NKU SOLAR PV FACILITY

Northern Cape Province

Scoping Report

November 2021

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PROJECT DETAILS

Title	:	Environmental Impact Assessment Process: Scoping Report for the Nku Solar PV Facility, Northern Cape Province
Authors	:	Savannah Environmental (Pty) Ltd Rendani Rasivhetshele Jo-Anne Thomas
Client	:	Great Karoo Renewable Energy (Pty) Ltd
Report Revision	:	Revision 0
Date	:	November 2021

When used as a reference this report should be cited as: Savannah Environmental (2021), Scoping Report for the Nku Solar PV Facility, Northern Cape Province.

PURPOSE OF THE SCOPING REPORT AND INVITATION TO COMMENT

Great Karoo Renewable Energy (Pty) Ltd, is proposing the development of a commercial photovoltaic (PV) solar energy facility and associated infrastructure located on a site located approximately 35km south-west of Richmond, and 80km south- east of Victoria West, within the Ubuntu Local Municipality and the Pixley Ka Seme District Municipality in the Northern Cape Province (refer to **Figure 1.1**). The facility will have a contracted capacity of up to 100MW and will be known as the Nku Solar PV Facility. The project is planned as part of a larger cluster of renewable energy projects, which include two (2) additional 100MW PV facilities (known as the Moriri Solar PV and Kwana Solar PV), two (2) 140MW Wind Energy Facilities (known as the Angora WEF and Merino WEF) and grid connection infrastructure connecting the facilities to the existing Eskom Gamma Substation (refer to **Figure 1.2**). These projects are proposed by separate Specialist Purpose Vehicles (SPVs)[1], and are assessed through separate Environmental Impact Assessment (EIA) processes.

Great Karoo Renewable 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 Scoping Report represents the findings of the Scoping Phase of the EIA process and contains the following chapters:

- **Chapter 1** provides background to the Nku Solar PV Facility project and the environmental impact assessment.
- **Chapter 2** provides a project description of the Nku Solar PV Facility project.
- **Chapter 3** provides the site selection information and identified project alternatives.
- **Chapter 4** outlines strategic regulatory and legal context for energy planning in South Africa and specifically for the proposed facility.
- **Chapter 5** describes the need and desirability of Nku Solar PV Facility.
- **Chapter 6** outlines the process which was followed during the scoping phase of the 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 Nku Solar PV Facility.
- **Chapter 10** describes the Plan of Study (PoS) for the EIA phase.
- **Chapter 11** provides references used to compile the Scoping report.

The Scoping Report is available for review from **12 November 2021 – 13 December 2021** at https://savannahsa.com/public-documents/energy-generation/the-great-karoo-cluster-of-renewable-energy-facilities/. All comments received and recorded during the 30-day review and comment period will be included, considered and addressed within the final Scoping report for the consideration of the National Department of Forestry, Fisheries and the Environment (DFFE).

[1] The development of the various projects under separate SPVs is in accordance with the DMRE's requirements under the REIPPPP.

Please submit your comments by **Monday 13 December 2021** to:

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Email: publicprocess@savannahsa.com

Comments can be made as written submission via fax, post or email.

EXECUTIVE SUMMARY

Great Karoo Renewable Energy (Pty) Ltd is proposing the development of a commercial PV facility and associated infrastructure on a site located approximately 35km south-west of Richmond, and 80km south-east of Victoria West, within the Ubuntu Local Municipality and the Pixley Ka Seme District Municipality in the Northern Cape Province.

A technically feasible project site, with an extent of ~29 909ha has been identified by Great Karoo Renewable Energy (Pty) Ltd as a technically suitable area for the development of the Nku Solar PV Facility. A development area[2] of approximately 571ha has been identified within the project site by the proponent for the development. The development area consists of two (2) affected properties, which include:

» Portion 1 of Farm Rondavel 85
» Portion 0 of Farm Rondavel 85

The full extent of the development area has been considered within this 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[3] 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 210ha in extent (for the 100MW PV facility, Battery Energy Storage System (BESS), and all associated infrastructures). 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 100MW 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. Infrastructure associated with the solar PV facility will include:

» Solar PV array comprising PV modules and mounting structures.
» Inverters and transformers.
» Cabling between the panels.
» 33/132kV onsite facility substation.
» Cabling from the onsite substation to the collector substation (either underground or overhead).
» Electrical and auxiliary equipment required at the collector substation that serves the solar energy facility, including switchyard/bay, control building, fences, etc.
» Battery Energy Storage System (BESS).
» Site offices and maintenance buildings, including workshop areas for maintenance and storage.
» Laydown areas.
» Access roads and internal distribution roads.

[2] The development area is that identified area (located within the project site) where the Nku Solar PV Facility 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 ~571ha in extent.
[3] The development footprint is the defined area (located within the development area) where the PV panel array and other associated infrastructure for Nku Solar PV Facility is planned to be constructed. This is the actual footprint of the facility, and the area which would be disturbed.

Potential impacts associated with the development of the Nku Solar PV are expected to occur during both the construction and operation phases. The conclusion of the findings of the Scoping Study is that the potential impacts identified to be associated with the construction and operation of the Nku PV are anticipated to be at a site or localised level, with few impacts extending from a local to regional extent which includes both positive and negative impacts. The following provides a summary of the findings of the specialist studies undertaken:

» *Ecology: T*he extent of the ecological impacts identified during the Scoping Phase is local and the significance of the impacts (at the scoping stage) is considered to be low. The site is not considered to have high sensitivity or biodiversity value. There are some natural habitats that are worthy of protection or that may be sensitive to disturbance. The impacts identified include impacts on vegetation due to construction activities, faunal impacts, degradation of the ecosystem and impacts on CBAs and broad-scale ecological processes.

» *Freshwater Features:* The extent of the impacts on the freshwater features located within the project site is local and the significance of the impacts (at the scoping stage) is considered to be low, subject to the avoidance of the sensitive features. The impacts identified include disturbance / degradation / loss to wetland soils or vegetation due to the construction of the facility and associated infrastructure, such as crossings, increased erosion and sedimentation & contamination of resources

» *Avifauna:* The PV will have an anticipated high, medium and low negative impact on priority avifauna, which is expected to be reduced to medium to low with appropriate mitigation. No fatal flaws are expected to be discovered during the. The impacts include habitat destruction and disturbance and/or displacement, entrapment in perimeter fences, collision with solar panels and disturbance due to construction and operational activities.

» *Bats:* The extent of the bat's impacts identified during the Scoping Phase is local to national and the significance of the impacts (at the scoping stage) will be from low to high, subject to the avoidance of the sensitivities. The impacts include loss of habitat, construction of new buildings, disturbance during roosting, destruction of roosts and interference with bat navigation.

» *Soils and Agricultural Potential:* The extent of the soils and agricultural potential impacts identified during the Scoping Phase is local and the significance of the impacts (at the scoping stage) will be very low (i.e. negligible), subject to the avoidance of the identified sensitive areas. The impacts include Compaction/soil stripping/transformation of land use which leads to loss of land capability.

» *Heritage:* Heritage sensitivity relates to archaeological resources, palaeontological resources, heritage resources, and the cultural landscape. From an archaeological perspective the extent of the impacts identified at the Scoping Phase will be within project boundary to regional. The impacts include Destruction of archaeological heritage, cultural landscapes and palaeontological heritage.

» *Social and Socio-Economic:* The extent of the impacts identified at the Scoping Phase is local to national and the significance of the impacts varies from low to high. Both positive and negative impacts were also identified to be associated with the construction and operation phases of the project. The positive impacts include creation of employment and business opportunities, skills development and trainaing, establishment of renewable energy infrastrucutre, the generation of

clean energy, increase in revenue, benefits associated with the Community Trustand improved energy security. The negative impacts include impacts associated with the presence of construction workers, influx of jobseekers, security risks, impact of heavy vehicles, impact on farming activities, visual impacts, impact on property values due to pperception and impacts on tourism due to perception.

» *Visual:* Visual impacts will mainly occur once the PV facility is operational. Due to the nature of a PV facility, the extent of the impact (at the scoping stage) is expected to be local (with the highest probability within 0km to 6km from the development footprint). The significance of the impact can only be identified and confirmed once the layout of the facility development footprint is available. The identified potential impacts include visual impacts due to construction activities, impact on oberserves travelling along the arterial and secondary roads, visibility of the facility from populated areas (inlcuding homesteads and farmsteads, impact on the visual charater and sense of place, impact due to the ancillary infrastructure.

» *Traffic:* Traffic impacts will mainly occur once the PV facility is operational. The significance of the impact can only be identified and confirmed once the layout of the facility development footprint is available. The identified potential impacts include Traffic congestion due to an increase in traffic caused by the transportation of equipment, material and staff to site

No environmental fatal flaws were identified to be associated with the development of the Nku PV on the identified project site at this stage in the process. **Figure 1** provides an environmental sensitivity map of the scoping phase no-go areas. This conclusion must be confirmed through a detailed investigation of the development footprint within the EIA Phase of the process.

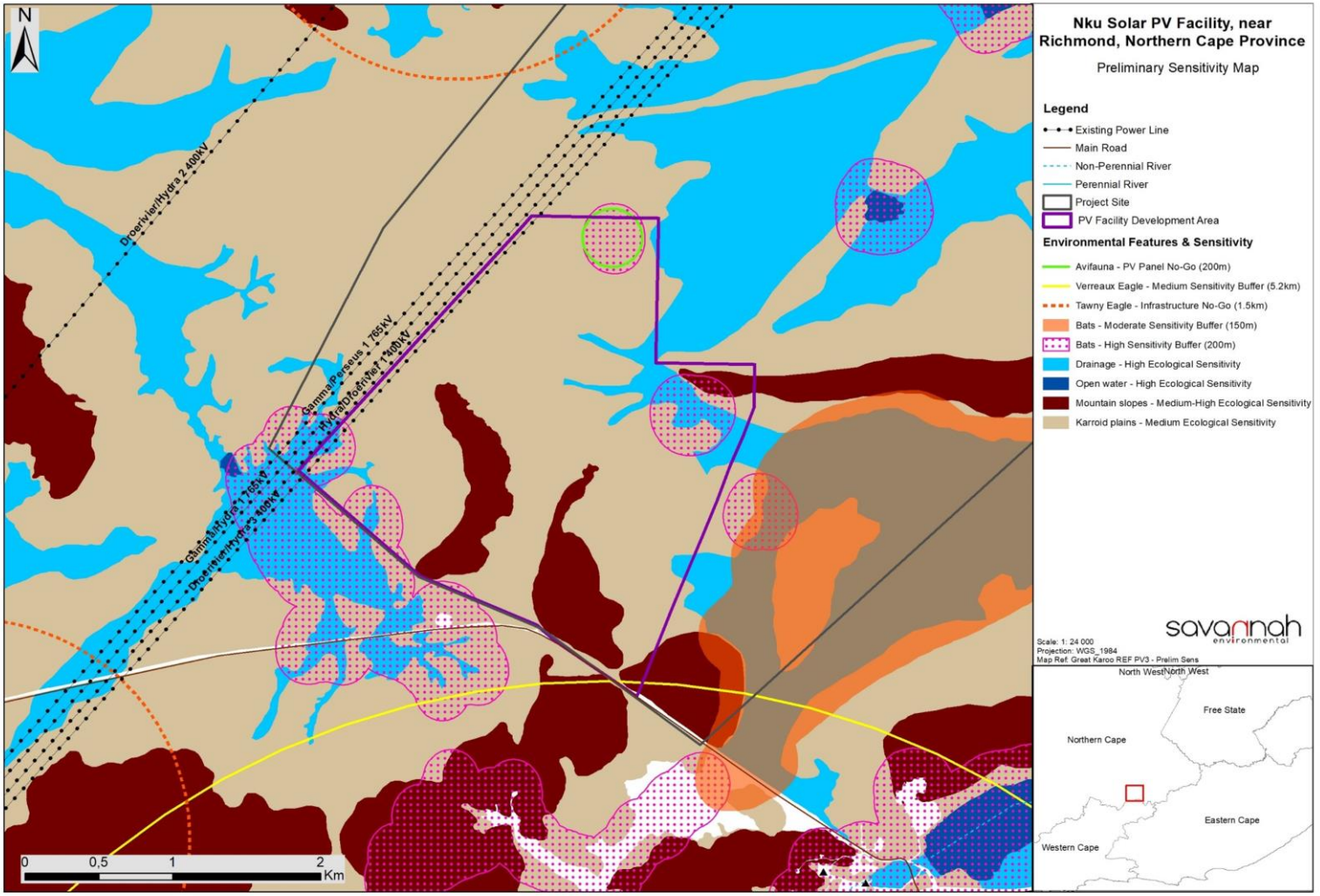

Figure 1: Environmental Sensitivity Map from the results of the scoping evaluation for the Nku PV Facility and associated infrastructure. The sensitivity map indicates the sensitivities for the project site, as well as the Nku PV development area.

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CHAPTER 1: INTRODUCTION

Great Karoo Renewable Energy (Pty) Ltd, is proposing the development of a commercial photovoltaic (PV) solar energy facility and associated infrastructure located on a site located approximately 35km south-west of Richmond, and 80km south- east of Victoria West, within the Ubuntu Local Municipality and the Pixley Ka Seme District Municipality in the Northern Cape Province (refer to **Figure 1.1**). The facility will have a contracted capacity of up to 100MW and will be known as the Nku Solar PV Facility. The project is planned as part of a larger cluster of renewable energy projects, which include two (2) additional 100MW PV facilities (known as the Moriri Solar PV and Kwana Solar PV), two (2) 140MW Wind Energy Facilities (known as the Angora WEF and Merino WEF) and grid connection infrastructure connecting the facilities to the existing Eskom Gamma Substation (refer to **Figure 1.2**). These projects are proposed by separate Specialist Purpose Vehicles (SPVs)[4], and are assessed through separate Environmental Impact Assessment (EIA) processes.

The Nku Solar PV Facility is proposed in response to the identified objectives of the national and provincial government and local and district municipalities to develop renewable energy facilities for power generation purposes. It is the developer's intention to bid the Nku Solar PV Facility under the Department of Mineral Resources and Energy's (DMRE's) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme or similar 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, in line with the objectives of the Integrated Resource Plan (IRP), with the Nku Solar PV Facility set to inject up to 100MW into the national grid.

From a regional perspective, the Northern Cape, and particularly the area under investigation, is considered favourable for the development of a commercial solar facility by virtue of prevailing climatic conditions, relief, the extent of the affected properties, the availability of a direct grid connection (i.e., a point of connection of the national grid) and the availability of land on which the development can take place.

1.1 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.

As the project has the potential to impact on the environment, an Environmental Authorisation (EA) is required from the National Department of Forestry, Fisheries and the Environment (DFFE) 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, as amended (GNR 326).

[4] The development of the various projects under separate SPVs is in accordance with the DMRE's requirements under the REIPPPP.

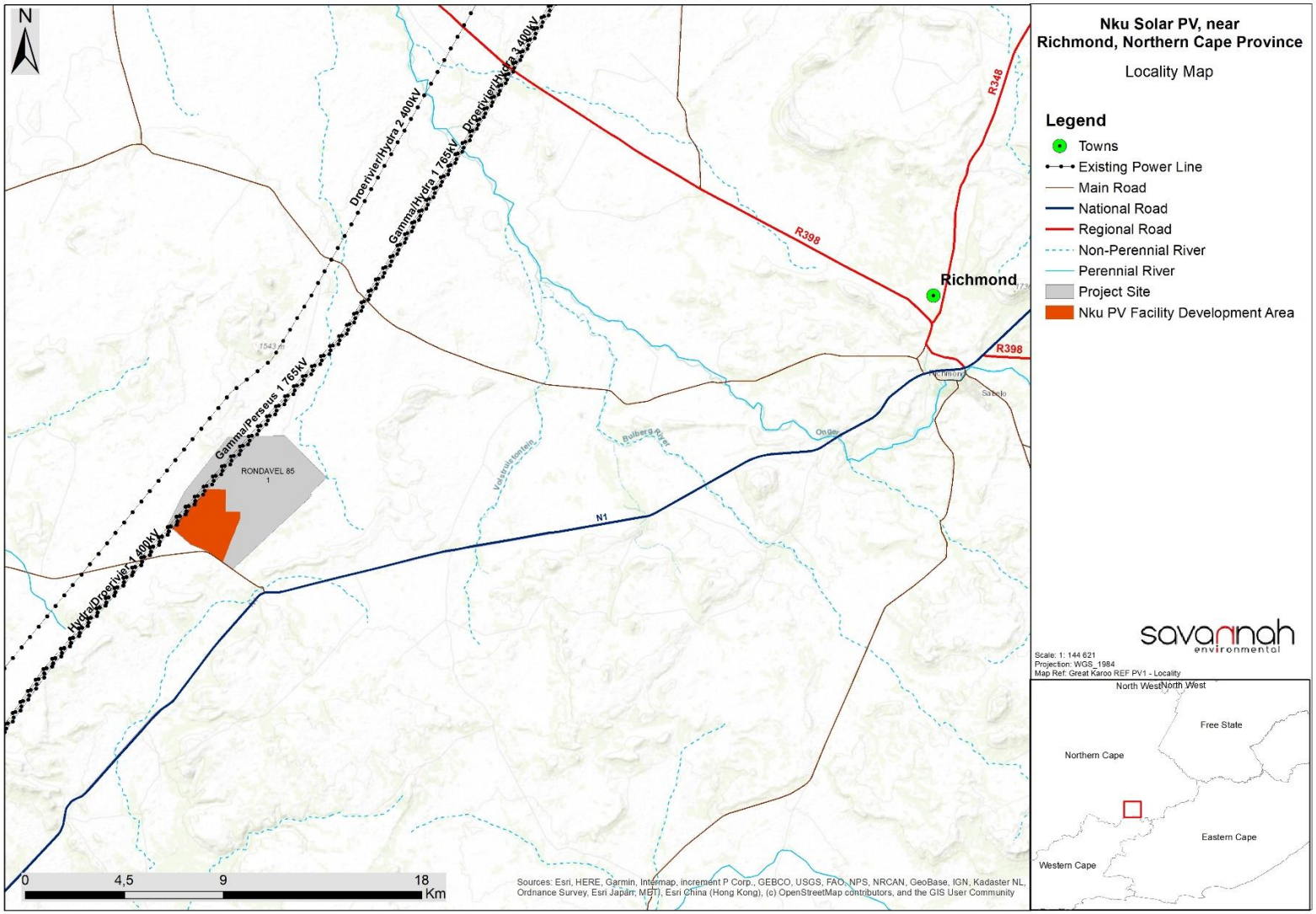

Figure 1.1: Locality map illustrating the location of the Nku Solar PV Facility project site on Portion 0 and 1 of Farm Rondavel 85 (refer to **Appendix N** for A3 map).

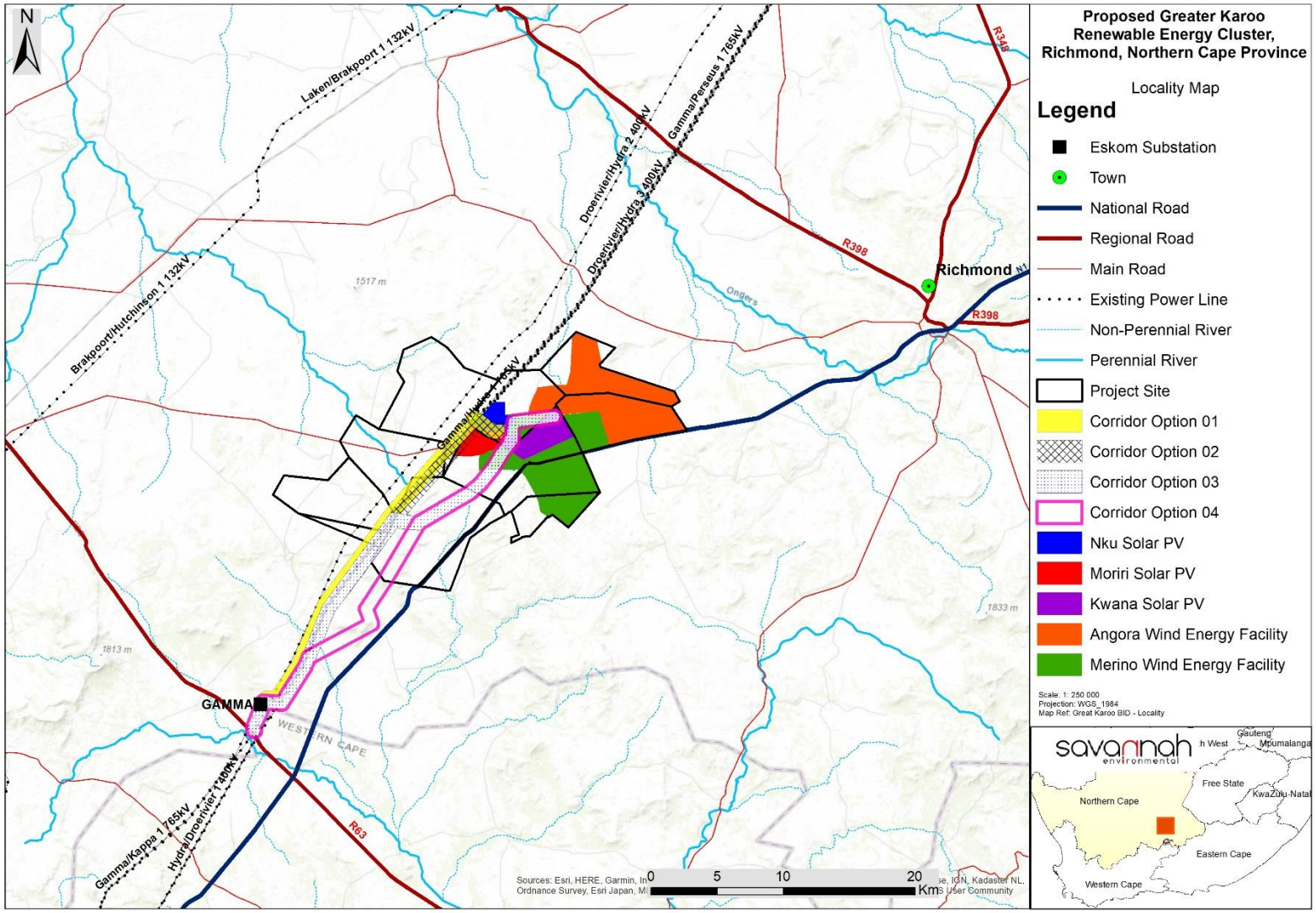

Figure 1.2: Locality map illustrating the cluster of proposed renewable energy facilities that the Nku PV facility forms part of (refer to Appendix N for A3 map).

The need for EA subject to the completion of a full S&EIA is triggered by the inclusion of, amongst others, Activity 1 of Listing Notice 2 (GNR 325)[5], 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 DFFE has been determined as the CA for all projects which relate to the IRP for Electricity (IRP) 2010 – 2030, and any updates thereto. Through the decision-making process, the DFFE will be supported by the Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform as the commenting authority.

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

This Scoping Report has been prepared in accordance with the requirements of the EIA Regulations published on 08 December 2014 (and amended on 07 April 2017) promulgated in terms of Chapter 5 of the National Environmental Management Act (Act No 107 of 1998). This chapter of the Scoping Report includes the following information required in terms of Appendix 2: Content of 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 and the expertise of the EAP have been included in **Section 1.5**. The Curriculum vitae of the Savannah Environmental team have been included as **Appendix A**.
(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 Nku Solar PV Facility has been included as **Figure 1.1**. The details of the affected properties, including the property names and numbers, as well as the SG-codes are included in **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 Nku Solar PV Facility has been included in **Figure 1.1**. The centre point co-ordinates of the project site are included in **Table 1.1**.

This Scoping Report consists of nine chapters, which include:

- **Chapter 1** provides background to the Nku Solar PV Facility project and the environmental impact assessment.
- **Chapter 2** provides a project description of the Nku Solar PV Facility project.
- **Chapter 3** provides the site selection information and identified project alternatives.
- **Chapter 4** outlines strategic regulatory and legal context for energy planning in South Africa and specifically for the proposed facility.
- **Chapter 5** describes the need and desirability of Nku Solar PV Facility.

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

- **Chapter 6** outlines the process which was followed during the scoping phase of the 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 Nku Solar PV Facility.
- **Chapter 10** describes the Plan of Study (PoS) for the EIA phase.
- **Chapter 11** provides references used to compile the Scoping report.

1.3 Project Overview

A technically feasible project site, with an extent of ~29 909ha has been identified by Great Karoo Renewable Energy (Pty) Ltd as a technically suitable area for the development of the Nku Solar PV Facility. A development area[6] of approximately 571ha has been identified within the project site by the proponent for the development. The development area consists of two (2) affected properties, which include:

- Portion 1 of Farm Rondavel 85
- Portion 0 of Farm Rondavel 85

The full extent of the development area has been considered within this 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[7] 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 210ha in extent (for the 100MW PV facility, Battery Energy Storage System (BESS), and all associated infrastructures). 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 100MW 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.

Table 1.1: Detailed description of the project.

Province	**Northern Cape Province**
District Municipality	Pixley Ka Seme District Municipality
Local Municipality	Ubuntu Local Municipality
Ward Number (s)	Ward 3
Nearest town(s)	Richmond (~35km south-west) and Victoria West (~80km south-east)
Farm name(s) and number(s) of properties affected by the Solar Facility	» Portion 1 of Farm Rondavel 85 » Portion 0 of Farm Rondavel 85
SG 21 Digit Code (s)	» Portion 1 of Farm Rondavel 85: C0630000000008500001 » Portion 0 of Farm Rondavel 85: C0630000000008500000
Current zoning	Agriculture

[6] The development area is that identified area (located within the project site) where the Nku Solar PV Facility 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 ~571ha in extent.

[7] The development footprint is the defined area (located within the development area) where the PV panel array and other associated infrastructure for Nku Solar PV Facility is planned to be constructed. This is the actual footprint of the facility, and the area which would be disturbed.

Province	Northern Cape Province
Site Coordinates (centre of affected property)	31°28'51.59"S; 23°35'34.10"E

Infrastructure associated with the solar PV facility will include:

- Solar PV array comprising PV modules and mounting structures.
- Inverters and transformers.
- Cabling between the panels.
- 33/132kV onsite facility substation.
- Cabling from the onsite substation to the collector substation (either underground or overhead).
- Electrical and auxiliary equipment required at the collector substation that serves the solar energy facility, including switchyard/bay, control building, fences, etc.
- Battery Energy Storage System (BESS).
- Site offices and maintenance buildings, including workshop areas for maintenance and storage.
- Laydown areas.
- Access roads and internal distribution roads.

The key infrastructure components proposed as part of the Nku Solar PV Facility are described in greater detail in Chapter 2 of this Scoping Report.

The overarching objective for the Nku Solar PV 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 accordance with the principles of sustainable development. 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.

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), limited field work, and consultation with interested and 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 public review period of the EIA Report, this phase culminates in the submission of a final EIA Report and an Environmental Management Programme (EMPr), including recommendations of practical and achievable mitigation and management measures, to the CA for final review and decision-making.

1.5 Details of Environmental Assessment Practitioner and Expertise to conduct the S&EIA Process

In accordance with Regulation 12 of the 2014 EIA Regulations (GNR 326), the applicant has appointed Savannah Environmental (Pty) Ltd as the independent environmental consultant 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 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 specialist environmental consulting company providing a holistic environmental management service, including environmental assessment, and planning to ensure compliance and evaluate the risk of development, and the development and implementation of environmental management tools. Savannah Environmental benefits from the pooled resources, diverse skills and experience in the environmental field held by its team. The Savannah Environmental team for this project includes:

- ***Rendani Rasivhetshele,*** the principle author of this report. She is a registered EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA -2019/1729), and she holds a Bachelor of Science Honours in Environmental Management. She has over 4 years of experience in conducting Environmental Impacts Assessments, public participation, and Environmental Management Programme for a wide range of projects including renewable energy projects. She is responsible for overall compilation of the report, this includes specialists' engagements, reviewing specialists reports and incorporating specialist studies into the Environmental Impact Assessment report and its associated Environmental Management.
- ***Jo-Anne Thomas,*** the principle EAP on this project, is a registered EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA - 2019/726). She provides technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, Environmental Impact Assessment studies, environmental auditing and monitoring, environmental permitting, public participation, Environmental Management Plans and Programmes, environmental policy, strategy and guideline formulation, and integrated environmental management. Her key focus is on integration of the specialist environmental studies and findings into larger engineering-based projects, strategic assessment, and providing practical and achievable environmental management solutions and mitigation measures. Responsibilities for environmental studies include project management (including client and authority liaison and management of specialist teams); review and manipulation of data; identification and assessment of potential negative environmental impacts and benefits; review of specialist studies; and the identification of mitigation measures.

» ***Nicolene Venter***, is a Board Member of IAPSA (International Association for Public Participation South Africa). She holds a Higher Secretarial Diploma and has over 21 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.

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

Specialist	Area of Expertise
David Hoare of David Hoare Consulting (Pty) Ltd	Ecology
Chris van Rooyen of Chris van Rooyen Consulting	Avifauna
Werner Marais of Animalia	Bats
Ivan Baker of the Biodiversity Company	Freshwater and Soils
Morné de Jager of Enviro-Acoustic Research	Noise
Lourens du Plessis of LoGIS	Visual
Tony Barbour of Tony Barbour Environmental Consulting	Social
Jenna Lavin of CTS Heritage	Heritage (including Archaeology Palaeontology and Cultural Landscape)
Adrian Johnston of JG Afrika	Traffic

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

CHAPTER 2 PROJECT DESCRIPTION

This Chapter provides an overview of the Nku Solar PV and details the project scope which includes the planning/design, construction, operation, and decommissioning activities required for the 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 Scoping Report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
3(b) the location of the activity including (i) the 21-digit Surveyor General code of each cadastral land parcel, (ii) where available the physical address and farm name and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.	The location of the proposed project is detailed in Chapter 1, **Table 1.1**, as well as section 2.2.1 below.
3(d)(ii) a description of the scope of the proposed activity, including a description of the activities to be undertaken including associated structures and infrastructure	A description of the activities to be undertaken with the development of project is included in **Table 2.1** and **Table 2.2**.

2.2 Nature and Extent of the Nku Solar PV facility

In responding to the growing electricity demand within South Africa, the need to promote renewable energy and sustainability within the Northern Cape Province, as well as the country's targets for renewable energy. Great Karoo Renewable Energy (Pty) Ltd is proposing the development of a commercial solar farm and associated infrastructure to add new capacity to the national electricity grid. The Nku solar PV facility will be developed in a single phase and will have a contracted capacity of up to 100MW. 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 within this Scoping Report.

The Nku Solar PV facility 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.

2.2.1 Overview of the Project Site

The project is to be developed on a site located approximately 35km south-west of Richmond and 80km south-east of Victoria West. The project site falls within Ward 3 of the Ubuntu Local Municipality and within the Pixley Ka Seme District Municipality in the Northern Cape Province. The full extent of the development area (i.e., ~571ha), located within the project site (i.e., 29 909ha) has been considered within this Scoping Phase of the EIA process, within which the Nku Solar PV facility will be appropriately located from a technical and environmental sensitivity perspective. The development area includes the following two (2) affected properties:

- Portion 0 of Farm Rondavel 85
- Portion 1 of Farm Rondavel 85

Access to the project site is ample with the presence of existing roads mainly consisting of national and regional roads. The project site is situated directly adjacent to the N1 national road, which provides access to the project site and development area (refer to **Figure 2.1**). The R398 is located to the north-east of the project site and the R63 is located to the south-west of the project site. The gravel main access road located to the north-east of the project site provides direct access to the project site and the development area and will therefore be utilised for accessing the project site and development area (refer to **Figure 2.2**).

Figure 2.1: Location of the N1 national road in relation to the Nku Solar PV development area (development area in purple).

Figure 2.2: Location of the development area (outline in purple) in relation to the gravel main access road located to the north-east of the project site, which provides direct access to the project site and development area.

Once environmentally constraining factors have been identified through the EIA process, the layout of the PV facility and associated infrastructures will be determined. The layout will take into consideration any environmentally sensitive areas identified through the EIA process and the PV Panels and associated infrastructures will be appropriately placed. A more accurate understanding of the final development footprint will be determined during the EIA phase with the availability of a facility layout plan.

2.2.2 Components of the Nku Solar PV facility.

The project site is proposed to accommodate both the PV panels, as well as most of the associated infrastructure, which is required for such a facility, and will include:

- Solar PV array comprising PV modules and mounting structures.
- Inverters and transformers.
- Cabling between the panels.
- 33/132kV onsite facility substation.
- Cabling from the onsite substation to the collector substation (either underground or overhead).
- Electrical and auxiliary equipment required at the collector substation that serves the solar energy facility, including switchyard/bay, control building, fences, etc.

- Battery Energy Storage System (BESS).
- Site offices and maintenance buildings, including workshop areas for maintenance and storage.
- Laydown areas.
- Access roads and internal distribution roads.

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

Table 2.1: Details or infrastructures proposed as part of Nku Solar PV facility. Specific details to be confirmed in the EIA phase.

Infrastructure	Footprint and dimensions
Number of Panels	To be determined in the EIA phase
Panel Height	Up to 5m
Technology	Use of fixed-tilt, single-axis tracking, and/or double-axis tracking PV technology. Monofacial or bifacial panels are both considered.
Contracted Capacity	Up to 100MW
Area occupied by the solar array	~210ha
Area occupied by the on-site facility substation	~1000m x 700m
Capacity of on-site facility substation	33kV/132kV
Underground cabling between the PV array and the onsite substation	Underground cabling will be installed at a depth of up to 1.5m to connect the PV array to the on-site facility substation. The cabling will have a capacity of up to 35kV.
Cabling from the onsite substation to the 132kV collector substation	Underground cabling will be installed at a depth of up to 1.5m to connect the on-site substation to the 132kV collector substation. The cabling will have a capacity of up to 35kV.
Area occupied by the electrical and auxiliary equipment required at the collector substation	100mx100m
Area occupied by laydown area	~1000m x 700m
Access and internal roads	Wherever possible, existing access roads will be utilised to access the project site and development area. It is unlikely that access roads will need to be upgraded as part of the proposed development. Internal roads of up to 4.5m in width will be required to access the PV panels and the on-site substation.
Grid connection	The 33/132kV on-site substation will be connected to the proposed 132kV central collector substation via underground cabling with a capacity of up to 132kV. A new 132kV single- or double-circuit power line will run from the central collector substation and tie into the existing Eskom Gamma Substation. The switching station forming part of the 132kV collector substation and the new 132kV single- or double-circuit will be assessed as part of a separate Basic Assessment process in support of an application for Environmental Authorisation.
Temporary infrastructure	Temporary infrastructure, including laydown areas, hardstand areas and a concrete batching plant, will be required during the construction phase. All areas affected by temporary infrastructure will be rehabilitated following the completion of the construction phase, where it is not required for the operation phase.

Table 2.2 overleaf provides details regarding the requirements and the activities to be undertaken during the Nku Solar PV facility development phases (i.e., construction phase, operation phase and decommissioning phase). **Section 2.3** provides illustrations of technology considered for the Solar Energy Facility and the Generation of Electricity.

2.2.3 *Project Development Phases Associated with the Nku Solar PV facility*

Table 2.2: Details of the Nku Solar PV facility project development phases (i.e., construction, operation, and decommissioning)

Construction Phase	
Requirements	» Project receives Environmental Authorisation from the DFFE, preferred bidder allocation granted by DMRE (or other offtaker), a generating license issued by NERSA, and a Power Purchase Agreement secured with Eskom (or private entity). » Expected to be 15-18 months for Nku Solar PV facility. » Create direct construction employment opportunities. Approximately 350 employment opportunities will be created. » No on-site labour camps. Employees to be accommodated in the nearby towns such as Richmond and Victoria West and transported to and from site on a daily basis. » Overnight on-site worker presence would be limited to security staff. » Waste removal and sanitation will be undertaken by a suitably qualified sub-contractor. Waste containers, including containers for hazardous waste, will be located at easily accessible locations on site when construction activities are undertaken. » Electricity required for construction activities will be generated by a generator. Where low voltage connections are possible, these will be considered. » Water required for the construction phase will be supplied by the municipality. In addition, where possible, borehole water will be used. Should water availability at the time of construction be limited, water will be transported to site via water tanks. Water will be used for sanitation and potable water on site as well as construction works.
Activities to be undertaken	
Conduct surveys prior to construction	» Including, but not limited to: a geotechnical survey, site survey and confirmation of the panel micro-siting footprint, and survey of the on-site collector substation site to determine and confirm the locations of all associated infrastructure.
Establishment of access roads to the Site	» Internal access roads within the site will be established at the commencement of construction. » Existing access roads will be utilised, where possible, to minimise impact. It is unlikely that access roads will need to be upgraded as part of the proposed development. » Access roads to be established for construction and/or maintenance activities within the development footprint. » Internal service road alignment will be approximately 4,5m wide. Location is to be determined by the final micro-siting or positioning of the PV panels.
Undertake site preparation	» Including the clearance of vegetation at the footprint of PV panel supports, establishment of the laydown areas, the establishment of internal access roads and excavations for foundations. » Stripping of topsoil to be stockpiled, for use during rehabilitation. » Vegetation clearance to be undertaken in a systematic manner to reduce the risk of exposed ground being subjected erosion. » Include search and rescue of floral species of concern (where required) and the identification and excavation of any sites of cultural/heritage value (where required).

Establishment of laydown areas and batching plant on site	» A laydown area for the storage of PV panels components and civil engineering construction equipment. » The laydown will also accommodate building materials and equipment associated with the construction of buildings. » No borrow pits will be required. Infilling or depositing materials will be sourced from licenced borrow pits within the surrounding areas. » A temporary concrete batching plant of 50m x 50m in extent to facilitate the concrete requirements for foundations, if required.
Construct foundation	» Excavations to be undertaken mechanically. » For PV array installation vertical support posts will be driven into the ground. » Depending on geological conditions, the use of alternative foundations may be considered (e.g., screw pile, helical pile, micropile or drilled post/piles).
Transport of components and equipment to and within the site	» The components for the solar PV facility and onsite substation will be transported to site by road. Transportation will take place via appropriate National and Provincial roads, and the dedicated access/haul road to the site. » Some of the components (i.e. substation transformer) may be defined as abnormal loads in terms of the Road Traffic Act (Act No. 29 of 1989) by virtue of the dimensional limitations. » Typical civil engineering construction equipment will need to be brought to the site (e.g. excavators, trucks, graders, compaction equipment, cement trucks, etc.) as well as components required for the mounting of the PV support structures, construction of the substation and site preparation.
Erect PV Panels and Construct Substation, Invertors and BESS	» The construction phase involves installation of the solar PV panels and the structural and electrical infrastructure to make the plant operational. In addition, preparation of the soil and improvement of the access roads would continue for most of the construction phase. For array installation, typically vertical support posts are driven into the ground. Depending on the results of the geotechnical report a different foundation method, such as screw pile, helical pile, micro-pile or drilled post/pile could be used. The posts will hold the support structures (tables) on which PV arrays would be mounted. Brackets attach the PV modules to the tables. Trenches are dug for the underground AC and DC cabling and the foundations of the inverter enclosures and transformers are prepared. While cables are being laid and combiner boxes are being installed, the PV tables are erected. Wire harnesses connect the PV modules to the electrical collection systems. Underground cables and overhead circuits connect the Power Conversion Stations (PCS) to the on-site AC electrical infrastructure and ultimately the project's on-site substation. This process also involves the installation of the BESS facility.
Connection of PV panels to the substation	» PV arrays to be connected to the on-site substation via underground electrical cables. » Excavation of trenches is required for the installation of the cables. Trenches will be approximately 1.5m deep. » Underground cables are planned to follow the internal access roads, as far as possible. » Onsite substation to be connected to the collector substation via underground cables.
Establishment of ancillary infrastructure	» Site offices and maintenance buildings, including workshop areas for maintenance and storage will be required. » Establishment will require the clearing of vegetation, levelling, and the excavation of foundations prior to construction.
Connect substation to the power grid	» A new 132kV single- or double-circuit power line will run from the central collector substation and tie into the existing Eskom Gamma Substation.

Undertake site rehabilitation	» Commence with rehabilitation efforts once construction completed in an area, and all construction equipment is removed. » On commissioning, access points to the site not required during the operation phase will be closed and prepared for rehabilitation.
Operation Phase	
Requirements	» Duration will be 20-25 years. » Requirements for security and maintenance of the project. » Employment opportunities relating mainly to operation activities and maintenance. Approximately 15 - 20 full-time employment opportunities will be available during the operation of the solar facility.
Activities to be undertaken	
Operation and Maintenance	» Full time security, maintenance, and control room staff. » All PV panels will be operational except under circumstances of mechanical breakdown, inclement weather conditions, or maintenance activities. » Solar PV to be subject to periodic maintenance and inspection. » It is anticipated that the PV panels will be washed twice a year during operation using clean water with no cleaning products, or non-hazardous biodegradable cleaning products. » Disposal of waste products (e.g., oil) in accordance with relevant waste management legislation. » Areas which were disturbed during the construction phase to be utilised, should a laydown area be required during operation.
Decommissioning Phase	
Requirements	» Decommissioning of the Nku Solar PV facility infrastructure at the end of its economic life. » Potential for repowering of the facility, depending on the condition of the facility at the time. » Expected lifespan of approximately 20 - 25 years (with maintenance) before decommissioning is required. » Decommissioning activities to comply with the legislation relevant at the time.
Activities to be undertaken	
Site preparation	» Confirming the integrity of site access to the site to accommodate the required decommissioning equipment. » Preparation of the site (e.g., laydown areas and construction platform). » Mobilisation of construction equipment.
Disassemble and remove PV panels	» Components to be reused, recycled, or disposed of in accordance with regulatory requirements. » 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. » Concrete will be removed to a depth as defined by an agricultural specialist and the area rehabilitated. Cables will be excavated and removed, as may be required

It is expected that the areas of the project site affected by the solar facility infrastructure (development footprint) will revert back to its original land-use (i.e. agriculture) once the Nku PV facility has reached the end of its economic life and all infrastructure has been decommissioned.

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

Nku Solar PV Facility will have a contracted capacity of 100MW 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 2.3**).

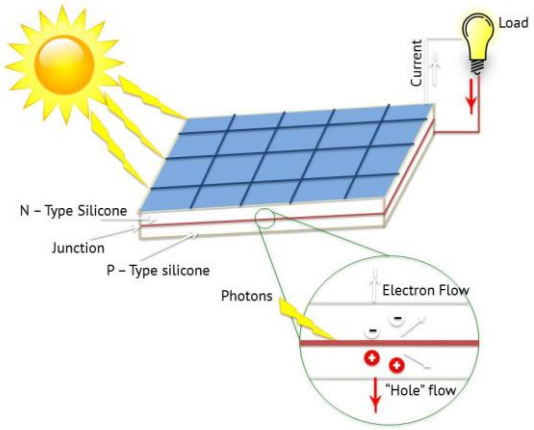

Figure 2.3: Diagram illustrating the Photovoltaic Effect (Source: Centre for Sustainable Energy)

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 2.4**). 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])).

[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).

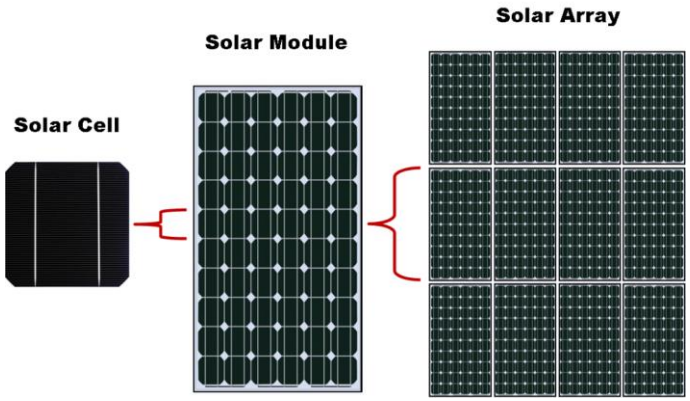

Figure 2.4: Overview of a PV cell, module and array / panel (Source: pveducation.com)

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 2.5**). 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.

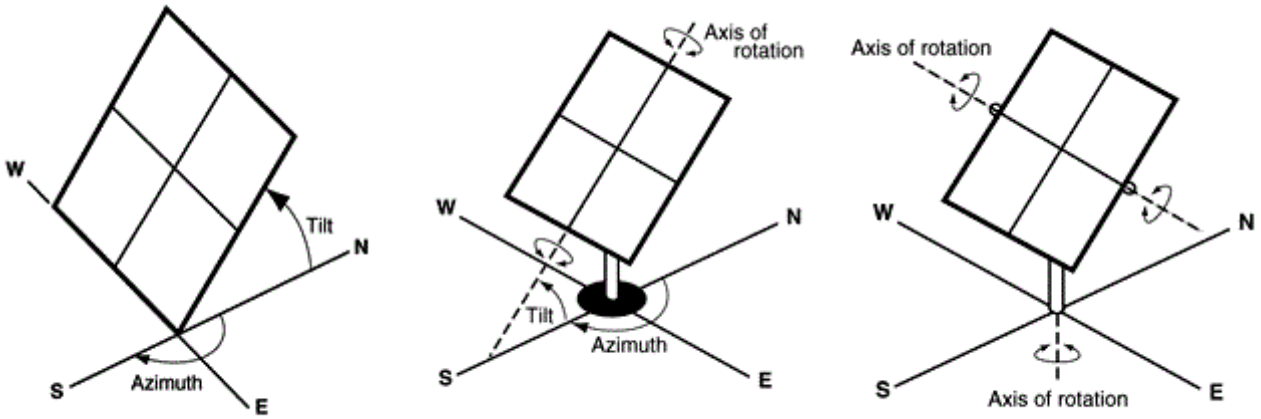

Figure 2.5: Overview of different PV tracking systems (from left to right: fixed-tilt, single-axis tracking, and double-axis tracking (Source: pveducation.com)).

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

Battery Energy Storage System (BESS)

The need for a BESS stem from the fact that electricity is only produced by the Renewable Energy Facility while the sun is shining, while the peak demand may not necessarily occur during the daytime. Therefore, the storage of electricity and supply thereof during peak-demand will mean that the facility is more efficient, reliable and electricity supply more constant.

The BESS will:

- Store and integrate a greater amount of renewable energy from the Solar PV Facilities into the electricity grid;
- This will assist with the objective to generate electricity by means of renewable energy to feed into the National Grid which will be procured under either the Renewable Energy Independent Power Producer Procurement Program (REIPPPP), other government run procurement programmes or for sale to private entities if required.
- Proposed footprint of battery storage area: Up to ~20ha
- Proposed preferred technology to be used: Three main technologies to be considered, either separately or in combination:
  - Lithium-ion batteries (LFP/NMC or others) (Li-Ion)
  - Lithium capacitors/Electrochemical capacitors (LiC)
  - Redox-flow batteries (RFB)

CHAPTER 3: CONSIDERATION OF ALTERNATIVES

This Chapter provides an overview of the various alternatives considered for Nku Solar PV Facility 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 Scoping Report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
3(g) a motivation for the preferred site, activity, and technology alternative	The identification and motivation for the preferred project site, the development area within the project site, the proposed activity and the proposed technology is included in sections 3.3.1, 3.3.3 and 3.3.4.
3(h)(i) details of the alternative considered	The details of all alternatives considered as part of the Nku Solar PV are included in sections 3.3.1 – 3.3.5.
3(h)(ix) the outcome of the site selection matrix	The site selection process followed by the developer in order to identify the preferred project site and development area is described in section 3.3.1.
3(h)(x) if no alternatives, including alternative locations for the activity were investigation, the motivation for not considering such	Where no alternatives have been considered, motivation has been included. This is included in section 3.3.

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.

The DFFE 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 Nku Solar PV facility, a solar energy facility with capacity of up to 100MW and associated infrastructure proposed to be developed by an Independent Power Producer (IPP) and intended to form part of the DMRE's REIPPP Programme, or another similar 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)[9], 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. Of particular relevance to the proposed project is the allocation of 6000MW of new capacity to large scale PV included in the IRP 2019. The site is considered most suitable for the development of a PV solar energy facility as a result of local irradiation, land availability and topography (as detailed in the sections below). 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.

The sections below describe the incrementally different alternatives being considered as part of the Nku Solar PV facility. Where no alternative is being considered, a motivation has been provided as required by the EIA Regulations, 2014.

3.3 Project Alternatives under Consideration for the Nku Solar PV facility

Table 3.1 provides an overview of the alternatives being considered as part of the project:

Table 3.1: Summary of the alternatives considered as part of the Nku Solar PV project.

Nature of Alternatives Considered	Description of the Alternatives relating to the Nku Solar PV facility.
Site-specific and Layout Alternatives	One preferred project site has been identified for the development of the Nku Solar PV facility due to site specific characteristics such as the solar resource, land availability, topographical considerations, proximity to a viable grid connection and environmental features. The project site is ~29 909ha in extent which is considered to be sufficient for the development of a Solar PV facility with a contracted capacity of up to 100MW. A development area of ~571ha has been identified by the proponent within the project site for the development.

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

Nature of Alternatives Considered	Description of the Alternatives relating to the Nku Solar PV facility.
Activity Alternatives	Only the development of a renewable energy facility is considered by Great Karoo Renewable Energy (Pty) Ltd. Due to the location of the project site and the suitability of the solar resource, only the development of a Solar PV facility is considered feasible considering the natural resources available to the area and the current land-use activities undertaken within the project site (i.e., livestock farming).
Technology Alternatives	Only the development of a solar facility is considered due to the characteristics of the site, including the natural resources available. The use of solar PV for the generation of electricity is considered to be the most efficient technology for the project site.
'Do-nothing' Alternative	This is the option to not construct the Nku Solar PV facility. No impacts (positive or negative) are expected to occur on the social and environmental sensitive features or aspects located within the project site or the surrounds. The opportunities associated with the development of the solar facility for the affected area and other surrounding towns in the area will not be made available.

These alternatives are described in more detail in the sections which follow.

3.3.1 Property or Location Alternatives

The Nku Solar PV facility is located south-east of Victoria West and south-west of Richmond. The preferred project site for the development of the Nku Solar PV facility was identified through an investigation of prospective sites and properties in the area within the Northern Cape Province. The investigation involved the consideration of specific characteristics within the province and specifically within the areas near Richmond and Victoria West including:

- Solar resource characteristics (including Global Horizontal Irradiation (GHI));
- Land availability;
- Land use and geographical and topographical considerations;
- Access to the national grid, including distance and capacity to connect the proposed project to the network;
- Site accessibility; and
- Environmental and social aspects.

The characteristics considered were identified by the developer as the main aspects that play a role in the opportunities and limitations for the development of a Solar PV facility. The characteristics considered, and the results thereof, are discussed in the sections below. The developer considered that should these characteristics not be favourable for the development of a Solar PV facility, then some limitations and challenges may be expected and potentially hinder such development from a technical and/or economic perspective.

- **Solar resource**: Solar resource is the first main driver of site selection and property viability when considering the development of Solar PV facilities. The economic viability of a solar PV facility is directly dependednt on the annual direct solar irradiation values of the area within which it will operate. The Global Horizon Irradiation (GHI) for the study area is in the region of approximately 2240 kWh/m$^{2/}$annum (refer to Figure 3.1). 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. Great Karoo Renewable 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 years. Based on the solar resource available, no alternative locations are considered.

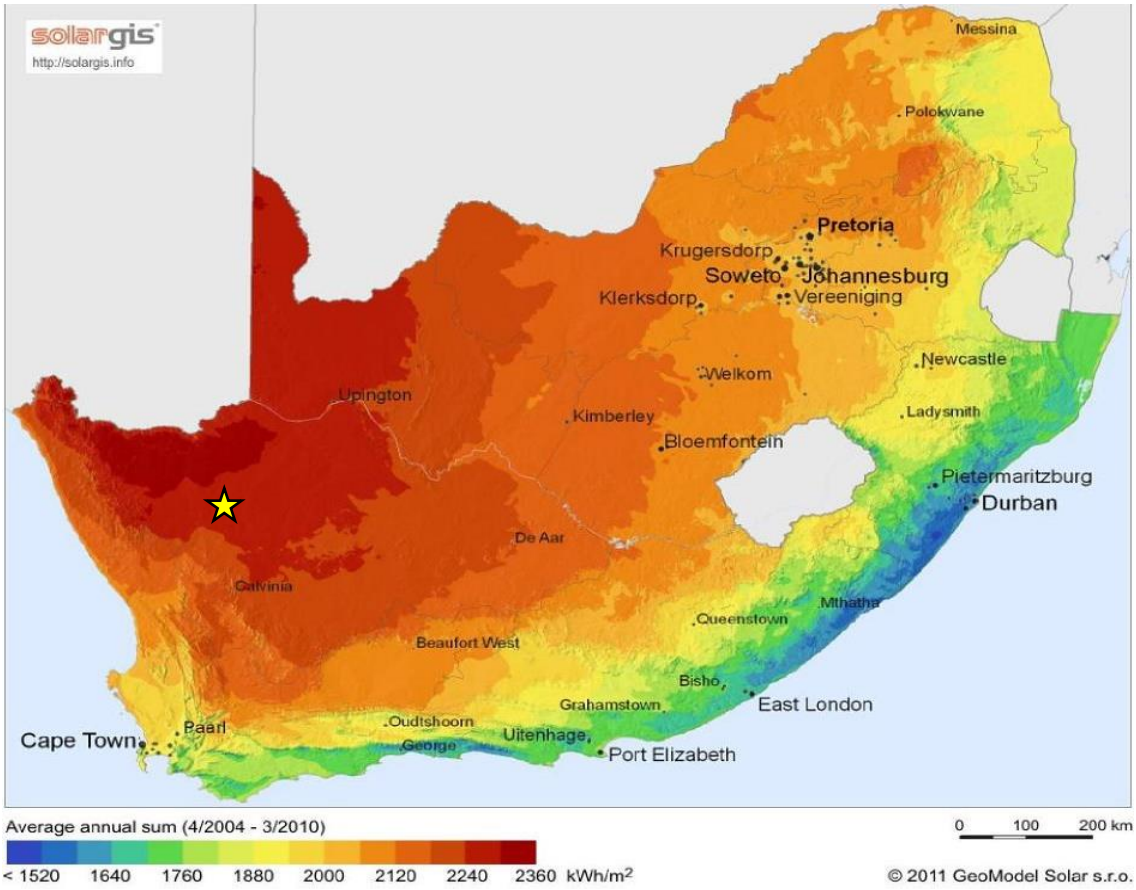

Figure 3.1: Solar irradiation map for South Africa; the proposed Nku Solar PV facility position is shown by the yellow star on the map. (Source: adapted from GeoModel Solar, 2011).

» **Land availability**: In order to develop the Nku Solar PV facility with a contracted capacity of up to 100MW, sufficient space is required. The properties included in the project site are privately-owned parcels available in the area, are available for a development of this nature through agreement with the landowners and are deemed technically feasible by the project developer for such development to take place. The combination of the affected properties has an extent of ~571ha, which was considered by the developer as sufficient for the development of the Nku Solar PV facility. A preferred development footprint of ~210ha within this larger project site has been identified for the location of the Nku Solar PV facility. An exact development footprint within the development area for the placement of infrastructure will be identified and assessed as part of the EIA Phase considering environmental constraints and sensitivities.

» **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 two landowners affected by the proposed Nku Solar PV facility do not view the development as a conflict with their current land use practices. The support from the landowners for the development to be undertaken on the affected

properties has been solidified by the provision of consent for the project to proceed on the property through the signing of consent forms.

» **Land use**: The character of the greater area surrounding the project site can be described as a rural, Karoo landscape characterised by livestock farming. There are a number of farm dwellings located in the vicinity of the site, including three farm dwellings within the boundary of the site. The land use identified within the greater area surrounding the project site (i.e., livestock farming) is generally preferred for developments of this nature as the livestock farming activities can continue on the affected properties in tandem with the operation of the solar facility.

» **Geographical and Topographical Considerations:** The topography in the wider area surrounding the project site is characterised by a largely flat to undulating landscape interspersed with areas of high elevation in the form of hills, koppies, ridges and/or mountains. In the wider area, a range of located hilly/mountainous topography with high elevations can be found to the south-east and north of the site, respectively. As such, there are very few physical constraints present which would have an effect on the construction and operation of a solar PV facility.

» **Access to the National Electricity Grid**: A key factor in the siting of any power generation project is a viable grid connection. The anticipated grid connection solution (subject to a separate environmental assessment and authorisation process) is a 132kV central collector substation and a 132kV power line to enable connection to the existing Gamma Substation. The developer consulted with the Eskom network planners to understand the current capacity of the existing grid connection infrastructure and to identify feasible connection points for the facility. The existing Gamma Substation, located to the south-west of the site was identified as the preferred grid connection point for the project.

» **Site access**: Access to the project site is ample with the presence of existing roads mainly consisting of national and regional roads. The project site is situated directly adjacent to the N1 national road, which provides access to the project site and development area. The R398 is located to the north-east of the project site and the R63 is located to the south-west of the project site. The gravel main access road located to the north-east of the project site provides direct access to the project site and the development area and will therefore be utilised for accessing the project site and development area.

Based on the above considerations, the Nku Solar PV project site was identified by the developer as being the most technically feasible and viable project site within the broader area for further investigation in support of an application for authorisation. As a result, no property/location alternatives are proposed as part of this Scoping and EIA process.

3.3.2. Design and Layout Alternatives

The overall aim of the facility layout (i.e. development footprint) is to maximise electricity production through exposure to the solar resource, while minimising infrastructure, operation, and maintenance costs, and social and environmental impacts. The findings of the specialist scoping assessments will assist the developer in selecting the optimum position for the PV arrays and associated infrastructures including, but not limited to, access roads, and laydown areas.

An overall environmental scoping sensitivity map has been provided in order to illustrate the sensitive environmental features located within the project site which needs to be considered and, in some instances completely avoided by the development footprint (refer to Chapter 8). Once more detailed information is available from an environmental and planning perspective for the broader site, a detailed micro-siting exercise will be undertaken to effectively 'design' the solar facility layout within the project site, which will be known as the development footprint. Through the process of determining constraining factors and environmentally sensitive areas, the layout of the PV facility footprint and infrastructure will be planned and adjusted if necessary to ensure the avoidance of no-go areas and mitigation of sensitive environmental features. A detailed facility layout will be developed and will be made available for assessment and ground-truthing by the independent specialists in the EIA phase. Where further conflicts are predicted, a mitigation strategy will be developed to meet the objectives of the mitigation hierarchy (avoid, minimise, mitigate).

3.3.3. Activity Alternatives

Great Karoo Renewable Energy (Pty) Ltd is a renewable energy project developer and as such is only considering renewable energy activities in accordance with the need for such development as identified within the IRP. The only activity considered for implementation on the identified site is therefore power generation.

3.3.4. Technology Alternatives

As Great Karoo Renewable Energy (Pty) Ltd is an IPP, only renewable energy technologies are being considered for the generation of up to 100MW (contracted capacity) of electricity. Considering the available natural energy resources within the area (i.e. solar irradiation) and the current significant restrictions placed on other natural resources such as water, it is considered that solar energy is the preferred option for the development of a renewable energy facility within the preferred project site.

The project site is located near the towns of Richmond and Victoria West in the Northern Cape Province which has the Global Horizon Irradiation (GHI) of approximately 2240 kWh/m^{2}/annum. Based on available information, it is concluded by the tat the project site is considered best suited for the development of a solar PV facility. Considering the suitability of the project site for the development of a solar PV facility, the current land-use activities being undertaken within the project site which relate to livestock farming and compatibility thereof, the activity (i.e., the development of a solar PV facility) is considered to be appropriate. Therefore, not activity alternatives are considered within this Scoping Report.

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.

The Integrated Resource Plan (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. Solar PV consists of a lower visual profile and limited water requirements when compared to the CSP technology option.

Therefore, considering the above, no other technology alternatives are being assessed for development on the proposed site.

When considering PV as a technology choice, several types of panels 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 remains 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.

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. Once environmental constraining factors have been determined through the Scoping and EIA process, Great Karoo Renewable Energy (Pty) Ltd will consider various solar panel options. The preferred option will be informed by efficiency as well as environmental impact and constraints (such as sensitive biophysical features). The PV panels proposed, 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. The Battery Energy Storage System (BESS) capacity will depend on technology to be used and total installed capacity of solar, and it is expected to be in the order of 200-600 MW to 200-800 MWh.

3.3.5 The 'Do-Nothing' Alternative

The 'Do-Nothing' alternative is the option of not constructing Nku Solar PV Facility. 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 Nku Solar PV Facility, 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 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 Nku Solar PV Facility 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 Nku Solar PV Facility.

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.

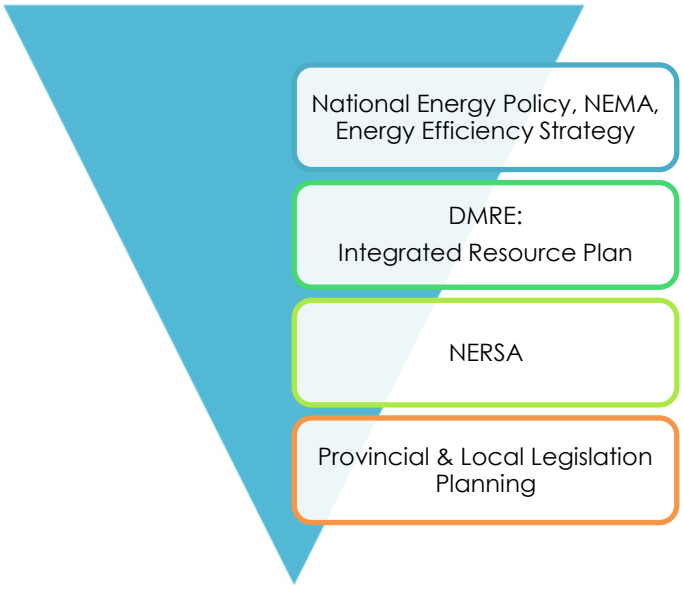

Figure 4.1: Hierarchy of electricity and planning documents

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 Forestry, Fisheries and the Environment (DFFE):** 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 Human Settlements, Water and Sanitation (DHSWS):** This Department is responsible for effective and efficient water resources management to ensure sustainable economic and social development. This Department is also responsible for evaluating and issuing licenses pertaining to water use (i.e. Water Use Licenses (WUL) and General Authorisation).
- **The Department of Agriculture, Rural Development and Land Reform (DARDLR):** 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 **Ubuntu Local Municipality** which forms part of the **Pixley Ka Seme 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 International Policy and Planning Context

A brief review of the most relevant international policies relevant to the establishment of the Nku Solar PV facility are provided below in **Table 4.1**. The Nku Solar PV facility is considered to be aligned with the aims of these policies, even if contributions to achieving the goals therein are only minor.

Table 4.1: International policies relevant to the Nku Solar PV facility

Relevant policy	Relevance to the Nku Solar PV facility
United Nations Framework Convention on Climate Change (UNFCCC) and Conference of the Party (COP)	The Conference of the Parties (COP), established by Article 7 of the UNFCCC, is the supreme body and highest decision-making organ of the Convention. It reviews the implementation of the Convention and any related legal instruments and takes decisions to promote the effective implementation of the Convention. 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. 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. South Africa's National Climate Change Response Policy (NCCRP) establishes South Africa's approach to addressing climate change, including adaptation and

Relevant policy	Relevance to the Nku Solar PV facility
	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 the Nku Solar PV facility 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 IV (October 2020)	The Equator Principles (EPs) IV 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 the Nku Solar PV facility) 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 the Nku Solar PV facility. 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. The Nku Solar PV facility is currently being assessed in accordance with the requirements of the 2014 EIA Regulations, 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

Relevant policy	Relevance to the Nku Solar PV facility
	an Environmental and Social Management System (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 Standards 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 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 the Nku Solar PV facility, 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.

4.4 National Policy and Planning Context

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 112 independent power producers (IPPs), with 4 724MW operational and made available to the grid[10]. 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.

A brief review of the most relevant national policies is provided below in **Table 4.2**. The development of Nku Solar PV Facility is considered to align with the aims of these policies, even where contributions to achieving the goals therein are only minor.

Table 4.2: Relevant national legislation and policies for Nku Solar PV Facility

Relevant legislation or policy	Relevance to Nku Solar PV Facility
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

[10]http://www.nersa.org.za/wp-content/uploads/2021/05/Monitoring-of-Renewable-Energy-Performance-of-Power-Plants-%E2%80%93-Performance-of-Power-Plants-in-2020

Relevant legislation or policy	Relevance to Nku Solar PV Facility
	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. The undertaking of an EIA process for the proposed project in terms of the requirements of the EIA Regulations, 2014 (as amended) aims to minimise any impacts on the natural and social environment.
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.
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 into account environmental management requirements and interactions amongst economic sectors, as well as matters relating to renewable energy. The National Energy Act also provides for energy planning, increased generation and consumption of renewable energies, contingency energy supply, holding of strategic energy feedstocks and carriers, adequate investment in, appropriate upkeep and access to energy infrastructure. The Act provides measures for the furnishing of certain data and information regarding energy demand, supply, and generation, and for establishing an institution to be responsible for promotion of efficient generation and consumption of energy and energy research. The Act provides the legal framework which supports the development of power generation facilities. The Act also provides for licences and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated. The development of the Nku Solar PV facility will have to ensure compliance with this Act as a license for the generation of electricity will be required.
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

Relevant legislation or policy	Relevance to Nku Solar PV Facility
	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 accessible and affordable coal resources. However, massive RE resources that can be sustainable alternatives to fossil fuels, have so far remained largely untapped. The development of additional renewable energy projects will promote the use of the abundant South African renewable energy resources and contribute to long-term energy security and diversification of the energy mix.
The Electricity Regulation Act (No. of 2006)	The Electricity Regulation Act of 2006, replaced the Electricity Act (No. 41 of 1987), as amended, except for 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), 2016	The purpose and objectives of the Integrated Energy Plan (IEP) are derived from the National Energy Act (No. 34 of 2008). The IEP takes into consideration the crucial role that energy plays in the entire economy of the country and is informed by the output of analyses founded on a solid fact base. It is a multi-faceted, long-term energy framework which has multiple aims, some of which include: » To guide the development of energy policies and, where relevant, set the framework for regulations in the energy sector. » To guide the selection of appropriate technologies to meet energy demand (i.e., the types and sizes of new power plants and refineries to be built and the prices that should be charged for fuels). » To guide investment in and the development of energy infrastructure in South Africa. » To propose alternative energy strategies which are informed by testing the potential impacts of various factors such as proposed policies, introduction of new technologies, and effects of exogenous macro-economic factors. A draft version of the IEP was released for comment on 25 November 2016. The purpose of the IEP is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development. The development of the IEP is an ongoing continuous process. It is reviewed periodically to take into account changes in the macroeconomic environment,

Relevant legislation or policy	Relevance to Nku Solar PV Facility
	developments in new technologies and changes in national priorities and imperatives, amongst others. The 8 key objectives of the integrated energy planning process are as follows: » Objective 1: Ensure security of supply. » Objective 2: Minimise the cost of energy. » Objective 3: Promote the creation of jobs and localisation. » Objective 4: Minimise negative environmental impacts from the energy sector. » Objective 5: Promote the conservation of water. » Objective 6: Diversify supply sources and primary sources of energy. » Objective 7: Promote energy efficiency in the economy. Objective 8: Increase access to modern energy.
Integrated Resource Plan for Electricity (IRP) 2010-2030	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 4 724MW being currently operational and made available to the grid[11]. 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 6422MW 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

[11]http://www.nersa.org.za/wp-content/uploads/2021/05/Monitoring-of-Renewable-Energy-Performance-of-Power-Plants-%E2%80%93-Performance-of-Power-Plants-in-2020

Relevant legislation or policy	Relevance to Nku Solar PV Facility
	PV facilities by 2030 to 8 288MW. Therefore, the development of the Nku Solar PV facility is supported by the IRP 2019.
New Growth Path (NGP) Framework, 23 November 2010	The purpose of the New Growth Path (NGP) Framework is to provide effective strategies towards accelerated job-creation through the development of an equitable economy and sustained growth. The target of the NGP is to create 5 million jobs by 2020; with economic growth and employment creation as the key indicators identified in the NGP. The framework seeks to identify key structural changes in the economy that can improve performance in terms of labour absorption and the composition and rate of growth. To achieve this, government will seek to, amongst other things, identify key areas for large-scale employment creation, as a result of changes in conditions in South Africa and globally, and to develop a policy package to facilitate employment creation in these areas.
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. In formulating its vision for the energy sector, the NDP took the IRP 2010 as its point of departure. Therefore, although electricity generation from coal is still seen as part of the energy mix within the NDP, the plan sets out steps that aim to ensure that, by 2030, South Africa's energy system will look very different to the current situation: coal will contribute proportionately less to primary-energy needs, while gas and renewable energy resources – especially wind, solar, and imported hydroelectricity – will play a much larger role. The NDP aims to provide a supportive environment for growth and development, while promoting a more labour-absorbing economy. The development of Nku Solar PV facility 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 Nku Solar PV Facility
	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 Nku Solar PV Facility 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 Nku Solar PV Facility, 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. Nku Solar PV Facility comprises a renewable energy generation facility and would not result in the generation or release of emissions during its operation.

4.5 Provincial Planning and Context

A brief review of the most relevant provincial policies is provided below in **Table 4.3**. 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 4.3: Relevant provincial legislation and policies for Nku Solar PV Facility

Relevant policy	Relevance to Nku Solar PV Facility
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 Nku Solar PV Facility 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 Nku Solar PV Facility 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 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*

Relevant policy	Relevance to Nku Solar PV Facility
	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 Nku Solar PV Facility will assist in achieving (although only to a limited extent) the promotion of the provincial green economy of the Northern Cape.
Northern Cape Province Green Document	The NCP Green Document (2017-2018) was prepared by the Northern Cape Department of Economic Development and Tourism and provides an impact assessment of IPPs on the communities in the province located within a 50km radius from existing facilities. The document notes that the NCP is nationally a leader in commercial-scale renewable energy projects. By 2018, a total of 23 IPP projects in the province had been integrated into the national grid. These projects include Solar PV, Concentrated Solar, and Wind Energy Facilities. The document notes that through their economic development obligations, these projects have already made a significant positive contribution to affected communities. Much of the effort has been directed at supporting local education. The document also notes that, as these projects are committed to 20-year minimum lifespans, they collectively hold a tremendous potential for socio-economic upliftment. The development of the Nku Solar PV facility will contribute towards further socio-economic upliftment in the Northern Cape Province.
Northern cape Critical Biodiversity Area (CBA) Map (2016)	The Northern Cape Critical Biodiversity Area (CBA) Map (Figure 4) was published in 2016 and updates, revises and replaces all older systematic biodiversity plans and associated products for the province. The Northern Cape CBA map classifies the natural vegetation of the province according to conservation value in decreasing value, as follows: 1. Protected 2. Critical Biodiversity Area One (Irreplaceable Areas) 3. Critical Biodiversity Area Two (Important Areas) 4. Ecological Support Area 5. Other Natural Area At a regional level, the Critical Biodiversity Area (CBA) map for Northern Cape indicates the northern part of the site as being important for conservation. There are also two drainage lines (the two main ones on site) that are designated as being CBA1 areas. The remaining drainage lines of the study area are indicated as being Ecological Support Areas (ESAs).

Relevant policy	Relevance to Nku Solar PV Facility
	The development area for the Nku PV does not fall within any CBAs. There are however ESAs (i.e, the drainage lines) that encroach into the development area)

4.6 Local Policy and Planning Context

The local tiers of government relevant to the Nku Solar PV Facility project are the Ubuntu Local Municipality and the Pixley Ka Seme District Municipality. Instruments and/or policies at both the district and local level contain objectives which align with the development of Nku Solar PV Facility. These include, economic growth, job creation, community upliftment and poverty alleviation.

Table 4.4: Relevant district and local legislation and policies for Nku Solar PV Facility

Relevant policy	Relevance to Nku Solar PV Facility
Pixley District Municipality Integrated Development Plan (2019-2020)	The vision for the PKSDM is "Developed and Sustainable District for Future Generations" The mission statement that underpins the vision is: » Supporting our local municipalities to create a home for all in our towns, settlements, and rural areas to render dedicated services. » Providing political and administrative leadership and direction in the development planning process. » Promoting economic growth that is shared across and within communities. » Promoting and enhancing integrated development planning in the operations of our municipalities. » Aligning development initiatives in the district to the National Development Plan. The Strategic Objectives to address the vision that are relevant to the project include the promotion of economic growth in the district and enhancement of service delivery. Chapter 4 of the IDP, Development of Strategies, highlights the key strategies of the PKSDM. The IDP also notes that the growth and development context in the district has also changed radically since 2013 (after it had been stagnant for decades) owing mainly to private and public investments in the area as a hub for renewable energy generation and astronomy. The IDP notes that the economy in the Pixley Ka Seme municipal area is characterised by: » High levels of poverty and low levels of education. » Low levels of development despite the strategic location in terms of the national transport corridors. » High rate of unemployment, poverty, and social grant dependence. » Prone to significant environmental changes owing to long-term structural changes (such as climate change, energy crises and other shifts). Of specific relevance, the IDP highlights the potential for renewable energy to help address some of these challenges. The development of the Nku Solar PV facility will promote economic development in the Pixley Ka Seme municipal area, thereby assisting in addressing some the challenges faced by the district municipality as detailed in the IDP.

Relevant policy	Relevance to Nku Solar PV Facility
Pixley Ka Seme District Municipality Spatial Development Framework (SDF) (2017)	The SDF notes that the vision for the PKSDM is "Pixley Ka Seme District Municipality, pioneers of development, a home and future for all". The Mission Statement that underpins the vision refers to: » Effective and efficient service delivery. » Optimal human and natural resource development. » Local economic growth and development, job creation and poverty alleviation. » A vibrant tourism industry. » To participate in the fight to reduce the infection rate and lessen the impact of HIV/AIDS and other communicable diseases. » A safe, secure and community friendly environment. The SDF identifies the opportunities and constraints associated with the district. An opportunity of relevance to the Nku Solar PV facility is renewable energy and the development of a renewable energy hub in the region.
Ubuntu Local Municipality Integrated Development Plan (IDP) (2019 – 2020)	The vision of ULM is "By 2030, Ubuntu Municipality shall be the best rural municipality through relentless pursuit of excellence through focused governance, efficient administration, and effective service delivery for inclusive targeted social and economic development against all odds". The mission is to: » Maximize the utility of the municipal resources in a sustainable, developmental, and economic manner to better the life of all. » Improve institutional effectiveness and efficiency. » Optimally develop our human, financial and natural resources. » Create an enabling environment for local economic growth in order to create employment opportunities and alleviate poverty. » Work with all our existing and prospective partners to establish a vibrant tourism industry. » Participate in the fight to reduce the HIV/AIDS infection rate and lessen the impact thereof. » Focus on youth development, women empowerment and enabling the disabled to play a meaningful role in unlocking human potential. » Ensure a safe, secure and community friendly environment. » Maintain sound and sustainable management of financial and fiscal affairs. The IDP identifies a number of challenges facing the area in terms of economic development and growth. Of relevance to the project these include: » Unemployment and poverty. » Shortage of critical skills » Needs of vulnerable groups, including women, disabled and youth. » Access to basic services such as water, sanitation, electricity and housing. » Improved access to services in education, health and social services. » Reduction in the rate of crime. These issues can be addressed by supplier and enterprise development and enterprise development spend linked to the Nku Solar PV facility.

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 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 Nku Solar PV Facility 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 Nku Solar PV Facility, 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.

Targets		Indicators	
		7.1.2	Proportion of population with primary reliance on 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 Nku Solar PV Facility would contribute positively towards Goal 7 of the SDGs through the following:

- By generating up to100MW (contracted capacity) 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.

The Kyoto Protocol (1997) is also relevant to the need for the development of the Nku solar PV from an international perspective. The protocol calls for the reduction of South Africa's greenhouse gas emissions through actively cutting down on using fossil fuels, or by utilising more renewable resources. The development of the Nku Solar PV facility will add capacity to the renewable energy sector of the country and strengthen the commitment and action plan to achieve the requirements, as set out in the protocol, through the generation of energy without the emission of greenhouse gasses.

5.3 Need and Desirability from a National Perspective

The National Development Plan (NDP) envisages that, by 2030, South Africa will have an energy sector that provides reliable and efficient energy service at competitive rates; that is socially equitable through expanded access to energy at affordable tariffs; and that is environmentally sustainable through

reduced emissions and pollution. Historically, coal has provided the primary fuel resource for baseload electricity generation in South Africa. Consequently, Eskom, who is the main electricity generating company in the country, generates approximately 85% of the country's electricity from coal resources (Stats SA, 2016), resulting in a large carbon footprint. Taking into consideration the need to ensure adequate supply of electricity and meet international obligations in terms of addressing climate change, Government has identified the need to diversify the energy mix within the country.

Nku Solar PV Facility is proposed in specific response to the requirement for diversification of the country's energy mix to include renewable energy such as solar PV as detailed in the IRP 2019. As a result, the need and desirability of Nku Solar PV Facility 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 considers the three pillars of sustainable development, and lists the following as the eight key energy planning objectives:

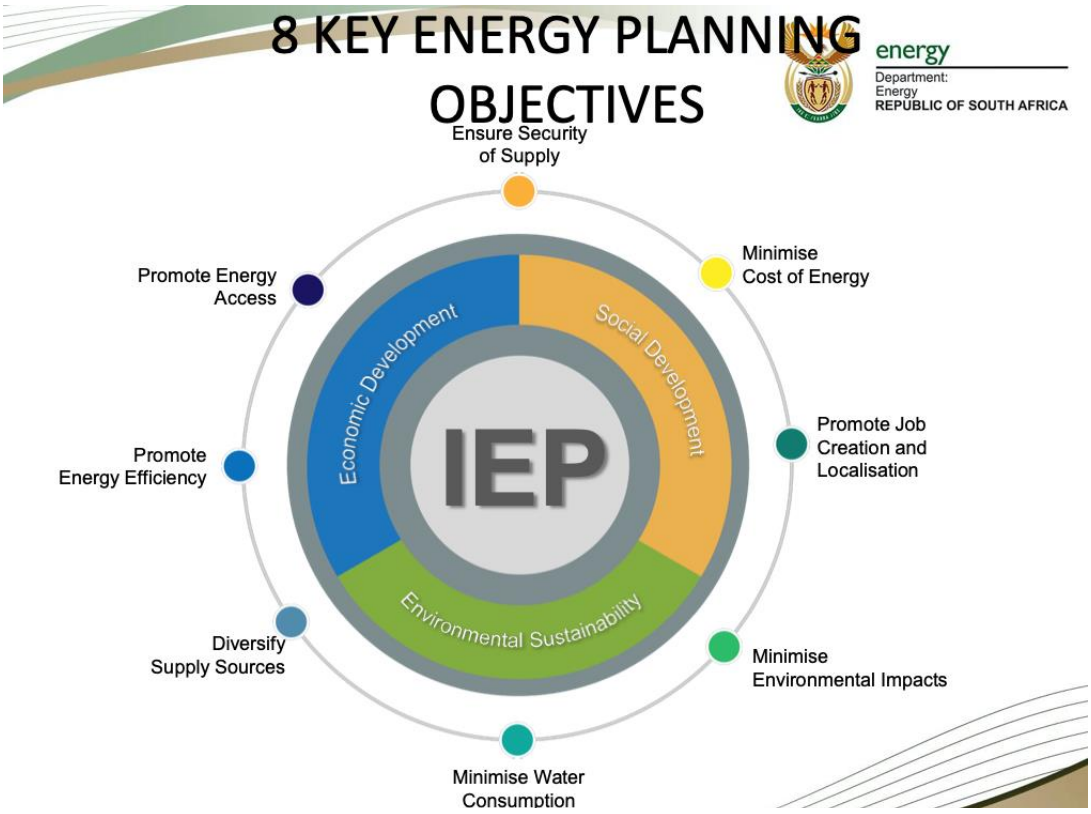

Figure 5.1: Eight key energy objectives as listed in the IEP, 2016 (extract from DOE presentation, December 2016)

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 megajoules per square meter [MJ/m²]) (Stassen, 1996), compared to about 3.6kWh/m² in parts of the United States and about 2.5kWh/m² in Europe and the United Kingdom. The total area of high radiation in South Africa amounts to approximately*
194 000km², 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 30.2MW, and just 1% of the high radiation area in the country being made available for solar power generation, the generation potential is approximately 64GW. 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 IRP for Electricity 2010 – 2030 (gazetted in 2019) is a subset of the IEP and constitutes 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. This plan provides for the development of 8288MW of capacity from Solar Photovoltaic energy facilities by 2030, with an annual contribution of 1000MW from 2022.

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. 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. 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. Since the promulgated IRP 2010, the following capacity developments have taken place:

- A total of **6 422MW** of electricity had been procured at the end of March 2019 from 112 renewable energy Independent Power Producers (IPPs) in seven bid rounds (DoE Independent Power Producers Procurement Programme (IPPPP) - An Overview, March 2019).
- **2 000MW** of generating capacity (comprising various technologies) has been awarded to 8 Independent Power Producers under the recent RMIPPPP.
- At the end of March 2019, **3976MW** of electricity generation capacity from 64 IPP projects has been connected to the national grid ((DoE, March 2019).
- **1 005MW** has been commissioned by IPPs from the two (2) Open Cycle Gas Turbine (OCGT) peaking plants; and
- Under the Eskom Build Programme, **1 332MW** has been commissioned from the Ingula Pump Storage Project in Kwa-Zulu Natal, **1 588MW** and **800MW** from the Medupi and Kusile power stations, and **100MW** has been commissioned from the Sere Wind Farm.

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 Nku Solar PV Facility 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).

Nku Solar PV Facility 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, Nku Solar PV Facility 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).

5.3.1 Benefits of Renewable Energy and the Need and Desirability in the South Africa Environment

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

Socio-economic upliftment of local communities: Nku Solar PV Facility 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.

Nku Solar PV Facility 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[12]. 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:

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

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.

By the end of March 2019, the REIPPPP had made the following significant impacts in terms of energy supply:

» 6 422MW of electricity had been procured from 112 Renewable Energy Independent Power Producers (IPPs) in seven bid rounds.
» 4 724MW of electricity generation capacity from 64 IPP projects has been connected to the national grid.
» 35 669 GWh6 of energy has been generated by renewable energy sources procured under the REIPPPP since the first project became operational. Renewable energy IPPs have proved to be very reliable. Of the 64 projects that have reached COD, 62 projects have been operational for longer than a year. The energy generated over the past 12-month period for these 62 projects is 10 648 GWh, which is 96% of their annual energy contribution projections of 11 146 GWh over a 12-month delivery period. Twenty-eight (28) of the 62 projects (45%) have individually exceeded their projections.

Economics: As a result of the excellent resource and competitive procurement processes, both wind power and solar PV power are now proven in South Africa as cheaper forms of energy generation than coal power. They offer excellent value for money to the economy and citizens of South Africa while benefitting society as a whole through the development of clean energy.

The following has been achieved by the IPP programme (March 2019) in terms of investment and economics:

» Investment (equity and debt) to the value of R209.7 billion10, of which R41.8 billion (20%) is foreign investment, was attracted.
» Socio-economic development contributions of R860.1 million to date, of which R81.1 million was spent in this 2019 reporting quarter.
» Enterprise development contributions of R276.7 million to date, of which R26.5 million was spent in this 2019 reporting quarter.

Pollution reduction: The release of by-products through the burning of fossil fuels for electricity generation has a particularly hazardous impact on human health and contributes 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.

The overview of the Independent Power Producers Procurement Report (March 2019) indicates that a carbon emission reduction of 36.2 Mton CO_2 has been realised by the IPP programme from inception to date, of which 2.91 Mton is in the 2019 reporting quarter.

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[13] of 25.3 million tonnes of CO_2 (IPP Office, March 2018). The development of Nku solar PV, 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 the Kyoto Protocol and the Paris Agreement, 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. The construction phase will create temporary employment opportunities and the operation phase will create limited full-time employment opportunities.

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

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

Protecting the natural foundations of life for future generations: Actions to reduce 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.

5.4 Need and Desirability of the project from a Regional Perspective

South Africa's electricity generation mix has historically been dominated by coal.
This can be attributed to the fact that South Africa has abundant coal deposits, which are relatively shallow with thick seams, and are therefore easy and comparatively cost effective to mine. In 2016, South Africa had a total generation capacity of 237 006GWh. Approximately 85.7% (equivalent to 203 054GWh) of this figure was generated by coal (predominantly located in Mpumalanga and Limpopo), and only 0.9% (equivalent to 2 151GWh) was generated by solar (refer to **Figure 5.2**).

[13] 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.

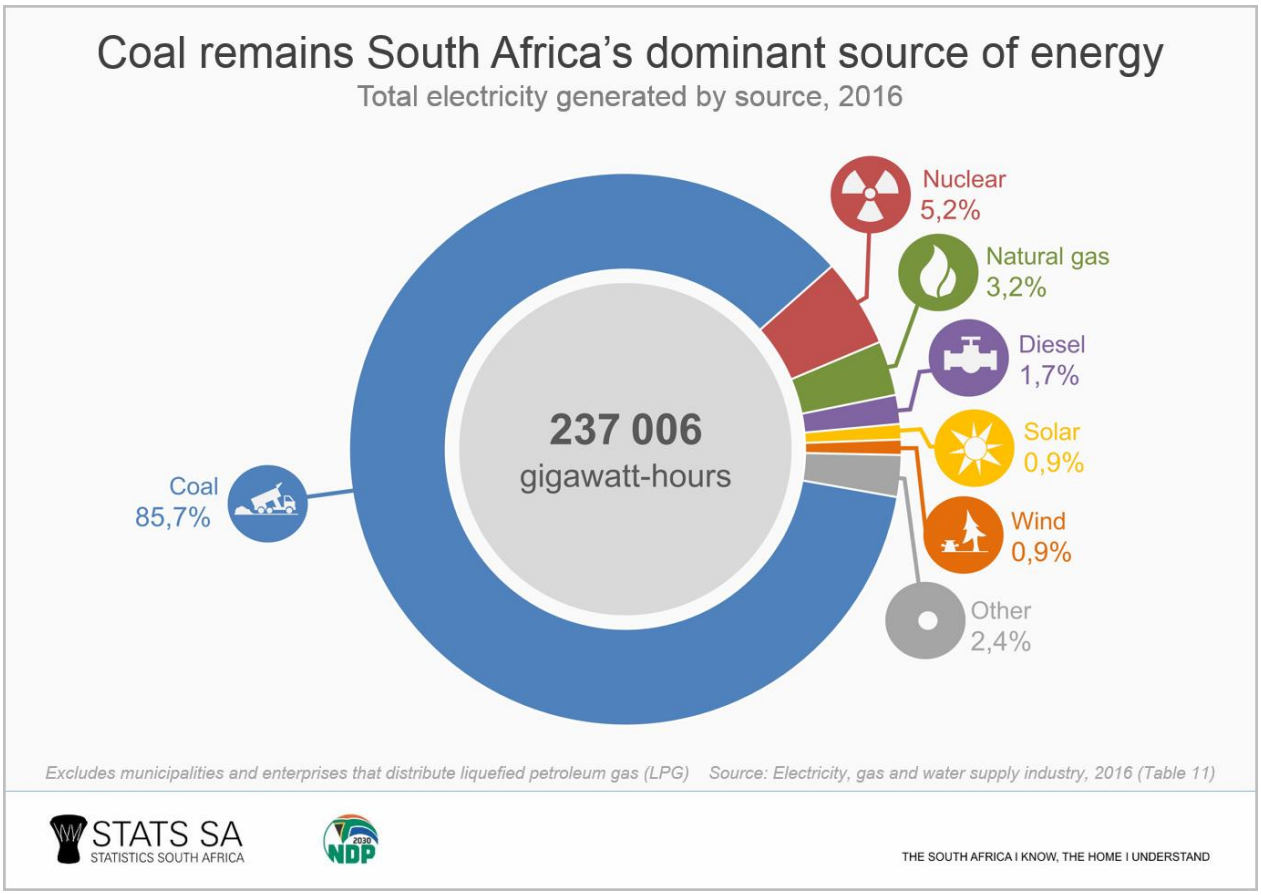

Figure 5.2: Overview of South Africa's electricity generation by source (Source: StatsSA 2016 Electricity, gas and water supply industry).

Whereas 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 a highly feasible and viable option. As detailed in Chapter 4, 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 location of the study area and project site within the Northern Cape is therefore considered to support the Province/Region's generation targets. The location of the study area and the project site within the Northern Cape is therefore considered to support the Province/ Region's generation targets.

5.5 Need and Desirability of the project from a District and Local Perspective

The Strategic Objectives to address Pixley Ka Seme District Municipality and Ubuntu Local Municipality vision that are relevant to the project include the promotion of economic growth in the district and enhancement of service delivery. Chapter 4 of the Pixley Ka Seme District Municipality Integrated Development Plan, Development of Strategies, highlights the key strategies of the district. The IDP also notes that the growth and development context in the district has also changed radically since 2013 (after it had been stagnant for decades) owing mainly to private and public investments in the area as a hub for renewable energy generation and astronomy. The potential in the area for Renewable Energy developments including the development of the Nku Solar PV facility will promote economic

development in the Pixley Ka Seme District and the Ubuntu Local Municipality area, thereby assisting in addressing some of the challenges faced locally such as.

- High levels of poverty and low levels of education.
- Low levels of development despite the strategic location in terms of the national transport corridors.
- High rate of unemployment, poverty, and social grant dependence.
- Prone to significant environmental changes owing to long-term structural changes (such as climate change, energy crises and other shifts).

These issues can be addressed by supplier and enterprise development and enterprise development spend linked to the Nku Solar PV facility.

The official unemployment rate in the Ubuntu Local municipality in 2011 was 18.1%, while 44.2% were employed, and 33.2% were regarded as not economically active. The figures for Ward 3 (i.e., the affected ward) in 2011 were 6.8% unemployed, 62.5% employed and 28.4% not economically active. With the development of the Nku solar PV facility, secondary social benefits can be expected in terms of additional spend in the nearby towns due to the increased demand for goods and services.
Considering the above, it is clear that a need for employment opportunities and skills development is present within the area.

5.6 Receptiveness of the proposed development area for the establishment of Nku Solar PV Facility

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 as detailed in chapter 3. 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.

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 Nku Solar PV Facility is a listed activity requiring Environmental Authorisation (EA). The application for EA is required to be supported by a Scoping & Environmental Impact Assessment (EIA) process based on the contracted capacity of the facility being 100MW and Activity 1 of Listing Notice 2 (GNR 325) being triggered.

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,** and is illustrated in Figure 6.1 Public Participation forms an important component of the process and is undertaken throughout both phases.

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

1.6 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 Nku Solar PV Facility is included in **Section 6.5.2** and copies of the supporting documents and inputs are included in **Appendix C**.

Requirement	Relevant Section
(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 Nku Solar PV Facility, 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 applicable to the project 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 Nku Solar PV Facility is a power generation project and relates to the IRP for Electricity 2010 – 2030, the National Department of Forestry, Fisheries and the Environment (DFFE) 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 Nku Solar PV Facility is being 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 details the listed activities in terms of the EIA Regulations, 2014 (as amended) that apply to the Nku Solar PV, and for which an application for Environmental Authorisation has been submitted to the DFFE. The table also includes a description of the specific project activities that relate to the applicable listed activities.

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. ***to connect the Nku PV facility to the grid connection infrastructure will consist of a 132kV onsite substation and 132kV cabling (buried or overhead) and will collectively exceed 2km outside an urban area for each project respectively.***
Listing Notice 1 (GNR 327) 08 December 2014 (as amended)	12(ii)(a)(c)	The development of – (ii) Infrastructure or structures with a physical footprint of 100 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 ***The construction and operation of the Nku PV facility and associated infrastructure will occur within rivers, as well as within 32m of watercourses. 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. ***The development of the Nku PV facility will require the construction and operation of facilities and infrastructure for the storage and handling of dangerous goods (combustible and flammable liquids, such as oils, lubricants, solvents) associated with the on-site substations, where such storage will occur inside containers with a combined capacity exceeding 80 cubic meters but not exceeding 500 cubic meters.***
Listing Notice 1 (GNR 327) 08 December 2014 (as amended)	19 (ii)	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a (i)watercourse; ***Parts of the development area for the Nku PV facility consist of extensive rivers throughout. Therefore, during the construction phase, 10 cubic metres of rock will be removed from the watercourses for the development of the Nku PV facility and associated infrastructure.***

Notice Number	Activity Number	Description of listed activity
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 Nku PV facility will require the construction of new access roads in areas where no road reserve exists to provide access to the facility. These are likely to exceed 8m in width.***
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 1 hectare. ***The total area to be development (i.e., the development footprint) for the Nku PV facility is greater than 1ha and occurs outside an urban area in an area currently zoned for agriculture.***
Listing Notice 1 (GNR 327) 08 December 2014 (as amended	56(ii)	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre (ii) where no reserve exists, where the existing road is wider than 8 metres. ***Existing farm roads within the project site may require widening, and access roads will be widened by more than 6 metres.***
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 20 megawatts or more, ***The project comprises a renewable energy generation facility, which will utilise solar power technology and will have a generating capacity of up to 100MW.***
Listing Notice 2 (GNR 325) 08 December 2014 (as amended)	15	The clearance of an area of 20ha or more of indigenous vegetation[14]. ***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 indigenous vegetation within an area in excess of 20ha for the development infrastructure.***
Listing Notice 3 (GNR 324) 08 December 2014 (as amended	10(g)(ii)	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 metres

[14] "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
		g. Northern Cape ii. Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland. ***The development of the Nku PV facility will require the construction and operation of facilities for the storage and handling of a dangerous goods (combustible and flammable liquids, such as oils, lubricants, solvents) associated with the on-site substations, where such storage will include insider containers with a capacity of 80 cubic meters. Parts of the development area for the Nku PV facility consist of extensive rivers throughout. The development area falls within the Northern Cape Province.***
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 metres of a watercourse, measured from the edge of a watercourse. g. Northern Cape ii. Outside urban areas: (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. ***The development of the Nku PV facility will require the establishment of infrastructure with a physical footprint exceeding 10m^2 within 32m of the watercourses. The project site comprises areas classified as Other Natural Areas (ONA) and falls outside of an urban area***.
Listing Notice 3 (GNR 324) 08 December 2014 (as amended	18(g)(ii)(ii)	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. g. Northern Cape ii. Outside urban areas: Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland. ***The development of the Nku PV will require the widening of roads by more than 4m, outside urban areas, within a watercourse or wetland and***

Notice Number	Activity Number	Description of listed activity
		within 100m from the edge of a watercourse or wetland in the Northern Cape Province.

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 Human Settlement, Water and Sanitation (DHSWS) 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.

In terms of the NFEPA (2011) and the NBAs 2018 National Wetlands Map 5 no wetlands are located within the extent of the project area. However, areas classified as rivers are extensive throughout the project.

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 ***The development area considered for the establishment of the Nku Solar PV facility has no wetlands located within the extent of the project area, however there are areas classified as rivers throughout the project development area, that might be affected by the activities pertaining to the establishment of the solar PV facility. This will be confirmed during the EIA phase.***
NWA (No. 36 of 1998)	Section 21 (i)	Altering the bed, banks, course or characteristics of a watercourse. ***The development area considered for the establishment of the Nku Solar PV facility has no wetlands located within the extent of the project area, however there are areas classified as rivers throughout the project development area, that might be affected by the activities pertaining to the establishment of the solar PV facility. This will be confirmed during the EIA phase.***

In the event that the flow of water in the watercourses is affected and the bed, banks or course characteristics are altered then a water use authorisation would be required. This will need to be 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 requirements of

Revision of General Authorisation. The process of applying for a WUL or GA registration will only be completed once a positive EA has been received and the project selected as Preferred Bidder. This is in line with the requirements of the Department of Human Settlement Water and Sanitation (DHSWS).

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 Nku Solar PV Facility

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 Nku Solar PV Facility requires EA from DFFE 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) this Scoping Report prepared for the project will be subject to a 30-day review and comment period during which any Interested and Affected Party (I&AP) or Authority are invited to review and provide comment on the findings (refer to **Figure 6.2**). Following the completion of this review period, a Final Scoping Report which incorporates all comments received during the 30-day public review and comment period, will be prepared and submitted to DFFE for its consideration. Following its receipt of the Final Scoping Report DFFE 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 DFFE for its consideration. Following its receipt of the Final EIA Report and EMPr, DFFE has 107 days within which to either grant or refuse the EA.

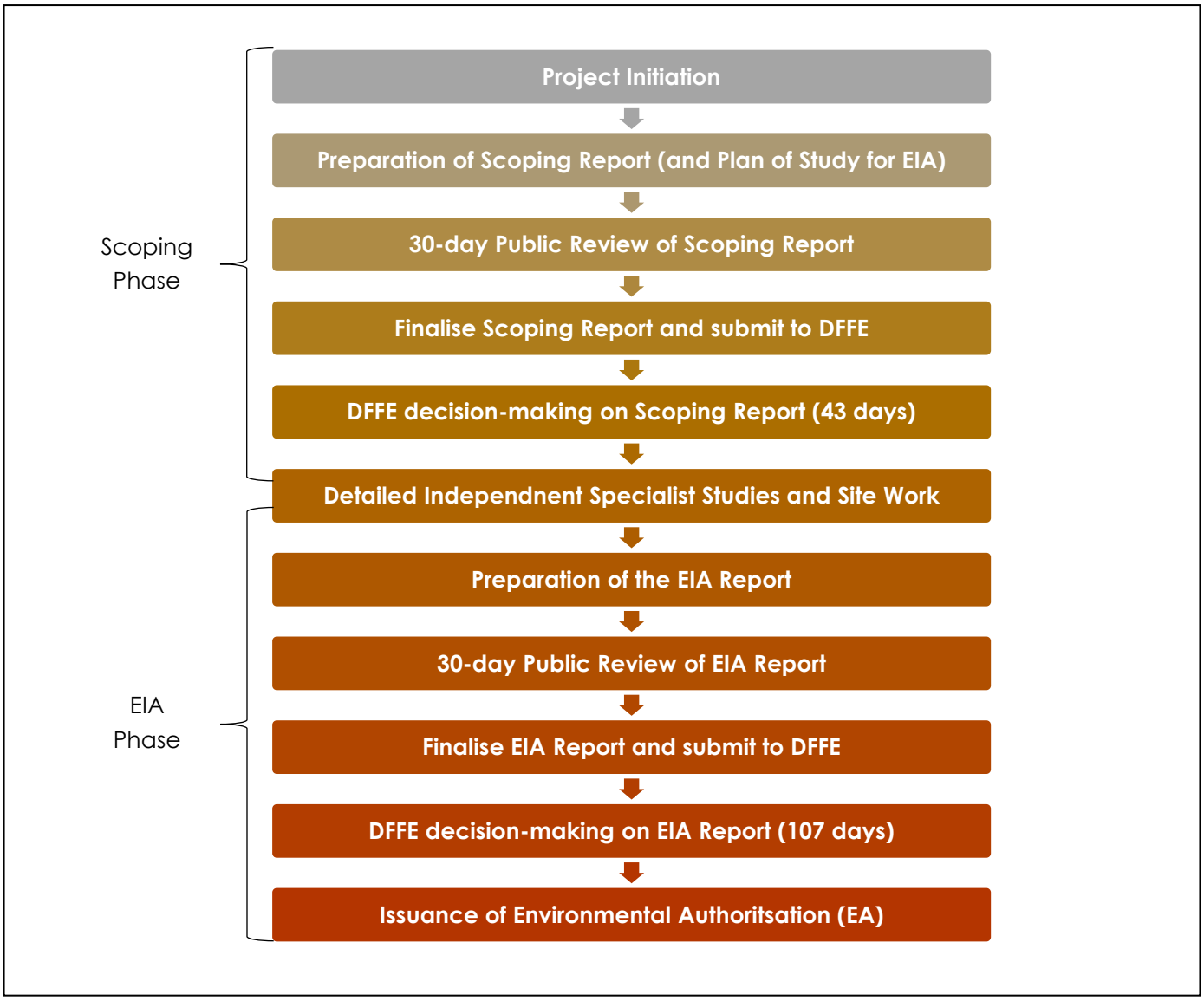

Figure 6.2: Regulated timeframe of an Environmental Impact Assessment (EIA) Process

6.4 Objectives of the Scoping Phase

This Scoping Report documents the evaluation of potential environmental impacts of Nku Solar PV Facility 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 Scoping Report.
» Activities to be undertaken for the development of Nku Solar PV Facility 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 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 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 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 (DFFE) 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 DFFE) 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.
» Undertaking of independent specialist studies in accordance with Appendix 6 of the EIA Regulations, 2014 (GNR326), as amended, and the requirements of the Specialist Protocols published in Regulation GNR 320, issued 20 March 2020 and GNR 1150 of 30 October 2020, where relevant, as well as other relevant guidelines.

- 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 DFFE 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 DFFE 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 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:

- Submission of a pre-application meeting request form, together with the public participation plan to the DFFE via email for approval on **02 September 2021**. Following submission of the public participation plan, the DFFE provided approval of the submitted PP Plan via email on **15 September 2021**, and no pre-application meeting was considered necessary (refer to **Appendix C9**).
- Submission of the Application for Environmental Authorisation to the DFFE via the use of the DFFE 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 DFFE (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**.

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 Nku Solar PV Facility has been run in tandem with the public consultation for Moriri Solar PV Facility and Kwana Solar PV Facility, located adjacent to 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 Nku Solar PV Facility 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, Fisheries and the Environment (DFFE) in terms of consultations with I&APs. A Public Participation Plan was prepared and submitted to DFFE for approval. Approval of the Plan was provided by the DFFE Case Officer via email **15 September 2021** (**Appendix B**).

The traditional means and opportunities available for the undertaking of public participation will still be covered and implemented as part of the public participation plan considering the current limitations. 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 which may not be 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 contains 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. Where parties do not have access to electronic systems to access the project information, opportunity for them to engage with the project team is facilitated through alternative means, such as consultation with the Ward Councillor, community representatives or one-on-one engagement, where the relevant Regulations to minimise, risks associated with COVID-19 can be adhered to.

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
  - 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 or other appropriate means.
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	•Virtual presentations (both English and Afrikaans) available via the online platform •Availability of project information via the online platform or other appropriate means. •An opportunity for I&APs and stakeholders to request virtual meetings with the project team.
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 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 throughout the process to be included in the reporting.

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 are 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 Nku Solar PV Facility

Organs of State
National Government Departments
Department Forestry, Fisheries and the Environment (DFFE)
Department of Mineral Resources and Energy (DMRE)
Department of Agriculture, Land Reform, and Rural Development (DALRRD)
Department of Human Settlements, Water and Sanitation (DHSWS)
Department of Communications
Government Bodies and State-Owned Companies
Eskom Holdings SOC Limited
National Energy Regulator of South Africa (NERSA)
Air Traffic Navigation Services (ATNS)
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, Environmental Affairs, Rural Development and Land Reform (DAEARD&LR)
Northern Cape Department of Economic Development and Tourism
Northern Cape Department of Roads and Public Works
Ngwao Boswa Kapa Bokone (NBKB) – provincial Heritage Authority
Local Government Departments

Pixley Ka Seme District Municipality
Ubuntu 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)
Wildlife and Environment Society of South Africa (WESSA)
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[15] 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 narrated presentations on the Savannah Environmental online platform during the public participation process.

I&APs have been 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.

[15] 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).

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 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 Nku Solar PV Facility, and providing background information of the project and inviting I&APs to register on the project's database were distributed via email. The evidence of the distribution is contained in **Appendix C5** of the Scoping Report. The BID is also available electronically on the Savannah Environmental website (https://savannahsa.com/public-documents/energy-generation/the-great-karoo-cluster-of-renewable-energy-facilities/).
- 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 **28 - 29 September 2021**. Photographs and the GPS co-ordinates of the site notices are contained in **Appendix C2** of the Scoping Report.
- Placement of the process advert in The Echo Newspaper on 23 September 2021 announcing the proposed Nku Solar PV facility development.
- Placement of an advertisement in the De Aar Echo Newspaper (in English) on **23 September 2021** at the commencement of the EIA process. This advert:
  - Announced the project and the associated EIA process.
  - Provided details of how I&APs can become involved in the EIA process, including details of the public participation consultant.
  - 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 the Scoping Report.
- A Live Read on RSG FM on **12 November 2021** at the commencement of the 30-day review and comment period. A further radio live read segment will also broadcasted on RSG as a reminder of the availability of the Scoping Report for review and comment on **06 December 2021**. RSG is one of the local radio stations accessible in the study area.
- The Scoping Report has been made available for review by I&APs for a 30-day review and comment period from **XX 2021** to **XX 2021**. The full Scoping Report is available on the Savannah Environmental

website. The evidence of distribution of the Scoping Report will be included in the Final Scoping Report, which will be submitted to the DFFE.

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 and will continue to be provided to I&APs to note their comments and issues. I&APs are being consulted through the following means:

Table 6.4: Public involvement for Nku Solar PV Facility

Activity	Date
Announcement of the EIA process in one local newspaper: De Aar Echo Newspaper (English advertisement)	**23 September 2021**
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.	**21 October 2021**
Placement of site notices at the project site, including placement of further notices in the town of Richmond.	**28 – 30 September 2021**
Announcement of the availability of the Scoping Report for a 30-day review and comment period, including details on how to access the Scoping Report via the online stakeholder engagement platform, in one provincial newspaper: De Aar Echo Newspaper (English advertisement)	**12 November 2021**
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.	**12 November 2021**
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.	**10 November 2021**
30-day review and comment period of the Scoping Report.	**12 November 2021 – 13 December 2021**
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.	To be held during the 30-day review and comment period
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 have been 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 has been 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 have been made available for review and comment in accordance with the approved public participation plan. Hard copies can however be made available on request where sanitary conditions can be maintained.

The Scoping Report has also been made available on the Savannah Environmental website (i.e. online stakeholder engagement platform) (https://savannahsa.com/public-documents/energy-generation/the-great-karoo-cluster-of-renewable-energy-facilities/). The notification was distributed prior to commencement of the 30-day review and comment period, on **10 November 2021**. Where I&APs are not able to provide written comments (including SMS and WhatsApp), other means of consultation, such as telephonic discussions are used to provide the I&APs with a platform to verbally raise their concerns and comments on the proposed development.

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

v. Identification and Recording of Comments

Comments raised by I&APs over the duration of the Scoping Phase will be synthesised into a Comments and Responses (C&R) Report which will be included in **Appendix C8** of the Final Scoping Report. These will include comments raised through the use of the Savannah Environmental online stakeholder engagement platform and any other written comments received. The C&R Report will include 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 will be included in **Appendix C7**.

6.5 Outcomes of the DFFE Web-Based Screening Tool

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 N** of the Scoping Report) for the Nku Solar PV is applicable as it triggers Regulation 19 of the EIA Regulations, 2014, as amended. **Table 6.5** 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 6.5: Sensitivity ratings from the DFFE's web-based online Screening Tool associated with the development of the Nku Solar PV facility.

Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)	Project Team Response
Agricultural Impact Assessment	Very High	The Soils and Agricultural scoping study is included in this Scoping Report as **Appendix G**. Based on the outcome of the desktop analysis of available data, it has been concluded that the the impacts to soils and agriculture will be further assessed during the EIA phase.
Landscape/Visual Impact Assessment	Very high	A Visual scoping study is included as **Appendix I** in this Scoping Report. The fact that some components of the proposed PV Facility and Associated Infrastructure may be visible does not necessarily imply a high visual impact. Sensitive visual receptors within (but not restricted to) a 3km buffer zone from the facility need to be identified and the severity of the visual impact assessed within the EIA phase
Archaeological and Cultural Heritage Impact Assessment	Low	A Heritage Screening (which covers both archaeological and cultural aspects of the project site) is included in this Scoping Report as **Appendix H**. Heritage impacts will be further assessed during the EIA phase.
Palaeontology Impact Assessment	Very High	A Heritage Screening (which covers palaeontological aspects of the project site) is included in this Scoping Report as **Appendix H.** Paleontological impacts will be further assessed during the EIA phase.
Terrestrial Biodiversity Impact Assessment	Very high	An Ecological scoping study (including flora and fauna) has been undertaken for the PV facility and is included as **Appendix D** of the Scoping Report
Aquatic Biodiversity Impact Assessment	Very high	An Ecological scoping study (including freshwater) has been undertaken for the PV facility and is included as Appendix D of the Scoping Report.
Avian Impact Assessment	High	An Avifauna scoping study (including winter season monitoring as per the BirdLife SA Best Practice Guidelines) has been undertaken for the PV facility and included as **Appendix E** of the Scoping Report.
Civil Aviation Assessment	Medium	The Civil Aviation Authority will be consulted throughout the Scoping/EIA process to obtain input.

Defence Assessment	Low	A defence of military base is not located within close proximity to the PV facility.
RFI Assessment	Medium	A defence of military base is not located within the close proximity to the PV facility.
Plant Species Assessment	Medium	An Ecological scoping study (including flora and fauna) has been undertaken for the PV facility and is included as **Appendix D** of the Scoping Report.
Animal Species Assessment	High	An Ecological scoping study (including flora and fauna) has been undertaken for the PV facility and is included as **Appendix D** of the Scoping Report.
Traffic Scoping Assessment	The screening report does not indicate a rating for this theme	A Traffic assessment has been undertaken for the PV facility and is included as **Appendix K** of the Scoping Report.
Social Assessment	The screening report does not indicate a rating for this theme	A Social assessment has been undertaken for the PV facility and is included as **Appendix J** of the Scoping Report.

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 Nku Solar PV Facility 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.

6.5.4 Finalisation of the Scoping Report

The final stage of the Scoping Phase entails the recording and capturing of comments received from stakeholders and I&APs on the Scoping Report in order to finalise the Scoping Report for submission to DFFE for decision-making. All written comments received will be addressed within the C&R Report (**Appendix C8**).

6.6 Assumptions and Limitations of the EIA Process

The following assumptions and limitations are applicable to the EIA process of Nku Solar PV Facility:

- 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 Nku Solar PV Facility 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, and the BESS).
- 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. This information has been used to inform this Scoping report and will be verified by specialists in the EIA phase to assess the project development footprint for Nku Solar PV Facility.

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

The following legislation and guidelines have informed the scope and content of this 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.
- Department of Environmental Affairs (2017), Integrated Environmental Management Guideline: Guideline on Need and Desirability.
- 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 Scoping Report. A review of legislative requirements applicable to the proposed project is provided in **Table 6.5**.

Table 6.6: Relevant legislative permitting requirements applicable to Nku Solar PV Facility

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 Nku Solar PV Facility project (i.e. contracted capacity of 100MW) and the triggering of Activity 1 of Listing Notice 2 (GNR 325) a full	DFFE – 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. The EIA process will culminate in the submission of a Final EIA Report to DFFE for review and decision-making.

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.	DFFE 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).	DFFE Northern Cape DAEARD&LR Ubuntu 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 Human Settlement, Water and Sanitation	Areas classified as rivers are extensive throughout the project area for Nku Solar PV facility as identified in the Aquatic Scoping

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)).		Assessment (**Appendix G**). As a result, a water use authorisation for the project may be required from the DHSWS. The process to be undertaken will only be confirmed and completed once a positive EA has been received and the project selected as Preferred Bidder by the DMRE or private offtaker. This is in line with the requirements from the DHSWS.
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 / Pixley KA Seme 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	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 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
	it with details regarding the location, nature, and 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).	DFFE 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.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)	Chapter 5 of NEM:BA pertains to alien and invasive species, and states that a person may not carry out a restricted 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).	DFFE Northern Cape DAEAR&LR	An Ecological Impact Assessment will be undertaken as part of the EIA Phase to identify 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.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			» Any other method of treatment recognised by the executive officer that has as its object the control of plants 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	DFFE	While no permitting or licensing requirements arise from this legislation, this Act will be applicable during the construction and operation of Nku Solar PV Facility, in terms of the preparation and maintenance of firebreaks, and the need to provide

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	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. 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.		appropriate equipment and trained personnel for firefighting purposes.
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.	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
	The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate 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.	DFFE – Hazardous Waste Northern Cape DAEARD&LR – General Waste	No waste listed activities are triggered by Nku Solar PV Facility, 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.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
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 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.	South African National Roads Agency (SANRAL) – national roads Northern Cape Department of Transport, Safety and Liaison	An abnormal load / vehicle permit may be required to transport the various components to site for construction. These include route 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:	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.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	» Boundary fences may not be altered in such a way as to prevent wild animals from freely moving onto or off of a property; » Aquatic habitats may not be destroyed or damaged; » The owner of land upon which an invasive species is found (plant or animal) must take the necessary steps to eradicate or destroy such species; The Act provides lists of protected species for the Province.		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.

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 6.7** 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 6.7: 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.

Bird distribution patterns fluctuate widely in response to environmental conditions (e.g. local rainfall patterns, nomadism, migration patterns, seasonality), meaning that a composition noted at a particular moment in time will differ during another time period at the same locality. For this reason, the PV transects are counted 4 times in Spring and then again 4 times in Autumn. The spring survey has already been conducted and the findings has been used to inform the avifauna scoping report completed for the scoping phase. The result from the Autumn season bird monitoring will be used to inform both the development footprint as well as Avifauna Impact Assessment report to be completed for the EIA phase.

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 Project Developer's Guide to Utility-Scale Solar Photovoltaic Power Plants

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. Aspects of the biophysical, social and economic environment that could be directly or indirectly affected by, or could affect, Nku Solar PV Facility 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 Nku Solar PV Facility 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 indicates the geographical aspects associated with Nku Solar PV Facility. This is included in **Section 7.2**.
	» The climatic conditions for the Richmond 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, cultural landscape 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**
	» The visual quality, land-use and settlement patterns of the affected environment has been included in **Section 7.7**
	» The current traffic conditions for the area surrounding the project have been included in **Section 7.8**

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

7.2. Regional Setting

The Nku Solar PV Facility development area is located approximately 35km south-west of Richmond and 80km south-east of Victoria West, within the Ubuntu Local Municipality and the Pixley Ka Seme District Municipality in the Northern Cape Province.

The Northern Cape Province is in the north-western extent of South Africa and constitutes South Africa's largest province, occupying an area of 372 889km² in extent, equivalent to nearly a third (30.5%) of the country's total land mass. It is also South Africa's most sparsely populated province with a population of 1 193 780, and a population density of 3.1/km². The capital city is Kimberley, and other important towns include Upington, Springbok, Kuruman, De Aar and Sutherland. It is bordered by the Western Cape, and Eastern Cape provinces to the south and south-east, Free State, and North West provinces to the east, Botswana, and Namibia, to the north, and the Atlantic Ocean to the west. The Northern Cape is the only South African province which borders Namibia and plays an important role in terms of providing linkages between Namibia and the rest of South Africa. The Orange River, which is South Africa's largest river, is a significant feature and is also the main source of water in the province, while also constituting the international border between South Africa and Namibia.

The Northern Cape is rich in minerals including alluvial diamonds, iron ore, asbestos, manganese, fluorspar, semi-precious stones and marble. The mining sector in the province is the largest contributor of the provincial Gross Domestic Product (GDP) and of a great importance to South Africa as it produces ~37% of the country's diamonds, 44% of its zinc, 70% of its silver, 84% of its iron ore, 93% of its lead and 99% of its manganese.

The province has fertile agricultural land in the Orange River Valley, especially at Upington, Kakamas and Keimoes, where grapes and fruit are cultivated intensively. The interior Karoo relies on sheep farming, while the karakul-pelt industry is one of the most important in the Gordonia District of Upington. Wheat, fruit, peanuts, maize, and cotton are produced at the Vaalharts Irrigation Scheme near Warrenton. The agricultural sector employs approximately 19.5% of the total formally employed individuals. The sector is also experiencing significant growth in value-added activities, including game-farming, while food production and processing for the local and export markets is also growing significantly (PGDS, July 2011). Furthermore, approximately 96% of the land in the province is used for livestock and game farming, while only approximately 2% is used for crop farming, mainly under irrigation in the Orange River Valley and the Vaalharts Irrigation Scheme.

The Northern Cape offers unique tourism opportunities including wildlife conservation destinations, natural features, historic sites, festivals, cultural sites, star gazing, adventure tourism, agricultural tourism, ecotourism, game farms, and hunting areas, etc. The province is home to the Richtersveld Botanical and Landscape World Heritage Site, which comprises a United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Site under the World Heritage Convention. The province also includes to two (2) Transfrontier National Parks, namely the Kgalagadi Transfrontier Park, and the Richtersveld /Ai-Ais Transfrontier Park, as well as five (5) national parks and six (6) provincial reserves. In addition, the province plays a significant role in South Africa's science and technology sector, as it is home to the Square Kilometre Array (SKA), the Southern African Large Telescope (SALT), and the Karoo Array Telescope (MeerKAT). In addition, the Augrabies National Park, a major tourist destination in the province is located 120km east of Upington near the town of Kakamas.

The capital city of the Northern Cape Province is Kimberley. Other important towns include Upington, Springbok, Kuruman and De Aar. The province is rich in minerals and has fertile agricultural land in the Orange River Valley. The interior Karoo relies on sheep farming, while the karakul-pelt industry is one of the most important in the Gordonia District of Upington. The Northern Cape Province comprises six (5) district

municipalities, namely, Frances Baard, John Taolo Gaetsewe, Namakwa, ZF Mgcawu and Pixley ka Seme Alfred Nzo (refer to **Figure 7.1**), which contain twenty-six local municipalities collectively.

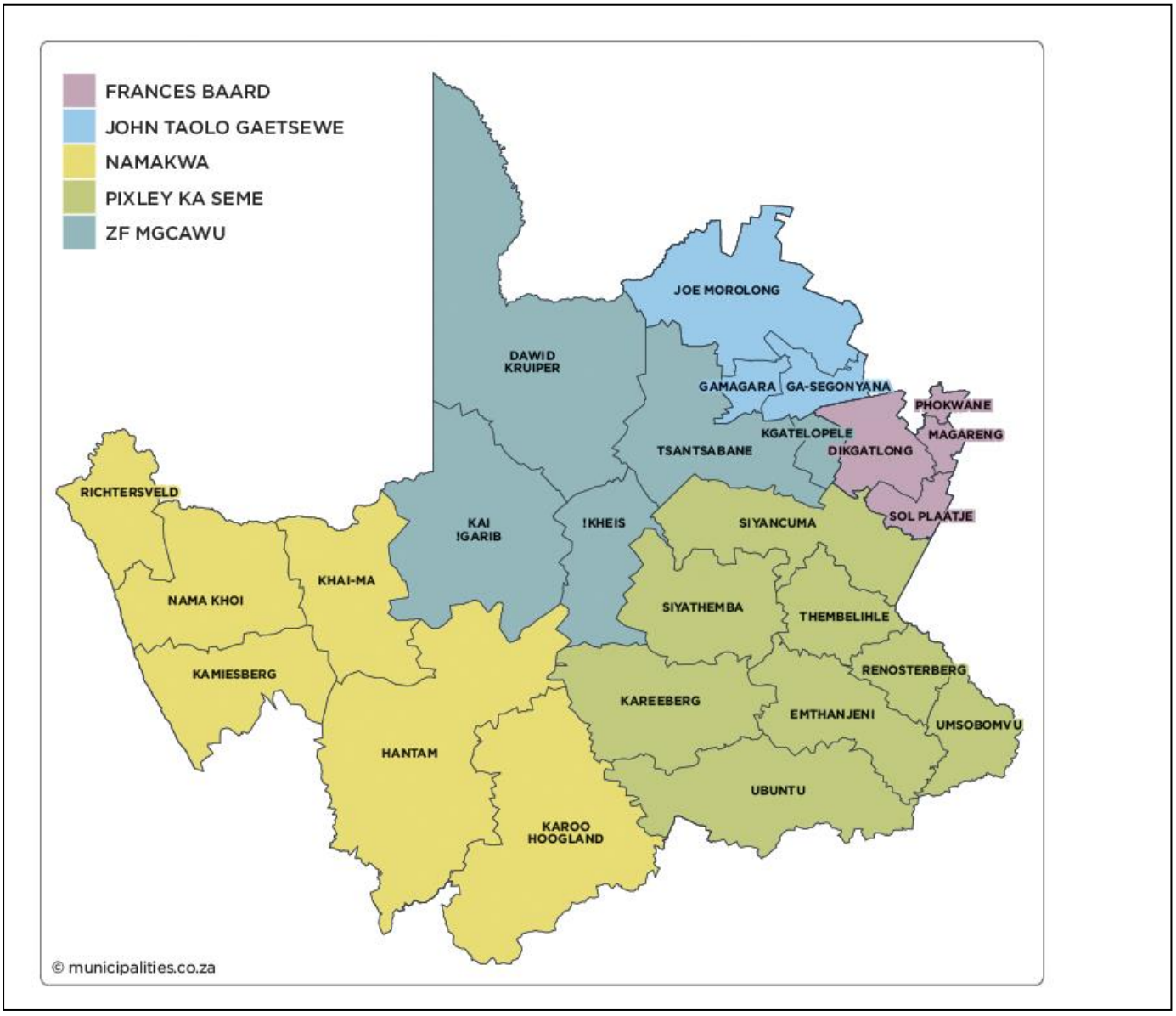

Figure 7.1: District municipalities of the Northern Cape (Source: Municipalities of South Africa)

The Pixley Ka Seme District Municipality (DM) is situated in the south-eastern extent of the Northern Cape Province and is a Category C municipality. It shares its borders with three other provinces, namely the Free State to the east, the Eastern Cape to the south-east, and the Western Cape to the south-west. It is the second-largest district of the five in the province but makes up almost a third of its geographical area. The district is comprised of eight local municipalities: Ubuntu, Umsobomvu, Emthanjeni, Kareeberg, Renosterberg, Thembelihle, Siyathemba and Siyancuma (refer to **Figure 7.2**). Its main town is De Aar. According to StatsSA 2011 and the Community Survey 2016, the Pixley ka Seme District Municipality's population sits at 195 595. The main economic sectors in the Pixley ka Seme District Municipality are community services (26.6%), agriculture (16.6%), transport (15.1%), trade (12.9%), finance (12.8%), electricity (7.0%), construction (3.3%), manufacturing (3.2%), and mining (2.6%).

Figure 7.2: Local Municipalities of the Pixley Ka Seme DM (Source: Municipalities of South Africa)

The broader project site for the establishment of the Nku PV facility and associated infrastructure is located within the Ubuntu Local Municipality. The Ubuntu Local Municipality is a Category B municipality within the Pixley Ka Seme District in the Northern Cape Province. It is bordered by Kareeberg and Emthanjeni in the north, the Western Cape and Eastern Cape Provinces in the south, the Eastern Cape in the east, and the Namakwa District in the west. The Ubuntu Local Municipality covers an area of ~ 20 393km², making it the largest of the eight local municipalities that make up the district. Cities and/or towns within the municipality include Hutchinson, Loxton, Richmond and Victoria West. The agricultural sector is the main economic sector in the Ubuntu Local Municipality. According to census 2011, the population of the Ubuntu Local Municipality grew from 16 375 in 2001 to 18 601 in 2001, indicating an annual population growth rate of 1.6%.

Areas surrounding the project site are generally sparsely populated, with the highest concentration of people living in the town of Richmond (5 122). The project site and the areas surrounding the site consist of a landscape that can be described as remote due to its considerable distance from any major metropolitan centres or populated areas. The scarcity of water and other natural resources has influenced settlement within this region, keeping numbers low, and distribution limited to the availability of water. Settlements, where they occur, are usually rural homesteads or farm dwellings.

The project site is situated directly adjacent to the N1 national road. The R398 and R63 are located to the north-east and south-west of the project site, respectively. The gravel main access road located to the north-east of the project site provides direct access to the project site and the development area and will used to access the project site and development area during the project lifecycle.

7.3. Climatic Conditions

The region within which the project site is located is relatively dry. This region's climate is characterised by rainfall during autumn and summer months which peaks at a Mean Annual Precipitation (MAP) ranging from 180 to 430 mm (from west to east respectively). This area is characterised by a high frost occurrence rate ranging from just below 30 to 80 days per year (Mucina and Rutherford, 2006). The mean minimum and maximum temperatures in the area are -7.2℃ and 36.1℃ for July and January respectively.

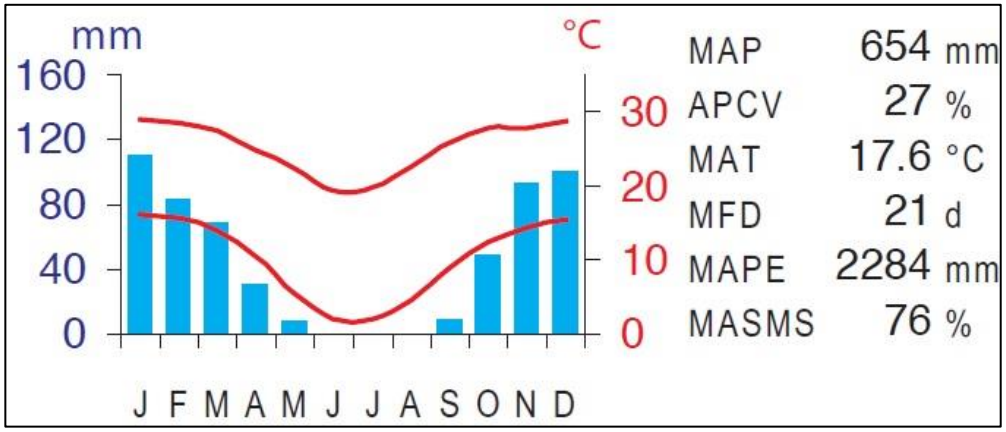

Figure 7.3: Climate graph for Richmond area, Northern Cape Province within which the proposed project site is located

7.4. Biophysical Characteristics of the Study Area and Development Area

The following section provides an overview and description of the biophysical characteristics of the study area and has been informed by specialist studies (**Appendix D-K**) undertaken for this Scoping Report.

7.4.1. Topographical profile

The study area occurs on land that ranges in elevation from approximately 1 170m (in the south-western corner of the study area) to 1 830m (at the top of the mountains to the east). The terrain of the site is predominantly flat to the north with small hills to the south. Other mountains and hills in closer proximity to the site include Bobbejaankran, Kamberg, Bulberg, Klipspringerkop, Kromhoek se Berg, Blouberg and Platberg. The overall terrain morphological description of the study area is described as *undulating plains* (lowlands), with *ridges*, *hills* and *mountains*. These hills and mountains are often referred to as *inselbergs* (island mountains) due to their isolated nature, or *mesas* (table mountains) due to their flat-topped summits.

The scope percentage of the development area has been calculated and most of the development area is characterised by a slope percentage between 0 and 20%, with some smaller patches within the development area characterised by a slope percentage in excess of 80% (refer to **Figure 7.4**).

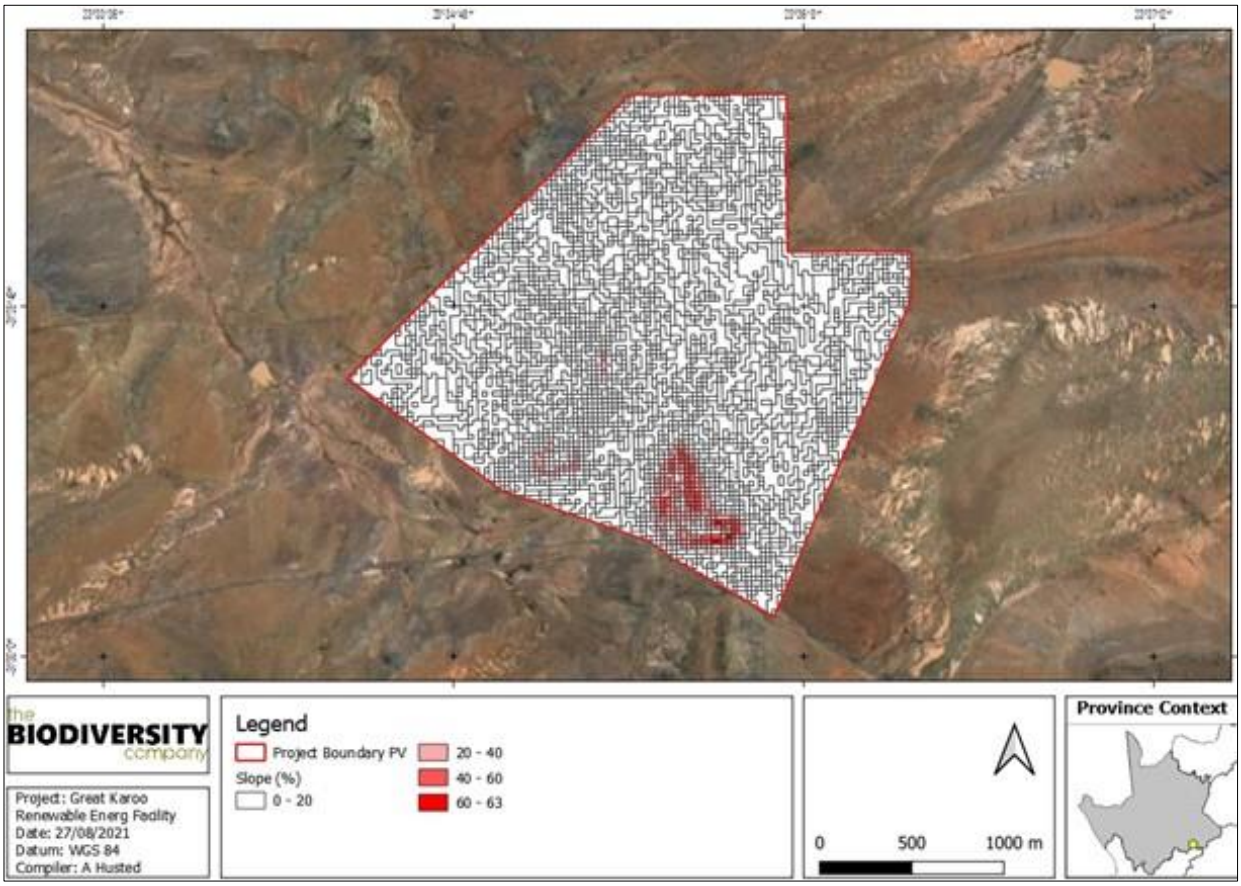

Figure 7.4: Slope percentage calculated for the development area within which the Nku Solar PV is proposed

7.4.2. Geology, Soils and Agricultural Potential

The development area is underlain by the Abrahamskraal and Teekloof Formations, both Adelaide Subgroup of the Beaufort Group of sediments (refer to **Figure 7.5**). According to the SAHRIS Fossil Heritage Browser and the Palaeotechnic Report for the Western Cape (Almond and Pether, 2008), the Beaufort Group sediments are known to preserve diverse terrestrial and freshwater tetrapods of *Tapinocephalus* to *Lystrosaurus* Biozones (amphibians, true reptiles, synapsids especially therapsids), palaeoniscoid fish, freshwater bivalves, trace fossils (including tetrapod trackways) and sparse vascular plants (*Glossopteris* Flora, including petrified wood).

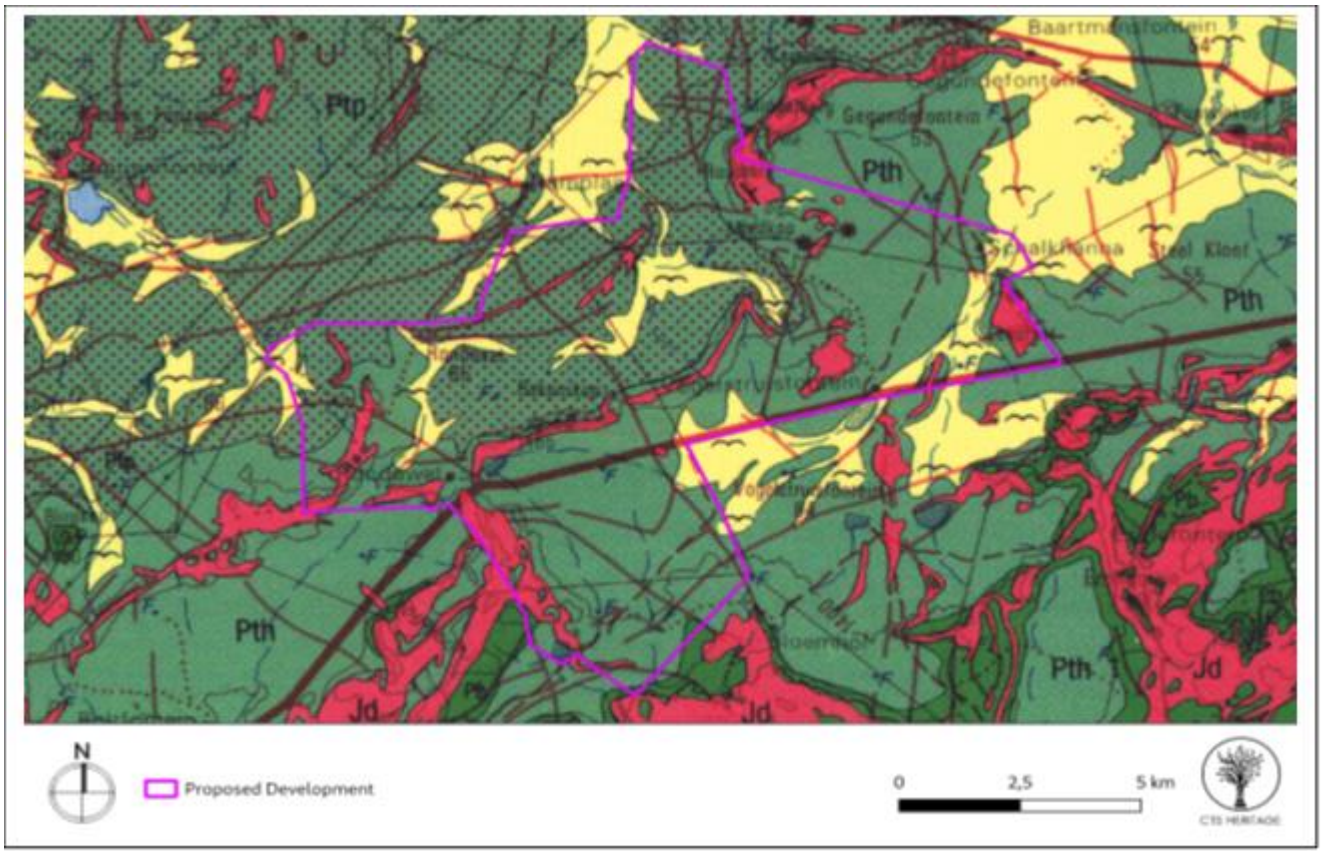

Figure 7.5: Extract from the CGS 3122 Victoria West Map indicating that the development area for the PV development is underlain by sediments of Ptp: Poortjie Member and Pth: Hoedemaker Member of the Teekloof Formation of the Adelaide Subgroup and Jd: Jurassic Dolerite as well as Quaternary Sands.

i. Soils forms, Land type, Land Capability, and agricultural potential of the project site

Existing soil information was obtained from the Land Type database (Land Type Survey Staff, 1972 – 2006). 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.

According to the land type database (Land Type Survey Staff, 1972 - 2006), the project area is characterised by the Da 76, Da 147, Fc 131, Fb 488, Ib 125, Fb 126 and Fb 397 land types (refer to **Figure 7.6**). The Da land type is characterised by prismacutanic and/or pedocutanic horizons with the possibility of red apedal B-horizons occurring. The Fb land type consists of Glenrosa and/or Mispah soil forms with the possibility of other soils occurring throughout. Lime is generally present within the entire landscape.

Considering the occurrence of various soil forms that are commonly associated with high land capabilities, it is likely that areas with high land capability sensitivity do occur within the project area. However, due to the poor climatic capability, the ultimate land potential is more likely to be low.

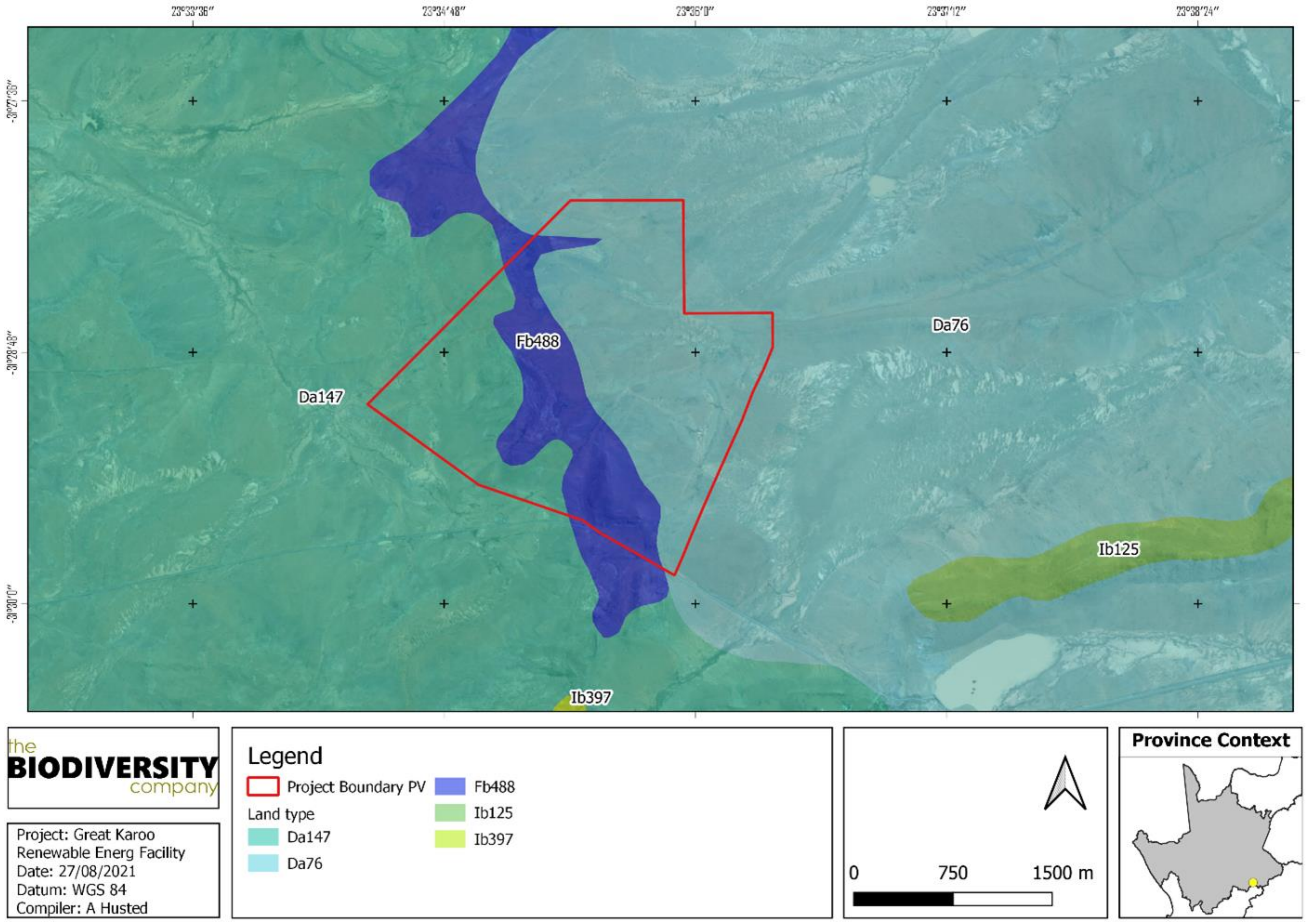

Figure 7.6: Land Types present within the project area

7.4.3. Land Use

The predominant land use in the area is stock farming (predominantly sheep, game, or goat farming). Since rainfall is low and water is scarce, crop farming accounts for only a small portion of the land use and is largely confined to the more fertile floodplain valleys. Due to the low carrying capacity, farms are large and usually at least about 5km apart.

There are no designated protected areas within the region and no major tourist attractions, or destinations were identified within the project site. There are however two overnight facilities, namely the Bloemhof Karoo Farmstay and the Rondawel Guest Farm. The former facility appears to be located on the farm identified for the Nku Solar PV Facility.

In spite of the rural and natural character of the area within which the project site is proposed, there are a large number of overhead power lines, all congregating at either the Gamma or Victoria Cap Substations. These include, Droërivier/Hydra 1, 2 & 3 400kV; Gamma/Hydra 1 765kV; and Gamma/Perseus 1 765kV.

These power lines traverse the proposed development site to the north-west, at a distance of 1km at the closest. Additional power lines to the north-west of the project site (at the Brakpoort Substation) include the Brakpoort/Hutchinson 1 132kV and Brakpoort/Laken 1 132kV lines.

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

i. Broad-Scale Vegetation Patterns

The national vegetation map for the project site is depicted in **Figure 7.7**. The Nku PV is mapped as falling within two vegetation types, namely, the Eastern Upper Karoo, which occurs across most of the site, and the Upper Karoo Hardeveld, which is associated with low mountains. Another vegetation type, i.e., the Southern Karoo Riviere, is shown as occurring nearby. There is a possibility that this may occur within drainage areas, although it is not mapped at a regional scale as occur within these areas. The vegetation types that occur on site are briefly described below.

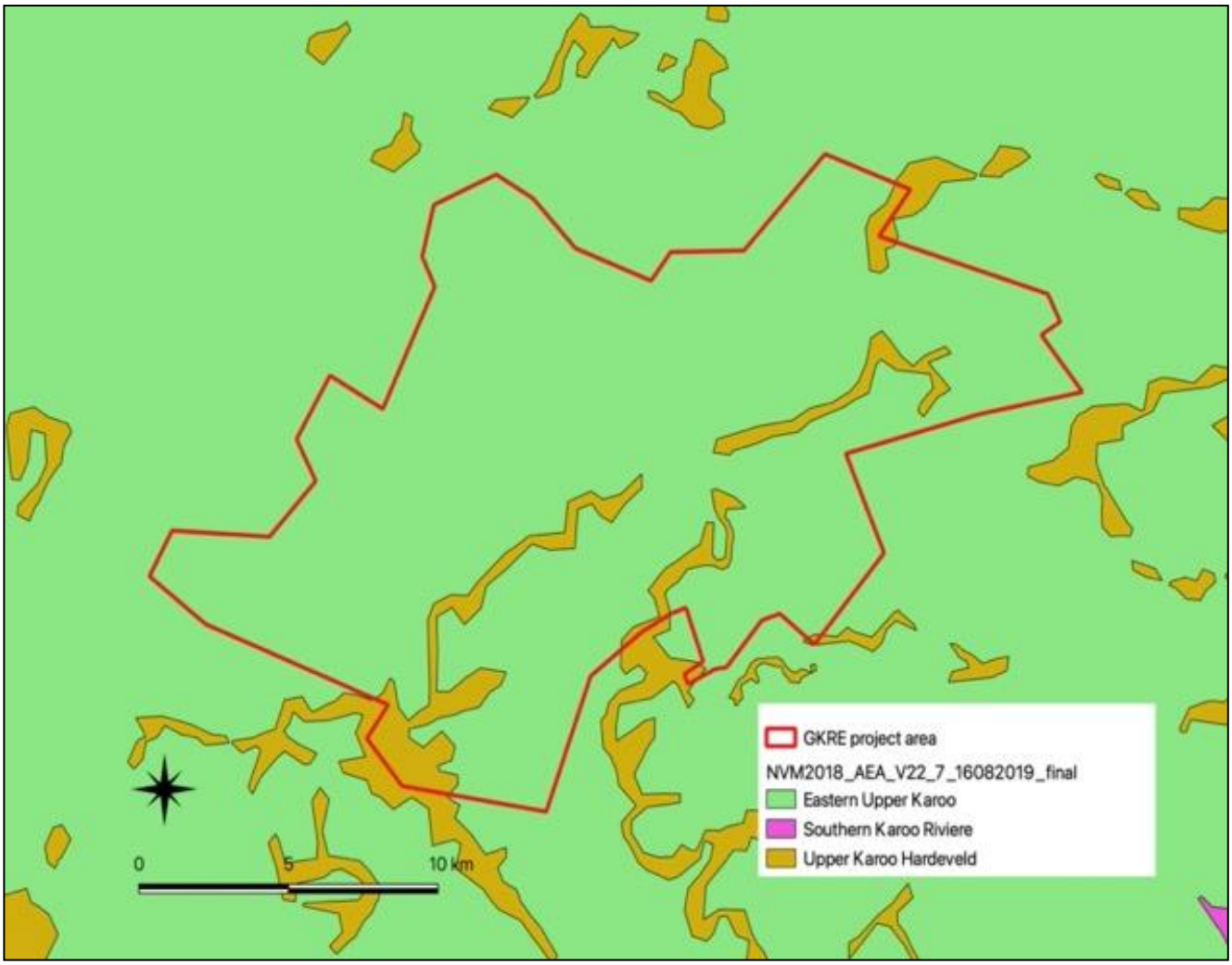

Figure 7.7: National vegetation map of the project site showing that the Nku PV facility (indicated with a white block) falls within the Eastern Upper Karoo and the Upper Karoo Hardeveld vegetation types.

Eastern Upper Karoo (NKu2)

Distribution:
Northern, Western and Eastern Cape Provinces: Discrete areas of slopes and ridges including dolerite dykes and sills in the region spanning Middelpos in the west and Strydenburg, Richmond and Nieu-Bethesda in the east. Most crest areas and steep slopes of the Great Escarpment facing south between Teekloofpas

(connecting Leeu-Gamka and Fraserburg) and eastwards to Graaff-Reinet. Altitude varies mostly from 1 000–1 900m.

Vegetation and Landscape Features:

Steep slopes of koppies, butts, mesas and parts of the Great Escarpment covered with large boulders and stones supporting sparse dwarf Karoo scrub with drought-tolerant grasses of genera such as *Aristida, Eragrostis* and *Stipagrostis*.

Important Taxa:

- **Tall Shrubs:** *Lycium cinereum* (d), *Rhigozum obovatum* (d), *Cadaba aphylla*, *Diospyros austro-africana*, *Ehretia rigida* subsp. *rigida*, *Lycium oxycarpum*, *Melianthus comosus*, *Rhus burchellii*.
- **Low Shrubs**: *Chrysocoma ciliata* (d), *Eriocephalus ericoides* subsp. *ericoides* (d), *Euryops lateriflorus* (d), *Felicia muricata* (d), *Limeum aethiopicum* (d), *Pteronia glauca* (d), *Amphiglossa triflora*, *Aptosimum elongatum*, *A. spinescens*, *Asparagus mucronatus*, *A. retrofractus*, *A. striatus*, *A. suaveolens*, *Eriocephalus spinescens*, *Euryops annae*, *E. candollei, E. empetrifolium, E. nodosus, Felicia filifolia* subsp. *filifolia*, *Garuleum latifolium*, *Helichrysum lucilioides*, *H. zeyheri*, *Hermannia filifolia* var. *filifolia*, *H. multiflora*, *H. pulchella*, *H. vestita*, *Indigofera sessilifolia*, *Jamesbrittenia atropurpurea*, *Lessertia frutescens*, *Melolobium candicans*, *M. microphyllum*, *Microloma armatum*, *Monechma incanum*, *Nenax microphylla*, *Pegolettia retrofracta*, *Pelargonium abrotanifolium*, *P. ramosissimum*, *Pentzia globosa*, *P. spinescens*, *Plinthus karooicus*, *Polygala seminuda*, *Pteronia adenocarpa*, *P. sordida*, *Rosenia humilis*, *Selago albida*, *Solanum capense*, *Sutera halimifolia*, *Tetragonia arbuscula*, *Wahlenbergia tenella*.
- **Succulent Shrubs:** *Aloe broomii*, *Drosanthemum lique*, *Faucaria bosscheana*, *Kleinia longiflora*, *Pachypodium succulentum*, *Trichodiadema barbatum*, *Zygophyllum flexuosum*.
- **Semiparasitic Shrub**: *Thesium lineatum* (d). Herbs: *Troglophyton capillaceum* subsp. *capillaceum*, *Dianthus caespitosus* subsp. *caespitosus*, *Gazania krebsiana*, *Lepidium africanum* subsp. *africanum*, *Leysera tenella*, *Pelargonium minimum*, *Sutera pinnatifida*, *Tribulus terrestris*.
- **Geophytic Herbs:** *Albuca setosa*, *Androcymbium albomarginatum*, *Asplenium cordatum*, *Boophone disticha*, *Cheilanthes bergiana*, *Drimia intricata*, *Oxalis depressa*, Graminoids: *Aristida adscensionis* (d), *A. congesta* (d), *A. diffusa* (d), *Cenchrus ciliaris* (d), *Enneapogon desvauxii* (d), *Eragrostis lehmanniana* (d), *E. obtusa* (d), *Sporobolus fimbriatus* (d), *Stipagrostis obtusa* (d), *Cynodon incompletus*, *Digitaria eriantha*, *Ehrharta calycina*, *Enneapogon scaber*, *E. scoparius*, *Eragrostis curvula*, *E. nindensis, E. procumbens*, *Fingerhuthia africana*, *Heteropogon contortus*, *Merxmuellera disticha*, *Stipagrostis ciliata*, *Themeda triandra*, *Tragus berteronianus*, *T. koelerioides*.

Endemic Taxa:

- **Succulent Shrubs**: *Aloe chlorantha*, *Crassula barbata* subsp. *broomii*, *Delosperma robustum, Sceletium expansum*, *Stomatium suaveolens*.
- **Low Shrubs**: *Cineraria polycephala*, *Euryops petraeus*, *Lotononis azureoides*, *Selago magnakarooica*.
- **Tall Shrub**: *Anisodontea malvastroides*.
- **Herbs**: *Cineraria arctotidea*, *Vellereophyton niveum*. **Succulent Herbs**: *Adromischus fallax*, *A. humilis*.
- **Geophytic Herbs**: *Gethyllis longistyla*, *Lachenalia auriolae, Ornithogalum paucifolium* subsp. *karooparkense*.

Eastern Upper Karoo (NKu4)

Distribution:

Northern Cape, Eastern Cape and Western Cape Provinces: Between Carnarvon and Loxton in the west, De Aar, Petrusville and Venterstad in the north, Burgersdorp, Hofmeyr and Cradock in the east and the Great Escarpment and the Sneeuberge-Coetzeesberge mountain chain in the south. Altitude varies between mostly 1 000–1 700 m.

Vegetation and Landscape Features:
Flats and gently sloping plains (interspersed with hills and rocky areas of Upper Karoo Hardeveld in the west, Besemkaree Koppies Shrubland in the northeast and Tarkastad Montane Shrubland in the southeast), dominated by dwarf microphyllous shrubs, with 'white' grasses of the genera *Aristida* and *Eragrostis* (these become prominent especially in the early autumn months after good summer rains). The grass cover increases along a gradient from southwest to northeast.

Important Taxa:
- **Tall Shrubs**: *Lycium cinereum* (d), *L. horridum*, *L. oxycarpum*.
- **Low Shrubs**: *Chrysocoma ciliata* (d), *Eriocephalus ericoides* subsp. *ericoides* (d), *E. spinescens* (d), *Pentzia globosa* (d), *P. incana* (d), *Phymaspermum parvifolium* (d), *Salsola calluna* (d), *Aptosimum procumbens*, *Felicia muricata*, *Gnidia polycephala*, *Helichrysum dregeanum*, *H. lucilioides*, *Limeum aethiopicum*, *Nenax microphylla*, *Osteospermum leptolobum*, *Plinthus karooicus*, *Pteronia glauca*, *Rosenia humilis*, *Selago geniculata*, *S. saxatilis*.
- **Succulent Shrubs**: *Euphorbia hypogaea*, *Ruschia intricata*.
- **Herbs**: *Indigofera alternans*, *Pelargonium minimum*, *Tribulus terrestris*.
- **Geophytic Herbs**: *Moraea pallida* (d), *Moraea polystachya*, *Syringodea bifucata*, *S. concolor*.
- **Succulent Herbs**: *Psilocaulon coriarium*, *Tridentea jucunda, T. virescens.*
- **Graminoids**: *Aristida congesta* (d), *A. diffusa* (d), *Cynodon incompletus* (d), *Eragrostis bergiana* (d), *E. bicolor* (d), *E. lehmanniana* (d), *E. obtusa* (d), *Sporobolus fimbriatus* (d), *Stipagrostis ciliata* (d), *Tragus koelerioides* (d), *Aristida adscensionis*, *Chloris virgata*, *Cyperus usitatus*, *Digitaria eriantha*, *Enneapogon desvauxii*, *E. scoparius*, *Eragrostis curvula*, *Fingerhuthia africana*, *Heteropogon contortus*, *Sporobolus ludwigii*, *S. tenellus*, *Stipagrostis obtusa*, *Themeda triandra*, *Tragus berteronianus*.

Endemic Taxa:
- **Succulent Shrubs:** *Chasmatophyllum rouxii*, *Hertia cluytiifolia*, *Rabiea albinota*, *Salsola tetrandra*.
- **Tall Shrub:** *Phymaspermum scoparium*.
- **Low Shrubs:** *Aspalathus acicularis* subsp. *planifolia*, *Selago persimilis*, *S. walpersii*.

ii. Conservation Status of Broad Vegetation Types

On the basis of a scientific approach used at national level by the South African National Biodiversity Institute (SANBI), vegetation types can be categorised according to their conservation status which is, in turn, assessed according to the degree of transformation relative to the expected extent of each vegetation type. The status of a habitat or vegetation type is based on how much of its original area still remains intact relative to various thresholds. On a national scale the thresholds are as depicted in **Table 7.1** below, as determined by best available scientific approaches. The level at which an ecosystem becomes Critically Endangered differs from one ecosystem to another and varies from 16% to 36%.

Table 7.1: Conservation status of different vegetation types occurring in the project site

Vegetation Type	Target (%)	Conserved (%)	Transformed (%)	Conservation status	
				Driver *et al*. 2005; Mucina *et al*., 2006	National Ecosystem List (NEM:BA)
Eastern Upper Karoo	21	0.7	2	Least Threatened	Not listed
Upper Karoo Hardeveld	21	2.9	<1	Least Threatened	Not listed

Determining ecosystem status (Driver *et al.*, 2005). *BT = biodiversity target (the minimum conservation requirement).

Habitat remaining (%)		
80–100	least threatened	LT
60–80	vulnerable	VU
*BT–60	endangered	EN
0–*BT	critically endangered	CR

According to scientific literature (Driver *et al*., 2005; Mucina *et al*., 2006), as shown in **Table 8.1**, both vegetation types are listed as Least Threatened.

The National List of Ecosystems that are Threatened and in need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004), lists national vegetation types that are afforded protection on the basis of rates of transformation. The thresholds for listing in this legislation are higher than in the scientific literature, which means there are fewer ecosystems listed in the National Ecosystem List versus in scientific literature.

Neither vegetation types are listed in the National List of Ecosystems that are Threatened and in need of protection (GN1002 of 2011).

iii. Habitats on Site

Four habitat types were identified within the project site for the Nku PV (refer to **Figure 7.8**), namely, karroid plains, mountain slopes, drainage, and open water. These are discussed in detail below.

Karroid Plains

The plains on the lowlands have gently undulating topography. They are found between the hills throughout the site. The vegetation in these areas is mostly a dwarf karroid shrubland. These areas have been moderately to heavily grazed throughout the study area.

Mountain Slopes

The site is characterised by the presence of a range of hills that form a mini-escarpment parallel to the national road. The topography within these areas is relatively steep and rugged. There are also various low hills and the free-standing Bloukop inland of the mini escarpment. The vegetation in these areas is a grassy dwarf karroid shrubland.

Drainage Areas

In the lowest parts of the plains, often in wide bands, are areas that are shaped by fluvial processes and are either channelled in places or eroded from water movement. The soils are mostly deep sands where they have not been eroded away. The vegetation is a karroid dwarf shrubland or a sparse weedy community in eroded areas.

Open Water

There are a number of farm dams on site. These are all man-made, but they nevertheless constitute an important water resource for wildlife. There is a possibility that the Protected Giant Bullfrog occurs in the general area, in which case these areas of open water may constitute important habitat for them.

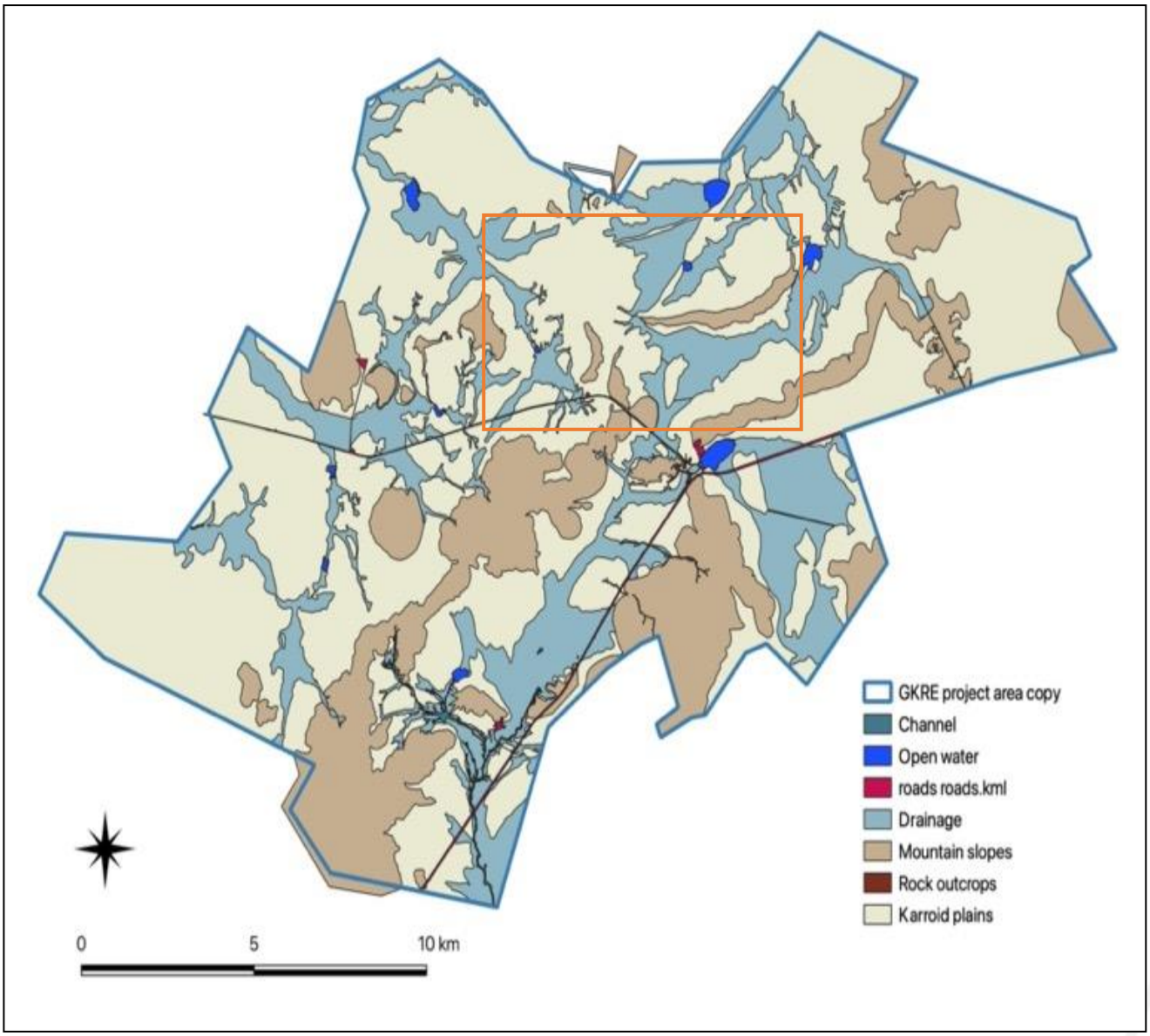

Figure 7.8: Habitats of the study area, including the project site for the Nku PV (indicated with the orange block)

iii. Protected Areas within the Broader Project Site

the project site does not occur within any protected site. According to the National Parks Area Expansion Strategy (NPAES), there are no areas within the project site that have been identified as priority areas for inclusion in future protected areas. The project site is therefore outside the NPAES focus area. There are many areas outside of the project site, to the north, south, east and west that are included as being part of future protected areas, but not within or adjacent to the site itself.

iv. Listed Plant Species

There are three species listed as Rare that are considered to occur within the geographical area under consideration and could potentially occur on site, namely, *Anisodontea malavastroides, Aloe broomii* var. *tarkaensis* and *Tridentea virescens* (refer to **Table 8.2**). These are all species with wide geographical distributions, but which are rarely encountered. None of these species are considered to be threatened and none were observed on site.

Table 7.2: Plant species of conservation importance (Threatened, Near Threatened and Declining) that have historically been recorded in the study area

Family	Taxon	Status	Habitat	Likelihood of occurrence on site
Apocynaceae	*Tridentea virescens*	RARE	Warmbad in southern Namibia to Kakamas and Prieska in the Nortern Cape stretching east to Prince Albert and Aberdeen. Stony ground, or hard loam in floodplains.	**MEDIUM**
Malvaceae	*Anisodontea malavastroides*	RARE	This species is endemic to the mountains of the Great Karoo, where it occurs in the Nuweveld and Sneeuberg mountains between Beaufort West and Middelburg. It occurs in arid grassland on summit plateaus and escarpments.	**MEDIUM**
Asphodelaceae	*Aloe broomii* var. *tarkaensis*	LC	Tarkastad, Middelburg and Graaff-Reinet districts, possibly also in the Victoria West district. Low, stony ridges.	**MEDIUM**

v. Plants Protected in terms of the National Environmental Management: Biodiversity Act and the Northern Cape Conservation Act

No plant species protected under the National Environmental Management: Biodiversity Act (No. 10 of 2004) were identified on site. However, several have a geographical distribution that includes the project site. Numerous plant species protected under the Northern Cape Nature Conservation Act (No. 9 of 2009) were identified on site. Despite not being threatened, any impacts on these species will require a permit from the relevant authority. There is a possibility that there may be additional protected plant species present on site that were not detected during the field survey.

vi. Trees Protected in Terms of the National Forests Act

There is a single tree species protected under the National Forests Act (No. 84 of 1998) that is known to have a geographical distribution within the project site, namely, *Boscia albitrunca* (Shepherd's Tree / Witgatboom), which occurs in semi-desert areas and bushveld, often on termitaria, but is common on sandy to loamy soils and calcrete soils.

vii. Critical Biodiversity Areas

An extract of the 2016 Northern Cape Critical Biodiversity Area Map for the study area is illustrated below (**Figure 7.9**). This biodiversity assessment identifies Critical Biodiversity Areas (CBAs) which represent biodiversity priority areas which should be maintained in a natural to near natural state. The CBA maps indicate the most efficient selection and classification of land portions requiring safeguarding in order to maintain ecosystem functioning and meet national biodiversity objectives.

The project site for the Nku PV does not fall within a CBA. It falls under Other Natural Areas (ONA).

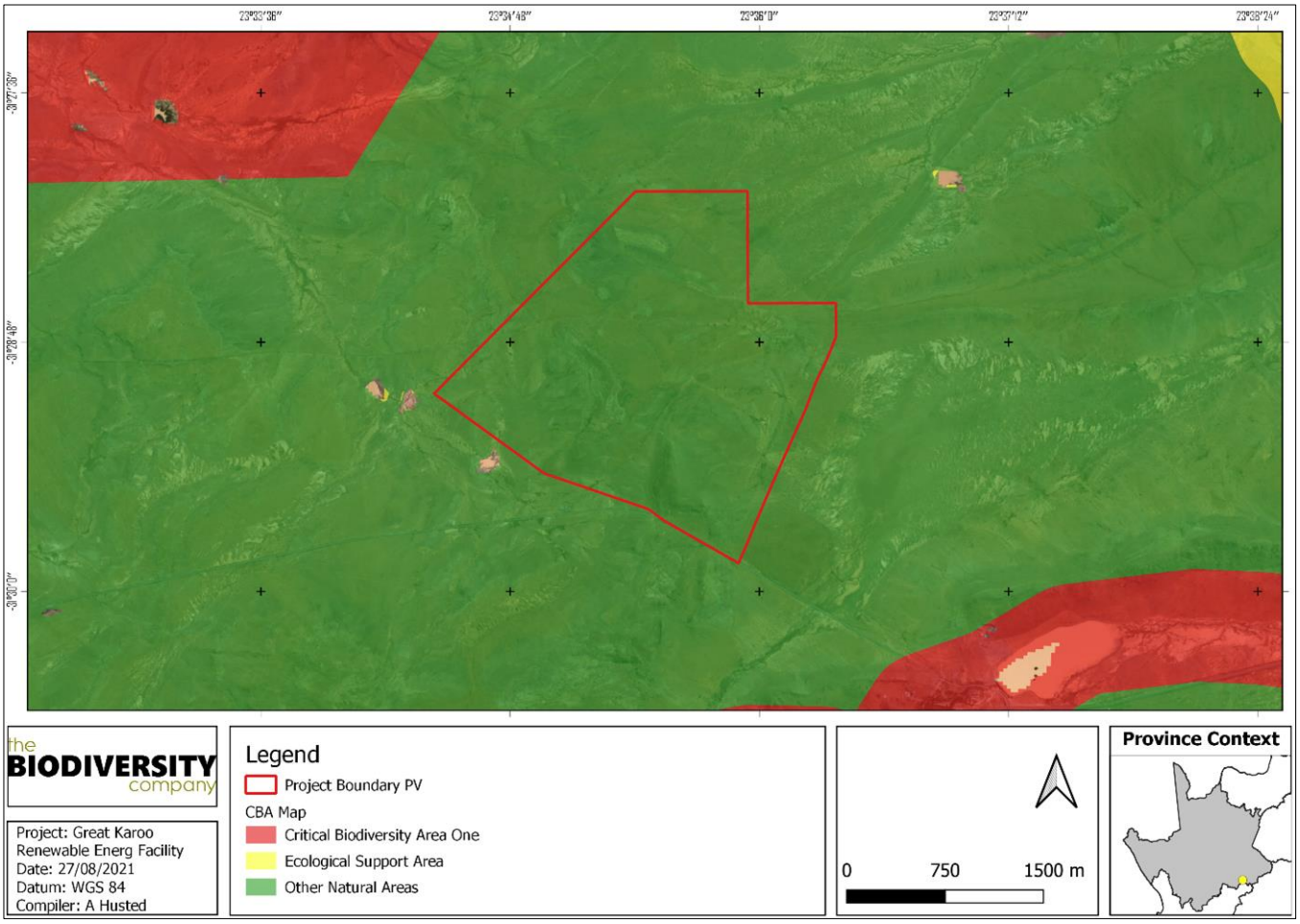

Figure 7.9: Critical Biodiversity Areas (CBAs), as per the 2016 Northern Cape Critical Biodiversity Area Map, located within the Nku PV project site

viii. Wetlands and Freshwater Resources

Catchment

The project site extends into two Water Management Areas (WMA), namely the Lower Orange WMA (WMA 6) and the Mzimvubu-Tsitsikamma WMA (WMA 7). The locally affected quaternary catchments include D61A and L21B.

National Freshwater Ecosystem Priority Area Status

In an attempt to better conserve aquatic ecosystems, South Africa has categorised its river systems according to set ecological criteria (i.e., ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs). The FEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act's (NEM:BA) biodiversity goals.

Figure 7.10 shows the location of the project site in relation to wetland FEPAs. Based on this information, non-priority systems are located within the extent of the project site. The wetlands are all considered to be in a largely to seriously modified ecological state.

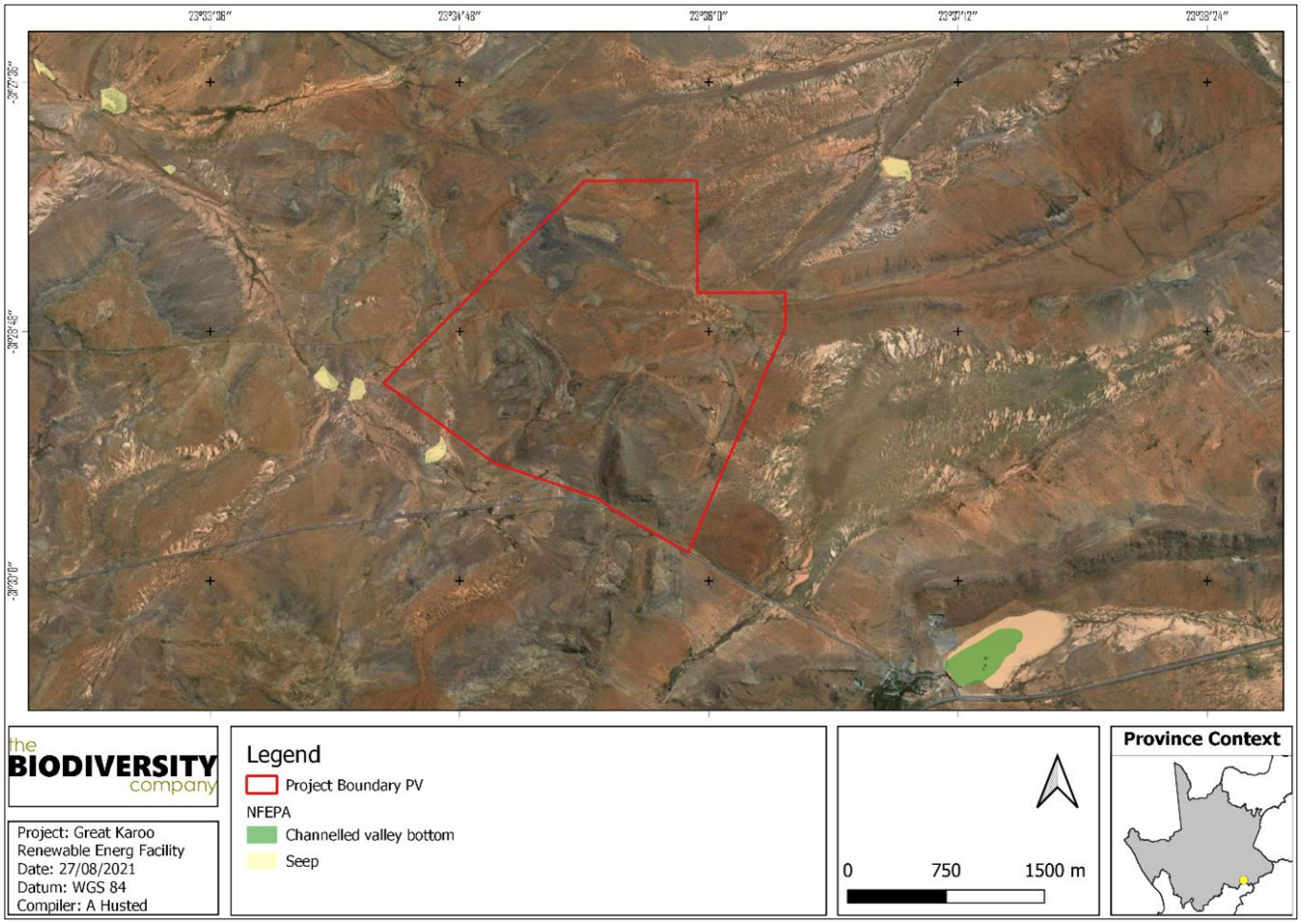

Figure 7.10: The location of NFEPA wetlands in relation to the project site

National Wetland Map 5

The National Wetland Map 5 (NWM5) spatial data was published in October 2019, in collaboration with SANBI, with the specific aim of spatially representing the location, type and extent of wetlands in South Africa. The data represents a synthesis of a wide number of official watercourse data, including rivers, inland wetlands, and estuaries. This database recognises the presence of floodplain systems to the eastern portion of the project site. Areas classified as "rivers" are located on the southern and eastern periphery of the project site (**Figure 7.11**).

Aquatic Ecosystems

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was released with the National Biodiversity Assessment (NBA) 2018. Ecosystem threat status (ETS) of river and wetland ecosystem types are based on the extent to which each river ecosystem type had been altered from its natural condition. Ecosystem types are categorised as CR, EN, VU or LT, with CR, EN and VU ecosystem types collectively referred to as 'threatened'. The floodplain systems are classified as Critically Endangered (CR), and Not Protected (refer to **Figure 8.13**).

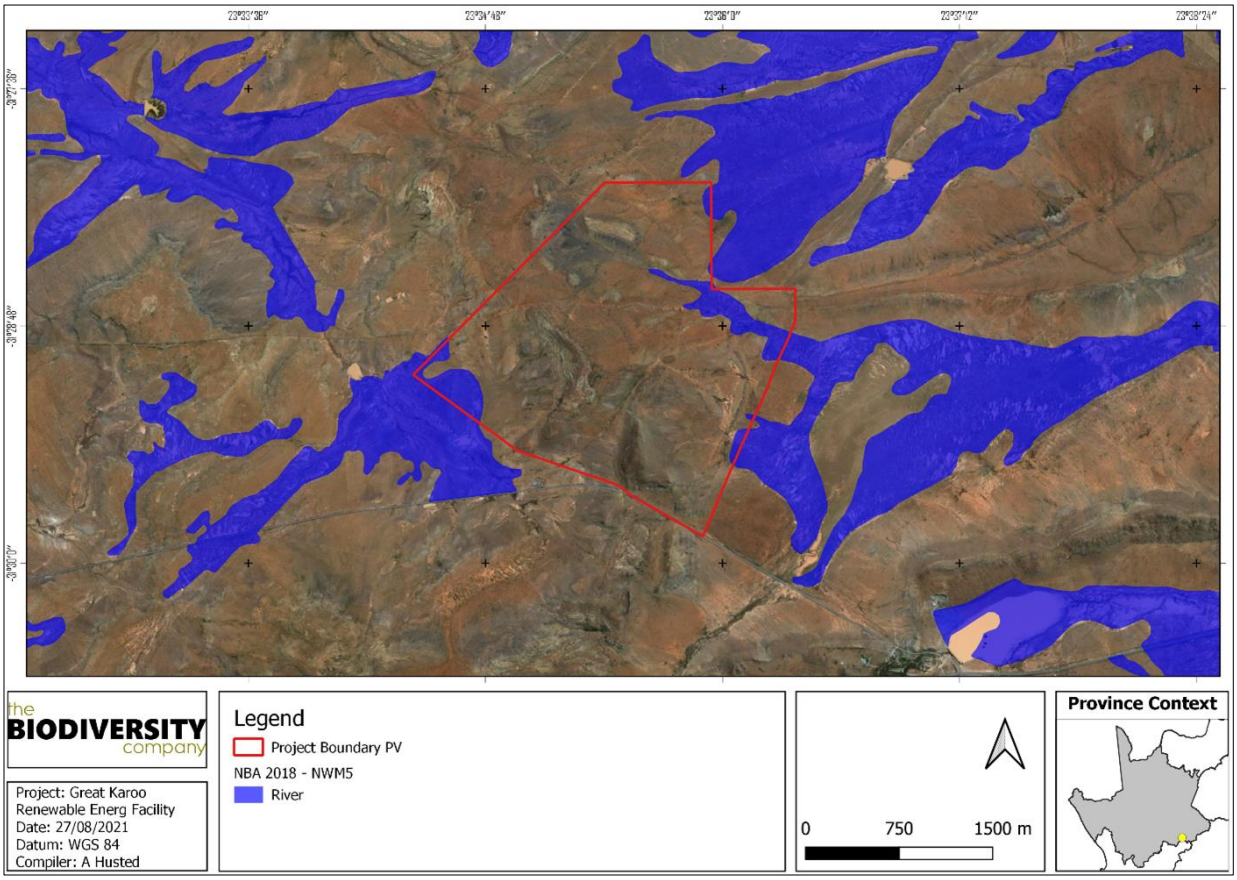

Figure 7.11: Map illustrating the NWM5 for the project area

ix. Terrestrial Fauna Communities in the Study Area

Mammals

The semi-arid area south of Richmond is known for a low diversity of mammals firstly related to the lack of open water and secondly the long history of farming in the region. The impact of the sheep farming is that the migration corridors of larger mammals were restricted and over time, many species have been lost to the area. In recent years with the increase in hunting, some farmers have reintroduced some of the mammals that were previously present in the area. The obvious threat of predators to livestock further contributes to the low diversity of mammals occurring in the area. The smaller cats e.g., *Genetta genetta, Felis nigripes* (Vulnerable) and the less feared small fox, *Otocyon megalotis* were recorded recently in the QDS (FitzPatrick Institute of African Ornithology – Virtual Museum, Mammal Records, 2021 and i-Naturalist, 2021) (**Table 7.3**). There was some rodent activity (active burrows and tracks) observed, but the species were not identified during the survey.

The endangered *Bunolagus monticularis* is not expected in the area (known distribution range further south), but a survey is currently being conducted to confirm its absence/presence in the study area.

Table 7.3: Summary of expected mammals associated with the QDS 3123DA (shaded species represent either observation or signs of activity)

Family	*Genus and species name*	Common name	Conservation status
Bathyergidae	*Cryptomys hottentotus*	African Mole-rat	Least Concern

Bovidae	*Raphicerus campestris*	Steenbok	Least Concern
Bovidae	*Antidorcas marsupialis*	Springbok	Least Concern
Bovidae	*Pelea capreolus*	Grey Rhebok	Least Concern
Canidae	*Otocyon megalotis*	Bat-eared Fox	Least Concern
Cercopithecidae	*Papio ursinus*	Cape Baboon	Least Concern
Felidae	*Felis nigripes*	Black-footed Cat	Vulnerable
Herpestidae	*Suricata suricatta*	Meerkat	Least Concern
Herpestidae	*Herpestes pulverulentus*	Cape Grey Mongoose	Least Concern
Leporidae	*Lepus saxatilis*	Scrub Hare	Least Concern
Leporidae	*Lepus capensis*	Cape Hare	Least Concern
Muridae	*Rhabdomys pumilio*	Four-striped Grass Mouse	Least Concern
Mustelidae	*Ictonyx striatus*	Striped polecat	Least Concern
Orycteropodidae	*Orycteropus afer*	Aardvark	Least Concern
Pedetidae	*Pedetes capensis*	Springhare	Least Concern
Procaviidae	*Procavia capensis*	Rock hyrax	Least concern
Sciuridae	*Geosciurus inauris*	Cape Ground Squirrel	Least Concern
Viverridae	*Genetta genetta*	Small-spotted Genet	Least Concern

Amphibians

According to the records (FitzPatrick Institute of African Ornithology – Virtual Museum, Frog Records, 2021), only two (2) amphibian species (**Table 7.4**) were recently collected within the area (QD 3123DA). These are the Common Caco (*Cacosternum boettgeri*) and Tandy's Sand Frog (*Tomopterna tandyi*), both with a listed conservation status of "Least Concern". Due to the recent droughts, the probability of encountering any specimens within the project is low.

Table 7.4: List of Amphibians associated with the QDS (3123DA) of the study area

Family	*Genus and species name*	Common name	Conservation status
Pyxicephalidae	*Cacosternum boettgeri*	Common Caco	Least Concern
Pyxicephalidae	*Tomopterna tandyi*	Tandy's Sand Frog	Least Concern

Reptiles

One will expect a more extensive list of reptiles for the study, but the combined list for the QDS (FitzPatrick Institute of African Ornithology – Virtual Museum, Mammal Records, 2021 and i-Naturalist, 2021) gives a short list of recently confirmed specimens (**Table 7.5**). This can be a result of the recent extensive drought and modified landscape (grazing and vegetation modification) associated with the agricultural activities. There are no species listed as red data for the area.

Table 7.5: List of expected reptiles on the area of the proposed development (FitzPatrick Institute of African Ornithology – Virtual Museum, Reptile Records, 2021 and i-Naturalist, 2021)

Family	*Genus and species name*	Common name	Conservation status
Agamidae	*Agama atra*	Southern Rock Agama	Least Concern
Agamidae	*Agama aculeata*	Ground Agama	Least Concern
Colubridae	*Lamprophis aurora*	Aurora House Snake	Least Concern
Cordylidae	*Karusasaurus polyzonus*	Karoo Girdled Lizard	Least Concern
Cordylidae	*Cordylus cordylus*	Cape Girdled Lizard	Least Concern
Gekkonidae	*Afroedura karroica*	Karoo Flat Gecko	Least Concern
Lacertidae	*Meroles suborbitalis*	Spotted Sand Lizard	Least Concern
Lacertidae	*Pedioplanis namaquensis*	Namaqua Sand Lizard	Least Concern

Scincidae	*Trachylepis sulcata*	Western Rock Skink	Least Concern
Scincidae	*Plestiodon gilberti*	Gilbert's Skink	Least Concern
Testudinidae	*Stigmochelys pardalis*	Leopard Tortoise	Least Concern
Varanidae	*Varanus albigularis*	Rock Monitor	Least Concern

Arachnida

A number of scorpions (**Table 7.6**) are listed for the larger area around the study site (African Snake Bite Institute, 2021) and a number of active burrows of these animals were noted during the survey.

Table 7.6: List of possible Scorpions that can occur on the study site, as these are listed in the larger area surrounding Richmond)

Family	*Genus and species name*	Common name	Conservation status
Buthidae	*Parabuthus granulatus*	Rough Thicktail Scorpion	Least Concern
Buthidae	*Parabuthus mossambicensis*	Mozambique Thicktail Scorpion	Least Concern
Buthidae	*Uroplectes carinatus*	Common Lesser-Thicktail Scorpion	Least Concern
Buthidae	*Uroplectes triangulifer*	Highveld Lesser-Thicktail Scorpion	Least Concern
Scorpionidae	*Opistophthalmus carinatus*	Radiant Burrower	Least Concern
Scorpionidae	*Opistophthalmus karrooensis*	Karroo Burrower	Least Concern

From the surveys conducted, it is clear that the animal diversity is low, and it can be linked to the current drought conditions and the semi-arid conditions associated with the region, as well as the history of habitat management associated with livestock production.

x. Bats

Bats play a critical role in many ecosystems and are important indicators of biodiversity and ecosystem health. They provide many essential ecosystem services which increase human well-being such as pollination, seed dispersal and the consumption of important agricultural pests.

Bat Species

There are several bat species in the vicinity of the site that occur commonly in the area. Some of these species are of special importance based on their likelihood of being impacted by the proposed PV facility, due to high abundances and certain behavioural traits. They have also been dominating records of fatalities at Solar PV facilities in South Africa. The relevant species are discussed below.

Tadarida aegyptiaca

The Egyptian Free-tailed Bat, *Tadarida aegyptiaca*, is a Least Concern species (IUCN Red List 2016) as it has a wide distribution and high abundance throughout South Africa and is part of the Free-tailed bat family (Molossidae). It occurs from the Western Cape of South Africa, north through to Namibia and southern Angola; and through Zimbabwe to central and northern Mozambique (Monadjem *et al*. 2020). This species is protected by national legislation in South Africa (ACR 2020).

They roost communally in small (dozens) to medium-sized (hundreds) groups in caves, rock crevices, under exfoliating rocks, in hollow trees and behind the bark of dead trees. *Tadarida aegyptiaca* has also adapted to roosting in buildings, in particular roofs of houses. Thus, man-made structures and large trees on the site would be important roosts for this species.

Tadarida aegyptiaca forages over a wide range of habitats, flying above the vegetation canopy. It appears that the vegetation has little influence on foraging behaviour as the species forages over desert, semi-arid scrub, savannah, grassland, and agricultural lands. Its presence is strongly associated with permanent water bodies due to concentrated densities of insect prey.

Neoromicia capensis

Neoromicia capensis is commonly called the Cape serotine and has a conservation status of Least Concern (IUCN Red List 2016) as it is found in high numbers and is widespread over much of Sub-Saharan Africa.

High mortality rates of this species would be a cause for concern as *N. capensis* is abundant and widespread and as such has a more significant role to play within the local ecosystem than the rarer bat species. *N. capensis* does not undertake migrations and is thus considered a resident of the site.

It roosts individually or in small groups of two to three bats in a variety of shelters, such as under the bark of trees, at the base of aloe leaves, and under the roofs of houses. It will use most man-made structures as day roosts which can be found throughout the site and surrounding areas (Monadjem *et al*. 2020).

N. capensis is tolerant to a wide range of environmental conditions as it survives and prospers across arid and semi-arid areas to montane grasslands, forests, and savannas; indicating that it may occupy several habitat types across the site and is amenable towards habitat changes. It is however a clutter-edge forager, meaning it prefers to hunt on the edge of vegetation clutter mostly, but can occasionally forage in open spaces.

Miniopterus natalensis

Miniopterus natalensis, commonly referred to as the Natal long-fingered bat, occurs widely across the country but mostly within the southern and eastern regions and is listed as Least Concern. This bat is a cave-dependent species and identification of suitable roosting sites may be more important in determining its presence in an area than the presence of surrounding vegetation. It occurs in large numbers when roosting in caves with approximately 260 000 bats observed making seasonal use of the De Hoop Guano Cave in the Western Cape, South Africa. Culverts and mines have also been observed as roosting sites for either single bats or small colonies. Separate roosting sites are used for winter hibernation activities and summer maternity behaviour, with the winter hibernacula generally occurring at higher altitudes in more temperate areas and the summer hibernacula occurring at lower altitudes in warmer areas of the country.

Very little is known about the migratory behaviour and paths of *M. natalensis* in South Africa, with migration distances exceeding 150km.

xi. Avifauna

Important Bird and Biodiversity Areas (IBA)

There are no Important Bird Areas (IBA) within a 60km radius of the proposed Nku PV facility. The closest IBA to the project site is the Platberg-Karoo Conservancy IBA SA037. It is therefore highly unlikely that the proposed development will have a negative impact on any IBA due to the distance from the project site.

Avifauna Micro-habitats

The project site within which the development area is located falls within the Nama Karoo biome. It consists of a flat plain with a number of inselbergs containing steep, boulder-strewn slopes, exposed rocky ridges and low cliffs. Two vegetation types are found in the development site, the dominant one being Eastern Upper Karoo, which is found on the plains and Upper Karoo Hardeveld occurring on the ridges.

Whilst the distribution and abundance of the bird species in the development area are typical of the broad vegetation type, it is also necessary to examine bird habitats in more detail as they may influence the distribution and behaviour of priority species. These are discussed in more detail below.

Nama Karoo: The vegetation at the development area consists of Karoo shrub.

Surface Water: The development area contains one source of permanent surface water, namely boreholes with water troughs which is situated in the extreme north of the development area.

High voltage lines: There are a number of high voltage lines that run to the north-west of the development area. Transmission lines are an important breeding substrate for raptors in the Karoo, due to the lack of large trees. There is a Tawny Eagle nest (FPTE1) situated approximately 2.7km from the development area border on the Droërivier – Hydra 2 400kV transmission line. The nest was last inspected in July 2021, when an adult bird was recorded on the nest.

Agricultural lands: Cultivation in the development area is limited to a few irrigated lands in the south of the development area where lucerne is cultivated.

Bird Community within the Surrounding Area and the Project Site

The South African Bird Atlas Project 2 (SABAP2) data indicates that a total of 164 bird species could potentially occur within the broader area. Of these, 61 species are classified as priority species and 12 of these are South African Red List species. Of the priority species, 27 are likely to occur regularly in the development area. **Table 7.7** below lists all the priority species that are likely to occur regularly and the possible impact on the respective species by the proposed PV facility.

Table 8.7: Priority species potentially occurring at the development area (Red List species are shaded) (where **NT = Near threatened, VU = Vulnerable** and **EN = Endangered**

		SABAP2 reporting rate		Status		Recorded	Endemic/n	Waterbird	Raptor	Habitat feature						Impact					
Species	**Taxonomic name**	**Full protocol reporting rate**	**ad hoc protocol reporting rate**	**Global status**	**Regional status**					**Nama Karoo**	**Surface water**	**Agriculture**	**Ridges**	**Alien trees**	**HV lines**	**PV panel collisions**	**Displacement - disturbance**	**Displacement - habitat loss**	**Entrapment in fences**	**Electrocution on the MV OHL**	**Collision with the MV OHL**
Ludwig's Bustard	*Neotis ludwigii*	45.83	7.58	EN	EN	x				x		x					x	x	x		x
Jackal Buzzard	*Buteo rufofuscus*	43.75	16.67			x			x	x	x		x		x					x	
Black-headed Canary	*Serinus alario*	25.00	0.00				x			x	x					x	x	x			
Sickle-winged Chat	*Emarginata sinuata*	56.25	7.58			x	x			x						x	x	x			
Tawny Eagle	*Aquila rapax*	12.50	3.03	VU	EN	x			x	x	x			*x*	x		x			x	
Fiscal Flycatcher	*Melaenornis silens*	33.33	3.03				x			x				*x*		x					
Pale Chanting Goshawk	*Melierax canorus*	45.83	13.64			x			x	x	x			*x*	x					x	
Karoo Korhaan	*Eupodotis vigorsii*	52.08	7.58	LC	NT	x				x							x	x	x		x
Large-billed Lark	*Galerida magnirostris*	50.00	13.64			x	x			x						x	x	x			
Karoo Prinia	*Prinia maculosa*	43.75	7.58			x	x			x						x	x	x			
Grey Tit	*Melaniparus afer*	18.75	4.55			x	x			x				*x*		x					
Booted Eagle	*Hieraaetus pennatus*	6.25	0.00			x			x	x	x		x		x	x				x	
Martial Eagle	*Polemaetus bellicosus*	10.42	1.52	VU	EN	x			x	x	x			*x*	x		x			x	
Karoo Eremomela	*Eremomela gregalis*	2.08	6.06			x	x			x						x	x	x			

Fairy Flycatcher	*Stenostira scita*	12.50	1.52				x			x						x	x	x			
Egyptian Goose	*Alopochen aegyptiaca*	37.50	6.06			x		x			x	x								x	x
		SABAP2 reporting rate		**Status**		**Recorded**	**Endemic/n**	**Water bird**	**Raptor**	**Habitat feature**						**Impact**					
Species	**Taxonomic name**	**Full protocol reporting rate**	**ad hoc protocol reporting rate**	**Global status**	**Regional status**					**Nama Karoo**	**Surface water**	**Agriculture**	**Ridges**	**Alien trees**	**HV lines**	**PV panel collisions**	**Displacement - disturbance**	**Displacement - habitat loss**	**Entrapment in fences**	**Electrocution on 3MV OHL**	**Collision with the MV OHL**
Greater Kestrel	*Falco rupicoloides*	31.25	3.03			x			x	x				*x*	x	x				x	
Rock Kestrel	*Falco rupicolus*	41.67	3.03			x			x	x			x	*x*	x	x					
South African Shelduck	*Tadorna cana*	47.92	4.55			x		x			x										x
Black-eared Sparrow-Lark	*Eremopterix australis*	18.75	3.03			x	x			x						x	x	x			
Pied Starling	*Lamprotornis bicolor*	35.42	9.09			x	x					x		*x*		x					
Layard's Warbler	*Curruca layardi*	25.00	1.52			x				x						x	x	x			
Cape White-eye	*Zosterops virens*	10.42	1.52			x	x			x				*x*							
Spotted Eagle-Owl	*Bubo africanus*	8.33	0.00						x	x			x	*x*			x			x	
Secretarybird	*Sagittarius serpentarius*	12.50	6.06	VU	VU				x	x	x			*x*			x	x	x		
Lanner Falcon	*Falco biarmicus*	2.08	3.03	VU	VU	x			x	x	x	x	x	*x*	x	x				x	

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

The area proposed for the Nku PV is located approximately 35km south-west of Richmond and 80km south-east of Victoria West outside of the identified Beaufort West REDZ, along the N1. The town of Richmond was established in 1843 to service the needs of the growing farming community. It was renowned as a resort town in the 1800s for European aristocrats suffering lung disease due to its clean air and mineral-rich waters.

7.5.1. Cultural Landscape

The name 'Karoo' has its roots in the Khoisan word meaning 'place of great dryness'. It once supported large grassy flatlands and the San and Khoekhoen migrated across the region for hunting and grazing purposes. Less than two hundred years ago large, herds of antelope still roamed the grass plains. With the occupation of the area by stock farmers, the sheep gradually replaced the game and the grass receded along with changing grazing and weather patterns. By the late 17th century, the Khoenhoen had moved from the region into the more water rich southern Karoo and the coastal plains. During the early colonial period, the harshness of the Karoo region formed an almost impenetrable barrier from the Cape to the interior for colonial explorers, hunters and travellers.

The 18th century was characterized by a marked increase in the rate of expansion of the boundaries of the settlement at the Cape. This was associated with the emergence of the migrant stock farmer (trekboer). Early routes into the interior largely followed the tracks initially used by migrating herds of game or the cattle herds and sheep flocks of the Khoekhoen on their seasonal route between coastal and inland grazing grounds. These routes were later reinforced by generations of trek farmers moving between the markets at the Cape and their farms.

Permanent settlement of the region only really occurred in the 19th century with towns being established near permanent water sources. It was during this period that Beaufort West was established as a drostdy in 1818 on the farm Hooyvlakte. In the same year, a mission station was established at Kookfontein, just outside Beaufort West. Beaufort West became the first municipality in South Africa on 3 February 1837 and had the country's first town hall. When the railroad reached the town in 1880 it became a marshalling yard and locomotive depot and today it is the largest town in the Karoo.

A number of the significant heritage resources located in close proximity to the proposed development area are located within Beaufort West and are associated with the early colonial history of the town. The area proposed for development has limited topography that could screen the proposed development. It is therefore very likely that the proposed development will have a negative impact on the cultural and scenic value of the landscape.

7.5.2. Archaeology

Very few heritage assessments have been completed within close proximity to the area proposed for development. The Karoo has a long and rich archaeological record dating from the earliest stages of Stone Age technology that are over a million years old, to the historic period that consists of the last few hundred years of human occupation. Archaeological sites include caves and rock shelters, open air artefact scatters, rock engravings and historic structures with their associated cultural materials. Because of the scarcity of caves and shelters, more than 90% of Karoo archaeological sites are open sites of stone artefacts, ostrich eggshell fragments and occasionally, pottery. Bone remains are rarely preserved. Artefacts of both the Early and Middle Stone Age are widespread and may generally be described as an ancient litter that occurs at a low frequency across the landscape. Where definable scatters of Early and Middle Stone Age material occur, they are considered to be significant heritage sites. More intensive occupation of the Karoo started around 13 000 years ago during the Later Stone Age, which is essentially the heritage of Khoisan groups who lived throughout the region.

The legacy of the San includes numerous open sites while traces of their presence can also be found in most large rock shelters, often in the form of rock art. They frequently settled a short distance from permanent water sources (springs or waterholes) and made use of natural shelters such as rock outcrops or large boulders or even large bushes. In the Great Karoo, natural elevated features such as dolerite dykes and ridges played a significant role in San settlement patterns. It is likely that similar archaeological heritage exists within the area proposed for development. **Figure 7.12** shows the heritage resources previously identified within the study area.

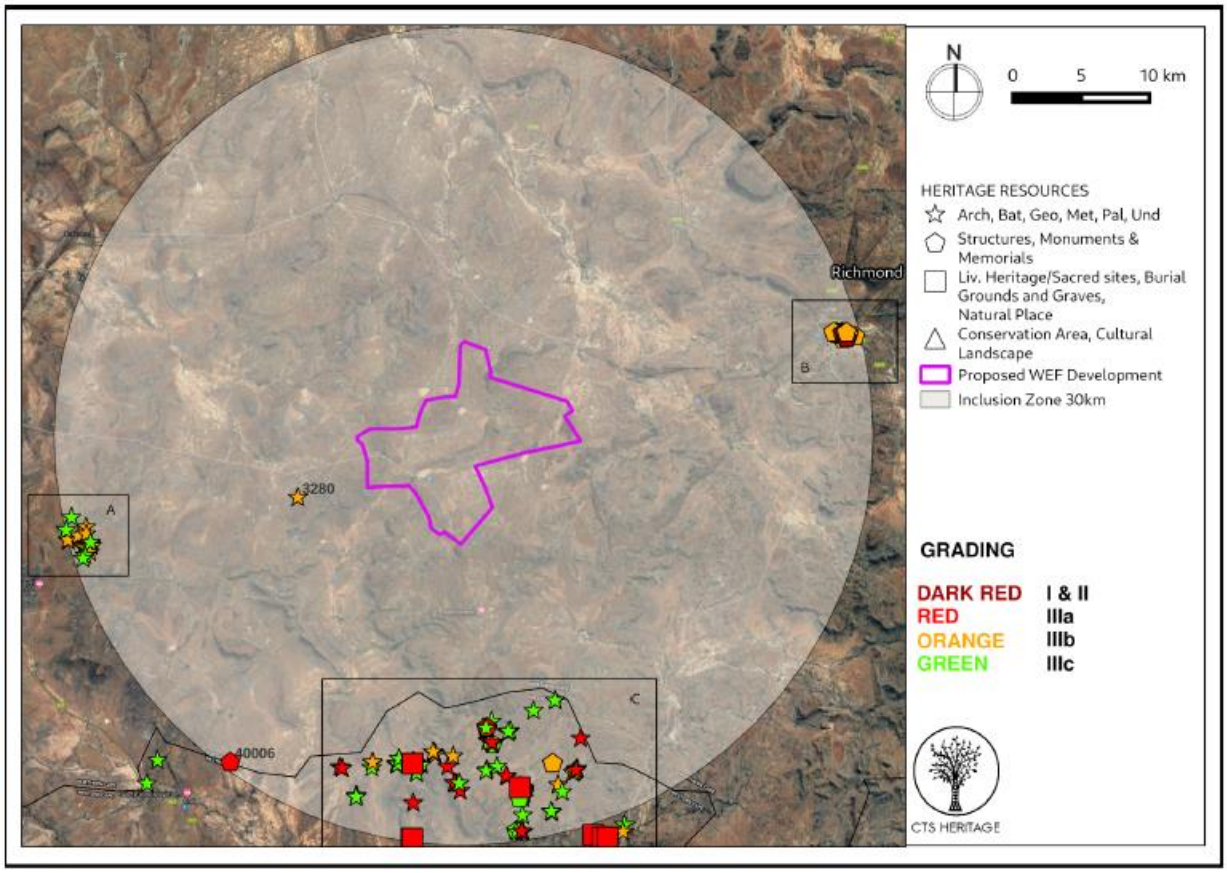

Figure 7.12: Heritage resources previously identified within the study area

7.5.3. Archaeology

According to the SAHRIS Palaeosensitivity Map (**Figure 7.13**), the area proposed for development is underlain by sediments of very high paleontological sensitivity. According to the extract from the Council for GeoSciences Map 3122 for Victoria West, the development area is underlain by the Abrahamskraal and Teekloof Formations, both of the Adelaide Subgroup of the Beaufort Group of sediments. According to the SAHRIS Fossil Heritage Browser and the Palaeotechnic Report for the Western Cape (Almond and Pether, 2008), the Beaufort Group sediments are known to preserve diverse terrestrial and freshwater tetrapods of *Tapinocephalus* to *Lystrosaurus* Biozones (amphibians, true reptiles, synapsids – especially therapsids), palaeoniscoid fish, freshwater bivalves, trace fossils (including tetrapod trackways) and sparse vascular plants (*Glossopteris* Flora, including petrified wood).

Based on the known paleontological sensitivity of this area, it is very likely that activities associated with the development of the proposed Nku PV facility will negatively impact on significant fossil heritage.

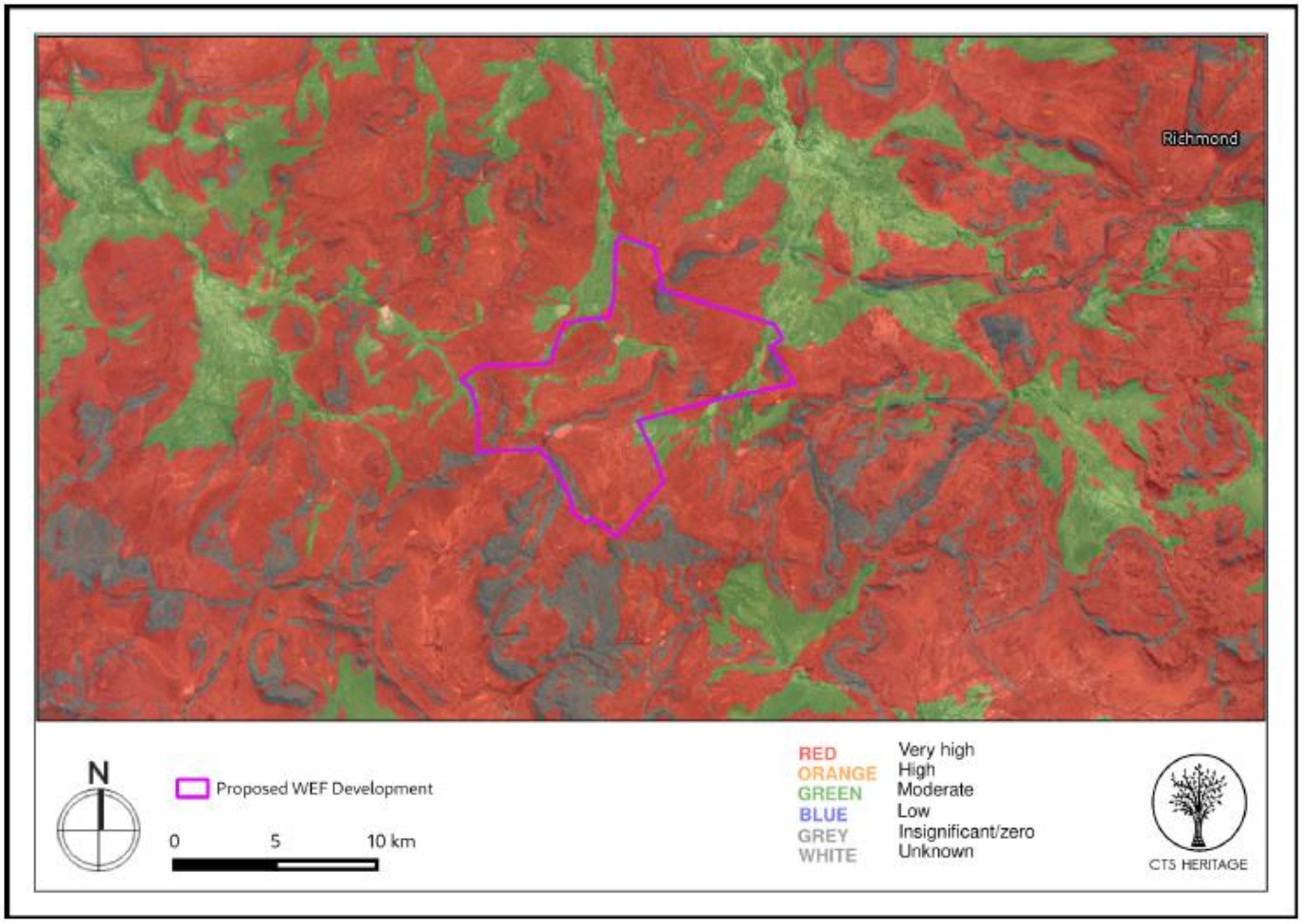

Figure 7.13: Palaeosensitivity map indicating fossil sensitivity underlying the study area.

7.6 Visual Quality

The study area occurs on land that ranges in elevation from approximately 1 170m (in the south-western corner of the study area) to 1 830m (at the top of the mountains to the east). The terrain surrounding the site

is predominantly flat to the east and the west, with a ridge traversing the centre of the site from the N1 national road to the south, up to the Kamberg Mountain to the north.

The proposed development site itself is located at an average elevation of 1 364m above sea level. The overall terrain morphological description of the study area is described as *undulating plains* (lowlands), with *ridges*, *hills,* and *mountains*.

The majority of the study area is sparsely populated (less than 1 person per km^2). The study area consists of a landscape that can be described as remote due to its considerable distance from any major metropolitan centres or populated areas. Settlements, where they occur, are usually rural homesteads or farm dwellings.

The photographs below aid in describing the general environment within the study area and surrounding the proposed project infrastructure.

The N1 national road traversing the study site

Ridges near the proposed development area

Typical Karoo homestead

Typical Karoo Scene

Figure 7.14: Photographs showing the general environment within the area.

7.6.1 Visual Exposure/visibility

A preliminary viewshed analyses for the proposed Nku PV was undertaken in order to determine the general visual exposure of the area under investigation, the results of which are shown in **Figure 7.15**.

The viewshed analyses was undertaken from preliminary vantage points within the proposed development area at offsets of 5m above average ground level.

The following is evident from the viewshed analyses:

- The Nku PV facility may be highly visible within a 1km radius of the development. There are no homesteads within this zone, only a section of the Rondawel secondary road traversing south-west of the site.
- The 3km zone contains the Rondawel homestead (guest farm), a short section of the N1 national road and the Rondawel secondary road. Other than these potential receptor sites, the rest of the visually exposed areas fall within vacant farmland.
- Visual exposure within the 6km zone will predominantly be towards the north-east, along the Droërivier/Hydro 1 and 3, Gamma/Perseus and Gamma/Hydra power lines, up to the Bobbejaankrans hills. The only homestead within this zone is the Nieuwefontein dwelling to the north-west, approximately 6km from the development site.
- At distances exceeding 6km the intensity of visual exposure is expected to be very low and highly unlikely due to the distance between the object (development) and the observer.

It is envisaged that the structures, where visible from shorter distances, and where sensitive visual receptors may find themselves within this zone, may constitute a high visual prominence, potentially resulting in a visual impact. This may include residents of the farm dwellings, as well as observers travelling along the roads in closer proximity to the facility.

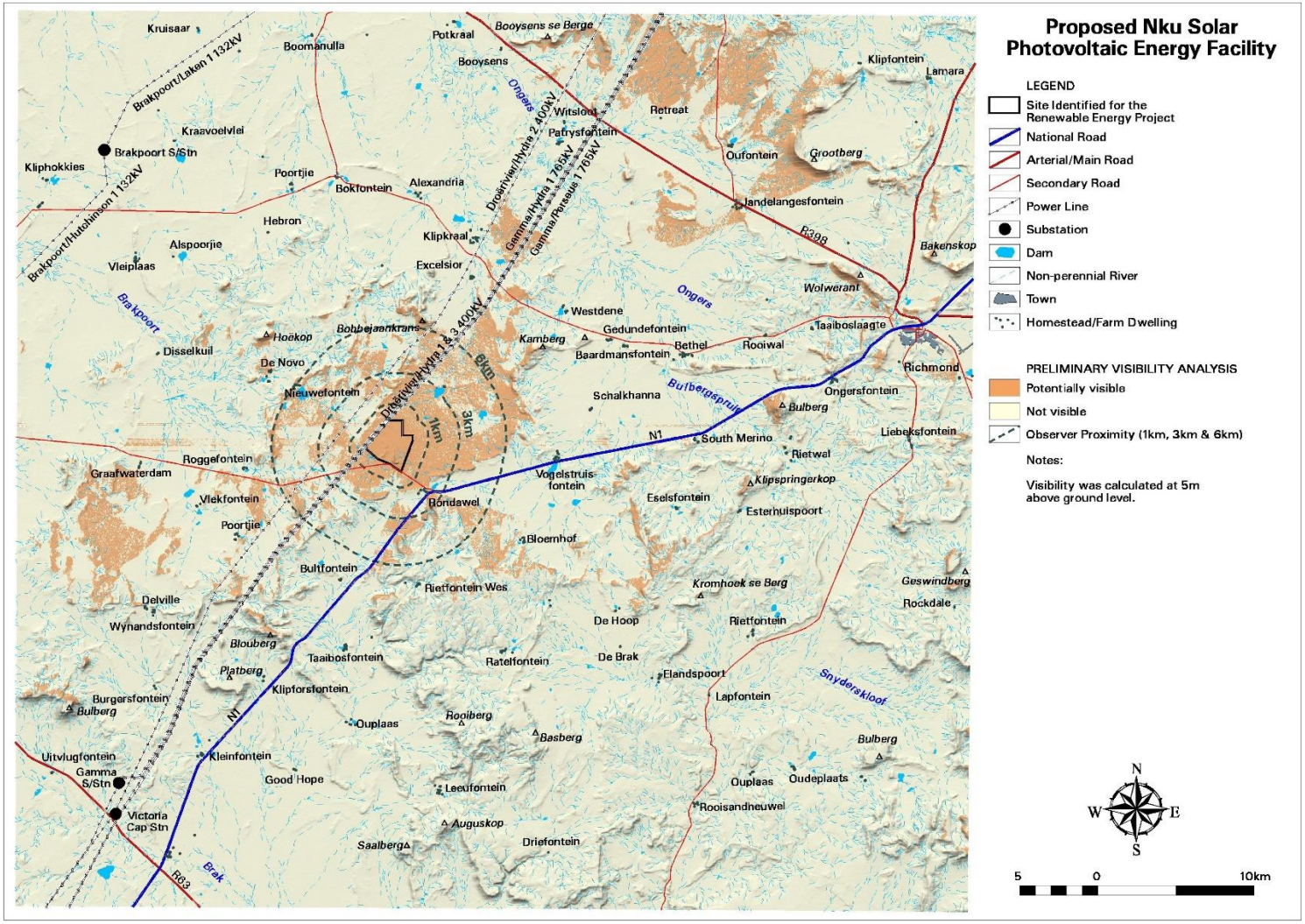

Figure 7.15: Map indicating the preliminary visual exposure of the proposed Nku PV facility.

7.7 Traffic Conditions

It is assumed that if components are imported to South Africa, it will be via the Port of Ngqura, which is located in the Eastern Cape, ~425km from the proposed site. Alternatively, components can be imported via the Port of Saldanha in the Western Cape, which is located ~675km from the proposed site.

The preferred route for abnormal load vehicles will be from the port (i.e., Port of Ngqura), heading north on the R75, passing Wolwefontein and Jansenville, and onto the R63 at Graaff-Reinet. The vehicles will travel on the R63 to the N1, passing Murraysburg, and continue on the N1 to the proposed site (refer to **Figure 7.16**).

Figure 7.16: Proposed route from the Port of Ngqura to the proposed site.

The proposed access to the project site is located on the N1 (refer to **Figure 7.17**) and will need to be upgraded to cater for the construction and abnormal road vehicles.

Figure 7.17: Proposed access point to the project site

7.8 Socio-Economic Broader Area

7.8.1 Profile of the Broader Area

The project site is located within Ward 3 of the Ubuntu Local Municipality, which forms part of the Pixley Ka Seme District Municipality.

Population

According to the Community Household Survey conducted in 2016, the Ubuntu Local Municipality has a population of 19 471. Of this total, 38.6% are under the age of 18, 55.9% between 18 and 64, and the remaining 5.5% are 65 and older. According to the 2011 StatsSA data, the population of Ward 3 is 4 715. Of this total 37% under the age of 18, 58% between 18 and 64, and the remaining 5% are 65 and older. The Ubuntu Local Municipality and the Ward 3 therefore have a high percentage of the population that falls within the economically active group of 18 – 65.

Employment

The official unemployment rate in the Ubuntu Local Municipality in 2011 was 18.1%, while 44.2% were employed, and 33.2% were regarded as not economically active. The figures for Ward 3 in 2011 were 6.8%

unemployed, 62.5% employed and 28.4% not economically active. The unemployment rates for the Ubuntu Local Municipality and Ward 3 are lower than the Provincial rate of 14.5% and the district rate of 14.8%. Recent figures released by Stats South Africa also indicate that South Africa's unemployment rate is in the region of 36%, the highest formal unemployment rate in the world.

Education

In terms of education levels, the percentage of the population over 20 years of age in the Ubuntu Local Municipality and Ward 3 with no schooling was 11.8% (2016) and 20.7% (2011), respectively, compared to 7.9% and 11.1% for the Northern Cape Province in 2016 and 2011, respectively. The percentage of the population over the age of 20 with matric was 23.2% and 15.6%, respectively, compared to 29.1% (2016) and 25.2% (2011) for the Northern Cape. The lower education levels are linked to the rural, isolated nature of the area.

7.8.2 Profile of the Immediate Affected Area

The Great Karoo Cluster of Renewable Energy Facilities is located to the north of the N1, between Three Sisters and Richmond. The closest towns to the site are Richmond, which is located approximately 35km south-west and Victoria West which is located 80km south-east. The bulk of the site is located to the north of the N1 with a small portion located to the south.

The town of Richmond was established in 1843 when a new congregation was formed for the area. The town was named after the Duke of Richmond from Kent, who was the father-in-law of the Governor of the Cape at that time, Sir Peregrine Maitland. Historically the town served as resort town for European aristocratic tuberculosis patients in the 1800s due to its clean air and mineral rich waters. The Pixley Ka Seme District Municipality Spatial Development Framework identifies Richmond as an Urban Satellite Town. These are towns that already have some services and infrastructure and have the potential to grow. The economy of the town is linked to providing services to the surrounding farming areas and through traffic associated with the N1.

The town of Victoria West was named after Queen Victoria of England and established in 1843. Victoria West forms the starting point of the Diamond Way and lies on the main route from Cape Town to Kimberley. Diamond fever was sparked in 1866 with the discovery at Hopetown and then at Kimberley. The Pixley Ka Seme District Municipality Spatial Development Framework identifies Victoria West as an Urban Centre. These towns are administrative centres within the respective eight municipalities in the district. These centres' administrative functions should be further enhanced, and it is recommended that programs for urban rehabilitation of these centres should focus on the stimulation of economic growth in these areas. The economy of the town is linked to providing services to the surrounding farming areas and through traffic associated with the N12 and R63.

The landscape associated with the site is a typical Karoo landscape consisting of dolerite koppies and ridges separated by valley bottoms. The land uses are linked to livestock farming. The character of the area can be described as a rural, Karoo landscape. There are a number of farm dwellings located in the vicinity of the site, including three farm dwellings within the boundary of the site. Most of the farm dwellings are located in the area to the west and north of the site. The Rondavel Guest Farm is located adjacent to the N1, within the boundary of the site.

CHAPTER 8: SCOPING OF POTENTIAL ISSUES

This chapter serves to describe environmental issues and potential impacts (direct, indirect, and cumulative impacts) that have been identified to be associated with the development of the Nku Solar PV and associated infrastructure, and to make recommendations for further studies required to be undertaken in the EIA Phase. The scoping process has involved the review of existing information (including previous detailed studies undertaken), limited field work, input from the project proponent and specialist consultants.

Environmental issues associated with construction and decommissioning activities of the project may include, among others, impacts on biodiversity (fauna, flora, and ecological integrity), loss of habitat, soil erosion, and impacts on, and/or benefits to the social environment and current land use. Environmental issues specific to the operation of a wind farm could include visual impact; change to ambient noise levels; avian mortality resulting from collisions with blades; and mortality, injury, and disturbance to faunal species (e.g., bat mortality due to barotrauma). Benefits during both the construction and operation phases include the creation of employment and business opportunities, and the opportunity for skills development and on-site training, improvement in energy security and support towards the renewable sector, benefits for local landowners, and benefits associated with socio-economic contributions to community development.

The development area considered for the proposed Nku PV includes Portion 0 of Farm Rondavel 85, and Portion 1 of Farm Rondavel 85 that comprises an area of approximately 571ha 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 considering in the planning of the located of the proposed NKU PV within the development footprint.

Section 8.3 provides a summary of the findings of the desktop scoping study undertaken for the construction, operation and decommissioning phases of the Nku PV. Those impacts associated with construction can also be expected to be associated with the decommissioning phase (however, to a lesser extent as the development footprint would have previously undergone transformation and disturbance during construction). More detail regarding potential impacts is included in the specialist scoping reports included in Appendix **D**-**K**.

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 Nku Solar PV Facility 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 Nku Solar PV Facility 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 Nku Solar PV Facility have been included in **Section 8.3.**
(g)(viii) the possible mitigation measures that could be applied and level of residual risk	Possible mitigation (specifically relating to the avoidance 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 Nku Solar PV Facility 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 onsite substation).
- The Scoping Phase evaluation of impacts has been largely based on desktop studies and available data within the proposed area. This information has been used to inform this Scoping report and will be verified by specialists in the EIA phase to assess the project development footprint for Nku PV.

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

8.3.1 Impacts on ecology (including flora and fauna)

The study area consists mostly of natural habitat that is used for commercial animal husbandry. The proposal to build the Nku Solar PV on site will therefore have significant effects on natural habitat. The existing biodiversity on site is, however, relatively limited in terms of uniqueness or potential presence of species of concern, with the possible presence of one Critically Endangered mammal species.

The vegetation on site is not considered to be part of any threatened ecosystem and has not been assessed as being of high conservation value due to rates of transformation. The regional vegetation types that occur on site, i.e., Eastern Upper Karoo and Upper Karoo Hardeveld, are both widespread and have low rates of transformation across their geographical range.

There are three plant species listed as Rare (*Anisodontea malavastroides, Aloe broomii* var. *tarkaensis* and *Tridentea virescens*) that could potentially occur on site, but these are all widespread species that are naturally rare where they are found. None have been previously recorded on this site. There are also two plant species protected according to National legislation (*Crinum bulbispermum* and *Harpagophytum procumbens*) that could potentially occur in the geographical area, but these are also very widespread species. The loss of some individuals, if they are found to occur on site, would not affect the conservation status of any of the species. It is, however, unlikely that any of them would be affected.

There are a small number of fauna species of conservation concern that were assessed as having a possibility of occurring on site. The Riverine Rabbit has been previously recorded within the broader project site. However, it does not occur within the development area for the Nku Solar PV.

Impacts associated with the construction, operation and decommissioning phases of the proposed PV facility and associated infrastructure on ecology include the following:

- Direct loss of vegetation. The main impact on terrestrial ecosystems is due to road construction and not to the turbines themselves. The placement of roads is therefore critical in limiting impacts.
- Loss, fragmentation, or degradation of faunal habitat.
- Displacement of populations of mobile species.
- Mortality of populations of sedentary species during construction.
- Loss of indigenous natural vegetation during construction.
- Loss of protected plants during construction.

Introduction and/or spread of declared weeds and alien invasive plants in terrestrial habitats.

Sensitivity Analysis of the Site

To determine sensitivity on site, local and regional factors were considered. There are some habitats on site that have been described as sensitive in their own right, irrespective of regional assessments. This includes primarily the dry stream beds and associated riparian zones. Rocky outcrops and steep slopes are more sensitive than surrounding areas, mainly due to higher floristic diversity and the likelihood of plant species with low local abundance occurring there.

At a regional level, the Critical Biodiversity Area (CBA) map for Northern Cape indicates the northern part of the site as being important for conservation. There are also two drainage lines (the two main ones on site) that are designated as being CBA1 areas. The remaining drainage lines of the study area are indicated as being Ecological Support Areas (ESAs).

In terms of other species of concern and overall biological diversity, including both plants and animals, the low hills and mountain ranges are the areas with the most species as well as being most likely to contain any species of concern. However, the southern main drainage line is the most likely habitat for the Critically Endangered Riverine Rabbit, if it occurs on site, which is unknown but possible.

Sensitivities that occur specifically within the development area for the Nku Solar PV that may be vulnerable to damage from the proposed project are as follows:

» Dry stream beds, including the associated riparian habitats and adjacent floodplains.

Based on this information, a map of habitat sensitivity on site is provided in **Figure 8.1,** with the development area for Nku Solar PV indicated with a black block. This shows main habitat sensitivity classes on site, namely VERY HIGH for habitat suitable for Riverine Rabbit (which is not found within the Nku PV solar development area), HIGH for other CBA1 areas and riparian habitats (note that no CBAs falls within the development area for the Nku Solar PV), MEDIUM-HIGH for ridges, outcrops, hills and mountain slopes, and MEDIUM for plains vegetation.

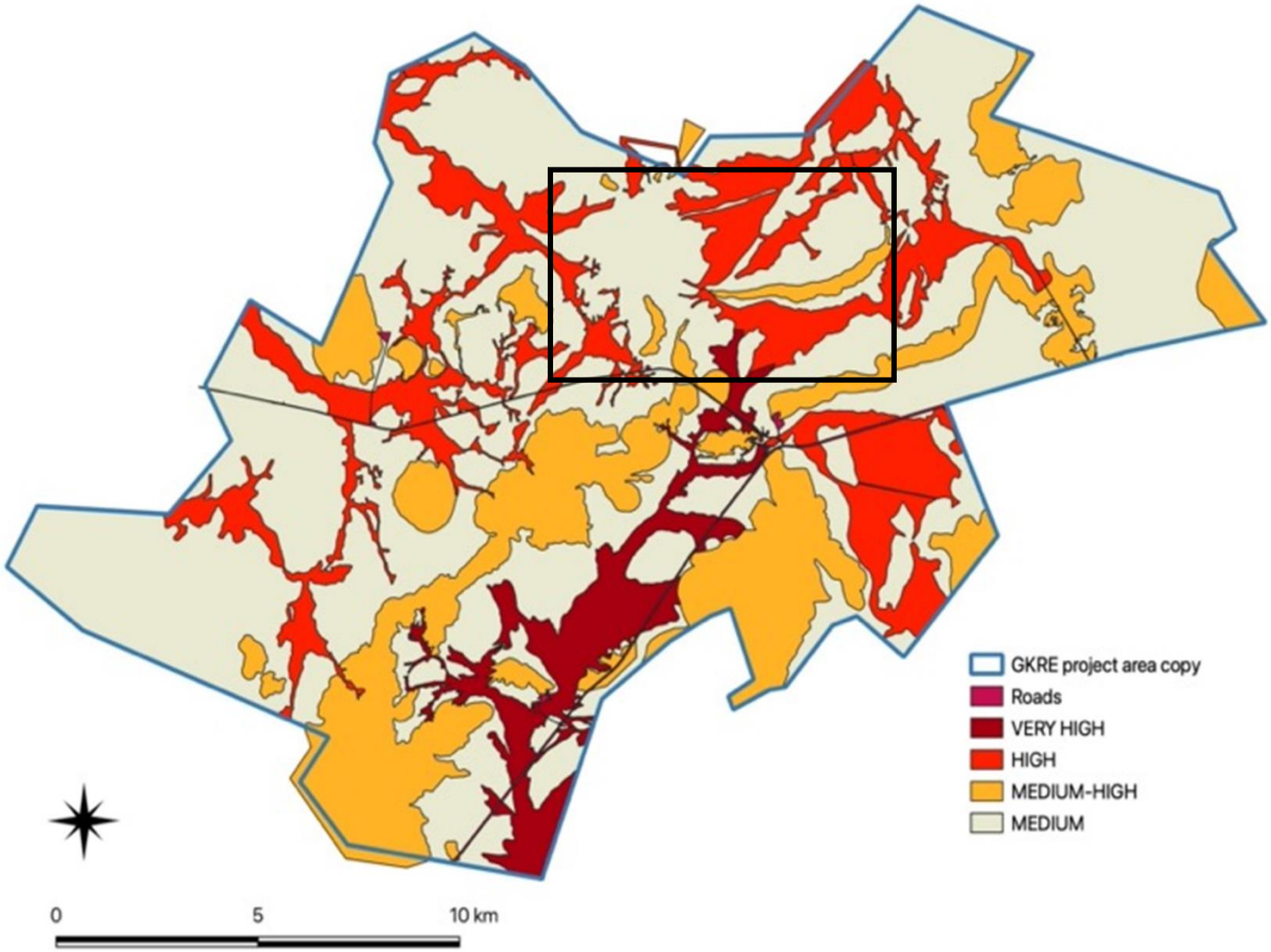

Figure 8.1. Preliminary ecological sensitivity map of the combined study area (with Nku shown by a black block).

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Disturbance/destruction to and loss of vegetation and fauna, introduction and/or spread of declared weeds and alien invasive plants, as well as increased runoff and erosion	**Construction Phase Impacts** Direct impacts: » Loss and/or fragmentation of indigenous natural vegetation due to clearing. » Loss of individuals of protected plants. » Loss of faunal habitat and refugia. » Direct mortality of fauna due to machinery, construction and increased traffic. » Displacement and/or disturbance of fauna due to increased activity and noise levels. » Increased poaching and/or illegal collecting due to increased access to the area. Indirect impacts: » Establishment and spread of alien invasive plants due to the clearing and disturbance of indigenous vegetation. » Increased runoff and erosion due to clearing of vegetation, construction of hard surfaces and compaction of surfaces, leading to changes in downslope areas. **Operation Phase Impacts** Direct impacts: » Continued disturbance to natural habitats due to general operational activities and maintenance. » Direct mortality of fauna through traffic, illegal collecting, poaching and collisions and/or entanglement with infrastructure. Indirect impacts: » Continued establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors. » Continued runoff and erosion due to the presence of hard surfaces that change the infiltration and runoff properties of the landscape.	Local to regional	None identified

	» Changes to behavioural patterns of animals, including possible migration away or towards the project area. » Positive potential impact on climate change due to generation of electricity without the need for coal mining or burning of coal, currently the main form of power generation in South Africa. **Decommissioning Phase Impacts** <u>Direct impacts:</u> » Loss and disturbance of natural vegetation due to the removal of infrastructure and need for working sites. » Direct mortality of fauna due to machinery, construction, and increased traffic. » Displacement and/or disturbance of fauna due to increased activity and noise levels. <u>Indirect impacts:</u> » Continued establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors. » Continued runoff and erosion due to the presence of hard surfaces that change the infiltration and runoff properties of the landscape. » Changes to behavioural patterns of animals, including possible migration away or towards the project area.		
Description of expected significance of impact From an ecological perspective it is clear that the proposed development will have a low impact on the biota (plants and animals), but if the access roads and final placement of structures are sensitive to the animals and sensitive habitats, impacts can be limited. On a local scale, one can expect a low to moderate impact on the habitat for the animals, whilst a low to very low impact can be expected on a regional level.			
Gaps in knowledge & recommendations for further study » Detailed camera-trap survey of potential Riverine Rabbit habitat, as per recommended protocols. This survey will provide incidental information on the occurrence of other mobile flora on site. » More detailed floristic surveys of main footprint areas in order to document composition, especially of protected species. Ideally, this should be undertaken after an appropriate time-period after rainfall to allow emergence of any species of potential interest.			

8.3.2 Impacts on avifauna

In summary, the main impacts of PV plants on avifauna which have been identified so far include the following:

Displacement due to disturbance associated with the construction of the solar PV plant and associated infrastructure

» As far as disturbance is concerned, it is likely that all the avifauna, including all the priority species (these are species that are of concern due to their population status amd their sensitivity to habitat manipulation) , will be temporarily displaced in the footprint area, either completely or more likely partially (reduced densities) during the construction phase, due to the disturbance associated with the construction activities e.g. increased vehicle traffic and short-term construction related noise (from equipment) and visual disturbance

Displacement due to habitat transformation associated with the construction of the solar PV plant and associated infrastructure

» Ground-disturbing activities affect a variety of processes in arid areas, including soil density, water infiltration rate, vulnerability to erosion, secondary plant succession, invasion by exotic plant species, and stability of cryptobiotic soil crusts. These processes have the ability – individually and together – to alter habitat quality, often to the detriment of wildlife, including avifauna. Any disturbance and alteration to the desert landscape, including the construction and decommissioning of utility-scale solar energy facilities, has the potential to increase soil erosion. Erosion can physically and physiologically affect plant species and can thus adversely influence primary production and food availability for wildlife (Lovich & Ennen 2011).

Collisions with the solar panels

» This impact refers to collision-related fatality during operation i.e., fatality resulting from the direct contact of the bird with a project structure(s). This type of fatality has been occasionally documented at solar projects of all technology types (McCrary et al. 1986; Hernandez et al. 2014; Kagan et al. 2014). In some instances, the bird is not killed outright by the collision impact, but succumbs to predation later, as it cannot avoid predators due to its injured state.

Entrapment in perimeter fences

» Visser et al. (2018) recorded a fence-line fatality (Orange River Francolin Scleroptila gutturalis) resulting from the bird being trapped between the inner and outer perimeter fence of the facility. This was further supported by observations of large-bodied birds unable to escape from between the two fences (e.g. Red-crested Korhaan Lophotis ruficrista) (Visser et al. 2019). Considering that one would expect the birds to be able to take off in the lengthwise direction (parallel to the fences), it seems possible that the birds panicked when they were approached by observers and thus flew into the fence.

Electrocution of priority species on the internal medium voltage reticulation network

» Medium voltage electricity poles could potentially pose an electrocution risk to raptors. Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components (van Rooyen 2000). The electrocution risk is largely determined by the design of the electrical hardware.

Collision with the internal medium voltage overhead lines

» Collisions are the biggest threat posed by transmission lines to birds in southern Africa (Van Rooyen 2004). Most heavily impacted upon are bustards, storks, cranes and various species of waterbirds, and to a lesser extent, vultures. These species are mostly heavy-bodied birds with limited manoeuvrability, which makes it difficult for them to take the necessary evasive action to avoid colliding with transmission lines (Van Rooyen 2004, Anderson 2001).

Sensitivity Analysis of the Site From an avifaunal perspective, the following specific sensitivities were identified within the development area (refer to **Figure 8.2**):

» **Surface water: 200m solar panel No-Go zone**

Included are areas within 200m of water troughs. Surface water in this semi-arid habitat is crucially important for priority avifauna and many non-priority species. It is important to leave open space with no solar panels for birds to access and leave the surface water area unhindered. Surface water is also important area for raptors to hunt birds which congregate around water troughs, and they should have enough space for fast aerial pursuit.

» **Nests of Red Listed eagles: 1.5km all infrastructure No-Go zone**

A 1.5km infrastructure free buffer zone must be implemented around the Tawny Eagle (SA status: Endangered) nest on the Droërivier-Hydra 2 400kV transmission line. This is to prevent any disturbance of the birds at the nest during the construction phase which could lead them to abandon the nest.

Figure 8.2: Avifaunal sensitivities (PV solar) at the Nku Solar PV facility and associated infrastructure.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
During construction: Displacement of priority species due to disturbance associated with construction of the PV plant and associated infrastructure.	At the PV facility, the priority species which would be most severely affected by disturbance would be ground nesting species, and those that utilise low shrubs for nesting, which are the following: Ludwig's Bustard, Karoo Korhaan, Black-headed Canary, Sickle-winged Chat, Large-billed Lark, Karoo	Local	A 1.5km infrastructure free buffer zone must be implemented around the Tawny Eagle nest on the Droërivier-Hydra 2 400kV transmission line.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
	Prinia, Karoo Eremomela, Fairy Flycatcher, Black-eared Sparrow-Lark, Layard's Warbler and Spotted Eagle-Owl. Large eagles breeding on the transmission lines in close proximity of the PV facility could also be at risk of disturbance, i.e. Martial Eagle and Tawny Eagle		
During construction: Displacement of priority species due to habitat transformation associated with construction of the PV plant and associated infrastructure.	Ground nesting species and some raptors are likely to be impacted by the habitat transformation, as it will result in reduced prey availability and accessibility. Priority species that could be negatively affected by displacement due to habitat loss are the following: Ludwig's Bustard, Karoo Korhaan, Secretarybird, Black-headed Canary, Sickle-winged Chat, Large-billed Lark, Karoo Prinia, Karoo Eremomela, Fairy Flycatcher, Black-eared Sparrow-Lark and Layard's Warbler.	Local	A 200m solar panel free buffer zone must be implemented around the borehole with water trough to provide unhindered access to the surface water for a variety of priority species.
During operation: Mortality of priority species due to collisions with solar panels	The priority species which would most likely be potentially affected by this impact are mostly small birds which forage between the solar panels, and possibly raptors which prey on them, or forage for insects between the PV panels, e.g. Lesser Kestrels (i.e. if they are not completely displaced due to the habitat transformation). Due to the absence of large permanent waterbodies at or close to the development area, it is unlikely that waterbirds will be attracted to the solar arrays due to the "lake effect". Priority species which could potentially be impacted due to collisions with the solar panels are the following: Black-headed Canary, Sickle-winged Chat, Fiscal Flycatcher, Large-billed Lark, Karoo Prinia, Grey Tit, Booted Eagle, Karoo Eremomela, Fairy Flycatcher, Greater Kestrel, Rock Kestrel, Black-eared Sparrow-Lark, Pied Starling, Lanner Falcon and Layard's Warbler.	Local	No avifaunal no-go areas were determined necessary for the mitigation of this anticipated impact.
During operation: Entrapment of large-bodied birds in the double perimeter fence	The priority species which could potentially be affected by this impact are most likely medium to large terrestrial species. Priority species which could potentially be impacted due entrapment are the following: Ludwig's Bustard, Karoo Korhaan and Secretarybird.	Local	No avifaunal no-go areas were determined necessary for the mitigation of this anticipated impact.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
During operation: Mortality of priority species due to electrocution on the medium voltage internal reticulation network	While the intention is to place the majority of the medium voltage reticulation network underground at the PV facility, there are areas where the lines will run above ground. Priority species which could be at risk of electrocution on the medium voltage powerlines are the following: Tawny Eagle, Martial Eagle, Spotted Eagle-Owl, Booted Eagle, Greater Kestrel, Jackal Buzzard, Pale Chanting Goshawk, Lanner Falcon and Egyptian Goose.	Regional	No avifaunal no-go areas were determined necessary for the mitigation of this anticipated impact.
During operation: Mortality of priority species due to collisions with the medium voltage internal reticulation network	While the intention is to place the majority of the medium voltage reticulation network underground at the PV facility, there are areas where the lines will run above ground. Priority species which will be most at risk of collisions with the medium voltage powerlines are the following: Egyptian Goose, Ludwig's Bustard, Karoo Korhaan, South African Shelduck, Secretarybird and Blue Crane	Regional	No avifaunal no-go areas were determined necessary for the mitigation of this anticipated impact.
Description of expected significance of impact » The priority species which would be most severely affected by disturbance would be ground nesting species, and those that utilise low shrubs for nesting. The significance of impact is expected to be medium to high. » It is not foreseen that collisions with the solar panels and entrapment of priority species in perimeter fences at the PV facility will be a significant impact. The significance is expected to be of low. » Mortality of priority species due to collisions with the medium voltage internal reticulation network is expected to be of high significance.			
Gaps in knowledge & recommendations for further study » Six seasonal avifaunal surveys must be undertaken[16] utilising transects and incidental counts, to inform the assessment of the potential impacts of the planned infrastructure within the development footprint and adhering to the relevant birds' guidelines. » The design and position of the development footprint and facility should consider potential impacts on avifauna. » Comparison of the site sensitivity recorded in the field with the sensitivity classification in the DFFE National Screening Tool and adjustment if necessary.			

8.3.3 Impacts on Bats

[16] This is currently ongoing with three of the six surveys having been completed to date.

The main possible impacts identified includes foraging and roosting habitat destruction due to earthworks and vegetation clearing, species composition alteration due to normal light pollution, and bat navigation interference due to polarised light pollution (PP).

The presence of security lights on and around PV facilities (including associated infrastructures) can create significant light pollution that will impact bat feeding habits and species compositions negatively, by discouraging photophobic (light averse) species and encouraging species that readily forage around lights attracting insects. This can cause local displacement of photophobic bat species, with a medium significance. This can be mitigated by using outside security lights with low sensitivity motion sensors that switch off automatically when no persons are nearby, to prevent the creation of regular insect gathering pools that will persist every night for the entire night. Additionally, ensure all lights are down hooded, and where possible and practical utilised lights with color temperatures that attracts less insects.

Sensitivity Analysis of the Site

Sensitivities have been classified as high or medium, where high sensitivities and their buffers are no-go zones for turbines and turbine blade overhang (**Table 9.1**). In other words, no turbine blades may intrude into high sensitivity buffers. Medium sensitivities indicate areas of probable increased risk due to seasonal fluctuations, but turbines are allowed to be constructed in medium sensitivity areas.

Table 8.1: Description of parameters used in the development of the sensitivity map.

Last revision	October 2021
High sensitivities	Valley bottom wetlands.
	Pans and depressions.
	Dams.
	Rocky boulder koppies (tors).
	Exposed rocky cliff edges.
	Drainage lines capable of supporting riparian vegetation.
	Other water bodies and other sensitivities such as manmade structures, buildings, houses, barns and sheds.
Moderate sensitivities	Alluvial plains and washes.
	Seasonal drainage lines.

Table 8.2: Description of sensitivity categories and their significance in the sensitivity map.

Sensitivity	**Description**
High Sensitivity and its buffers	Areas that are deemed critical for resident bat populations, capable of elevated levels of bat activity and support greater bat diversity/activity than the rest of the site. These areas are no-go zones for PV panels, construction camps,

	substation, O&M building, the BESS and any other activity that requires earthworks or complete vegetation clearing. With the exception of access roads and underground/overhead cables
Medium Sensitivity and its buffers	Medium sensitivities indicate areas of probable increased risk, but PV panels are allowed to be constructed in medium sensitivity areas.

Figure 8.3 depicts the sensitive areas of the site, based on features identified to be important for foraging and roosting of the bat species that are most probable to occur on site. Thus, the sensitivity map is based on species ecology, habitat preferences and bat activity recorded by the passive bat detection systems during the pre-construction monitoring programme currently underway on the site.

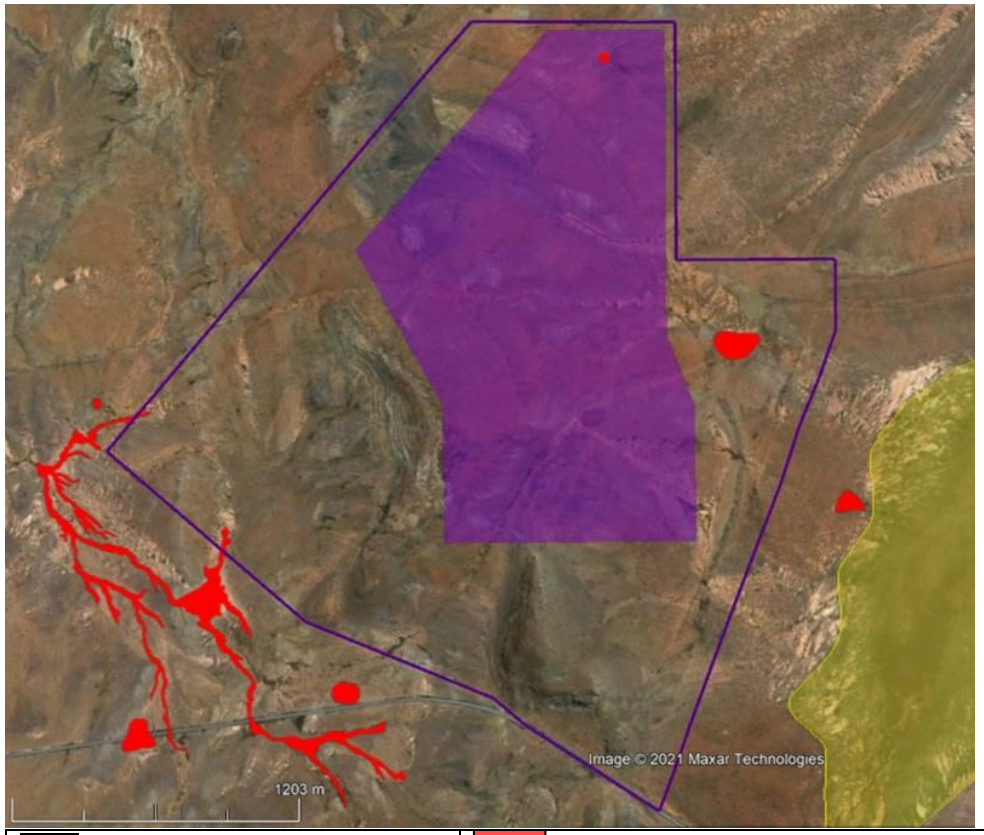

Figure 8.3: Bat sensitivity map of the site (Shaded purple area are the PV development area, purple lines are the project boundaries)

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Potential loss of bat foraging habitat	Direct impacts: » Loss of habitat will potentially lead to a reduction in bat insect prey numbers. Indirect impacts: » A reduction of insect prey numbers may lead to increased competition for food resources and lowered carrying capacity of the general area.	Site	As per the sensitivity map
Description of expected significance of impact The construction of PV panels requires continuous areas to be cleared of vegetation, and in some cases earthworks and levelling. But the proposed PV development area does not intrude on large areas of High bat sensitivity, therefore the destruction of foraging habitat is not expected to be of a high significance.			
Gaps in knowledge & recommendations for further study Specialist Bat assessment must be undertaken in the EIA phase			

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Potential disturbance/destruction of bat roosts	Direct impacts: » Loss of bat roosts can lead to direct mortalities of bats utilising the roost. Indirect impacts: » A reduction of available roosting space may lead to increased competition for roosting areas and lowered carrying capacity of the general area.	Site	As per the sensitivity map
Description of expected significance of impact During construction, bat roosts can be destroyed during earth levelling processes that involves levelling of single trees or clumps of trees or demolishing of buildings. Bat mortalities can occur during roost destruction. The significance can be high if not mitigated.			
Gaps in knowledge & recommendations for further study Specialist Bat assessment must be undertaken in the EIA phase			

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Alteration of nocturnal bat foraging habits and bat species composition.	Direct impacts: » Increased lights at the facility can discourage certain bat species form foraging in the area.	Site	As per the sensitivity map

Issue	Nature of Impact	Extent of Impact	No-Go Areas
	Indirect impacts: » Over the long-term population dynamics can be influenced by altering bat feeding habits and species compositions negatively. By discouraging photophobic (light averse) species and encouraging species that readily forage around lights attracting insects		
Description of expected significance of impact The presence of security lights on and around PV facilities (including associated infrastructures) can create significant light pollution that will impact bat feeding habits and species compositions negatively, by discouraging photophobic (light averse) species and encouraging species that readily forage around lights attracting insects. This can cause local displacement of photophobic bat species, with a medium significance.			
Gaps in knowledge & recommendations for further study Specialist Bat assessment must be undertaken in the EIA phase			

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Interference with bat navigation.	Direct impacts: » Navigation of bats can be influenced by polarised light reflected off PV panels. Indirect impacts: » Long term navigation interference can discourage bats from utilising a specific area for roosting/foraging.	Site	As per the sensitivity map
Description of expected significance of impact Evidence exists of bats using polarised light at dusk to calibrate their internal magnetic compasses, and PV solar panels are strong reflectors of horizontally polarised light which can possibly interfere with this method of navigation. Although, the degree of impact on bats needs to be determined for bats foraging near and around their roost, since the study referenced experimented on the homing capabilities of bats released away from their roost. The impact may be medium if not mitigated.			
Gaps in knowledge & recommendations for further study Specialist Bat assessment must be undertaken in the EIA phase			

8.3.4 Impacts on Freshwater Feautures

Impacts on Freshwater features
A key consideration for the scoping level impact assessment is the presence of the Critically Endangered floodplain system located in the eastern portion of the project area. The available data also suggests the presence of drainage features, dams, and extensive Section A river networks. The dams are artificial and regarded as man-made features.

These dams are not expected to be characterised by hydromorphic properties or hydrophytic vegetation. These systems, considering their artificial nature, are assigned an overall low sensitivity.

A network of drainage features, comprising of channels and networks are expected for the area. These systems are characterised by terrestrial soils with hydromorphic properties completely being absent. The overall sensitivity of these systems is also expected to be low. Nevertheless, these systems should be granted some level of protection considering the roles that these systems play in ensuring the functionality of the Section A river systems.

Areas indicated as river systems at a desktop level have been classified as Section A river systems due to the expected dominance of alluvial soils and riparian vegetation within and surrounding the direct channel. Section A river systems are characterised by zero-baseflow conditions given the fact that the zone of saturation is not in contact with the base of the stream channel (DWAF, 2005). A Section A system is the least sensitive of the three (section A, B and C) systems in regard to water yield from catchments and is often also referred to as non-perennial systems. The overall sensitivity of these systems is moderate to moderately high.

The main impact to freshwater features from construction and/or operation activities is the disturbance and/or loss of wetlands.

Sensitivity Analysis of the Site

The aquatic biodiversity theme sensitivity indicates predominantly "Low" sensitivity, with areas of "Very High" sensitivity (**Figure 8.1**) aligned with the Ecological Support Areas and watercourses. These "Very High" sensitivities are attributed to the presence of wetlands, rivers, and priority area Quaternary catchments. The watercourses in the area are classified as Least Threatened and the floodplain systems are classified as Critically Endangered. Further to this, also considering the presence of areas indicated as Ecological Support Areas, a buffer width of 45m is recommended for construction and operation activities.

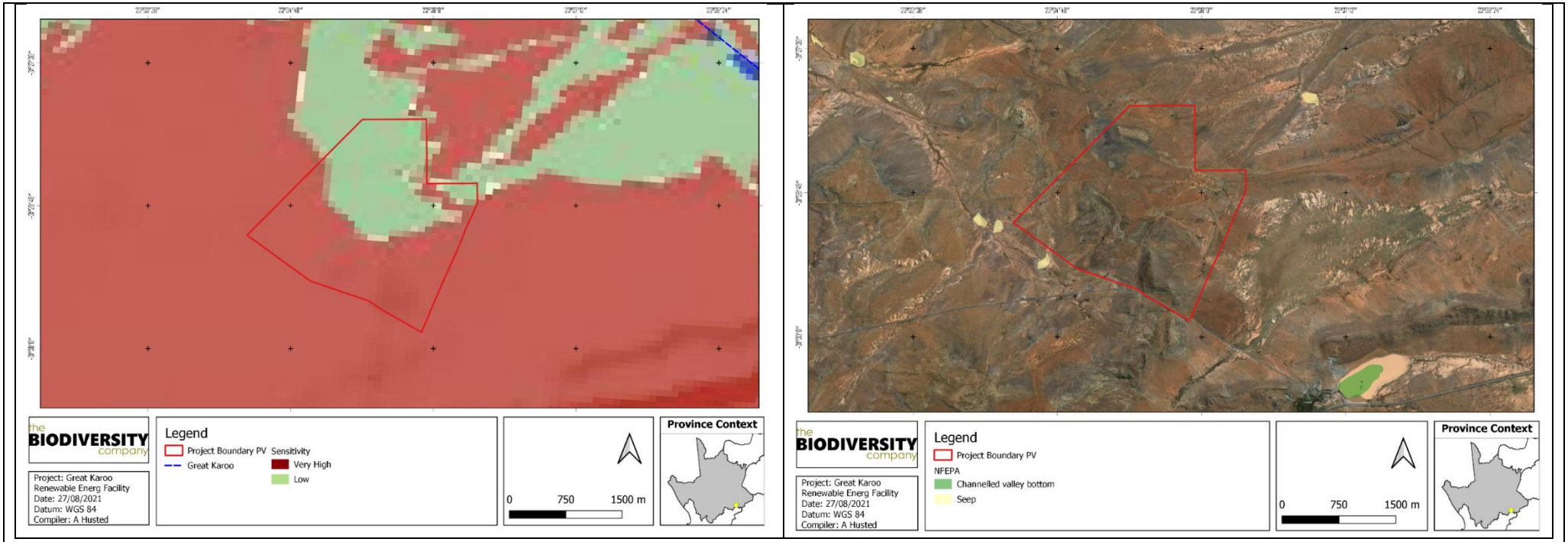

Figure 8.5: The aquatic biodiversity theme sensitivity classification and the threat status for local river systems within the development area for the Nku Solar PV facility

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Disturbance / degradation / loss to wetland soils or vegetation due to the construction of the facility and associated infrastructure, such as crossings	Direct impacts: » Disturbance / degradation / loss to wetland soils or vegetation Indirect impacts: » Loss of ecosystem services	Regional	Water resources and buffer area
Increased erosion and sedimentation & contamination of resources	Direct impacts: » Erosion and structural changes to the systems Indirect impacts: » Sedimentation & contamination of downstream reaches	Regional	None identified at this stage

Description of expected significance of impact

The development of the area could result in the encroachment into water resources and result in the loss or degradation of these system, most of which are functional and provide ecological services. Water resources are also likely to be traversed by roads and other linear infrastructure which might create a barrier to flow and biotic movement across the systems. These disturbances could also result in the infestation and establishment of alien vegetation would affect the functioning of the systems. Earthworks will expose and mobilise earth materials which could result in sedimentation of the receiving systems. A number of machines, vehicles and equipment will be required, aided by chemicals and concrete mixers for the project. Leaks, spillages or breakages from any of these could result in contamination of the receiving water resources. Contaminated water resources are likely to have an effect on the associated biota. It is anticipated to increase stormwater runoff due to the hardened surfaces and the crossings will result in an increase in run-off volume and velocities, resulted in altered flow regimes. The changes could result in physical changes to the receiving systems caused by erosion, run-off and also sedimentation, and the functional changes could result in changes to the vegetative structure of the systems. The reporting of surface run-off to the systems could also result in the contamination of the systems, transporting (in addition to sediment) diesel, hydrocarbons and soil from the operational areas.

Gaps in knowledge & recommendations for further study

- This study is completed at a desktop level only.
- Identification, delineation and characterisation of water resources.
- Undertake a functional assessment of systems where applicable.
- Determine a suitable buffer width for the resources.

Recommendations with regards to general field surveys

- Field surveys to prioritise the development areas, but also consider the 500 m regulation area.
- Beneficial to undertake fieldwork during the wet season period.

8.3.5 Impacts on Soils, Geology, Agricultural Potential

Considering the occurrence of various soil forms that are commonly associated with high land capabilities, it is likely that areas with high land capability sensitivity do occur within the project area. However, due to the poor climatic capability, the ultimate land potential is more likely to be low.

Sensitivity Analysis of the Site

The agriculture theme sensitivity as indicated in the screening report indicates predominantly a combination of "Low" and "Medium" sensitivities, with isolated areas of "High" sensitivity (**Figure 8.4**). This sensitivity is based on the screening tool and considered to be preliminary for this stage of the project. These sensitivities will be confirmed during the impact phase of the project.

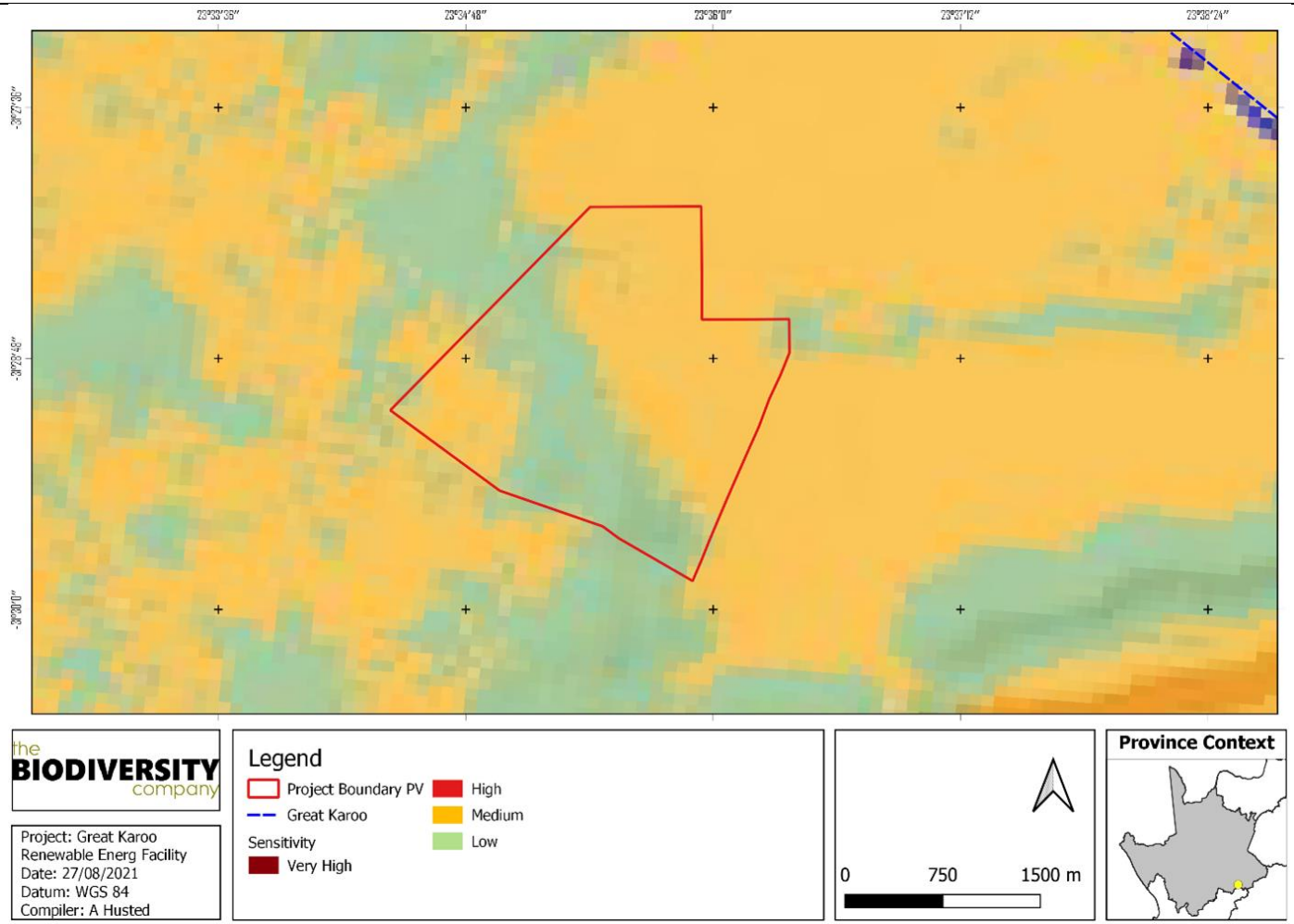

Figure 8.4: The agriculture theme sensitivity

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Compaction/soil stripping/transformation of land use which leads to loss of land capability	Direct impacts: » Loss of soil / land capability Indirect impacts:	Regional	None identified at this stage

	» Loss of land capability		

Description of expected significance of impact

The development of the area could result in the encroachment into areas characterised by high land potential properties, which can ultimately result in the loss of land capability. These disturbances could also result in the infestation and establishment of alien vegetation, which in turn can have a detrimental impact on soil resources. Earthworks will expose and mobilise earth materials which could result in compaction and/or erosion. A number of machines, vehicles and equipment will be required, aided by chemicals and concrete mixes for the project. Leaks, spillages or breakages from any of these could result in contamination of soil resources, which could affect the salinity or pH of the soil, which can render the fertility of the soil unable to provide nutrition to plants. During the operational phase, the impacts associated with the substation and collector sub will be easily managed by best "housekeeping" practices.

Gaps in knowledge & recommendations for further study

» This study is completed at a desktop level only.
» Identification and delineation of soil forms.
» Determine of soil sensitivity.

Recommendations with regards to general field surveys

» Field surveys to prioritise the development areas.

8.3.6 Impacts on Heritage (Archaeology and Palaeontology)

Heritage and archaeological resources and cultural landscape

Archaeological sites include caves and rock shelters, open air artefact scatters, rock engravings and historic structures with their associated cultural materials. In the Great Karoo natural elevated features such as dolerite dykes and ridges played a significant role in San settlement patterns. It is likely that similar archaeological heritage exists within the areas proposed for development and as such, impact to these resources must be assessed. The proposed development is located along the N1 which is used as a main transport route from the Western Cape to Gauteng through the Northern Cape. In addition, the area proposed for development has limited topography that could screen the proposed development). It is therefore very likely that the proposed development will have a negative impact on the cultural and scenic value of the landscape.

Palaeontological sensitivity Analysis of the Site

The Palaeosensitivity was identified as very high in terms of the SAHRIS Palaeontological Sensitivity Map (refer to **Figure 8.6**), the geological structure shows that, the development area is underlain by the Abrahamskraal and Teekloof Formations, both of the Adelaide Subgroup of the Beaufort Group of sediments. Based on the known paleontological sensitivity of this area, it is very likely that activities associated with the development of the proposed PV facility will negatively impact on significant fossil heritage.

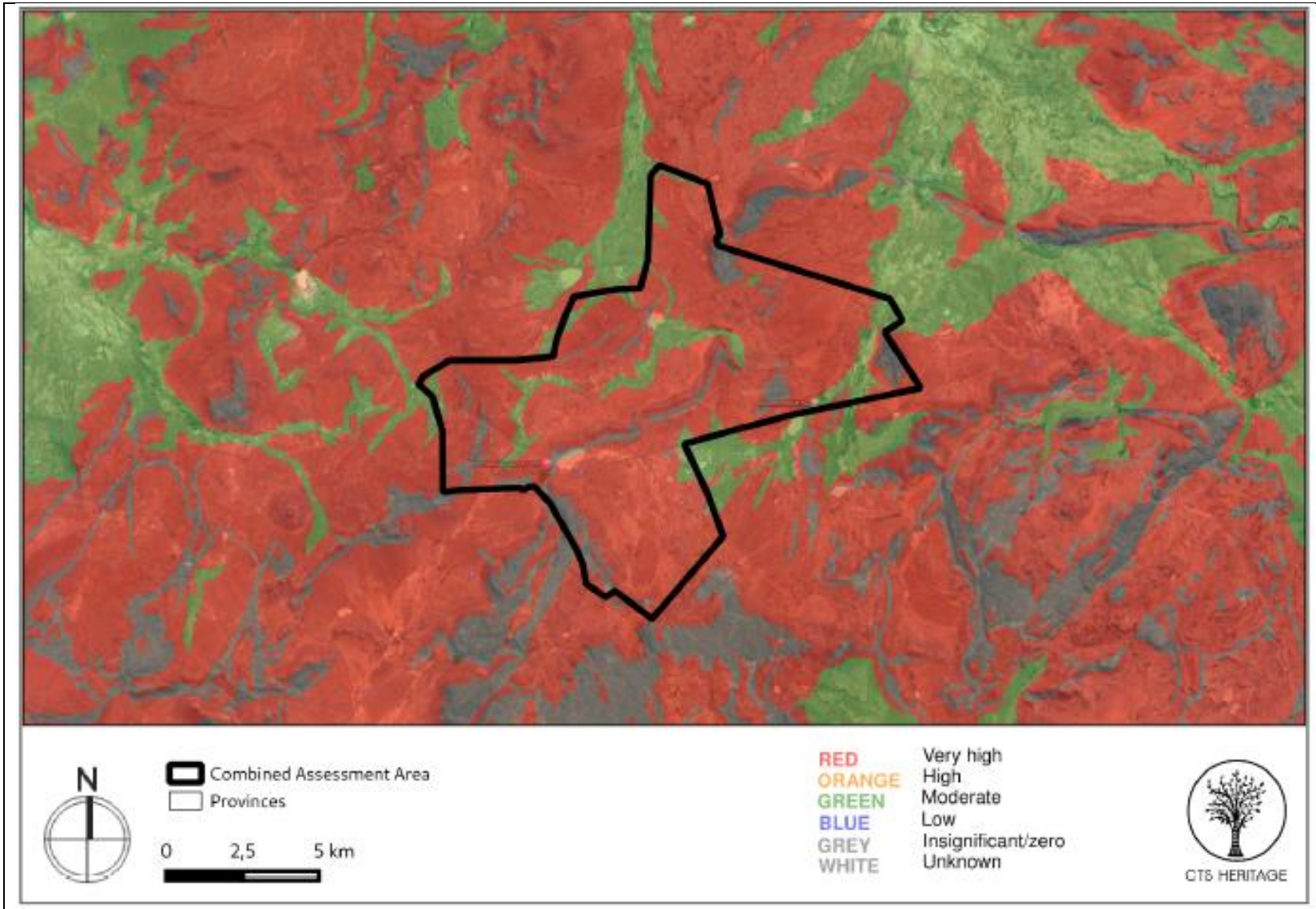

Figure 8.6. Palaeosensitivity Map. Indicating fossil sensitivity underlying the study area.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Destruction of archaeological heritage	Direct impact to archaeological heritage of scientific significance	Local	None identified at this stage
Negative impact to significant cultural landscapes	Indirect impact to significant cultural landscapes and cultural landscapes elements	Regional	None identified at this stage
Destruction of palaeontological heritage	Direct impact to palaeontological heritage of scientific significance	Local	None identified at this stage

Description of expected significance of impact

» Field assessment will determine the significance of the resources likely to be impacted. Impacts can be minimised through the implementation of appropriate mitigation measures.

Gaps in knowledge

» The project area and the area more broadly have not been subjected to many heritage impact assessments and therefore substantial gaps in knowledge exist. Field assessment will fill these gaps.

Recommendations with regards to general field surveys

» Archaeological field surveys must provide sufficient ground-coverage of the areas to be developed to be able to determine the nature of the resources likely to be impacted.
» Palaeontological and cultural landscape field surveys will target sensitive geological and cultural landscape features.

8.3.7 Visual Impacts

Visual impact of the facility on observers in close proximity to the proposed PV facility infrastructure and activities. Potential sensitive visual receptors include:

» Residents of homesteads and farm dwellings (in close proximity to the facility)
» Observers travelling along the Rondawel secondary road (and potentially the N1 national road)

Sensitivity Analysis of the Site

The viewshed analysis was undertaken from a representative number of vantage points within the development footprint at an offset of 5m above ground level (**Figure 8.7**). This was done to determine the general visual exposure (visibility) of the area under investigation, simulating the maximum height of the proposed structures (PV panels and inverters) associated with the facility.

The viewshed analysis will be further refined once a preliminary and/or final layout is completed and will be regenerated for the actual position of the infrastructure on the site and actual proposed infrastructure during the EIA phase of the project. **Figure 8.7** also indicates proximity radii from the development footprint in order to show the viewing distance (scale of observation) of the facility in relation to its surrounds.

It is clear that the relatively constrained dimensions of the PV facility would amount to a fairly limited area of potential visual exposure. The visual exposure would largely be contained within a 6km radius of the proposed development site, with the predominant exposure to the north-east.

The following is evident from the viewshed analyses:

- Within 0-1km the facility may be highly visible. There are no homesteads within this zone, only a section of the Rondawel secondary road traversing south-west of the site.
- The zone within 3km radius contains the Rondawel homestead[17] (guest farm), a short section of the N1 national road and the Rondawel secondary road. Other than these potential receptor sites, the rest of the visually exposed areas fall within vacant farmland.
- Visual exposure within 6km radius will predominantly be towards the north-east, along the Droërivier/Hydro 1 and 3, Gamma/Perseus and Gamma/Hydra power lines, up to the Bobbejaankrans hills. The only homestead within this zone is the Nieuwefontein dwelling to the north-west
- At distances exceeding 6km the intensity of visual exposure is expected to be very low and highly unlikely due to the distance between the object (development) and the observer.

[17] The names listed are of the homestead or farm dwelling as indicated on the SA 1: 50 000 topographical maps and do not refer to the registered farm name.

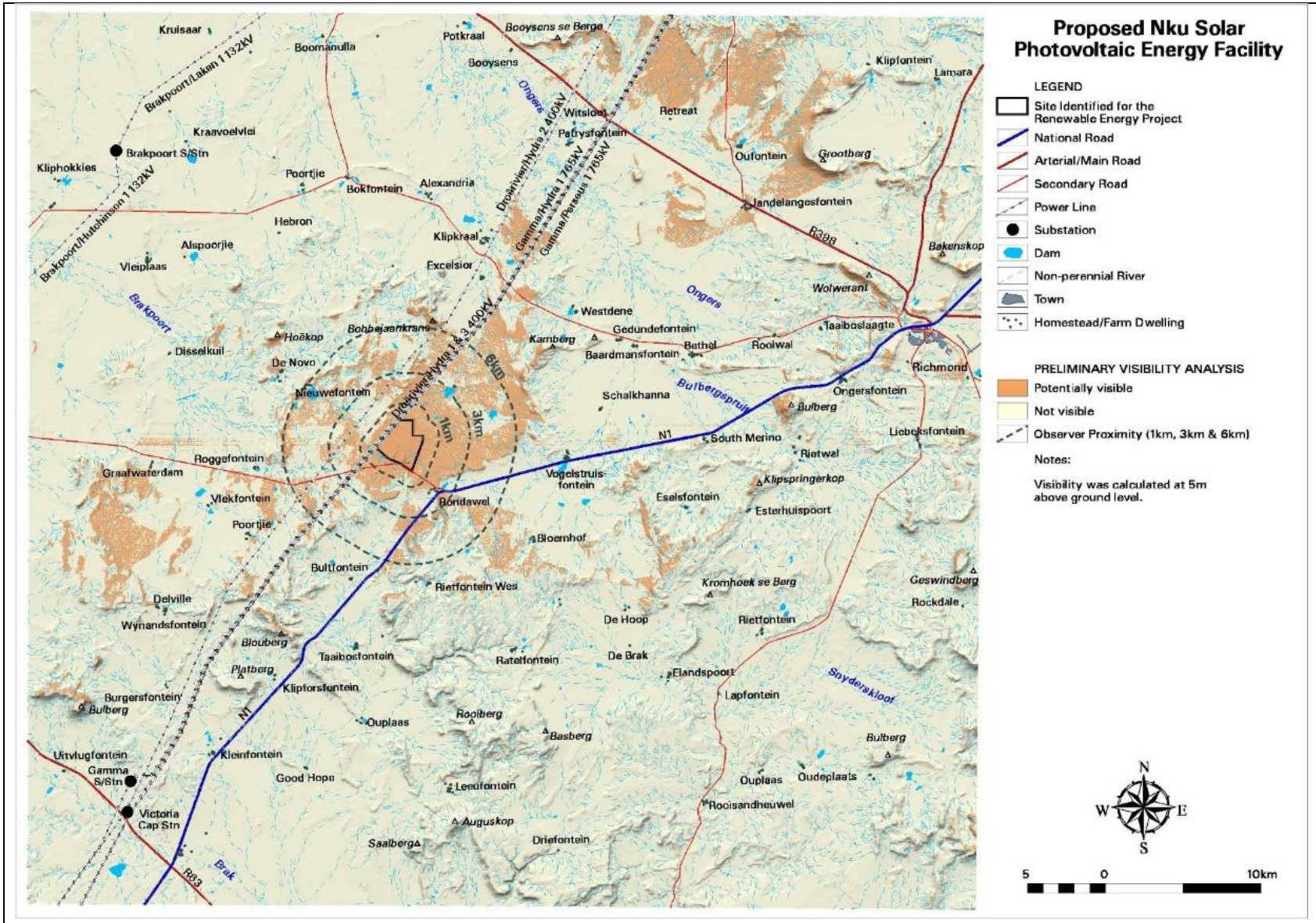

Figure 8.7: Map indicating the Preliminary visual exposure of the Nku PV facility

Issue	Nature of Impact	Extent of Impact	No-Go Areas
The viewing of the PV facility infrastructure and activities	The potential negative experience of viewing the infrastructure and activities within a predominantly undeveloped setting.	Primarily observers situated within a 3km radius of the facility	None identified at this stage
The visibility of the facility to, and potential visual impact on, observers travelling along the Rondawel secondary road (and potentially the N1 national road).			
The visibility of the facility to, and potential visual impact on residents of dwellings within the study area, with specific reference to the farm residences in closer proximity to the proposed development.			
The potential visual impact of the facility on the visual character or sense of place of the region.			
The potential visual impact of the facility on tourist routes or tourist destinations/facilities (if present).			
The potential visual impact of the construction of ancillary infrastructure (i.e. internal access roads, buildings, etc.) on observers in close proximity to the facility.			
The visual absorption capacity of the natural vegetation (if applicable).			
Potential cumulative visual impacts (or consolidation of visual impacts), with specific reference to the placement of the PV facility within an area where additional solar energy facilities have been authorised.			
The potential visual impact of operational, safety and security lighting of the facility at night on observers residing in close proximity of the facility.			
Potential visual impact of solar glint and glare as a visual distraction and possible air/road travel hazard.			

Description of expected significance of impact

Due to the nature and location of the facility, there is likely to be a long-term influence on surrounding landscape character as experienced by the receptors. The impact significance is therefore anticipated to be moderate to high. The significance of this impact will be confirmed during the EIA Phase.

Gaps in knowledge & recommendations for further study

A finalised layout of the PV facility and ancillary infrastructure are required for further analysis. This includes the provision of the dimensions of the proposed structures and ancillary equipment.

Additional spatial analyses are required in order to create a visual impact index that will include the following criteria:

» Visual exposure
» Visual distance/observer proximity to the structures/activities

» Viewer incidence/viewer perception (sensitive visual receptors) » Visual absorption capacity of the environment surrounding the infrastructure and activities Additional activities: » Identify potential cumulative visual impacts » Undertake a site visit » Recommend mitigation measures and/or infrastructure placement alternatives

8.3.8 Traffic Impacts

Impact:
Traffic congestion due to an increase in traffic caused by the transportation of equipment, material and staff to site

Desktop Sensitivity Analysis of the Site:
Traffic congestion possible along the N1 during construction.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Traffic congestion	Potential traffic congestion and delays on the surrounding road network. The associated noise and dust pollution due to the increase in traffic.	Local	None identified
	The traffic generated during the operational phase will be negligible and will not have a significant impact on the surrounding road network. However, the Client/Facility Manager is to ensure that regular maintenance of gravel roads occurs during operation phase to minimise/mitigate dust pollution.		

Description of expected significance of impact
The significance of the transport impact during the construction phase can be rated as medium. However, considering that this is temporary and short term in nature, the impact can be mitigated to an acceptable level. Traffic will return to normal levels after construction is completed. Noise and dust pollution during the construction phase cannot be completely mitigated but mitigation measures will significantly reduce the impact. These potential impacts limited to the construction period.

Gaps in knowledge & recommendations for further study

Gaps

Items such as existing traffic volumes along the N1, local or imported components, water source to be clarified – borehole or transported to site., number of components, number of abnormal loads, dimensions and weight of components, size of water bowser to be used, construction period, number of site staff, Fleet size.

Recommendations
It its recommended to avoid staggered intersections on the N1. Intersections should rather be consolidated or realigned, stagger component delivery to site, reduce the construction period, the use of mobile batch plants and quarries in close proximity to the site, staff and general trips should occur outside of peak traffic periods

8.3.9 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 development of renewable energy projects would make a notable positive economic impact on the local economies of the Ubuntu Local Municipality 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 social impacts associated with the proposed PV development includes the following:
Positive impacts

- Creation of employment and business opportunities, and opportunity for skills development and on-site training.

Positive negative impacts

- Impacts associated with the presence of construction workers on local communities.
- Impacts related to the potential influx of job-seekers.
- Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site.
- Increased risk of grass fires associated with construction related activities.
- Nuisance impacts, such as noise, dust, and safety, associated with construction related activities and vehicles.
- Impact on productive farmland.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Creation of employment and business opportunities during the construction phase	Direct impacts » Creation of temporary employment opportunities » Creation of business and procurement opportunities Indirect impacts » Support for local economy. » Creation of training and skills development opportunities	Local -Regional	No no-go areas have been identified to date.
Potential impacts on family structures and social networks associated with the presence of construction workers	Direct impacts » Disruption of existing family structures and social networks » Anti-social behaviour of construction workers » Increase in substance abuse, crime, sexually transmitted diseases. » Unplanned pregnancies Indirect impacts » Impact on psychological well-being of local communities. » Resentment of outsiders and tension within local communities	Local -Regional	No no-go areas have been identified to date.
Potential impacts on family structures, social networks and community services associated with the influx of job seekers	Direct impacts » Disruption of existing family structures and social networks » Anti-social behaviour of construction workers » Increase in substance abuse, crime, sexually transmitted diseases. » Unplanned pregnancies » Pressure on local services Indirect impacts » Impact on psychological well-being of local communities. » Resentment of outsiders and tension within local communities	Local -Regional	No no-go areas have been identified.
Potential risk to safety of scholars, farmers and farm workers, livestock	Direct impacts » Damage of gates, fences, etc.	Local	No no-go areas have been identified.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
and damage to farm infrastructure associated with the presence of construction workers on site	» Injuries to and loss of livestock » Break-ins, and theft of from local farms. » Damage of local farm roads. <u>Indirect impacts</u> » Exposure to outside people of farming operations and risk to farming operations. » Increased risk of stock-theft.		
Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires	<u>Direct impacts</u> » Damage of structures, grazing, gates, fences, etc. » Injuries to and loss of livestock <u>Indirect impacts</u> » Impact on stocking levels and future farming operations. » Increased risk of stock losses and theft.	Local	No no-go areas have been identified to date.
Potential noise, dust and safety impacts associated with construction related activities	<u>Direct impacts</u> » Dust impacts, and impact on quality of life and also crops and grazing. » Noise impacts, and impact on quality of life. » Safety of farmers due to movement of construction vehicles » Damage of local farm roads. <u>Indirect impacts</u> » Limited indirect impacts	Local	No no-go areas have been identified to date.
Damage to farmland and loss of grazing and or crops	<u>Direct impacts</u> » Loss of grazing and or crops <u>Indirect impacts</u> » Impact on future farming operations. » Impact on employment opportunities on the farm.	Local	No no-go areas have been identified to date.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Improve SA's energy security and reduce reliance on coal	Direct impacts » Improve energy security » Reduce reliance on coal. » Support renewable energy Indirect impacts » Address climate change impacts	Local-International	No no-go areas have been identified to date.
Creation of employment and business opportunities associated with the operational phase	Direct impacts » Creation of employment opportunities » Creation of business and procurement opportunities Indirect impacts » Support for local economy. » Creation of training and skills development opportunities	Local-Regional	No no-go areas have been identified to date.
Generation of additional income for affected landowners	Direct impacts » Additional income to support farming Indirect impacts » Opportunity to invest and expand farming operations and create more employment opportunities on the farm.	Local	No no-go areas have been identified to date.
Support for local economic development and investment	Direct impacts » Support local economic development » Create employment opportunities » Create skills development and training opportunities » Improve basic services Indirect impacts » Up-grade local municipalities and improve quality of life of local communities	Local-Regional	No no-go areas have been identified to date.
Impact on rural sense of place	Direct impacts » Change in rural sense of place	Local	No no-go areas have been identified to date.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
	Indirect impacts » Potential impact on property values and hospitality operations.		
Impact on rural sense of place and associated impact on property values.	Direct impacts » Change in rural sense of place and impact on property values Indirect impacts » Potential impact on hospitality operations.	Local	No no-go areas have been identified to date.
Impact on existing and future tourism operations.	Direct impacts » Change in rural sense of place and impact on tourism activities. Indirect impacts » Potential impact on future development of hospitality operations.	Local	No no-go areas have been identified to date.

Description of expected significance of impact

- Evidence from the other renewable energy projects indicates that the construction phase of 100 MW SEF will extend over a period of approximately 18-24 months and create in the region of 350 employment opportunities. Members from the local communities in the area, specifically Victoria West and Richmond, would be in a position to qualify for most of the low skilled and semi-skilled opportunities. The business-related opportunities will be linked to the hospitality (accommodation) and services sector (catering, security, transport).
- Evidence from the other renewable energy projects indicates that presence and behaviour of construction workers can impact negatively on local communities. Members from the local communities in the area, specifically Victoria West and Richmond, would be at potential risk depending on where non-local construction workers are accommodated during the construction phase.
- Evidence from the other renewable energy projects indicates that the construction phase can result in the influx of jobseekers to the area and that this has the potential to impact negatively on local communities. However, the potential for the influx of jobseekers is also influenced by the location of the project. Projects located in relatively remote, rural areas are less likely to attract jobseekers
- Evidence from the other renewable energy projects indicates that the movement and activities of construction workers can impact on farming operations. The impacts include damage to fences and gates, gates being left open resulting in loss of livestock, increased risk of petty theft and stock theft.
- Evidence from the other renewable energy projects indicates that the activities associated with the construction phase can increase the risk of grass fires, which in turn can impact on farming operations. The impacts include loss of grazing, damage to structures, fences, and gates, etc. These impacts impact on the livelihood of farmers.
- Evidence from the other renewable energy projects indicates that the activities associated with the construction phase do result in dust, noise and safety impacts that can impact on local farmers and farm workers.

- Evidence from the other renewable energy projects indicates that the activities associated with the construction phase will result in the loss of farmland, including grazing and or crops depending on the location. These impacts impact on the livelihood of farmers. However, loss of land and crops can be addressed by minimising the disturbance footprint and compensation for losses.
- The direct employment opportunities associated with the operational phase of renewable energy projects are relatively limited. However, a review of the REIPPPP indicates that the benefits associated with the operation of renewable energy projects are significant and extend beyond direct employment opportunities.
- Evidence from the other renewable energy projects indicates that the generation of additional income represents a significant benefit for the local affected farmer(s) and reduces the risks to their livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as feed.
- The revenue from the proposed SEF can be used to support a number of social and economic initiatives in the area such as Creation of jobs, Education., Support for and provision of basic services, School feeding schemes, Training and skills development, Support for SMMEs.
- Renewable energy projects do have the potential to impact on an area's sense of place. In some instances, this can impact on property values. In other cases, local landowners have indicated that the potential visual impacts and impact on property values are not regarded as an issue.
- Renewable energy projects do have the potential to impact on an areas sense of place. In some instances, this can impact on tourism activities. In other cases, local landowners have indicated that the potential visual impacts and impact on tourism activities are not regarded as an issue.

Gaps in knowledge & recommendations for further study

- Local skills, education levels.

Recommendations with regards to general field surveys

- Site visit and interviews with representatives from local chamber of commerce, hospitality associations, community, local farmers, local farming associations local municipality, and the hospitality and services sector.
- Collection of information on accommodation options and capacity, existing community challenges and needs, existing farming operations and activities, and risk of grass fires in the area.
- Collection and review of information on REIPPPP.

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 the Nku PV facility are described below and will be assessed in detail as part of the subsequent EIA phase to be conducted for the project.

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 Nku PV have been viewed from two perspectives within this Scoping Report:

- Cumulative impacts associated with the scale of the project (one 100MW 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).

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

- Additive (incremental);
- Interactive.
- Sequential; or
- Synergistic.

Canter and Sadler (1997) describe the following process for addressing cumulative effects in an EIA:

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

The site for the proposed development (Portion 0 and Portion 1 of the Farm Rondavel 85 is located within 30km from several other authorised solar PV facilities. These projects include the following (refer to **Figure 8.8**):

Project Name	Project Status
Brakpan Solar PV facility	Authorised
Umsinde Emoyeni Wind Energy Facility	Authorised
Aurora Solar PV facility	Authorised
Mainstream Renewable Energy Cluster	Authorised
Ishwati Emoyeni Wind Energy Facility	Authorised
Trouberg Wind Energy Facility	Authorised
Modderfontein Wind Energy Facility	Authorised

In addition to the renewable energy facilities listed above, four new renewable energy facilities (two solar PV facilities and two wind farms are proposed adjacent to the Nku Solar PV facility, namely:

Project Name	Affected property	Contracted Capacity
Kwana PV	Portion 0 of Farm Rondavel 85	100MW
Moriri PV	Portion 0 of Farm Rondavel 85	100MW
Angora Wind farm	Portion 11 of Farm Gegundefontein 53 Portion 0 of Farm Vogelstruisfontein 84 Portion 0 of Farm Rondavel 85 Portion 1 of Farm Rondavel 85	140MW
Merino Wind Farm	Portion 1 of Farm Rondavel 85 Portion 0 of Farm Rondavel 85 Portion 9 of Farm Bult & Rietfontein 96 Portion 0 of Farm Vogelstruisfontein 84	140MW

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 the Nku PV facility within the development area being considered for the development:

- 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 solar energy 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.

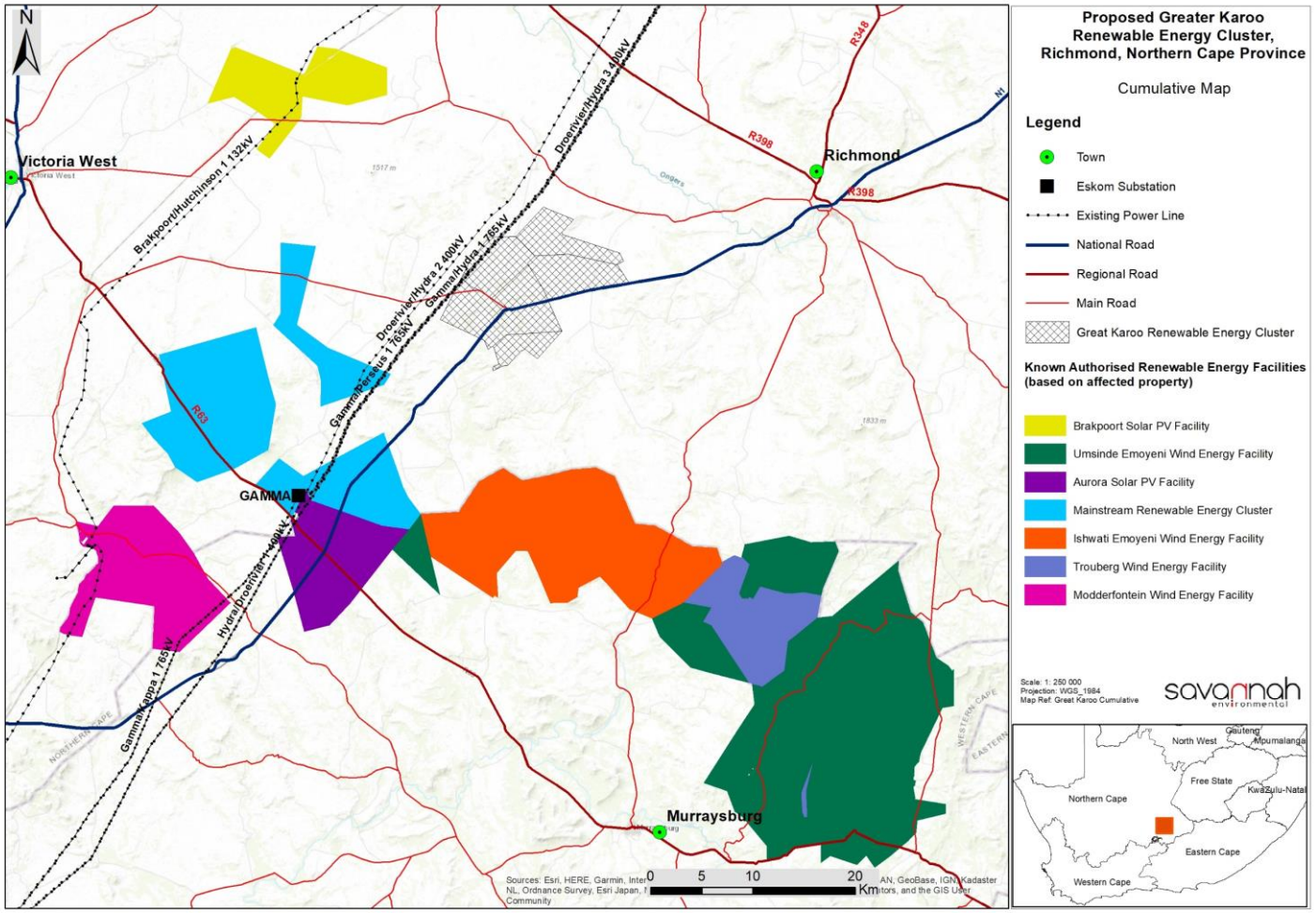

Figure 8.8: Cumulative map illustrating other approved and/or constructed PV facilities located within the vicinity of the Nku Solar PV Facility project site (**Appendix L**).

CHAPTER 9: CONCLUSIONS

This Scoping Report is aimed at detailing the nature and extent of the proposed development, identifying and describing potential issues associated with developing the Nku PV and associated infrastructure on the identified site, 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 was achieved through an evaluation of the proposed project, involving the project proponent, and specialist consultants. This 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 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 Nku PV facility is included within this chapter as a whole.

9.2 Overview of the Nku PV facility

This Scoping Report documents the procedure for determining the extent of, and approach to, the Environmental Impact Assessment (EIA) Phase. The Scoping Phase included the following key tasks:

- Involvement of relevant authorities and Interested and Affected Parties (I&APs) through the Public Involvement Process.
- Consideration of feasible alternatives to be assessed during the EIA Phase.
- Identification of potential impacts (positive and negative) associated with feasible project alternatives to be assessed during the EIA Phase.
- Defining Terms of Reference for any specialist studies required to inform the EIA Phase (Plan of Study (PoS) for the Environmental Impact Assessment Report.

The Nku PV facility is proposed on a site located approximately 35km south-west of Richmond and 80km south-east of Victoria West. The project site falls within Ward 3 of the Ubuntu Local Municipality and within the Pixley Ka Seme District Municipality in the Northern Cape Province on the following two (2) affected properties:

- Portion 1 of Farm Rondavel 85
- Portion 0 of Farm Rondavel 85

The Nku PV facility project site is proposed to accommodate the following infrastructure which will enable the PV facility to supply a contracted capacity of up to 100MW:

- Solar PV array comprising PV modules and mounting structures.
- Inverters and transformers.
- Cabling between the panels.
- 33/132kV onsite facility substation.
- Cabling from the onsite substation to the collector substation (either underground or overhead).
- Electrical and auxiliary equipment required at the collector substation that serves the solar energy facility, including switchyard/bay, control building, fences, etc.
- Battery Energy Storage System (BESS).
- Site offices and maintenance buildings, including workshop areas for maintenance and storage.
- Laydown areas.
- Access roads and internal distribution roads.

The Scoping study included the identification of potential impacts associated with the project through specialist inputs and consultation with affected parties and key stakeholders. A preliminary evaluation of the extent and expected significance of potential impacts associated with the development of the Nku PV facility 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 sensitive areas within the development area to assist in focussing the location of the development footprint for the Nku PV facility to minimise the potential for environmental impact. The extent of the project site is ~571ha and has been considered in this Scoping Report. A development area of ~210ha was demarcated within this project site and allows an adequate footprint for the installation of a PV energy facility with a contracted capacity of up to 100MW, while allowing for the avoidance of environmental site sensitivities. The size of the development footprint within the development area 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 the Nku PV facility and associated infrastructure are anticipated to be localised and restricted to the development area itself, while operation phase impacts/benefits range from local to regional. No environmental fatal flaws were identified to be associated with the development area. Areas of high and very high sensitivity were identified to be avoided by the development footprint.

The potentially significant issues related to the construction and operation of the Nku PV facility include:

- Disturbance/destruction to and loss of vegetation and fauna and associated habitats
- Introduction and/or spread of declared weeds and alien invasive plants.
- Disturbance / degradation / loss of agricultural soils.
- Increased erosion and sedimentation & contamination of soil and water resources.
- Potential loss of bat foraging habitat.
- Potential disturbance/destruction of bat roosts.
- Increased bat mortality due to light pollution and collision with moving turbine blades.
- Mortality of priority bird species due to collision with moving turbine blades and electrocution and collisions with medium voltage power lines within the facility.
- Displacement of priority bird species.

- Loss of land with agricultural capability.
- Destruction of archaeological and palaeontological heritage.
- Negative impact to significant cultural landscapes.
- Visual impacts on the landscape and sense of place.
- Increase in noise level at sensitive receptors.
- Traffic congestion during construction.
- Social impacts, both positive and negative (job creation and business opportunities, impacts associated with construction workers in the area, and economic benefits).

9.3 Sensitivity Analysis for the Nku PV facility

This section considers the sensitive features located within the development area, as identified by the independent specialists within each respective field, and also indicates the locations of the sensitive features within 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 detail is based on the desktop review of available baseline information for the project site, as well as the sensitivity data from specialist studies undertaken during the scoping phase, which included field surveys. During the site and desktop surveys, the affected area was investigated in sufficient detail in order to provide definitive insight into the potential for constraining factors on the site. The sensitivity map must be used as a tool by the developer to avoid any areas flagged to be of higher risk or sensitivity and inform the location/layout of the development footprint for the facility and associated infrastructure. The development footprint is the area which will be assessed further in detail in the EIA Phase, in order to provide an assessment of environmental acceptability and suitability of the facility layout of the Nku PV Facility.

9.3.1 Ecological Sensitive Features

To determine sensitivity within the project site, local and regional factors were considered. There are some habitats within the project site that have been described as sensitive in their own right, irrespective of regional assessments. This includes primarily the dry stream beds and associated riparian zones. Rocky outcrops and steep slopes are more sensitive than surrounding areas, mainly due to higher floristic diversity and the likelihood of plant species with low local abundance occurring there.

At a regional level, the Critical Biodiversity Area (CBA) map for Northern Cape indicates the northern part of the broader project site as being important for conservation. There are also two drainage lines (the two main ones on site) that are designated as being CBA1 areas. The remaining drainage lines of the broader project site are indicated as being Ecological Support Areas (ESAs).

In terms of species of concern and overall biological diversity, including both plants and animals, the low hills and mountain ranges are the areas with the most species recorded as well as being most likely to contain any species of concern. However, the southern main drainage line is the most likely habitat for the Critically Endangered Riverine Rabbit, if it occurs on site, which is unknown but possible.

Sensitivities that occur specifically within the development area for the Nku PV facility that may be vulnerable to damage from the proposed project are as follows:

High ecological sensitivity:
» Dry stream beds, including the associated riparian habitats and adjacent floodplains.

Medium – high ecological sensitivity:
» Mountain slopes.

Medium ecological sensitivity:
» Plains vegetation.

9.3.2 Freshwater Sensitive Features

As per the DFFE screening reports the aquatic biodiversity theme sensitivity indicates a combination of "Low" and "Very High" sensitivity. No natural wetland areas are expected for the Nku PV facility. Desktop information suggests the presence of drainage features, dams, and also extensive Section A river networks. It is apparent from the data that the Section A river systems are predominantly located on the western and eastern periphery of the project area, and these have been assigned a moderate to moderately high sensitivity. In the event a watercourse is identified within the project area, a buffer width of 32 m for the construction and operation phases would be recommended

9.3.3 Bat Sensitive Features

Within the Nku PV facility project site, sensitive bat features have been identified which need to be considered by the development footprint. The sensitive features are considered to be mainly no-go areas, with some medium and high sensitivity features also present. The following sensitive features have been identified:

High bat sensitivity (a 200m buffer has been recommended around these features with the exception of access roads and underground/ overhead cables):
» Valley bottom wetlands.
» Pans and depressions.
» Dams.
» Rocky boulder koppies (tors).
» Exposed rocky cliff edges.
» Drainage lines capable of supporting riparian vegetation.
» Other water bodies and other sensitivities such as manmade structures, buildings, houses, barns, and sheds.

Medium bat sensitivity (a 150m buffer has been recommended around these features panels are allowed to be constructed):
» Alluvial plains and washes.
» Seasonal drainage lines.

9.3.4 Avifaunal Sensitive Features

A number of habitat units comprising potential sensitive avifauna features have been observed within the development area for the Nku PV facility. The following preliminary avifauna sensitivities have been identified:

» **Surface water: 200m solar panel No-Go zone**
Surface water in this semi-arid habitat is crucially important for priority avifauna and many non-priority species. It is important to leave open space with no solar panels for birds to access and leave the surface water area unhindered. Surface water is also important area for raptors to hunt birds which congregate around water troughs, and they should have enough space for fast aerial pursuit.

» **Tawny Eagle nest: 1.5km all infrastructure No-Go zone**
A 1.5km infrastructure free buffer zone must be implemented around the Tawny Eagle (SA status: Endangered) nest on the Droërivier-Hydra 2 400kV transmission line. This is to prevent any disturbance of the birds at the nest during the construction phase which could lead them to abandon the nest.

9.3.5 *Soils and Agricultural Potential Sensitive Features*

From an agricultural perspective, the sensitivity of the development area within which Nku PV facility is proposed is predominantly a combination of "Low" and "Medium" sensitivities, with isolated areas of "High" sensitivity. These "High" sensitivity areas were identified towards the southern and eastern periphery the development area. These sensitivities are considered to be preliminary and will be confirmed during the impact phase of the project.

The agriculture theme sensitivity as indicated in the screening report indicates predominantly a combination of "Low" and "Medium" sensitivities, with isolated areas of "High" sensitivity (**Error! Reference source not found.**). This sensitivity is based on the screening tool and considered to be preliminary for this stage of the project. These sensitivities will be confirmed during the impact phase of the project.

9.3.6 *Heritage sensitive features, the cultural landscape (incl. archaeology, palaeontology, and cultural landscape)*

Heritage sensitivity relates to archaeological resources, palaeontological resources, heritage resources, and the cultural landscape. According to the SAHRIS Palaeosensitivity Map, the area proposed for development is underlain by sediments of very high paleontological sensitivity. According to the extract from the Council for GeoSciences Map 3122 for Victoria West, the development area is underlain by the Abrahamskraal and Teekloof Formations, both of the Adelaide Subgroup of the Beaufort Group of sediments. According to the SAHRIS Fossil Heritage Browser and the Palaeotechnic Report for the Western Cape (Almond and Pether, 2008), the Beaufort Group sediments are known to preserve diverse terrestrial and freshwater tetrapods of *Tapinocephalus* to *Lystrosaurus* Biozones (amphibians, true reptiles, synapsids – especially therapsids), palaeoniscoid fish, freshwater bivalves, trace fossils (including tetrapod trackways) and sparse vascular plants (*Glossopteris* Flora, including petrified wood).

There are no areas identified which are required to be excluded from the proposed development footprint.

9.3.7 *Visual Sensitive Features*

A preliminary viewshed analysis for the proposed Nku PV facility was undertaken in order to determine the general visual exposure of the area under investigation. The viewshed analyses was undertaken from

preliminary vantage points within the proposed development area at offsets of 5m above average ground level.

The following is evident from the viewshed analysis:

» The Nku PV facility may be highly visible within a 1km radius of the development. There are no homesteads within this zone, only a section of the Rondawel secondary road traversing south-west of the site.
» The 3km zone contains the Rondawel homestead (guest farm), a short section of the N1 national road and the Rondawel secondary road. Other than these potential receptor sites, the rest of the visually exposed areas fall within vacant farmland.
» Visual exposure within the 6km zone will predominantly be towards the north-east, along the Droërivier/Hydro 1 and 3, Gamma/Perseus and Gamma/Hydra power lines, up to the Bobbejaankrans hills. The only homestead within this zone is the Nieuwefontein dwelling to the north-west, approximately 6km from the development site.
» At distances exceeding 6km the intensity of visual exposure is expected to be very low and highly unlikely due to the distance between the object (development) and the observer.

It is envisaged that the structures, where visible from shorter distances, and where sensitive visual receptors may find themselves within this zone, may constitute a high visual prominence, potentially resulting in a visual impact. This may include residents of the farm dwellings, as well as observers travelling along the roads in closer proximity to the facility.

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 Nku PV project site (Portion 0 and Portion 1 of Farm Rondavel 85). 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 development of 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 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.

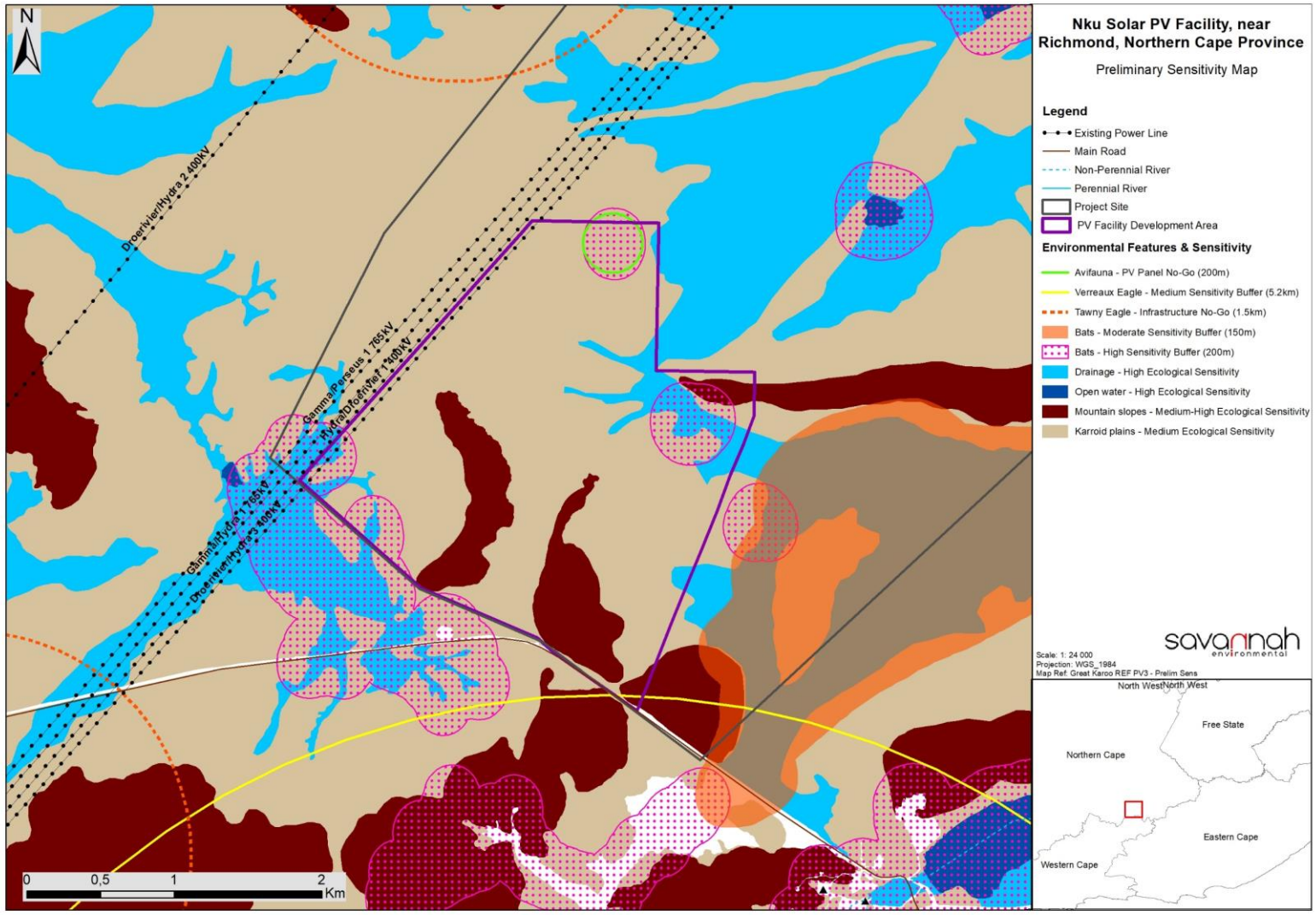

Figure 9.1: Environmental Sensitivity Map from the results of the scoping evaluation for the Nku PV, indicating the recommended development envelope (area excludes any areas of significant biodiversity and do not contain any areas considered to be no-go areas)

CHAPTER 10: PLAN OF STUDY FOR THE ENVIRONMENTAL IMPACT ASSESSMENT

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 the Nku PV facility, which 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 a Scoping Report

This chapter of the 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 the Nku PV facility is included within this chapter as a whole.

10.2 Objectives of the EIA Phase

The EIA Phase to be undertaken for the Nku PV facility and associated infrastructure will aim to achieve the following:

- Provide an overall description and detailed assessment of the social and biophysical environment affected by the development of the Nku PV facility and associated infrastructure.
- Assess potentially significant impacts (direct, indirect, and cumulative, where required) associated with the PV facility.
- Identify and recommend appropriate avoidance strategies and 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 comments are recorded.

The EIA will assess potential environmental impacts and benefits (direct, indirect and cumulative impacts) associated with each phase of the development including design, construction, operation and decommissioning; and will aim to provide the Competent Authority with sufficient information to make an informed decision regarding the proposed development. The site layout being proposed for the Nku PV facility will be assessed through detailed independent specialist studies. As required in terms of the 2014 EIA Regulations (GNR 326), as amended, the assessment will include consideration of the 'do nothing' alternative.

10.3 Consideration of Alternatives

The following project alternatives will be investigated in the EIA:

Nature of Alternatives Considered	Description of the Alternatives relating to the Nku PV facility
Site-specific and Layout Alternatives	One preferred project site has been identified for the development of the Nku PV facility due to site specific characteristics such as the solar resource, land availability, topographical considerations, proximity to a viable grid connection and environmental features. The project site is ~571ha in extent which is considered to be sufficient for the development of a Nku PV facility with a contracted capacity of up to 100MW. A development area of ~210ha has been identified by the proponent within the project site for the development.
Activity Alternatives	Only the development of a renewable energy facility is considered by Great Karoo Renewable Energy (Pty) Ltd. Due to the location of the project site and the suitability of the solar resource, only the development of a PV facility is considered feasible considering the natural resources available to the area and the current land-use activities undertaken within the project site (i.e., livestock farming).
Technology Alternatives	Only the development of a Solar PV is considered due to the characteristics of the site, including the natural resources available. The use of solar PV for the generation of electricity is considered to be the most efficient technology for the project site.
'Do-nothing' Alternative	This is the option to not construct the Nku PV facility. No impacts (positive or negative) are expected to occur on the social and environmental sensitive features or aspects located within the project site or the surrounds. The opportunities associated with the development

Nature of Alternatives Considered	Description of the Alternatives relating to the Nku PV facility
	of the solar PV for the affected area and other surrounding towns in the area will not be made available.

10.4 Description of project to be assessed during the EIA Phase

10.4.1 Project description

The aspects or nature and extent of the project to be assessed as part of the EIA are detailed in **Table 10.1** below. A more detailed description of the activities associated with the construction and operation of the project is included in Chapter 2 of this Scoping Report.

Table 10.1: Activities and associated infrastructure to be assessed in the EIA

Infrastructure	Footprint and dimensions
Number of Panels	To be determined in the EIA phase
Panel Height	Up to 5m
Technology	Use of fixed-tilt, single-axis tracking, and/or double-axis tracking PV technology. Monofacial or bifacial panels are both considered.
Contracted Capacity	Up to 100MW
Area occupied by the solar array	~210ha
Area occupied by the on-site facility substation	~1000m x 700m
Capacity of on-site facility substation	33kV/132kV
Underground cabling between the PV array and the onsite substation	Underground cabling will be installed at a depth of up to 1.5m to connect the PV array to the on-site facility substation. The cabling will have a capacity of up to 35kV.
Cabling from the onsite substation to the 132kV collector substation	Underground cabling will be installed at a depth of up to 1.5m to connect the on-site substation to the 132kV collector substation. The cabling will have a capacity of up to 35kV.
Area occupied by the electrical and auxiliary equipment required at the collector substation	100mx100m
Area occupied by laydown area	~1000m x 700m
Access and internal roads	Wherever possible, existing access roads will be utilised to access the project site and development area. It is unlikely that access roads will need to be upgraded as part of the proposed development. Internal roads of up to 4.5m in width will be required to access the PV panels and the on-site substation.
Grid connection	The 33/132kV on-site substation will be connected to the proposed 132kV central collector substation via underground cabling with a capacity of up to 132kV. A new 132kV single- or double-circuit power line will run from the central collector substation and tie into the existing Eskom Gamma Substation. The switching station forming part of the 132kV collector substation and the new 132kV single- or double-circuit will be assessed as part of a separate Basic Assessment process in support of an application for Environmental Authorisation.

Infrastructure	Footprint and dimensions
Temporary infrastructure	Temporary infrastructure, including laydown areas, hardstand areas and a concrete batching plant, will be required during the construction phase. All areas affected by temporary infrastructure will be rehabilitated following the completion of the construction phase, where it is not required for the operation phase.

10.4.2. Scope of the EIA phase and EIA report

The EIA Report will be compiled in terms of the requirements of the EIA Regulations and include the information as required in Appendix 3 of GNR 326. The results of the specialist studies and other available information will be integrated, synthesised, and presented in the EIA Report by the Savannah Environmental project team. The EIA report will assess the overall environmental impacts associated with the development, consider mitigation measures as may be required, and make recommendations regarding the best development alternative. The EIA Report will also identify mitigation measures and provide management recommendations to minimise negative impacts and enhance benefits. The EIA Report will include:

- The details and expertise of the **EAP** who prepared the report.
- The **location** of the development footprint 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 as contemplated in the accepted scoping report.
- 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 location of the preferred alternative development location; and
- a full description of the process followed to identify, assess and rank impacts of the activity and associated infrastructure on the preferred location including all environmental issues and risks that have been identified and an assessment of the significance of each issue and risk and the extent to which the issue/risk can be avoided or mitigated.

» An **assessment** of the identified potentially significant impacts and risks.
» A summary of the **findings and recommendations** of any specialist report and an indication as to how these findings and recommendations have been included.
» An **environmental impact assessment** containing a summary of key findings, an environmental sensitivity map and a summary of the positive and negative impacts and risks of the proposed activity.
» An **Environmental Management Programme** (EMPr), as per Appendix 4 of GNR326, containing the recommendations from specialists, the impact management **objectives,** and the impact management **outcomes**.
» The final **alternatives** which respond to the impact management measures, avoidance and mitigation measures identified.
» Any aspects which were **conditional** to the findings of the assessment.
» Description of the assumptions, uncertainties and gaps in knowledge relating to the assessment and mitigation measures proposed.
» An **opinion** as to whether the proposed activity should or should not be authorised and the conditions thereof.
» An undertaking under **affirmation** by the EAP in relation to the correctness of the information, the inclusion of comments and inputs from stakeholders and interested and affected parties, the inclusion of inputs and recommendations from the specialists and any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties.

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

10.5 Specialist Assessments to be undertaken during the EIA Phase

A summary of the aspects which require further investigation within the EIA Phase through specialist studies, as well as the proposed activities to be undertaken in order to assess and ground truth the significance of the potential impacts is provided within **Table 10.2**. The specialists proposed to undertake detailed studies in the EIA Phase are also reflected within this table. These specialist studies will consider the development footprint proposed for the PV facility and all associated infrastructure, as well as feasible and reasonable alternatives identified for the project. The terms of reference for each specialist includes the following:

Table 10.2: Aspects requiring further investigation by specialists during the EIA Phase and terms of reference to assess the significance of the potential impacts relevant to the Nku PV facility

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
Ecology (Fauna and Flora)	<u>The following site-specific assessments are recommended for the EIA Phase:</u> » Detailed camera-trap survey of potential Riverine Rabbit habitat, as per recommended protocols. This survey will provide incidental information on the occurrence of other mobile flora on site. » More detailed floristic surveys of main footprint areas in order to document composition, especially of protected species. Ideally, this should be undertaken after an appropriate time-period after rainfall to allow emergence of any species of potential interest. <u>Assessment of Impacts for the EIA</u> The methodology described in **Section 10.6** 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. <u>Environmental Management Programme</u> 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.	David Hoare of David Hoare Consulting (Pty) Ltd
Freshwater resources (including all waterbodies and wetlands)	<u>The EIA Phase will include the following activities:</u> Freshwater resources located within the development area will be further assessed during the EIA Phase. The following activities will be undertaken: » Identify, delineate, and characterise water resources. » Undertake a functional assessment of systems, where applicable. » Determine a suitable buffer width for the resources. » Undertake a field survey during the wet season period that prioritises the development areas, but also considers the 500m regulated area. <u>Assessment of Impacts for the EIA:</u>	Ivan Baker of the Biodiversity Company

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	The methodology described in **Section 10.6** 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. <u>Environmental Management Programme:</u> 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.	
Bats	<u>The EIA Phase will include the following activities:</u> A bat impact assessment report will be compiled and be informed by the results of 12-month pre-construction monitoring programme. The following activities will be undertaken during the EIA Phase: <u>Assessment of Impacts for the EIA:</u> The methodology described in **Section 10.6** 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. <u>Environmental Management Programme:</u> 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.	Werner Marais of Animalia
Avifauna	<u>The EIA Phase will include the following activities:</u> An avifauna impact assessment report will be compiled and be informed by the results of 12-month pre-construction monitoring programme. The following activities will be undertaken during the EIA Phase:	Chris van Rooyen of Chris van Rooyen Consulting

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	» The implementation of six avifaunal surveys, utilising transects and incidental counts, to inform the assessment of the potential impacts of the planned infrastructure within the development footprint (see Appendix 3)[18]. The monitoring protocol is guided by the following: o 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 NEMA when applying for Environmental Authorisation (Gazetted October 2020) o Guidelines for the implementation of the Terrestrial Flora (3c) & Terrestrial Fauna (3d) Species Protocols for EIAs in South Africa produced by the South African National Biodiversity Institute on behalf of the Department of Environment, Forestry and Fisheries (2020). o The BirdLife South Africa (BLSA) Guidelines for assessing and monitoring the impact of solar power generating facilities on birds in Southern Africa. BirdLife South Africa by Jenkins, A.R., Ralston-Patton, Smit-Robinson, A.H.2017 (hereafter referred to as the Solar Guidelines) were consulted to determine the level of survey effort that is required. » The avifaunal specialists report will be structured around the following terms of reference: o Description of the affected environment from an avifaunal perspective. o Discussion of gaps in baseline data and other limitations. o Description of the methodology that was used for the field surveys. o Comparison of the site sensitivity recorded in the field with the sensitivity classification in the DFFE National Screening Tool and adjustment if necessary. o Provision of an overview of all applicable legislation. o Provision of an overview of assessment methodology. o Identification and assessment of the potential impacts of the proposed development on avifauna including cumulative impacts. o Provision of sufficient mitigation measures to include in the Environmental Management Programme (EMPr). o Conclusion with an impact statement whether the PV facility is fatally flawed or may be authorised. <u>Assessment of Impacts for the EIA:</u> The methodology described in **Section 10.6** 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	

[18] This is currently ongoing with three of the six surveys having been completed to date.

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	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. <u>Environmental Management Programme:</u> 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 and Agricultural Potential	<u>The EIA Phase will include the following activities:</u> The soils impact assessment will include the consideration of aspects related to agricultural aspects in accordance with the protocols and procedures of GN 320 of 2020. The assessment will also include: » Identification and delineation of soils forms. » Determination of soil sensitivity. » Undertake a field survey that will prioritise the development areas. <u>Assessment of Impacts for the EIA:</u> The methodology described in **Section 10.6** 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. <u>Environmental Management Programme:</u> 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.	Ivan Baker of the Biodiversity Company
Heritage (including Cultural	<u>The EIA Phase will include the following activities:</u>	Jenna Lavin of CTS Heritage

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
Landscape, Archaeology and Palaeontology)	As part of the EIA, it is necessary to undertake a Heritage and Archaeological Study to fulfil the SAHRA requirements in accordance with the National Heritage Resources Act (No. 25 of 1999). A Heritage and Archaeological Impact Assessment (including cultural landscape and palaeontology) will therefore be conducted, the primary objective of which is to determine the heritage and archaeological significance of features on the site as well as the significance of the cultural landscape. The following activities will be undertaken during the EIA Phase: » Undertake field assessments in order to fill the identified gaps in knowledge. The archaeological field surveys will provide sufficient ground-coverage of the areas to be developed to be able to determine the nature of the resources likely to be impacted. The palaeontological and cultural landscape field surveys will target sensitive geological and cultural landscape features. <u>Assessment of Impacts for the EIA:</u> The methodology described in **Section 10.6** 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. <u>Environmental Management Programme:</u> 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	<u>The EIA Phase will include the following activities:</u> » A visual impact assessment will be undertaken during the EIA Phase. The report will include an assessment of potential visual impacts according to the nature, extent, duration, intensity or magnitude, probability and significance of the potential visual impacts, and will propose management actions and/or monitoring programs, and may include recommendations related to the solar energy facility layout. The visual impact will be determined for the highest impact-operating scenario (worst-case scenario) and varying climatic conditions (i.e., different seasons, weather conditions, etc.) will not be considered. The visual impact	Lourens du Plessis of LoGIS

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	assessment will also consider potential cumulative visual impacts, or alternatively the potential to concentrate visual exposure/impact within the region. The following via specific tasks must be undertaken: o Determine potential visual exposure. o Determine visual distance/observer proximity to the facility. o Determine viewer incidence/viewer perception (sensitive visual receptors). o Determine the visual absorption capacity (VAC) of the landscape. o Calculate the visual impact index. o Determine impact significance. o Propose mitigation measures. o Reporting and map display. o Site visit. <u>Assessment of Impacts for the EIA:</u> The methodology described in **Section 10.6** 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. <u>Environmental Management Programme:</u> 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.	
Traffic	<u>The EIA Phase will include the following activities:</u> » Undertake additional site visit. » Confirmation of trip generation based on the activities related to traffic movement for the construction and operation (maintenance) phases of the facility. » Access assessment based on the preferred access point. » Impact assessment and mitigation measure. » Cumulative impact assessment.	Iris Wink of JG Afrika

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	Assessment of Impacts for the EIA: The methodology described in **Section 10.6** 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.	
Social	The EIA Phase will include the following activities: The proposed approach to the Social Impact Assessment (SIA) is based on the Guidelines for SIA endorsed by Western Cape Provincial Environmental Authorities (DEA&DP) in 2007. The Guidelines are based on accepted international best practice guidelines, including the Guidelines and Principles for Social Impact Assessment (Inter-organizational Committee on Guidelines and Principles for Social Impact Assessment, 1994) and IAIA Guidance for Assessing and Managing Social Impacts (2015). The approach to the study will involve: » Collection and review of reports and baseline socio-economic data on the area. This includes socio-economic characteristics of the affected areas, current and future land uses, and land uses planning documents relating to the study area and surrounds. » Identification of the components associated with the construction and operational phase of the proposed project, including estimate of total capital expenditure, number of employment opportunities created and breakdown of the employment opportunities in terms of skill levels (low, medium and high skilled), breakdown of wages per skill level, assessment procurement policies etc. » Site visit and interviews with key affected parties, including local communities, local landowners, key government officials (local and regional), the client, local farmers associations, tourism and conservation officials, chamber of commerce etc.	Tony Barbour of Environmental Consulting and Research

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	» Review of key findings of the key specialist studies that have a bearing on the SIA, such as the Visual Impact Assessment (VIA). This information will also be used to inform the engagement with the affected landowners. » Identification and assessment of key social issues and assessment of potential impacts (negative and positive) associated with the construction, operational and decommissioning phase of the project. » Identification and assessment of cumulative impacts (positive and negative). » Identification of appropriate measures to avoid, mitigate, enhance, and compensate for potential social impacts. » Preparation of Social Impact Assessment (SIA) Report. Assessment of Impacts for the EIA: The methodology described in **Section 10.6** 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.	
Cumulative Assessment	Assess the cumulative impacts associated with the construction and operation of more than one development (i.e., renewable energy developments) within the immediate surrounding areas of the project site on the ecological, heritage, soil and agricultural potential, bats, avifaunal, social, traffic, visual and noise impacts of the area. The objective is to identify and focus on potentially significant cumulative impacts so these may be taken into consideration in the decision-making process. The following will be considered:	Savannah Environmental

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	» 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 infrastructures. » 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). » Unacceptable increase in ambient noise conditions. » Complete or whole-scale change in the sense of place and character of an area and unacceptable visual intrusion. » Unacceptable impact on traffic and road conditions. » Unacceptable impact to socio-economic factors and components.	

10.6 Methodology for the Assessment of Potential Impacts

Direct, indirect, and cumulative impacts of the above issues identified through this Scoping Study will be assessed in terms of the following criteria:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional:
  - local extending only as far as the development site area – assigned a score of 1;
  - limited to the site and its immediate surroundings (up to 10 km) – assigned a score of 2;
  - will have an impact on the region – assigned a score of 3;
  - will have an impact on a national scale – assigned a score of 4; or
  - will have an impact across international borders – assigned a score of 5.
- The **duration**, wherein it will be indicated whether:
  - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - medium-term (5–15 years) – assigned a score of 3;
  - long term (> 15 years) - assigned a score of 4; or
  - permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  - 0 is small and will have no effect on the environment;
  - 2 is minor and will not result in an impact on processes;
  - 4 is low and will cause a slight impact on processes;
  - 6 is moderate and will result in processes continuing but in a modified way;
  - 8 is high (processes are altered to the extent that they temporarily cease); and
  - 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** *of occurrence*, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale, and a score assigned:
  - Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
  - Assigned a score of 2 is improbable (some possibility, but low likelihood);
  - Assigned a score of 3 is probable (distinct possibility);
  - Assigned a score of 4 is highly probable (most likely); and
  - Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- the **significance**, which shall be determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- the **status**, which will be described as either positive, negative or neutral.
- the degree to which the impact can be reversed.
- the degree to which the impact may cause irreplaceable loss of resources.
- the *degree* to which the impact can be *mitigated*.

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

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

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

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

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

Other aspects to be taken into consideration in the specialist studies and EIA report are:

- Impacts should be described in terms of before and after the proposed mitigation and management measures have been implemented.
- All impacts should be evaluated for the full lifecycle of the proposed development, including construction, operation, and decommissioning.
- The impact assessment should take into consideration the cumulative effects associated with this and other similar developments which are either developed or in the process of being developed in the region. The purpose of the cumulative assessment is to test if such impacts are relevant to the proposed project in the proposed location (i.e., whether the addition of the proposed project in the area will increase the impact). In this regard, specialist studies will consider whether the construction of the proposed development will result in:

    - Unacceptable risk
    - Unacceptable loss
    - Complete or whole-scale changes to the environment or sense of place
    - Unacceptable increase in impact

A conclusion regarding whether the proposed development will result in any unacceptable loss or impact considering all the projects proposed in the area is included in the respective specialist reports.

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

10.7 Authority Consultation

Consultation with the regulating authorities (i.e., DFFE and Northern Cape DAEARD&LR has been undertaken in the Scoping Phase and will continue throughout the EIA process. On-going consultation will include the following:

- Submission of a Final Scoping Report following a 30-day review period which will include all comments and issues raised during the review period as well as appropriate responses to the comments.
- Submission of an EIA Report and EMPr for a 30-day review and comment period.
- Submission of a Final EIA Report and EMPr following a 30-day review period which will include all comments and issues raised during the review period as well as appropriate responses to the comments received.
- Consultation and an authority site visit (if required) in order to discuss the findings and conclusions of the EIA Report.

10.8 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 DFFE (**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, identify additional issues of concern or highlight positive aspects of the proposed project, and 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 public participation process will include the following activities:

- Placement of advertisements in one local newspaper (De Aar Echo Newspaper, in both English and Afrikaans).
- Maintenance and finalisation of the I&AP database.
- Release of the EIA Report for a 30-day review and comment period.
- Ongoing consultation with all registered I&APs regarding the progress of the EIA process and the outcomes or findings of the EIA Report through stakeholder consultation via notification letters, telephone calls, focus group meetings and open-house/information sharing meetings, depending on the specific needs of the stakeholders in the area.
- Facilitate comments on the EIA Report.
- Compile a Comments and Responses Report and evidence of the public participation process undertaken to be included in the final EIA Report for decision-making.

10.9 Key Milestones of the Programme for the EIA

The envisaged key milestones of the programme for the EIA Phase are outlined in the following table (and include indicative dates):

Key Milestone Activities	Proposed timeframe
Make the Scoping Report available to the public, stakeholders, and authorities for 30 days	12 November 2021 – 13 December 2021
Finalisation of Scoping Report, and submission of the Final Scoping Report to DFFE	14 January 2021
Authority acceptance of the Final Scoping Report and Plan of Study to undertake the EIA	43 days from submission of the Final Scoping Report
Undertake specialist studies and public participation process	December 2021 – February 2022
Make Draft EIA Report and EMPr available to the public, stakeholders, and authorities	February 2022 – March 2022
Finalisation of EIA Report, and submission of the Final EIA Report to DFFE	April 2022
Authority review period and decision-making (107 calendar days)	April 2022 – July 2022

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Nid	Report Type	Author/s	Date	Title
120317	HIA Phase 1	Celeste Booth, Sholeen Shanker	01/12/2012	An archaeological ground-truthing walk-through for the proposed substation and associated overhead power line for the Nobelsfontein Wind Energy Facility situated on a site south of Victoria West on the Farm Nobelsfontein 227, Northern Cape Province
120325	HIA Phase 1	Celeste Booth, Sholeen Shanker	01/12/2012	An archaeological ground-truthing walk-through for the proposed substation and associated overhead power line for the Nobelsfontein Wind Energy Facility situated on a site south of Victoria West on the Farm Nobelsfontein 227, Northern Cape Province
120325	HIA Phase 1	Celeste Booth, Sholeen Shanker	01/12/2012	An archaeological ground-truthing walk-through for the proposed substation and associated overhead power line for the Nobelsfontein Wind Energy Facility situated on a site south of Victoria West on the Farm Nobelsfontein 227, Northern Cape Province
120820	HIA Phase 1	Celeste Booth	01/12/2012	An Archaeological Ground-Truthing Walk-Through for The Nobelsfontein Wind Energy Facility Situated on A Site South of Victoria West On The Farms Nobelsfontein 227, Annex Nobelsfontein 234, Ezelsfontein 235, And Rietkloofplaaten 239, Northern Cape Province
251290	PIA Desktop	Lloyd Rossouw	01/01/2014	Combined Environmental Environmental Impact Assessment for the proposed Ishwati Emoyeni Wind Energy Facility and Supporting Eskom Transmission and Eskom Distribution Grid Connection Infrastructure near Murraysburg, Western Cape. Chapter 13: Palaeontology Impact Assessment.

251296	AIA Phase 1	Dave Halkett	01/01/2014	Combined Environmental Impact Assessment for the proposed Ishwati Emoyeni Wind Energy Facility and Supporting Eskom Transmission and Eskom Distribution Grid Connection Infrastructure near Murraysburg, Western Cape. Chapeter 13: Archaeology Impact Assessment.
356942	AIA Phase 1	Johan Binneman, CelesteBooth, Natasha Higgitt	01/05/2010	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) FOR THE PROPOSED SKIETKUIL QUARRIES 1 AND 2 ON THE FARM SKIETKUIL No. 3, VICTORIA WEST, CENTRAL KAROO DISTRICT, WESTERN CAPE PROVINCE
356942	AIA Phase 1	Johan Binneman, Celeste	01/05/2010	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) FOR THE PROPOSED
		Booth, Natasha Higgitt		Skietkuil Quarries 1 and 2 On the Farm Skietkuil No. 3, Victoria West, Central Karoo District, Western Cape Province
357137	Heritage Impact Assessment Specialist Reports	Timothy Hart	13/10/2015	Heritage Impact Assessment for the proposed Umsinde Emoyeni Wind Energy Facility
360840	Non-Impact Assessment Related Reports	Wouter Fourie	05/03/2016	Environmental Impact Assessment of the proposed amendments to the Environmental Authorisation for the Mainstream Renewable Power South Africa Wind Energy Project near Victoria West in the Northern Cape: Specialist Heritage Opinion
360850	HIA Phase 1	Wouter Fourie	04/03/2016	Basic assessment process for Proposed development of supporting infrastructure to the Victoria West Wind Energy Facility, Victoria West
6805	AIA Phase 1	Len van Schalkwyk, Elizabeth Wahl	01/09/2007	Heritage Impact Assessment of GammaGrassridge Power Line Corridors and Substation, Eastern, Western and Northern Cape Provinces, South Africa
7035	AIA Phase 1	Johan Binneman, CelesteBooth, Natasha Higgitt	05/03/2011	A Phase 1 Archaeological Impact Assessment (AIA) for the proposed Karoo Renewable Energy Facility on asite south of Victoria West, Northern and Western Cape Province on the farms

				Phaisantkraal 1, Modderfontein 228, Nobelsfontein 227, Annex Nobelsfontein
7036	AIA Desktop	Celeste Booth, Natasha Higgitt	19/11/2010	An Archaeological Desktop Study for the proposed Karoo Renewable Energy Facility on a site south of Victoria West, Northern and Western Cape
8943	PIA Phase 1	Lloyd Rossouw	24/03/2011	Palaeontological desktop assessment of a commercial renewable energy facility site located approximately 34km south of Victoria West in the Western Cape Province (and Northern Cape)

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