soil.

The Namakwa Bioregional Plan (2008) describes these wetlands as water storage areas - above and below ground. Their plant cover slows runoff, filters and purifies water and reduces the impacts of droughts and floods by regulating surface hydrology. These wetlands, as harsh as they appear to be, provide large surface areas to temporarily contain large volumes of water produced during wet weather. Simultaneously, these valley floors filter out nutrients and suspended particles through the fine-grained accumulated sediment, and thereby improve the quality of the water as it drains away and replenished ground water reserves. The functionality of these wetlands is important within the wider ecosystem, and transformation of such wetlands should be avoided.

Prominent tall shrubs are *Rhigozum trichotomum, Parkinsonia africana* and *Xerocladia viridiramis*. The low shrub layer is dominated by *Salsola* species, *Pegolettia retrofracta, Asparagus glaucus, Eriocephalus spinescens* and *Lycium pumilum*. The grass layer will be very variable from year to year, consisting mainly of *Stipagrostis ciliata* and *S. obtusa*.

Currently about 164 indigenous higher (all plants with a definite vascular system) plant species are listed in the SANBI databases for the quarter degree grids in which the study area is situated. It is not likely that all of these species will occur on the study site, but species that do occur there may also not be listed in the databases due to insufficient sampling up to date.

The status of species of conservation concern and number of species expected on site can be summarised as follows:

NEMA: BA protected:	1
NCNCA Schedule 1:	1
NCNCA Schedule 2:	22

Vegetation associations within the larger study area can be primarily divided into habitats with alluvial deposits and habitats without such deposits, the latter mainly with shallow soils and a high percentage of surface rock.

Associations on Alluvial Soils (habitats derived/influenced strongly by fluvial action) include:
» Association 1: *Cenchrus ciliaris – Lycium bosciifolium* ephemeral drainage lines
» Association 2: *Rosenia spinescens – Salsola rabieana* pans
» Association 3: *Rosenia humilis – Enneapogon desvauxii* valley floors
» Association 4: *Aridaria noctiflora – Salsola namaqualandica* Boesmanland Vloere

Associations on shallow soils with calcrete hardpans, dolerite boulders or shales include:
» Association 5: *Microloma sagittatum – Osteospermum armatum* Broken Plains
» Association 6: *Stipagrostis ciliata – Zygophyllum chrysopteron* Calcrete Plains
» Association 7: Mixed shrublands on undulating rocky plains

Differences between sample sites in terms of species present is the highest in the fluvial systems (Associations 1-4), indicating that the presence of the plant species is highly event-driven (i.e. as variable and unpredictable as the rainfall events), with several species being introduced there due to seeds deposited there from runoff off surrounding, higher lying areas (but the latter only persisting in low numbers).

Of the seven vegetation associations identified within the broader study area, six occur within the development area, with majority of the area being covered by Mixed Shrublands (all other areas not mapped in Figure 7.3). The other five associations include Calcrete grass plains, Valley floors, pans/dams, Boesmanland Vloere, and Ephemeral drainage lines. The dominant associations are mapped in Figure 7.3 and further described below.

» ***Mixed shrublands***

The mixed shrublands have been mapped as a single unit, as their general ecosystem processes, sensitivity and functionality are relatively uniform. However, due to differences in micro-topography and underlying geology and associated soil moisture regimes, the vegetation ranges from a very sparse, low shrub layer to areas with denser, higher shrubs.

It is anticipated that most of the Proposed Project development will be situated on these areas which have an overall low conservation and sensitivity value.

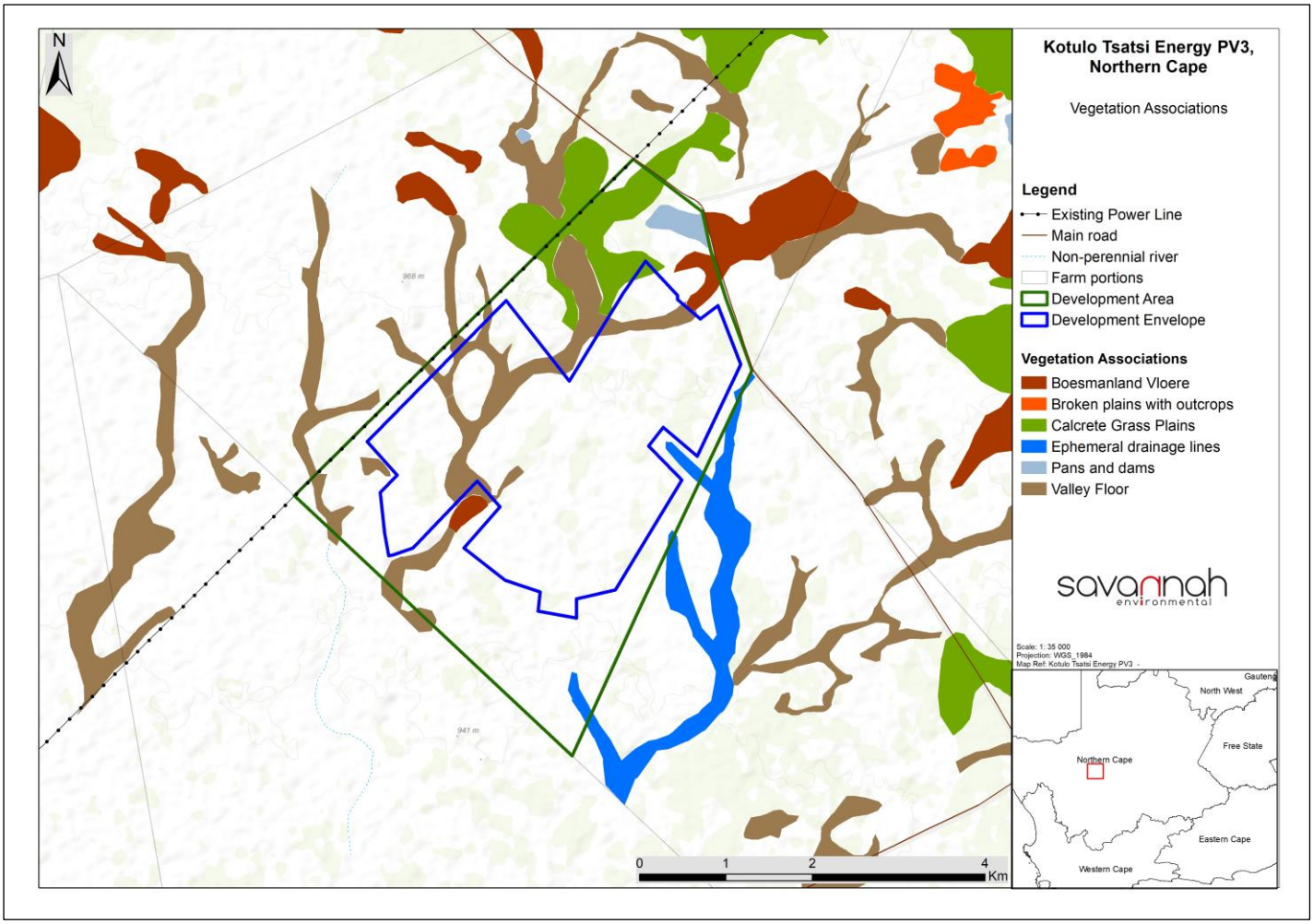

Figure 7.3: Vegetation associations mapped across the Kotulo Tsatsi PV3 development area

Figure 7.4: General view of the mixed shrublands

» ***Calcrete Plains (Stipagrostis ciliata – Zygophyllum chrysopteron)***

These undulating plains are associated most with broken plains, and occasionally border on small pans and other fluvial systems. The vegetation consists mostly of a taller grass layer of variable density (Figure 7.5), interspersed by a low density of low and medium shrubs. High shrubs are generally rare, but do occur in smaller groves where these seem to be preferred places for fauna to rest under during the midday heat.

Localised species diversity was low during the survey, but is expected to be higher after sufficient rains when geophytes and annual species emerge.

Figure 7.5: View of the calcrete grass plains.

» ***Ephemeral Drainage Lines (Cenchrus ciliaris – Lycium bosciifolium)***

Drainage lines can be found in narrower incisions within the undulating plains, most of them too small to map individually. Occasionally, smaller washes can also be found within smaller valley floor areas, indicating that these smaller valley floors do not have the same flood-buffering capacities as the larger systems. Generally, the steeper the surrounding undulating low slopes, the larger the drainage lines with a more pronounced and deeper sand-bed in the centre, resulting from many centuries of accumulation of sands.

Figure 7.6: Vegetation along one of the larger drainage lines in the study area

The riparian vegetation consists of a relatively dense low shrub and palatable grass layer – the latter often characterised by patches of the more nutritious grass, *Cenchrus ciliaris*. High shrub cover within the riparian vegetation is extremely variable, ranging from almost none, to dense stands of *Lycium*, *Phaeoptilum* and *Rhigozum* and/or *Parkinsonia* species.

» ***Valley Floors (Rosenia humilis – Enneapogon desvauxii)***

The Valley Floors are generally very old, well-established and stable floodplains – typical of the pre-river optimal runoff accumulation and flow systems of southern African drier ecosystems.

The ecosystem processes here can be summarised as follows:

- The Valley Floors are relatively continuous fluvial systems, accumulating runoff from higher undulating areas to lower-lying pans, but always with the possibility of a unidirectional flow of water to lower-lying areas.
- These systems are relatively wide, occasionally with wider lower-lying plains, therefore runoff is seldom concentrated in a narrower channel.
- As there is unidirectional flow of water, and, depending on rainfall volumes, flows may be high, there is accumulation of silts and sandy loams, but not an accumulation of excess minerals (as in pans where the water ends up).
- The deeper alluvial deposits enable a higher retention of water during moist seasons, which enables the establishment of a relatively permanent vegetation layer (shrubs and grasses).
- Fine-grained soils (accumulated from thousands of years of occasional runoff) generally have a low infiltration rate and surface layers dry out very quickly, but the vegetation layer does not only slow down accumulated runoff, but also significantly increases moisture infiltration to such degree that ground water reserves can also be significantly replenished (larger systems).
- While there is a high permanent shrub component, reaching up to 6 m height in places and providing nesting, shelter, browsing, there is also a strong palatable dwarf shrub and herbaceous (grass) layer, which will provide valuable grazing beyond the rainfall season.

The importance of these Valley Floors to the overall ecosystem processes therefore depends largely on the length and width of the channels and their connectivity to lower-lying larger fluvial systems (pans, rivers,

dams). Within the development area, such connectivity is not as pronounced as in other areas of the larger study area. Those systems which are not well connected are of less conservation importance as they are cut off from the remainder of the ecosystem.

Figure 7.7: Dense shrubland and grasses in the larger valley floor systems

» ***Pans (Rosenia spinescens – Salsola rabieana)***

Pans have been formed in often isolated low-lying depressions, by deposits resulting from millennia of accumulating runoff. Fine silt and clay particles that have been layered here are fine enough to have filtered out most of the dissolved salts/minerals that have been washed off higher-lying areas. Unlike other fluvial systems, these minerals were accumulated because runoff accumulating here is not distributed or moved over larger areas, but will gradually either evaporate or infiltrate, hence the sodic content of the alluvial deposits in the pans is generally higher than in all other fluvial systems.

Inundation of pans with standing water will be scarce. Even very shallow and short-lived surface water resulting from sufficiently large rainfall events will not only serve as surface water for fauna, but due to the higher mineral content be a breeding ground for several specially adapted invertebrates. These may then appear in very large numbers, becoming a valuable source of food to birds and reptiles. Less saline zones on the outer edges of the pans will change into a short-lived green belt of low vegetation, which will provide mostly habitat for invertebrates to lay eggs for the next generation.

Figure 7.8: One of the more barren pans within the project site

» ***Boesmanland Vloere (Aridaria noctiflora – Salsola namaqualandica)***

The Boesmanland Vloere occur as relatively extensive systems to the north of project with their origin, composition and ecosystem processes intermediary between large pans and the Valley Floors. Soils within the Boesmanland Vloere have been deposited there through thousands of years by runoff events from surrounding higher-lying areas. However, if flooding events are large enough there is some unidirectional flow either into lower-lying drainage lines or associated pans. Otherwise, runoff will accumulate and remain stationary similar to pan systems, therefore soils generally appear to have a higher mineral content (higher than valley floors), but do not reach the high mineral accumulation levels of pans.

Several species, especially succulents, manage to flourish only on these soils. This relatively unique albeit harsh plant habitat, together with its ability to accumulate runoff, filter it and help replenish ground water resources, renders it as a more sensitive system.

Figure 7.9: Larger 'Boesmanland Vloere' pan area located to the north of project

ii. Fauna

Although not remarkably rich in species diversity or endemism, the fauna of the region are impressively adapted to its climatic extremes.

a) Amphibians

Nine amphibian species have the potential to occur in the study area. No species were however recorded during a three day site visit. Most amphibians occur in or near wetland habitats or moister sites and therefore will only occur within the study area during periods of higher moisture. It is therefore not expected that the study area supports a high diversity and density of amphibian species due to the arid nature of the area and lack of surface water.

b) Reptiles

Twenty five reptile species have the potential to occur in the study area. Of these, several species were recorded during the site visits: *Psammophis* species (sand snake), Tent Tortoise, Variegated Skink and Southern Rock Agama. Both species were recorded frequently in the rocky outcrops that are scattered throughout the study area. These species are not threatened, but provide a source of food for several small predators observed in the area.

c) Mammals

Thirty three mammal species have the potential to occur in the study area. Of these, several species were either sighted or recent signs of their activity were recorded during the site visit. These included: Aardvark, Aardwolf, Bat Eared Fox, Cape Ground Squirrel, Cape Hare, Porcupine, Springhare, African Wild Cat (tracks only), Rock Dassie, Common Duiker, Steenbok, Suricate and Yellow Mongoose. None of these are threatened and all are common and widespread species in South Africa. No bats or bat roosts were observed on site or in the surroundings.

iii. Alien invasive species

The SANBI database lists several alien invasive species in the wider Kenhardt area. Of these, only *Prosopis glandulosa* could be confirmed within the study area. *Prosopis glandulosa* is considered a Category 3 Listed Invasive species, indicating that it must be managed. However, where it occurs in riparian areas, it must be considered a Category 1b species, indicating that it must be eradicated and controlled.

Additional alien invasive species do occur in the surrounding area along major transport routes, which could be accidentally introduced to the Project Site during construction. Regular monitoring and early eradication should enable a cost-effective control of invasives.

iv. Species of Conservation Concern

The following species of flora and fauna were observed on the study site during this survey are protected:
The Nature Conservation Ordinance (NCO) 8 of 1969 and subsequent amendments

Fauna:	Aardvark (*Orycteropus afer)* Aardwolf (*Proteles cristatus*) Bat-eared Fox (*Otocyon megalotis*) Note: all Girdled Lizards, Land Tortoises and Chameleons that may be on the site during construction are protected and must be relocated to safety within the same land portion	
Flora:	*Acacia erioloba*	*Psilocaulon coriarium*
	Aridaria noctiflora	*Brownanthus vaginatus*
	Babiana species	*Aloe claviflora*
	Drosanthemum hispidum	*Brownanthus vaginatus*
	Hoodia gordonii	*Prenia tetragona*
	Jamesbrittenia canescens	*Nemesia anisocarpa*
	Larryleachia species	*Moraea species*
	Microloma sagittatum	

National Forest Act (Act No. 84 of 1998)

- Camel Thorn: *Acacia erioloba*

National Environmental Management Act: Biodiversity Act (NEMA: BA) (Act No. 10 of 2004) and amendments

- Ghaap: *Hoodia gordonii*

v. Critical Biodiversity Areas and Conservation Targets

The majority of the development area of Kotulo Tsatsi PV3 is located within Other Natural Areas (ONA), with the south-western corner of the site being demarcated as Ecological Support Area (i.e. a prescribed buffer around the north/south trending drainage feature). Within the northern portion of the development area, two smaller valley floor areas/features are demarcated as Critical Biodiversity Area One (CBA1) (and also shown on the National Wetland Map 5).

The Namakwa Bioregional Plan Draft 1, published in 2010 by the Namakwa District Municipality, and which was made available by SANBI in 2018 provides objective for Critical Biodiversity Areas, Ecological Support Areas (ESA) and Other Natural Areas which guides the appropriate land-use management within these defined areas. The foundations of the CBA classification are the biodiversity sector's understanding and quantification of the desired ecological state or biodiversity land management objectives for a given

component of biodiversity. The table below provide the land management objectives associated with the CBA areas present within the Kotulo Tsatsi PV3 development area.

CBA Category	Land Management Objective
CBA 1 and Protected Areas	Natural landscapes: » Ecosystems and species fully intact and undisturbed » These are areas with high irreplaceability or low flexibility in terms of meeting biodiversity pattern targets. If the biodiversity features targeted in these areas are lost then targets will not be met.
CBA 2	Near-natural landscapes: » Ecosystems and species largely intact and undisturbed. » Areas with intermediate irreplaceability or some flexibility in terms of area required to meet biodiversity targets. There are options for loss of some components of biodiversity in these landscapes without compromising our ability to achieve targets. » These are landscapes that are approaching but have not passed their limits of acceptable change.
ESA	Functional landscapes: » Ecosystems moderately to significantly disturbed but still able to maintain basic functionality. » Individual species or other biodiversity indicators may be severely disturbed or reduced. » These are areas with low irreplaceability with respect to biodiversity pattern targets only.
ONA	Production landscapes: » Manage land to optimise sustainable utilization of natural land.

vi. Avifauna

» ***Supporting avifaunal habitat within the study area***

Bird habitats in the study area can be grouped into three broad categories:

- » Open grassy/rocky areas (Bushmanland basin shrubland) that supports grassland dominated by larks, korhaans and also larger dark rocky outcrops that support raptors and wheatears on the kopjes;
- » Low shrubland bush which covers much of the lower lying areas, and is especially dense in the dry ephemeral drainage lines
- » Pan (Bushmanland Vloere) which are found dotted across the larger study area either as small pans or very large accumulation areas for ephemeral water. When dry, these areas may hold flocks of seed-eating birds and when inundated may hold wetland species (e.g. flamingos) that are attracted from afar with the rains;
- » Artificial habitats are provided by (i) the existing power lines and accompanying pylons, and (ii) the water points that are scattered across the landscape for livestock. The pylons are used mainly by large raptorial birds from which to hunt and occasionally nest on (goshawks, kestrels and eagles), while large numbers of birds are attracted to farmer's dams.

Each of the main habitat types have been surveyed independently for bird species richness and bird abundance in the dry and wet seasons.

» ***Avian species richness and red data species***

Although very limited, available research for the area summarised 226 bird species in total and highlighted eleven species of significance: two bustards (Ludwig's and Kori); two eagles (Martial and Verreaux's), two flamingos (Greater and Lesser), two korhaans (Karoo and Northern Black), two larks (Red and Sclater's) and the Secretarybird *Sagittarius serpentarius.*

An avifaunal survey undertaken over 7 days in the dry and wet seasons recorded a low species richness of sixty four avifaunal species recorded within the broader study area, five of which are threatened (red listed species) and forty of which are endemic. Species identified to be of most concern due to their interactions with the broader areas are the large nomadic Ludwig's Bustard *Neotis ludwigii* and Kori Bustard *Ardeotis kori*, the Martial Eagle *Polemaetus bellicosus,* the Sclaters Lark *(Spizocorys sclateri)* and Lanner Falcons *Falco biarmicu*. No red data species such as red larks or flamingos have been recorded on site due to the lack of habitat to support such species.

» ***Species recorded through on-site surveys***

From the three 1 km walked transects within the project site only fifteen bird species were recorded. One of these species (Sclater's Lark) is a Near Threatened and range-restricted endemic species. Only four Sclaters' Larks within three 1 km transects were recorded suggesting that their occurrence on the site is infrequent.

An active Martial Eagle nest with a fledging chick was recorded on top of the 400kV power line tower/pylon of the Aries–Helios power line a distance 5km of the centre of development area. From the driving surveys undertaken, one flight of a Martial Eagle through the proposed development area was observed. Although no Bustards were recorded within the site, the existing Eskom power line was flagged during the survey as being the source of a significant number of Bustard mortalities due to collisions.

From 1-km transects undertaken, an average 8.75 species/km were recorded in September 2014, while an average of 7.0 species/km were recorded in March 2015. The total number of species recorded in all walking and driving surveys was 64 with slightly more species in the wet than the dry season. Overall however, more birds were recorded in the dry season than in the wet season. This probably arose from birds being attracted away from the dry study site to rain events in the surrounding areas in March 2015. The biggest differences were between habitat variants where the number of birds per kilometre was twice as high in the dry drainage lines supporting low scrub (Rhigozum) bushes than they were in the open grassy plains that surrounded them.

vii. Freshwater Features

The site can be described as moderately undulating (slopes 3-5%) to flat with few isolated outcrops, draining south-east into ephemeral water washes that drain into the Verneuk Pan System located 18 km to 45 km southeast and east of the study area.

Valley floors may or may not connect to larger drainage systems, but seldom accumulate enough runoff to create a flooding event. Still, all runoff collected in these depressions is filtered through the fine-grained but freely drained soils to replenish groundwater resources. Although the valley floors are often without vegetation due to their sometimes sodic/saline soils, they are very important in maintaining the overall

water balance of the ecosystem. Because their function is to accumulate and store water, they are classified as wetlands.

The study area falls within Water Management Area (WMA) 14 within Quaternary Catchment D57D. The most significant watercourse within the WMA is the Orange (Gariep) River. The hydrological characteristics of catchment D57D are summarised as follows:

- Mean Annual Precipitation = 137.68mm;
- Mean Annual Runoff = 1.6mm; and
- Hydrological Zone = K.

Numerous non-perennial streams define a poorly developed dendritic drainage pattern; these rivers are seasonal and flow only after periods of heavy rainfall. There are a number of dry pans that occur throughout the study area.

A non-perennial stream exists approximately 2 800 m west of the development area. This stream drains southerly towards the Gemsbokrivier. The Gemsbokrivier discharges into the Sak River approximately 30km downstream of the study area. The riverbed is dry and consists mainly of small rocks. The river banks are covered with light vegetation and a few trees. The significance of this stream is rated low as stream flow on the riverbed is not readily evident. This stream is located at the upper reaches (most upstream point) of Quaternary Catchment D57D. Upper reaches of the catchment are associated with low flows as the effective catchment area is small. Unlike perennial streams, this stream does not have dry weather flow as runoff is only observed during significant storm events and becomes dry for months. From a biological point of view, this stream cannot support flow-dependant aquatic life.

7.5. Integrated Heritage including Archaeology, Palaeontology and the Cultural Landscape

7.5.1. Historical and Archaeological Background

The archaeology of the Northern Cape is rich and varied covering long spans of human history. Thousands of square kilometres of Bushmanland are covered by a low density lithic scatter. Cultural Resources Management (CRM) surveys in the immediate vicinity provide some insight as to the occupation of the area and in the wider region provides a good basis for understanding the local archaeology. Collection of surface samples by other archaeologists means that stone artefacts north of the study area have been analysed and indicates the presence of humans in the area for the last two million years. The larger area also probably represented a rich source of rocks for knapping. Previous work therefore suggests that the wider area could contain a widespread distribution of Early and Middle Stone Age material with perhaps a few Later Stone Age sites, depending on topography and proximity to water.

The development area is characterised primarily by areas barren of vegetation situated on sedimentary surfaces consisting of mud rock and possibly shale. Within the area, no locally available raw material exists which is suitable for knapping. No Stone Age sites (knapping, quarry or habitation sites) were, therefore, recorded during a field survey. Artefact density in the broader study area is so low that they do not represent individual sites but rather background scatter or find spots.

7.5.2. Palaeontology

The broader study area is underlain by glacially-related sediments of the Permo-Carboniferous Dwyka Group (Karoo Supergroup, C-Pd). However, only the northern-most sector of the site is underlain by Dwyka rocks. The majority of the development area on Styns Vlei 280 is underlain by postglacial basinal mudrocks of the Prince Albert Formation (Karoo Supergroup, Ecca Group, Pp) of Early Permian age. The Karoo Supergroup sediments have been locally intruded and baked by extensive intrusive sheets or sills of the Karoo Dolerite Suite (Jd) which build a north-south trending zone of rocky terrain running along the eastern border of Styns Vlei 280 as well as scattered outcrops further to the northeast and east (e.g. Klipheuwels). Small exposures of much older Precambrian basement rocks of the Namaqua-Natal Province are mapped to the east of the present broader study area on the farm Karee Boom Kolk 248, and similar outcrops may also occur subsurface in the broader study area itself. These comprise two billion year old granitoid intrusions.

A field study showed that the Karoo Supergroup sediments, Karoo dolerites and any older basement rocks within the broader study area, including the development area, are almost entirely mantled with a range of Late Caenozoic superficial deposits, mostly of Late Tertiary to Quaternary age. They include alluvium, pan sediments, calcrete hard pans as well as surface and subsurface gravels and may reach thicknesses of several meters or more. Where exposed in borrow pits along the major roads and the Sishen-Saldanha railway line and in other artificial excavations (e.g. farm dams), the bedrocks are often weathered and calcretised to a depth of several meters, reflecting periods of both drier and wetter climates in the geologically recent past. The projecting small koppies within the area consist largely of dolerite and occasionally of associated baked (thermally metamorphosed) country rocks.

Desktop analysis of the fossil records of the various sedimentary rock units underlying the broader study area, combined with field assessment of numerous representative rock exposures within and close to this area, indicate that all of the geological units are of low to very low palaeontological sensitivity. The potentially fossiliferous Karoo Supergroup bedrocks (Dwyka and Ecca Groups) are deeply weathered and extensively calcretised near-surface. Over the majority of their outcrop areas the bedrocks are mantled by various superficial deposits that may reach thicknesses of several meters and that are of low palaeontological sensitivity. These include alluvium, colluvium, a wide range of surface gravels, calcrete hardpans and pan sediments. The only fossil remains recorded during the field assessment are (1) small-scale fossil burrows within Prince Albert Formation mudrocks of Early Permian age, (2) downwasted, ice-transported blocks (erratics) of Precambrian stromatolitic carbonate within surface gravels overlying the Dwyka Group tillites, and (3) rare calcretised termitaria of probable Pleistocene or younger age embedded within weathered Dwyka bedrocks. These fossils are all of widespread occurrence within Bushmanland and special protection or mitigation measures for the very few known fossil sites are, therefore, not required.

7.6 Social Context

The majority of the study area is sparsely populated (30 people per km^2 within the Namakwa District Municipality) and consists of a landscape of wide-open expanses and vast desolation. The scarcity of water and other natural resources has influenced settlement within this region, keeping numbers low, and distribution limited to the availability of permanent water. Settlements, where they occur, are usually rural homesteads and farmsteads. Land use within the study area is limited to grazing (sheep), and land cover consists mostly of shrubland.

A main road (i.e. the R27) services the study area. Other roads are secondary roads linking with one another and with the R27, giving access to the farmsteads and settlements.

There are no built up areas, towns or mining land uses in close proximity to the study area. Infrastructure includes the Aries-Helios 1 400kV overhead power line, the Aries Substation and the Sishen/Saldanha railway line (a freight railway line). Both traverse the study area from the south west to the north east. This railway line bypasses the site to the north west while the power line transects the site.

7.6.1 Demographic Profile

The Hantam Local Municipality (LM) covers a geographical area of 36 128km^2 which is approximately 28% of Namakwa District Municipality (DM) total area. The Hantam LM has a population of 21 578 people at a population growth rate of 0.59 and a population density of 1/km^2. 18% of Namakwa DM population resides within the HLM.

Kenhardt is the closest town to the proposed site and is situated within the Kai !Garib Local Municipality and is located approximately 70km north east from the proposed site. Kenhardt is a town that covers an area of 159.35km^2 and consists of a population of 4 843 people, with a density of 30 people per squared kilometre (Census, 2011).

According to Census 2011, Hantam LM has a total population of 21 578, of which 82.2% are coloured. Afrikaans is the most prominent spoken language in both the Hantam LM and Kai !Garib LM.

7.6.2 Economic Profile of the Hantam Local Municipality

The closest town to the site which is located in the Hantam Local Municipality is Brandvlei. It is situated on the north-western boundary of the municipality and has a population of 2 859 people (Stats SA, 2014). It includes some minor retail shops and a filling station and has little to offer for local residents and visitors. It has limited social infrastructure and primarily services the nearby rural communities and farmers.

The economy is relatively small and in 2013 was valued at R1 307 million in current prices (Quantec, 2014). It contributed 11.0% to the Namakwa District's Gross Domestic Product per Region (GDP-R) or 1.9% to the provincial economy. In the period between 2008 and 2013, the economy of the Hantam LM grew at a Compounded Annual Growth Rate (CAGR) of 2.4%, showing a better performance than that of Namakwa (0.9%) and the Northern Cape (1.3%) (Quantec, 2014). Overall, the District is considered to be in distress and the Hantam LM economy, according to the Hantam SDF (Umsebe Development Planners, 2010), also requires investment injection and government support to turnaround its situation.

In 2011, the Hantam LM had 13 860 people within the working age population, of who 7004 comprised the labour force (Stats SA, 2014). About 3.4% of the working age population was discouraged job seekers, who are capable of working but who are no longer looking for employment (Stats SA, 2014). The labour force comprised of 6 122 employed and 882 unemployed, reflecting a 12.6% unemployment rate which is significantly lower than that of the country's unemployment rate of 29.7% recorded by Stats SA through Census 2011 (Stats SA, 2014). The unemployment rate within the Hantam LM though varied significantly. For example, Brandvlei had the highest unemployment rate of 25.8% in the municipality (Stats SA, 2014).

About 60% of the employed population in the Hantam LM is employed in the formal sector, while one out of five people work in the informal sector (Stats SA, 2014).

The agricultural sector and personal services sectors in the Hantam LM account for the largest number of jobs created in the area, i.e. 19.7% and 20.6%. Other sectors that make a prominent contribution towards employment in both formal and informal sectors include trade (11.7%), business services (14.7%) and government services (19.1%). Since 2000, the number of jobs in the municipality has declined by 457 positions. Agriculture has lost the largest number of 1 700 jobs during that period following by trade (175 jobs) and construction (86 jobs). Other sectors have increased employment absorption since 2000, however it is clear that it was insufficient to offset the massive losses experienced in the agricultural sector.

7.6.3 Settlement and infrastructure

The project development area is located on Portion 2 of the Farm Styns Vley 280. The nearest homestead is Valsvlei (within the project site) which is unoccupied. The next nearest homestead is a farmhouse at Gannakom which is located west of the development area and occupied by the manager of the farm.

There are no built up areas, towns or mining land uses within the immediate study area. Infrastructure includes the Aries-Helios 400kV overhead power line (directly to the west), and the Sishen/Saldanha railway line (a freight railway line) to the north west of Project. The R27 road is to the east of the development area. A gravel access road (Soafskolk road) forms the northern boundary of the development area.

Table 7.2 provides a baseline summary of the socio-economic profile of the Hantam LM within which Kotulo Tsatsi PV3 is proposed. The data presented in this section have been derived from the 2011 Census, the Local Government Handbook South Africa 2019, the Northern Cape Provincial Spatial Development Framework (PSDF), and the Integrated Development Plans of the Namakwa DM and Hantam LM[23].

Table 7.2: Baseline description of the socio-economic characteristics of the area proposed for Kotulo Tsatsi PV3

Location characteristics
» The project is proposed within the Northern Cape Province, which is South Africa's largest, but least populated Province.
» The project is proposed within the Hantam LM and the Namakwa DM.
» The Hantam LM covers an area of land 36 128km² in extent.
Population characteristics
» The Hantam LM has a total population of 21 505 with a growth rate of 0.2% between 2011 and 2017.
» In terms of the age structure 6 192 of the population is between the ages of 0 and 14 years, 13 274 of the population is between the ages of 15 and 64 and 2 038 of the population is older than 65 years.

[23] While information was derived from the Local Government Handbook South Africa 2019, Northern Cape PSDF, Namakwa DM and Khâi-Ma LM IDP, these sources largely make use of statistical information derived from the Census 2011. The information presented in this Chapter may therefore be somewhat outdated but is considered sufficient for the purposes of this assessment (i.e. to provide an overview of the socio-economic characteristics against which impacts can be identified and their significance assessed).

- Coloureds comprise the predominant population group within the Hantam LM.
- Within the Hantam LM 83.4% of the population is coloured, 11% is white, 4.9% is Black African and 0.6% is Asian.
- The dominant language spoken in the Hantam LM is Afrikaans at 93.1%. The remaining spoken languages in the area includes English (1%), IsiNdebele (0.1%), IsiXhosa (0.6%), IsiZulu (0.1%), Sesotho (0.1%), Setswana (0.4%), Sign Language (0.4%) and Tshivenda (0.1%).
- The Hantam LM, Namakwa DM, and Northern Cape provincial, and South African national population age structures are all youth dominated. A considerable proportion of the respective populations therefore comprise individuals within the economically active population between the ages of 15 and 64 years of age.

Economic, education and household characteristics

- The Hantam LM has a dependency ratio of 62.0. The dependency ratios of the Namakwa DM is 47.1, the Northern Cape Province is 35.8, and South Africa is 34.5.
- Education levels within the Hantam LM are 3 068 of the population has No Schooling, 2 451 has Matric and 1056 has a higher education.
- The population within the working age (15-64) is 13 508, with 5 165 people employed, 802 people unemployed and 5 646 people not economically active.
- In 2011, the unemployment rate was highest across the Northern Cape at 27.4% and lowest across the Namakwa DM at 20.1%.
- The number of indigent households in the Hantam LM area is, on average, between 35% and 40% of all households with the most of these households living in Calivinia.
- 96.8% of the Hantam LM population live in formal dwellings and 2.5% live in informal dwellings.
- The primary economic sectors within the Hantam LM include agriculture, tourism and mining.

Services

- The two hospitals are available within the Namakwa DM which includes the Abraham Esau Hospital in Calvinia and the Dr Van Niekerk Hospital in Springbok. The Hantam LM houses two community health centres, three clinics and one small district hospital.
- The majority of households within the Hantam LM are well serviced with regards to flush toilets connected to sewage, refuse removal, piped water and electricity.

CHAPTER 8 SCOPING OF POTENTIAL ISSUES

This Chapter provides an overview of the potential impacts and risks associated with the establishment of Kotulo Tsatsi Energy PV3, including the BESS and associated infrastructure, identified at this stage of the process through a desktop review of available existing information and studies previously completed for the property.

Potential environmental impacts and risks associated with the development of PV solar energy generation facilities, as described in the IFC's Project Developer's Guide to Utility-Scale Solar Photovoltaic Power Plants (2015), include:

- Construction phase impacts, such as temporary air emissions (dust and vehicle emissions), noise, solid waste and wastewater generation, and Occupational Health and Safety (OHS) issues such as the risk of preventable accidents leading to injuries and/or fatalities.
- Water usage, such as the cumulative water use requirements in arid areas where local communities rely on scarce groundwater resources.
- Land matters, such as land acquisition procedures and in particular involuntary land acquisition/resettlement.
- Landscape and visual impacts, such as the visibility of the project within the wider landscape and associated impacts on landscape designations, character types and surrounding communities.
- Ecology and natural resources, such as habitat loss / fragmentation, impacts on designated areas and disturbance or displacement of protected or vulnerable species.
- Cultural heritage, such as impacts on the setting of designated sites or direct impacts on below-ground archaeological deposits as a result of ground disturbance during construction.
- Transport and access, such as impacts associated with the transportation of materials and personnel on project-affected communities.
- Drainage/flooding, such as the potential for high flood risk associated with the project site.

This chapter serves to describe and evaluate the identified potential environmental impacts relevant and specific with the construction and operation phases of the Kotulo Tsatsi Energy PV3 (up to 200MW in capacity) and to make recommendations for further studies required to be undertaken in the EIA phase.

The project site considered for the proposed Kotulo Tsatsi Energy PV3 facility includes Portion 2 of Farm Styns Vley 280 that comprises of an area of approximately 4935ha in extent, which has been investigated during this Scoping Phase to determine the environmental suitability of the site. This will provide an indication of the areas of sensitivity that the developer would need to take into consideration in the planning of the location of the proposed Kotulo Tsatsi Energy PV3 facility within the development area.

The majority of the environmental impacts are expected to occur during the construction phase. Environmental issues associated with construction and decommissioning activities of the PV facility and associated infrastructure are similar and include, among others:

- Impact on ecology, including flora and fauna.
- Impact on avifauna.
- Impact on soils, geology, agricultural potential and land use.
- Impact on heritage resources (including archaeology and palaeontology).

» Social impacts (positive and negative).
» Visual impacts.

Environmental issues specific to the operation of the PV facility and associated infrastructure could include, among others:

» Long-term loss of protected species (flora, fauna, avifauna) or conservation-worthy habitats.
» Change in land-use for the footprint of the facility.
» Visual impacts (negative viewer perceptions and visibility of the facility).
» Social impacts (positive and negative).

Section 8.3 provides a summary of the findings of the desktop scoping study undertaken for the construction, operation and decommissioning phases of the Kotulo Tsatsi Energy PV3. Those impacts associated with construction can also be expected to be associated with the decommissioning phase (however, to a lesser extent as the project site would have previously undergone transformation and disturbance during construction). Potential impacts associated with the project are evaluated, and recommendations are made regarding further studies required within the EIA phase. The evaluations in **Section 8.3** are based on desktop data as well as the findings of studies which have been completed previously for this specific site, and provide the basis of what is required to be assessed in further detail during the EIA phase.

A summary of the potential cumulative impacts that may be associated with the project is provided in **Section 8.4**. These impacts are associated with the scale of the project when considered together with other similar developments within the region, and will be confirmed and assessed within the EIA phase of the project.

8.1 Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of an Impact Assessment Report

This chapter serves to identify the potential environmental impacts associated with the development of the Kotulo Tsatsi Energy PV3 from a desktop level. This chapter includes the following information required in terms of the EIA Regulations, 2014 - Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(g)(v) the impacts and risks which have informed the identification of each alternative, including the nature, significance, consequence, extent, duration and probability of such identified 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 to be associated with the construction and operation phase of Kotulo Tsatsi Energy PV3 have been included in **Section 8.3.** Impact tables have been included for each field of study which considers the nature, significance, consequence, extent, duration and probability of the impacts, as well the reversibility of the impacts, the loss of resources and avoidance, management or mitigation.
(g)(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 positive and negative impacts associated with the Kotulo Tsatsi Energy PV3 have been included in **Section 8.3.**
(g)(viii) the possible mitigation measures that could be	Possible mitigation (specifically relating to the avoidance

Requirement	Relevant Section
applied and level of residual risk	of sensitive areas) has been included in **Section 8.3.**

8.2 Assumptions made during the Evaluation of Potential Impacts

While evaluating potential impacts associated with the proposed project, the Scoping evaluation assumed the following:

- All information provided by the developer and I&APs to the environmental team was correct and valid at the time it was provided.
- It is assumed that the development area for the solar PV facility identified by the developer represents a technically suitable site for the establishment of Kotulo Tsatsi Energy PV3 which is based on the design undertaken by technical consultants for the project.
- The development footprint (the area that will be affected during the operation phase) will include the footprint for the PV facility and associated infrastructure (i.e. internal access roads, BESS and grid connection infrastructure).
- The Scoping Phase evaluation of impacts has been largely based on desktop studies as well as the findings of studies which have been completed previously for this specific site. Specialists assessments, including detailed field investigations were undertaken for the full extent of the development area during the Environmental Impact Assessment undertaken for Kotulo Tsatsi CSP2. This information has been used to inform this Final Scoping report and will be verified by specialists in the EIA phase to assess the project development footprint for Kotulo Tsatsi Energy PV3.
- Previously authorised grid connection infrastructure, including the Eskom collector substation, switching station and grid connection power line to Aries Substation will provide the grid connection solution for the facility, and is not required to be reassessed through this process.

8.3 Evaluation of Potential Impacts associated with the Construction Phase, Operation and Decommissioning phases

Impacts on ecology (including flora and fauna)

The landscapes and habitats within the project site consist of an intricate mosaic of undulating plains of mixed shrubland, with small to extensive valley floors that function partially as wetlands. The general ecosystem processes and functionality within the mixed shrublands are relatively uniform. The majority of the development area will be within these areas which have an overall low conservation and sensitivity value. Soils are generally alkaline with a high pH, and much of the salinity has been accumulated in the valley floors, where growing conditions for plants are extremely limited, despite the deeper soils and seasonal waterlogging of these areas. The system is driven by unpredictable rainfall events, and hence most perennial vegetation consists of low, mostly spiny shrubs. No protected trees have been found within the study area, but there are several protected succulent and low shrub species. The species of 'highest' conservation concerns, namely *Hoodia*, *Trichocaulon* and *Aloe* species, can be relocated with relative ease and success. The majority of the development area of Kotulo Tsatsi PV3 is located within Other Natural Areas (ONA), with the south-western corner of the site being demarcated as Ecological Support Area (i.e. a prescribed buffer around the north/south trending drainage feature). Within the northern portion of the development area, two smaller valley floor areas/features are demarcated as Critical Biodiversity Area One (CBA1) (and also shown on the National Wetland Map 5).

The most significant potential impact of any PV facility on all faunal communities is the displacement or exclusion of threatened, rare, endemic or range-restricted species due to habitat loss brought about by habitat destruction and disturbance during the construction and operational phases of the facility. The infrastructure associated with PV facility (including the access roads, laydown areas, on-site substation and power line) also impact on faunal communities habitat loss through destruction and disturbance during construction and maintenance of substations, servitudes and roadways.

Sensitivity Analysis of the Site

An ecological sensitivity map has been compiled using existing information for the Province, including Critical Biodiversity Areas and Wetlands (as per the National Biodiversity Assessment Wetland Map 5), as well as available data obtained during field work undertaken during previous studies on the same property (refer to **Figure 8.1**). This ecological sensitivity map is preliminary in nature, and will be refined and revised during in the EIA phase, as required. The following sensitive habitats and features have been identified within the development area.

- The main sensitive features within the development area include ephemeral drainage lines and valley floors. These fluvial features rarely accumulate water for any periods, but provide a unique and essential habitat to this arid environment, and are considered to be important corridors for landscape connectivity. The importance of these features to the overall ecosystem processes depends largely on the length and width of the channels and their connectivity to lower-lying larger fluvial systems (pans, rivers, wetlands). Within the development area, such connectivity is not as pronounced as in other areas of the larger study area. Those systems which are not well connected are of less conservation importance as they are cut off from the remainder of the ecosystem. The well connected features are considered to be of high sensitivity, unsuitable for development and should be regarded as sensitive areas to development.
- A prescribed buffer around the north/south trending drainage feature traversing the south-western corner of the site is demarcated as an Ecological Support Area to maintain functionality and connectivity of this system.
- Critical Biodiversity Area One (CBA1) are areas with high irreplaceability or low flexibility in terms of meeting biodiversity pattern targets. If the biodiversity features targeted in these areas are lost, then targets will not be met. These areas are considered as sensitive areas to development. CBA1 areas are also associated with

wetlands identified within the National Wetland Map 5.

» The majority of the site is considered to be of low sensitivity due to the lower abundance of protected species and dominance of vegetation which is generally an indicator of poor veld condition. No species of high conservation concern were observed in this area and is considered potentially suitable for development.

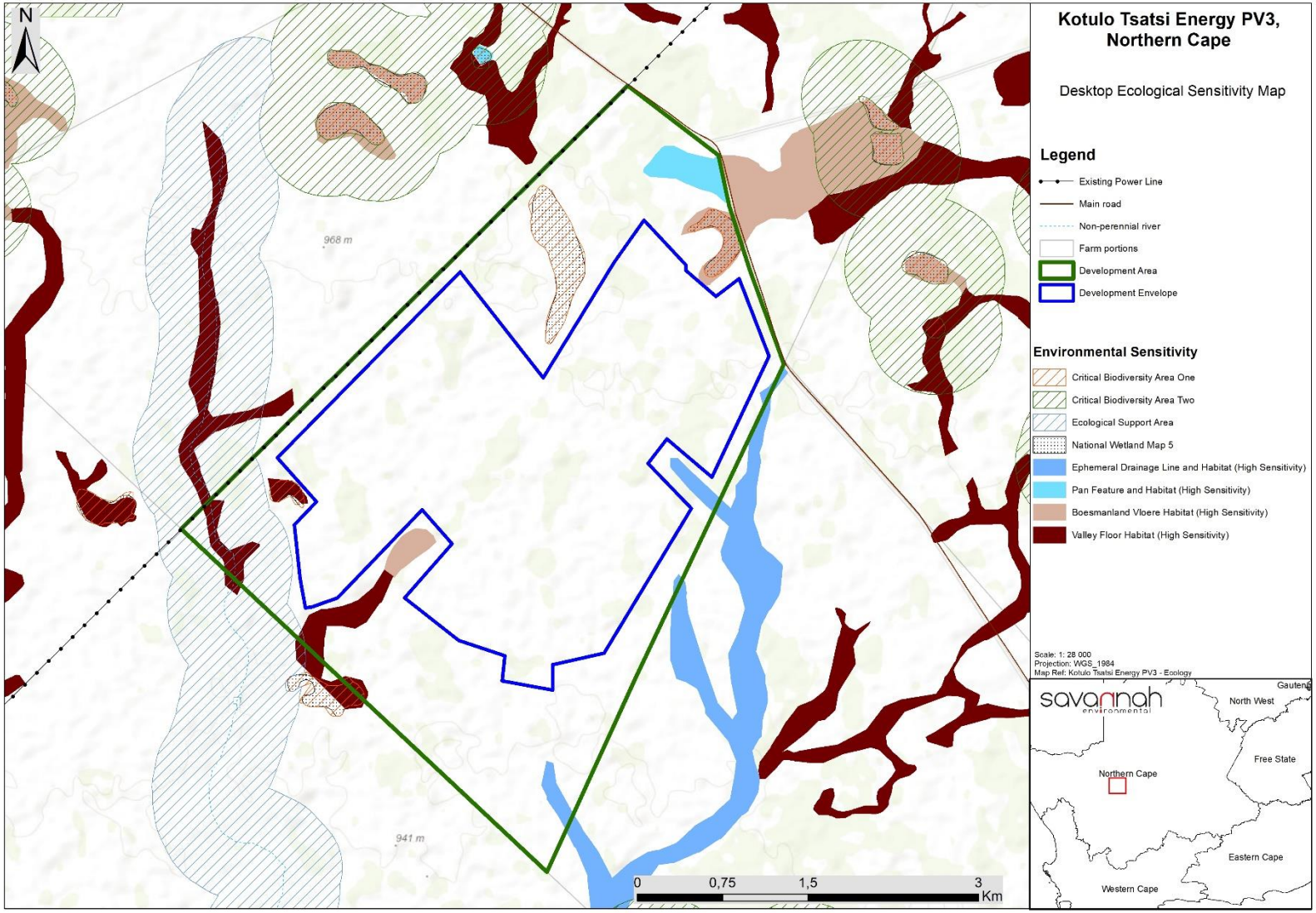

Figure 8.1. Preliminary ecological sensitivity map of the full extent of the Kotulo Tsatsi Energy PV3 development area

Overview of the most significant impacts of the proposed facility

- Migration routes of fauna may be impacted, which could have an effect population dynamics and long-term persistence. This can be mitigated, but requires planning to maintaining migration routes.
- For the construction of the solar panels, the affected area is largely cleared of vegetation prior to construction.
- Destruction and disturbance of the fauna and avifauna as an area of approximately 600ha will be required for the facility (the development footprint will be confirmed in the EIA Phase following layout design).

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Disturbance to and loss of indigenous natural vegetation	Construction of infrastructure will lead to direct loss of vegetation, causing a localised or more extensive reduction in the overall extent of vegetation. Consequences of the clearing and loss of indigenous natural vegetation occurring may include: » Increased vulnerability of remaining vegetation to future disturbance, including extreme climatic events » General loss of habitat for sensitive fauna and flora species » Loss of migratory function of landscapes » Loss in variation within sensitive habitats » General reduction in biodiversity » Increased fragmentation (depending on location of impact) and associated reduced viability of species populations » Alteration of the habitat suitable for plant populations by altering surface structure. This will change species composition and associated species interactions » Disturbance to processes maintaining biodiversity and ecosystem goods and services » Loss of ecosystem goods and services	Local to regional	The larger ephemeral drainage lines and valley floors, which are limited in number and extent. Larger Boesmanland Vloere systems. This excludes sections where there are already existing access roads which can be used for access to the project site.
Disturbance or loss of threatened/ protected plants	Red-data plant species could potentially occur on the site, so far only the presence of *Hoodia gordonii* could be confirmed. Flora is affected by overall loss or alteration of habitat and due to its limited ability to extend or change its distribution range. In the case of threatened plant species, a loss of a population or individuals could lead to a direct change in the conservation status of the species. This may arise if the proposed infrastructure is located where it will impact on such individuals or populations. Consequences of this may include: » Fragmentation and decline of populations of affected species	Local	Occasional Red-data species occur within the proposed development area and these locations should be avoided where known; the overall number affected is expected to be relatively low.

	» Alteration of the habitat suitable for plant associations by altering surface structure. Reduction in area of occupancy of affected species » Loss of genetic variation within affected species These may all lead to a negative change in conservation status of the affected species, which implies a reduction in the chance of survival of the species.		
Loss of landscape functionality	The ephemeral drainage lines found within Valley Floors and the Boesmanland Vloere play an important part in accumulation and long-term conservation of below-ground water resources. In addition, the landscape is assumed to be part of a migration route used by fauna (and flora) between larger wetlands systems in the region. Excessive transformation of these ecosystem components will lead to: » Reduced accumulation and filtering of runoff » Potential increased loss of precipitation gains to excessive evaporation » Loss of the slowing of large volumes of runoff that may occur during occasional thunderstorms, and hence less infiltration of this runoff into soils and ultimately ground water » Loss of seasonal grazing and browsing, increased grazing pressure on surrounding vegetation » Loss of below-ground storage and channeling of water.	Local and regional	CBA1 areas CBA2 areas Where smaller valley floor and upper ephemeral washes need to be lost to the development footprint, runoff from the transformed area must be channelled in the same direction and same drainage lines as the pre-construction landscapes.
Impact on CBA areas	Impacts on the CBA areas located within the development area. Impacts on such areas may lead to a loss of CBA areas and dysconnectivity in the landscape. There are no potential impacts associated with the proposed development that are of a high sensitivity and which cannot be mitigated to the acceptable level.	Local	No-go areas identified and primarily avoided by the development envelope.
Loss of habitat for fauna species of conservation concern. Displacement and exclusion of species brought about by habitat destruction	Fauna species of conservation concern are indirectly affected primarily by loss of or alteration of habitat and associated resources. Animals are mobile and, in most cases, can move away from a potential threat, unless they are bound to a specific habitat that is also spatially limited and will be negatively impacted by a development. Nevertheless, the proposed development will reduce the extent of habitat available to fauna.	Local	No No-Go areas identified.
Disturbance to migration routes and	Site preparation and construction activities will interfere with current migration routes of fauna (and flora) species. This may lead to:	Local and surroundings	The larger ephemeral drainage lines and valley floors, which are limited in number

associated impacts to species populations	» Reduced ability of species to move between breeding and foraging grounds, reducing breeding success rates » Increased mortality rates due to fatal collisions with infrastructure » Reduced genetic variation due to reduced interaction amongst individuals or populations due to fragmentation effects caused by the proposed developments.		and extent or confirmed as an ESA. Larger Boesmanland Vloere systems. This excludes sections where there are already existing access roads which can be used for access to the project site.
Description of expected significance of impact Impacts on ecology and species of conservation concern are likely to be of moderate significance, depending on the exact location of the development footprint. The project site provides sufficient area for the development of the project within areas which are not considered to be of significant ecological sensitivity. Where the facility layout is able to avoid areas of sensitivity, the impact of the development on CBAs and broad-scale processes is likely to be relatively low and of low overall significance.			
Gaps in knowledge & recommendations for further study » Multiple field surveys have previously been undertaken. The distribution of species of conservation concern is known and areas of sensitivity defined. The determination of the facility layout by the developer must take the sensitive features into account. » Some important habitat features such as valley floors may become isolated by the development and the potential impact on the loss of connectivity between these features and the landscape will need to be considered against the final layout of the development. Th EIA will assess the layout of the facility to ensure that important movement corridors are not disrupted by the development. » The affected habitats to be considered in local context and the potential for cumulative impact on these areas, once the final layout is available. » Statement of any mitigation strategy to be implemented considering the nature of the area impacted by the development footprint and the extent of this habitat in the larger area. » Assessment of the density and distribution of sensitive habitats of conservation concern within the development footprint to better inform the EIA Phase and the final sensitivity map.			

Impacts on avifauna

Bird monitoring has previously been undertaken by a qualified Bird Specialist in both the wet and the dry season. The avifaunal survey undertaken recorded a low species richness of sixty four avifaunal species recorded within the broader study area, five of which are threatened (red listed species) and forty of which are endemic. Species identified to be of most concern due to their interactions with the broader areas are the large nomadic Ludwig's Bustard (*Neotis ludwigii)* and Kori Bustard (*Ardeotis kori)*, the Martial Eagle (*Polemaetus bellicosus),* the Sclaters Lark (*Spizocorys sclateri*) and Lanner Falcons (*Falco biarmicu)*.

Bird habitats in the study area were grouped into three broad categories:

» open grassy/rocky areas (Bushmanland basin shrubland) that supports grassland dominated by larks and korhaans; and also larger dark rocky outcrops that support

raptors and wheatears on the kopjes;
» the low shrubland bush (*Rhigozum spp*) which covers much of the lower lying areas, and is especially dense in the dry ephemeral river lines;
» the pans (Bushmanland Vloere) which are found dotted across the landscape either as small pans or very large accumulation areas for ephemeral water. When dry, these areas may hold flocks of seed-eating birds and, when inundated, may hold wetland species that are not resident, but attracted from afar with the rains;
» Two more, entirely *artificial*, habitats are provided by (i) the existing power lines and accompanying towers, and (ii) the water points that are scattered across the landscape for livestock. The power line towers are used mainly by large raptorial birds from which to hunt and occasionally nest on (eagles, chanting goshawks, and kestrels and falcons), while large numbers of smaller birds are attracted to farm dams.

Each of the main habitat types was surveyed independently in previous surveys for bird species richness and bird abundance in the dry and wet seasons.

The potential impacts to avifauna from construction and/or operation activities include:

» The displacement of nationally important species from their habitats,
» Loss of habitats for such species,
» Disturbance during construction, and operation, including the potential for collision with infrastructure.

Sensitivity Analysis of the Site

The finding of the previous site surveys was relatively low numbers of smaller birds (and low species richness) in the open grassy plains, but higher numbers of birds and species richness in the dry river line shrubs. High numbers of small birds were found visiting the water holes (148-250 birds/10-h day) and in the dry pans (Vloere) where flocks of canaries and buntings were common. It is therefore identified that habitats more suitable to the PV facility development would be the open grassy areas, while the habitats to be avoided would include the dry river lines, water reservoirs and pans, wherever feasible.

In addition, a 3km buffer was identified in 2015 for a previously active Martial Eagle nest (located 5km south west on the Eskom Aries-Helios power line). The active use of the nest will need to be confirmed. The 3km buffer is considered to be a cautionary buffer for the development of the PV facility.

While the development would result in some habitat loss for avifauna of local significance, it will not necessarily impact negatively on red-listed avifaunal species, which appear to occur sparsely within the broader study area or may be restricted to the highly sensitive habitats.

» *Habitat loss and disturbance on small passerines:*
For the smaller passerine species, the most important impacts will include displacement from the area encompassed by the development footprint as a result of habitat destruction. The loss of habitat will be permanent while disturbance may be continuous during the operational phase of the solar facility. Other impacts such as disturbances caused by reflective panels are not likely to have any appreciable impact on these small species. The impacts in general can be expected to be minimal as the populations of these smaller species are far less susceptible to the associated impacts than larger species.

» *Habitat loss, disturbance and collision risk of medium terrestrial birds and raptors:*
Small to medium-sized non-passerines that may be impacted to some extent due to habitat loss and displacement include resident raptors. These species may also be susceptible to collisions with associated infrastructure such as the PV panels and site fencing, but this is not expected to have a major impact on most of these species.

» *Habitat loss and disturbance of large terrestrial birds and raptors:*
The group of primary concern is the medium to large non-passerines, which include the large terrestrial birds and diurnal raptors. Many of these are also red-listed, such as Martial eagle, and Kori Bustard. Besides the loss of potential habitat that these species will experience, disturbances during construction and maintenance of the facility is also expected to have a negative impact.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Loss of intact habitat due to transformation for the facility and associated infrastructure.	Vegetation clearing will potentially lead to the loss of avifaunal species, habitats and ecosystems as birds are displaced from their habitat.	Local	The larger drainage lines, which are limited in number and extent and the larger Boesmanland Vloere systems to be a no-go area. The active use of the Martial Eagle nesting site needs to be confirmed.
Mortality of avifauna from collisions with plant infrastructure and/or disturbance of avifauna due to general operation activities.	Mortality among the local avifauna may result due to direct collisions with solar panels, making use the facility infrastructure for nesting sites, or entrapment along the fenced boundaries of the facility.	Local	The larger drainage lines, which are limited in number and extent and the larger Boesmanland Vloere systems to be a no-go area. The active use of the Martial Eagle nesting site needs to be confirmed.

Description of expected significance of impact

Since habitat loss is an unavoidable outcome of the development, this impact cannot be fully mitigated and the impacts on the local avifauna after mitigation are likely to be low negative for Kotulo Tsatsi Energy PV3, but cumulative significance could be higher. Impacts restricted to the construction period, such as noise, are likely to be of low significance. With mitigation, the impact of the facility during operation on avifauna due to nesting, collision and other interaction is expected to be of low significance.

Gaps in knowledge & recommendations for further study

» The density and distribution of protected species of conservation concern across the project site will need to be characterised and quantified within the proposed development footprint to better inform the EIA Phase and the final sensitivity map.
» The presence of larger raptors and other similar species of conservation concern at the project site to be confirmed. This information should be used to inform the sensitivity mapping at the site as well as the final layout of the development footprint of the facility.

» The design and position of the development footprint and facility should consider potential impacts on avifauna.

Impacts on Soils, Geology, Agricultural Potential and Land-Use

The site is underlain by mudstone, sandstone and shale of the Prince Albert Formation and post Karoo dolerite intrusives. These occur over much of the site and are overlain by recent Kalahari deposits comprising wind-blown sand and dunes, and red brown sand. This area is known for having thick aeolian (wind-blown) deposits. Aeolian deposits are renowned for having a collapsible grain structure and being highly compressible, with a great reduction in shear strength when saturated.

The overall agricultural potential of the site is very low, largely restricted by the arid climate conditions and shallow soils. The area has a land capability classification, on the 8 category scale, of predominantly Class 7 - non-arable, low potential grazing land, with small sections of class 8 – non utilisable wilderness land. The current land-use is restricted to low intensity grazing. The natural grazing capacity of the larger farm is between 41 and 60 ha per stock unit. The limitations to agriculture are aridity and lack of access to water plus the shallow soil depth and rockiness. Agricultural potential is fairly uniform across the farm and the choice of placement of the facility on the farm therefore has minimal influence on the significance of agricultural impacts. No agriculturally sensitive areas occur within the proposed development footprint.

The following have been identified as potential impacts on agricultural resources and productivity, the significance of which will be determined during the EIA Phase. All these impacts are local in extent, confined to the site.

- » Loss of agricultural land use due to direct occupation by the infrastructural footprint of the development for the duration of the project.
- » Soil erosion due to alteration of the land surface run-off characteristics. Alteration of run-off characteristics may be caused by construction related land surface disturbance, vegetation removal, and the establishment of hard standing surfaces and roads. Erosion will cause loss and deterioration of soil resources.
- » Loss of topsoil due to poor topsoil management .
- » Soil degradation due to contamination: Spillages of oil, diesel, petrol or other contaminants may contaminate the soil.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Loss of agricultural land use	Direct occupation by PV panels and other infrastructure, including roads, for the duration of the project.	Local	None identified at this stage
Soil erosion	Alteration of run-off characteristics may be caused by construction related land surface disturbance, vegetation removal, the establishment of hard standing areas and roads, and the presence of panel surfaces. Erosion will cause loss and deterioration of soil resources and may occur during all phases of the project.	Local	None identified at this stage
Loss of topsoil	Due to poor topsoil management (burial, erosion, etc) during	Local	None identified at this stage

	construction related soil profile disturbance (levelling, excavations, road surfacing etc.) and resultant decrease in that soil's agricultural suitability.		
Cumulative impacts due to the regional loss of agricultural resources and production	As a result of other developments on agricultural land in the region.	Regional	None identified at this stage

Description of expected significance of impact

The significance of agricultural impacts is influenced by the extremely limited agricultural capability of the site, with no cultivation practises, and that the footprint of disturbance will only impact on a portion of the total land surface. The agricultural potential of the broader area will not be affected by the proposed project. The site has low land capability and a low carrying capacity, and although the proposed development footprint will cover a surface area of 600ha (to be confirmed in the EIA Phase), it is not anticipated that the inherent agricultural potential of the site will be changed permanently by the project. The proposed project may have a moderate to major positive impact on the current land use.

Gaps in knowledge & recommendations for further study

The appropriate placement of the PV facility and other infrastructure to be assessed considering the slopes and erodibility of the soils present on the site. The following will be assessed in the EIA phase:

» Soil conditions
» Erosion potential and mitigation
» Activities and materials that may result in soil pollution
» Current land use viability

Impacts on Heritage (Archaeology and Palaeontology)

The development area is characterised primarily by areas barren of vegetation situated on sedimentary surfaces consisting of mud rock and possibly shale. From previous surveys of the site, it is noted that in the development area, no locally available raw material exists which was suitable for knapping, and no Stone Age sites were therefore recorded. Stone Age Material was restricted to isolated widely dispersed low density scatters outside of the development footprint area. No heritage sites or graves have been found to be located within the proposed development footprint.

Similarly, no areas or sites of exceptional fossil heritage sensitivity or significance have been identified within the Project study area and larger study area. A previous field study showed that the Karoo Supergroup sediments, Karoo dolerites and any older basement rocks within the broader study area, including the development area, are almost entirely mantled with a range of Late Caenozoic superficial deposits, mostly of Late Tertiary to Quaternary age. They include alluvium, pan sediments, calcrete hard pans as well as surface and subsurface gravels and may reach thicknesses of several meters or more. Desktop analysis of the fossil records of the various sedimentary rock

units underlying the broader study area, combined with field assessment of numerous representative rock exposures within and close to this area, indicate that all of the geological units are of low to very low palaeontological sensitivity.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Direct impact to archaeological sites, historical sites and burial sites	The construction phase could directly impact on surface and subsurface archaeological sites.	Local	None identified at this stage
Damage or destruction of unmarked graves	Damage or destruction of unmarked graves during the construction of project infrastructure.	Local	None identified at this stage
Damage or destruction of fossil materials	Damage or destruction of fossil materials during the construction of project infrastructure to a maximum depth of those excavations.	Local	None identified at this stage

Description of expected significance of impact

No highly significant impacts to archaeological or palaeontological materials/resources are expected as a result of the development. It is however possible that artefacts will be revealed during construction activities. Due to the generally low cultural significance of the archaeological materials, the intensity of impacts is not expected to be high and the resulting significance would likely be low. The significance of this impact will be confirmed during the EIA Phase.

Gaps in knowledge & recommendations for further study

» In line with the National Heritage Resources Act (Act 25 of 1999) a Phase 1 Archaeological Impact Assessment report will be prepared considering existing survey reports submitted to SAHRA. Additional field work may not be required, as a full survey has previously been undertaken for the development area by both a heritage consultant and a palaeontologist.

» The subsurface archaeological and palaeontological record can never be fully understood without excavation, and the EIA Phase report will make recommendations on how to proceed should fossils or heritage finds be discovered during construction activities.

Visual Impacts

Existing Settlements and Infrastructure

There are no built-up areas, towns or mining land uses within the study area. Infrastructure includes the Aries-Helios 400kV overhead servitude line and the Sishen - Saldanha railway line. Settlements, where they occur, are rural homesteads and farmsteads. These include Gannakom and Valsvlei (unoccupied) in the vicinity of the development site. A main road (the R27) services the broader area. Other roads are secondary roads linking with one another and with the R27, giving access to the farmsteads and settlements.

Visibility of the Facility

The visibility of the proposed PV facility is expected to low. Visibility of the PV structures would effectively dissipate outside of the foreground / mid ground areas, coupled with a low frequency of viewers.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Visibility of the PV facility to observers residing in rural homesteads and farmsteads within the study area.	Potential visual impact of the operational period on visual receptors.	Local	None identified at this stage
Industrialisation of the landscape.	The proposed development is likely to have limited impact due general limited visibility.	The immediately surrounding area.	No no-go areas have been identified from a visual perspective.
Visual impact of operational, safety and security lighting of the facility and ancillary infrastructure at night on sensitive visual receptors residing in close proximity.	Visual receptors within (but not restricted to) a 0-2 km buffer zone from the facility may be impacted by the lighting by the facility at night.	The immediately surrounding area.	No no-go areas have been identified from a visual perspective.
Description of expected significance of impact Due to the nature and location of the facility, there is likely to be minimal additional industrial influence on surrounding landscape character as experienced by the majority of receptors. The impact significance is therefore anticipated to be low.			
Gaps in knowledge & recommendations for further study » Confirmation of sensitivity of the landscape and receptors from a site visit and consultation during the EIA process. » A development layout and details of structure height is needed to assess the impacts as well as the identification of possible mitigation measures in any detail. » Additional spatial analyses to be undertaken in order to create a visual impact index that will further aid in determining potential visual impact. » Specific spatial criteria need to be applied to the visual exposure of the proposed facility in order to successfully determine visual impact and ultimately the significance of the visual impact.			

Social Impacts

The proposed development supports the social and economic development through enabling skills development and training in order to empower individuals and promote employment creation within the area. The development would mainly focus on economic benefits to the area and other dimensions of impacts such as influx of jobseekers into the local area will need to be weighed.

The findings of a previous study which considered the development of renewable energy projects in this area indicated that the development of such projects would make a notable positive economic impact on the local economies of the Hantam LM due to the increase in construction activities in the area and the demand created for various services. It is anticipated that the local unemployment rates would notably decline during the construction period. The Project could create much needed employment

opportunities in the area and will contribute to the overall objective of national government of diversifying energy sources in the country and improving energy security. The positive socio-economic impacts that are associated with the Project include skills development in the respective industries, increase in government revenue, improved livings standards of households who will benefit from created employment, as well as long-term injections into the local economies through SED and ED commitments during operations.

The site is located away from a town, and workers would be required to be housed locally.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Creation of direct and indirect employment, skills development opportunities and skills development as a result of the operation of the project.	Positive – The creation of employment opportunities and skills development will assist to an extent in alleviating unemployment levels within the area.	The impact will occur at local, regional, and national levels.	No no-go areas have been identified to date.
Increased pressure on infrastructure and basic services, and social conflicts during construction as a result of in-migration of people.	Negative – The in-migration of job seekers to the area could result in increased pressure being placed on infrastructure and basic services, and a rise in social conflicts.	The impact will occur at a local level.	No no-go areas have been identified to date.
Temporary increase in safety and security concerns associated with the influx of people during the construction phase.	Negative – The in-migration of job seekers to the area could be perceived to result in increased criminal activity.	The impact will occur at a local level.	No no-go areas have been identified to date. No workers should be allowed to reside on-site during construction.
Benefits to the local area from Socio-Economic Development (SED) / Enterprise Development (ED) programmes and community trust from REIPPP Programme social responsibilities.	Positive – The creation of employment opportunities, skills development, and the proposed project's contributions to local economic development will assist to an extent in both alleviating unemployment levels within the area, and improving the quality of life.	The impact will occur at local, regional, and national levels.	No no-go areas have been identified to date.
Sense of place impacts from a social perspective associated with the facility and associated infrastructure.	Negative – The project could alter the areas sense of place which could negatively impact on sensitive receptors.	The impact will occur at a local level.	No no-go areas have been identified to date.
Nuisance impacts in terms of temporary increase in noise and dust, traffic related impacts and wear and tear on access roads to the site.	Negative – The impact will negatively impact sensitive receptors, and could cause disruptions for neighbouring properties and road users.	The impact will occur at a local level.	No no-go areas have been identified to date.
Description of expected significance of impact			

At its peak, the construction is likely to result in the creation of approximately 500 employment opportunities. Of those employment opportunities likely to be generated during construction, approximately 60% will comprise opportunities for low skilled workers, 25% for semi-skilled workers, and 15% for skilled workers. Skills developed through experience in the construction of the facility will be retained by the community members involved. The impact is likely to be positive, local to national in extent, short-term, and of medium significance.

During operation, a maximum of approximately 50 employment opportunities will be created. Of those employment opportunities created approximately 70% will comprise opportunities for semi-skilled workers, and approximately 30% will comprise opportunities for skilled workers. Employment opportunities include safety and security staff, operation and monitoring; and maintenance crew. Maintenance activities will be carried out throughout the lifespan of the project, and include washing of solar panels, vegetation control, and general maintenance around the facility. The impact is likely to be positive, local-to-national in extent, long-term, and of medium significance.

The in-migration of people to the area as either non-local workforce and / or jobseekers could result in increased pressure being placed on infrastructure and basic services on the local population (rise in social conflicts). An influx of people into the area, could lead to a temporary increase in crime levels, cause social disruption, and put pressure on basic services. An influx of people looking for economic opportunities could result in pressure on the local population such as the rise in social conflicts and change in social dynamics, increase in HIV, pregnancies and drug abuse. Adverse impacts could occur if a large in-migrant workforce, which is culturally different from the local population, is brought in during construction. The impact is likely to be negative, local in extent, short-term, and of medium significance due to the number of jobs expected to be created, and the proportion of which would accrue to the non-local workforce.

The perception exists that an influx of jobseekers, and / or construction workers to an area is a contributor to increased criminal activities in an area, such as increased safety and security risk for neighbouring properties and damage to property, increased risk of veld fire, stock theft, and crime etc. The impact is likely to be negative, local in extent, short-term, and of medium significance due to the number of jobs expected to accrue to the non-local workforce.

Under the REIPPP Programme, renewable energy projects are required to contribute to local economic development in the area. Awarded projects are required to spend a certain amount of their generated revenue (as defined in the agreement with DoE) on Socio-Economic Development (SED) and Enterprise Development (ED) and share ownership in the project company with local communities. The impact is likely to be positive, local-to-national in extent, long-term, and of high significance.

Where the visibility of the proposed project is likely to be limited, the facility is unlikely to have a major influence on the character of the landscape as experienced by the majority of observers. The impact is therefore likely to be negative, local in extent, short-term, and of low significance; given the remote location of the site.

Gaps in knowledge & recommendations for further study

- The PV facility will require further assessment during the EIA phase. This will involve obtaining an understanding of how the facility will directly affect the local communities by conducting interview and collecting information on the environmental and historical trends.
- Information on exact direct and indirect employment opportunities and skills development programmes likely to be created during operation are needed.
- Mitigation measures for the Environmental Management Programme are required at the EIA phase.

8.4 Evaluation of Potential Cumulative Impacts Associated with the project

Impacts of a cumulative nature place the direct and indirect impacts of the proposed project into a regional and national context, particularly in view of similar or resultant developments and activities in the region. Potential cumulative impacts associated with Kotulo Tsatsi Energy PV3 are described below, and will be assessed in detail as part of the subsequent EIA phase to be conducted for the project.

Impact

Cumulative impacts, in relation to an activity, refer to the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area. For cumulative effects analysis to help the decision-maker and inform interested parties, it must be limited to effects that can be evaluated meaningfully (DEAT, 2004). It is important to explore the potential for cumulative impacts as this will lead to a better understanding of these impacts and the potential for mitigation that may be required. The scale at which the cumulative impacts are assessed is important. For example, the significance of the cumulative impact on the regional or national economy will be influenced by solar PV facility developments throughout South Africa, while the significance of the cumulative impact on the visual amenity may only be influenced by solar PV facility developments that are in closer proximity to each other. For practical purposes a sub-regional scale of 30km is considered for the evaluation of cumulative impact of PV facilities.

The cumulative impacts associated with Kotulo Tsatsi Energy PV3 have been viewed from two perspectives within this Scoping Report:

- Cumulative impacts associated with the scale of the project (one 200MW PV Facility on the project site); and
- Cumulative impacts associated with other relevant planned, approved or existing solar developments within a 30km radius of the project site (multiple PV facilities in the proximity of the site).

The site for the proposed development (Portion 2 of Farm Styns Vley 280) is located adjacent to one authorised PV facility. The facility is also located within 50km from one existing and several other authorised solar PV facilities. These projects include the following:

Project Name	Distance from the proposed site	Project Status
Kotulo Tsatsi PV2, Northern Cape. Kotulo Tsatsi Energy (DEA reference number 14/12/16/3/3/2/696)	Located within the project site and development footprint	Environmental Authorisation issued
Aries Photovoltaic PV Solar Energy Facility One, Northern Cape, BioTherm (Pty) Ltd. (DEA 12/12/20/2098/2)	36 km north east	Round 1 preferred bidder. Project is commissioned.

PV power plant, Kenhardt, AES Solar Energy Ltd. Process: Scoping & EIA (DEA reference number: 12/12/20/2170)	37 km north east	Environmental Authorisation issued
Solar Cape photovoltaic energy facility generation facility, Kenhardt District, Solar Land CC. Process: Scoping & EIA (DEA reference number: 12/12/20/2113)	39 km north east	Environmental Authorisation issued
Green Continent Partners 75MW Solar Energy Electricity Generation Facility (Kenhardt District), Wine Estate Capital Management South Africa (Pty) Ltd. Process: Scoping & EIA. (DEA reference number: 14/12/16/3/3/2/344)	45 km north east	Environmental Authorisation issued
Green Continent Partners photovoltaic energy electricity generation facility, Kenhardt district, Green Continent Partners (Pty) Ltd. Process: Scoping & EIA. (DEA reference number: 12/12/20/220)	47km north east	Environmental Authorisation issued

These projects were identified using the Department of Environmental Affairs latest release of the South African Renewable Energy EIA Application Database (REEA_OR_2020_Q2, 31 August 2020)[24]. A map showing other relevant solar projects in the study area is shown in **Figure 8.2**.

In addition to the solar energy developments listed above, two additional 200MW PV solar energy facilities are proposed for development within the immediate area, namely:

Project Name	Affected property	Contracted Capacity
Kotulo Tsatsi Energy PV1	Portion 3 of Farm Styns Vley 280	200MW
Kotulo Tsatsi Energy PV4	Portion 2 of Farm Kopjes Vley 281, Portion 2 of Farm Styns Vley 280	200MW

The cumulative assessment will consider those facilities within 30km from Kotulo Tsatsi Energy PV3 only.

The cumulative impacts that have the potential to be compounded through the development of the solar PV facility and its associated infrastructure in proximity to other similar developments include impacts such as those listed below. The role of the cumulative assessment is to test if such impacts are relevant to Kotulo Tsatsi Energy PV3 within the development area being considered for the development:

[24] Source: The DEA's Environment Geographic Information Systems (EGIS) website (https://egis.environment.gov.za/).

- Unacceptable loss of threatened or protected vegetation types, habitat or species through clearing, resulting in an impact on the conservation status of such flora, fauna or ecological functioning;
- Unacceptable risk to freshwater features through disturbance associated with construction activities and increased runoff and erosion during the operation phase;
- Unacceptable risk to avifauna through habitat loss, displacement and collision with PV panels;
- Unacceptable loss of high agricultural potential areas presenting a risk to food security and increased soil erosion;
- Unacceptable loss of heritage resources (including palaeontological and archaeological resources);
- Complete or whole-scale change in the sense of place and character of an area and unacceptable visual intrusion; and
- Unacceptable impact to socio-economic factors and components.

Summary of the nature, significance, consequence, extent, duration and probability of the impacts

- The above mentioned impacts are considered to be probable, although it is anticipated that the extent, duration, and magnitude of these impacts can be minimised to levels where this impact can be regarded as having low significance through the implementation of appropriate mitigation measures.
- The operational lifespan of the project and other PV facilities within the surrounding areas is expected to be long-term (i.e. a minimum of 20 years) and subsequently the impact is also expected to be long-term.
- The impact associated with the proposed development is expected to be local, affecting mainly the immediate environment and surrounding areas, as well as other renewable energy facilities within the vicinity.

Gaps in knowledge & recommendations for further study:

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

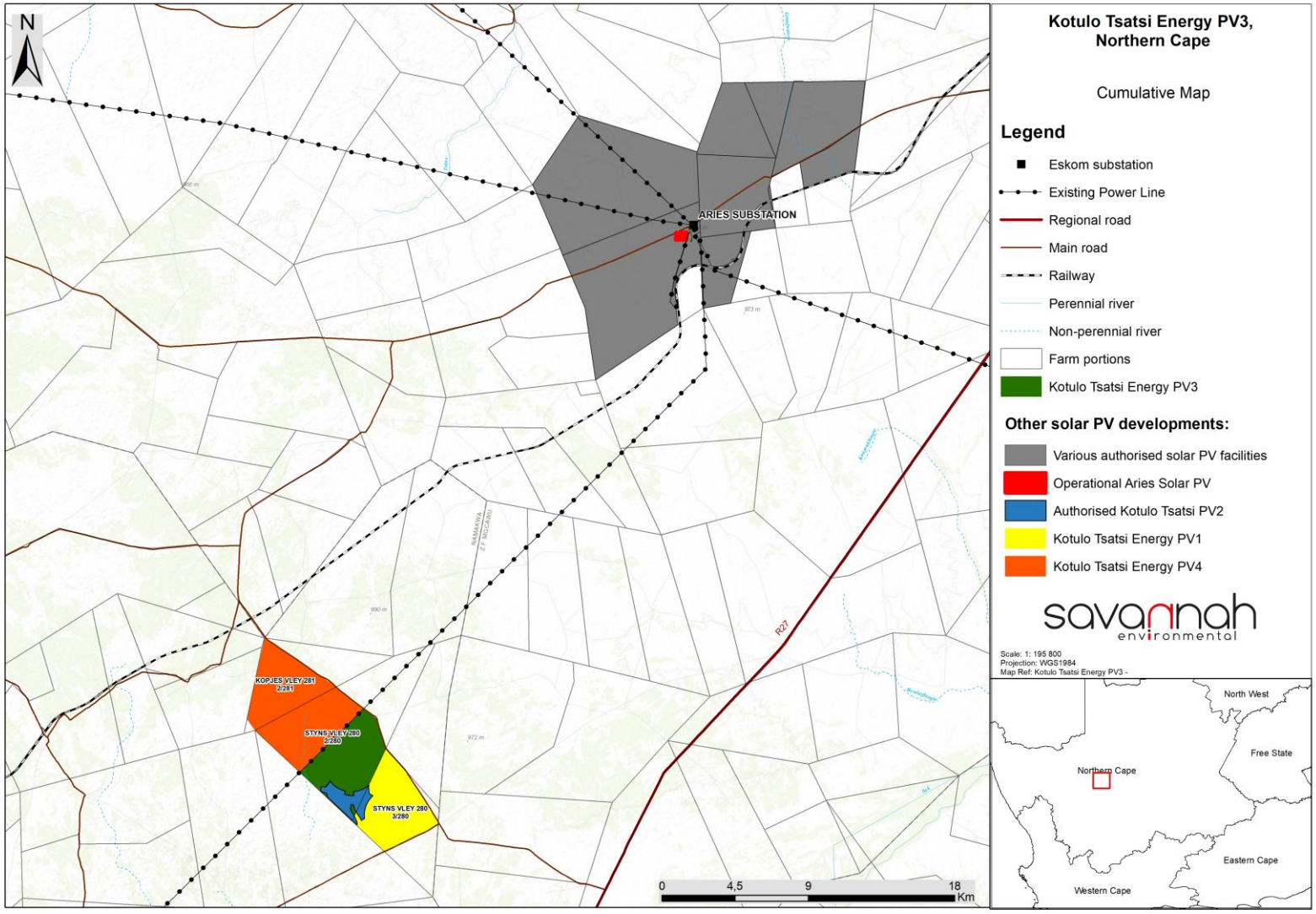

Figure 8.2: Cumulative map illustrating other approved and/or constructed PV facilities located within the vicinity of the Kotulo Tsatsi Energy PV3 project site (**Appendix D**).

8.4.1 Contribution of the Project to Climate Change Mitigation

South Africa is a country with an economy dependent on coal for the majority of its electricity, an energy-intensive industrial sector and an energy sector responsible for 82% of total GHG emissions, making it the 12th highest world emitter of GHG[1].

It has been reported internationally that the move towards renewable energy for electricity generation needs has resulted in decreased greenhouse gas emissions. The International Energy Agency announced in March 2015 that 2014 carbon dioxide emissions from the energy sector levelled off for the first time in 40 years. This has happened without being linked to an economic downturn. This was attributed to the increase in the use of renewable energy sources by China and OECD countries[2]. As GHG emissions associated with the provision of energy services are a major cause of climate change, this move to renewable energy and subsequent reduction in CO2 emissions is considered as a positive contribution towards climate change mitigation.

The South African Government recognises the need to diversify the mix of energy generation technologies within the country and to reduce the country's reliance on fossil fuels which contribute towards climate change and are therefore not environmentally friendly. This is in accordance with the prescriptions of the United Nations Convention on Climate Change 1994 (UNFCCC) and its associated Kyoto protocol of 1997.

Consequently, the South African Government has recognised the need to move towards cleaner energy and has therefore set targets for cleaner energy technologies (including of 6000MW solar PV contribution to new power generation capacity) by 2030 (IRP, 2019). Renewable energy plays a key role in mitigating global greenhouse gas emissions by radically lowering the emissions profile of the global energy system (International Renewable Energy Agency (IRENA), 2015). The proposed PV facility will assist in reducing the country's CO2 emissions associated with energy supply relative to fossil fuels (e.g. coal). Development of numerous such facilities will have a cumulative positive impact on CO2 emissions as this will reduce reliance on power generation from fossil fuels. This will aid the country in meeting the commitments made under the COP 21 Agreement, to which the Government is a signatory.

This is considered to be a significant positive impact for the environment and society at an international level.

[1] Greenhouse Gas Inventory for South Africa: 2000-2010
[2] http://ecowatch.com/2015/03/23/renewables-mitigate-climate-change/

CHAPTER 9 CONCLUSIONS

This Final Scoping Report is aimed at detailing the nature and extent of the proposed development, identifying and describing potential issues associated with developing the project on the identified project site, identifying potential environmental fatal flaws and/or areas of sensitivity, and defining the extent of studies required to be undertaken as part of the detailed EIA phase. This has been achieved through considering available information from previous studies undertaken within the project site and input from the project team with experience on similar projects. This Final Scoping Report has been compiled in terms of the 2014 EIA Regulations (GNR 326) published in terms of Section 24(5) of NEMA.

A summary of the conclusions of the evaluation of the potential impacts identified to be associated with the project is provided in **Section 9.2**. Recommendations regarding investigations required to be undertaken within the detailed EIA phase are provided within the Plan of Study for EIA (**Chapter 10**).

9.1 Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of an Impact Assessment Report

This chapter of the Final Scoping Report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(g)(xi) a concluding statement indicating the preferred alternatives, including the preferred location of the activity.	An overall conclusion and fatal flaw analysis regarding the Kotulo Tsatsi Energy PV3 facility is included within **Section 9.4**.

9.2 Conclusions drawn from the Evaluation of the PV Facility Development

Kotulo Tsatsi Energy PV3 is proposed on the farm Portion 2 of Farm Styns Vley 280[25], which is located approximately 70km south-west of the town of Kenhardt and 60km north east of Brandvlei. PV technology is proposed to be utilised for the generation of electricity, and the Kotulo Tsatsi Energy PV3 facility will have a contracted capacity of up to 200MW. Infrastructure associated with the solar PV facility will include:

- Solar PV array comprising PV modules and mounting structures.
- Inverters and transformers.
- Cabling between the project components.
- On-site facility substation to facilitate the connection between the solar PV facility and the Eskom electricity grid.
- Battery Energy Storage System (BESS).

[25] The development area was previously authorised for the development of Concentrated Solar Power (CSP) technology (DEFF Ref.: 14/12/16/3/3/2/694/2), known as Kotulo Tsatsi Concentrated Solar Plant 2. However, this project is no longer being considered for the site as the development of CSP no longer forms part of the energy mix of the Country as indicated in the IRP.

» Site offices and maintenance buildings, including workshop areas for maintenance and storage.
» Laydown areas and temporary man camp area.
» Access roads, internal distribution roads and fencing around the development area.

The Scoping study included the identification of potential impacts associated with the project through a desktop study (considering existing information and previous assessments undertaken for the development area) and consultation with affected parties and key stakeholders. A preliminary evaluation of the extent and significance of potential impacts associated with the development of Kotulo Tsatsi Energy PV3 have been detailed in Chapter 8. These will be assessed in detail through the EIA Phase assessment, which will include independent specialist assessments.

This scoping study has identified areas of higher sensitivity within the development area to assist in focussing the location of the development envelope for Kotulo Tsatsi Energy PV3 to minimise the potential for environmental impact. The proposed delineated development area is significantly larger than the area required to house the PV facility and associated infrastructure. The affected property (i.e. Portion 2 of Farm Styns Vley 280) is approximately 4935ha in extent, which is sufficient for the installation of a solar PV facility with a contracted capacity of up to 200MW_{AC}, while allowing for the avoidance of environmental site sensitivities. A development area[26] of ~1832ha was demarcated and considered in this Final Scoping report. A development envelope has been demarcated as a preferred area within the development area for the placement of the development footprint. The identified development envelope has an extent of ~951ha, which is equivalent to 46% of the extent of the development area. The facility can therefore be appropriately placed within the larger project site and avoid identified sensitivities. The site extent is sufficient for the proposed development, and other alternative locations for the development have not been considered in this report. The size of the development footprint within the development envelope will be confirmed in the EIA phase once the facility layout is available for assessment.

The majority of potential impacts identified to be associated with the construction of Kotulo Tsatsi Energy PV3 are anticipated to be localised and restricted to the development envelope itself, while operation phase impacts/benefits range from local to regional. No environmental fatal flaws were identified to be associated with the development area. Features within the larger area have, however, been identified as 'no-go' areas or areas of high ecological impact should be avoided by the development footprint. The development envelope has been identified to avoid these areas of sensitivity present within the development area and therefore avoidance of sensitive features is considered a necessity for the placement of infrastructure early in the EIA process.

[26] The development area is that identified area (located within the project site) where the Kotulo Tsatsi Energy PV3 facility is planned to be located. This area has been selected as a practicable option for the facility, considering technical preference and constraints. The development area is ~1797ha in extent.

The potentially significant issues related to the **construction** of the Kotulo Tsatsi Energy PV3 facility include:

- Biodiversity and habitat loss and impacts on flora, fauna and avifauna resulting from activities such as site clearance for installation of the facility components and associated infrastructure. The development of PV facility will result in a total loss of over 500 hectares.
- Soil erosion, loss or degradation due to site clearance and compaction for installation of the facility components and associated infrastructure and due to the construction on internal access roads.
- Impact on heritage and paleontological resources through construction activities.
- Visual impacts on the landscape.
- Social impacts, both positive and negative (job creation and business opportunities, impacts associated with construction workers in the area).

The potentially significant issues related to the **operation** of the Kotulo Tsatsi Energy PV3 facility include:

- Change in land use from agriculture to energy generation .
- Direct impacts on the on-site drainage during high rainfall events, i.e. indirect impacts on water resources, i.e. ephemeral drainage lines and valley floors.
- Visual impacts.
- Positive social and economic impacts through job creation and economic benefits.

9.3 Sensitivity Analysis for the Development Area

The potentially sensitive areas which have been identified through the environmental scoping study are listed below and illustrated in **Figure 9.1**. The scoping phase sensitivity map provides an informed estimate of the sensitivity on the larger site, and specifically the development area. The detail is based on the desktop review of available baseline information for the project site, as well as the sensitivity data from previous studies undertaken for the farm portion, which included field surveys. During the previous site surveys, the site was well covered and the affected area was investigated in detail in order to provide definitive insight into the potential for constraining factors on the site. The sensitivity map informed the location/layout of the development envelope for the facility, and must be used as a tool by the developer to avoid those areas flagged to be of potential high sensitivity. The development envelope is the area which will be assessed further in detail in the EIA Phase (**Figure 9.2**).

The majority of the site consists of arid mixed grassy shrubland on open plains considered to be of moderate to low sensitivity. Within this habitat type there are few listed or protected species present and the significance of impacts on vegetation within these areas are likely to be relatively low. There are, however, a variety of ecological sensitive features scattered within these areas including ephemeral drainage lines, Boesmanland Vloere Habitat, Broken Plains Habitat, pan features and the associated habitat, valley floor habitat and Calcrete Grass Plains Habitat.

- Not all of the valley floors identified at the site are considered highly significant as some have been degraded through disturbance or lack connectivity to the wider ecosystem. The valley floor located in the south western corner of the property should not be transformed. The smaller valley floor areas/features in the northern portion are demarcated as CBA1. These areas are indicated on the sensitivity map and excluded from the development envelope.

» Ephemeral drainage lines (significant drainage lines with clear riverbed) located to the western boundary of the development area and must be avoided. They are ecologically significant and provide ecological functions and services.

The majority of the development area is located within Other Natural Areas (ONA). Within the northern portion of the development area, two smaller valley floor areas/features are demarcated as Critical Biodiversity Area One (CBA1) (and also shown on the National Wetland Map 5). The CBA areas are not considered to be appropriate for development based on the high irreplaceability or low flexibility for meeting biodiversity pattern targets. These areas therefore need to be avoided by development and have been excluded from the development envelope. The north/south trending ephemeral drainage feature/valley floor habitat traversing the south-western corner of the site is demarcated as an Ecological Support Area and acts as a buffer to support functionality and connectivity of this system.

These areas have been excluded from the proposed development envelope, as demarcated in **Figure 9.1** and **Figure 9.2**.

A Martial Eagle nesting site was noted on a power line tower of the Aries-Helios 400kV power line located ~5km west of the site in 2015. A 3km precautionary buffer has been applied around this nest site where development activities should be limited.

The Soafskolk Road as well as two homesteads could be considered as potentially sensitive visual receptors. Mitigation is achieved through separation distance from the receptors (visual buffer), as well as the low nature of the PV array and the flatness of the landscape, which in combination limit visibility of the proposed project. In addition, other planned and approved development in the area could change the character of the existing landscape.

There are no sensitive agricultural areas or camps used for livestock farming. The development of the facility will not have a significant impact on the current land use, which is limited to grazing and the land itself has very severe limitations to agricultural potential.

No heritage or paleontological sensitivities are identified within the development area. Heritage features from previous surveys have been mapped. A range of heritage sites do occur in the larger region but are considered to be of limited heritage conservation value.

An area of focus which is environmentally preferred for the development of a PV project on Portion 2 of Farm Styns Vley 280 is outlined in Blue in **Figure 9.1** and **Figure 9.2**. The area represents the development envelope, that is, the portion of the farm and development area with the greatest potential for development of a PV facility after taking into consideration the sensitivity identified within the development area.

This 'funnel-down approach' in the consideration of the larger project site and development area focuses the detailed specialist studies to be undertaken in the EIA Phase on the portion of the site with reduced environmental sensitivities. In order to reduce the potential for on-site environmental the identified sensitive areas should be avoided as far as reasonably possible. While observing these constraints to the available area for development, the demarcated focus area for the development is illustrated in **Figure 9.1** as the "Development Envelope". The extent of this demarcated area far exceeds the required

development footprint for the 200MW PV facility and, therefore, it is possible to accommodate the PV development at the site with a low impact on sensitive features.

9.4 Overall Conclusion and Fatal Flaw Analysis

The findings of the desktop Scoping Study indicate that no environmental fatal flaws are associated with the Kotulo Tsatsi Energy PV3 project site (Portion 2 of Farm Styns Vley 280). While some impacts of potential significance do exist, it is anticipated that the implementation of appropriate mitigation measures would assist in reducing the significance of such impacts to acceptable levels. It is, however, recommended that the development area for the facility be considered outside of the identified areas of a high sensitivity as far as possible in order to ensure that the development does not have a detrimental impact on the environment. This forms part of the 'funnel-down approach' for the identification of an appropriate development footprint within the project site. Even with the appropriate avoidance of sensitive areas, there is an extensive area on the site which can accommodate the proposed facility with relatively low impacts on the environment. This area is referred to as the Development Envelope.

With an understanding of which areas within the project site are considered sensitive to the development of the proposed facility, the Applicant 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 for EIA contained in **Chapter 10** of this Final Scoping Report. These studies will consider the detailed layouts produced by the Applicant, and make recommendations for the implementation of avoidance strategies (if required), and mitigation and management measures to ensure that the final assessed layout retains an environmental impact within acceptable limits. The sensitivity map will be further refined in the EIA phase on the basis of these specialist studies, in order to provide an assessment of environmental acceptability of the final design of the facility.

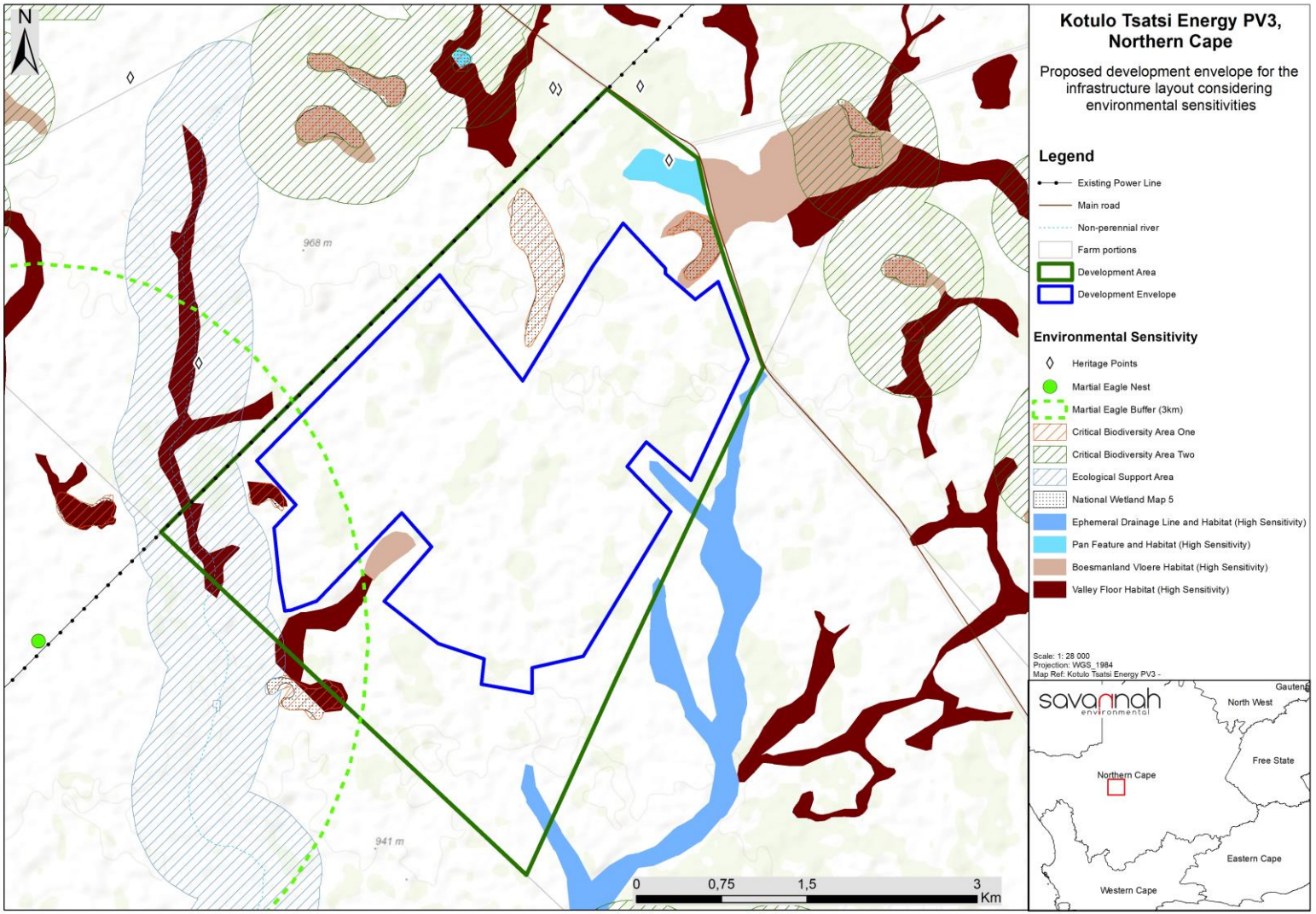

Figure 9.1: Environmental Sensitivity Map from the results of the scoping evaluation for the Kotulo Tsatsi Energy PV3, indicating the recommended development envelope (area excludes any areas of significant biodiversity and do not contain any areas considered to be no-go areas)

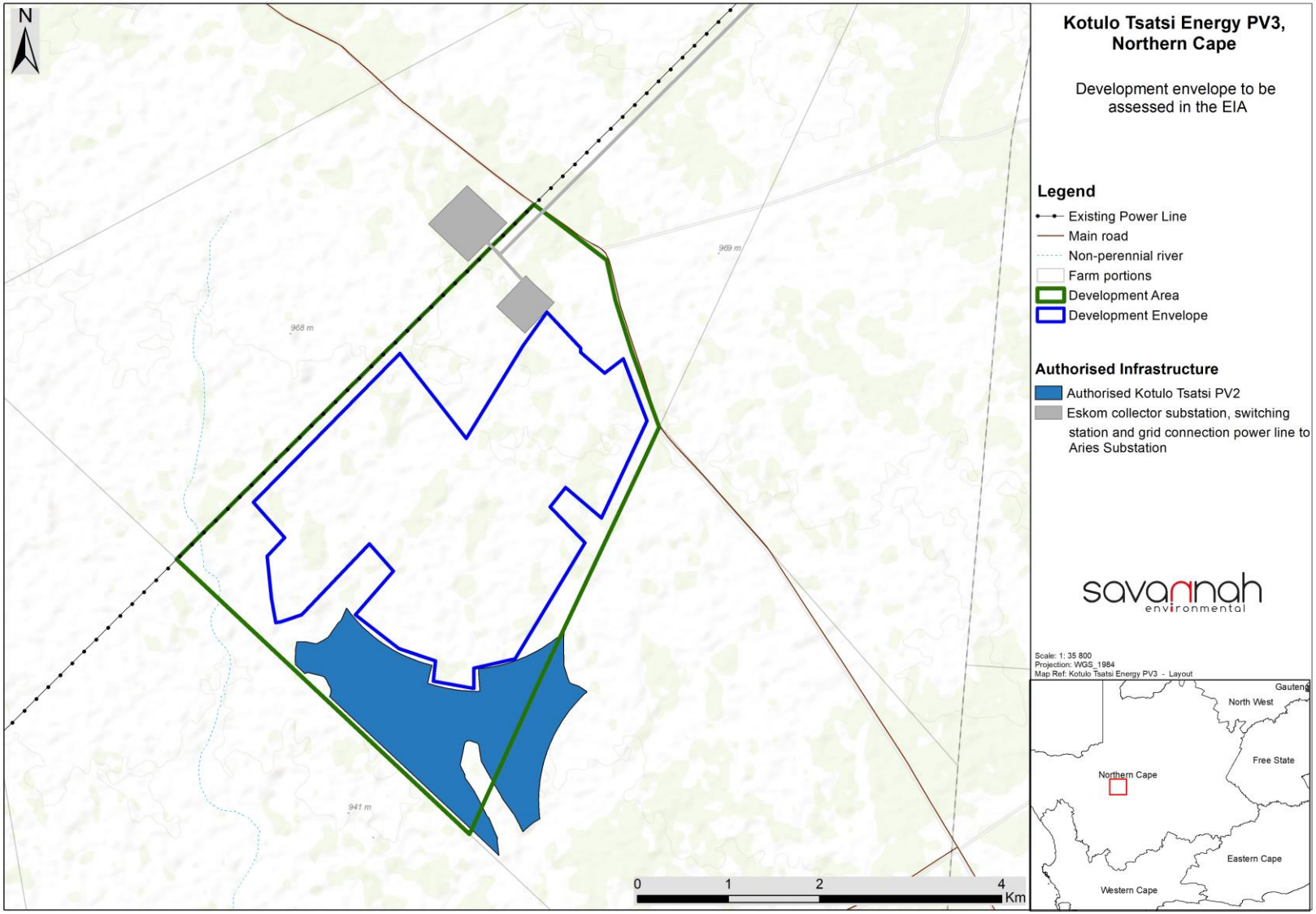

Figure 9.2: Development envelope to be assessed in detail as part of the EIA Phase and within which the project development footprint/layout will be designed

CHAPTER 10 PLAN OF STUDY FOR THE EIA

One of the key objectives of the Scoping phase is to determine the level of assessment to be undertaken within the EIA Phase of the process. This will include the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken. This is to determine the impacts and risks a particular activity will impose on a preferred site through the life of the activity (including the nature, significance, consequence, extent, duration and probability of the impacts) to inform the location of the development footprint within the preferred site.

This Chapter contains the Plan of Study for the EIA for Kotulo Tsatsi Energy PV3. The findings of the Scoping Phase include inputs from the project proponent and the EIA specialist team. The findings are used to inform the Plan of Study for EIA together with the requirements of the 2014 EIA Regulations (GNR 326) and applicable guidelines. The Plan of Study for EIA describes how the EIA Phase will proceed, and includes details of the independent specialist studies required to be undertaken to assess the significance of those impacts identified within the Scoping Study to be of potential significance.

10.1. Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of an Impact Assessment Report

This chapter of the Final Scoping Report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(h) a plan of study for undertaking the environmental impact assessment process to be undertaken, including - (i) a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity; (ii) a description of the aspects to be assessed as part of the environmental impact assessment process; (iii) aspects to be assessed by specialists; (iv) a description of the proposed method of assessing the environmental aspects, including aspects to be assessed by specialists; (v) a description of the proposed method of assessing duration and significance: (vi) an indication of the stages at which the competent authority will be consulted; (vii) particulars of the public participation process that will be conducted during the environmental impact assessment process; and (viii) a description of the tasks that will be undertaken as part of the environmental impact assessment process; (ix) identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.	A plan of study for the undertaking of the EIA Phase for Kotulo Tsatsi Energy PV3 is included within this chapter.

10.2. Objectives of the EIA Phase

The EIA will assess the potential direct, indirect and cumulative environmental impacts and benefits associated with each phase of the development including design, construction, operation, and decommissioning. The EIA will aim to provide the CA with sufficient information to make an informed decision regarding the proposed development. The site layout being proposed, will be assessed by a range of independent specialist studies. Furthermore, as required in terms of the 2014 EIA Regulations (GNR 326), the assessment will also include an assessment of the "do nothing" (i.e. no-go) alternative.

The EIA Phase will aim to achieve the following:

- Provide an overall assessment of the social and biophysical environment affected by the Kotulo Tsatsi Energy PV3 facility.
- Assess potentially significant impacts (direct, indirect and cumulative, where required) associated with Kotulo Tsatsi Energy PV3 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.

10.3. Authority Consultation

Consultation with the regulating authorities (i.e. DEFF and Northern Cape DAEARD&LR) have been and will continue to be undertaken throughout the EIA process. On-going consultation will include the following:

- Undertaking of a pre-application meeting with DEFF prior to the lodging of the Application for Environmental Authorisation.
- Submission of a Final Scoping Report following the 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 (and consideration of comments received).
- Consultation and a site visit with DEFF and Northern Cape DAEARD&LR (if required) in order to discuss the findings and conclusions of the EIA Report.

10.4. Consideration of Alternatives

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

- **Design and Layout Alternatives:** Kotulo Tsatsi Energy PV3 development footprint is to be located within the best possible position within a development area of ~1832ha. A development envelope has been demarcated as an area of ~951ha, which is equivalent to 46% of the extent of the development area. The facility can therefore be appropriately placed within the larger site and avoid identified sensitivities. The site extent is sufficient for the proposed development and other alternative locations for the development have not been considered in this report. The size of the development footprint within the development envelope will be confirmed in the EIA phase once the facility layout is available for assessment The environmental sensitivity identification process will inform the layout

design for the solar facility, avoiding sensitive areas as far as possible, thereby ensuring that the layout plan taken forward for consideration during the EIA Phase is the most optimal from an environmental perspective. An optimal location within the broader project site has been identified based on constraints identified through desk-top data and previous studies to date. An area for the development of the solar facility (a development envelope) has, therefore, been recommended based on this information. These constraints also include any areas considered to be no-go areas.

» **The 'Do-Nothing' Alternative:** The 'do-nothing' alternative is the option of not constructing Kotulo Tsatsi Energy PV3. Should this alternative be selected, there would be no environmental impacts as a result of construction and operation activities associated with a solar PV facility. This alternative will be assessed within the EIA Phase of the process.

10.5. Assessment of Potential Impacts and Recommendations regarding Mitigation Measures

In terms of GN R960 (promulgated on 5 July 2019) and Regulation 16(1)(b)(v) of the 2014 EIA Regulations (as amended), the submission of a Screening Report generated from the national web based environmental screening tool is compulsory for the submission of applications in terms of Regulations 19 and 21 of the EIA Regulations.

The requirement for the submission of a Screening Report (included as **Appendix F** of the Final Scoping Report) for Kotulo Tsatsi Energy PV3 is applicable as it triggers Regulation 21 of the EIA Regulations, 2014 (as amended). **Table 10.1** provides a summary of the specialist assessments identified in terms of the screening tool and responses to each assessment from the project team considering the development area under consideration.

Table 10.1: Sensitivity ratings from the DEFF's web-based online Screening Tool associated with the development of Kotulo Tsatsi Energy PV3

Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating the to need for the study)	Project Team Response
Landscape/Visual Impact Assessment	The Screening Report did not include a rating for this theme; however, the specialist assessment was identified based on the technology proposed.	A Visual Impact Assessment will be undertaken as part of the EIA Phase.
Archaeological and Cultural Heritage Impact Assessment	High	A Heritage Assessment Report will be undertaken as part of the EIA Phase to comply with the requirements of the Heritage Resources Act. This report will also consider archaeology and cultural heritage.
Palaeontology Impact Assessment	High	A Heritage Assessment Report will be undertaken as part of the EIA Phase to comply with the requirements of the Heritage Resources Act. This report will also consider palaeontology.
Terrestrial Biodiversity Impact Assessment	Very High	An Ecological Impact Assessment (including flora and fauna) will be undertaken as part of the EIA Phase.
Aquatic Biodiversity Impact Assessment	Very High	A Freshwater Resource Study & Assessment will be undertaken as part of the EIA Phase.
Hydrology	The Screening Report did not include a	A Freshwater Resource Study & Assessment will be

Assessment	rating for this theme.	undertaken as part of the EIA Phase. This assessment will consider the hydrology for the area under assessment.
Socio-Economic Assessment	The Screening Report did not include a rating for this theme; however, the specialist assessment was identified.	A Social Impact Assessment will be undertaken as part of the EIA Phase.
Plant Species Assessment	Medium	An Ecological Impact Assessment (including flora and fauna) will be undertaken as part of the EIA Phase and will consider flora present within the site.
Animal Species Assessment	Medium	An Ecological Impact Assessment (including flora and fauna) will be undertaken as part of the EIA Phase and will consider fauna present within the site.

A summary of those issues identified during Scoping which require further investigation during 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 10.2** As part of the EIA Phase, these specialist studies will consider the development footprint proposed for Kotulo Tsatsi Energy PV3 and associated infrastructure (excluding the grid connection, which has been authorised under a separate process), as well as feasible and reasonable alternatives identified for the project.

It must be noted that the independent specialist studies will consider and comply (where relevant and applicable) with the requirements of the minimum criteria for reporting on identified environmental theses, as gazetted on 20 March 2020 (GNR 320).

Table 10.1: Impacts requiring further investigation during the EIA Phase, and activities to be undertaken in order to assess the significance of these potential impacts relevant to Kotulo Tsatsi Energy PV3

Issue	Activities to be undertaken in order to assess significance of impacts
Ecology (Flora and Fauna)	***Sensitivity Analysis and EIA assessment*** The main aspects of an ecosystem that need to be incorporated in a sensitivity analysis include the following: » Describing the nature and amount of species present, taking into consideration their conservation value as well as the probability of such species to survive or re-establish itself following disturbances of various magnitudes » Identifying the species or habitat features that are 'key ecosystem providers' and characterising their functional relationships » Determining the aspects of community structure that influence function, especially aspects influencing stability or rapid decline of communities » Assessing key environmental factors that influence the provision of services » Sensitivity mapping » Sensitivity ratings assigned and reasoning will be clearly defined. ***Assessment of Impacts for the EIA*** The methodology described above 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 associated with an activity. 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. It will refer 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 (where appropriate) will be drafted for inclusion in the project EMPr.
Avifauna	***Sensitivity Analysis and EIA assessment*** The following activities are proposed during the EIA Phase: » Consider the findings of a summer-season as well as a winter-season (i.e. wet and dry seasons) avifaunal survey against the planned infrastructure within the development footprint. » Provide an assessment of cumulative impacts associated with the development of the project site. Including an assessment of the extent of habitat lost to solar energy development in the area to date, and the likely future potential loss from the current as well as other proposed developments in the area.

Issue	Activities to be undertaken in order to assess significance of impacts
	» Evaluate, based on the site attributes and final layout of the proposed development, what the most applicable mitigation measures to reduce the impact of the proposed development on the project site would be, and if there are any areas where specific pre-cautions or mitigation measures should be implemented. Particular attention will be paid to potential impacts on important landscape features in the vicinity of the site or where sensitive avifaunal species may nest or roost. » Identifying the species or habitat features that are 'key ecosystem providers' and complete sensitivity mapping » Sensitivity ratings assigned and reasoning will be clearly defined. ***Assessment of Impacts for the EIA*** This methodology described above 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 criteria including extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described. It will refer 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 (where appropriate) will be drafted for inclusion in the project EMPr.
Freshwater resources	***Sensitivity Analysis and EIA assessment*** Specific outcomes in terms of the EIA Phase are presented below: » The watercourses will be mapped according to the ecological sensitivity of the watercourses in relation to the project site. In addition to the watercourse boundaries, the appropriate provincial recommended buffers and legislated regulated areas will be depicted where applicable. » Evaluation of environmental issues and potential impacts (direct, indirect and cumulative impacts and residual risks) identified. » Development of recommendations for mitigating potential impacts on the receiving environment. ***Assessment of Impacts for the EIA*** This methodology described above 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. It will refer 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.

Issue	Activities to be undertaken in order to assess significance of impacts
	Environmental Management Programme For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.
Soils, Land Use, Land Capability and Agricultural Potential	***Sensitivity Analysis and EIA assessment*** Due to the low agricultural potential and land capability present within the site a Soils Compliance Statement will be provided which confirms the current conditions of the site, identifies and assesses the associated impacts and provides mitigation measures for the management of the identified impacts. ***Assessment of Impacts for the EIA*** The methodology described above 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. It will refer 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 (where appropriate) will be drafted for inclusion in the project EMPr.
Visual impact	***Sensitivity Analysis and EIA assessment*** The Visual Impact Assessment study to be undertaken in the EIA phase will include a level 3 assessment which includes: » Determine Visual Distance/Observer Proximity to the facility - The proximity radii (calculated from the boundary lines of the facility). » Determine Viewer Incidence/Viewer Perception - Identify areas of high viewer incidence and to classify certain areas according to the observer's visual sensitivity towards the proposed facility and its related infrastructure. » Determine the Visual Absorption Capacity (VAC) of the landscape - The VAC is primarily a function of the vegetation, and will be low if the vegetation is, low growing sparse and patchy vegetation. » Determine the Visual Impact Index - The site-specific issues and potential sensitive visual receptors will be measured against this visual impact index and be addressed individually in terms of nature, extent, duration, probability, severity and significance of visual impact. » Identification and assessment of all potential impacts (direct, indirect and cumulative) identified in this scoping phase report and;

Issue	Activities to be undertaken in order to assess significance of impacts
	» Recommendations will be made for the management of identified impacts. ***Assessment of Impacts for the EIA*** This methodology described above 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. It will refer 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 (where appropriate) will be drafted for inclusion in the project EMPr.
Heritage (Archaeology and Palaeontology)	***Sensitivity Analysis and EIA assessment*** SAHRA requires that an assessment be provided for the Kotulo Tsatsi Energy PV3 facility. The report will comply with the requirements of he National Heritage Resources Act and will consider Heritage Impact Assessments previously undertaken within the project site and surrounding area. This is considered to be sufficient as the environment or heritage of the area has not changed. ***Assessment of Impacts for the EIA*** The methodology described above 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. It will refer 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 (where appropriate) will be drafted for inclusion in the project EMPr, as well as a chance finds procedure.
Social	***Sensitivity Analysis and EIA assessment*** The specialist study to be undertaken in the EIA phase will include:

Issue	Activities to be undertaken in order to assess significance of impacts
	» 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 » Interview directly affected and adjacent landowners, and key stakeholders to obtain primary information related to the project site, social environment, and to gain their inputs on the proposed project and its perceived social impact (positive and /or negative). » Assess impacts identified for the project in terms of their nature, extent, duration, magnitude, probability, status, and significance; as well as the degree to which the impact can be reversed, may cause irreplaceable loss of resources, and can be mitigated. » Identify mitigation measures with which to reduce negative impacts and enhance positive impacts for inclusion in the Environmental Management Programme (EMPr). As far as possible, the mitigation hierarchy of "avoid, minimise, and reduce" will be followed in the mitigation of potential negative impacts. » Identify any conditions for inclusion in the Environmental Authorisation (EA). » Provide a reasoned opinion regarding the acceptability of the project. » Developing an Environmental Management Programme ***Assessment of Impacts for the EIA*** This methodology described above 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. It will refer 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 (where appropriate) will be drafted for inclusion in the project EMPr.

10.6. Assessment of Potential Impacts Associated with the Project

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.
  - 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.
  - 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).
  - 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).
  - 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).

The project applicant has the responsibility to avoid and / or minimise impacts as well as plan for their management (in terms of the 2014 EIA Regulations (GNR 326)), 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 impact assessment studies and other available information will be integrated by the Savannah Environmental project team. The EIA Report will be compiled in terms of the requirements of the 2014 EIA Regulations (GNR 326) 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.
- A concluding statement indicating the preferred alternative development location.
- 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.
» A 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 or **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.

The EIA Report will be released to the public and relevant stakeholders, Organs of State and Authorities for a 30-day review period. 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 DEFF for decision-making.

10.7. Public Participation Process

A public participation process will be undertaken by Savannah Environmental during the EIA phase. The Public Participation will be undertaken in line with the approved Public Participation Plan as per the correspondence from DEFF (**Appendix B** and **Appendix C9**). 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 proposed 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 meetings (pre-arranged and I&APs invited to attend) via the use of virtual platforms (Zoom or MS Teams).
- One-on-one consultation meetings (for example with directly affected and surrounding landowners) via telephone or virtual platforms.
- 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 EIA Report will be made available for a 30-day review period prior to finalisation and submission to the DEFF for decision-making. All comments received during the public review period will be included within the final report to be submitted to the DEFF for review and decision-making.

10.8. 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[27]
Make Scoping Report available to the public, stakeholders and authorities (30 days)	23 October 2020 – 23 November 2020
Finalisation of Scoping Report, and submission of the Final Scoping Report to DEFF	November 2020
Authority acceptance of the Final Scoping Report and Plan of Study to undertake the EIA (44 days)	Within 44 days of receipt of the Final Scoping Report (i.e. December 2020/ January 2021)
Make EIA Report and EMPr available to the public, stakeholders and authorities (30 days)	January 2021
Finalisation of EIA Report, and submission of the Final EIA Report to DEFF	February 2021
Authority review period and decision-making (107 days)	Within 107 days of submission of the Final EIA Report to the DEFF

[27] Indicative dates.

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