

# Zionsheuvel Solar PV Facility

Northern Cape Province

Draft Scoping Report

January 2023

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## PROJECT DETAILS

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**When used as a reference this report should be cited as:** Savannah Environmental (2023) Scoping Report Zionsheuvél Solar PV Facility, Northern Cape Province

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## PURPOSE OF THE SCOPING REPORT AND INVITATION TO COMMENT

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Akuo Energy Afrique has appointed Savannah Environmental as the independent environmental consultant to undertake the Scoping and Environmental Impact Assessment Process for the Zionsheuvél Solar PV Facility. The EIA process is being undertaken in accordance with the requirements of the 2014 EIA Regulations promulgated in terms of the National Environmental Management Act (NEMA; Act No. 107 of 1998). This Scoping report has been compiled in accordance with Appendix 2 of the EIA Regulations, 2014 (as amended) and consists of the following sections:

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 Zionsheuvél Solar PV Facility project and the environmental impact assessment.
- » **Chapter 2** provides a project description of the Zionsheuvél Solar PV Facility project.
- » **Chapter 3** provides the site selection information and identified project alternatives.
- » **Chapter 4** provides the description of Solar PV as a power generation technology
- » **Chapter 5** outlines strategic regulatory and legal context for energy planning in South Africa.
- » **Chapter 6** outlines the need and desirability of the Zionsheuvél Solar PV Facility.
- » **Chapter 7** outlines the process which was followed during the scoping phase of the EIA process.
- » **Chapter 8** describes the existing biophysical and social environment within and surrounding the study and development area.
- » **Chapter 9** provides an identification and evaluation of the potential issues associated with the proposed solar PV facility and associated infrastructure.
- » **Chapter 10** presents the conclusions of the scoping evaluation for the Zionsheuvél Solar PV Facility.
- » **Chapter 11** describes the Plan of Study (PoS) for the EIA phase.
- » **Chapter 12** provides references used to compile the Scoping report.

The Scoping Report has been made available for review from **16 January 2023 to 15 February 2023** and is available for download from <https://savannahsa.com/public-documents/energy-generation/hydra-b-cluster/>. All comments received and recorded during the 30-day review and comment period was included, considered, and addressed where possible within the final Scoping report for the consideration of the DFFE

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## EXECUTIVE SUMMARY

Zionsheuvél Solar Energy (Pty) Ltd (a consortium consisting of Akuo Energy Afrique, Africoast Investments and Golden Sunshine Trading) proposed to develop the Zionsheuvél Solar PV Facility and its associated electrical infrastructure on Remainder of Farm Leeuwberg 79 in the Renosterberg Local Municipality in the greater Pixley ka Seme District Municipality in the Northern Cape Province (refer to **Figure 1**). The project site is located approximately 20km north of Philipstown and 30km west of Petrusville and within the Central Transmission Corridor.

The Project (Zionsheuvél Solar PV Facility) is part of a cluster of solar facilities known as the Crossroads Green Energy. The Cluster entails the development of up to 21 solar energy facilities, each up to 240MW in capacity, and each including grid connection infrastructure connecting the facilities to the proposed Hydra B Substation. Each solar energy facility will be constructed as a separate stand-alone project and therefore, separate Scoping and Environmental Impact Assessment (S&EIA) processes will be undertaken for each of the renewable energy facilities. The projects will be considered through the EIA process in batches, with Batch 1 consisting of 9 projects, Batch 2 considering 6 projects and Batch 3 considering 6 projects. Zionsheuvél Solar PV Facility forms part of the EIA process for Batch 1 consisting of 9 projects to be undertaken in 2023. A summary of the projects and EIA processes is listed in **Table 1 and displayed in Figure 2**.

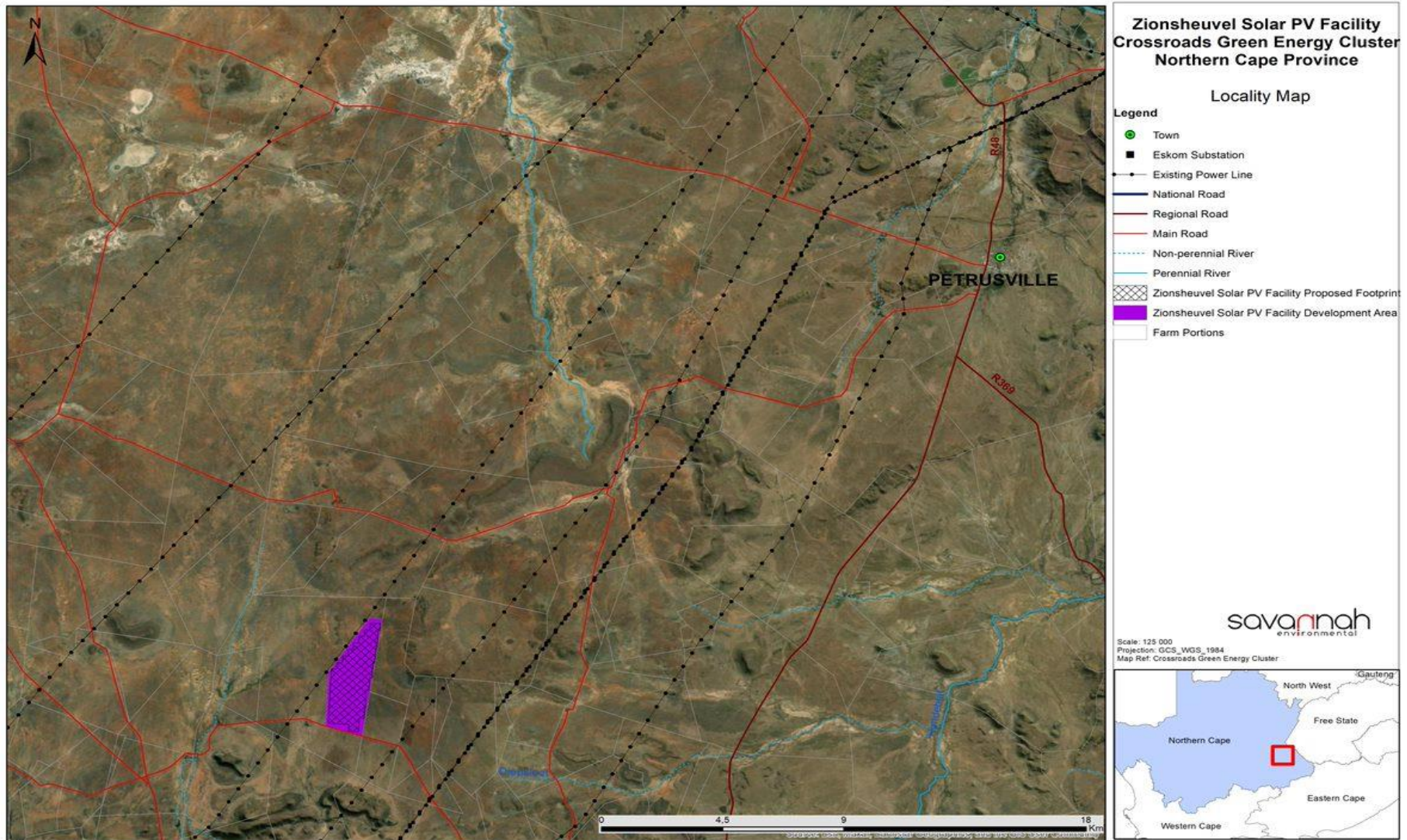
**Table 1:** EIA Processes to be undertaken for the Crossroads Green Energy Cluster

No	Project name	Farm Name and portion Number	Capacity	Project Batch
1	Tafelkop Solar PV Facility	Portion 3 of the Farm Grass Pan 40	240MW	Phase 1
2	Koppy Alleen Solar PV Facility	Portion 5 of the Farm Koppy Alleen 83	100MW	Phase 1
3	Vrede Solar PV Facility	Portion 5 of the Farm Bas Berg 88	150MW	Phase 1
4	Zionsheuvél Solar PV Facility	Remainder of Farm Leeuwberg 79	240MW	Phase 1
5	Amper Daar Solar PV Facility	Remainder of Farm Wolwe Kuil 44	100MW	Phase 1
6	Wag-'n-Bietjie Solar PV Facility	Portion 1 of the Farm Leeuwe Berg 45	100MW	Phase 1
7.1	Ruspoort 1 Solar PV Facility (Option A)	Portion 5 of the Farm Bokken Kraal 81 (Option A)	100MW	Phase 1
7.2	Ruspoort 1 Solar PV Facility (Option B)	Portion 4 on the Farm Knoffelfontein 74 Portion 1 on the Farm 78 Portion 2 on the Farm Leeuwberg 79 (Option B)	100MW	Phase 1
8	Ruspoort 2 Solar PV Facility	Portion 2 of the Farm Leeuwberg 79	100MW	Phase 1
9	Middelplaas Solar PV Facility	Portion 4 of the Farm Grass Pan 40	100MW	Phase 1
10	JW Solar PV Facility	Remainder of the Farm Plaas 196	240MW	Phase 2
11	Pro Deo Solar PV Facility	Portion 1 of the Farm Grass Pan 40	100MW	Phase 2
12	Uitkyk Solar PV Facility	Remainder of the Farm Plaas 197	100MW	Phase 2
13	Kareekloof Solar PV Facility	Remainder of the Farm Swart Koppies 86	100MW	Phase 2
14	JAN Solar PV Facility	Portion 1 of the Farm Schaap Kraal 38, Portion 1 of the Farm Annex Donker Hoek 89; and Remainder of Farm Kuhns Post 90	240MW	Phase 2
15	Driefontein Solar PV Facility	Portion 1 of the Farm Driefontein 87	100MW	Phase 2
16	Jagpoort Solar PV Facility	Portion 2 of the Farm Driefontein 87, Portion 3 of the Farm Driefontein 87, and Portion 2 of the Farm Kareekloof 85	150MW	Phase 3
17	Strydam Solar PV Facility	Portion 3 of the Farm Stryd Dam 107	240MW	Phase 3
18	Roodekraal Solar PV Facility	Remainder of the Farm Roode Kraal 106	150MW	Phase 3

No	Project name	Farm Name and portion Number	Capacity	Project Batch
19	Oosthuisfontein Solar PV Facility	Remainder of the Farm Oosthuisfontein 108	100MW	Phase 3
20	Bokkraal Solar PV Facility	Remainder of the Farm Bokken Kraal 81	100MW	Phase 3
21	HCA Solar PV Facility	Portion 4 of the Farm Kopy Alleen 83	100MW	Phase 3

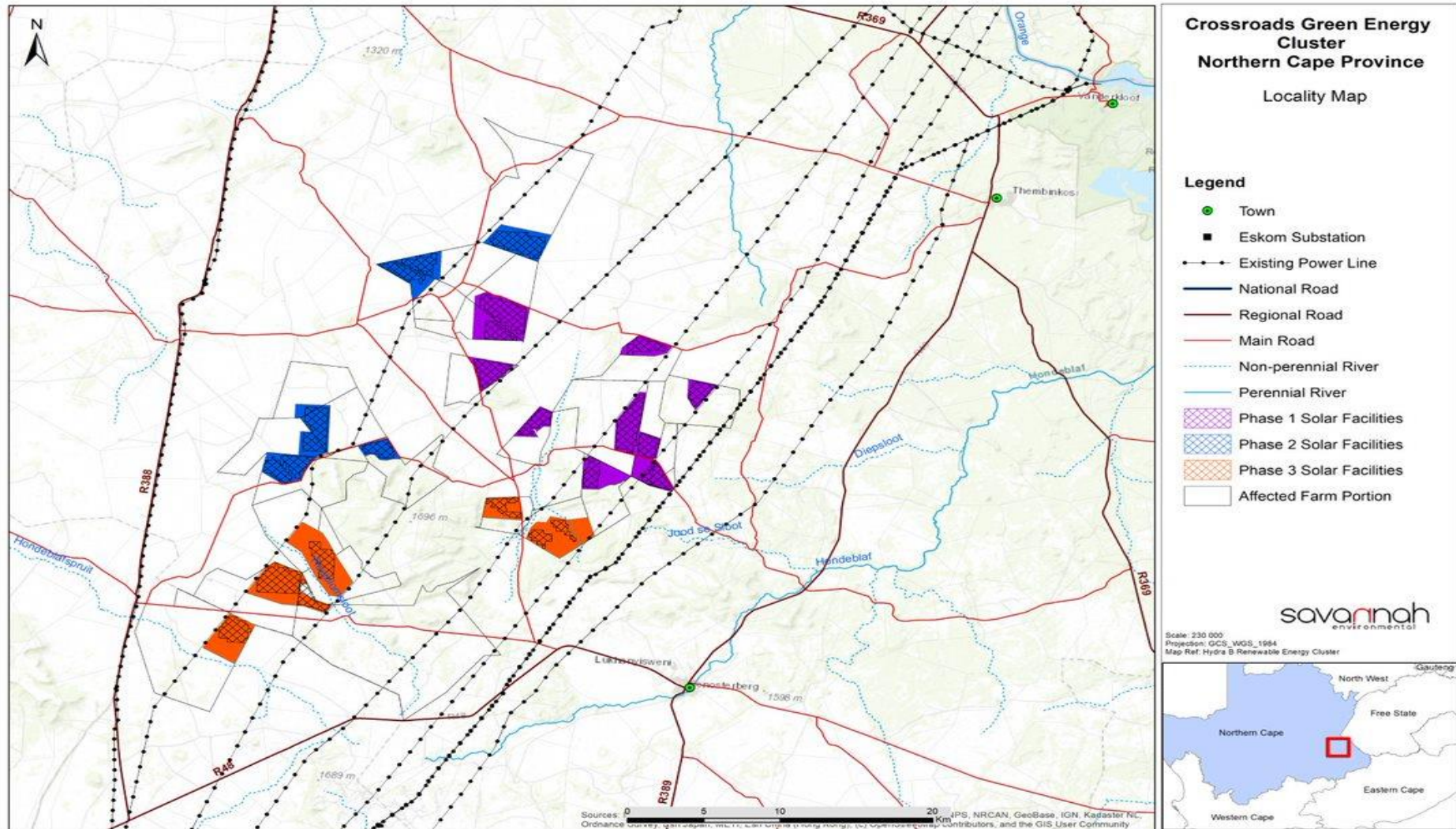
The Zionsheuvel Solar PV Facility is proposed in response to the identified objectives of the national and provincial government and local and district municipalities to develop renewable energy facilities for power generation purposes. It is the developer's intention to bid the Zionsheuvel Solar PV Facility under the Department of Mineral Resources and Energy's (DMRE's) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme, or similar renewable energy programme organized by public or private commercial & industrial customers through tenders or bilateral consultations, 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 Zionsheuvel Solar PV Facility set to inject up to 240MW into the national grid.

From a regional perspective, the Northern Cape Province, 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.



**Figure 1:** Locality map illustrating the location of the Zionsheuveel Solar PV Facility project site on Remainder of Farm Leeuwberg 79.





**Figure 2:** Visual Representation of the EIA Processes to be undertaken for the Crossroads Green Energy renewable energy cluster (Batch 1, Batch 2, and Batch 3).

### **10.3. Site Sensitivity Analysis for the Zionsheugel Solar PV Facility**

This section considers the sensitive features located within the project site, as identified by the independent specialists within each respective field, and also indicates the locations of the sensitive features within the project site.

The potentially sensitive areas which have been identified through the scoping study are illustrated in **Figure 10.1** and in the specialist reports included in **Appendix D to H**. The detail is based on the desktop review of available baseline information for the project site, as well as 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 Zionsheugel Solar PV Facility.

#### **10.3.1 Terrestrial Ecology Sensitive Features**

The expectant anthropogenic activities are likely to drive habitat destruction causing displacement of fauna and flora and possibly even direct mortality. Land clearing destroys local wildlife habitat and can lead to the loss of local breeding grounds, nesting sites and wildlife movement corridors such as rivers, streams and drainage lines, or other locally important features. The removal of natural vegetation may reduce the habitat available for fauna species and may reduce animal populations and species compositions within the area.

#### **10.3.2 Freshwater Sensitive Features**

A key consideration for the impact assessment is the presence of the water resources in proximity to the project area. The available data also suggests the presence of drainage features in the area, with an expected low to medium sensitivity for these systems.

Construction 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. These disturbances could also result in the infestation and establishment of alien vegetation would affect the functioning of the systems. Leaks and/or spillages could result in contamination of the receiving water resources. Contaminated water resources are likely to have an effect on the associated biota. An increase in stormwater runoff 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.

### **10.3.3 Soils and Land Capability Sensitive Features**

Various soil forms are expected throughout the project area, of which some are commonly associated with high land capabilities. Even though the soil depth, texture and permeability of these soils ensure high land capability, the climatic capability of the area often reduces the land potential considerably. Areas characterised by "High" land potential are expected for selected areas.

The proposed development can result in the loss of land capability. The disturbances could further also result in the infestation and establishment of alien vegetation, which in turn can have a detrimental impact on soil resources. The development of the area could also result in compaction and/or erosion. Further to this, these activities could also cause leaks and/or spillages resulting 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.

### **10.3.4 Heritage Sensitive Features (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 high and very high paleontological sensitivity. According to the extract from the Council for GeoSciences Map 3024 for Colesburg, the development area is underlain by Jurassic Dolerite, the Tierberg Formation of the Eccca Group and the Adelaide Subgroup of the Beaufort Group.

As part of the Vetlaagte project in 2012, Almond completed a field-based palaeontological assessment. Almond (2012) found that "The potentially fossiliferous sediments of the Late Palaeozoic Karoo Supergroup (Eccca and Lower Beaufort Groups) that underlie the study area are almost entirely mantled in a thick layer of superficial deposits of probable Pleistocene to Recent age. These include various soils, gravels and – at least in some areas - a well-developed calcrete hardpan. The upper Eccca Group bedrocks in the northern portion of the study area contain locally abundant fossil wood (of palaeontological interest for dating and palaeoenvironmental studies), as well as low diversity non-marine trace fossil assemblages typical of the Waterford Formation, rather than the Tierberg Formation as mapped. No vertebrate fossils and only scattered woody plant impressions of the Permian Glossopteris Flora were observed within the Lower Beaufort Group rocks that are very poorly exposed in the southern portion of the Vetlaagte study area. Trace fossils, silicified wood and rare vertebrate remains (therapsids, parareptiles) of the Middle Permian Pristerognathus Assemblage Zone have recently been recorded from this succession in the De Aar region (Almond 2010b). Extensive dolerite sills and dykes of the Early Jurassic Karoo Dolerite Suite intruding the Karoo Supergroup sediments are entirely unfossiliferous, as are rare intrusive kimberlite pipe rocks of Cretaceous age. The diverse superficial deposits within the three study areas (e.g. soils, gravels, alluvium, calcrete hardpans) are of low palaeontological sensitivity as a whole. Abundant fragments of reworked fossil wood material of Eccca provenance occur widely within subsurface and surface gravels overlying the Eccca Group outcrop area."

In Bamford's assessment completed for the area in 2021, she notes that "Based on experience, other reports and the lack of any significant previously recorded fossils from the area, it is unlikely that any fossils would be preserved in the Tierberg Formation or Adelaide Subgroup. Nonetheless, a Fossil Chance Find Protocol should be added to the EMPr."

### **10.3.5 Visual Sensitive Features**

The fact that some components of the proposed Zionsheuvell Solar 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 of the project.

It is recommended that additional spatial analyses be undertaken in order to create a visual impact index that will further aid in determining potential areas of visual impact. This exercise should be undertaken for the core PV facility as well as for the ancillary infrastructure, as these structures (e.g. the BESS structures) are envisaged to have varying levels of visual impact at a more localised scale. The site-specific issues (as mentioned earlier in the report) and potential sensitive visual receptors should be measured against this visual impact index and be addressed individually in terms of nature, extent, duration, probability, severity and significance of visual impact.

This recommended work must be undertaken during the Environmental Impact Assessment (EIA) Phase of reporting for this proposed project.

### **10.3.6 Social Sensitive Features**

The proposed approach to the 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.
- » 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.

The site visit will be undertaken during the Assessment Phase of the SIA. The site visit will include interviews with key stakeholders and interested and affected parties.

### 10.3.7 Traffic Sensitive Features

This scoping report addressed key issues and alternatives to be considered for the proposed Zionsheuvél Solar PV Facility.

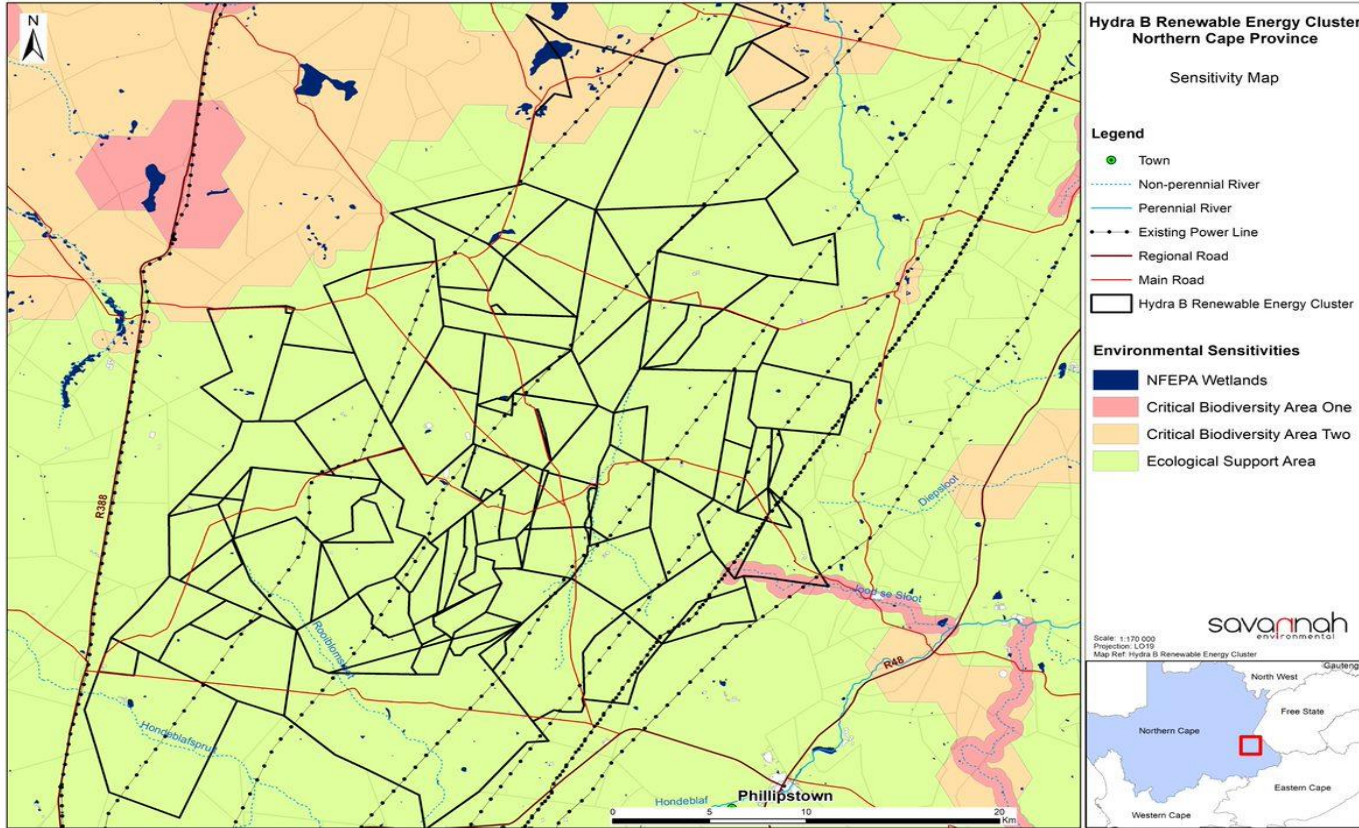
- » The preferred Port of Entry for imported components is the Port of Ngqura.
- » The proposed access road located off the R48 is deemed a suitable access road as it is an existing gravel road i.e., less expensive to upgrade.
- » It needs to be ensured that the gravel sections of the haulage routes remain in good condition and will hence need to be maintained during the additional loading of the construction phase and then reinstated after construction is completed. The gravel roads will require grading with a grader to obtain a flat even surface and the geometric design of these gravel roads needs to be confirmed at detailed design stage.
- » The construction phase traffic, although significant, will be temporary and can be mitigated to an acceptable level.
- » During operation, it is expected that staff and security will periodically visit the facility. The traffic generated during this phase will be minimal and will not have an impact on the surrounding road network.
- » The construction and decommissioning phases of a development is the only significant traffic generator and therefore noise and dust pollution will be higher during this phase. The duration of this phase is short term i.e., the impact of the traffic on the surrounding road network is temporary and solar facilities, when operational, do not add any significant traffic to the road network.

### 10.4 Overall Conclusion and Fatal Flaw Analysis

The project site for the Zionsheuvél Solar PV Facility is outlined in black in **Figure 10.1**. The findings of the Scoping Study indicate that no environmental fatal flaws are associated with the proposed project. 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 project site for the development of the facility be considered outside of the areas identified as no-go areas 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' of the mitigation hierarchy for the identification of an appropriate development footprint within the development area. Even with the appropriate avoidance of sensitive areas, there is an adequate area on the site which can accommodate the planned 150MW facility with relatively low impacts on the environment. This area is referred to as the development footprint.

With an understanding of which areas within the project site are considered sensitive to the development of the proposed facility, the developer can prepare a detailed facility 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 11** of this Scoping Report. These studies will consider the detailed facility layout produced by the developer 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 10.1:** Environmental Sensitivity Map from the results of the scoping evaluation for the Zionsheuvél Solar Energy Facility and associated infrastructure

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## CHAPTER 1: INTRODUCTION

Zionsheuvél Solar Energy (Pty) Ltd (a consortium consisting of Akuo Energy Afrique, Africoast Investments and Golden Sunshine Trading) proposed to develop the Zionsheuvél Solar PV Facility and its associated electrical infrastructure on Remainder of Farm Leeuwberg 79 in the Renosterberg Local Municipality in the greater Pixley ka Seme District Municipality in the Northern Cape Province. The project site is located approximately 20km north of Philipstown and 30km west of Petrusville and within the Central Transmission Corridor.

The Project (Zionsheuvél Solar PV Facility) is part of a cluster of solar facilities known as the Crossroads Green Energy. The Cluster entails the development of up to 21 solar energy facilities, each up to 240MW in capacity, and each including grid connection infrastructure connecting the facilities to the proposed Hydra B Substation<sup>1</sup> (refer to Figure 1.2). Each solar energy facility will be constructed as a separate stand-alone project and therefore, separate Scoping and Environmental Impact Assessment (S&EIA) processes will be undertaken for each of the renewable energy facilities. The projects will be considered through the EIA process in batches, with Batch 1 consisting of 9 projects, Batch 2 considering 6 projects and Batch 3 considering 6 projects. Zionsheuvél Solar PV Facility forms part of the EIA process for Batch 1 consisting of 9 projects to be undertaken in 2023. A summary of the projects and EIA processes is listed in **Table 1.1 and displayed in Figure 1.2.**

**Table 1.1:** EIA Processes to be undertaken for the Crossroads Green Energy Cluster

No	Project name	Farm Name and portion Number	Capacity	Project Batch
1	Tafelkop Solar PV Facility	Portion 3 of the Farm Grass Pan 40	240MW	Phase 1
2	Koppy Alleen Solar PV Facility	Portion 5 of the Farm Koppy Alleen 83	100MW	Phase 1
3	Vrede Solar PV Facility	Portion 5 of the Farm Bas Berg 88	150MW	Phase 1
4	Zionsheuvél Solar PV Facility	Remainder of Farm Leeuwberg 79	240MW	Phase 1
5	Amper Daar Solar PV Facility	Remainder of Farm Wolwe Kuil 44	100MW	Phase 1
6	Wag-'n-Bietjie Solar PV Facility	Portion 1 of the Farm Leeuwe Berg 45	100MW	Phase 1
7.1	Ruspoort 1 Solar PV Facility (Option A)	Portion 5 of the Farm Bokken Kraal 81 (Option A)	100MW	Phase 1
7.2	Ruspoort 1 Solar PV Facility (Option B)	Portion 4 on the Farm Knoffelfontein 74 Portion 1 on the Farm 78 Portion 2 on the Farm Leeuwberg 79 (Option B)	100MW	Phase 1
8	Ruspoort 2 Solar PV Facility	Portion 2 of the Farm Leeuwberg 79	100MW	Phase 1
9	Middelplaas Solar PV Facility	Portion 4 of the Farm Grass Pan 40	100MW	Phase 1
10	JW Solar PV Facility	Remainder of the Farm Plaas 196	240MW	Phase 2
11	Pro Deo Solar PV Facility	Portion 1 of the Farm Grass Pan 40	100MW	Phase 2
12	Uitkyk Solar PV Facility	Remainder of the Farm Plaas 197	100MW	Phase 2
13	Kareekloof Solar PV Facility	Remainder of the Farm Swart Koppies 86	100MW	Phase 2
14	JAN Solar PV Facility	Portion 1 of the Farm Schaap Kraal 38, Portion 1 of the Farm Annex Donker Hoek 89; and Remainder of Farm Kuhns Post 90	240MW	Phase 2
15	Driefontein Solar PV Facility	Portion 1 of the Farm Driefontein 87	100MW	Phase 2
16	Jagpoort Solar PV Facility	Portion 2 of the Farm Driefontein 87, Portion 3 of the Farm Driefontein 87, and	150MW	Phase 3

<sup>1</sup> The Hydra B Substation is a Main Transmission Substation (MTS) proposed in consultation with Eskom in line with their Transmission network planning. A separate EIA process is being undertaken for this substation.

No	Project name	Farm Name and portion Number	Capacity	Project Batch
		Portion 2 of the Farm Kareekloof 85		
17	Strydam Solar PV Facility	Portion 3 of the Farm Stryd Dam 107	240MW	Phase 3
18	Roodekraal Solar PV Facility	Remainder of the Farm Roode Kraal 106	150MW	Phase 3
19	Oosthuisfontein Solar PV Facility	Remainder of the Farm Oosthuisfontein 108	100MW	Phase 3
20	Bokkraal Solar PV Facility	Remainder of the Farm Bokken Kraal 81	100MW	Phase 3
21	HCA Solar PV Facility	Portion 4 of the Farm Koppy Alleen 83	100MW	Phase 3

The Zionsheuve 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 Zionsheuve Solar PV Facility under the Department of Mineral Resources and Energy's (DMRE's) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme, or similar renewable energy programme organized by public or private commercial & industrial customers through tenders or bilateral consultations, 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 Zionsheuve Solar PV Facility set to inject up to 240MW into the national grid.

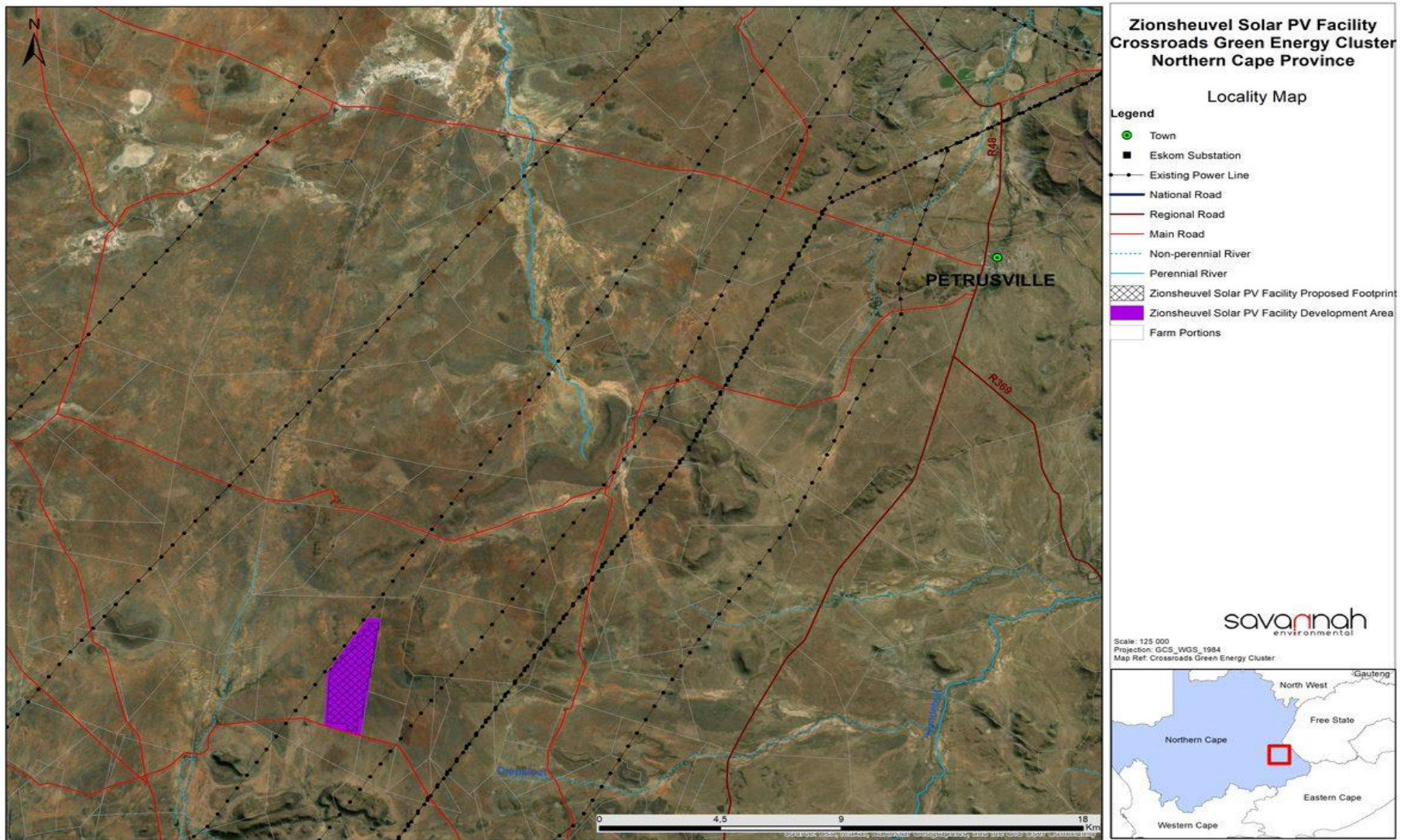
From a regional perspective, the Northern Cape Province, and particularly the area under investigation, is considered favourable for the development of a commercial solar facility by virtue of prevailing climatic conditions, relief, the extent of the affected properties, the availability of a direct 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.

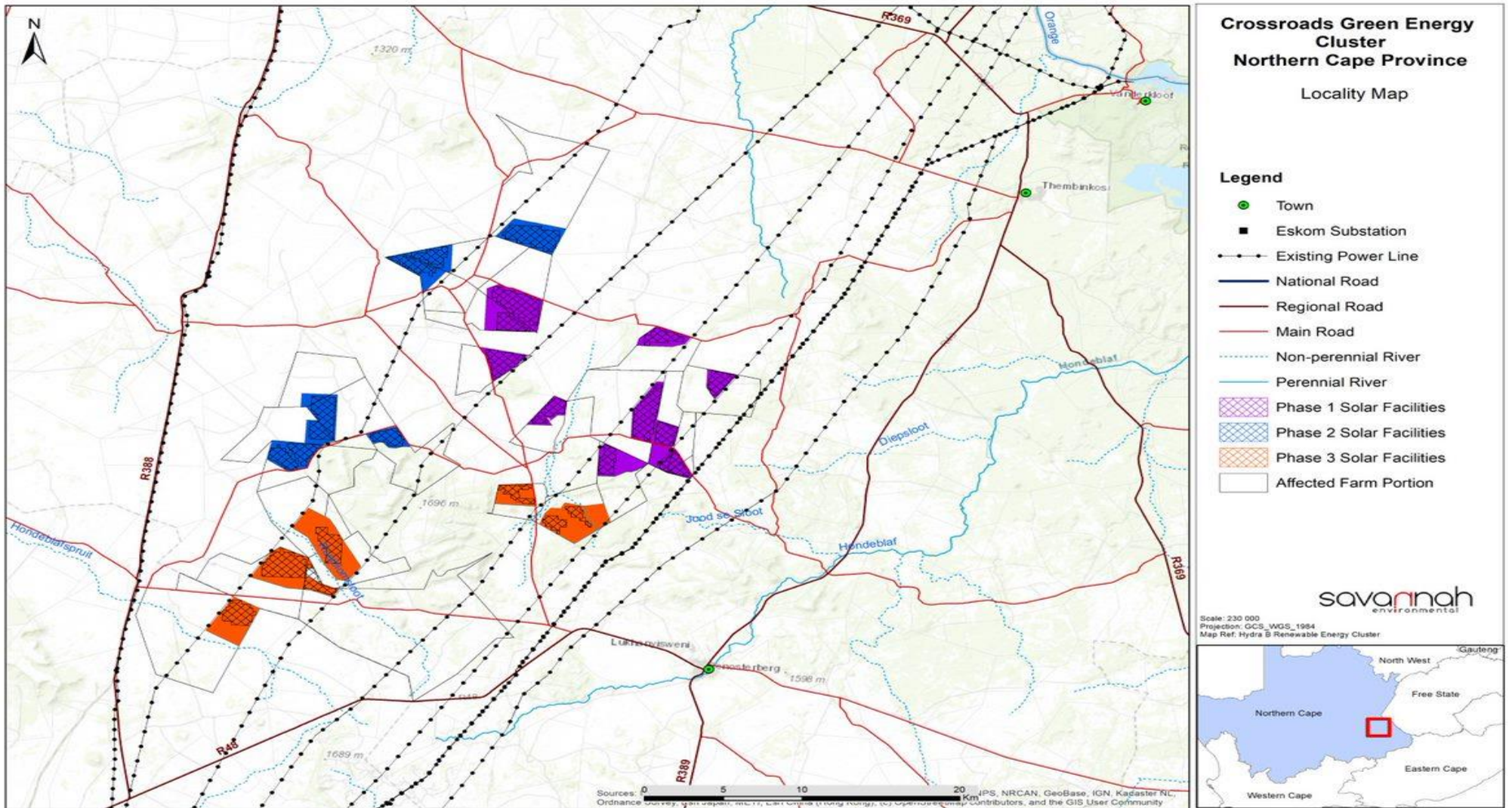
As the project has the potential to impact on the environment, an Environmental Authorisation (EA) is required from the Department of Forestry, Fisheries and the Environment (DFFE), the CA for the project, subject to the completion of a full Scoping and Environmental Impact Assessment (S&EIA), as prescribed in Regulations 21 to 24 of the 2014 EIA Regulations, as amended (GNR 326), as the project exceeds 20MW in capacity.





**Figure 1.1:** Locality map illustrating the location of the Zionsheuveel Solar PV Facility project site on Remainder of Farm Leeuwberg 79 (refer also to **Appendix N**).





**Figure 1.2:** Visual Representation of the EIA Processes to be undertaken for the Hydra B renewable energy cluster (Batch 1, Batch 2, and Batch 3) (refer also to **Appendix N**).

## 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
2(1)(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 <b>Section 1.5</b> . The Curriculum vitae of the Savannah Environmental team have been included as <b>Appendix A</b> .
2(1)(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 Zionsheuvell Solar PV Facility has been included as <b>Figure 1.1</b> . The details of the affected properties, including the property names and numbers, as well as the SG-codes are included in <b>Table 1.1</b> .
2(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 Zionsheuvell Solar PV Facility has been included in <b>Figure 1.1</b> . The centre point co-ordinates of the project site are included in <b>Table 1.1</b> .

This Scoping Report consists of nine chapters, which include:

- » **Chapter 1** provides background to the Zionsheuvell Solar PV Facility project and the environmental impact assessment process.
- » **Chapter 2** provides a description of the Zionsheuvell Solar PV Facility.
- » **Chapter 3** provides the site selection information and identified project alternatives.
- » **Chapter 4** provides the description of Solar PV as a power generation technology
- » **Chapter 5** outlines strategic regulatory and legal context for energy planning in South Africa
- » **Chapter 6** outlines the need and desirability of the Zionsheuvell Solar PV Facility.
- » **Chapter 7** outlines the process which was followed during the scoping phase of the EIA process.
- » **Chapter 8** describes the existing biophysical and social environment within and surrounding the study and development area.
- » **Chapter 9** provides an identification and evaluation of the potential issues associated with the proposed solar PV facility and associated infrastructure.
- » **Chapter 10** presents the conclusions of the scoping evaluation for the Zionsheuvell Solar PV Facility.
- » **Chapter 11** describes the Plan of Study (PoS) for the EIA phase.
- » **Chapter 12** provides references used to compile the Scoping Report.

### 1.3. Project Overview

The proposed facility will have a proposed contracted capacity of 240MW and will include the following infrastructure:

- » Solar PV array comprising PV modules and mounting structures (monofacial or bifacial and of fixed-tilt, single-axis tracking, and/or double-axis tracking PV technology)
- » Inverters and transformers
- » Cabling between the project components
- » Battery Energy Storage System (BESS)
- » On-site facility substation and power lines between the solar PV facility and the Eskom substation (to be confirmed and assessed through a separate process)
- » Site offices, Security office, operations and control, and maintenance and storage laydown areas
- » Access roads, internal distribution roads

A technically suitable project site of ~2964ha has been identified by the Applicant for the establishment of the Zionsheuvel Solar PV Facility.

**Table 1.1:** Detailed description of the project site.

<b>Province</b>	<b>Northern Cape Province</b>		
<b>District Municipality</b>	Pixley Ka Seme District Municipality		
<b>Local Municipality</b>	Renosterberg Local Municipality		
<b>Ward Number (s)</b>	Ward 4		
<b>Nearest town(s)</b>	Philipstown (20km north) and Petrusville (30km west)		
<b>Farm name(s) and number(s) of properties affected by the Solar PV Facility</b>	Remainder of Farm Leeuwberg 79		
<b>SG 21 Digit Code (s) for all properties</b>	N075C057000000000079000001		
<b>Current zoning</b>	Livestock Farming (mainly sheep farming)		
<b>Current land use</b>	Agriculture		
<b>Site Extent (Study Area)</b>	~2964ha		
<b>PV Development Area</b>	~498ha		
<b>Site Coordinates (project site)</b>		<b>Latitude:</b>	<b>Longitude:</b>
	Northern point	30°13'8.77"S	24°26'5.17"E
	Eastern point	30°15'15.08"S	24°25'51.01"E
	Western point	30°14'35.49"S	24°22'15.87"E
	Southern point	30°17'12.13"S	24°25'36.50"E
	Centre point	30°14'54.42"S	24°24'31.10"E

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

The overarching objective for the Zionsheuvel 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. The full extent of the development area has been considered within this Scoping Report

through site-specific specialist studies with the aim of determining the suitability from an environmental and social perspective and identifying areas that should be avoided in development planning. The exact location of the development area within the project site for the Zionsheuvell Solar PV Facility is not defined at this stage of the process. In order to evaluate the project, the following is considered through this Scoping/EIA process:

<b>Project site</b>	Remainder of Farm Leeuwberg 79 (~2964ha in extent).
Development area	The identified area (to be located within the project site) where the Zionsheuvell Solar PV Facility is planned to be positioned. This area will be selected as a practicable location option for the facility, considering technical preference and environmental constraints. The development area is ~498ha in extent and will be demarcated as a result of the findings of the Scoping phase.
Development footprint (facility layout)	The defined area (located within the development area) where the PV panel array and other associated infrastructure for the Zionsheuvell Solar PV Facility is planned to be constructed. This is the facility footprint, and the area which would be disturbed by project-related infrastructure. The development footprint will be confirmed in the EIA Phase.

The development footprint/facility layout for the 240MW PV facility, including a BESS, and all associated infrastructure, 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 240MW PV facility, and therefore provides the opportunity for the optimal placement of the infrastructure, ensuring avoidance of environmental sensitivities or constraints identified through this Scoping and EIA process.

#### 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:

- » **Carina de Ornelas** Junior Environmental Consultant and author of this report that has recently started her environmental career at Savannah Environmental. She holds a Bachelor of Arts in Environmental Management and intends to further her studies in the near future. She previously worked in retail as a supervisor for over 4 years and now has over 5 months of experience as a Junior Environmental Consultant whereby she has helped in drafting of scoping reports, basic assessment reports, EIAs and GIS mapping for reports.
- » **Nkhensani Masondo**, the principle EAP on this project is registered with the Environmental Assessment Practitioners Association of South Africa (EAPASA (2020/1385) and holds a BSocSci in Environmental Analysis and Management and is currently completing her MSc in Environmental Management. She has six (6) years of working experience in the environmental field and has gained extensive experience in conducting Environmental Impact Assessments, Stakeholder Engagements, Environmental Auditing and Environmental Management Plans Programmes for a wide range of 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** is the Environmental Assessment Practitioner (EAP) for this project. She holds a Master of Science Degree in Botany (M.Sc. Botany) from the University of the Witwatersrand and is registered as a Professional Natural Scientist (400024/2000) with the South African Council for Natural Scientific Professions (SACNASP) and a registered Environmental Assessment Practitioner (EAP) with the Environmental Assessment Practitioners Association of South Africa (EAPASA) (2019/726). She has over 20 years of experience in the field of environmental assessment and management, and the management of large environmental assessment and management projects. During this time, she has managed and coordinated a multitude of large-scale infrastructure EIAs, including those for solar PV developments, and is also well versed in the management and leadership of teams of specialist

consultants, and dynamic stakeholders. She has been responsible for providing technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, EIA studies, environmental permitting, public participation, EMPs and EMPs, environmental policy, strategy and guideline formulation, and integrated environmental management ("IEM"). Her responsibilities for environmental studies include project management, review and integration of specialist studies, identification and assessment of potential negative environmental impacts and benefits, and the identification of mitigation measures, and compilation of reports in accordance with applicable environmental legislation.

- » **Nicolene Venter.** She 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 Zionsheuvell Solar PV Facility, the following specialist consultants have provided input into this scoping report:

Company	Specialist Area of Expertise	Specialist Name
The Biodiversity Company	Ecology (flora & fauna), avifauna (Regime 2 monitoring), aquatic ecology	Andrew Husted Lindi Steyn
JG Africa	Traffic	Iris Wink
The Biodiversity Company	Soils and Agricultural Potential	Andrew Husted Ivan Baker
LOGIS	Visual	Lourens du Plessis Bryony van Niekerk
CTS Heritage	Heritage and Palaeontology	Jenna Lavin
Tony Barbour	Social	Tony Barbour

**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 Zionsheugel Solar PV Facility 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
2(1)(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, <b>Table 1.1</b> , as well as section 2.2.1 below.
2(1)(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 <b>Table 2.1</b> and <b>Table 2.2</b> .

### 2.2. Nature and Extent of the Zionsheugel 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, Crossroads Green Energy 1 (Pty) Ltd are proposing the development of a commercial solar facility and associated infrastructure to add new capacity to the national electricity grid. The Zionsheugel Solar PV Facility will be developed in a single phase and will have a contracted capacity of up to 240MW. 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.

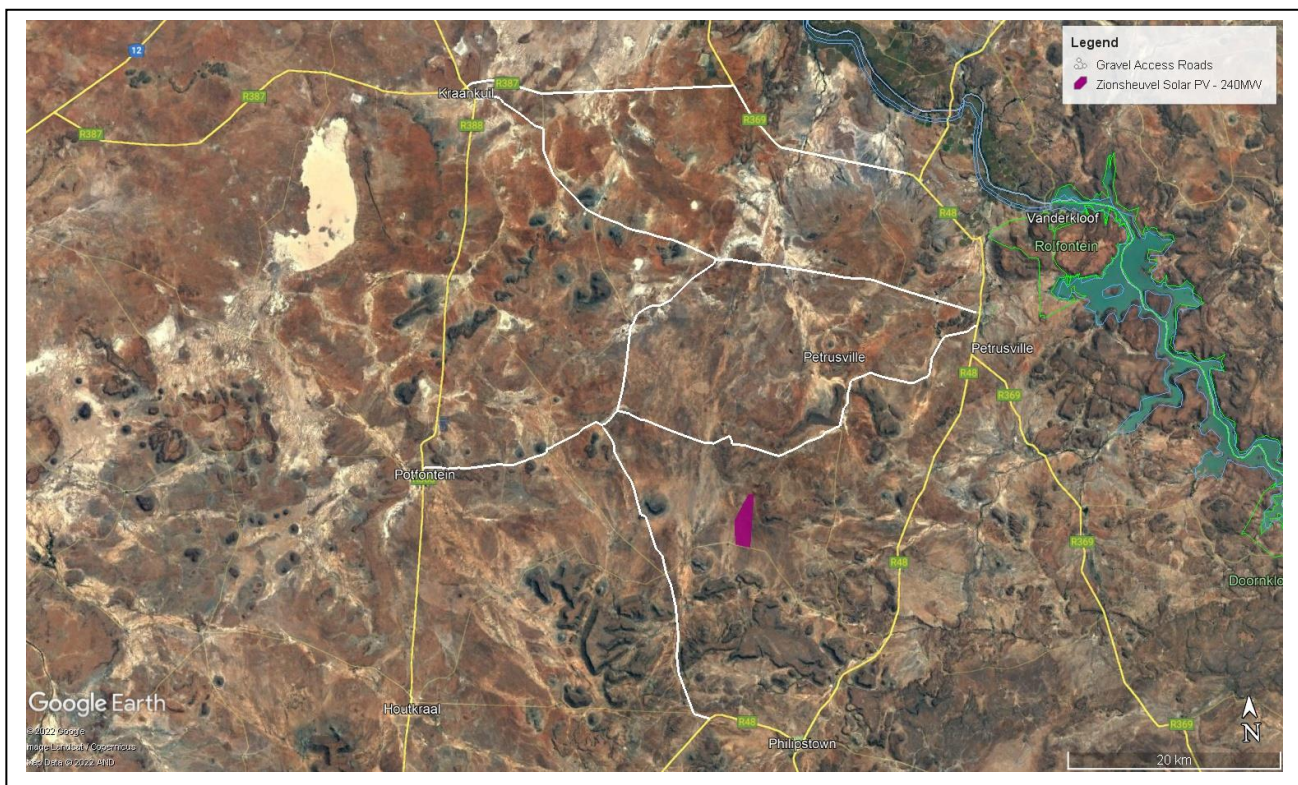
The Zionsheugel Solar PV Facility will comprise solar panels which, once installed, will stand less than 5m above ground level. The solar PV panels are mounted on either fixed tilt mounting structures or tracking systems and connected to each other to form PV arrays. Thanks to photoelectric effect, they generate direct electrical current when exposed to sunlight. Inverters convert the DC power generated by PV panels into AC power, and step-up transformers increase the AC voltage level, before it is fed into the grid

### 2.3. Overview of the Project Site



The project is to be developed within Remainder of Farm Leeuwberg 79 , located approximately 20km north of Philipstown and 30km west of Petrusville. The project site falls within Ward 4 of the Renosterberg Local Municipality in the greater Pixley Ka Seme District Municipality in the Northern Cape. The full extent of the development area (i.e., ~ 498ha), located within the project site (i.e., ~ 2964ha) has been considered within this Scoping Study, within which the Zionsheuve! Solar PV Facility will be appropriately located from a technical and environmental sensitivity perspective. 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.

The site is accessible via existing roads in the area. The proposed main access road to the site is an existing gravel road located off the R48 at Philipstown. An existing gravel road between the proposed site and Petrusville can be considered as an alternative access road. The proposed access road will link to the internal road network of the facility (refer to **Figure 2.1**).



**Figure 2.1:** Location of the gravel road and the R48 regional road in relation to the Zionsheuve! Solar PV Facility development area.

#### 2.4. Components of the Zionsheuve! Solar PV Facility

The project infrastructure will include:

- » Solar PV array comprising PV modules and mounting structures (monofacial or bifacial and a fixed tilt or single axis tracking system)
- » Inverters and transformers



- » Cabling between the project components
- » Battery Energy Storage System (BESS)
- » On-site facility substation and power lines between the solar PV facility and the Eskom substation (to be confirmed and assessed through a separate process)
- » Site offices, Security office, operations and control, and maintenance and storage laydown areas
- » Access roads, 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 0.1:** Details of infrastructures proposed as part of Zionsheugel Solar PV Facility. Specific details to be confirmed in the EIA phase.

Infrastructure	Footprint and dimensions
Contracted Capacity	Up to 240MW
Number of Panels	~ 510, 000 units of 540Wp panels or higher capacity panels if available.
Panel Height	Up to 5m from ground level
Technology	Use of fixed-tilt, single-axis tracking, and/or double-axis tracking PV technology. Monofacial or bifacial panels are both considered.
Battery Energy Storage System (BESS)	<ul style="list-style-type: none"> <li>» Standard 20ft HC ISO container with a capacity ranging from 200kWh to 2MWh</li> <li>» The total size of the Battery Energy Storage System will be determined at a later stage but could be up to 1 MWh per MW of solar PV, taking the assumption that 15% of daily consumption is stored resulting in a 240MWh BESS capacity.</li> <li>» The use of containerized battery storage solutions, which capacity ranges from 200kWh to 2MWh, and which size is 6,06 x 2,44 x 2,90m. Considering circa. 30m<sup>2</sup> footprint for a container, the total BESS footprint would be 1,15ha</li> </ul>
Other infrastructures	Operations building – Not Exceeding 500m <sup>2</sup> Workshop – Not Exceeding 500m <sup>2</sup> Stores - Not Exceeding 500m <sup>2</sup>
Area occupied by laydown area	Temporary laydown areas to be used in construction: 1ha/100MW Permanent laydowns that will be used in operation: 0,25ha from temporary laydown area
Area occupied by the solar array	Footprint of the infrastructure should be approx.390 ha PV modules area: 130ha Roads: to be determined in the EIA phase Buildings: to be determined in the EIA phase
Area occupied by the substations	Facility substation: Not exceeding 2ha.
Access and internal roads	A minimum required road width of 4 m needs to be maintained and all turning radii must conform with the specifications needed for the abnormal load vehicles and haulage vehicles. It needs to be ensured that the gravel sections of the haulage routes remain in good condition and will hence need to be maintained during the additional loading of the construction phase and then reinstated after construction is completed. The gravel roads will require grading with a grader to obtain a flat even surface and the geometric design of these gravel roads needs to be confirmed at detailed design stage. Main access road to the project site will be via the existing R48 gravel road. Internal access roads (gravel) of up to 8m in

Infrastructure	Footprint and dimensions
	width within a temporary 20 meter construction corridor will be required to access the PV facility.
Grid connection	The on-site substation will increase the voltage level from 33kV to 132kV or possibly up to 275kV for transmitting the generated electric power to the proposed central collector substation (or switching station), where several projects totalling a capacity up to 500MVA will connect. A new line will then run from the central collector substation and tie into the proposed Hydra B MTS via a double circuit, whether it will be an underground or overhead power line is dependent on the environmental sensitivities. The collector substation and the transmission line servitudes will be assessed as part of a separate Environmental Impact 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.

## 2.5. Project Development Phases Associated with the Zionsheugel Solar PV Facility

**Table 2.2** overleaf provides details regarding the requirements and the activities to be undertaken during the Zionsheugel Solar PV Facility development phases (i.e., construction phase, operation phase and decommissioning phase).

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

<b><u>Construction Phase</u></b>	
<b>Requirements</b>	<ul style="list-style-type: none"> <li>» 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) or a Connection and Wheeling Agreement with Eskom.</li> <li>» Expected to be 15-18 months for Zionsheuvell Solar PV Facility.</li> <li>» Create direct construction employment opportunities. Up to 300 employment opportunities will be created.</li> <li>» Temporary accommodation will be built on site for construction workers.</li> <li>» Overnight on-site worker presence would be limited to security staff.</li> <li>» A technician will be one on standby during the construction period.</li> <li>» All wastes, which cannot be reused, will be managed and disposed of in accordance with the local regulatory standards. All debris, spoilt materials, rubbish and other waste, shall be cleared from the site during construction and disposed of accordingly at Municipal designated dump/landfill sites for such wastes.</li> <li>» Electricity required for construction activities will be generated by a generator. Where low voltage connections are possible, these will be considered.</li> <li>» 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.</li> </ul>
<b>Activities to be undertaken</b>	
Conduct surveys prior to construction	<ul style="list-style-type: none"> <li>» Including, but not limited to: a geotechnical survey, site survey and confirmation of the panel micro-siting footprint, and survey of the on-site substation site to determine and confirm the locations of all associated infrastructure.</li> </ul>
Establishment of access roads to the Site	<ul style="list-style-type: none"> <li>» Main access to and Internal access roads within the site will be established at the commencement of construction.</li> <li>» 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.</li> <li>» Main access road will be approximately 8m wide and will be located within a 20m servitude to accommodate side drainage, etc.</li> <li>» Internal service road alignment will be approximately 8m wide. Location is to be determined by the final micro-siting or positioning of the PV panels.</li> </ul>
Undertake site preparation	<ul style="list-style-type: none"> <li>» 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.</li> <li>» Stripping of topsoil to be stockpiled, for use during rehabilitation.</li> <li>» Vegetation clearance to be undertaken in a systematic manner to reduce the risk of exposed ground being subjected erosion.</li> <li>» 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).</li> </ul>

Establishment of laydown areas and batching plant on site	<ul style="list-style-type: none"> <li>» A laydown area for the storage of PV panels components and civil engineering construction equipment.</li> <li>» The laydown will also accommodate building materials and equipment associated with the construction of buildings.</li> <li>» No borrow pits will be required. Infilling or depositing materials will be sourced from licenced borrow pits within the surrounding areas.</li> <li>» A temporary concrete batching plant of 50m x 50m in extent to facilitate the concrete requirements for foundations, if required.</li> </ul>
Construct foundation	<ul style="list-style-type: none"> <li>» Excavations to be undertaken mechanically.</li> <li>» For PV array installation vertical support posts will be driven into the ground.</li> <li>» Depending on geological conditions, the use of alternative foundations may be considered (e.g., screw pile, helical pile, micropile or drilled post/piles ).</li> </ul>
Transport of components and equipment to and within the site	<ul style="list-style-type: none"> <li>» 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.</li> <li>» 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.</li> <li>» 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.</li> </ul>
Erect PV Panels and Construct Substation, Invertors and BESS	<ul style="list-style-type: none"> <li>» 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.</li> <li>» For array installation, typically vertical support posts are driven into the ground. Depending on the results of the geotechnical study 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.</li> <li>» 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.</li> <li>» Wire harnesses connect the PV modules to the electrical collection systems.</li> <li>» 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.</li> </ul>
Connection of PV panels to the onsite substation	<ul style="list-style-type: none"> <li>» PV arrays to be connected to the on-site substation via underground electrical cables.</li> <li>» Excavation of trenches is required for the installation of the cables. Trenches will be approximately 1.5m deep.</li> <li>» Underground cables are planned to follow the internal access roads, as far as possible.</li> <li>» Onsite substation to be connected to the collector substation via overhead lines.</li> </ul>
Establishment of ancillary infrastructure	<ul style="list-style-type: none"> <li>» Site offices and maintenance buildings, including workshop areas for maintenance and storage will be required.</li> <li>» Establishment will require the clearing of vegetation, levelling, and the excavation of foundations prior to construction.</li> </ul>

Connect substation to the power grid	» A new 132kV single- or double-circuit power line will run from the project on-site substation to the cluster collector substation and tie into the proposed Hydra B MTS.
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**

<b>Requirements</b>	» Duration will be 30 years. » Requirements for security and maintenance of the project. » Employment opportunities relating mainly to operation activities and maintenance » Approximately 15 or up to 30 employees will be required during the operational phase of the larger Crossroads Green Energy Cluster. There will also be contractors and temporary workers.
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**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 two times a year during operation using clean water with no cleaning products or using 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.
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**Decommissioning Phase**

<b>Requirements</b>	» Decommissioning of the Zionsheuveel 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 30 years (with maintenance) before decommissioning is required. » Decommissioning activities to comply with the legislation relevant at the time.
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**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

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Post-decommissioning land use	» Following decommissioning of the facility, the project site will be returned to the current land use (i.e. agriculture: livestock farming, specifically sheep farming)
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## CHAPTER 3: CONSIDERATION OF ALTERNATIVES

This Chapter provides an overview of the various alternatives considered for Zionsheuvél 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
2(1)(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.
2(1)(h)(i) details of the alternative considered	The details of all alternatives considered as part of the Zionsheuvél Solar PV Facility are included in sections 3.3.1 – 3.3.5.
2(1)(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.
2(1)(h)(x) if no alternatives, including alternative locations for the activity were investigated, 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:

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

In this instance, ‘the project’ refers to Zionsheuvél Solar PV Facility, a solar energy facility with capacity of up to 240MW 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)<sup>2</sup>, 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 fundamental energy generation alternatives were assessed and considered within the development of the IRP and the need for the development of renewable energy projects as part of the country's energy mix has been defined. Therefore, fundamentally different alternatives to the proposed project are not considered within this S&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 Zionsheuvell 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 Zionsheuvell Solar PV Facility**

### **3.3.1. Property or Location Alternatives**

The proposed site for the Zionsheuvell Solar PV Facility is located west of the town Petrusville. The preferred project site for the development of the Zionsheuvell 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 Petrusville including:

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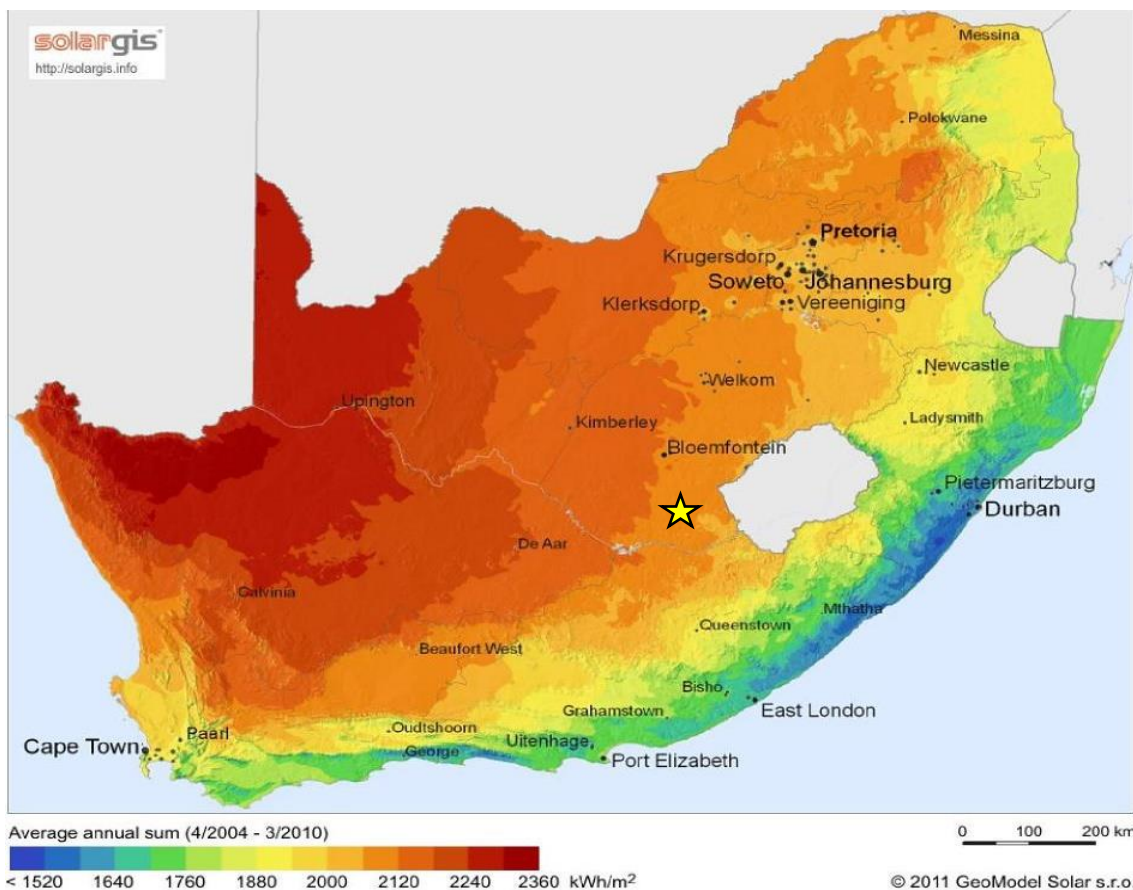
<sup>2</sup> The Integrated Resource Plan (IRP) is legislated policy which regulates power generation planning.



- » 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; and,
- » Site accessibility.

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.

- » **Solar resource:** Solar resource is the first main driver of site selection and property viability when considering the development of solar PV facilities in an area. The economic viability of a solar PV facility is directly dependent on the annual direct solar irradiation values of the area within which it will operate. The Global Horizon Irradiation (GHI) for the study area is in the region of approximately 2120 kWh/m<sup>2</sup>/annum (refer to **Figure 3.1**). The Northern Cape Province is considered to have high solar irradiation values which therefore enables the development of solar energy projects and the successful operation thereof. Based on the solar resource available, the area identified for development was considered feasible and no alternative locations are considered.



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

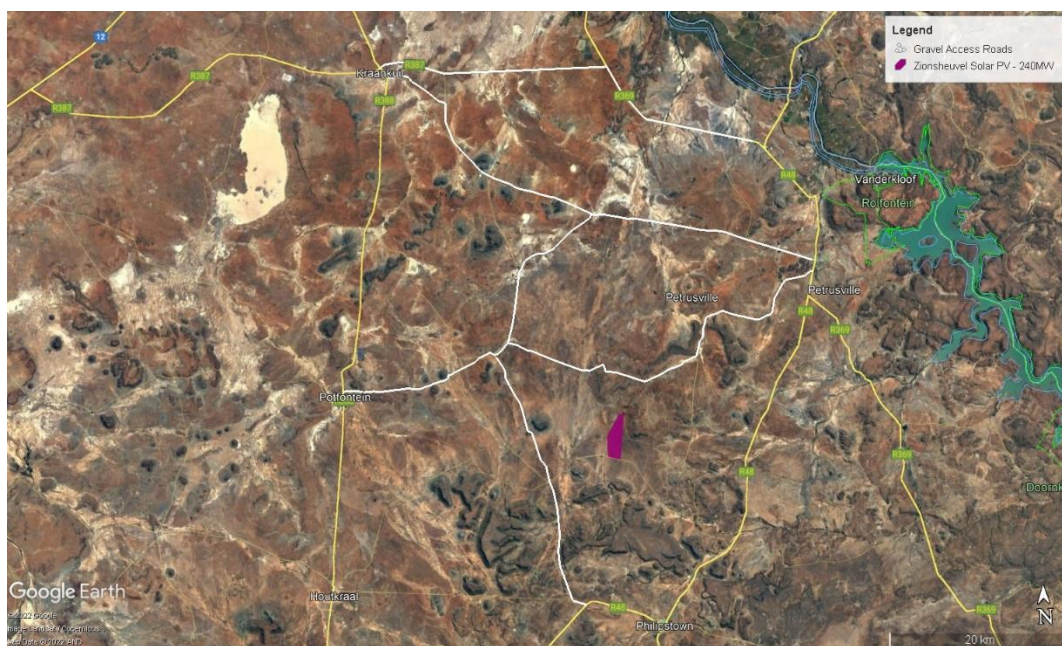
- » **Land availability:** In order to develop the Zionsheuevl Solar PV Facility with a contracted capacity of up to 240MW, sufficient space is required. The property included in the project site is a privately-owned parcel available in the area. The respective land is available for a development of this nature through agreement with the landowner and is deemed technically feasible by the project developer for such development to take place. The affected property has an extent of ~2964ha, which was considered by the developer as sufficient for the development of the Zionsheuevl Solar PV Facility. A preferred development area of ~498ha within this larger project site has been identified for the location of the 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 identified through the process.
- » **Landowner Support:** The selection of a site where the landowner is supportive of the development of renewable energy, and specifically solar PV, is essential for ensuring the success of the project. The landowner affected by the proposed Zionsheuevl Solar PV Facility does not view the development as a conflict with their current land use practices. The support from the landowner for the development to be undertaken on the affected property has been solidified by the provision of consent for the project to proceed on the property through the signing of consent forms for the EIA process and conclusion of a preliminary lease agreement with the developer.
- » **Land suitability and land use activities:** The current land use of the development area is an important consideration in site selection in terms of limiting disruption to existing land use practices. The project site is currently used for agriculture (livestock farming, specifically sheep farming), which is generally preferred for developments of this nature as the grazing activities can continue on the project site in tandem with the operation of the solar PV facility. There is no cultivated agricultural land on the project site or directly adjacent, which could be impacted upon by the proposed development. The proposed development is therefore considered to be compatible with the surrounding land uses and does not present a conflicting land use.
- » **Geographical and Topographical Considerations:** Sites that facilitate easy construction conditions, (i.e. relatively flat topography, lack of major rock outcrops, limited watercourse crossings, etc.) are favoured by developers during the site selection process. The slope percentage of the project area has been calculated and most of the area is characterised by a slope percentage between 0 and 2%. This indicates a uniform topography with gentle slopes being present within the project area. Steep slopes (> 4%) are associated with the mountains and ridges (Mesas and Inselbergs) located outside of the areas identified for development. The site is therefore considered suitable for the proposed development in terms of topographical considerations.
- » **Access to the National Electricity Grid:** A key factor in the siting of any power generation project is a viable grid connection. The Zionsheuevl Solar PV Facility has good access to the proposed Eskom-Hydra B MTS. Since the introduction of renewable generation within the Northern Cape, it was clear that the network will need to be strengthened to enable the integration and evacuation of renewable power out of the province to other parts of the country. The proposed Eskom-Hydra B MTS offers very good grid connectivity as many major transmission lines connect via the Eskom Hydra MTS to all parts of the country. A proposed new Main Transmission Substation (the Hydra B MTS Substation<sup>3</sup>), included in the last Eskom

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<sup>3</sup> The Hydra B MTS is the subject of a separate EIA application being undertaken by the Applicant on behalf of Eskom.

Transmission Development Plan and located to the south-west of the site was identified as the preferred grid connection point for the project.

**Site access:** The proposed main access road to the site is an existing gravel road located off the R48 between De Aar and Philipstown. An existing gravel road between the proposed site and Petrusville can be considered as an alternative access road, as shown in Figure 3.2. The proposed access road will link to the internal road network of the facility. The proposed access road to the development is deemed suitable as it is an existing gravel road. The gravel roads will require grading with a grader to obtain a flat even surface and the geometric design of these gravel roads needs to be confirmed at detailed design stage.



**Figure 3.2:** Proposed Access Road

Based on the above considerations, the Zionsheuvel Solar PV Facility 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 within the larger development area considered.

An overall environmental scoping sensitivity map has been provided within this report 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**

Zionsheugel Solar PV Facility is a renewable energy project owned by Crossroads Green Energy 2 (Pty) Ltd 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 using renewable energy resources.

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.

As detailed in the sections above, the project site is located near the town of Phillipstown in the Northern Cape Province which has the Global Horizon Irradiation (GHI) of approximately 2120 kWh/m<sup>2</sup>/annum. Based on available information, it is concluded by the Applicant that 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, no activity alternatives are considered within this Scoping Report.

### **3.3.4. Technology Alternatives**

Few technology options are available for solar facilities. 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. 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. For the same installed capacity, while trackers increase the production of a site by more than 15 to 25% over fixed-tilt, 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, Akuo Energy Afrique, Africoast Investments and Golden Sunshine Trading 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 be connected to centralised or string inverters. The project could include Battery Energy Storage System (BESS). The BESS capacity will depend on technology to be used and total installed capacity of solar, and it is expected to be up to 1 MWh per MW of solar PV facility.

### **3.3.5 The 'Do-Nothing' Alternative**

The 'Do-Nothing' alternative is the option of not constructing Zionsheugel 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 the current Applicant. This alternative will be assessed within the EIA Phase of the process.



## CHAPTER 4: SOLAR AS A POWER GENERATION TECHNOLOGY

Environmental pollution and the emission of CO<sub>2</sub> from the combustion of fossil fuels through the implementation of conventional power plants constitute a threat to the environment. The use of fossil fuels is reportedly responsible for ~70% of greenhouse gas emissions worldwide. The approach to addressing climate change needs to include a shift in the way that energy is generated and consumed. Worldwide, many solutions and approaches are being developed to reduce emissions. However, it is important to acknowledge that the most cost-effective solution in the short-term is not necessarily the least expensive long-term solution. This holds true not only for direct project costs, but also indirect project costs such as impacts on the environment. Renewable energy is considered a 'clean source of energy' with the potential to contribute greatly to a more ecologically, socially and economically sustainable future. The challenge however is to ensure that renewable energy projects are able to meet all economic, social and environmental sustainability criteria through the appropriate placement of these facilities.

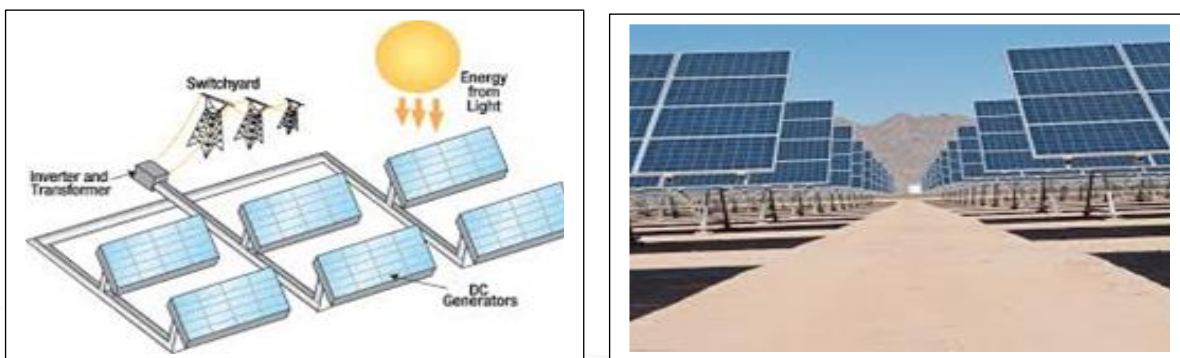
This chapter explores the use of solar energy as a means of power generation.

### 4.1. Solar PV System

Solar energy facilities which utilise PV technology use the energy from the sun to generate electricity through a process known as the **Photovoltaic Effect**. Generating electricity using the Photovoltaic Effect is achieved through the use of the following components:

#### Photovoltaic Modules

PV cells are made of crystalline silicon, the commercially predominant PV technology, that includes materials such as polycrystalline and monocrystalline silicon or thin film modules manufactured from a chemical ink compound. PV cells are arranged in multiples / arrays and placed behind a protective glass sheet to form a PV module (Solar Panel). 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)). When sunlight hits the PV panels free electrons are released and flow through the panels to produce direct electrical (DC) current. DC then needs to be converted to alternating current (AC) using an inverter before it can be directly fed into the electrical grid.



**Figure 4.1:** Overview of a PV cell, module and array / panel (Source: pveducation.com).

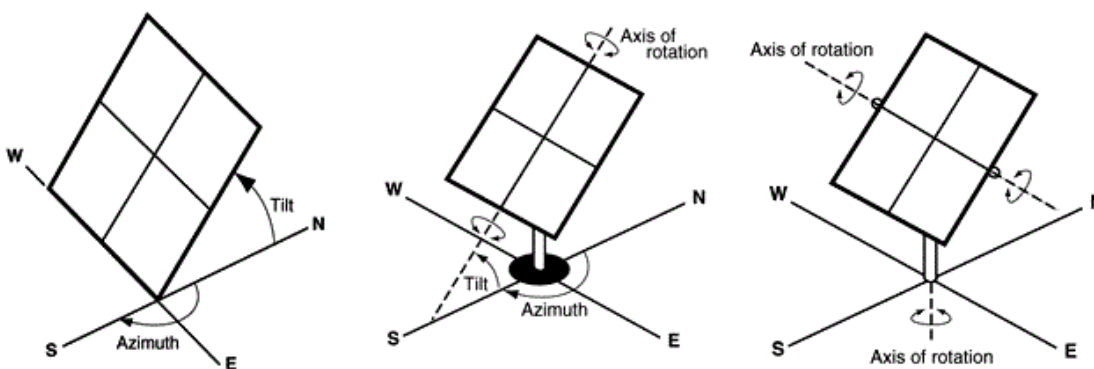


## Inverters

Inverters are used to convert electricity produced by the PV panels from DC into AC, to enable the facility to be connected to the national electricity grid. In order to connect a large solar facility such as the one being proposed to the national electricity grid, numerous inverters will be arranged in several arrays to collect, and convert power produced by the facility.

## Support Structures

PV panels will be fixed to a support structure. PV panels can either utilise fixed / static support structures, or alternatively they can utilise single or double axis tracking support structures. 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.



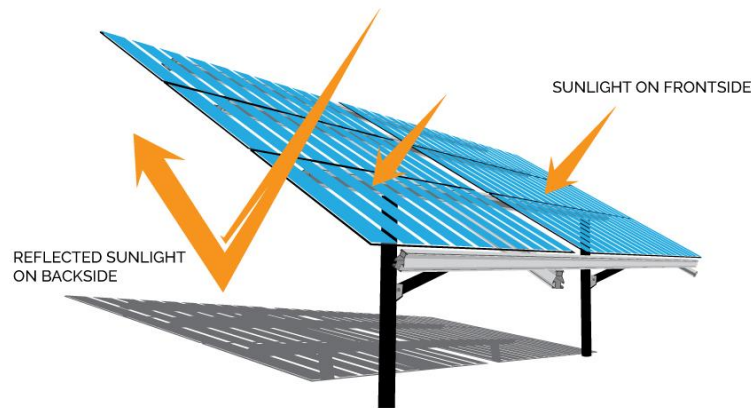
**Figure 4.2:** Overview of different PV tracking systems (from left to right: fixed-tilt, single-axis tracking, and double-axis tracking (Source: pveducation.com)).

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

## Bifacial Solar Panel Technology

Bifacial (“two-faced”) modules produce solar power from both sides of the panel. Traditional solar panels capture sunlight on one light-absorbing side. The light energy that cannot be captured is simply reflected away. Bifacial solar panels have solar cells on both sides, which enables the panels to absorb light from the back and the front (refer to Figure 4.3). Practically speaking, this means that a bifacial solar panel can absorb light reflected off the ground or another material. In general, more power can be generated from bifacial modules for the same area, without having to increase the development footprint.

The optimum tilt for a bifacial module has to be designed so as to capture a big fraction of the reflected irradiation. Use of trackers is recommended so the modules can track the sun's movement across the sky, enabling them to stay directed to receive the maximum possible sunlight to generate power.



**Figure 4.3:** Diagram showing how bifacial Solar PV panels work (Source: <https://sinovoltaics.com/learning-center/solar-cells/bifacial-solar-modules/>)

### **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 of electricity may not necessarily occur during the daytime. The BESS is also designed to reduce the variability of photovoltaic (PV) power output, where the battery adds power to the PV output (or subtracts) to smooth out the high frequency components of the PV power that occur during periods with transient cloud shadows on the PV array. 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 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)





**Figure 4.1:** Photographs of the construction phase of a solar facility similar to those proposed

## CHAPTER 5: 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 Zionsheuvél 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.

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

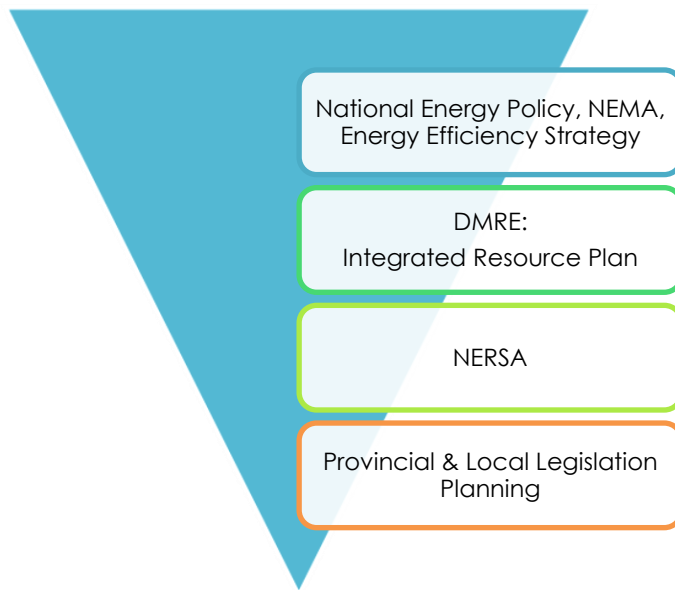
This chapter of the Scoping Report includes the following information required in terms of Appendix 3: Scope of Assessment and Content of Environmental Impact Assessment Report:

Requirement	Relevant Section
2(1)(e) a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.	Chapter 5, 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 Zionsheuvél Solar PV Facility is proposed is included in <b>sections 5.3, 5.4, 5.5 and 5.6.</b>

### 5.2 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 5.1**. 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 Zionsheuvél 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 5.1: 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. DFFE is the Competent Authority for this project (as per GN R779 of 01 July 2016) and is charged with granting the EA for the project under consideration.
- » **The South African Heritage Resources Agency (SAHRA):** SAHRA is a statutory organisation established under the National Heritage Resources Act (No. 25 of 1999) (NHRA), as the national administrative body responsible for the protection of South Africa's cultural heritage.
- » **South African National Roads Agency Limited (SANRAL):** This Agency is responsible for the regulation and maintenance of all national road routes.
- » **Department of Water and Sanitation (DWS):** 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:

- » **Northern Cape Department of Economic Development and Tourism:** The Department's mission is to accelerate the economic growth and development of the Northern Cape Province through diversification, empowerment, employment, business creation and sustainable development.
- » **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.
- » **Northern Cape Heritage Resources Authority (NCHRA):** This department is responsible for the identification and management of heritage resources in the Northern Cape, which, in a provincial context, have special significance.

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 **Renosterberg 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.

### 5.3 International Policy and Planning Context

A brief review of the most relevant international policies relevant to the establishment of the Zionsheugel Solar PV Facility are provided below in **Table 5.1**. The Zionsheugel 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 5.1:** International policies relevant to the Zionsheugel Solar PV Facility

Relevant policy	Relevance to the Zionsheugel Solar PV Facility
United Nations Framework Convention on Climate Change (UNFCCC) and Conference of the Party (COP)	<p>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.</p> <p>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.</p> <p>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.</p>



Relevant policy	Relevance to the Zionsheugel Solar PV Facility
	<p>The Paris Agreement sets out that every 5 years countries must set out increasingly ambitious climate action. This meant that, by 2020, countries needed to submit or update their plans for reducing emissions, known as nationally determined contributions (NDCs). The COP26 summit held on 2021 brought parties together to accelerate action towards the goals of the Paris Agreement and the UN Framework Convention on Climate Change. On 13 November 2021, COP26 concluded in Glasgow with all countries agreeing the Glasgow Climate Pact to keep 1.5°C alive and finalise the outstanding elements of the Paris Agreement.</p> <p>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.</p> <p>The policy provides support for the Zionsheugel 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.</p>
<p>The Equator Principles IV (October 2020)</p>	<p>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 Zionsheugel Solar PV Facility) and apply globally to all industry sectors.</p> <p>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 Zionsheugel 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.</p> <p>The Zionsheugel 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.</p>

Relevant policy	Relevance to the Zionsheugel Solar PV Facility
<p>International Finance Corporation (IFC) Performance Standards and Environmental and Social Sustainability (January 2012)</p>	<p>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.</p> <p>Performance Standard 1 requires that a process of environmental and social assessment be conducted, and 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.</p> <p>Given the nature of the Zionsheugel 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.</p>

#### 5.4 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. According to the IPP Procurement Programme overview report (2021), as at March 2021, 6 422MW of renewable energy capacity from 112 independent power producers (IPPs) has been procured in seven bid rounds<sup>4</sup>, with 5 078MW from 79 IPP projects operational and made available to the grid<sup>5</sup>. 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 5.2**. The development of Zionsheugel 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 5.2:** Relevant national legislation and policies for Zionsheugel Solar PV Facility

<sup>4</sup> Bid windows 1, 2, 3, 3.5, 4 and small BW1(1S2) and small BW2(2S2). 2 583 MW of renewable energy capacity was awarded to IPPs in the REIPPPP bid window 5 in October 2021. 860MW of renewable energy capacity (all solar PV) was awarded to IPPs in the REIPPPP bid window 6 in December 2022.

<sup>5</sup><https://www.cliffedekkerhofmeyr.com/en/news/publications/2019/Corporate/energy-alert-22-october-The-Integrated-Resource-Plan-2019-A-promising-future-roadmap-for-generation-capacity-in-South-Africa.html>

Relevant legislation or policy	Relevance to Zionsheuveel Solar PV Facility
<p>Constitution of the Republic of South Africa, 1996</p>	<p>Section 24 of the Constitution pertains specifically to the environment. It states that everyone has the right to an environment that is not harmful to their health or well-being, and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.</p> <p>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.</p>
<p>National Environmental Management Act (No. 107 of 1998) (NEMA)</p>	<p>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.</p> <p>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.</p> <p>The need for responsible and informed decision-making by government on the acceptability of environmental impacts is therefore enshrined within NEMA.</p>
<p>National Energy Act (No. 34 of 2008)</p>	<p>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.</p> <p>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 Zionsheuveel Solar PV Facility will have to ensure compliance with this Act as a license for the generation of electricity will be required.</p>
<p>White Paper on the Energy Policy of the Republic of South Africa (1998)</p>	<p>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.</p>

Relevant legislation or policy	Relevance to Zionsheuve Solar PV Facility
	<p>The policy states that the advantages of RE include, minimal environmental impacts during operation in comparison with traditional supply technologies, generally lower running costs, and high labour intensities. Disadvantages include higher capital costs in some cases, lower energy densities, and lower levels of availability, depending on specific conditions, especially with sun and wind-based systems. Nonetheless, renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future.</p>
<p>White Paper on the Renewable Energy Policy of the Republic of South Africa (2003)</p>	<p>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.</p> <p>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.</p> <p>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.</p>
<p>The Electricity Regulation Act (No. of 2006)</p>	<p>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. Projects developed by IPPs which exceed 100MW in capacity are required to obtain a Generation License from the National Energy Regulator of South Africa (NERSA).</p>
<p>Integrated Energy Plan (IEP), 2016</p>	<p>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:</p> <ul style="list-style-type: none"> <li>» To guide the development of energy policies and, where relevant, set the framework for regulations in the energy sector.</li> <li>» 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).</li> <li>» To guide investment in and the development of energy infrastructure in South Africa.</li> <li>» 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.</li> </ul>

Relevant legislation or policy	Relevance to Zionsheuveel Solar PV Facility
	<p>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, developments in new technologies and changes in national priorities and imperatives, amongst others.</p> <p>The 8 key objectives of the integrated energy planning process are as follows:</p> <ul style="list-style-type: none"> <li>» Objective 1: Ensure security of supply.</li> <li>» Objective 2: Minimise the cost of energy.</li> <li>» Objective 3: Promote the creation of jobs and localisation.</li> <li>» Objective 4: Minimise negative environmental impacts from the energy sector.</li> <li>» Objective 5: Promote the conservation of water.</li> <li>» Objective 6: Diversify supply sources and primary sources of energy.</li> <li>» Objective 7: Promote energy efficiency in the economy.</li> <li>» Objective 8: Increase access to modern energy.</li> </ul>
<p>Integrated Resource Plan for Electricity (IRP) 2010-2030</p>	<p>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.</p> <p>The promulgated IRP 2010–2030 identified the preferred generation technology required to meet expected demand growth up to 2030. It incorporated government objectives such as affordable electricity, reduced greenhouse gas (GHG) emissions, reduced water consumption, diversified electricity generation sources, localisation and regional development.</p> <p>Since the promulgated IRP 2010–2030, the following capacity developments have taken place:</p> <ul style="list-style-type: none"> <li>» A total 6 422 MW under the Renewable Energy Independent Power Producers Programme (REIPPPP) has been procured, with 3 876 MW operational and made available to the grid as of 31 March 2021<sup>6</sup> with 5 078MW from 79 IPP projects operational and made available to the grid<sup>7</sup>.</li> <li>» 2 000MW of generating capacity (comprising various technologies) has been awarded to 8 Independent Power Producers under the RMIPPPP in March 2021.</li> <li>» 2 583MW of electricity in bid window 5 of the REIPPPP, announced on 28 October 2021 (DMRE, 2021).</li> <li>» IPPs have commissioned 1 005 MW from two Open Cycle Gas Turbine (OCGT) peaking plants.</li> </ul>

<sup>6</sup> Bid windows 1, 2, 3, 3.5, 4 and small BW1(1S2) and small BW2(2S2). 2 583 MW of renewable energy capacity was awarded to IPPs in the REIPPPP bid window 5 in October 2021. 860MW of renewable energy capacity (all solar PV) was awarded to IPPs in the REIPPPP bid window 6 in December 2022.

<sup>7</sup><https://www.cliffedekkerhofmeyr.com/en/news/publications/2019/Corporate/energy-alert-22-october-The-Integrated-Resource-Plan-2019-A-promising-future-roadmap-for-generation-capacity-in-South-Africa.html>

Relevant legislation or policy	Relevance to Zionsheuve Solar PV Facility
	<p>» Under the Eskom build programme, the following capacity has been commissioned:</p> <ul style="list-style-type: none"> <li>* 1 332 MW of Ingula pumped storage, 1 588 MW of Medupi, 800 MW of Kusile and</li> <li>* 100 MW of Sere Wind Farm.</li> </ul> <p>» 18 000MW of new generation capacity has been committed to.</p> <p>Besides capacity additions, a number of assumptions have changed since the promulgation of IRP 2010–2030. Key assumptions that changed include the electricity demand projection, Eskom's existing plant performance, as well as new technology costs. In addition, environmental considerations such as South Africa's contribution to Greenhouse gases which contribute to climate change, local air quality and water availability have come to the fore.</p> <p>These considerations necessitated the review and update of the IRP and ultimately the promulgation of a revised plan in October 2019. In terms of the IRP 2019, South Africa continues to pursue a diversified energy mix that reduces reliance on a single or a few primary energy sources. In the period prior to 2030, the system requirements are largely for incremental capacity addition (modular) and flexible technology, to complement the existing installed inflexible capacity. South Africa is a signatory to the Paris Agreement on Climate Change and has ratified the agreement. In line with INDCs (submitted to the UNFCCC in November 2016), South Africa's emissions are expected to peak, plateau and from year 2025 decline.</p> <p>Following consideration of all these factors, the following provision has been made for the following new capacity by 2030:</p> <ul style="list-style-type: none"> <li>» 1 500MW of coal;</li> <li>» 2 500MW of hydro;</li> <li>» 6 000MW of solar PV;</li> <li>» 14 400MW of wind;</li> <li>» 1 860MW of nuclear;</li> <li>» 2 088MW of storage;</li> <li>» 3 000MW of gas/diesel; and</li> <li>» 4 000MW from other distributed generation, co-generation, biomass and landfill technologies.</li> </ul> <p>Development of the Zionsheuve Solar PV Facility project would contribute towards the allocation for solar energy development.</p>
<p>New Growth Path (NGP) Framework, 23 November 2010</p>	<p>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.</p> <p>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.</p>



Relevant legislation or policy	Relevance to Zionsheugel Solar PV Facility
<p>National Development Plan 2030 (2012)</p>	<p>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.</p> <p>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:</p> <ul style="list-style-type: none"> <li>» 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.</li> <li>» Social equity through expanded access to energy at affordable tariffs and through targeted, sustainable subsidies for needy households.</li> <li>» Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change.</li> </ul> <p>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.</p> <p>The NDP aims to provide a supportive environment for growth and development, while promoting a more labour-absorbing economy. The development of Zionsheugel 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.</p>
<p>Strategic Integrated Projects (SIPs)</p>	<p>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.</p> <p>SIP 8 of the energy SIPs supports the development of RE projects as follows:                  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.</p> <p>The development of Zionsheugel 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.</p>
<p>National Climate Change Response Policy, 2011</p>	<p>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</p>

Relevant legislation or policy	Relevance to Zionsheuveel Solar PV Facility
	<p>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.</p> <p>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 Depository.</p> <p>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.</p> <p>The policy provides support for Zionsheuveel 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.</p>
<p>Climate Change Bill, 2018</p>	<p>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.</p> <p>Zionsheuveel Solar PV Facility comprises a renewable energy generation Facility and would not result in the generation or release of emissions during its operation.</p>
<p>National Biodiversity Economy Strategy (NBES) (March 2016)</p>	<p>The biodiversity economy of South Africa encompasses the businesses and economic activities that either directly depend on biodiversity for their core business or that contribute to conservation of biodiversity through their activities. The commercial wildlife and the bioprospecting industries of South Africa provide cornerstones for the biodiversity economy and are the focus of this strategy.</p> <p>Both the wildlife and bioprospecting sub-sectors of the biodiversity economy have already demonstrated the potential for significant future development and growth. In the study commissioned on the situational analysis of the biodiversity economy, the contribution of the biodiversity economy to the national economy can be measured in terms of Gross Domestic Product (GDP), with the wildlife and bioprospecting industries contributing approximately R3 billion to GDP in 2013. Growth in the wildlife and bioprospecting industries can make a significant impact on the national economy, while contributing to national imperatives such as job creation, rural development and conservation of our natural resources.</p> <p>The Wildlife Industry value chain is centred on game and wildlife farming/ranching activities that relate to the stocking, trading, breeding, and hunting of game, and all the services and goods required to support this value chain. The key drivers of this value chain include domestic hunters, international hunters and a growing retail market</p>

Relevant legislation or policy	Relevance to Zionsheuve Solar PV Facility
	<p>demand for wildlife products such as game meat and taxidermy products. This sector is therefore characterised by an interesting combination of agriculture, eco-tourism and conservation characteristics.</p> <p>Over the period 2008-2013, the total Wildlife Industry market grew by more than 14% per year. This growth comprised an average annual growth exceeding 6% in domestic hunting, a decrease in international hunting, and an exponential growth in live auction sales. It is considered likely that the consolidated Wildlife Industry has the potential to experience a weighted average annual growth rate of between 4 %-14 % per year up to 2030.</p> <p>In order for the wildlife and bioprospecting sub-sectors of the biodiversity economy to achieve its full potential, a strategic partnership between the state, private sector and communities is required. To this end, a National Biodiversity Economy Strategy (NBES) is required to guide the sustainable growth of the wildlife and bioprospecting industries and to provide a basis for addressing constraints to growth, ensuring sustainability, identifying clear stakeholder's responsibilities and monitoring progress of the Enabling Actions.</p> <p>The Vision of NBES is to optimise the total economic benefits of the wildlife and bioprospecting industries through its sustainable use, in line with the Vision of the Department of Environmental Affairs. The purpose of NBES is to provide a 14-year national coordination, leadership and guidance to the development and growth of the biodiversity economy.</p> <p>NBES has set an industry growth goal stating that by 2030, the South African biodiversity economy will achieve an average annualised GDP growth rate of 10% per annum. This envisioned growth curve extends into the year 2030 and is aligned to the efforts of the country's National Development Plan, Vision 2030. The NBES seeks to contribute to the transformation of the biodiversity economy in South Africa through inclusive economic opportunities, reflected by a sector which is equitable - equitable access to resources, equitable and fair processes and procedures and equitable in distribution of resources (i.e. business, human, financial, indigenous species, land, water) in the market.</p> <p>To address these transformation NBES imperatives, NBES has the principles of:</p> <ul style="list-style-type: none"> <li>» Conservation of biodiversity and ecological infrastructure</li> <li>» Sustainable use of indigenous resources</li> <li>» Fair and equitable beneficiation</li> <li>» Socio-economic sustainability</li> <li>» Incentive driven compliance to regulation</li> <li>» Ethical practices</li> <li>» Improving quality and standards of products.</li> </ul> <p>The NBES provides the opportunity to redistribute South Africa's indigenous biological/genetic resources in an equitable manner, across various income categories and settlement areas of the country. The NBES has prioritised nodes in the country for biodiversity economy transformation, referred to as BET nodes. NBES prioritises 18 BET nodes, 13 rural and 5 urban districts across the nine provinces of the country, with communities having been prioritised for development of small and medium size</p>

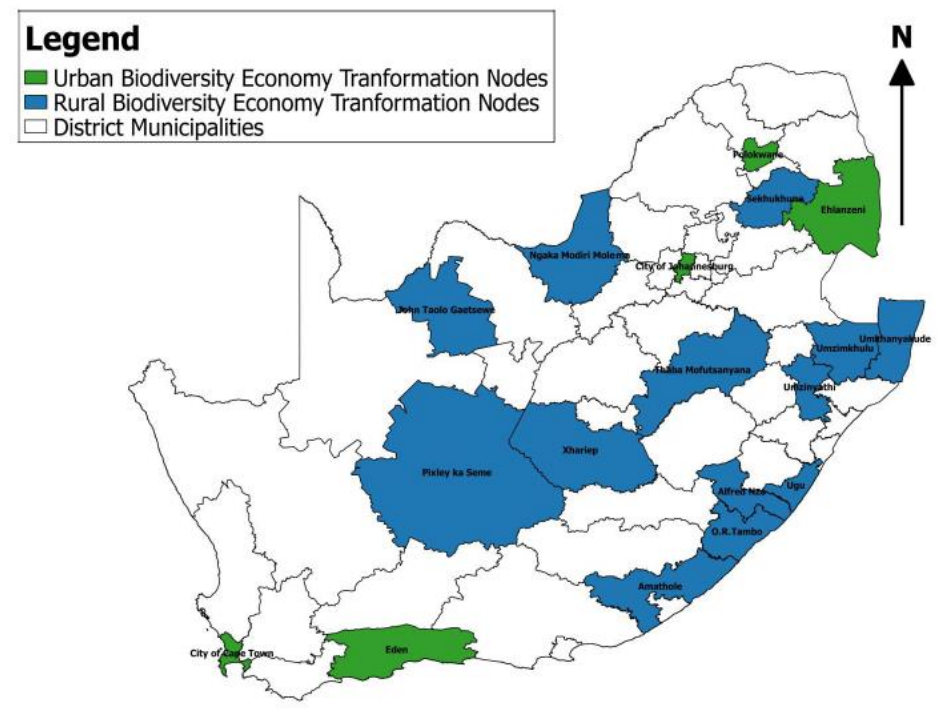
Relevant legislation or policy	Relevance to Zionsheuve! Solar PV Facility
	<p>enterprises and community-based initiatives which sustainably use of indigenous biological and/or genetic resources. The Pixley Ka Seme District Municipality within which the Zionsheuve! Solar PV Facility is proposed is identified as a Rural Biodiversity Economy Transformation Node.</p> 

Figure 5.2: Hierarchy of electricity and planning documents

### 5.4 Provincial Planning and Context

A brief review of the most relevant provincial policies is provided below in **Table 5.2**. The proposed development is considered to align with the aims of these policies, even if contributions to achieving the goals therein are only minor.

**Table 5.2:** Relevant provincial legislation and policies for Zionsheuve! Solar PV Facility

Relevant policy	Relevance to Zionsheuve! Solar PV Facility
<p>Northern Cape Province Provincial Growth and Development Strategy (PDP), 2020- 2025</p>	<p>The Northern Cape Provincial Growth and Development Strategy (NCPGDS) identifies poverty reduction as the most significant challenge facing the government and its partners. All other societal challenges that the province faces emanate predominantly from the effects of poverty. The NCPGDS notes that the only effective way to reduce poverty is through long-term sustainable economic growth and development. The sectors where economic growth and development can be promoted include:</p> <ul style="list-style-type: none"> <li>» Agriculture and Agro processing.</li> <li>» Fishing and Mariculture.</li> <li>» Mining and mineral processing.</li> <li>» Transport.</li> <li>» Manufacturing.</li> <li>» Tourism.</li> </ul>

Relevant policy	Relevance to Zionsheugel Solar PV Facility
	<p>However, the NCPGDS also notes that economic development in these sectors also requires:</p> <ul style="list-style-type: none"> <li>» Creating opportunities for lifelong learning.</li> <li>» Improving the skills of the labour force to increase productivity.</li> <li>» Increasing accessibility to knowledge and information.</li> </ul> <p>The achievement of these primary development objectives depends on the achievement of a number of related objectives that, at a macro-level, describe necessary conditions for growth and development. These are:</p> <ul style="list-style-type: none"> <li>» Developing requisite levels of human and social capital.</li> <li>» Improving the efficiency and effectiveness of governance and other development institutions.</li> <li>» Enhancing infrastructure for economic growth and social development.</li> </ul> <p>Of specific relevance to the SIA the NCPGDS makes reference to the need to ensure the availability of inexpensive energy. The section notes that in order to promote economic growth in the Northern Cape the availability of electricity to key industrial users at critical localities at rates that enhance the competitiveness of their industries must be ensured. At the same time, the development of new sources of energy through the promotion of the adoption of energy applications that display a synergy with the province's natural resource endowments must be encouraged. <i>In this regard the NCPGDS notes "the development of energy sources such as solar energy, the natural gas fields, bio-fuels, etc., could be some of the means by which new economic opportunity and activity is generated in the Northern Cape"</i>. The NCPGDS also highlights the importance of close co-operation between the public and private sectors in order for the economic development potential of the Northern Cape to be realised.</p> <p>The NCPGDS also highlights the importance of enterprise development and notes that the current level of private sector development and investment in the Northern Cape are low. In addition, the province also lags in the key policy priority areas of SMME Development and Black Economic Empowerment. The proposed solar energy Facility therefore has the potential to create opportunities to promote private sector investment and the development of SMMEs in the Northern Cape Province.</p> <p>In this regard, care will need to be taken to ensure that the proposed development and associated renewable energy facilities do not negatively impact on the regions natural environment. In this regard, the NCPGDS notes that the sustainable utilisation of the natural resource base on which agriculture depends is critical in the Northern Cape with its fragile eco-systems and vulnerability to climatic variation. The document also indicates that due to the provinces exceptional natural and cultural attributes, it has the potential to become the preferred adventure and ecotourism destination in South Africa.</p> <p>The overall energy objective for the province is to promote 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. With the developed and proposed independent power producer capacity (including the Zionsheugel Solar PV Facility), the</p>

Relevant policy	Relevance to Zionsheugel Solar PV Facility
<p>Northern Cape Provincial Spatial Development Framework (SDF) (2016) – Published 2017</p>	<p>province will produce its own electrical power needs from renewable energy resources (although this energy will be fed into the national grid).</p> <p>Northern Cape Provincial Spatial Development Framework (NCSDf) (2012) lists a number of sectoral strategies and plans that are to be read and treated as key components of the PSDf. Of these there are a number that are relevant to the proposed STPs. These include:</p> <ul style="list-style-type: none"> <li>» Sectoral Strategy 1: Provincial Growth and Development Strategy of the Provincial Government.</li> <li>» Sectoral Strategy 2: Comprehensive Growth and Development Programme of the Department of Agriculture, Land Reform and Rural Development.</li> <li>» Sectoral Strategy 5: Local Economic Development (LED) Strategy of the Department of Economic Development and Tourism.</li> <li>» Sectoral Strategy 11: Small Micro Medium Enterprises (SMME) Development Strategy of the Department of Economic Development and Tourism.</li> <li>» Sectoral Strategy 12: Tourism Strategy of the Department of Economic Development and Tourism.</li> <li>» Sectoral Strategy 19: Provincial renewable energy strategy (to be facilitated by the Department of Economic Development and Tourism).</li> </ul> <p>Section C8.2.3, Energy Objectives, sets out the energy objectives for the Northern Cape Province. The section makes specific reference to renewable energy. Of relevance the objectives include:</p> <ul style="list-style-type: none"> <li>» Promote the development of renewable energy supply schemes. Large-scale renewable energy supply schemes are strategically important for increasing the diversity of domestic energy supplies and avoiding energy imports while minimizing detrimental environmental impacts.</li> <li>» In order to reinforce the existing transmission network and to ensure a reliable electricity supply in the Northern Cape, construct a 400 kV transmission power line from Ferrum Substation (near Kathu/Sishen) to Garona Substation (near Groblershoop). There is a national electricity supply shortage, and the country is now in a position where it needs to commission additional plants urgently. Consequently, renewable energy projects are a high priority.</li> <li>» Develop and institute innovative new energy technologies to improve access to reliable, sustainable, and affordable energy services with the objective to realize sustainable economic growth and development. The goals of securing supply, providing energy services, tackling climate change, avoiding air pollution, and reaching sustainable development in the province offer both opportunities and synergies which require joint planning between local and provincial government as well as the private sector.</li> <li>» Develop and institute energy supply schemes with the aim to contribute to the achievement of the targets set by the White Paper on Renewable Energy (2003).</li> </ul> <p>Section C8.3.3, Energy Policy, sets out the policy guidelines for the development of the energy sector, with specific reference to the renewable energy sector.</p> <ul style="list-style-type: none"> <li>» The construction of telecommunication infrastructure must be strictly regulated in terms of the spatial plans and guidelines put forward in the PSDf. They must be carefully placed to avoid visual impacts on landscapes of significant symbolic,</li> </ul>



Relevant policy	Relevance to Zionsheugel Solar PV Facility
	<p>aesthetic, cultural or historic value and should blend in with the surrounding environment to the extent possible.</p> <ul style="list-style-type: none"> <li>» EIAs undertaken for such construction must assess the impacts of such activities against the directives listed in (a) above.</li> <li>» Renewable energy sources such as wind, solar, thermal, biomass and domestic hydroelectricity are to constitute 25% of the province's energy generation capacity by 2020.                     <ul style="list-style-type: none"> <li>* The following key policy principles for renewable energy apply.</li> <li>* Full cost accounting: Pricing policies will be based on an assessment of the full economic, social and environmental costs and benefits of energy production and utilisation.</li> <li>* Equity: There should be equitable access to basic services to meet human needs and ensure human well-being. Each generation has a duty to avoid impairing the ability of future generations to ensure their own well-being.</li> <li>* Global and international cooperation and responsibilities: Government recognises its shared responsibility for global and regional issues and act with due regard to the principles contained in relevant policies and applicable regional and international agreements.</li> <li>* Allocation of functions: Government will allocate functions within the framework of the Constitution to competent institutions and spheres of government that can most effectively achieve the objectives of the energy policy.</li> <li>* The implementation of sustainable renewable energy is to be promoted through appropriate financial and fiscal instruments.</li> <li>* An effective legislative system to promote the implementation of renewable energy is to be developed, implemented, and continuously improved.</li> <li>* Public awareness of the benefits and opportunities of renewable energy must be promoted.</li> <li>* The development of renewable energy systems is to be harnessed as a mechanism for economic development throughout the province in accordance with the Sustainable Development Initiative (SDI) approach (refer to Toolkit D10) or any comparable approach.</li> <li>* Renewable energy must, first, and foremost, be used to address the needs of the province before being exported</li> </ul> </li> </ul> <p>The development of the proposed PV Facility and its associated grid connection infrastructure will contribute to economic growth and development, which will in turn help eradicate poverty through job creation and skills development in the region which will be in line with the Northern Cape SDF.</p>
<p>Northern Cape Climate Change Response Strategy (2017)</p>	<p>The key aspects of the PCCRS 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 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 wild fire, with heightened requirements for effective disaster management".</p>

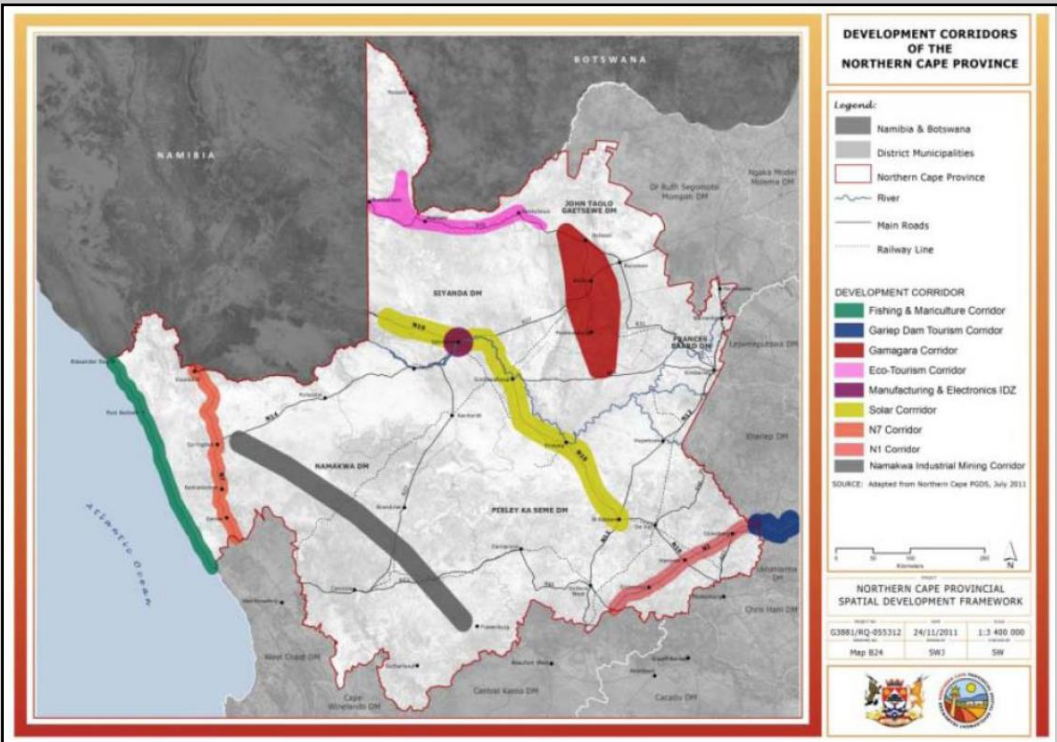
Relevant policy	Relevance to Zionsheuve Solar PV Facility
	<p>Key points from MEC's address include the NCPG's commitment to develop and implement policy in accord with the National Green Paper for the National Climate Change Response Strategy (2010), and an acknowledgement of the NCP's extreme vulnerability to climate-change driven desertification. The development and promotion of a provincial green economy, including green jobs, is identified 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 MEC also indicated that the NCP was involved in the processing a number of WEF and Solar Energy Facility EIA applications.</p> <p>This is due to RE sources having considerable potential for increasing security of supply by diversifying the energy supply portfolio and increasingly contributes towards a long-term sustainable energy future. In terms of environmental impacts, RE results in the emission of less GHGs than fossil fuels, as well as fewer airborne particulates, and other pollutants. Furthermore, RE generation technologies save on water consumption in comparison with coal-fired power plants.</p>
<p>Northern Cape Province Green Document (2017-2018)</p>	<p>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 50 km 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 WEFs. 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, the collectively hold a tremendous potential for socio-economic upliftment.</p> <p>Key issues identified with regard to improving the potential beneficial impact of IPPs in the NCP include:</p> <ul style="list-style-type: none"> <li>» Local community members abusing project benefits for personal gain.</li> <li>» Difficulty in outreach to local community beneficiaries due to high local illiteracy levels.</li> <li>» A lack of business skills generally hampers the successful establishment of local small enterprises which could benefit from projects.</li> <li>» Community benefit obligations are currently met in a piecemeal and uncoordinated fashion.</li> <li>» Anticipated community benefits are often frustrated by inadequate engagement and insufficient ongoing consultation.</li> <li>» The scarcity of people skilled in maths and sciences in local communities hampers meaningful higher-level local skills development and employment.</li> <li>» Insufficient support from local municipalities for IPP development.</li> </ul> <p>The Northern Cape Province Green Document aims at building a sustainable economy to eradicate poverty and improve social development. The proposed Zionsheuve Solar PV Facility will contribute to growth and development of the local area by expanding the economic base and creating employment opportunities.</p>

## 5.5 Local Policy and Planning Context

The local tiers of government relevant to the Zionsheuvél Solar PV Facility project are in the Renosterberg- and Emthanjeni- Local Municipality, within 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 Zionsheuvél Solar PV Facility. These include, economic growth, job creation, community upliftment and poverty alleviation.

**Table 5.3:** Relevant district and local legislation and policies for Zionsheuvél Solar PV Facility

Relevant policy	Relevance to Zionsheuvél Solar PV Facility
<p>Pixley Ka Seme District Municipality Integrated Development Plan (IDP), 2017-2022</p>	<p>The vision for the PKSDM is "Developed and Sustainable District for Future Generations"</p> <p>To mission statement that underpins the vision is:</p> <ul style="list-style-type: none"> <li>» Supporting our local municipalities to create a home for all in our towns, settlements, and rural areas to render dedicated services.</li> <li>» Providing political and administrative leadership and direction in the development planning process.</li> <li>» Promoting economic growth that is shared across and within communities.</li> <li>» Promoting and enhancing integrated development planning in the operations of our municipalities.</li> <li>» Aligning development initiatives in the district to the National Development Plan.</li> </ul> <p>The Strategic Objectives to address the vision that are relevant to the project includes the promotion of economic growth in the district and enhance service delivery. Chapter 4, Development of Strategies, highlights the key strategies of the PKSDM. The promotion of economic development is the most relevant strategy for the project. 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.</p> <p>The IDP notes that the economy in the Pixley Ka Seme municipal area is characterized by:</p> <ul style="list-style-type: none"> <li>» High levels of poverty and low levels of education.</li> <li>» Low levels of development despite the strategic location in terms of the national transport corridors.</li> <li>» High rate of unemployment, poverty and social grant dependence.</li> <li>» Prone to significant environmental changes owing to long-term structural changes (such as climate change, energy crises and other shifts).</li> </ul> <p>Of specific relevance the IDP highlights the potential for renewable energy to help address some of these challenges.</p> <p>The implementation of Zionsheuvél Solar PV Facility would therefore contribute positively towards local economic development, as well as the creation of new job opportunities within the Pixley Ka Seme District Municipality.</p>
<p>Pixley Ka Seme District Municipality Spatial Development</p>	<p>The SDF (2014) notes that the vision for the PKSDM is "Pixley Ka Seme DM, pioneers of development, a home and future for all". The Mission Statement that underpins the vision refers to:</p> <ul style="list-style-type: none"> <li>» Effective and efficient service delivery.</li> <li>» Optimal human and natural resource development.</li> </ul>

Relevant policy	Relevance to Zionsheuvel Solar PV Facility
<p>Framework (2014)</p>	<ul style="list-style-type: none"> <li>» Local economic growth and development, job creation and poverty alleviation.</li> <li>» A vibrant tourism industry.</li> <li>» To participate in the fight to reduce the infection rate and lessen the impact of HIV/ Aids and other communicable diseases.</li> <li>» A safe, secure and community friendly environment.</li> </ul> <p>The SDF identifies the opportunities and constraints associated with the district. Of relevance to the project the opportunities include:</p> <p>Renewable Energy and the identification of a renewable energy hub in the region. The natural environment and maintenance and conservation of the pristine natural environment to support sustainable farming into the future is also identified as an opportunity. The SDF notes that Pixley Ka Seme District area with its abundance of sunshine and vast tracts of available land has attracted considerable interest from solar energy investors. The high solar index of the area provides many opportunities in terms of the development of renewable energy. This has been acknowledged by the Northern Cape Government with the identification of the Renewable Energy Hub. The areas around the northern and eastern borders of the Pixley Ka Seme District Municipality form part of this hub with the potential to stimulate special economic development zoned within the area that have the potential to stimulate industrial development.</p> <p>The PKSDM also falls within the Solar Development Corridor as identified in the Northern Cape Provincial Spatial Development Framework. The corridor extends from Kakamas to Upington and down to De Aar in the south-east (Figure 5.3). Section 5.6.1 of the SDF also refers to the establishment of a Renewable Energy Hub proposed for the Northern Cape stretching from the west coast right up to the De Aar region (Figure 5.4). The Hub can accommodate special economic development within the zone as earmarked and entails a 100km wide zone. The proposed project is located within the corridor and proposed hub.</p> 

**Figure 5.3:** Northern Cape Development Corridors-Solar Corridor (yellow) » (Source: Northern Cape SDF)

Relevant policy

Relevance to Zionsheuvell Solar PV Facility

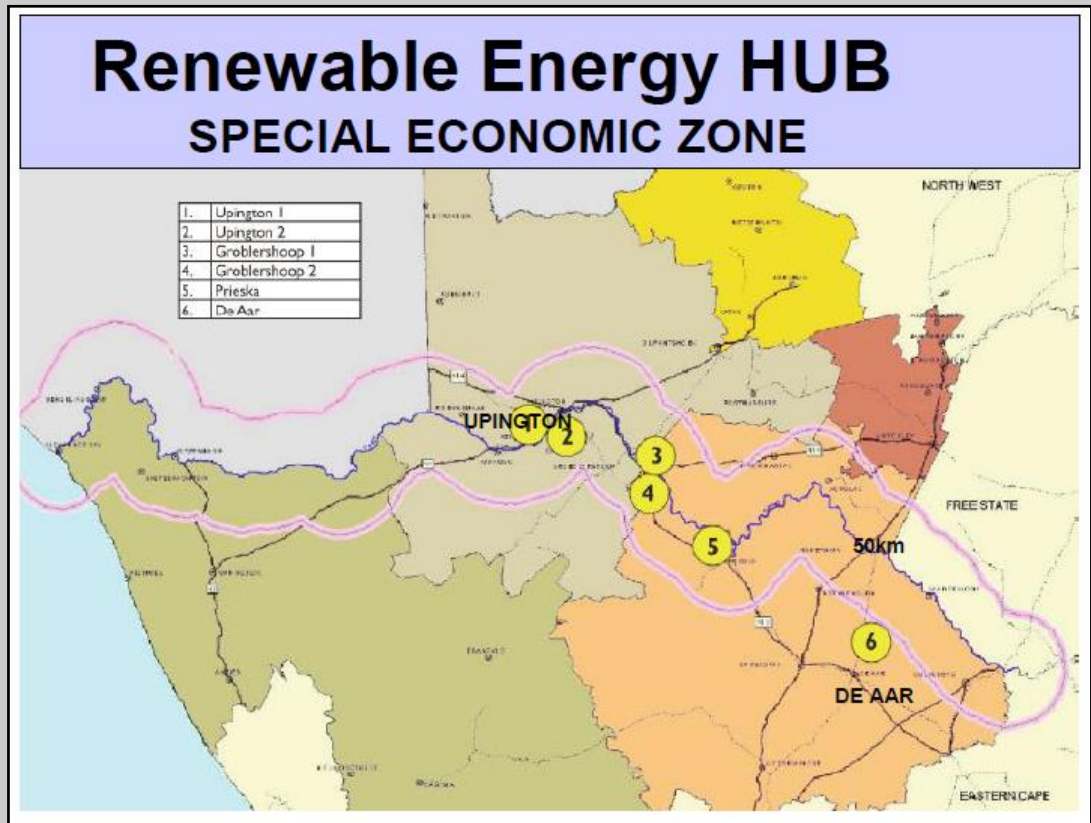


Figure 5.4: Renewable Energy Hub SED (Source: Northern PKSDM SDF)

The SDF does however also note that the area is known for its clean air and open skies with limited light pollution. Potential visual impacts are therefore an issue that needs to be considered.

In this regard the SDF notes that the topography of Pixley Ka Seme region is one of its main assets with vast open spaces and unspoilt panoramic visual vistas stretching over great distances. This asset makes for excellent scenic drives throughout the whole of the region from the flat plains to crossing the main rivers of South Africa. Visual vistas, ridges and “koppies” are assets within the region and they must be handled with sensitivity.

The relevant constraints include high levels of poverty and unemployment, backlog in basic services, including electricity and housing in rural areas, the limited supply of water and overall scarcity of water in the region to support economic development.

The development challenges that face the Pixley Ka Seme District Municipality include high unemployment and poverty rates and low income which are placing increasing demand on service delivery because very few people are able to pay for services. Declining population numbers, and alcohol and substance abuse are also key challenges.

In terms of services, inadequate schools in farming areas results in children having to travel long distances to areas where they go to school. There are also insufficient health centres and lack of amenities and recreational services. Where these services do exist, they are often poorly managed and maintained. The level of key services, such as refuse removal, are also low, while many rural and a number of urban households rely on boreholes for their water supply.



Relevant policy	Relevance to Zionsheuvl Solar PV Facility
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Climate change is also identified as a key risk. The SDF notes that the Karoo is predicted to experience more drought periods, coupled with increased evaporation and temperatures and this will negatively impact already restricted water supply. It is likely that the greatest impacts will be on water supply.

A copy of the latest five-year IDP (2017-2021) for the RLM was not available at the time preparing the Scoping Report. This is likely linked to the dissolution of RLM by the Northern Cape Provincial Government on 7 September 2020. A statement by the Premier of the Northern Cape, Dr. Zamai Saul (7 September 2020) noted that the “Renosterberg Local Municipality has been plagued with political and administrative challenges and failing to fulfil the prescripts of Chapter 7 as enshrined in Section 152 of the Constitution”. The statement also note that the intervention efforts made by the Departments of Cooperative Governance, Human Settlements and Traditional Affairs (CoGHSTA), Provincial Treasury and the Pixley Ka Seme District Municipality and the respective MECs to monitor and provide support to Renosterberg local municipality had not succeeded. The Municipal Council has also failed to implement and support the National Treasury discretionary Financial Recovery Plan that commenced in 2018 and was on-going until November 2019.

The information on the RLM is therefore based on the information contained in the Pixley Ka Seme District SDF 2013 - 2018 Sixth Draft May 2014.

The locality of the RLM along the southern bank of the Gariep (Orange) River provides a sustainable water resource and creates a number of development opportunities in terms of tourism and agriculture. Development opportunities are also supported by close locality of Philipstown to the N10 and N1 as major transport routes that cross the Pixley Ka Seme District Municipal Area. The municipal area consists of the towns of Petrusville, Philipstown and Vanderkloof (Figure 5.5). The administrative centre is Petrusville.

Renosterberg  
Local  
Municipality  
Integrated  
Development  
Plan (2017- 2021)

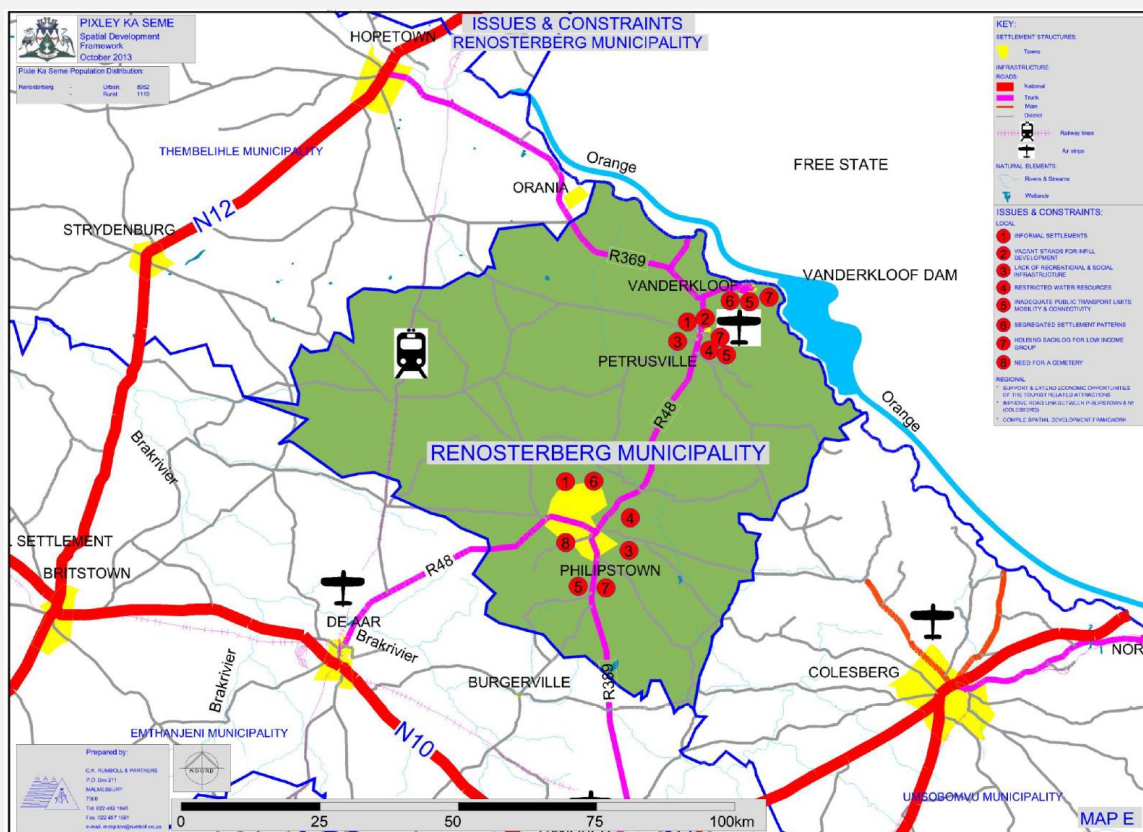


Figure 5.5: Renosterberg Local Municipality



Relevant policy	Relevance to Zionsheugel Solar PV Facility
	<p>The small town of Petrusville is located on the northern part of the of the Renosterberg Municipal area, near the Vanderkloof Dam and functions as a service centre for the surrounding farming areas. The economic opportunities for the town are linked to expanding its role at the areas administrative centre and capitalising on the proximity of the Vanderkloof Dam and the N1 (to the east) and N12 (to the west). The socio-economic challenges include water shortages during the dry months, shortage of lower income housing and lack of recreational and social facilities. The construction of a pipeline from the Vanderkloof Dam has been identified as a solution to address the water issue. The tourism potential of the town and surrounding area is linked to the local church museum, farm stays and hunting. There are also a number of San Rock Art site and historical Boer War trenches in the area.</p> <p>Philipstown is located on the southern section of the Renosterberg Municipal area, to the northeast of De Aar. The economic opportunities for the town are linked to the proximity of the N1 (to the east), N12 (to the west) and N10 (to the south). The socio-economic challenges include high levels of youth unemployment, water shortages during the dry months, shortage of lower income housing and lack of recreational and social facilities. The construction of a pipeline from the Vanderkloof Dam has been identified as a solution to address the water issue. The tourism potential of the town and surrounding area is linked to farm stays and hunting. There are also a number of San Rock Art sites in the area.</p> <p>Vanderkloof is located on the southern bank of the Vanderkloof Dam in the northern section of the Renosterberg Municipal area. The main focus of the town is for residential and recreational purposes and the town is a well-established holiday resort town. The tourism potential of the town and the surrounding area are linked to the water sports activities in the Vanderkloof Dam (boating, swimming, fishing etc), and the Vanderkloof and Rolfontein Nature Reserves. The socio-economic challenges include a shortage of lower income housing units.</p>
<p>Emthanjeni Local Municipality Integrated Development Plan</p>	<p>The Emthanjeni Local Municipality (ELM) borders onto the southern boundary of the Renosterberg Local Municipality (RLM) and is a category B municipality consisting of three towns, namely, De Aar, Britstown and Hanover. The vision of the RLM is "Leading sustainable development for inclusive economic growth". The mission statement linked to the vision is "To create a viable economic development plan that is relevant to the characteristics of the Emthanjeni Municipal area, designed to create and maintain a sound and healthy local economy, drawing upon local strengths and resources. This will be achieved through:</p> <ul style="list-style-type: none"> <li>» Strategic partnerships and collaboration.</li> <li>» Effective stakeholder communications.</li> <li>» Supporting existing businesses and encourage the expansion and repositioning of desirable commercial and industrial uses.</li> <li>» To increase the number of farms or agricultural land in the community.</li> </ul> <p>The Integrated Development Plan (IDP) refers to the national economic pillars adopted on the National Framework for Local Economic Development in South Africa which launched in 2014. The pillars are aligned to the main thrusts and opportunities within RLM to ensure an integrated approach for optimal rate of implementation and economic development in the municipality. The five pillars are:</p> <ul style="list-style-type: none"> <li>» Pillar 1: Building a Diverse Economic Base.</li> <li>» Pillar 2: Developing learning and skilful economies.</li> <li>» Pillar 3: Developing Inclusive Economies.</li> <li>» Pillar 4: Enterprise Development and Support.</li> <li>» Pillar 5: Economic Governance and Infrastructure.</li> </ul>

Relevant policy	Relevance to Zionsheuve Solar PV Facility
	<p>Pillars 1, 2, 3 and 4 are relevant to the proposed development.</p> <p><u>Pillar 1: Building a Diverse Economic Base</u>                      The first pillar focuses on building a diverse economic base and growing the local economy through industrial and sector-specific (e.g., Tourism, Mining, Agriculture, Manufacturing, etc.).</p> <p><u>Pillar 2: Developing learning and skilful economies</u>                      The IDP notes that addressing the skills gap and improving skills levels is critical to the to the successful implementation of all the other pillars, as increased skills lead to increased opportunities for stimulating local economies.</p> <p><u>Pillar 3: Developing Inclusive Economies</u>                      Creating decent work and sustainable livelihoods improves the living standards and ensures a dignified existence for individuals.</p> <p><u>Pillar 4: Enterprise Development and Support</u>                      The IDP highlights the importance of supporting economic development and creating a diverse economic sector. The need to support SMMEs is also noted.</p> <p>The development of the project will support these pillars, specifically the SED and ED spend linked to the project. The IDP also lists 7 Key Performance Areas (KPAs) of which KPA 1: Basic Services and Infrastructure Development, KPA 5: Local Economic Development and KPA 7: Social Development, are relevant to the project.</p> <p>The IDP highlights the importance to the renewable energy sector and refers to a number of IPP projects located in the RLM and PKSDM.</p>

## 5.6. Conclusion

From a review of the relevant policy and planning framework, it was concluded that the project is well aligned with the policy framework, and a clear need for the project is seen from a policy perspective at a local, provincial, and National level.

## CHAPTER 6: 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 of the scoping report provides an overview of the need and desirability, and perceived benefits of the project specifically. These will be further investigated in the EIA Phase of the process and informed by the outcomes of the assessment of potential impacts associated with the project.

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

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

Requirement	Relevant Section
2(1)(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 Zionsheugel 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.

### 6.2 Need and Desirability from an Energy Perspective

Electricity is essential for most human activities and for South Africa's social and economic development. The development of large-scale electricity generation projects contributes towards security of supply and assists in minimising the costs of energy. In order for the benefits associated with electricity to be realised, it needs to be readily available, easily accessible, and affordable. It should also be generated in a sustainable manner, while minimising adverse social and environmental impacts. In addition to energy provision, large-scale electricity generation projects, such as solar facilities, have the ability to contribute positively to the creation of skilled, unskilled, and semi-skilled employment opportunities and mitigate climate change.

An increased supply of electricity within or to an area is also considered beneficial from a development perspective as the availability of electricity and other services can act as a pull factor attracting new development and industry.

### 6.3 Need and Desirability from an International Perspective

The need and desirability of Zionsheugel 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 goal being to ensure access to affordable, reliable, sustainable and modern energy for all. The following targets and indicators have been set for Goal 7:

Targets	Indicators
7.1 By 2030, ensure universal access to affordable, reliable and modern energy services.	7.1.1 Proportion of population with access to electricity. 7.1.2 Proportion of population with primary reliance on 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 Zionsheugel Solar PV Facility would contribute positively towards Goal 7 of the SDGs through the following:

- » By generating up to 240MW (contracted capacity) of affordable and clean energy. Solar power 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 Zionsheugel Solar PV Facility 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 Zionsheugel 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.

## 6.4 Need and Desirability from a National Perspective

South Africa has experienced 15 years of intermittent black-outs and in the recent months, the country has yet again faced a considerable shortage in the availability and stability of electricity supply. Following the energy crisis in 2008, South African Government started to introduce renewable energy developments on a large scale and further enhanced the promotion of energy efficiency in all sectors to meet the demand of energy while reducing CO<sub>2</sub> emissions and creating jobs<sup>8</sup>. As a consequence, significant investment in renewable energy and energy efficient technologies is required. Increasing the diversity of South Africa's electricity mix is important, not only for enhancing the crucially important security of supply of the country, but also to support job creation and mitigate climate change.

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.

South Africa needs to build about 40 000MW of new generation capacity by 2025 to meet demand requirements. According to the IRP 2019, 17 742MW should be provided by renewable energy projects. To achieve this, the government plans to install a total of 17GW of wind energy, 8288MW of solar photovoltaic energy, and 600 MW of concentrated solar power by 2030.

Zionsheuvel 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 Zionsheuvel 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:

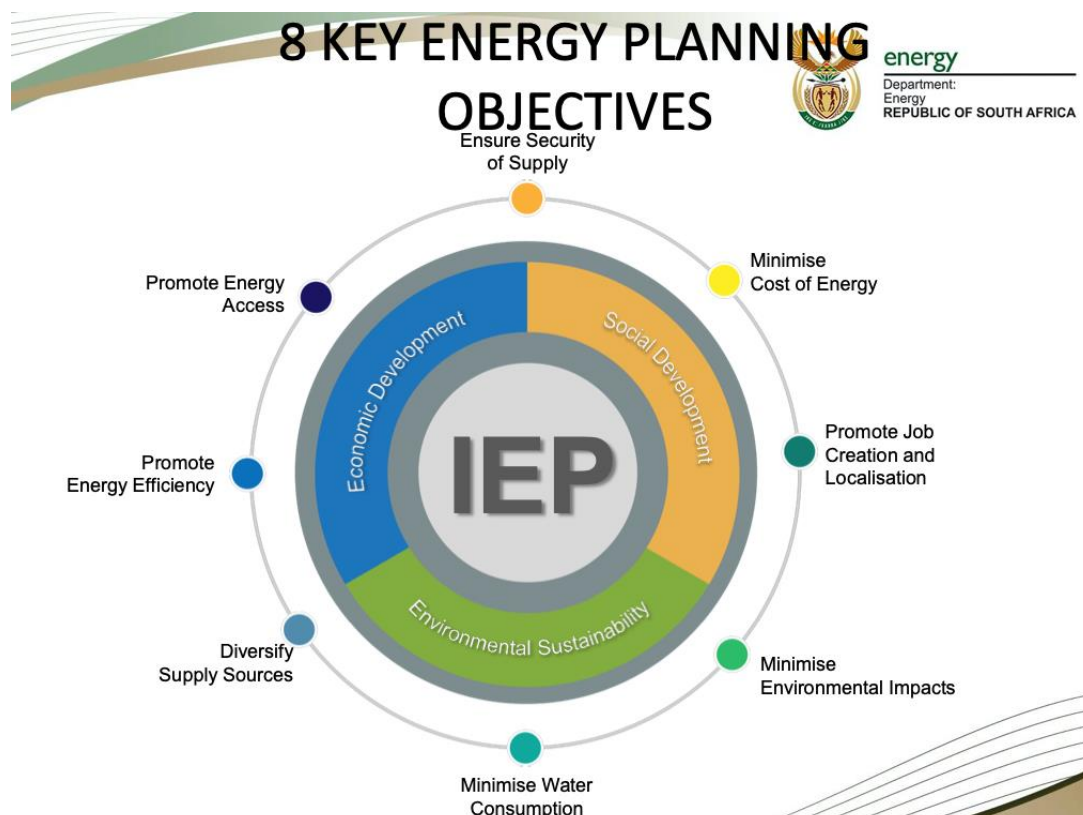
- » Integrated Energy Plan (IEP)
- » Integrated Resource Plan (IRP)

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.

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<sup>8</sup> [https://energypedia.info/wiki/South\\_Africa\\_Energy\\_Situation](https://energypedia.info/wiki/South_Africa_Energy_Situation)

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 6.1:** 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) contains 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/m<sup>2</sup>) (16 and 23 megajoules per square meter [MJ/m<sup>2</sup>]) (Stassen, 1996), compared to about 3.6kWh/m<sup>2</sup> in parts of the United States and about 2.5kWh/m<sup>2</sup> in Europe and the United Kingdom. The total area of high radiation in South Africa amounts to approximately 194 000km<sup>2</sup>, 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 a total 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 **Figure 6.2**).

	Coal	Cost (Decommissioning)	Nuclear	Hydro	Storage	PV	Wind	CSP	GAS/ Diesel	Other (Distributed Generation, Cogeri, Biomass, Landfill)
<b>Current</b>	31715		1860	2100	2912	1474	1980	300	3830	499
2019	2155	-2372	-	-	-	-	244	300	-	Allocation to the intent of the short term capacity and energy gap
2020	1433	-557	-	-	-	114	300	-		
2021	1433	-1403	-	-	-	300	818	-		
2022	755	-344	-	-	513	400	1600	-		
2023	750	-555	-	-	-	1000	1600	-	500	
2024	1 000	-	1660	-	-	-	1600	-	1000	500
2025	7 000	-	-	-	-	1000	1600	-	-	500
2026	-	-1734	-	-	-	-	1600	-	-	500
2027	750	-547	-	-	-	-	1600	-	2000	500
2028	-	-475	-	-	-	1000	1600	-	-	500
2029	-	-1654	-	-	1575	1000	1600	-	-	500
2030	-	-1656	-	1500	-	1000	1600	-	-	500
<b>Total Installed Capacity by 2030 (MW)</b>		33164	1660	4600	5000	8288	17742	600	6380	-
<b>% Total Installed Capacity (% of MW)</b>		43	2.36	5.84	6.35	10.52	22.53	0.76	8.1	-
<b>% Annual Energy Contribution (% of MWh)</b>		58.3	4.5	0.3	1.2	6.3	17.8	0.6	1.3	-

**Figure 6.2:** A snapshot of the Energy Mix as per the IRP 2019

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 by government 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.

Between 2011 and 2021, the South African Government, through its IRP 2010 - 2020, have successfully launched and completed five bidding windows under the REIPPPP<sup>9</sup> (refer to Table **Figure 6.3**<sup>10</sup>).

REIPPPP Bid Windows	1	2	3	3.5	4	4 (additional)	4.5 (expedited)	5	[...13] (up to 2030)	Total
Bid Date	04-Nov-11	05-Mar-12	19-Aug-13	03-Mar-14	17-Aug-14	17-Aug-14	11-Nov-15	16-Aug-21	TBD	-
Pref. Bidders ("PB") announced	07-Dec-11	21-May-12	31-Dec-13	14-Dec-14	16-Apr-15	07-Jun-15		TBD	TBD	-
Financial Close ("FC") - from	19-Jun-12	13-Dec-12	30-Jul-14	01-May-21	30-Apr-18	30-Apr-18		TBD	TBD	-
Years between PB announcement & FC	0.54	0.57	0.58	6.39	3.05	2.90		TBD	TBD	-
Projects Bid	53	79	93	3	74	-	CANCELLED	102	TBD	404.0
Projects awarded	28	19	17	2	13	13		TBD	TBD	92.0
Capacity offered (MW)	3,625	1,275	1,473	300	1,105	1,170		2,600	[29,000*]	11,548.0
Capacity awarded (MW)	1,426	1,040	1,457	200	1,121	1,084		TBD	TBD	6,327.9
Total investment (\$bn)	6.2	4.2	4.5	1.8	2.0	1.9		TBD	TBD	20.5
Avg. Real IRR (ZAR)	17.0%	15.5%	11.0%	13.75%	9.5%	9.5%		[3%-7%*]	TBD	-

\*Estimation; TBD – To be Determined

Source: Finergreen

**Figure 6.3:** Overview of bid windows 1 to 5

**Figure 6.3** shows that between 2011 and 2015 (excluding bid window 5), 302 bids were submitted, with around 30% (92) of the projects receiving approval. From those 92 projects, close to 70% (4.41GW) are already in operation, with wind and solar PV projects comprising most of the projects awarded (roughly 86%). In addition, of the 11.5GW of total capacity offered, 6.3GW (roughly 71%) was allocated, with wind and solar PV projects comprising the majority of projects.

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.

In addition to government procurement programmes, various private procurement initiatives have been undertaken by various industries that are electricity intensive which have identified a need to diversify their energy mix and to change their reliance on State-provided electricity. In 2021, the South African government acknowledged that aging state-owned electricity infrastructure and a demand far surpassing supply, is hampering the country and economy's growth. On 10 June 2021, President Ramaphosa announced the government's approval of an increase in the generation license exemption threshold for embedded generation facilities from 1MW to 100MW. This allows industry to not only generate electricity for

<sup>9</sup><https://www.pv-magazine.com/2021/09/30/reipp-one-of-the-worlds-best-renewable-energy-tenders-but-theres-room-for-improvement/>

<sup>10</sup> 2 583 MW of renewable energy capacity was awarded to IPPs in the REIPPPP bid window 5 in October 2021. 860MW of renewable energy capacity (all solar PV) was awarded to IPPs in the REIPPPP bid window 6 in December 2022.

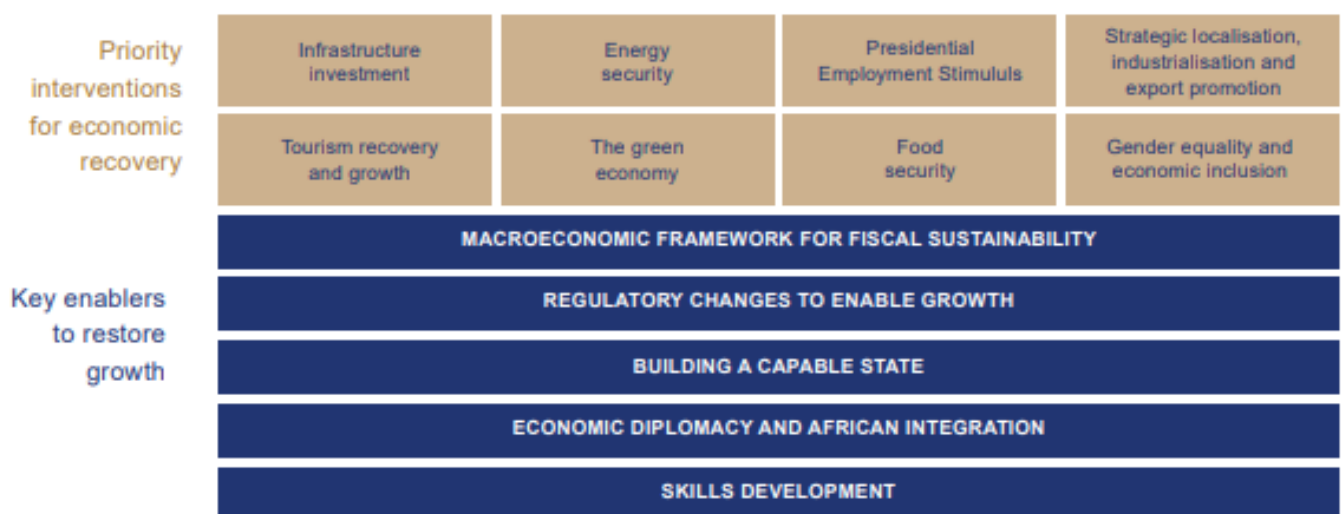
self-consumption but allows them to develop facilities with a more realistic capacity response to their demand requirements without the need to obtain a Generation License from NERSA. This in turn aims to reduce generation demands on the national grid and to alleviate residential, commercial, and industrial electricity supply constraints.

In addition to the policy considerations detailed above, Government has prioritised post COVID-19 turnaround plans in terms of renewable energies within the Just Energy Transition (JET), coupled with key development objectives of the various spheres of government. These policies share the same ideals, such as:

- » The utilisation, application and investment in renewable energy resources in South Africa is considered to be an essential means of reducing the carbon footprint of the country,
- » Diversifying the national economy,
- » Reducing poverty, and
- » Providing critical additional energy to that of Eskom.

Government has compiled an Economic Reconstruction and Recovery Plan which was presented to Parliament in October 2020. According to this plan, the economic survey will rely on a massive investment in infrastructure, including energy, telecommunications, ports and rail. The core elements of the Economic Reconstruction and Recovery Plan are as follows:

1. Priority interventions for economic recovery: the plan sets out eight priority interventions that will ignite South Africa's recovery and reconstruction effort. These are the flagship initiatives that all of society will rally around to build a new economy (**Figure 6.4**).
2. Enabling conditions for growth: these are growth-enhancing reforms and other preconditions for an inclusive, competitive and growing economy.
3. Macroeconomic framework: economic reconstruction and recovery requires careful mobilisation of resources to ensure fiscal sustainability.
4. Institutional arrangements: the plan focuses on execution, and is supported by enhanced institutional arrangements to ensure implementation and accountability.



**Figure 6.4:** Core elements of the Economic Reconstruction and Recovery Plan (source: Building a new economy - Highlights of the Reconstruction and Recovery Plan, Presidency of the Republic of South Africa)

The plan recognises energy security as the most important prerequisite for the recovery agenda and states that renewed investment in a diversified energy mix can be achieved within a short time horizon, while alleviating a crippling energy crisis and facilitating a necessary transition to a less carbon-intensive economy. One of the key commitments of the plan is therefore to implement the IRP 2019 without delay to provide a substantial increase in the contribution of renewable energy sources by 2030, alongside other sources including battery storage, gas and clean coal. The transition to green energy is recognised as contributing towards the realisation of the low-carbon, climate-resilient and inclusive economy envisaged by the National Development Plan.

The South African government has identified the green economy as one of 12 job drivers that could help contribute to creating 5 million additional jobs by 2020. The New Growth Path, in which the sectoral jobs targets are disaggregated, envisages that as many as 300 000 new direct jobs could be created in the areas of natural resource management and renewable energy construction (Department of Energy, 2019). Even though the project will not form part of the REIPPP programme, the Applicant will implement similar social and economic development strategies, including amongst others, job creation, local content, skills development, enterprise and supplier development, and socio-economic development. In addition to electricity generation and supply the project will therefore also contribute positively towards socio-economic development of a region, over and above job creation.

The need for new power generation from solar energy has therefore been identified and assessed by Government at a national scale considering the national energy requirements as well as international commitments to address climate change under the Paris Agreement and reaffirmed at COP26, and provision has been made for the inclusion of new solar power generation capacity in South Africa's energy mix. The implementation of the Zionsheuvel Solar PV Facility, therefore, has the potential to contribute positively towards the identified national need, while simultaneously contributing to job creation and socio-economic development, which is identified as a need for the country within the National Development Plan. The PV facility will make use of renewable energy technology and would contribute positively towards reducing South Africa's GHG emissions and the Just Energy Transition of the country. In addition, by making use of solar power technology, the project would have reduced water requirements, when compared with some other generation technologies such as coal and gas, in alignment with one of the vision 2030 themes of DWS's National Water Resource Strategy 2 (2013) (i.e., transitioning to a low carbon economy through stimulating renewable energy and retrofitting buildings).

#### **6.4.1. 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:** Zionsheuvel 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. Some of the challenges facing the Local and District municipalities, as detailed in the IDPs include high rates of unemployment, high levels of poverty, and low levels of development despite the strategic local in terms of the national transport corridors. The Local and District municipalities are therefore in need of economic development, sustainable employment opportunities and growth in personal income levels.

Since inception of the REIPPPP in 2011 up to bid window 4, approximately 109 400 job years for South African citizens to date have been created.

Zionsheuve 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 REIPPPP, 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. According to CSIR's power sector statistics, South Africa experienced loadshedding for 1 169 hours in 2021 (13% of the time) wherein 2 521GWh of estimated energy was shed (mostly stage 2 load shedding). This is 40% increase on the total loadshedding experienced during 2020<sup>11</sup>. It is important to note that although extensive load shedding continued during 2021, record relative variable renewable energy contributions were recorded, with solar PV contributing 5.1 TWh.

**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.

According to the IPP Procurement Programme overview report dated 31 March 2021, water savings of 71.7 million kilolitres has been realised by the programme from inception to the date of this publication, of which 4.2 million kilolitres is in the 2021 reporting quarter included in this report.

**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.

According to the IPP Procurement Programme overview report, as of 31 March 2021, the REIPPPP had made the following significant impacts in terms of energy supply:

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<sup>11</sup> CSIR Energy Centre. Statistics of utility-scale power generation in South Africa in 2021. April 2022

<sup>11</sup> Bid windows 1, 2, 3, 3.5, 4 and small BW1 (1S2) and small BW2(2S2). 2 583 MW of renewable energy capacity was awarded to IPPs in the REIPPPP bid window 5 in October 2021. 860MW of renewable energy capacity (all solar PV) was awarded to IPPs in the REIPPPP bid window 6 in December 2022.

- » 6 422MW of electricity had been procured from 112 Renewable Energy Independent Power Producers (IPPs) in seven bid rounds<sup>12</sup>.
- » 5 078 MW of electricity generation capacity from 79 IPP projects has been connected to the national grid.
- » 59 761GWh of energy has been generated by renewable energy sources procured under the REIPPPP since the first project became operational in November 2013. Renewable energy IPPs have proved to be very reliable. Of the 79 projects that have started operations, 67 projects have been operational for longer than a year. The electrical energy generated over the past 12-month period for the 67 projects is 11 679GWh, which is 94% of their annual energy contribution projections of 12 481GWh over a 12-month delivery period. Twenty-six (26) of the 67 projects (39%) have individually exceeded their projections.

In August 2021, Bid Window 5, which had aimed to sign up 2 600MW of power, including 1 600MW of wind and 1 000MW of solar was open. It attracted 102 bids, offering capacity of 9 644MW. 25 Preferred Bidders were selected to provide a total of 2 583MW from wind and solar developments.

**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 2021) in terms of investment and economics:

- » Investment (equity and debt) to the value of R209.7 billion was attracted in seven bid rounds.
- » Socio-economic development contributions of R1.5 billion to date, of which R103.5 million was spent in this 2021 reporting quarter.
- » Enterprise development contributions of R463.5 million to date, of which R34.8 million was spent in this 2021 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 2021) indicates that a carbon emission reduction of 60.7 Mton CO<sub>2</sub> has been realised by the IPP programme from inception to date, of which 3.6 Mton is in the 2021 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. According to the Climate Transparency Report (2020), total GHG emissions in South Africa (excluding land use) have increased by 41% since 1990, but emissions in recent years have been almost constant, owing largely to low economic growth and a sharp rise in electricity prices. South Africa is ranked 12th worldwide in terms of per capita carbon dioxide emissions as of 2021<sup>18</sup>. Since its inception, the REIPPPP has achieved carbon emission reductions<sup>19</sup> of 60.7

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<sup>12</sup> Bid windows 1, 2, 3, 3.5, 4 and small BW1 (1S2) and small BW2 (2S2). 2 583 MW of renewable energy capacity was awarded to IPPs in the REIPPPP bid window 5 in October 2021. 860MW of renewable energy capacity (all solar PV) was awarded to IPPs in the REIPPPP bid window 6 in December 2022.



Mton of CO<sub>2</sub>. The development of Zionsheuveel Solar PV Facility, and the associated electricity generated as a result of the facility, will result in considerable savings on tons of CO<sub>2</sub> 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.

## 6.5 Need and Desirability of the project from a Regional Perspective

South Africa's electricity generation mix has historically been dominated by coal. However, up to 2030, a new capacity demand will be driven by the decommissioning of existing coal-fired power stations. A further 24 100MW of coal power is expected to be decommissioned in the period 2030 to 2050 (refer to **Figure 6.2**). Therefore, additional capacity will be required from renewable energy sources, with the solar PVs being allocated 1000MW per annum for the period up to 2030.

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

The overarching objective for the Zionsheuveel Solar PV Facility is to maximise electricity production through exposure to the solar resource, while minimising infrastructure, operational and maintenance costs, as well as social and environmental impacts. From a regional site selection perspective, this region is considered to be preferred for solar energy development by virtue of its abundant solar resource.

As detailed in **Chapter 5**, the project is aligned with development planning for the province. The Northern Cape Provincial Spatial Development Framework (NCSDf) (2012) lists a number of sectoral strategies and

plans that are to be read and treated as key components of the PSDF. Of these there are a number that are relevant to the proposed project. These include:

- » Sectoral Strategy 1: Provincial Growth and Development Strategy of the Provincial Government.
- » Sectoral Strategy 2: Comprehensive Growth and Development Programme of the Department of Agriculture, Land Reform and Rural Development.
- » Sectoral Strategy 5: Local Economic Development (LED) Strategy of the Department of Economic Development and Tourism.
- » Sectoral Strategy 11: Small Micro Medium Enterprises (SMME) Development Strategy of the Department of Economic Development and Tourism.
- » Sectoral Strategy 12: Tourism Strategy of the Department of Economic Development and Tourism.
- » Sectoral Strategy 19: Provincial renewable energy strategy (to be facilitated by the Department of Economic Development and Tourism).

Section C8.2.3, Energy Objectives, sets out the energy objectives for the Northern Cape Province. The section makes specific reference to renewable energy. Of relevance the objectives include:

- » Promote the development of renewable energy supply schemes. Large-scale renewable energy supply schemes are strategically important for increasing the diversity of domestic energy supplies and avoiding energy imports while minimizing detrimental environmental impacts.
- » In order to reinforce the existing transmission network and to ensure a reliable electricity supply in the Northern Cape, construct a 400 kV transmission power line from Ferrum Substation (near Kathu/Sishen) to Garona Substation (near Groblershoop). There is a national electricity supply shortage, and the country is now in a position where it needs to commission additional plants urgently. Consequently, renewable energy projects are a high priority.
- » Develop and institute innovative new energy technologies to improve access to reliable, sustainable, and affordable energy services with the objective to realize sustainable economic growth and development. The goals of securing supply, providing energy services, tackling climate change, avoiding air pollution, and reaching sustainable development in the province offer both opportunities and synergies which require joint planning between local and provincial government as well as the private sector.
- » Develop and institute energy supply schemes with the aim to contribute to the achievement of the targets set by the White Paper on Renewable Energy (2003). This target relates to the delivery of 10 000 GWh of energy from renewable energy sources (mainly biomass, wind, solar, and small-scale hydro) by 2013.

Section C8.3.3, Energy Policy, sets out the policy guidelines for the development of the energy sector, with specific reference to the renewable energy sector.

- » The construction of telecommunication infrastructure must be strictly regulated in terms of the spatial plans and guidelines put forward in the PSDF. They must be carefully placed to avoid visual impacts on landscapes of significant symbolic, aesthetic, cultural or historic value and should blend in with the surrounding environment to the extent possible.
- » EIAs undertaken for such construction must assess the impacts of such activities against the directives listed in (a) above.
- » Renewable energy sources such as wind, solar, thermal, biomass and domestic hydroelectricity are to constitute 25% of the province's energy generation capacity by 2020.

The following key policy principles for renewable energy apply.

- » Full cost accounting: Pricing policies will be based on an assessment of the full economic, social and environmental costs and benefits of energy production and utilisation.
- » Equity: There should be equitable access to basic services to meet human needs and ensure human well-being. Each generation has a duty to avoid impairing the ability of future generations to ensure their own well-being.
- » Global and international cooperation and responsibilities: Government recognises its shared responsibility for global and regional issues and act with due regard to the principles contained in relevant policies and applicable regional and international agreements.
- » Allocation of functions: Government will allocate functions within the framework of the Constitution to competent institutions and spheres of government that can most effectively achieve the objectives of the energy policy.
- » The implementation of sustainable renewable energy is to be promoted through appropriate financial and fiscal instruments.
- » An effective legislative system to promote the implementation of renewable energy is to be developed, implemented, and continuously improved.
- » Public awareness of the benefits and opportunities of renewable energy must be promoted.
- » The development of renewable energy systems is to be harnessed as a mechanism for economic development throughout the province in accordance with the Sustainable Development Initiative (SDI) approach (refer to Toolkit D10) or any comparable approach.
- » Renewable energy must, first, and foremost, be used to address the needs of the province before being exported.

The development of the Zionsheuvel Solar PV Facility would contribute positively towards increased electricity provision in the Northern Cape Province, which could be used in the development of socio-economic infrastructure within the province, as well as to increase employment opportunities.

The Northern Cape Provincial Growth and Development Strategy identifies poverty reduction as the most significant challenge facing the government and its partners. All other societal challenges that the province faces emanate predominantly from the effects of poverty. The development of the Zionsheuvel Solar PV Facility has the potential to create employment opportunities, promote skills development, create opportunities to promote private sector investment and the development of SMMEs in the Northern Cape Province.

## **6.6 Need and Desirability of the project from a District and Local Perspective**

The Pixley Ka Seme District Municipality SDF (2014) notes that the vision for the PKSDM is "*Pixley Ka Seme DM, 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. Of relevance to the project the opportunities include Renewable Energy and the identification of a renewable energy hub in the region. The natural environment and maintenance and conservation of the pristine natural environment to support sustainable farming into the future is also identified as an opportunity. The SDF notes that Pixley Ka Seme District area with its abundance of sunshine and vast tracts of available land has attracted considerable interest from solar energy investors. The high solar index of the area provides many opportunities in terms of the development of renewable energy. This has been acknowledged by the Northern Cape Government with the identification of the Renewable Energy Hub. The areas around the northern and eastern borders of the Pixley Ka Seme District Municipality form part of this hub with the potential to stimulate special economic development zoned within the area that have the potential to stimulate industrial development.

The PKSDM also falls within the Solar Development Corridor as identified in the Northern Cape Provincial Spatial Development Framework. The corridor extends from Kakamas to Upington and down to De Aar in the south-east. The development of the Zionsheuvél Solar PV Facility will promote economic development in the De Aar area, thereby assisting in addressing some the challenges faced by the district municipality as detailed in the IDP.

The Strategic Objectives to address Pixley Ka Seme District Municipality and Renosterberg Local Municipality vision that are relevant to the project include the promotion of economic growth in the district and enhancement of service delivery. The potential in the area for Renewable Energy developments including the development of the Zionsheuvél Solar PV Facility will promote economic development in the Pixley Ka Seme District and the Renosterberg 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 Zionsheuvél Solar PV Facility.

## **6.7 Receptiveness of the proposed development area for the establishment of Zionsheuvél 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.

## 6.8 Conclusion

From the detail presented in this chapter, it is clear that the need and desirability for the project is supported from a planning and policy perspective on a national, provincial, district, and local level, as well as from a technical perspective when considering solar resource. It is however important to also consider the potential impacts and benefits that the proposed solar facility may have for the affected site and surrounding area from both a biodiversity sustainability perspective and a socio-economic perspective. Therefore, it is imperative for the assessment being undertaken for the project to consider this project not only from a policy (national, provincial, and local level) perspective, but also from a biodiversity and socio-economic perspective. The aim of the EIA process is to ensure a balance between these three spheres and to ensure that conclusions made regarding the proposed project draw on both the positive and negative consequences of the proposed development, as well as the potential for impacts to be compounded through the development of the solar facility and its associated infrastructure in proximity to other similar developments (i.e. cumulative impact). The potential impacts associated with the project are identified and described within this Scoping Report and will be assessed in the EIA Phase.

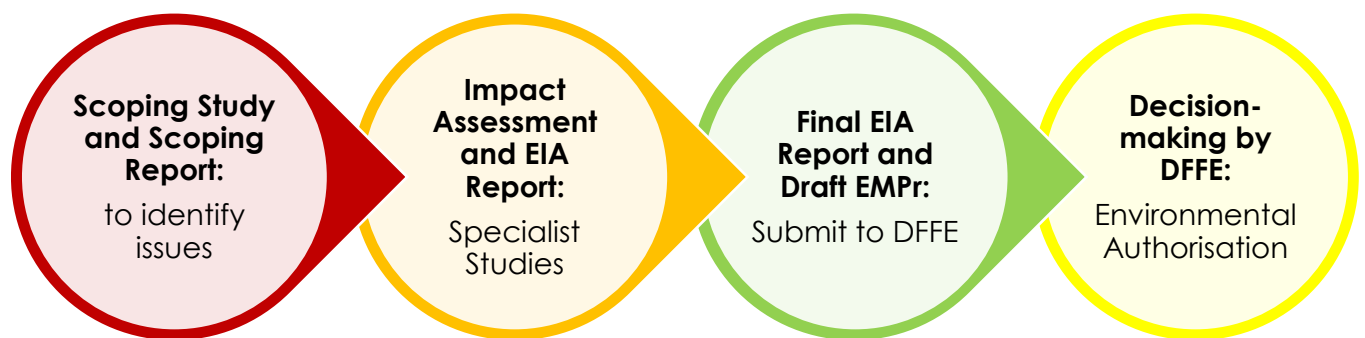
## CHAPTER 7: APPROACH TO UNDERTAKING THE SCOPING PHASE

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 Zionsheuveel Solar PV Facility is a listed activity requiring Environmental Authorisation (EA). The application for EA is required to be supported by an Environmental Impact Assessment (EIA) process based on the contracted capacity of the facility being 240MW, which triggers Activity 1 of Listing Notice 2 (GNR 325).

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

A comprehensive consultation process has been designed and implemented to cater for the undertaking of a full-scale, innovative public participation process which includes I&APs, the competent authority, directly impacted landowners/occupiers, adjacent landowners/occupiers, relevant Organs of State departments, ward councillors and other key stakeholders, while remaining within the limits as stipulated by the National Government. This chapter outlines the process that was followed during the Scoping Phase of the EIA process.

The EIA process is illustrated in **Figure 7.1**.



**Figure 7.1:** The Phases of an Environmental Impact Assessment (EIA) Process

### 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
2(1)(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 <b>Section 7.2</b> .
2(1)(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 Zionsheugel Solar PV Facility is included in <b>Section 7.5.2</b> and copies of the supporting documents and inputs are included in <b>Appendix C</b> .
2(1)(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 <b>Appendix C</b> .
2(1)(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 <b>Section 7.5.3</b> .

## 7.2 Relevant legislative permitting requirements

### 7.2.1 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 Zionsheugel Solar PV Facility is a power generation project and therefore 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 authority, the Northern Cape Department: Economic Development and Tourism 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 the Zionsheugel Solar PV Facility is undertaken in accordance with Section 24(5) of the NEMA, which defines the procedure to be followed in applying for EA, and requires that the potential consequences for, or impacts of, listed or specified activities on the environment be considered, investigated, assessed, and reported on to the competent authority. Listed Activities are activities identified in terms of Section 24 of the NEMA which are likely to have a detrimental effect on the

environment, and which may not commence without an EA from the competent authority subject to the completion of an environmental assessment process (either a Basic Assessment (BA) or full Scoping and EIA).

**Table 7.1** contains all the listed activities identified in terms of NEMA, the 2014 EIA Regulations (GNR 326), and Listing Notice 1 (GNR 327), Listing Notice 2 (GNR 325), and Listing Notice 3 (GNR 324) which may be triggered by the proposed development of the Zionsheuvel Solar PV Facility and associated infrastructure, and for which an application for EA has been made:

**Table 7.1:** 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	<p>The development of facilities or infrastructure for the transmission and distribution of electricity-</p> <p>(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts</p> <p><b><i>The development of Zionsheuvel Solar PV Facility will require the construction and operation of facilities and infrastructure for the transmission and distribution of electricity, outside of an urban area with a capacity of more than 33 but less than 275 kilovolts such as 132kV transmission lines. A 33/132kV on-site substation will be connected to the proposed central collector substation via overhead cabling with a capacity of up to 132kV. A new 132kV double-circuit power line will run from the central collector substation and tie into the proposed Hydra B MTS. The switching station forming part of the 132kV collector substation and the new 132kV double circuit will be assessed as part of a separate Environmental Impact Assessment process in support of an application for Environmental Authorisation.</i></b></p>
Listing Notice 1 (GNR 327) 08 December 2014 (as amended)	12(ii)(a)(c)	<p>The development of –</p> <p>(ii) Infrastructure or structures with a physical footprint of 100 square metres or more</p> <p>Where such development occurs-</p> <p>(a) within a watercourse; or</p> <p>(c) within 32 metres of a watercourse.</p> <p><b><i>The development area considered for the establishment of the Zionsheuvel Solar PV Facility will result in the encroachment into water resources. Construction could occur within 32m of watercourses. The infrastructure will have a physical footprint of more than 100 square metres.</i></b></p>
Listing Notice 1 (GNR 327) 08 December 2014 (as amended)	14	<p>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.</p> <p><b><i>The development of Zionsheuvel Solar 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</i></b></p>

Notice Number	Activity Number	Description of listed activity
		<b><i>the on-site substation where such storage will occur inside containers with a combined capacity exceeding 80 cubic meters but not exceeding 500 cubic meters.</i></b>
<p>Listing Notice 1 (GNR 327) 08 December 2014 (as amended)</p>	<p>19</p>	<p>The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from-</p> <p>(i) a watercourse;</p> <p>but excluding where such infilling, depositing, dredging, excavation, removal or moving-</p> <p>(a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or</p> <p>(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies</p> <p><b><i>The available data suggests the presence of drainage features in the area, with an expected low to medium sensitivity for these systems. The development area considered for the establishment of the Zionsheugel Solar PV Facility could result in the infilling or depositing of any material of more than 5 cubic metres, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres into these water resources.</i></b></p>
<p>Listing Notice 1 (GNR 327) 08 December 2014 (as amended)</p>	<p>24 (ii)</p>	<p>The development of a road –</p> <p>(ii) with a reserve wider than 13.5m, or where no reserve exists where the road is wider than 8m.</p> <p><b><i>Access roads will be developed during the construction phase of the project. These are likely to be 8m in width with a temporary reserve of 20m during construction.</i></b></p>
<p>Listing Notice 1 (GNR 327) 08 December 2014 (as amended)</p>	<p>28 (ii)</p>	<p>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:</p> <p>(ii) will occur outside an urban area, where the total land to be developed is bigger than 1ha.</p> <p><b><i>The total area to be developed for the PV facility and associated infrastructure is greater than 1ha and occurs outside an urban area in an area currently zoned for agriculture.</i></b></p>
<p>Listing Notice 1 (GNR 327) 08 December 2014 (as amended)</p>	<p>56 (ii)</p>	<p>The widening of a road by more than 6 m, or lengthening of a road by more than 1 km –</p> <p>(ii) where no reserve exists, where the existing road is wider than 8 metres</p> <p><b><i>Existing roads may require widening of up to 6m and/or lengthening by more than 1km, to accommodate the movement of heavy vehicles and cable trenching activities.</i></b></p>

Notice Number	Activity Number	Description of listed activity
Listing Notice 2 (GNR 325) 08 December 2014 (as amended)	1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20MW or more.  <b>The proposed PV facility will have a capacity that exceeds 20MW. The Zionsheugel Solar PV Facility will have a contracted capacity of 240MW.</b>
Listing Notice 2 (GNR 325) 08 December 2014 (as amended)	15	The clearance of an area of 20ha or more of indigenous vegetation <sup>13</sup> .  <b>Zionsheugel Solar PV Facility will require the clearance of an area in excess of 20ha for the development of the PV facility and associated infrastructure.</b>
Listing Notice 3 (GNR 324) 08 December 2014 (as amended)	<b>4 (g)(cc)(dd)(ee)</b>	The development of a road wider than 4 metres with a reserve less than 13,5 metres.  <b>g. Northern Cape</b> iii. Outside urban areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;  <b>The development of the PV facility and associated infrastructures will require the development of roads wider than 4m within ESA areas. The project area does not overlap with a NPAES protected area.</b>
Listing Notice 3 (GNR 324) 08 December 2014 (as amended)	<b>10 (g)(cc)(dd)(ee)</b>	The development and related operation of facilities for 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  <b>g. Northern Cape</b> (iii). Outside urban areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve;  <b>The development of the PV facility and associated infrastructure will require the storage and handling of a dangerous good with a capacity of 80 cubic meters within ESA areas.</b>  <b>The project area is located 3.25 km northeast from the Platberg-Karoo Conservancy. The Platberg-Karoo Conservancy Important Bird Area covers the entire districts of De Aar, Philipstown and Hanover. Important Bird &amp; Biodiversity Areas (IBAs) are the sites of international significance for the conservation of the world's birds and other conservation significant species as identified by Birdlife</b>

<sup>13</sup> "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
		<b><i>International. This area is considered a sensitive area as an Important Bird Area IBA is important because it contributes significantly to the conservation of large terrestrial birds as well as raptors.</i></b>
Listing Notice 3 (GNR 324) 08 December 2014 (as amended)	<b>12 (g)(ii)</b>	<p>The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</p> <p><b>g. Northern Cape</b> ii. Within critical biodiversity areas identified in bioregional plans; iii.</p> <p><b><i>The development of the renewable energy facility and associated infrastructures will require the clearance of more than 300 square meters of indigenous vegetation within areas classified as ESA.</i></b></p>
Listing Notice 3 (GNR 324) 08 December 2014 (as amended)	<b>14(ii)(g)(dd)(ee)(ff)(hh)</b>	<p>The development of— (ii) infrastructure or structures with a physical footprint of 10 square metres or more;</p> <p>where such development occurs— (a) within a watercourse; or (c) within 32 metres of a watercourse, measured from the edge of a watercourse.</p> <p><b>g. Northern Cape</b></p> <p>(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p> <p><b><i>The development of the PV facility will require the establishment of infrastructure with a physical footprint exceeding 10m<sup>2</sup> within 32m of the watercourses and within areas classified as ESAs.</i></b></p>
Listing Notice 3 (GNR 324) 08 December 2014 (as amended)	<b>18 (g)(cc)(dd)(ee)(gg)(ii)</b>	<p>The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.</p> <p><b>g. Northern Cape</b></p> <p>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (ii) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland</p> <p><b><i>The development of the solar energy facility and associated infrastructures may require the widening of a road by more than 4 metres, outside urban areas and within areas classified as ESA. The development area considered for the establishment of the Zionsheugel Solar PV Facility could result in the encroachment into water resources.</i></b></p>

## 7.2.2 National Water Act (No. 36 of 1998) (NWA)

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

The development area for the Zionsheugel Solar PV facility overlaps with endangered and Least Threatened NBA rivers. The expected wetlands include depressions in isolated areas, which are classified as vulnerable.

Error! Reference source not found. 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 3.1: 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 (a)	Taking water from a water resource  <b><i>The developer intends to source water from existing boreholes in the project area (extraction from groundwater). A geohydrological assessment is underway to assess the feasibility of using the existing boreholes. The geohydrological survey is being conducted for the existing infrastructure which can be used for operational use. Should the existing infrastructure not be sufficient, a groundwater exploration potential report will be provided to identify borehole development options.</i></b>
NWA (No. 36 of 1998)	Section 21 (c)	Impeding or diverting the flow of water in a watercourse  <b><i>The available data suggests the presence of drainage features in the area, with an expected low to medium sensitivity for these systems. The development area considered for the establishment of the Zionsheugel Solar PV Facility could result in the encroachment into these water resources.</i></b>
NWA (No. 36 of 1998)	Section 21 (g)	Disposing of waste in a manner which may detrimentally impact on a water Resource  <b><i>The Zionsheugel Solar PV facility will make use of underground septic tanks. Waste from these tanks will be disposed of in an environmentally sound manner that includes the appropriate control of emissions and residues resulting from the handling and processing of the waste material.</i></b>
NWA (No. 36 of 1998)	Section 21 (i)	Altering the bed, banks, course or characteristics of a watercourse.



Notice No.	Activity No.	Description of Water Use
NWA (No. 36 of 1998)	Section 21 (a)	<p>Taking water from a water resource</p> <p><b>The developer intends to source water from existing boreholes in the project area (extraction from groundwater). A geohydrological assessment is underway to assess the feasibility of using the existing boreholes. The geohydrological survey is being conducted for the existing infrastructure which can be used for operational use. Should the existing infrastructure not be sufficient, a groundwater exploration potential report will be provided to identify borehole development options.</b></p> <p><b>The available data suggests the presence of drainage features in the area, with an expected low to medium sensitivity for these systems. The development area considered for the establishment of the Zionsheuvel Solar PV Facility could result in the encroachment into these water resources.</b></p>

In the event that any water uses as defined in Section 21 of the Water Act are applicable, 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 Water and Sanitation (DWS).

### 7.2.3 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 000m<sup>2</sup> 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).

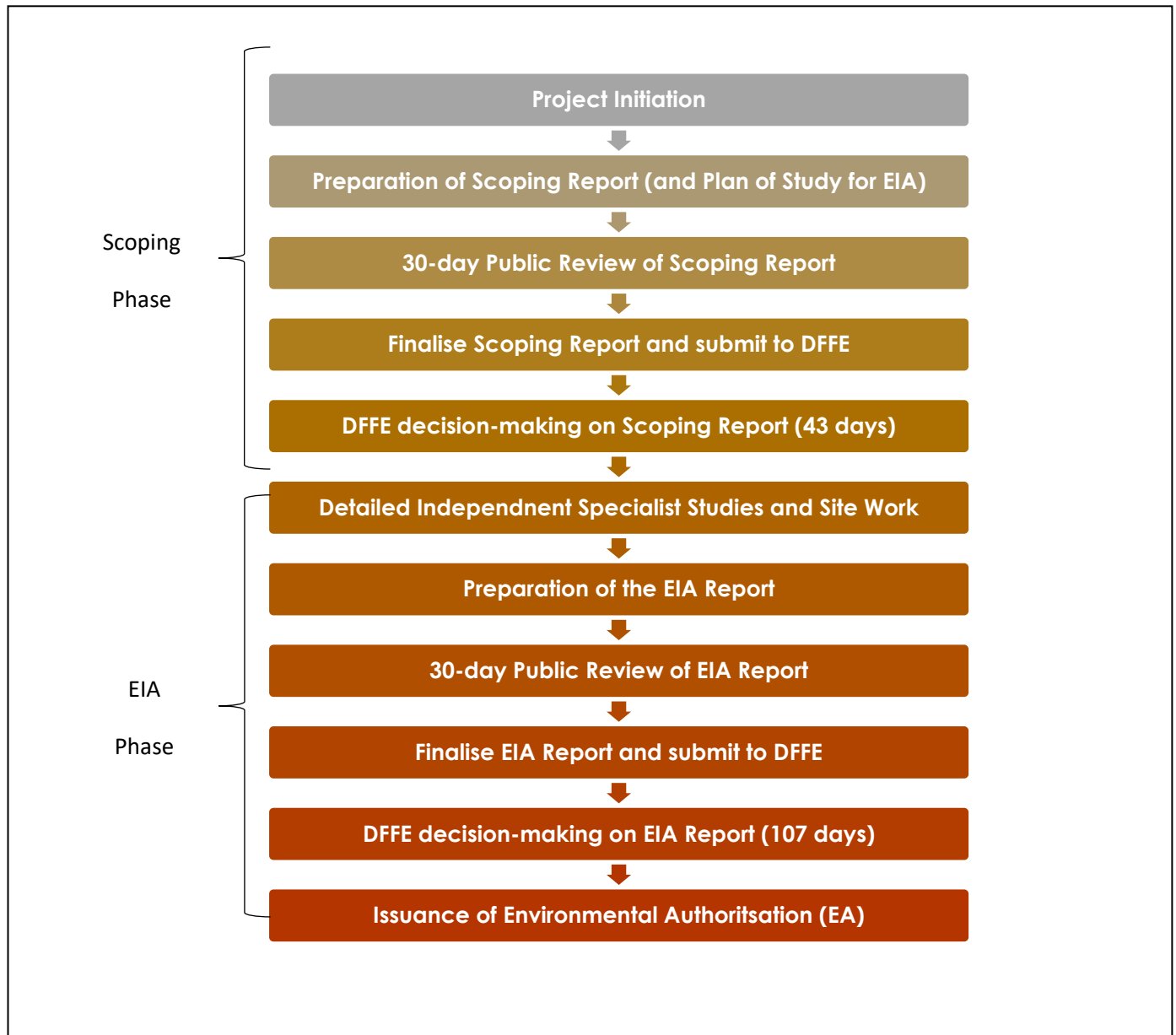
### **7.3 Overview of the Scoping and EIA (S&EIA) Process being undertaken for Zionsheuvell Solar PV Facility**

In terms of NEMA, the 2014 EIA Regulations (GNR 326), and Listing Notices (Listing Notice 1 (GNR 327), Listing Notice 2 (GNR 325) and Listing Notice 3 (GNR 324) the development of Zionsheuvell 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 (refer to **Figure 7.2**):

- » The **Scoping Phase** includes the identification and description of potential issues associated with the project through desktop studies, field surveys, as well as consultation with I&APs and key stakeholders through a Public Participation process. The entire development area is 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. 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 7.2:** Regulated timeframe of an Environmental Impact Assessment (EIA) Process

#### 7.4 Objectives of the Scoping Phase

This Scoping Report documents the evaluation of potential environmental impacts of the Zionsheuvél 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 Zionsheuvel 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 development area.
- » 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.

## **7.5 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 accordance with Chapter 6 of GNR326, and the Department of Environmental Affairs (2017) Public Participation guidelines in order to identify issues and concerns associated with the proposed project.
- » Preparation of a Scoping Report and Plan of Study for EIA in accordance with the requirements of Appendix 2 of the 2014 EIA Regulations (GNR 326).
- » Preparation of a Comments and Response (C&R) Report detailing all comments raised by I&APs and responses provided as part of the Scoping Phase.
- » Submission of a Final Scoping Report, including a Plan of Study for the EIA, to DFFE for review and approval.

### 7.5.1 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 the Northern Cape Department of Economic Development and Tourism 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 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, are all undertaken electronically, as required by the DFFE. A record of all authority correspondence undertaken during the Scoping Phase is included in **Appendix B** and **Appendix C**.

### 7.5.2 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 Zionsheuvl Solar PV Facility has been undertaken concurrently with the following facilities as they form part of the Crossroads Green Energy Cluster and are located in close proximity to one another.

No	Project name	Farm Name and portion Number	Capacity	Project Batch
1	Tafelkop Solar PV Facility	Portion 3 of the Farm Grass Pan 40	240MW	Phase 1
2	Koppy Alleen Solar PV Facility	Portion 5 of the Farm Koppy Alleen 83	100MW	Phase 1
3	Vrede Solar PV Facility	Portion 5 of the Farm Bas Berg 88	150MW	Phase 1
4	Zionsheuvl Solar PV Facility	Remainder of Farm Leeuwberg 79	240MW	Phase 1
5	Amper Daar Solar PV Facility	Remainder of Farm Wolwe Kuil 44	100MW	Phase 1
6	Wag-'n-Bietjie Solar PV Facility	Portion 1 of the Farm Leeuwe Berg 45	100MW	Phase 1
7.1	Ruspoort 1 Solar PV Facility ( <b>Option A</b> )	Portion 5 of the Farm Bokken Kraal 81 ( <b>Option A</b> )	100MW	Phase 1
7.2	Ruspoort 1 Solar PV Facility ( <b>Option B</b> )	Portion 4 on the Farm Knoffelfontein 74 Portion 1 on the Farm 78 Portion 2 on the Farm Leeuwberg 79 ( <b>Option B</b> )	100MW	Phase 1

No	Project name	Farm Name and portion Number	Capacity	Project Batch
8	Ruspoort 2 Solar PV Facility	Portion 2 of the Farm Leeuwberg 79	100MW	Phase 1
9	Middelplaas Solar PV Facility	Portion 4 of the Farm Grass Pan 40	100MW	Phase 1

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 seven 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.

A consultation process has 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 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 potential issues of concern and suggestions for mitigation measures
  - \* 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 a 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.

#### 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
- I 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 7.2**.

**Table 7.2:** Initial list of Stakeholders identified for the inclusion in the project database during the public participation process for Zionsheuvel Solar PV Facility

<b>Organs of State</b>
<b>National Government Departments</b>
Department of Forestry, Fisheries and the Environment (DFFE)
Department of Mineral Resources and Energy (DMRE)
Department of Agriculture, Rural Development and Land Reform (DARDLR):
Department of Water and Sanitation (DWS)
<b>Government Bodies and State-Owned Companies</b>
Eskom Holdings SOC Limited
National Energy Regulator of South Africa (NERSA)
South African Civil Aviation Authority (CAA)
Air Traffic and Navigation Services (ATNS)
South African Heritage Resources Agency (SAHRA)
Telkom SOC Limited
South African National Defence Force (SANDF)
South African Weather Services (SWAS)
South African National Roads Agency Limited (SANRAL)
<b>Provincial Government Departments</b>
Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform
Northern Cape Department of Roads and Public Works
Ngwao Boswa Kapa Bokone (NBKB)- Heritage Authority
<b>Local Government Departments</b>
Pixley Ka Seme District Municipality
Renosterberg Local Municipality– including the Ward Councillor, ward committee members, community representative or local community forum members
<b>Commenting Stakeholders</b>
BirdLife South Africa
Endangered Wildlife Trust (EWT)
Wildlife and Environment Society of South Africa (WESSA)
Agri SA
Transvaal Agricultural Union
<b>Landowners</b>
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<sup>14</sup> 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 47D of the Act, to –
  - (i) The occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;
  - (ii) Owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;
  - (iii) The municipal councillor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area;
  - (iv) The municipality which has jurisdiction in the area;
  - (v) Any organ of state having jurisdiction in respect of any aspect of the activity; and
  - (vi) Any other party as required by the competent authority.
- 40.(2)(c) Placing an advertisement in –
  - (i) One local newspaper; or
  - (ii) Any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;
- 40.(2)(d) Placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or 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

<sup>14</sup> 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).

(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 Zionsheuvel Solar PV Facility (and the other projects proposed as part of the larger Hydra B PV cluster), and providing background information of the project and inviting I&APs to register on the project's database were distributed via email on **08 July 2022**. The evidence of the distribution is contained in **Appendix C4 and Appendix C5** of the Scoping Report. The BID is also available electronically on the Savannah Environmental website (<https://savannahsa.com/public-documents/energy-generation/>).
- » 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 **26 May 2022 to 28 May 2022**. Photographs and the GPS co-ordinates of the site notices are contained in **Appendix C** of the Scoping Report.
- » Placement of an advertisement in 'Volksblad' Newspaper on **13 January 2023 (Appendix C2)**. This advert:
  - \* announced the project and the associated EIA process,
  - \* announced the availability of the Scoping report, the review period, and where it is accessible for review,
  - \* provided all relevant details to access the Savannah Environmental online stakeholder engagement platform.
- » A copy of the newspaper advert as sent to the newspaper is included in **Appendix C2** of the Scoping Report.
- » An advertisement will also be placed in Die Echo / Midland Nuus, the local community newspaper on 20 January 2023. The community newspaper offices opens on 16 January 2023 after the December 2022 holiday break and an advertisement could not be placed prior to the 20th of January 2023. The tearsheet will be included in the final Scoping Report.
- » The Scoping Report has been made available for review by I&APs for a 30-day review and comment period from **16 January 2023 to 15 February 2023**. The full Scoping Report is available on the Savannah Environmental website.

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 7.3:** Public involvement for Zionsheugel Solar PV Facility

Activity	Date
Distribution of the BID, process notification letters and stakeholder reply form announcing the EIA process and inviting I&APs to register on the project database.  The BID and electronic reply form was also made available on Savannah Environmental's website.	30 June 2022
Placement of site notices and process notices – process notices were placed at public places in towns.	26 May 2022 to 28 May 2022
Advertising of the availability of the Scoping Report for a 30-day review and comment period in Volksblad and Die Echo/Midland Nuus Newspapers, including details on how to access the Scoping Report via Savannah Environmental's website	Volksblad: 13 January 2023 Die Echo/Midland Nuus: 20 January 2023
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 as currently identified through networking..	13 January 2023
30-day review and comment period of the Scoping Report.	16 January 2023 to 15 February 2023
Virtual meetings through the use of virtual platforms as determined through discussions with the relevant stakeholder group: <ul style="list-style-type: none"> <li>» Landowners</li> <li>» Authorities and key stakeholders (including Organs of State, local municipality and official representatives of community-based organisations).</li> <li>» Interested &amp; Affected Parties (I&amp;APs)</li> </ul>	Virtual meetings will be held during the 30-day review period
On-going consultation (i.e. telephone liaison; e-mail communication) with all I&APs.	Throughout 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 Scoping Report has been made available on the Savannah Environmental website (i.e. online stakeholder engagement platform <https://savannahsa.com/public-documents/energy-generation/>). CD copies or hard copies will be made available on request. The notification was distributed prior to commencement of the 30-day review and comment period, on **16 January 2023**. 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 be recorded and included in **Appendix C7** of the final Scoping Report.

#### v. Identification and Recording of Comments

Comments raised by I&APs during the inception of the Scoping Phase have been synthesised into a Comments and Responses (C&R) Report which is included in **Appendix C8** of the Scoping Report. 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.

The C&R Report will be updated with all comments received during the 30-day review and comment period of the Scoping Report and will be included as **Appendix C** in the Final Scoping Report that will be submitted to the DFFE for approval.

### **7.5.3 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 C**).

### **7.6 Evaluation of Issues Identified through the Scoping Process**

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 screening tool report is included as **Appendix J** of the Scoping Report. **Table 7.4** 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 project site under consideration. A site sensitivity verification report compiled by the EAP is included in **Appendix K**.



**Table 7.4:** Sensitivity ratings from the DFFE's web-based online Screening Tool associated with the development of the Zionsheugel 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	High	The Soils and Agricultural scoping study is included in this Scoping Report as <b>Appendix F</b> . Based on the outcome of the desktop analysis of available data, it has been concluded that the entire development area has a Low to Medium sensitivity to the development from the perspective of soil and agricultural potential conservation. The impacts to soils and agriculture will be further assessed during 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 <b>Appendix G</b> . There is the potential for the project to impact on heritage resources and, therefore, heritage impacts will be further assessed during the EIA phase.
Palaeontology Impact Assessment	High	A Heritage Screening (which covers palaeontological aspects of the project site) is included in this Scoping Report as <b>Appendix G</b> . There is the potential for the project to impact on palaeontological resources and, therefore, 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 <b>Appendix D</b> of the Scoping Report. Based on the outcomes of the desktop study and available data, it has been indicated that the development area falls within the areas identified as Very High Sensitivity. The sensitivity will be confirmed, and the impacts will be further assessed during the EIA phase.
Aquatic Biodiversity Impact Assessment	Very high	An Ecological scoping study (including freshwater) has been undertaken for the PV facility and is included as <b>Appendix D</b> of the Scoping Report. The available data also suggests the presence of drainage features in the area. It is however not possible from a desktop assessment perspective to determine if wetland conditions are present in these and therefore, further assessments are required in the EIA phase.
Avian Impact Assessment	Low	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 <b>Appendix E</b> of the Scoping Report. Based on the outcome of the desktop study and available data, it has been concluded that the development area has a Low Sensitivity. The sensitivity will be confirmed, and the impacts will be further assessed during the EIA phase.
Civil Aviation Assessment	Low	No major aerodromes or small airfields are known to occur in the larger area. The Civil Aviation Authority and ATNS will be consulted throughout the Scoping/EIA process to obtain any relevant comments regarding the proposed project.
Defence Assessment	Low	A defence or military base is not located within close proximity to the PV facility.

Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)	Project Team Response
RFI Assessment	Medium	The project site under consideration is not located near a telecommunications tower. Relevant telecommunications service providers will be consulted during the Scoping/EIA process to obtain any relevant comments regarding the proposed project. In addition, SARAO will be consulted regarding any specific requirements in terms of the SKA.
Plant Species Assessment	Low	An Ecological scoping study (including flora and fauna) has been undertaken for the PV facility and is included as <b>Appendix D</b> of the Scoping Report. Based on the outcomes of the desktop study and available data, it has been indicated that the development area falls within the areas identified as Medium Sensitivity in terms of animal and plant species sensitivity. The sensitivity will be confirmed, and the impacts will be further assessed during the EIA phase.
Animal Species Assessment	Medium	

Issues (both direct and indirect environmental impacts) associated with the Zionsheugel Solar PV Facility identified within the scoping process have been evaluated through specialist studies by specialist consultants. These specialists include:

Specialist	Area of Expertise	Refer Appendix
Dr Lindi Steyn and Andrew Husted – The Biodiversity Company	Ecology (Terrestrial and Freshwater)	Appendix D
Dr Lindi Steyn and Andrew Husted – The Biodiversity Company	Avifauna	Appendix E
Dr Lindi Steyn and Andrew Husted – The Biodiversity Company	Soils & Agricultural Potential	Appendix F
Nicholas Wiltshire and Jenna Lavin – CTS Heritage	Heritage (including archaeology, cultural landscape and palaeontology)	Appendix G
Lourens du Plessis – LOGIS Bryony Van Niekerk- NuLeaf Environmental	Visual	Appendix H
Tony Barbour – Tony Barbour	Social	Appendix I

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 for each of the proposed project components:

- » Identify the **nature** of the potential impact, which includes a description of what causes the effect, what will be affected and how it will be affected.
- » Identify the **extent** of the potential impact, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development) or regional.
- » Identify **sensitive receptors** that may be impacted on by the Zionsheugel Solar PV Facility and the **types of impacts** that are most likely to occur.
- » Evaluate the **significance** of potential impacts in terms of the requirements of the 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.

## 7.7 Assumptions and Limitations of the EIA Process

The following assumptions and limitations are applicable to the EIA process of Zionsheuveel 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 Zionsheuveel 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 grid connection infrastructure).
- » The Scoping Phase evaluation of impacts has been largely based on desktop studies. 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 Zionsheuveel Solar PV Facility.

## 7.8 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 7.5**.

**Table 7.5:** Relevant legislative permitting requirements applicable to Zionsheugel Solar PV Facility

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
<b>National Legislation</b>			
Constitution of the Republic of South Africa (No. 108 of 1996)	<p>In terms of Section 24, the State has an obligation to give effect to the environmental right. The environmental right states that:</p> <p><i>“Everyone has the right –</i></p> <ul style="list-style-type: none"> <li>» <i>To an environment that is not harmful to their health or well-being, and</i></li> <li>» <i>To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:</i> <ul style="list-style-type: none"> <li>* <i>Prevent pollution and ecological degradation,</i></li> <li>* <i>Promote conservation, and</i></li> <li>* <i>Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”</i></li> </ul> </li> </ul>	Applicable to all authorities	<p>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.</p>
National Environmental Management Act (No 107 of 1998) (NEMA)	<p>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).</p> <p>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</p>	DFFE – Competent Authority  Northern Cape Department: Economic Development and Tourism – Commenting Authority	<p>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 Scoping Report and a Plan of Study for EIA to DFFE for approval.</p> <p>Considering the capacity of the proposed Zionsheugel Solar PV Facility project (i.e. contracted capacity of 240MW) and the triggering of Activity 1 of Listing Notice 2 (GNR</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
<p>National Environmental Management Act (No 107 of 1998) (NEMA)</p>	<p>charged by NEMA with granting of the relevant environmental authorisation.</p> <p>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.</p> <p>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.</p>	<p>DFFE</p> <p>Northern Cape Department of Economic Development and Tourism – Commenting Authority</p>	<p>325) a full Scoping and EIA process is required in support of the Application for EA.</p> <p>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.</p>
<p>Environment Conservation Act (No. 73 of 1989) (ECA)</p>	<p>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.</p> <p>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.</p>	<p>Northern Cape Department of Economic Development and Tourism</p> <p>Renosterberg Local Municipality</p>	<p>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.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>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).</p>		
<p>National Water Act (No. 36 of 1998) (NWA)</p>	<p>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 a GA, or if a responsible authority waives the need for a licence.</p> <p>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.</p> <p>Consumptive water uses may include taking water from a water resource (Section 21(a)) and storing water (Section 21(b)).</p> <p>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)).</p>	<p>Regional Department of Water and Sanitation or relevant Catchment Management Agency</p>	<p>An Ecological scoping study (including freshwater) has been undertaken for the PV facility and is included as <b>Appendix D</b> of the Scoping Report.</p> <p>Available spatial data has revealed the presence of various drainage lines within the Zionsheugel Solar PV development. It is however not possible from a desktop assessment perspective to determine if wetland conditions are present in these and therefore, further assessments are required in the EIA phase. Should these resources be impacted by the project, a Water Use Authorisation would be required.</p> <p>The applicant intends to source the water from existing boreholes in the area. A geohydrologist is performing geohydrological assessments and surveying the existing boreholes to analyse the existing infrastructure which can be used for operational use. Should the existing infrastructure not be sufficient, a groundwater exploration potential report will be provided to identify borehole development options. <i>The</i></p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
<p>Minerals and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA)</p>	<p>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.</p> <p>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.</p>	<p>Department of Mineral Resources and Energy (DMRE)</p>	<p>Zionsheugel Solar PV facility will make use of underground septic tanks. Waste from these tanks will be disposed of in an environmentally sound manner that includes the appropriate control of emissions and residues resulting from the handling and processing of the waste material.</p> <p>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.</p> <p>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.</p>
<p>National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM:AQA)</p>	<p>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.</p> <p>In accordance with the Regulations (GNR 827) any person who conducts any activity in such</p>	<p>Northern Cape Department of Economic Development and Tourism / Pixley Ka Seme District Municipality</p>	<p>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</p>



Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>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.</p> <p>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.</p>		<p>management plan would need to be developed.</p>
<p>National Heritage Resources Act (No. 25 of 1999) (NHRA)</p>	<p>Section 07 of the NHRA stipulates assessment criteria and categories of heritage resources according to their significance.</p> <p>Section 35 of the NHRA provides for the protection of all archaeological and palaeontological sites, and meteorites.</p> <p>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.</p> <p>Section 38 of the NHRA lists activities which require developers or any person who intends to undertake a listed activity to notify the responsible heritage resources authority and furnish it with details regarding the location, nature, and extent of the proposed development.</p>	<p>South African Heritage Resources Agency (SAHRA)</p> <p>Ngwao Boswa Kapa Bokone (NBKB) – provincial heritage authority</p>	<p>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.</p> <p>Should a heritage resource be impacted upon, a permit may be required from SAHRA or The Northern Cape Heritage Resources Authority (previously called Ngwao Boswa jwa Kapa Bokone)in accordance with of Section 48 of the NHRA, and the SAHRA Permit Regulations (GN R668).</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>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.</p>		
<p>National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)</p>	<p>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.</p> <p>Three government notices have been published in terms of Section 56(1) of NEM:BA as follows:</p> <ul style="list-style-type: none"> <li>» Commencement of TOPS Regulations, 2007 (GNR 150).</li> <li>» Lists of critically endangered, vulnerable and protected species (GNR 151).</li> <li>» TOPS Regulations (GNR 152).</li> </ul> <p>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</p>	<p>DFFE</p> <p>Northern Cape Department of Economic Development and Tourism</p>	<p>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 scoping study has been undertaken for the PV facility and is included as <b>Appendix D</b> of the Scoping Report. Desktop data confirmed the likelihood of several protected plant, animal, reptilian, avifauna, and amphibian species. The presence of these species will be confirmed during comprehensive field assessments during the EIA phase.</p> <p>The POSA database indicates that 507 species of indigenous plants are expected to occur within the project area (The full list of species will be provided in the final EIA report). No SCCs are expected in the project area, however protected tree such as camel thorn trees (<i>Vachellia erioloba</i>) might occur.</p> <p>Based on the IUCN Red List Spatial Data and AmphibianMap, 14 amphibian species are expected to occur within the area (The full list</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>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).</p>		<p>will be provided in the final assessment). One (1) is regarded as threatened.</p> <p>Based on the IUCN Red List Spatial Data and the ReptileMAP database, 42 reptile species are expected to occur within the area (The full list will be provided in the final assessment). One (1) is regarded as threatened.</p> <p>The SABAP2 Data lists 227 avifauna species that could be expected to occur within the area (The full list will be provided in the final assessment). Twelve (12) of these expected species are regarded as threatened.</p> <p>The IUCN Red List Spatial Data lists 58 mammal species that could be expected to occur within the area (The full list will be provided in the final assessment). This list includes large mammal species that are normally restricted to protected areas, as these were observed during the screening assessment. Eight (8) (smaller non protected area restricted species) of these expected species are regarded as threatened.</p> <p>The presence of any of the above-mentioned species on the site will be determined during the detailed EIA phase of the process.</p>
<p>National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)</p>	<p>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</p>	<p>DFFE</p>	<p>An Ecological scoping study has been undertaken for the PV facility and is included as <b>Appendix D</b> of the Scoping Report.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>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.</p> <p>Applicable, and exempted alien and invasive species are contained within the Alien and Invasive Species List (GNR 864).</p>	<p>Northern Cape Department of Economic Development and Tourism</p>	<p>The presence of any alien plant species on the site will be determined during the detailed EIA phase of the process. Any such species would require appropriate management throughout the life cycle of the project.</p>
<p>Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA)</p>	<p>Section 05 of CARA provides for the prohibition of the spreading of weeds.</p> <p>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.</p> <p>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.</p>	<p>Department of Agriculture, Rural Development, and Land Reform (DARDLR)</p>	<p>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.</p> <p>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:</p> <ul style="list-style-type: none"> <li>» Uprooting, felling, cutting or burning.</li> <li>» 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.</li> <li>» 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.</li> <li>» Any other method of treatment recognised by the executive officer that</li> </ul>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			<p>has as its object the control of plants concerned, subject to the provisions of sub-regulation 4.</p> <p>» 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.</p>
<p>National Forests Act (No. 84 of 1998) (NFA)</p>	<p>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.</p> <p>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”.</p>	<p>DFFE</p>	<p>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.</p> <p>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.</p>
<p>National Veld and Forest Fire Act (No. 101 of 1998) (NVFFA)</p>	<p>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</p>	<p>DFFE</p>	<p>While no permitting or licensing requirements arise from this legislation, this Act will be applicable during the construction and operation of Zionsheugel Solar PV Facility, in terms of the preparation and maintenance of firebreaks, and the need to provide appropriate equipment and trained personnel for firefighting purposes.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>and long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land, it does not cause soil erosion, and it is reasonably free of inflammable material capable of carrying a veldfire across it.</p> <p>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.</p>		
<p>Hazardous Substances Act (No. 15 of 1973) (HAS)</p>	<p>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.</p>	<p>Department of Health (DoH)</p>	<p>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.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<ul style="list-style-type: none"> <li>» 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</li> <li>» Group IV: any electronic product, and</li> <li>» Group V: any radioactive material.</li> </ul> <p>The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.</p>		
<p>National Environmental Management: Waste Act (No. 59 of 2008) (NEM:WA)</p>	<p>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.</p> <p>The Minister may amend the list by –</p> <ul style="list-style-type: none"> <li>» Adding other waste management activities to the list.</li> <li>» Removing waste management activities from the list.</li> <li>» Making other changes to the particulars on the list.</li> </ul> <p>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.</p>	<p>DFFE – Hazardous Waste</p> <p>Northern Cape Department of Economic Development and Tourism DEDECT – General Waste</p>	<p>No waste listed activities are triggered by Zionsheuvell 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.</p>



Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that:</p> <ul style="list-style-type: none"> <li>» The containers in which any waste is stored, are intact and not corroded or in</li> <li>» Any other way rendered unfit for the safe storage of waste.</li> <li>» Adequate measures are taken to prevent accidental spillage or leaking.</li> <li>» The waste cannot be blown away.</li> <li>» Nuisances such as odour, visual impacts and breeding of vectors do not arise, and</li> <li>» Pollution of the environment and harm to health are prevented.</li> </ul>		
<p>National Road Traffic Act (No. 93 of 1996) (NRTA)</p>	<p>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.</p> <p>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.</p>	<p>South African National Roads Agency (SANRAL) – national roads</p> <p>Northern Cape Department of Roads and Public Works</p>	<p>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.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>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.</p>		
<p>Astronomy Geographic Advantage Act (Act 21 of 2007)</p>	<ul style="list-style-type: none"> <li>» Preservation and protection of areas within South Africa that are uniquely suited for optical and radio astronomy.</li> <li>» In terms of section 7(1) and 7(2) of this Act, the Minister declared core astronomy advantage areas on 20 August 2010 under Regulation No. 723 of Government Notice No. 33462. In this regard, all land within a 3 kilometres radius of the centre of the Southern African large Telescope dome falls under the Sutherland Core Astronomy Advantage Area. The declaration also applies to the core astronomy advantage area containing the MeerKAT radio telescope and the core of the planned Square Kilometre Array (SKA) radio telescope. The study area does not fall within the 3 km radius of SALT or within an area which could affect the MeerKAT and SKA developments.</li> <li>» Under Section 22(1) of the Act the Minister has the authority to protect the radio</li> </ul>	<p>Department of Science and Technology</p>	<p>The study area falls within the Northern Cape. SARAO should be consulted as a key stakeholder to confirm that the project will not impact on the SKA and to determine any specific requirements.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>frequency spectrum for astronomy observations within a core or central astronomy advantage area. As such, the Minister may still under section 23(1) of the Act, declare that no person may undertake certain activities within a core or central astronomy advantage area. These activities include the construction, expansion or operation of any fixed radio frequency interference source, facilities for the generation, transmission or distribution of electricity, or any activity capable of causing radio frequency interference or which may detrimentally influence the astronomy and scientific endeavour.</p>		
<b>Provincial Policies / Legislation</b>			
<p>Northern Cape Nature Conservation Act 9 of 2009.</p>	<p>This Act To provide for the sustainable utilisation of wild animals, aquatic biota and plants; to provide for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; to provide for offences and penalties for contravention of the Act; to provide for the appointment of nature conservators to implement the provisions of the Act; to provide for the issuing of permits and other authorisations; and to provide for matters connected therewith.</p> <p>Amongst other regulations, the following may apply to the current project:</p> <ul style="list-style-type: none"> <li>» Restricted activities involving specially protected animals</li> </ul>	<p>Northern Cape DEDECT Cape Nature</p>	<p>A collection/destruction permit must be obtained from Cape Nature for the removal of any protected plant or animal species found on site.</p> <p>The desktop survey highlighted the presence of protected fauna and flora. Refer to the Ecological Scoping Study (<b>Appendix D</b>). Their presence will be verified during the field study conducted for the EIA phase and further impacts will be further assessed during the EIA phase.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<ul style="list-style-type: none"> <li>» 17. Keeping of wild animals in captivity</li> <li>» 18. Release of certain wild animals</li> <li>» 19. Manipulation of boundary fences</li> <li>» 23. Auctioning of certain wild animals</li> <li>» 26. Prohibitions regarding wild animals</li> <li>» SUSTAINABLE UTILISATION OF PLANTS</li> <li>» Restricted activities involving specially protected plants</li> <li>» Picking, receipt, possession, acquisition or handling of indigenous plants</li> <li>» CHAPTER 7</li> <li>» Invasive plant species</li> </ul> <p>The Act provides lists of protected species for the Province.</p>		

### 7.8.1 Best Practice Guidelines Agriculture and Land Capability (2020)

From an agricultural perspective, current and historical cultivation activities undertaken within the study area need to be considered as the National Department of Agriculture consider the loss of agricultural land to the development of solar energy facilities as a potential issue in terms of food security within South Africa.

The major concern from an agricultural perspective with any development is the possible loss of high potential agricultural land, and this is linked to the land types for the study area. Hence when considering the potential for agricultural activities within the study area, the potential of the landtypes for the undertaking of agricultural activities needs to be considered in order to understand what limitations are associated with the area.

National Department of Agriculture in principle does not support any renewable energy related footprint in high potential or cultivated agricultural land. Within the context of South Africa's very limited availability of arable land, National Department of Agriculture considers any land that is capable of consistently and sustainably producing agricultural crops to be high potential agricultural land. According to this definition, any land that has been cultivated at least once in the past 10 years, or has the potential to be cultivated in future, is restricted in terms of renewable energy development, and must comply with current Department of Agriculture internal guidelines.

The Department of Environmental Affairs prescribes 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. The DFFE undertook a Strategic Environmental Assessment for Wind and Solar PV Energy in South Africa, 2015, for the effective and efficient roll- out of large-scale wind and solar development in South Africa. The SEA process was undertaken in specific areas referred to as the Renewable Energy Development Zones (REDZs) as published under Government Notice No. 114, Gazette No. 41445 on 16 February 2018 and GNR 144 (February 2021). This process identified potential environmental sensitivities of the areas to renewable energy development. The sensitivities were refined through further public consultation and stakeholder interaction and have been captured in the DFFE screening tool.

From an agricultural potential perspective, allowable development limits were defined through the SEA process to allow for reasonably small footprints of renewable energy development to be allowed on appropriate agricultural land. These allowable development limits refer to the area of a particular land capability that can be directly impacted (i.e., taken up by the physical footprint) by a renewable energy development. Physical footprint in this context is the area that is directly occupied by all infrastructure, including roads, hard standing areas, buildings, substations, etc. that is associated with the renewable energy generation facility during its operational phase, and that result in the exclusion of that land from potential cultivation or grazing. It excludes all areas that were already occupied by roads and other infrastructure prior to the establishment of the renewable energy facility but includes the surface area required for expanding existing infrastructure (e.g., widening existing roads). It excludes the corridor underneath overhead power lines but includes the pylon footprints. It therefore represents the total land that is excluded from agricultural use because of the renewable energy facility. **Figure 7.3** outlines the allowable development limits for renewable energy developments as defined by the DFFE.

<b>Table 1: Allowable development limits for renewable energy generation developments generating electricity of 20 MW or more</b>		
<b>Criteria (land capability evaluation value and category of crop boundary)</b>	<b>Allowable development limits in hectares per MW of installed generation capacity (with sensitivity ratings from the national web based environmental screening tool shown in brackets)</b>	
	<b>Within field crop boundaries</b>	<b>Outside field crop boundaries</b>
Land capability evaluation value of 11 – 15; Irrigation, horticulture/viticulture, shade-net; high value agricultural areas with a priority rating A and/or B	0 (Very High Sensitivity)	0 (Very High Sensitivity)
Land capability evaluation value of 8 – 10; all cultivated areas including sugarcane; high value agricultural areas with a priority rating C and/or D	0.20 (High Sensitivity)	0.35 (Medium Sensitivity)
Land capability evaluation value of 6 - 7;	0.25 (High Sensitivity)	2.50 (Low Sensitivity)
Land capability evaluation value of 1 - 5;	0.30 (High Sensitivity)	2.50 (Low Sensitivity)

**Figure 7.3: Details the allowable development limits for RE developments of 20MW or more in hectares** (Source: DFFE Screening (2020). GN320 Protocol for the specialist assessment and minimum report content requirements of environmental impacts on agricultural resources by onshore wind and/or solar photovoltaic energy generation facilities where the electricity output is 20 megawatts or more).

<b>MEDIUM SENSITIVITY RATING</b> - Land capability evaluation values of 6 – 7. Medium sensitivity areas are likely to be very marginal arable land.	
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**7.8.2 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 7.6** is taken from the best practise guidelines and provides a summary of the recommended assessment regimes in relation to proposed solar energy technology, project size, and likely risk).

**Table 7.2:** 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.



Type of technology*	Size**	Avifaunal Sensitivity***		
		Low	Medium	High
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 <ol style="list-style-type: none"> <li>1) Avifaunal habitat (e.g. a wetland, nesting or roost sites) of local significance.</li> <li>2) A locally significant population of a priority species.</li> <li>3) A locally significant bird movement corridor.</li> </ol> An area would be considered to be of low avifaunal sensitivity if it 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, an austral winter season and an austral summer season bird monitoring survey will be conducted in line with Regime 2 for the Zionsheuve Solar PV Facility. The austral winter season survey has already been conducted; the findings has been used to inform the avifauna scoping report completed for the Scoping phase. The result from the austral summer season survey will be used to inform both the development footprint as well as Avifauna Impact Assessment report, to be completed for the EIA Report.

### 7.8.3 The IFC Environmental Health and Safety (EHS) Guidelines

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

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

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

The General EHS Guidelines include consideration of the following:

- » Environmental:
  - \* Air Emissions and Ambient Air Quality
  - \* Energy Conservation
  - \* Wastewater and Ambient Water Quality
  - \* Water Conservation
  - \* Hazardous Materials Management
  - \* Waste Management
  - \* Noise
  - \* Contaminated Land

- » Occupational Health and Safety:
  - \* General Facility Design and Operation
  - \* Communication and Training
  - \* Physical Hazards
  - \* Chemical Hazards
  - \* Biological Hazards
  - \* Radiological Hazards
  - \* Personal Protective Equipment (PPE)
  - \* Special Hazard Environments
  - \* Monitoring
- » Community Health and Safety:
  - \* Water Quality and Availability
  - \* Structural Safety of Project Infrastructure
  - \* Life and Fire Safety (L&FS)
  - \* Traffic Safety
  - \* Transport of Hazardous Materials
  - \* Disease Prevention
  - \* Emergency Preparedness and Response
- » Construction and Decommissioning:
  - \* Environment
  - \* Occupational Health & Safety
  - \* Community Health & Safety

#### **7.7.4 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. consulting 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 8: 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, Zionsheuvél 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 EIA process is being conducted.

### 8.1 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
2(1)(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 proposed development 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 the proposed project. This is included in <b>Section 8.2</b> .
	» The climatic conditions for the De Aar area have been included in <b>Section 8.3</b> .
	» The biophysical characteristics of the project site and the surrounding areas are included in <b>Section 8.4</b> . 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 <b>Section 8.5</b> .
	» The social and socio-economic characteristics associated with the broader study area and the project site has been included in <b>Section 8.6</b>
	» The visual quality, land-use and settlement patterns of the affected environment has been included in <b>Section 8.7</b>
» The current traffic conditions for the area surrounding the project have been included in <b>Section 8.8</b>	

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

### 8.2. Regional Setting

The Zionsheuvél Solar PV Facility development area is located approximately 20km north of Philipstown and 30km west of Petrusville within the Renosterberg Local Municipality and the Pixley Ka Seme District Municipality in the Northern Cape Province.

The vast and arid Northern Cape is the largest province in South Africa and covers an area of 372 889km<sup>2</sup> taking up nearly a third of the country's land area and constitutes approximately 30% of South Africa. The province is divided into five district municipalities (DM), namely, Frances Baard, Karoo, Namakwa, Pixley Ka

Seme and ZF Mgcawu District Municipality (known before 1 July 2013 as Siyanda DM). The site itself is located in the Pixley Ka Seme DM.

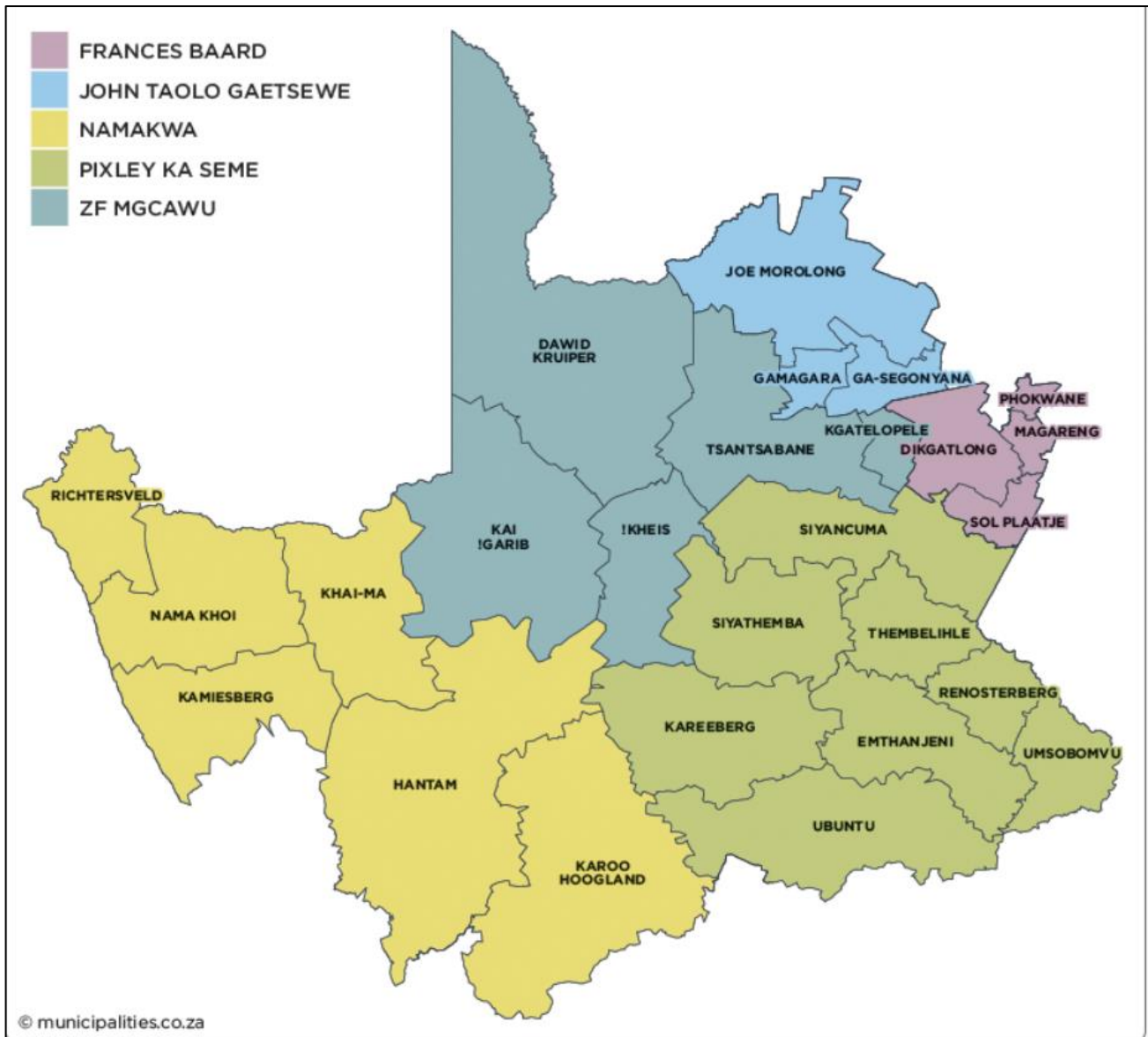
The Northern Cape has a population of 1 193 780, the least populous of South Africa's provinces. It is bordered by Namibia and Botswana to the north, and also by the Northwest, Free State, Eastern Cape and Western Cape provinces. The cold Atlantic Ocean forms the province's western boundary.

The capital city is Kimberley. Other important towns are Upington, centre of the karakul sheep and dried-fruit industries, and the most northerly winemaking region of South Africa; Springbok, in the heart of the Namaqualand spring-flower country; Kuruman and De Aar, the second most important junction of South Africa's railway network. Sutherland is host to the southern hemisphere's largest astronomical observatory; the multinational sponsored Southern African Large Telescope.

The Northern Cape is rich in minerals. Alluvial diamonds are extracted from the beaches and the sea between Alexander Bay and Port Nolloth. The Sishen Mine near Kathu is the biggest source of iron ore in South Africa, while the copper mine at Okiep is one of the oldest mines in the country. Copper is also mined at Springbok and Aggeneys. The province is rich in asbestos, manganese, fluorspar, semi-precious stones and marble.

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 Northern Cape is divided into five district municipalities and further subdivided into 26 local municipalities. **(Refer to Figure 8.1)**



**Figure 8.1:** Map showing the municipalities of the Northern Cape Province (Source: [www.municipalities.co.za](http://www.municipalities.co.za)).

The study area is located within the Renosterberg Local Municipality (RLM), which falls within the greater Pixley Ka Seme District Municipality (PKSDM) (**Figure 8.2**). The PKSDM is made up of eight category B local municipalities which include Emthanjeni, Kareeberg, Thembelihle, Siyathemba, Ubuntu, Siyancuma and Umsobomvu municipalities. De Aar is the administrative seat of the PKSDM. The administrative seat of the RLM is Petrusville.

The Renosterberg Local Municipality is a Category B municipality located in the Pixley Ka Seme District of the Northern Cape, known as the Karoo region. It is the smallest of eight municipalities in the district, making up only 5% (Area: 5 529km<sup>2</sup>) of its geographical area.

The nearest town, Petrusville is a typical upper Karoo semi-desert suburb with flat hilltops. The region is also rich with history and culture. The Dutch Reformed Church Museum exhibits century-old clothing and a horse-drawn hooded cart. The Pillar Fountain was erected to honour King Edward VII. Most of the original town

dwelling are simple structures with a prominent, covered veranda as protection against the sun. The more elaborate homes have traces of Victorian style, but still maintain a Karoo-like integrity.

In the Karoo Battlefields, the bitter conflict brought about by the Anglo-Boer War (1899-1902) has left its mark in world history. The best-marked and most accessible sights form part of the N12 Battlefields Route, which links the Karoo to the Diamond Fields. National Monuments include the old prison museum, the magistrate's offices, the Reformed Church, and Teichhouse. Vanderkloof Dam attracts tourists for angling and water-related sports.

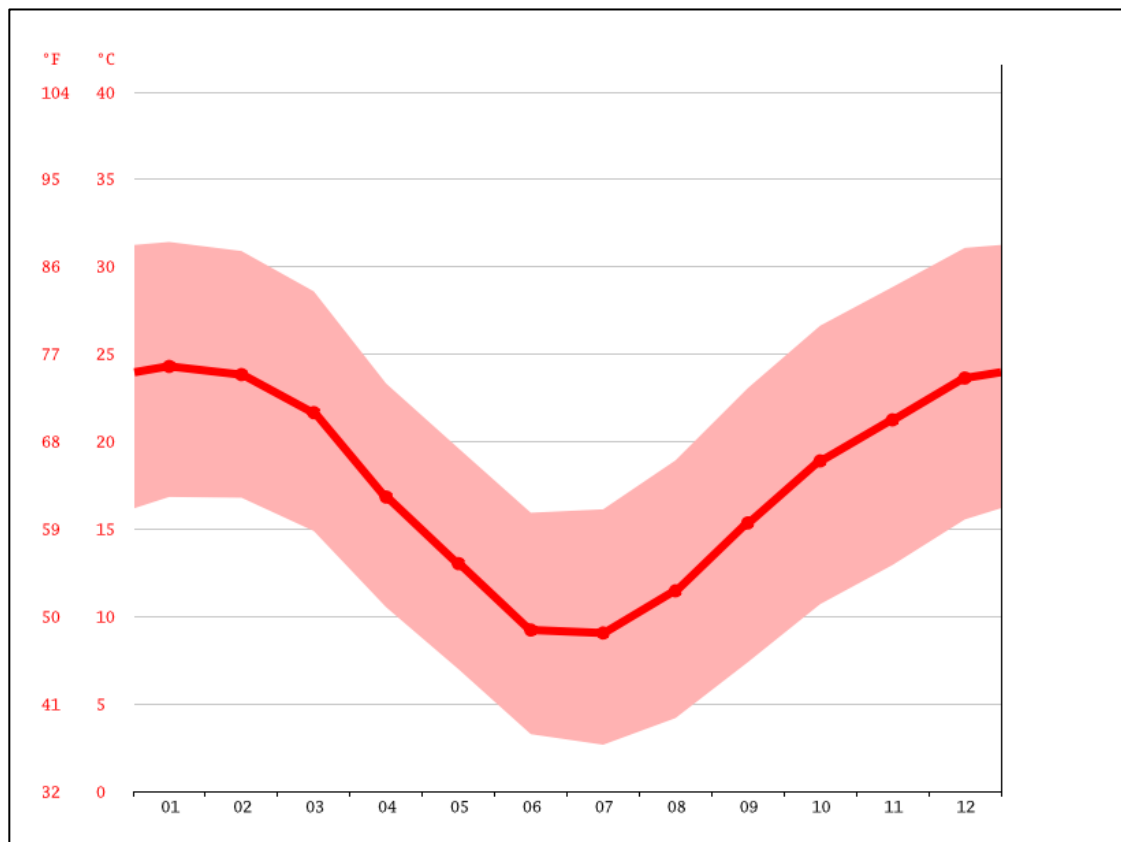
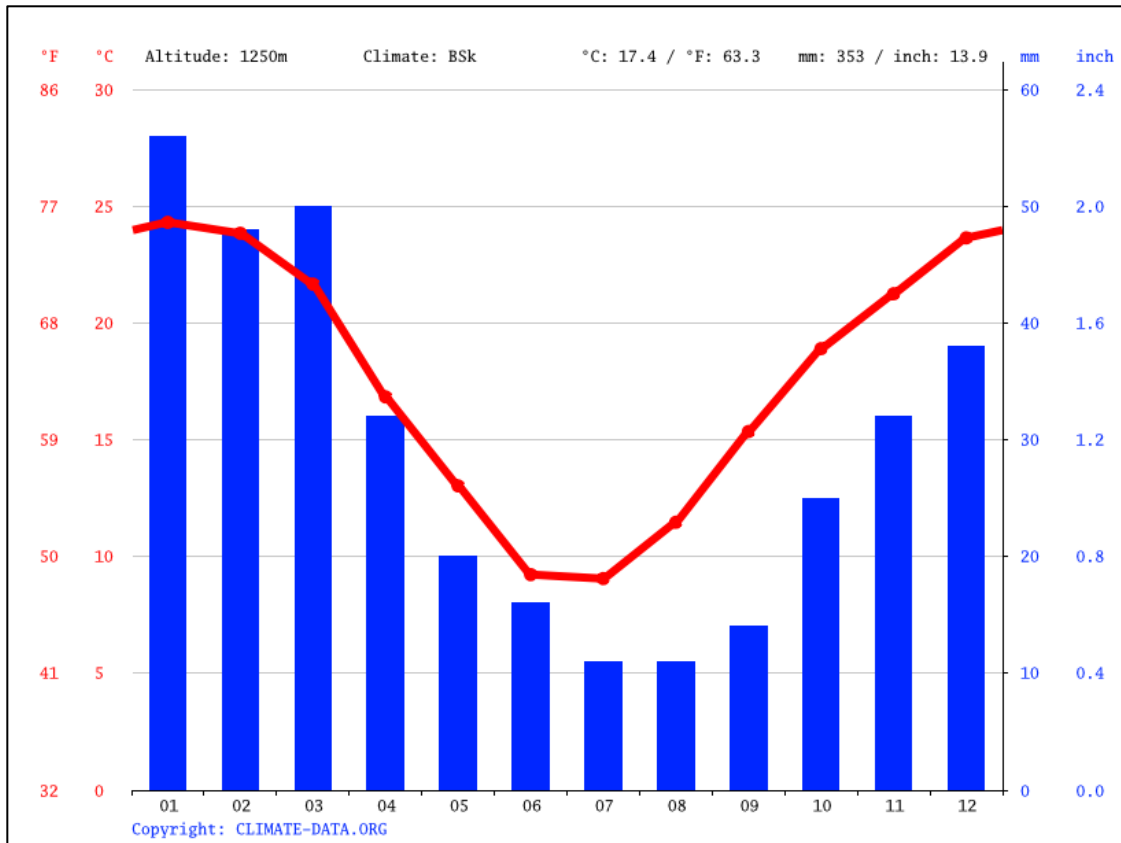
It is regarded as one of the most beautiful regions in the province. It enjoys warm winter days, cool evening temperatures and rainfall during the winter season. The summers are hot to very hot and dry.



**Figure 8.2:** Location of the Renosterberg Local Municipality within the Pixley Ka Seme District Municipality (Source: [www.municipalities.co.za](http://www.municipalities.co.za)).

### 8.3. Climatic Conditions

Climate data for the De Aar area was used as a baseline for this report. De Aar is located approximately 33km southwest of the project site. The climate within the De Aar region is semi-arid, with the study area receiving between 320mm and 433mm of rainfall per annum. Land cover is primarily low shrubland with patches of bare rock and soil in places. Some degraded land is evident along the hills within the area, particularly around Jagpoort and Tierberg in the south. Vegetation types include Northern Upper Karoo on the flat terrain within the study area, and Besemkaree Koppies Shrubland on the more elevated terrain and hills. The climate here is considered to be a local steppe climate. During the year there is little rainfall. This location is classified as BSk by Köppen and Geiger. The average annual temperature is 17.4 °C. About 353 mm of precipitation falls annually.



**Figure 8.3:** Climate and Temperature graphs for De Aar area, Northern Cape Province (Source: en.climate-data.org).



The driest month is July, with 11 mm of rain. Most of the precipitation falls in January, averaging 56 mm. January is the warmest month of the year. The temperature in January averages 24.3 °C. July is the coldest month, with temperatures averaging 9.1 °C.

**Table 8.1:** Climate data for De Aar area, Northern Cape Province (Source: en.climate-data.org).

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C	24.3 °C	23.8 °C	21.7 °C	16.8 °C	13 °C	9.2 °C	9.1 °C	11.5 °C	15.3 °C	18.9 °C	21.2 °C	23.6 °C
(°F)	(75.7) °F	(74.9) °F	(71) °F	(62.3) °F	(55.4) °F	(48.6) °F	(48.3) °F	(52.6) °F	(59.6) °F	(66) °F	(70.2) °F	(74.5) °F
Min. Temperature °C (°F)	16.8 °C (62.3) °F	16.8 °C (62.2) °F	14.9 °C (58.8) °F	10.5 °C (51) °F	7 °C (44.6) °F	3.3 °C (37.9) °F	2.7 °C (36.8) °F	4.2 °C (39.5) °F	7.4 °C (45.3) °F	10.7 °C (51.3) °F	12.9 °C (55.3) °F	15.5 °C (60) °F
Max. Temperature °C	31.4 °C	30.9 °C	28.6 °C	23.3 °C	19.6 °C	15.9 °C	16.1 °C	18.9 °C	23.1 °C	26.6 °C	28.8 °C	31.1 °C
(°F)	(88.6) °F	(87.6) °F	(83.5) °F	(74) °F	(67.3) °F	(60.7) °F	(61) °F	(66.1) °F	(73.5) °F	(79.9) °F	(83.9) °F	(88) °F
Precipitation / Rainfall	56	48	50	32	20	16	11	11	14	25	32	38
mm (in)	(2)	(1)	(1)	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(1)	(1)
Humidity(%)	36%	38%	42%	47%	49%	52%	45%	37%	29%	29%	29%	30%
Rainy days (d)	5	6	5	4	2	2	2	2	2	3	3	4
avg. Sun hours (hours)	11.9	11.2	10.4	9.3	8.8	8.3	8.6	9.3	10.2	11.1	11.9	12.3

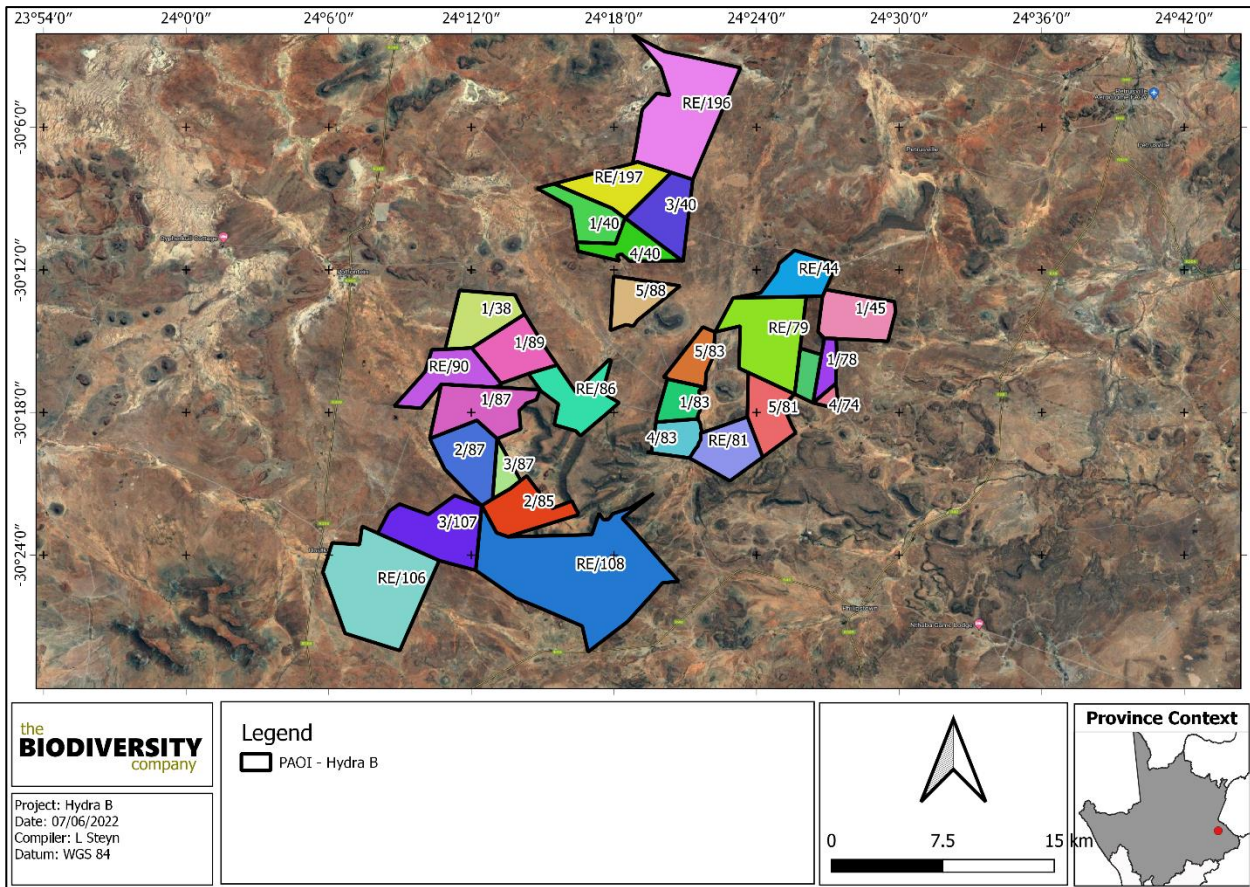
#### 8.4. Biophysical Characteristics of the Study Area and Development Area

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-I**) undertaken for this Scoping Report. **Figure 8.4** highlights the Project Area of Influence (PAOI) known as Portion 3 of the Farm Grass Pan 40 as presented in the following subsections.

A summary of ecological features and habitat characteristics pertinent to the Zionsheuvel Solar PV facility is summarised in **Table 8.2**. These ecological features pertain to the respective farm portions, namely

**Table 8.2:** Summary of relevance of the PAOI to ecologically important landscape features

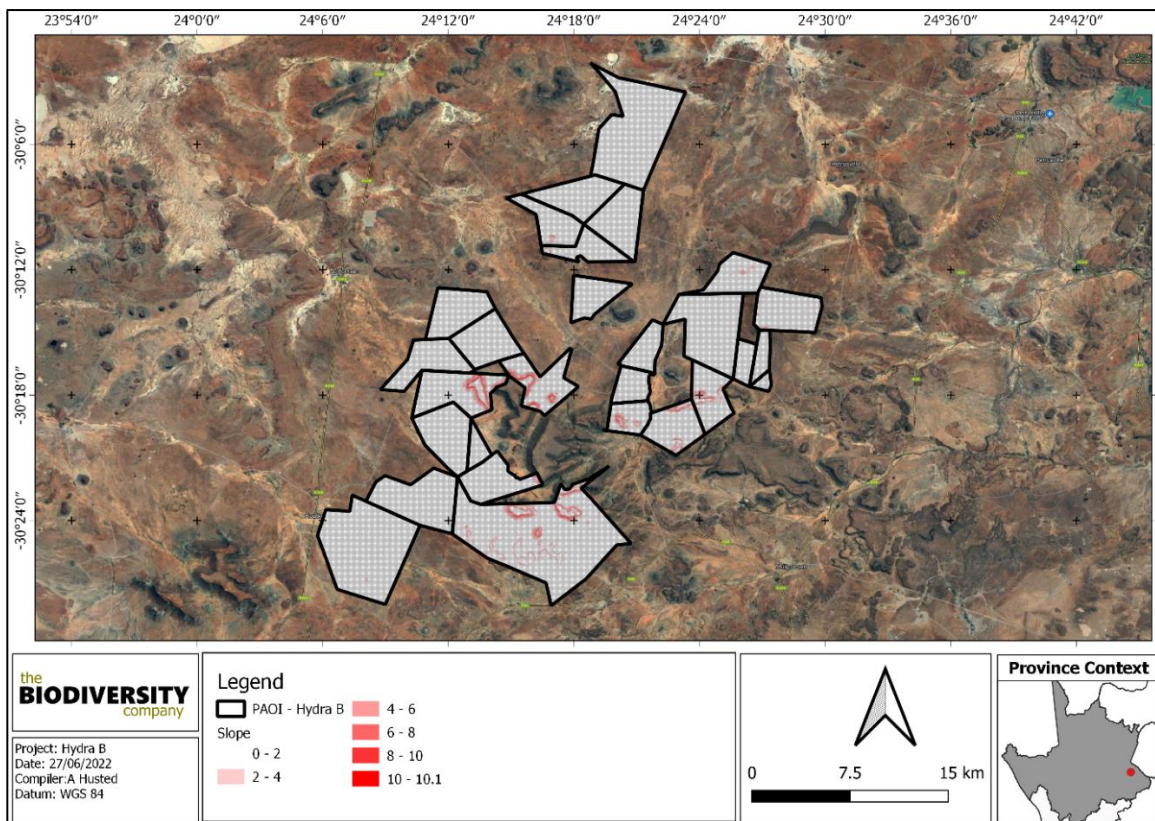
Desktop Information Considered	Relevant/Irrelevant
Ecosystem Threat Status	Relevant – Overlaps with a Least Concern ecosystem
Protected Areas	Irrelevant – The project area does not overlap with a protected area
Renewable Energy Development Zones	Irrelevant - The project area is not within a REDZ
Powerline Corridor	Relevant- The project area falls within the Central Corridor
National Protected Areas Expansion Strategy	Irrelevant – The project area does not overlap with a NPAES protected area
Important Bird and Biodiversity Areas	Relevant – The project area is located in the Platberg-Karoo Conservancy IBA
Strategic Water Source Areas	Irrelevant- The project area is not located in a SWSA



**Figure 8.4:** Farm portions affected by the Hydra B Renewable Energy Cluster also known as Crossroads Green Energy Cluster Development highlighting the Project Area of Interest (PAOI)

**8.4.1. Topographical profile**

The slope percentage of the project area has been calculated and is illustrated in **Figure 8.5**. Most of the area is characterised by a slope percentage between 0 and 2%. This illustration indicates a uniform topography with gentle slopes being present within the project area. Steep slopes (> 4%) area associated with the mountains and ridges (Mesas and Inselbergs).



**Figure 8.5:** Slope percentage map for the Project Area of Influence (PAOI)

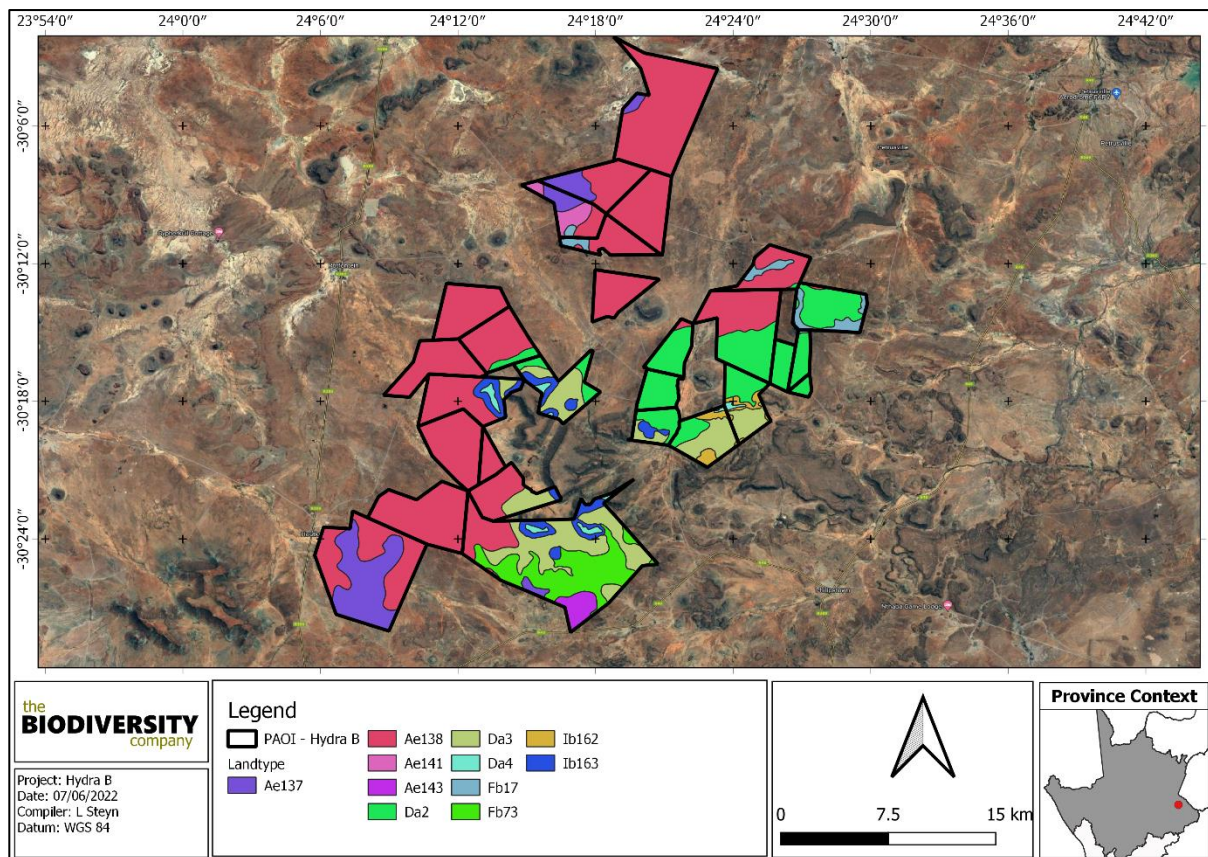
#### 8.4.2. Geology, Soils and Agricultural Potential

##### Geology Setting of the Project area

According to the land type database (Land Type Survey Staff, 1972 - 2006), the PAOI is located in the Ae, Da, Fb and Ib broad land types. The Ae land type consists of red-yellow apedal soils which are freely drained. The soils tend to have a high base status and is deeper than 300 mm. The Da land type is characterised by prismatic 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. The Ib land type consists of miscellaneous land classes including rocky areas with miscellaneous soils.

The broad land types for the area are illustrated in **Figure 8.6** with a description of the land types listed in **Table 8.3**.





**Figure 8.6:** Illustration of broad land types for the PAOI (Land Type Survey Staff, 1972 - 2006)

**Table 8.3:** The descriptions for the broad land types (Land Type Survey Staff, 1972 - 2006)

Land Type	Description
Ae	RED, YELLOW APEDAL, FREELY DRAINED SOILS; Red, high base status > 300 mm deep (no dunes)
Da	PRISMACUTANIC AND/OR PEDOCUTANIC DIAGNOSTIC HORIZONS DOMINANT; Red B horizons
Fb	GLENROSA AND/OR MISPAH FORMS (other soils may occur); Lime rare or absent in upland soils but generally present in low-lying soils
Ib	MISCELLANEOUS LAND CLASSES; Rock areas with miscellaneous soils

As part of the desktop assessment, soil information was obtained using published South African Land Type Data. Land type data for the site was obtained from the Institute for Soil Climate and Water (ISCW) of the Agricultural Research Council (ARC) (Land Type Survey Staff, 1972 - 2006). The land type data is presented at a scale of 1:250 000 and comprises of the division of land into land types. The overall land capability sensitivity for the area ranges from low to medium (**Figure 8.7**).



**Figure 8.7:** The land capability sensitivity for the study area

### 8.4.3. Land Use

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, specifically sheep farming. A generalised land-use derived for the larger project area considering agricultural productivity includes:

- » Mining;
- » Bare areas;
- » Agriculture crops;
- » Natural veld;
- » Grazing lands;
- » Forest;
- » Plantation;
- » Urban;
- » Built-up;
- » Waterbodies; and
- » Wetlands.



### 8.4.4. Ecological Profile of the Study Area and the project site

#### Vegetation

The project area is situated in the Nama-Karoo Biome. It is a large, landlocked region that lies on the central plateau of the western half of South Africa and extends into south-eastern Namibia. In terms of climate, the Nama-Karoo Biome is arid and characterised by the presence of mostly nonperennial rivers, highly variable and unreliable low rainfall, and unpredictable and sometimes prolonged droughts (Booyesen & Rowswell 1983; Mucina & Rutherford, 2006). On the plains to the northeast, there are gradual transitions between the Nama-Karoo and Grassland Biomes, making the border between the two biomes difficult to map (Mucina & Rutherford, 2006).

Generally, the vegetation of the Nama-Karoo Biome is a filtered subset of the vegetation of surrounding biomes, including Savanna, Grassland, Fynbos, Succulent Karoo and Albany Thicket Biomes (Hilton-Taylor, 1987). The three most dominant floral families are Asteraceae, Fabaceae and Poaceae, similar to the vegetation structure of other arid and semi-arid areas (Mucina & Rutherford).

On a fine-scale vegetation type, the project area overlaps with three vegetation types, namely the Northern Upper Karoo (Nku 3), The Eastern Upper Karoo (Nku 4) and the Besemkaree Koppies Shrubland (Gh 4), with the conservation status of all vegetation types classified as Least Threatened.

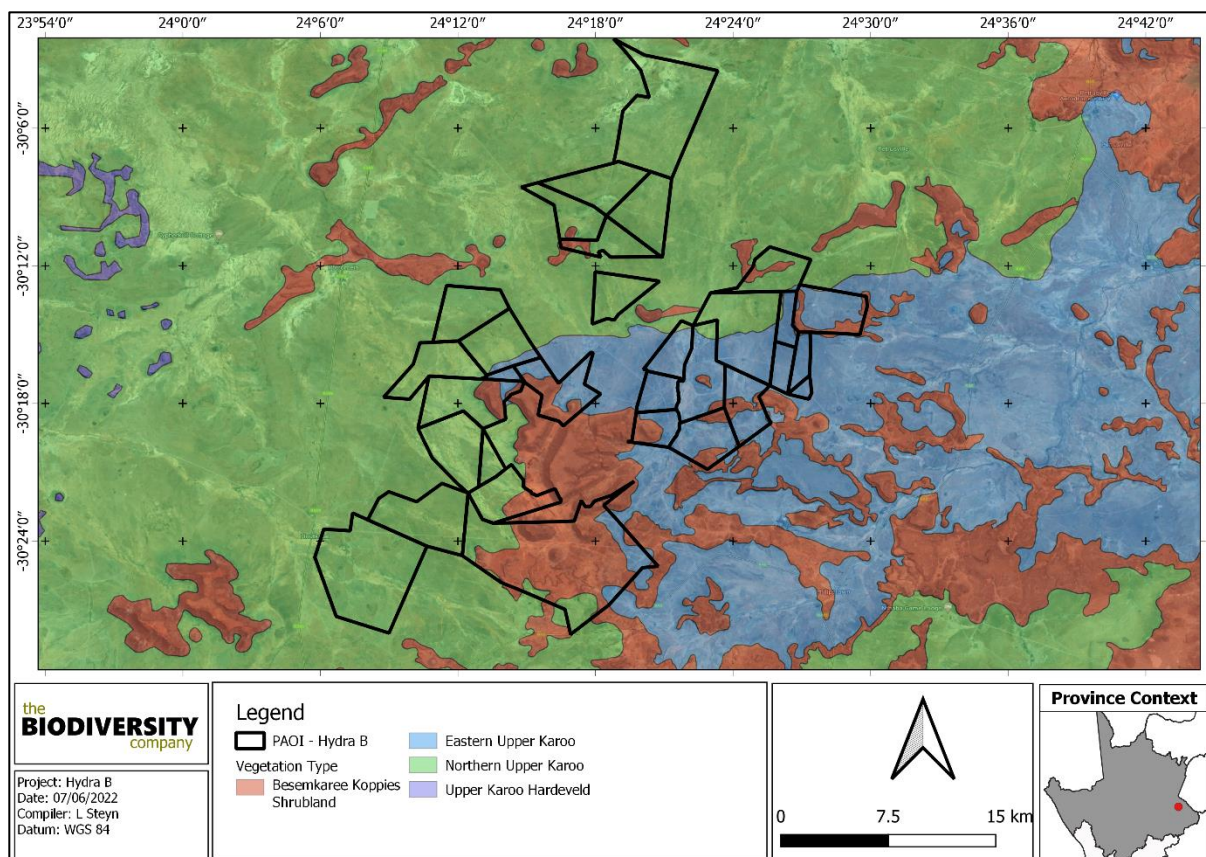
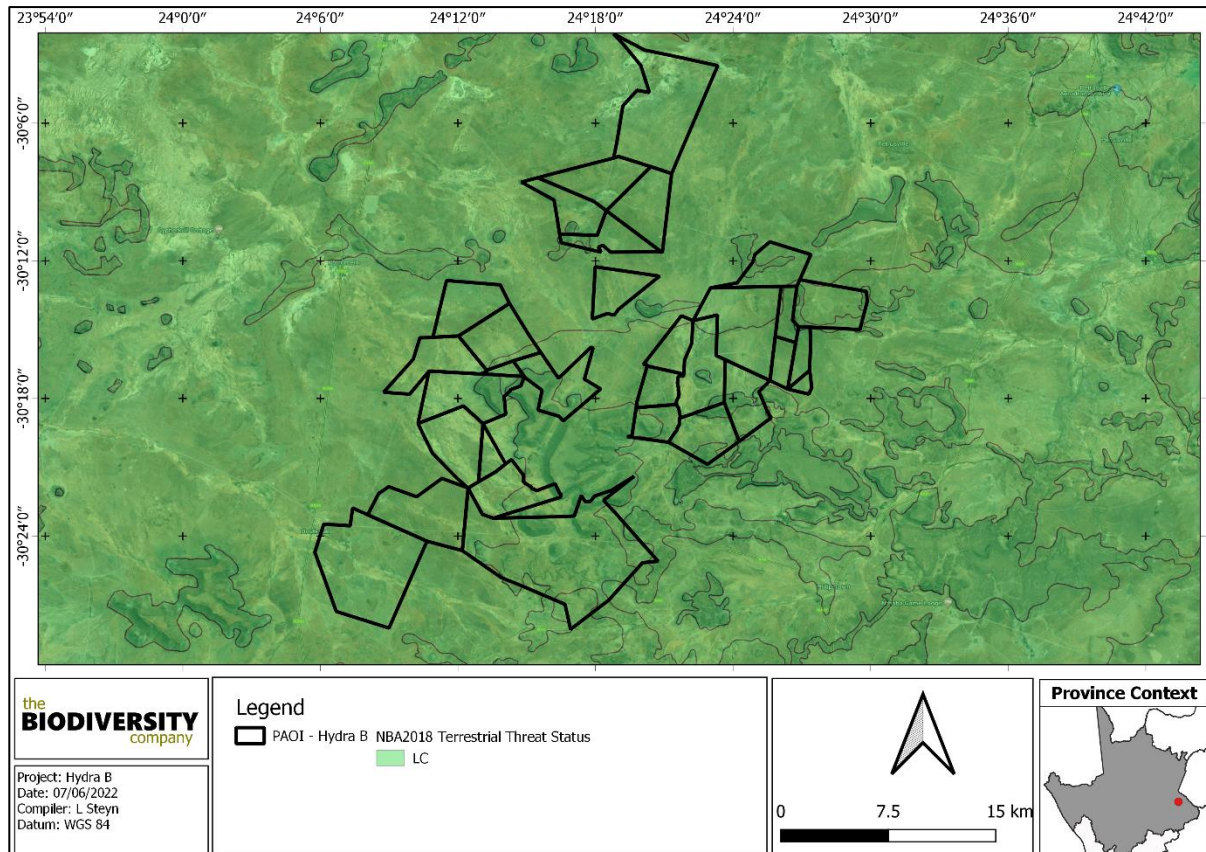


Figure 8.8: Vegetation types associated with the PAOI

### **Ecosystem Threat Status**

The Ecosystem Threat Status is an indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition. According to the spatial dataset the PAOI overlaps with a LC ecosystem (**Figure 8.9**).

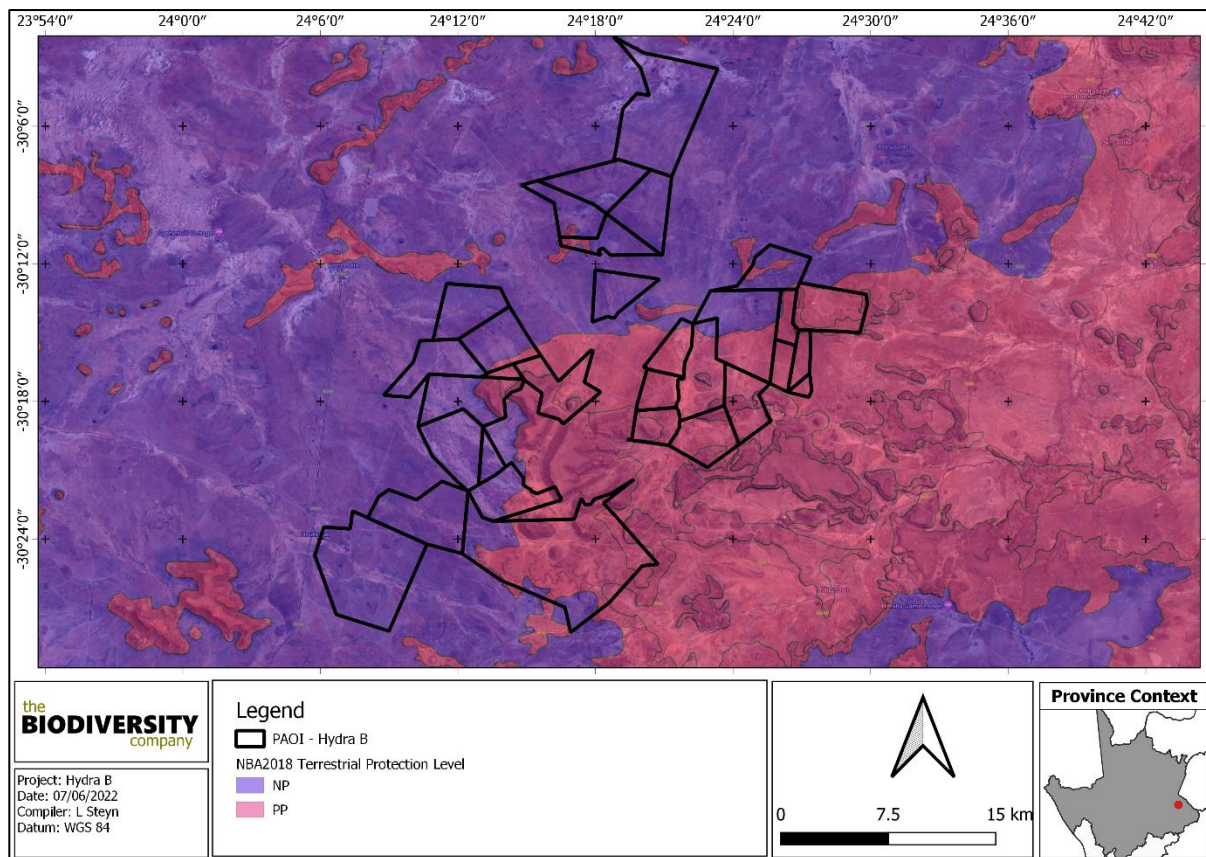


**Figure 8.9:** Map illustrating the ecosystem threat status associated with the PAOI

### **Ecosystem Protection Level**

This is an indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. NP, PP or MP ecosystem types are collectively referred to as under-protected ecosystems. The PAOI overlaps with a NP and PP ecosystems (**Figure 8.10**).





**Figure 8.10:** Map illustrating the ecosystem protection level associated with the PAOI

### **Critical Biodiversity Areas and Ecological Support Areas**

The key output of a systematic biodiversity plan is a map of biodiversity priority areas. The CBA map delineates Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs), Other Natural Areas (ONAs), Protected Areas (PAs), and areas that have been irreversibly modified from their natural state.

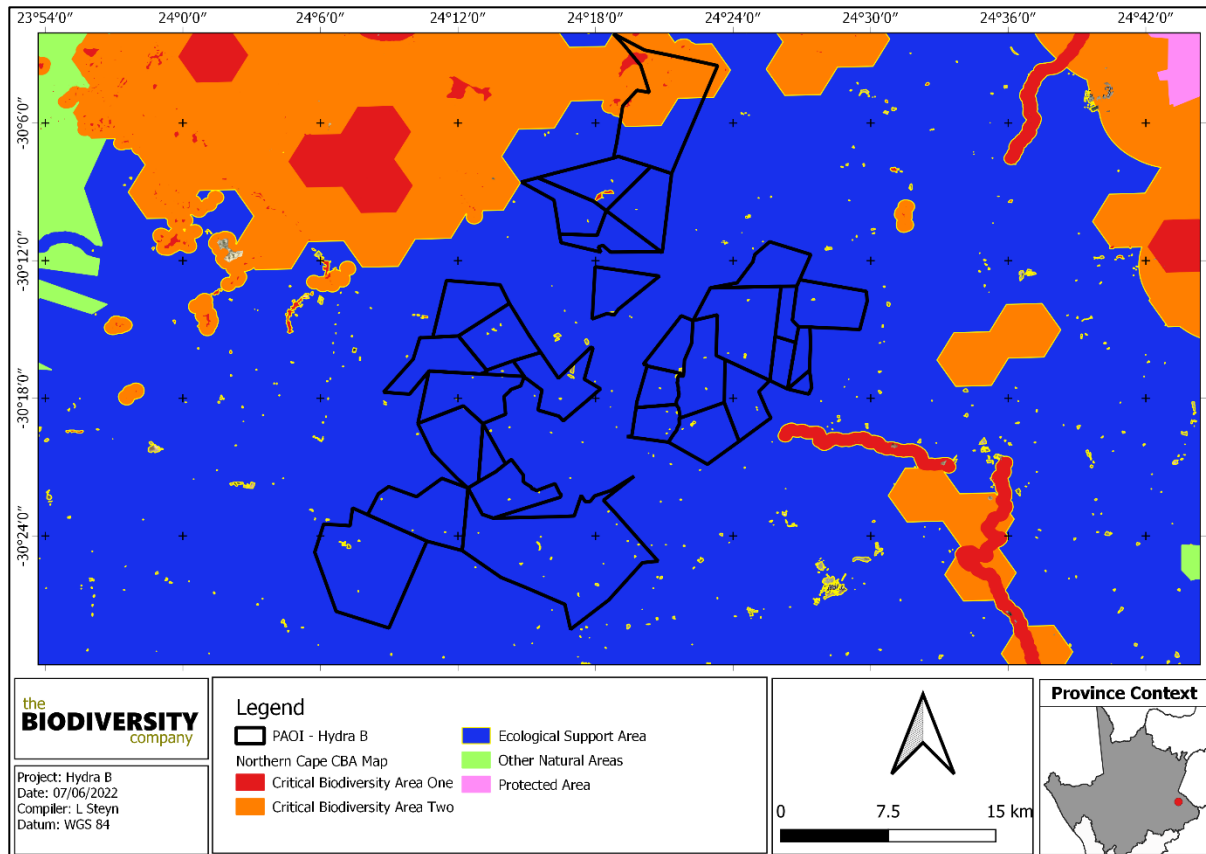
Critical Biodiversity Areas (CBAs) are terrestrial and aquatic areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. CBAs are areas of high biodiversity value and need to be kept in a natural state, with no further loss of habitat or species. Thus, if these areas are not maintained in a natural or near natural state then biodiversity targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity compatible land uses and resource uses (SANBI-BGIS, 2017).

Ecological Support Areas (ESAs) are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services. Critical Biodiversity Areas and Ecological Support Areas may be terrestrial or aquatic (SANBI-BGIS, 2017).

Other Natural Areas (ONAs) consist of all those areas in good or fair ecological condition that fall outside the protected area network and have not been identified as CBAs or ESAs. A biodiversity sector plan or bioregional plan must not specify the desired state/management objectives for ONAs or provide land-use guidelines for ONAs (SANBI-BGIS, 2017).



**Figure 8.11** shows the greater Project Area of Influence (PAOI) superimposed on the Terrestrial CBA maps. The PAOI is dominated by areas classified as ESAs, with CBAs located to the north and east of the area. Smaller (isolated) unclassified areas are scattered across the PAOI. The development area for the ZionsheuveSolar PV Facility overlaps ESA areas.



**Figure 8.11:** Map illustrating the locations of conservation areas in the PAOI

### **Important Bird and Biodiversity Area**

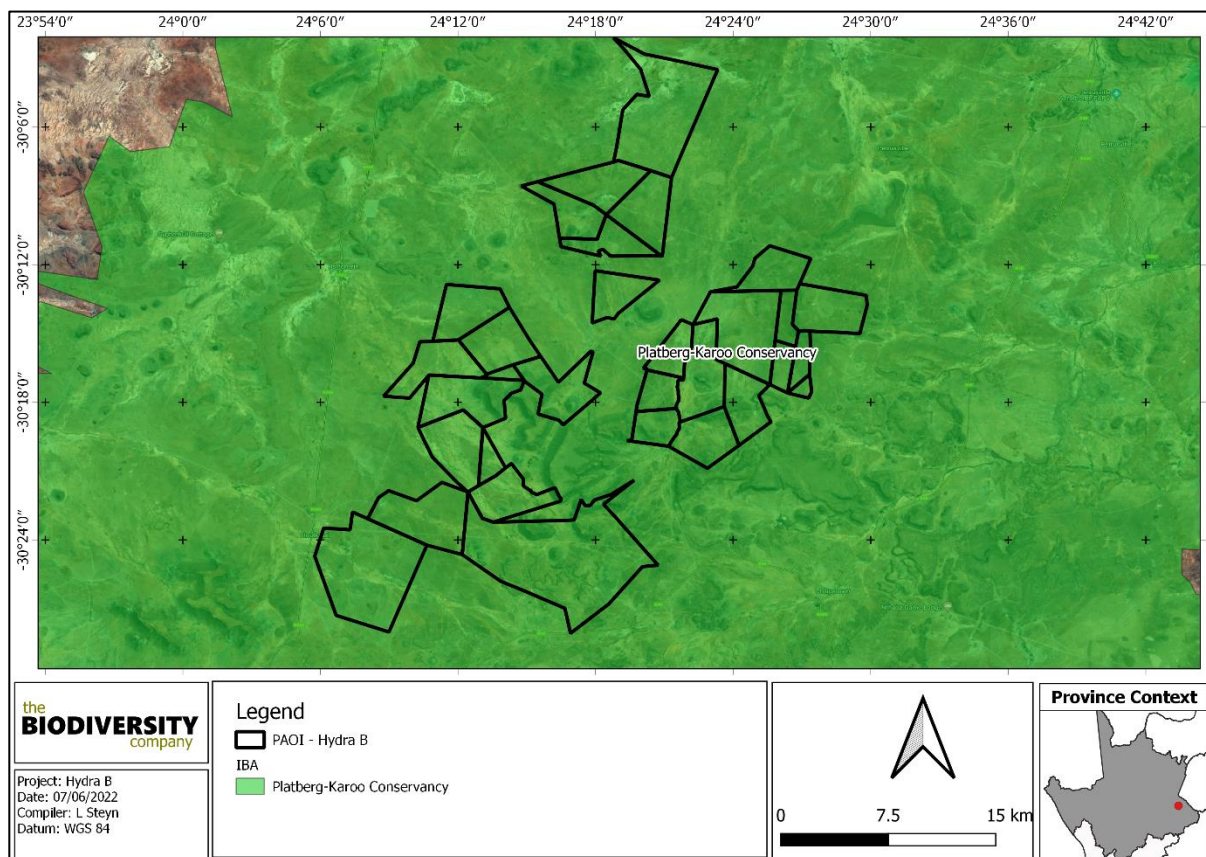
Important Bird & Biodiversity Areas (IBAs) are the sites of international significance for the conservation of the world's birds and other conservation significant species as identified by Birdlife International. These sites are also all Key Biodiversity Areas; sites that contribute significantly to the global persistence of biodiversity (Birdlife, 2017).

According to Birdlife International (2017), the selection of IBAs is achieved through the application of quantitative ornithological criteria, grounded in up-to-date knowledge of the sizes and trends of bird populations. The criteria ensure that the sites selected as IBAs have true significance for the international conservation of bird populations and provide a common currency that all IBAs adhere to, thus creating consistency among, and enabling comparability between, sites at national, continental and global levels.

**Figure 8.12** shows that the project area is located 3.25 km northeast from the Platberg-Karoo Conservancy.

The Platberg–Karoo Conservancy IBA covers the entire districts of De Aar, Philipstown and Hanover, including suburban towns, and consists of extensive flat to gently undulating plains that are broken by dolerite hills and flat-topped inselbergs. It is used mainly for grazing and agriculture (Birdlife South Africa, 2015).

This IBA is important because it contributes significantly to the conservation of large terrestrial birds as well as raptors. These birds include Blue Crane (*Anthropoides paradiseus*), Ludwig's Bustard (*Neotis ludwigii*), Kori Bustard (*Ardeotis kori*), Blue Korhaan (*Eupodotis caerulescens*), Black Stork (*Ciconia nigra*), Secretarybird (*Sagittarius serpentarius*), Martial Eagle (*Polemaetus bellicosus*), Verreaux's Eagle (*Aquila verreauxii*) and Tawny Eagle (*A. rapax*) (Birdlife South Africa, 2015).



**Figure 8.12:** The extent of the PAOI in respect of the associated IBA

### **Hydrological Setting**

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was released with the 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' (Van Deventer *et al.*, 2019; Skowno *et al.*, 2019). The PAOI overlaps with EN and LT NBA rivers (**Figure 8.13**). The expected wetlands include depressions in isolated areas, which are classified as VU (**Figure 8.14**).



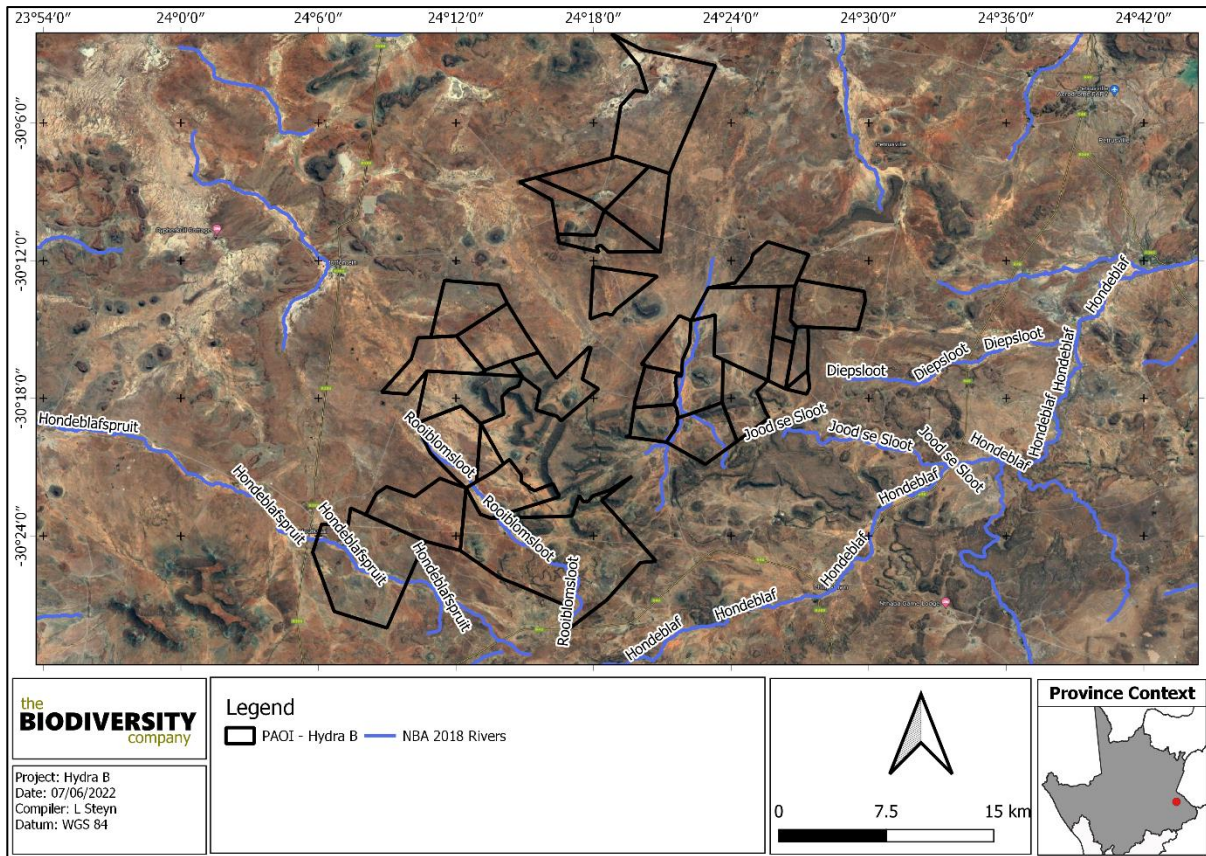


Figure 8.13: Map illustrating ecosystem threat status of rivers in the PAOI

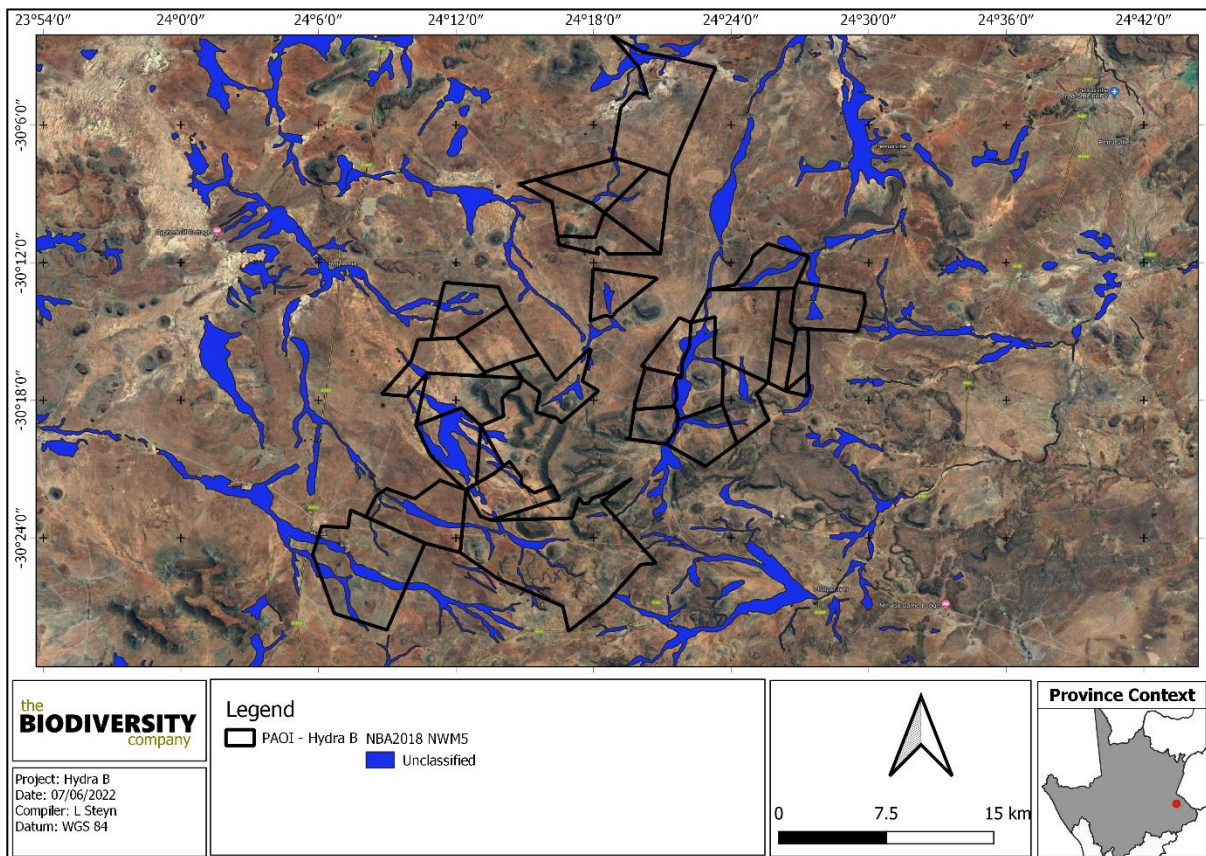


Figure 8.14: Map illustrating ecosystem threat status of wetland ecosystems in the PAOI



**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) (Driver *et al.*, 2011). 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 (Nel *et al.*, 2011).

Figure 8.15 shows the PAOI predominantly overlaps with unclassified FEPA wetlands, with classified (or priority) wetlands located predominantly to the north of the PAOI.

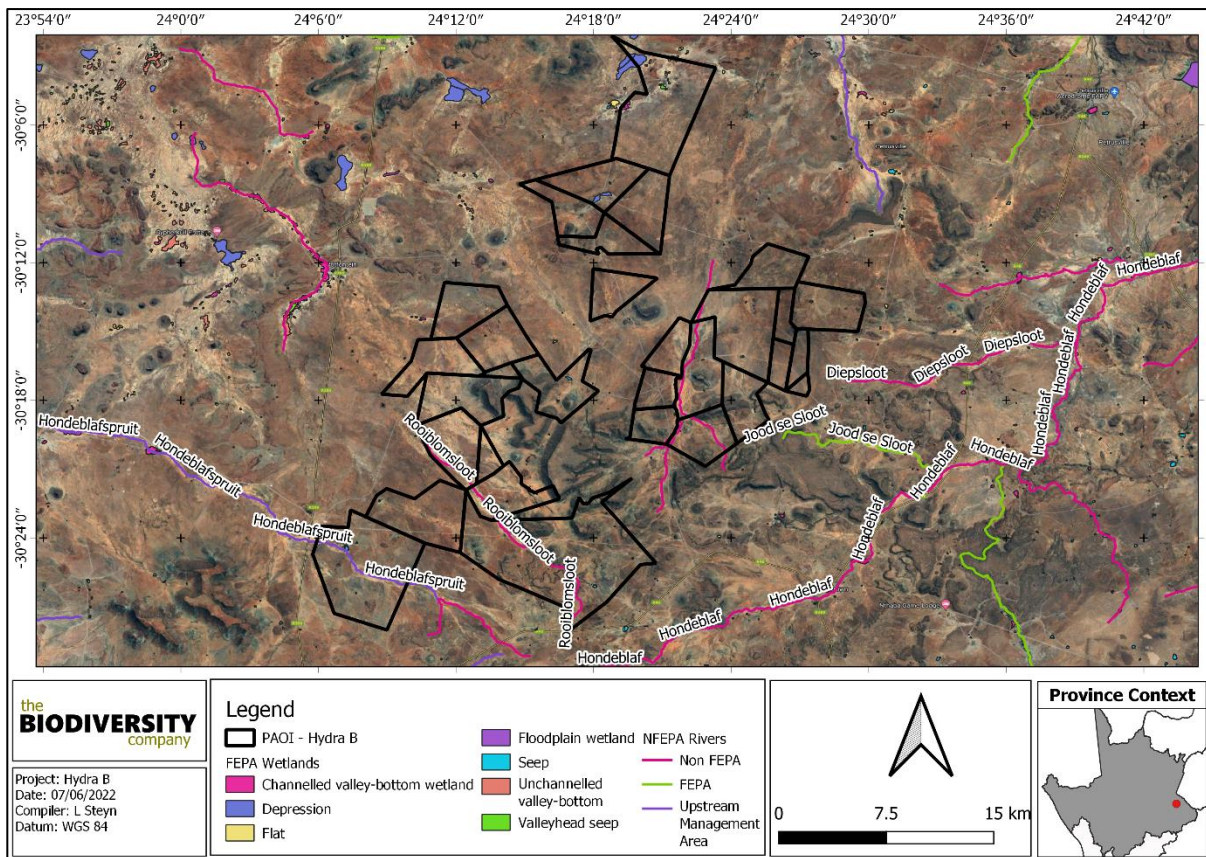


Figure 8.15: The PAOI in relation to the National Freshwater Ecosystem Priority Areas

**Flora Description**

The POSA database indicates that 507 species of indigenous plants are expected to occur within the project area (The full list of species will be provided in the final EIA report). No SCCs are expected in the project area, however protected tree such as camel thorn trees (*Vachellia erioloba*) might occur.

## Faunal Description

### Amphibians

Based on the IUCN Red List Spatial Data and AmphibianMap, 14 amphibian species are expected to occur within the area (The full list will be provided in the final assessment). One (1) is regarded as threatened (**Table 8.4**).

**Table 8.4:** Threatened amphibian species that are expected to occur within the project area

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
<i>Pyxicephalus adspersus</i>	Giant Bullfrog	NT	LC

### Reptiles

Based on the IUCN Red List Spatial Data and the ReptileMAP database, 42 reptile species are expected to occur within the area (The full list will be provided in the final assessment). One (1) is regarded as threatened (Error! Reference source not found. **8.5**).

**Table 8.5:** Threatened reptile species that are expected to occur within the project area

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
<i>Psammophis leightoni</i>	Cape Sand Snake	VU	LC

### Mammals

The IUCN Red List Spatial Data lists 58 mammal species that could be expected to occur within the area (The full list will be provided in the final assessment). This list includes large mammal species that are normally restricted to protected areas, as these were observed during the screening assessment. Eight (8) (smaller non protected area restricted species) of these expected species are regarded as threatened (Error! Reference source not found. **8.6**).

**Table 8.6:** Threatened mammal species that are expected to occur within the project area.

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
<i>Eidolon helvum</i>	African Straw-colored Fruit Bat	LC	NT
<i>Felis nigripes</i>	Black-footed Cat	VU	VU
<i>Leptailurus serval</i>	Serval	NT	LC
<i>Panthera pardus</i>	Leopard	VU	VU
<i>Parahyaena brunnea</i>	Brown Hyaena	NT	NT
<i>Parotomys littledalei</i>	Littledale's Whistling Rat	NT	LC
<i>Poecilogale albinucha</i>	African Striped Weasel	NT	LC
<i>Redunca fulvorufula</i>	Mountain Reedbuck	EN	EN

### Avifauna

The SABAP2 Data lists 227 avifauna species that could be expected to occur within the area (The full list will be provided in the final assessment). Twelve (12) of these expected species are regarded as threatened (Error! Reference source not found. **8.7**).

**Table 8.7:** Threatened avifauna species that are expected to occur within the project area

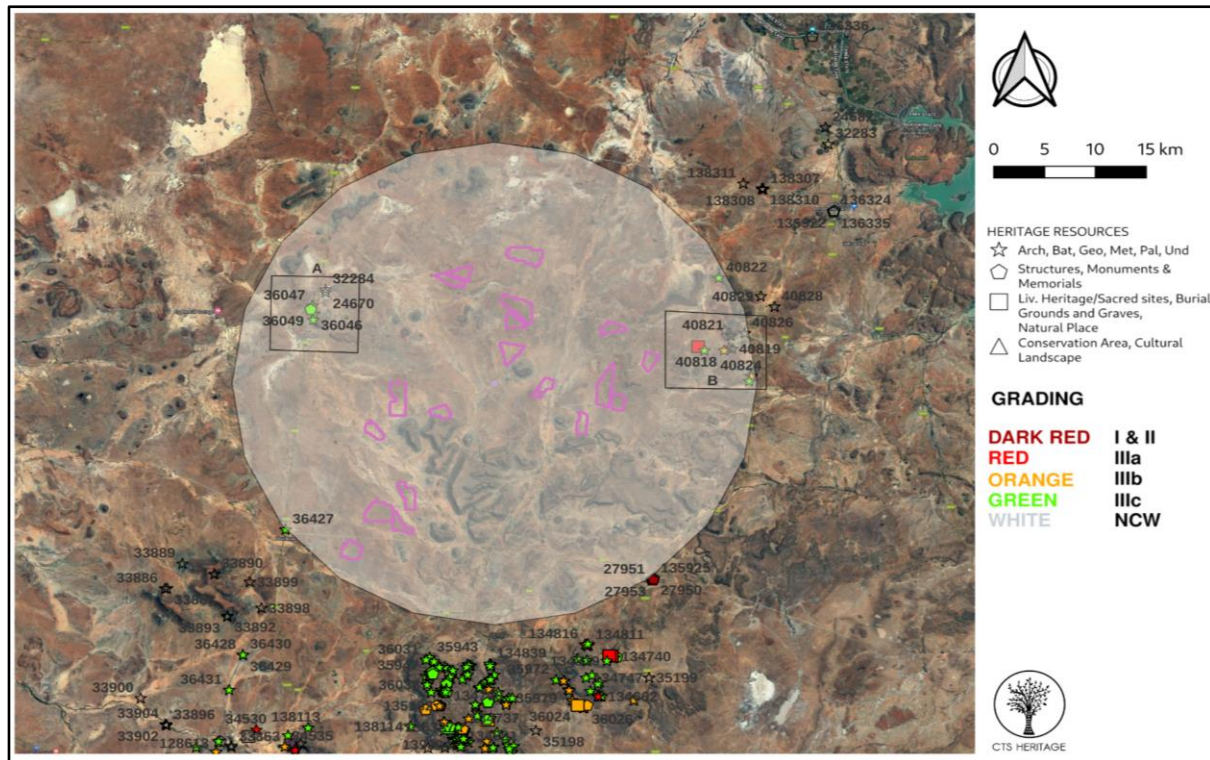
Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
<i>Anthus crenatus</i>	Pipit, African Rock	NT	NT
<i>Aquila verreauxii</i>	Eagle, Verreaux's	VU	LC
<i>Ardeotis kori</i>	Bustard, Kori	NT	NT
<i>Ciconia abdimii</i>	Stork, Abdim's	NT	LC
<i>Cursorius rufus</i>	Courser, Burchell's	VU	LC
<i>Eupodotis vigorsii</i>	Korhaan, Karoo	NT	LC
<i>Falco biarmicus</i>	Falcon, Lanner	VU	LC
<i>Grus paradisea</i>	Crane, Blue	NT	VU
<i>Neotis ludwigii</i>	Bustard, Ludwig's	EN	EN
<i>Phoeniconaias minor</i>	Flamingo, Lesser	NT	NT
<i>Phoenicopterus roseus</i>	Flamingo, Greater	NT	LC
<i>Sagittarius serpentarius</i>	Secretarybird	VU	EN

## 8.5. Heritage including Archaeology and Palaeontology

### 8.5.1. Archaeology

A number of impact assessments related to renewable energy (wind and solar) have been carried out in the De Aar area over the last 15 years. A cluster of solar energy projects surround the Hydra substation 10km south of De Aar. As part of the 2012 process for approval of the Vetlaagte Solar Energy Facility, Kruger conducted a detailed Heritage Impact Assessment of the area proposed for development. According to Kruger (2012), "During the survey, widespread Middle Stone Age (MSA) material, including characteristic formal MSA stone tools such as points, blades and scrapers were documented in the survey area along a north-south oriented drainage on the eastern periphery of the property. The lithic remains occur in three large scatters and, almost without exception, in low lying areas along non-perennial drainage lines and wetland areas where precipitation and groundwater have exposed the stone tools, originally deposited on a decomposed calcrete rock layer approximately 30cm sub surface. Preliminary examinations of some of the lithics indicated that a number of flakes displayed faceted platforms, characteristic of the MSA."

The approved Castle Wind Energy Facility lies on the hills just to the southeast of the Hydra B project area. The development area has been subject to a previous heritage impact assessment process (Van der Walt, 2014, SAHRIS ID 183142) and a palaeontology assessment (Milstead, 2014, SAHRIS ID 183143). A number of San engravings can be found on the dolerite boulders spread throughout the area and a more recent historical set of engravings has been made since the establishment of diamond mining at Kimberley and the spread of stock farming in the area.



**Figure 8.16:** Heritage resources previously identified within the study area

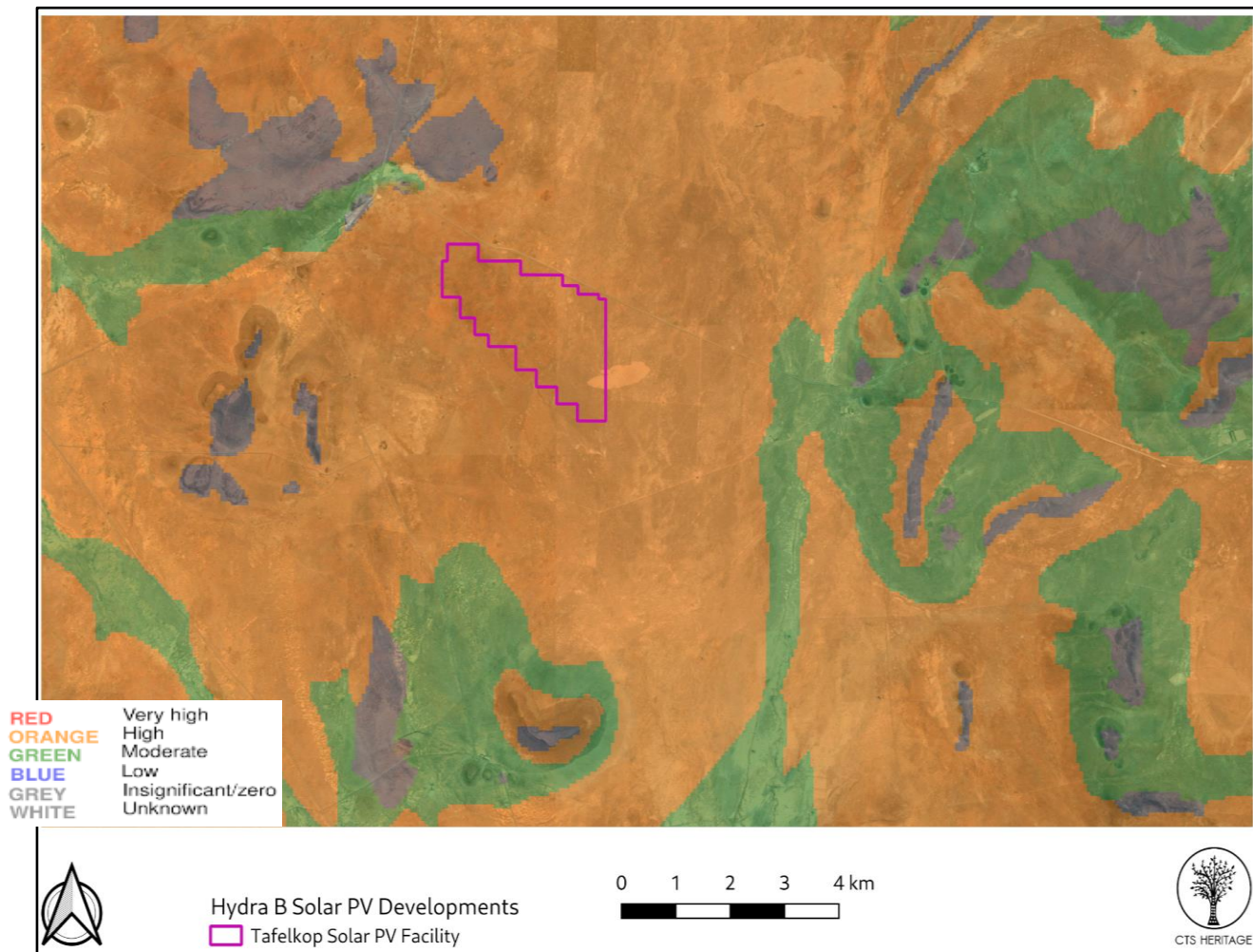
### 8.5.2. Palaeontology

According to the SAHRIS Palaeosensitivity Map (Figure 4a), the area proposed for development is underlain by sediments of high and very high paleontological sensitivity. According to the extract from the Council for GeoSciences Map 3024 for Colesburg, the development area is underlain by Jurassic Dolerite, the Tierberg Formation of the Eccca Group and the Adelaide Subgroup of the Beaufort Group.

As part of the Vetlaagte project in 2012, Almond completed a field-based palaeontological assessment. Almond (2012) found that "The potentially fossiliferous sediments of the Late Palaeozoic Karoo Supergroup (Eccca and Lower Beaufort Groups) that underlie the study area are almost entirely mantled in a thick layer of superficial deposits of probable Pleistocene to Recent age. These include various soils, gravels and – at least in some areas - a well-developed calcrete hardpan. The upper Eccca Group bedrocks in the northern portion of the study area contain locally abundant fossil wood (of palaeontological interest for dating and palaeoenvironmental studies), as well as low diversity non-marine trace fossil assemblages typical of the Waterford Formation, rather than the Tierberg Formation as mapped. No vertebrate fossils and only scattered woody plant impressions of the Permian Glossopteris Flora were observed within the Lower Beaufort Group rocks that are very poorly exposed in the southern portion of the Vetlaagte study area. Trace fossils, silicified wood and rare vertebrate remains (therapsids, parareptiles) of the Middle Permian Pristerognathus Assemblage Zone have recently been recorded from this succession in the De Aar region (Almond 2010b). Extensive dolerite sills and dykes of the Early Jurassic Karoo Dolerite Suite intruding the Karoo Supergroup sediments are entirely unfossiliferous, as are rare intrusive kimberlite pipe rocks of Cretaceous age. The diverse superficial deposits within the three study areas (e.g. soils, gravels, alluvium, calcrete hardpans) are of low palaeontological sensitivity as a whole. Abundant fragments of reworked fossil wood material of Eccca provenance occur widely within subsurface and surface gravels overlying the Eccca Group outcrop area."



In Bamford's assessment completed for the area in 2021, she notes that "Based on experience, other reports and the lack of any significant previously recorded fossils from the area, it is unlikely that any fossils would be preserved in the Tierberg Formation or Adelaide Subgroup. Nonetheless, a Fossil Chance Find Protocol should be added to the EMPr."



**Figure 8.17:** Palaeosensitivity Map Indicating varied fossil sensitivity underlying the study area.

## 8.6 Visual Quality

The larger study area occurs on land that ranges in elevation from approximately 1 175m above sea level (areas to the north) to 1,675m at the top of the Tierberg mountain in the south. The terrain surrounding the proposed properties is generally flat. A few farm dams are present in the broader area.

The terrain type of the region is relatively homogenous and is described as predominantly *lowlands with hills*. Some prominent hills and ridges occur in the study area - a small range of hills lies in the southern portion of the study area, inclusive of the Tierberg (**Refer to Figure 8.18**).

Merino and Dorper sheep as well as cattle ranching are the primary agricultural activities in the district. Maize and lucerne are also produced on a small scale.

The study area is sparsely populated outside of the Philipstown (i.e., less than two people per km<sup>2</sup> within the district municipality). A number of isolated homesteads occur throughout the study area. Some of these in the study area include:

- » Jakobsrus<sup>15</sup>
- » Wolwekuil
- » Leeubergspoot
- » Donkerhoek
- » Swartkoppies
- » Rooddam
- » Driefontein
- » Vrede
- » Bokkraal



**Figure 8.18:** Topography and vegetation of the region (Photo: Google Earth)

The R388 traverses the study area and is found to the west of the proposed Hydra B cluster also known as Crossroads Green Energy CLusterr. The R48 is located to the south of the study area passing through Philipstown. Rail infrastructure runs from north to south adjacent to the R388 in the west of the study area. These lines include both freight and passenger lines.

Other industrial infrastructure within the study area includes the Kalkbult and Antelope switching stations (to the west of the proposed Zionsheuvel Solar PV Facility). There is a significant network of power lines transecting the study area. Some of these include:

- » Antelope/Behrshoek 1 132 kV
- » Gamma/Perseus 1 765 kV
- » Hydra/Perseus 1 765 kV
- » Hydra/Perseus 3 400 kV
- » Hydra/Perseus 2 400 kV
- » Beta/Hydra 1 400 kV
- » Hydra/Roodekuil 1 132 kV
- » Hydra/Roodekuil 2 200 kV

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<sup>15</sup> 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 8.19:** Powerline infrastructure within the study area (Photo: Google Earth)

Land cover is primarily *low shrubland* with patches of *bare rock and soil* in places. Some *degraded land* is evident along the hills within the area, particularly around Jagpoort and Tierberg in the south. Vegetation types include *Northern Upper Karoo* on the flat terrain within the study area, and *Besemkaree Koppies Shrubland* on the more elevated terrain and hills.

Despite the significant industrial type of infrastructure, the greater landscape of the study area is characterised by wide-open spaces and otherwise very limited development. It should however be noted that there are a number of authorised (and current) renewable energy applications within the study area and the greater region, that may change the landscape to some degree in the future. There are no formally protected or conservation areas within the study area.<sup>16</sup>

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<sup>16</sup> Sources: DEAT (ENPAT Northern Cape), NBI (Vegetation Map of South Africa, Lesotho and Swaziland), NLC2018 (ARC/CSIR), REEA\_OR\_2021\_Q1 and SAPAD2021 (DFFE), Wikipedia.



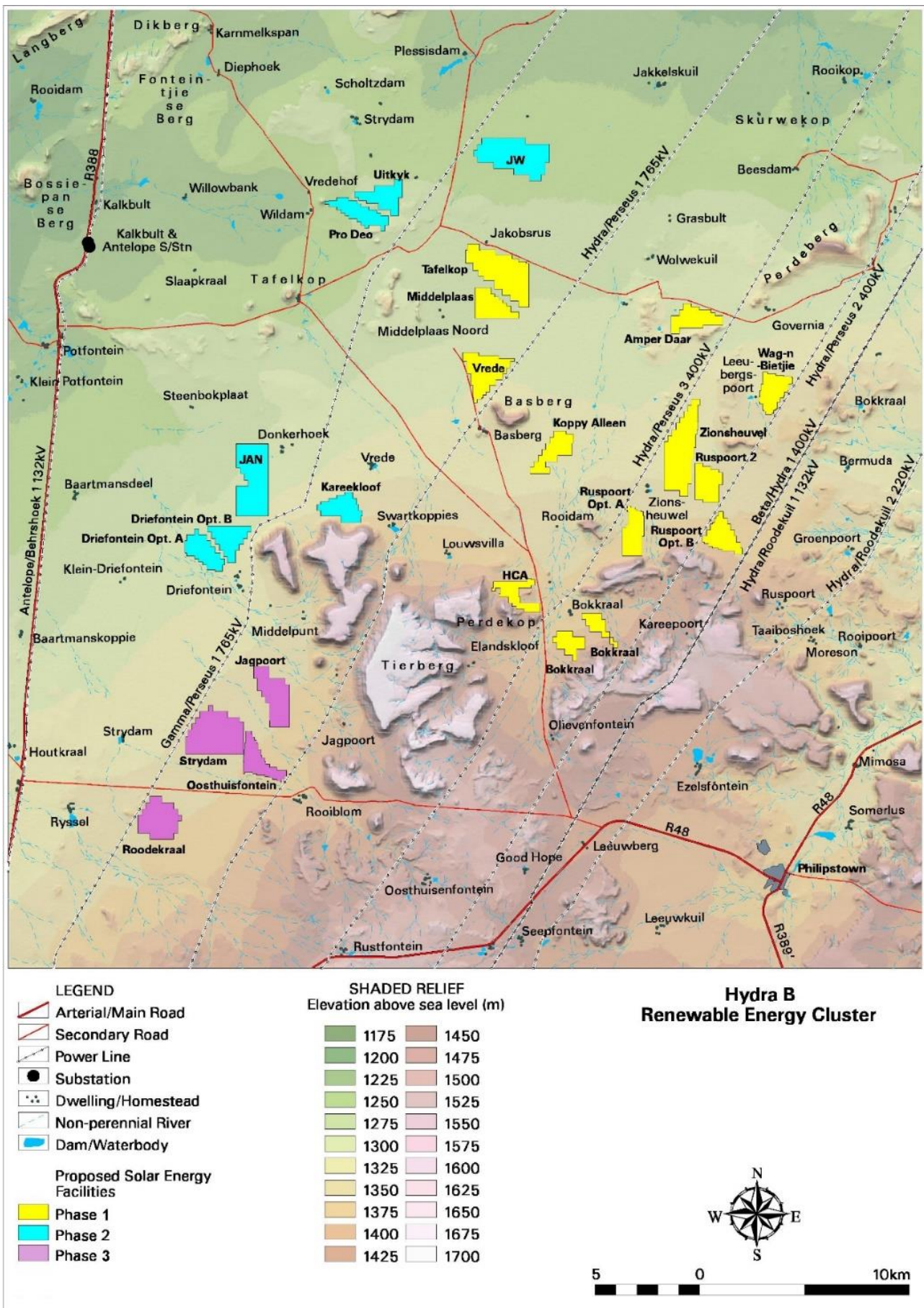


Figure 8.20: Shaded relief map of the study area.



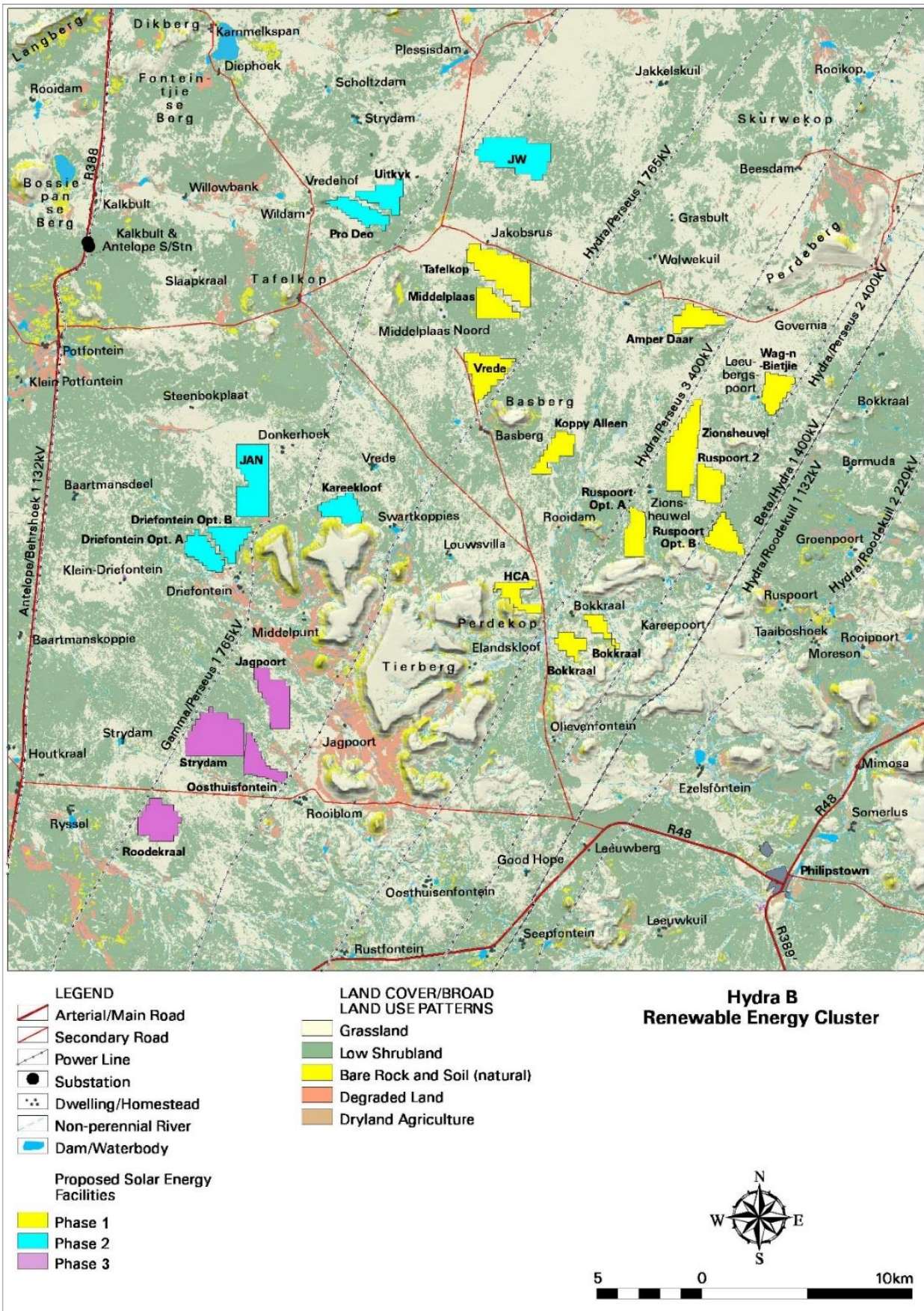


Figure 8.21: Land cover and broad land use patterns.

## 8.7 Social Context

**Table 8.8** provides a baseline summary of the socio-economic profile of the Renosterberg Local Municipality within which Zionsheugel Solar PV Facility is proposed. The data presented in this section have been derived from the 2011 Census, the Northern Cape Provincial Spatial Development Framework (PSDF), and the Pixley Ka Seme District Municipality and Renosterberg Local Municipality IDPs.

**Table 8.8:** Baseline description of the socio-economic characteristics of the area proposed for Zionsheugel Solar PV Facility.

Location characteristics
<ul style="list-style-type: none"> <li>» The project is proposed within the Northern Cape Province, the province located to the west of the major population centre of Gauteng Province.</li> <li>» The project is proposed within the Renosterberg LM of the Pixley Ka Seme DM.</li> <li>» The Renosterberg LM is approximately 5 529km<sup>2</sup> in extent.</li> </ul>
Population characteristics
<ul style="list-style-type: none"> <li>» According to Census 2011, the population of Renosterberg Local Municipality in 2016 was 11 818. The RLM is therefore a sparsely populated municipality.</li> <li>» Of this total, 37% were under the age of 18, 56.8% were between 18 and 64, and the remaining 6.1% were 65 and older. The RLM therefore has a relatively large young population. This creates challenges in terms of creating employment opportunities.</li> <li>» In terms of race groups, Coloureds made up 57% of the population, followed by Black Africans (32.8%) and Whites (9.8%). The main first language spoken in the RLM was Afrikaans (69.9%), followed by IsiXhosa (26.3%) and Sesotho (1%).</li> <li>» The LM occupies an area of land approximately 5 529km<sup>2</sup> in extent and has a population density of 2 persons/km<sup>2</sup>.</li> <li>» Between 2001 and 2011 the LM experience a positive population growth of 1.3% per year. This is higher than the DM population growth of 1.0% between 2001 and 2011.</li> <li>» Based on the information from the 2016 Community Household Survey 34.4% of the households in the RLM are headed by females. The figure for RLM was lower than the District and Provincial figures of 37% and 39% respectively. The high number of female-headed households at the local municipal reflects the lack on formal employment and economic opportunities in the RLM. There are 2 995 households in the municipality, with an average household size of 3,4 persons per household. 41,1% of households have access to piped water either in their dwelling or in the yard. 88,1% of households have access to electricity for lighting.</li> <li>» 3 575 people are economically active (employed or unemployed but looking for work), and of these, 26,8% are unemployed.</li> </ul>
Economic, education and household characteristics
<ul style="list-style-type: none"> <li>» When assessing five-year age groups, the largest proportion of the population are between the ages of 0 to 4 years old, with the proportion decreasing uniformly as age increases. There are no significant outliers within any one age group. In terms of education levels, the percentage of the population over 20 years of age in the RLM with no schooling was 11.2% in 2011, compared to 7.9% for the Northern Cape Province and 11.9% for the district. The percentage of the population over the age of 20 with matric was 33.6%, which was significantly higher than the provincial and district figures of 29.1% and 25.3% respectively. Only 1.4% and 2% of the population over the age of 20 years in the RLM had an undergraduate and postgraduate qualification, respectively.</li> <li>» Of the 1 777 economically active youth (15 – 35 years) in the area, 29,8% are unemployed.</li> <li>» The dependency ratio is the ratio of non-economically active dependents (usually people younger than 15 or older than 64) to the working age population group (15-64). The higher the dependency ratio the larger the percentage of the population dependent on the economically active age group. This in turn translates reduced revenue for local authorities to meet the growing demand for services. The national dependency ratio in 2011</li> </ul>



was 52.7%, similar to that of the Northern Cape Province (55.7%). The dependency ratio for the RLM (2011) was 64%.

- » Based on the information from the 2016 Community Survey there were a total of 3 563 households in the RLM. Most of the households reside in formal houses (71.4%). The figure for the RLM is lower than the district (78.1%) and Provincial (74.4%) figures. Approximately 14.7% of the households in the RLM reside in shacks and 7.5% in backyard flats. A relatively high percentage of the households therefore live in informal structures.
- » Based on the information from the 2016 Community Household Survey 34.4% of the households in the RLM are headed by females. The figure for RLM was lower than the District and Provincial figures of 37% and 39% respectively. The high number of female-headed households at the local municipal reflects the lack of formal employment and economic opportunities in the RLM. As a result, job seekers from the RLM need to leave the areas to seek work in the larger centres. The majority of the job seekers are likely to be males.

#### Services

- » In terms of access to water, 91.9% of households were supplied by a regional or local service provider, while 7.5% relied on their own supply, which reflects the rural nature of the municipality. The provincial and district figures for water provided by a service provider were 88.6% and 90.7% respectively.
- » Based on the information from the 2016 Community Survey, 89.8% of households have access to flush toilets, while 7.4% had not access to toilet facilities. The figures in terms of access to flush toilets are higher than provincial (71.4%) and District (82.8%) figures. For Ward 6 72.7% of households had access to flush toilets and 7.2% had no access to toilets. 16 % relied on pit latrines.
- » 54.7% of households have their refuse collected on a regular basis by a local authority or private company, while 25.2% relied on communal dumps, 8.1% use their own dumps, and 9.4% are not serviced. The provincial and district figures for refuse collection provided by a service provider on a regular basis were 64.9% and 78.1% respectively. The figures for the RLM are therefore lower than the district and provincial service levels.
- » The PKSDM is served by 3 District Hospitals, 8 Community Health Centres, 28 Primary Health Care Clinics, 4 satellite clinics and 1 mobile clinic, distributed over the district. The RLM has 1 District Hospital and 6 Primary Health Care clinics. There are no community health centres within RLM that provide a 24-hour service. A new hospital was built in De Aar and was opened in 2017. The Central Karoo Hospital serves as the referral hospital for the district. Minor operations are performed at the facility. Specialists visit the district on a monthly basis from Kimberley Hospital Complex. In terms of education the RLM has 16 schools of which 13 are no-fee schools. The RLM also has libraries.

## CHAPTER 9: SCOPING OF POTENTIAL ISSUES

This chapter serves to describe and evaluate the identified potential environmental impacts (direct, indirect, and cumulative impacts) relevant and specific to the construction and operation phases of the 240MW Zionsheuvel Solar PV Facility, 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 in the area), limited field work, input from the project developer and specialist consultants.

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

This chapter identifies the potential environmental impacts associated with the development of the proposed project. This chapter includes the following information required in terms of the EIA Regulations, 2014 - Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
2(1)(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 ZionsheuvelSolar PV have been included in <b>Section 9.3</b> . 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.
2(1)(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 Zionsheuvel Solar PV have been included in <b>Section 9.3</b> .
2(1)(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 <b>Section 9.3</b> .

### 9.2 Identification of Potential Impacts Associated with the Project

The project site considered for the Zionsheuvel Solar PV Facility includes Remainder of Farm Leeuwberg 79, an area of approximately 1703ha in extent. The proposed project site, a development area of approximately ~1703ha has been investigated during this Scoping Phase to determine the environmental suitability of the site. The study will provide an indication of the areas of sensitivity that the developer would need to take into consideration in the planning of the layout of the ZionsheuvelSolar PV Facility within the development area.

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

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

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

- » Impact on ecology, including flora and fauna.
- » Impact on avifauna.
- » Impact on soils, geology, agricultural potential, and land use.
- » Impact on heritage resources (including archaeology and palaeontology).
- » Visual impacts.
- » Social impacts (positive and negative); and
- » Impacts on Traffic

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

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

In order to appropriately identify, assess and, as far as possible, avoid or mitigate potential impacts and risks that may be associated with the development, construction, operation and decommissioning of the Zionsheuvél Solar PV Facility, Savannah Environmental commissioned a team of independent specialists with relevant scientific knowledge and expertise in the biophysical and socio-economic environments. Specialist Scoping level assessments are included in **Appendices D – I** of this Scoping Report. A summary of the findings is presented in this chapter.

**Section 9.3** provides the findings of the scoping study undertaken for the construction and operation phases of the Zionsheuvél Solar PV Facility. Those impacts associated with construction can also be expected to be associated with the decommissioning phase (however, to a lesser extent as the project site would have previously undergone transformation and disturbance during construction).

A summary of the potential cumulative impacts that may be associated with the project are provided in **Section** Error! Reference source not found.. 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 EIA process.

### 9.3 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 Zionsheugel 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 grid connection infrastructure).
- » 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 Zionsheugel Solar PV Facility.

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

### 9.4.1 Impacts on terrestrial ecology (including flora, fauna, and avifauna)

<b>Impact: Biodiversity loss/disturbance</b>			
<p>Anthropogenic activities drive habitat destruction causing displacement of fauna and flora, and possibly direct mortality. Land clearing destroys local wildlife habitat and can lead to the loss of local breeding grounds, nesting sites and wildlife movement corridors such as rivers, streams and drainage lines, or other locally important features. The removal of natural vegetation may reduce the habitat available for fauna species and may reduce animal populations and species compositions within the area.</p>			
<b>Issue</b>	<b>Nature of Impact</b>	<b>Extent of Impact</b>	<b>No-Go Areas</b>
Destruction, fragmentation and degradation of habitats and ecosystems	<p><u>Direct impacts:</u></p> <ul style="list-style-type: none"> <li>» Disturbance / degradation / loss to vegetation and habitats</li> <li>» Ecological corridors are disrupted</li> <li>» Habitat fragmentation</li> </ul> <p><u>Indirect impacts:</u></p> <ul style="list-style-type: none"> <li>» Erosion risk increases</li> <li>» Fire risk increases</li> <li>» Increase in invasive alien species</li> </ul>	Regional	None identified at this stage
Spread and/or establishment of alien and/or invasive species	<p><u>Direct impacts:</u></p> <ul style="list-style-type: none"> <li>» Loss of vegetation and habitat due to increase in alien species</li> </ul> <p><u>Indirect impacts:</u></p> <ul style="list-style-type: none"> <li>» Creation of infrastructure suitable for breeding activities of alien and/or invasive species</li> <li>» Spreading of potentially dangerous diseases due to invasive and pest species</li> </ul>	Regional	None identified at this stage
Direct mortality of fauna	<p><u>Direct impacts:</u></p> <ul style="list-style-type: none"> <li>» Loss of SCC species</li> <li>» Loss of fauna diversity</li> </ul> <p><u>Indirect impacts:</u></p> <ul style="list-style-type: none"> <li>» Loss of diversity and species composition in the area.</li> </ul>	Regional/International	None identified at this stage

	» Possible impact on the food chain		
Reduced dispersal/migration of fauna	<p><u>Direct impacts:</u></p> <ul style="list-style-type: none"> <li>» Loss of genetic diversity</li> <li>» Isolation of species and groups leading to inbreeding</li> </ul> <p><u>Indirect impacts:</u></p> <ul style="list-style-type: none"> <li>» Reduced seed dispersal</li> <li>» Loss of ecosystem services</li> </ul>	Regional/National	None identified at this stage
Environmental pollution due to water runoff, spills from vehicles and erosion	<p><u>Direct impacts:</u></p> <ul style="list-style-type: none"> <li>» Pollution in watercourses and the surrounding environment</li> <li>» Faunal mortality (direct and indirectly)</li> </ul> <p><u>Indirect impacts:</u></p> <ul style="list-style-type: none"> <li>» Ground water pollution</li> <li>» Loss of ecosystem services</li> </ul>	Regional	None identified at this stage
Disruption/alteration of ecological life cycles (breeding, migration, feeding) due to noise, dust, heat radiation and light pollution.	<p><u>Direct impacts:</u></p> <ul style="list-style-type: none"> <li>» Disruption/alteration of ecological life cycles due to noise</li> <li>» Reduced pollination and growth of vegetation due to dust</li> <li>» Faunal mortality due to light pollution (nocturnal species becoming more visible to predators)</li> <li>» Heat radiation could lead to the displacement of species</li> </ul> <p><u>Indirect impacts:</u></p> <ul style="list-style-type: none"> <li>» Loss of ecosystem services</li> </ul>	Regional	None identified at this stage
Staff and others interacting directly with fauna (potentially dangerous) or poaching of animals	<p><u>Direct impacts:</u></p> <ul style="list-style-type: none"> <li>» Loss of SCCs or TOPS species</li> </ul> <p><u>Indirect impacts:</u></p> <ul style="list-style-type: none"> <li>» Loss of ecosystem service</li> <li>» Loss of genetic diversity</li> </ul>	Regional	None identified at this stage
<b>Description of expected significance of impact</b>			
The development of the area could result in the loss or degradation of the habitat and vegetation, most of which is still in a natural condition and supports a number of fauna species. The construction of the facility could also lead to the displacement/mortalities of the fauna and more specifically SCC fauna species. The operation of the facility			



could result in the disruption of ecological life cycles. This could be as a result of a number of things, but mainly due to dust, noise and light pollution. The disturbance of the soil/vegetation layer will allow for the establishment of flora alien invasive species, the new infrastructure in turn will provide refuge for invasive/feral fauna species. Erosion is another possible impact that could result from the disturbance of the topsoil and vegetation cover. 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 the receiving water resources. Contaminated water resources are likely to have an effect on the associated biota.

**Gaps in knowledge & recommendations for further study**

- » This study is completed at a desktop level only.
- » Identification and descriptions of habitats.
- » Identification of the Site Ecological Importance.
- » Location and identification of SCCs as well as in the case of fauna their location of the nests/dens.
- » Determine a suitable buffer width for the identified features.

**Recommendations with regards to general field surveys**

- » Field surveys to prioritise the development areas, but also consider the 500 m PAOI.
- » Fieldwork to be undertaken during the wet season period.
- » Avifauna assessment field work to be conducted over two seasons to ensure migratory species are considered.

**9.4.2 Impacts on Freshwater Resources (including wetlands)**

**Impact: Water resource disturbance / loss**

The following potential main impacts on surface water resources were considered for the construction phase of the proposed project. Construction 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. During construction 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 for the phase, aided by chemicals and concrete mixes 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. The following potential impacts during site clearing and preparation were considered:

- » Water resource disturbance / loss.
  - Direct disturbance / degradation / loss to soils or vegetation due to the construction of the facility and associated infrastructure; and
- » Water runoff from construction site;

- Increased erosion and sedimentation; and
- Contamination of receiving water resources.

During the operation phase an increase in stormwater runoff is anticipated due to the hardened surfaces, resulting in an increase in run-off volume and velocities due to the 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. The following potential impacts were considered:

- » Hardened surfaces;
  - Potential for increased stormwater runoff, leading to increased erosion and sedimentation; and
- » Contamination;
  - Potential for increased contaminants entering water resources (including wetlands, watercourses, and drainage lines).

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	<u>Direct impacts:</u> » Disturbance / degradation / loss to wetland soils or vegetation <u>Indirect impacts:</u> » Loss of ecosystem services	Regional	None identified at this stage
Increased erosion and sedimentation & contamination of resources	<u>Direct impacts:</u> » Erosion and structural changes to the systems <u>Indirect impacts:</u> » 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 mixes 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.

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

**Impact: Loss of Land Capability**

Construction could result in the encroachment into areas characterised by high land potential properties, which can ultimately result in the loss of land capability, albeit these areas are limited. These disturbances could also result in the infestation and establishment of alien vegetation, which in turn can have a detrimental impact on soil resources. During construction 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 for the phase, 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. The following potential impacts during site clearing and preparation were considered:

- » Loss of land capability
- » Erosion which results in the loss of topsoil and valuable macro nutrients;
- » Compaction, which will ultimately reduce infiltration, aeration, micro-biological activities etc.; and
- » Soil stripping and stockpiling, which, if not treated and ameliorated, could degrade significantly over time.

During the operational phase, the impacts can be easily managed by best “housekeeping” practices. This phase will be permanent, which emphasises the need to conserve resources in the direct surroundings of the associated footprint areas.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Compaction/soil stripping/transformation of land use which leads to loss of land capability	<u>Direct impacts:</u> » Loss of soil / land capability <u>Indirect impacts:</u> » Loss of land capability	Regional	None identified at this stage
Erosion	<u>Direct impacts:</u> » Loss of soil / land capability <u>Indirect impacts:</u> Loss of land capability	Local	None identified at this stage
<p><b>Description of expected significance of impact</b></p> <p>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.</p>			
<p><b>Gaps in knowledge &amp; recommendations for further study</b></p> <ul style="list-style-type: none"> <li>» This study is completed at a desktop level only.</li> <li>» Identification and delineation of soil forms.</li> <li>» Determine of soil sensitivity.</li> </ul> <p>Recommendations with regards to general field surveys</p> <ul style="list-style-type: none"> <li>» Field surveys to prioritise the development areas.</li> </ul>			

#### 9.4.4 Impacts on Heritage (Archaeology and Palaeontology)

De Aar was originally established on the Farm "De Aar." The name means "the artery," a reference to its underground water supply. The Cape Government Railways were founded in 1872, and the route that the government chose for the line to connect the Kimberley diamond fields to Cape Town on the coast, ran directly through De Aar. Because of its central location, the government also selected the location for a junction between this first railway line, and the other Cape railway networks further east, in 1881. In 1899 two brothers who ran a trading store and hotel at the junction, Isaac and Wulf Friedlander, purchased the farm of De Aar. Following the Anglo Boer War, the Friedlander brothers surveyed the land for the establishment of a town. The municipality was created a year later in 1900. Phillipstown lies at the south-eastern end of the Crossroads Green Energy study area while Petrusville lies to the north east.

This area was also a contested space during the South African War (also known as the Second Boer War/Anglo-Boer War) where various sorties through the area were carried out by Generals De Wet and Smuts. The British erected a number of blockhouses protecting the railway lines that were essential in maintaining territorial control and the Hopetown - De Aar line runs along the western end of the Crossroads Green Energy project area. This line was also actively used to transport military equipment during the Border War (1966-1990) fought between South Africa and independence movements in Angola, Namibia, Botswana, Zambia, Zimbabwe and Mozambique.

Kruger (2012) documented historical period buildings dating to the 1930s and associated farm graveyards at Vetlaagte - a number of farm homestead complexes dot the area covered by the Crossroads Green Energy project but all are situated sufficiently far away (at least 1km) from these homesteads that no heritage impacts are anticipated on these resources.

##### **Archaeology**

A number of impact assessments related to renewable energy (wind and solar) have been carried out in the De Aar area over the last 15 years. A cluster of solar energy projects surround the Hydra substation 10km south of De Aar. As part of the 2012 process for approval of the Vetlaagte Solar Energy Facility, Kruger conducted a detailed Heritage Impact Assessment of the area proposed for development. According to Kruger (2012), "During the survey, widespread Middle Stone Age (MSA) material, including characteristic formal MSA stone tools such as points, blades and scrapers were documented in the survey area along a north-south oriented drainage on the eastern periphery of the property. The lithic remains occur in three large scatters and, almost without exception, in low lying areas along non-perennial drainage lines and wetland areas where precipitation and groundwater have exposed the stone tools, originally deposited on a decomposed calcrete rock layer approximately 30cm sub surface. Preliminary examinations of some of the lithics indicated that a number of flakes displayed faceted platforms, characteristic of the MSA."

The approved Castle Wind Energy Facility lies on the hills just to the south east of the Crossroads Green Energy project area. The development area has been subject to a previous heritage impact assessment process (Van der Walt, 2014, SAHRIS ID 183142) and a palaeontology assessment (Milstead, 2014, SAHRIS ID 183143). A number of San engravings can be found on the dolerite boulders spread throughout the area and a more recent historical set of engravings has been made since the establishment of diamond mining at Kimberley and the spread of stock farming in the area.

##### **Palaeontology**

According to the SAHRIS Palaeosensitivity Map (Figure 4a), the area proposed for development is underlain by sediments of high and very high paleontological sensitivity.

According to the extract from the Council for GeoSciences Map 3024 for Colesberg, the development area is underlain by Jurassic Dolerite, the Tierberg Formation of the Eccca Group and the Adelaide Subgroup of the Beaufort Group.

As part of the Vetlaagte project in 2012, Almond completed a field-based palaeontological assessment. Almond (2012) found that "The potentially fossiliferous sediments of the Late Palaeozoic Karoo Supergroup (Eccca and Lower Beaufort Groups) that underlie the study area are almost entirely mantled in a thick layer of superficial deposits of probable Pleistocene to Recent age. These include various soils, gravels and – at least in some areas - a well-developed calcrete hardpan. The upper Eccca Group bedrocks in the northern portion of the study area contain locally abundant fossil wood (of palaeontological interest for dating and palaeoenvironmental studies), as well as low diversity non-marine trace fossil assemblages typical of the Waterford Formation, rather than the Tierberg Formation as mapped. No vertebrate fossils and only scattered woody plant impressions of the Permian Glossopteris Flora were observed within the Lower Beaufort Group rocks that are very poorly exposed in the southern portion of the Vetlaagte study area. Trace fossils, silicified wood and rare vertebrate remains (therapsids, parareptiles) of the Middle Permian Pristerognathus Assemblage Zone have recently been recorded from this succession in the De Aar region (Almond 2010b). Extensive dolerite sills and dykes of the Early Jurassic Karoo Dolerite Suite intruding the Karoo Supergroup sediments are entirely unfossiliferous, as are rare intrusive kimberlite pipe rocks of Cretaceous age. The diverse superficial deposits within the three study areas (e.g. soils, gravels, alluvium, calcrete hardpans) are of low palaeontological sensitivity as a whole. Abundant fragments of reworked fossil wood material of Eccca provenance occur widely within subsurface and surface gravels overlying the Eccca Group outcrop area."

In Bamford's assessment completed for the area in 2021, she notes that "Based on experience, other reports and the lack of any significant previously recorded fossils from the area, it is unlikely that any fossils would be preserved in the Tierberg Formation or Adelaide Subgroup. Nonetheless, a Fossil Chance Find Protocol should be added to the EMPr."

Potential impacts on heritage resources include:

- » Impact to archaeological and built environment resources
- » Impact to palaeontological resources
- » Impact to Cultural Landscape
- » Cumulative Impact

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Impact to significant heritage resources through destruction during the development phase and disturbance during the operational phase.	Destruction of significant heritage resources	Local scale with broader impacts to scientific knowledge	None known at present
<b>Description of expected significance of impact</b>			
<ul style="list-style-type: none"> <li>» Impact to significant archaeological resources such as Stone Age artefact scatters, remnants of Iron Age settlements, burial grounds and graves, historical artefacts, historical structures and rock art engravings through destruction during the development phase and disturbance during the operational phase is possible.</li> <li>» Impacts to palaeontological resources are unlikely.</li> <li>» There is the potential for the cumulative impact of proposed solar energy facilities to negatively impact the cultural landscape due to a change in the landscape character</li> </ul>			



from rural and mining to semi-industrial, however, due to the density of mining activities in the area, the impact on the experience of the cultural landscape is not foreseen to be significant.

**Gaps in knowledge & recommendations for further study**

The heritage resources in the area proposed for development are not yet sufficiently recorded.

Based on the available information, including the scale and nature of the proposed development, it is likely that significant heritage resources will be impacted by the proposed development and as such it is recommended that further heritage studies are required in terms of section 38 of the NHRA with specific focus on impacts to archaeological heritage.

**9.4.5 Visual Impacts**

**Impact: Existing Settlements and Infrastructure**

Despite the significant industrial type of infrastructure, the greater landscape of the study area is characterised by wide-open spaces and otherwise very limited development. It should however be noted that there are a number of authorised (and current) renewable energy applications within the study area and the greater region, that may change the landscape to some degree in the future. There are no formally protected or conservation areas within the study area.

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 closer proximity to the facility)
- » Observers travelling along the secondary roads traversing near the proposed developments

**Sensitivity Analysis of the Site**

The result of the viewshed analysis for the proposed Zionsheugel Solar PV Facility is shown in **Figure 9.4**. The viewshed analysis was undertaken from a representative number of vantage points within the development footprint at an offset of 5m above ground level. This was done in order to determine the general visual exposure (visibility) of the area under investigation, simulating the maximum height of the proposed structures (PV panels, inverters and BESS) 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 9.4 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.

Results

The visual exposure for the ZionsheuveSolar PV Facility as per the viewshed analysis is as follows:

### **0 – 1km**

The PV facility may be highly visible within a 1km radius of the proposed development. Sensitive visual receptors within this zone include observers traveling along the secondary road which borders the facility to the north and residents at the following homesteads:

- » Jakobusrus

### **1 – 3km**

Within 1-3 km, visual exposure is still quite concentrated though becomes slightly fragmented to the east, south east and south west.

Sensitive visual receptors within this zone include observers traveling along the secondary roads to the west and residents at the following homesteads:

- » Middelplaas Noord
- » A few unknown homesteads to the west and east of the proposed facility

Other than these homesteads and sections of road, the rest of the visually exposed areas fall within undeveloped farmland or natural open space. It is expected that the PV facility would be clearly visible from both the homesteads and the exposed sections of road.

### **3 - 6km**

Within a 3 – 6km radius, the visual exposure is more scattered and interrupted due to the undulating nature of the topography, however it remains quite concentrated within this zone. Most of this zone falls within undeveloped farmland or natural open space. Sensitive visual receptors include observers traveling along the secondary roads and residents at the following homesteads:

- » Wolwekuil
- » Unknown homesteads

### **> 6km**

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. This zone contains no potentially exposed receptor sites.

**Conclusion**

In general terms it is envisaged that the structures, where visible from shorter distances (e.g. less than 1km and potentially up to 3km), 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 mentioned above, as well as observers travelling along the roads in closer proximity to the facility.

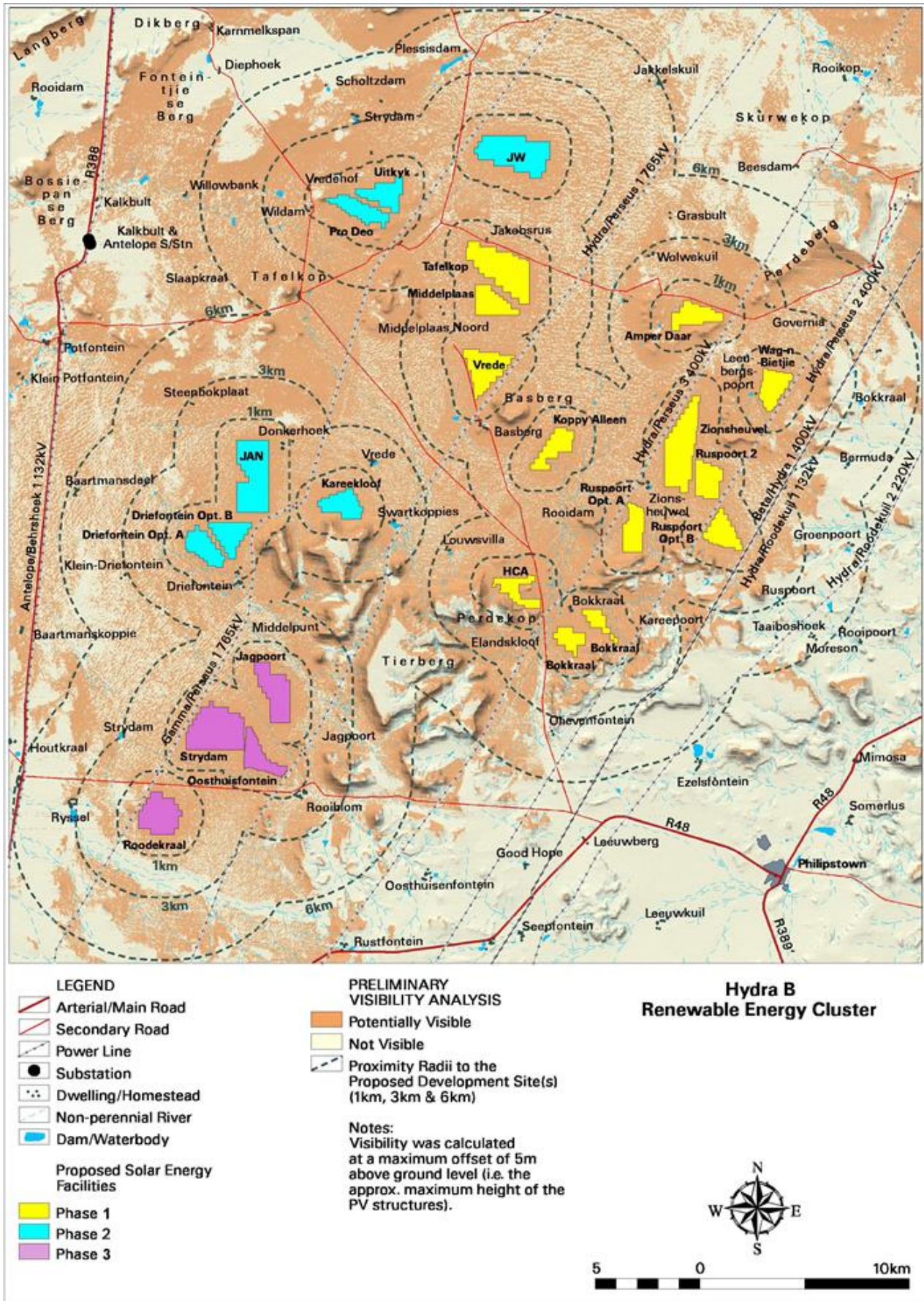


Figure 9.4: Preliminary visual exposure of the Zionsheuvel Solar PV Facility

Issues	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.
<p><b>Description of expected significance of impact</b></p> <p>Extent: Local                  Duration: Long term                  Magnitude: Moderate to High (depending on observer proximity)                  Probability: Probable                  Significance: Moderate to High                  Status (positive, neutral or negative): Negative                  Reversibility: Recoverable                  Irreplaceable loss of resources: No                  Can impacts be mitigated: Yes</p>			
<p><b>Gaps in knowledge &amp; recommendations for further study</b></p> <p>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.</p> <p>Additional spatial analyses are required in order to create a visual impact index that will include the following criteria:</p> <ul style="list-style-type: none"> <li>» Visual exposure</li> <li>» Visual distance/observer proximity to the structures/activities</li> <li>» Viewer incidence/viewer perception (sensitive visual receptors)</li> <li>» Visual absorption capacity of the environment surrounding the infrastructure and activities</li> </ul> <p>Additional activities:</p> <ul style="list-style-type: none"> <li>» Identify potential cumulative visual impacts</li> <li>» Undertake a site visit</li> <li>» Recommend mitigation measures and/or infrastructure placement alternatives</li> </ul>			

#### 9.4.6 Social Impacts

##### Construction Phase Social Impacts

###### Potential positive impacts

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

###### Potential negative impacts

- » Impacts associated with the presence of construction workers on local communities.
- » Impacts related to the potential influx of jobseekers.
- » 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.

##### **Impact: Creation of local employment, training, and business opportunities**

The construction phase will extend over a period of approximately 18 months and create in the region of 250 employment opportunities. Members from the local communities in the area, specifically De Aar, Phillipstown and Petrusville, would be in a position to qualify for most of the low skilled and semi-skilled employment opportunities. Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members of the community. Based on information from similar projects the total wage bill will be in the region of R 31 million (2022 Rand values). A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in the local towns in the area.

Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit. The capital expenditure will be approximately R 2 billion (2022 Rand value).

Due the lack of diversification in the local economy the potential for local companies is likely to be limited. The majority of benefits are therefore likely to accrue to contractors and engineering companies based outside the RLM and ELM. The local service sector will also benefit from the construction phase. The potential opportunities would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site.



The hospitality industry in the area will also benefit from the provision of accommodation and meals for professionals (engineers, quantity surveyors, project managers, product representatives etc.) and other (non-construction) personnel involved on the project. Experience from other construction projects indicates that the potential opportunities are not limited to on-site construction workers but also to consultants and product representatives associated with the project.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Creation of employment and business opportunities during the construction phase	<p><u>Direct impacts:</u></p> <ul style="list-style-type: none"> <li>» Creation of temporary employment opportunities</li> <li>» Creation of business and procurement opportunities</li> </ul> <p><u>Indirect impacts:</u></p> <ul style="list-style-type: none"> <li>» Support for local economy.</li> <li>» Creation of training and skills development opportunities</li> </ul>	Local-Regional	N/A

**Description of expected significance of impact**  
 Evidence from the other renewable energy projects indicates that the construction phase of 240 MW SEF will extend over a period of approximately 18 months and create in the region of 250 employment opportunities. Members from the local communities in the area, specifically Petrusville, Philipstown and De Aar, would be in a position to qualify for the low skilled and semi-skilled opportunities. The business-related opportunities will be linked to the hospitality (accommodation) and services sector (catering, security, transport etc.).

**Gaps in knowledge & recommendations for further study**

- » Collection of information on local skills and education levels.
- » Collection of information on local hospitality and services sector.

**Recommendations with regards to general field surveys**

- » Site visit and interviews with representatives from local municipality, and the hospitality and services sector.
- » Site visit and interviews with local chamber of commerce.

**Impact: Impact of construction workers on local communities**

The presence of construction workers poses a potential risk to family structures and social networks. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on local communities. The most significant negative impact is associated with the disruption of existing family structures and social networks. This risk is linked to potentially risky behaviour, mainly of male construction workers, including:

- » An increase in alcohol and drug use.
- » An increase in crime levels.

- » The loss of girlfriends and/or wives to construction workers.
- » An increase in teenage and unwanted pregnancies.
- » An increase in prostitution.
- » An increase in sexually transmitted diseases (STDs), including HIV.

The proponent has indicated that workers will be accommodated on site.

The objective will be to source as many of the low and semi-skilled workers locally. These workers will be from the local community and form part of the local family and social networks. This will reduce the risk and mitigate the potential impacts on the local community. The balance of semi-skilled and skilled workers will be accommodated in the nearby towns of Philipstown, Petrusville and De Aar.

The total number of construction workers employed, and duration of the construction phase will depend on the timing and phasing of the construction of the Crossroads Green Energy Cluster. This will have a bearing on the potential impact on local communities and services. This information will be collected as part of the assessment phase.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Potential impacts on family structures and social networks associated with the presence of construction workers	<u>Direct impacts:</u> <ul style="list-style-type: none"> <li>» Disruption of existing family structures and social networks</li> <li>» Anti-social behaviour of construction workers</li> <li>» Increase in substance abuse, crime, sexually transmitted diseases.</li> <li>» Unplanned pregnancies</li> </ul> <u>Indirect impacts:</u> <ul style="list-style-type: none"> <li>» Impact on psychological well-being of local communities.</li> <li>» Resentment of outsiders and tension within local communities</li> </ul>	Local-Regional	N/A
<b>Description of expected significance of impact</b> 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, Petrusville, Philipstown and De Aar, would be at potential risk depending on where non-local construction workers are accommodated during the construction phase.			
<b>Gaps in knowledge &amp; recommendations for further study</b>			

- » Collection of information on local skills and education levels. Employing local community members reduces the potential risks
  - » Collection of information on accommodation options and capacity.
  - » Collection of information on existing community challenges and needs.
- Recommendations with regards to general field surveys**
- » Site visit and interviews with representatives from local municipality and community representatives.
  - » Site visit and interviews with representatives from hospitality sector with regard to accommodation options.

**Impact: Influx of job seekers**

Large construction projects tend to attract people to the area in the hope that they will secure a job, even if it is a temporary job. These job seekers can in turn become "economically stranded" in the area or decide to stay on irrespective of finding a job or not. While the proposed project on its own does not constitute a large construction project, the establishment of a number of renewable energy projects in the area may attract job seekers to the area. As in the case of construction workers employed on the project, the actual presence of job seekers in the area does not in itself constitute a social impact. However, the way in which they conduct themselves can impact on the local community. The main areas of concern associated with the influx of job seekers include:

- » Impacts on existing social networks and community structures.
- » Competition for housing, specifically low-cost housing.
- » Competition for scarce jobs.
- » Increase in incidences of crime.

These issues are similar to the concerns associated with the presence of construction workers and are discussed in Section 4.3.1. The potential for economically motivated in-migration and subsequent labour stranding is likely to be negligible. This is due to the isolated location of the area and the limited economic and employment opportunities in the nearby towns of Philipstown, Petrusville and De Aar.

The total number of construction workers employed, and duration of the construction phase will depend on the timing and phasing of the construction of the Crossroads Green Energy Cluster. This information will be collected as part of the assessment phase.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Potential impacts on family structures, social networks and community services associated with the influx of job seekers	<p><u>Direct impacts:</u></p> <ul style="list-style-type: none"> <li>» Disruption of existing family structures and social networks</li> <li>» Anti-social behaviour of construction workers</li> </ul>	Local-Regional	N/A

	<ul style="list-style-type: none"> <li>» Increase in substance abuse, crime, sexually transmitted diseases.</li> <li>» Unplanned pregnancies</li> <li>» Pressure on local services</li> </ul> <p><u>Indirect impacts:</u></p> <ul style="list-style-type: none"> <li>» Impact on psychological well-being of local communities.</li> <li>» Resentment of outsiders and tension within local communities</li> </ul>		
<p><b>Description of expected significance of impact</b> 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</p>			
<p><b>Gaps in knowledge &amp; recommendations for further study</b> » Collection of information on existing community challenges and needs.</p> <p><b>Recommendations with regards to general field surveys</b> » Site visit and interviews with representatives from local municipality and community representatives.</p>			

<p><b>Impact: Risk to safety, livestock, and farm infrastructure</b></p> <p>The presence on and movement of construction workers on and off the site poses a potential safety threat to local farmers and farm workers in the vicinity of the site. In addition, farm infrastructure, such as fences and gates, may be damaged and stock losses may also result from gates being left open and/or fences being damaged, or stock theft linked either directly or indirectly to the presence of construction workers on the site. The potential risks (safety, livestock, and farm infrastructure) can be effectively mitigated by careful planning and managing the movement of construction workers on and off the site workers during the construction phase.</p>			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
<p>Potential risk to safety of scholars, farmers and farm workers, livestock and damage to farm infrastructure associated with the presence of construction workers on site</p>	<p><u>Direct impacts:</u></p> <ul style="list-style-type: none"> <li>» Damage of gates, fences, etc.</li> <li>» Injuries to and loss of livestock</li> <li>» Break-ins, and theft of from local farms.</li> <li>» Damage of local farm roads.</li> </ul> <p><u>Indirect impacts:</u></p>	<p>Local</p>	<p>N/A</p>

	<ul style="list-style-type: none"> <li>» Exposure to outside people of farming operations and risk to farming operations.</li> <li>» Increased risk of stock-theft.</li> </ul>		
<p><b>Description of expected significance of impact</b> 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 etc.</p>			
<p><b>Gaps in knowledge &amp; recommendations for further study</b> » Collection of information on existing farming operations and activities.</p> <p><b>Recommendations with regards to general field surveys</b> » Site visit and interviews with local farmers and representatives from local farming associations etc.</p>			

<p><b>Impact: Increased risk of grass fires</b></p> <p>The presence of construction workers and construction-related activities on the site poses an increased risk of grass fires that could, in turn pose, a threat to livestock, crops, wildlife and farm infrastructure. The potential risk of grass fires will be higher during the dry, windy winter months from May to October. The impacts will be largely local and can be effectively mitigated.</p>			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires	<p><u>Direct impacts:</u></p> <ul style="list-style-type: none"> <li>» Damage of structures, grazing, gates, fences, etc.</li> <li>» Injuries to and loss of livestock</li> </ul> <p><u>Indirect impacts:</u></p> <ul style="list-style-type: none"> <li>» Impact on stocking levels and future farming operations.</li> <li>» Increased risk of stock losses and theft.</li> </ul>	Local	N/A
<p><b>Description of expected significance of impact</b> 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.</p>			
<p><b>Gaps in knowledge &amp; recommendations for further study</b> » Collection of information on existing farming operations and activities, and risk of grass fires in the area.</p> <p><b>Recommendations with regards to general field surveys</b> » Site visit and interviews with local farmers and representatives from local farming associations etc.</p>			

**Impact: Nuisance impacts associated with construction related activities**

Construction related activities, including the movement of heavy construction vehicles of and on the site, has the potential to create dust, noise and safety impacts and damage roads. The impacts will be largely local (confined to the site) and can be effectively mitigated.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Potential noise, dust and safety impacts associated with construction related activities	<p><u>Direct impacts:</u></p> <ul style="list-style-type: none"> <li>» Dust impacts, and impact on quality of life and also crops and grazing.</li> <li>» Noise impacts, and impact on quality of life.</li> <li>» Safety of farmers due to movement of construction vehicles</li> <li>» Damage of local farm roads.</li> </ul> <p><u>Indirect impacts:</u></p> <ul style="list-style-type: none"> <li>» Limited indirect impacts</li> </ul>	Local	N/A

**Description of expected significance of impact**

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.

**Gaps in knowledge & recommendations for further study**

- » Collection of information on existing farming operations and activities.

**Recommendations with regards to general field surveys**

- » Site visit and interviews with local farmers and representatives from local farming associations etc.

**Impact: Impacts associated with loss of farmland**

The activities associated with the construction phase and establishment of the proposed project and associated infrastructure will result in the disturbance and loss of land available for grazing. The impact on farmland associated with the construction phase can be mitigated by minimizing the footprint of the construction related activities and ensuring that disturbed areas are fully rehabilitated on completion of the construction phase. In addition, the landowner will be compensated for the loss of land.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Damage to farmland and loss of grazing and or	<u>Direct impacts:</u>	Local	N/A



crops	» Loss of grazing and or crops <u>Indirect impacts:</u> » Impact on future farming operations. » Impact on employment opportunities on the farm.		
<p><b>Description of expected significance of impact</b>                  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.</p>			
<p><b>Gaps in knowledge &amp; recommendations for further study</b>                  » Collection of information on existing farming operations and activities.</p> <p><b>Recommendations with regards to general field surveys</b>                  » Site visit and interviews with local farmers and representatives from local farming associations etc.</p>			

**Operational Phase Social Impacts**

Potential positive impacts

- » The establishment of infrastructure to improve energy security and support renewable sector.
- » Creation of employment opportunities.
- » Benefits to the affected landowners.
- » Benefits associated with the socio-economic contributions to community development.

Potential negative impacts

- » Visual impacts and associated impacts on sense of place.
- » Impact on property values.
- » Impact on tourism.

**Impact: Improve energy security and support the renewable energy sector**

The primary goal of the proposed project is to improve energy security in South Africa by generating additional energy. The proposed PV SEF will also reduce the carbon

<p>footprint associated with energy generation. The project should therefore be viewed within the context of the South Africa's current reliance on coal powered energy to meet the majority of its energy needs, and secondly, within the context of the success of the REIPPPP.</p>			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
<p>Improve SAs energy security and reduce reliance on coal</p>	<p><u>Direct impacts:</u></p> <ul style="list-style-type: none"> <li>» Improve energy security</li> <li>» Reduce reliance on coal.</li> <li>» Support renewable energy</li> </ul> <p><u>Indirect impacts:</u></p> <ul style="list-style-type: none"> <li>» Address climate change impacts</li> </ul>	<p>Local-International</p>	<p>N/A</p>
<p><b>Description of expected significance of impact</b>                  South Africa's energy crisis, which started in 2007 and is ongoing, has resulted in widespread rolling blackouts (referred to as load shedding) due to supply shortfalls. The load shedding has had a significant impact on all sectors of the economy and on investor confidence. A review of the REIPPPP and establishment of renewable energy facilities not only addresses environmental issues associated with climate change and consumption of scarce water resources, but also create significant socio-economic opportunities and benefits, specifically for historically disadvantaged, rural communities.</p>			
<p><b>Gaps in knowledge &amp; recommendations for further study</b></p> <ul style="list-style-type: none"> <li>» Collection and review of information on REIPPPP.</li> </ul> <p><b>Recommendations with regards to general field surveys</b></p> <ul style="list-style-type: none"> <li>» N/A. Desktop review of REIPPPP.</li> </ul>			

<p><b>Impact: Creation of employment opportunities</b></p> <p>The proposed development will create in the region up to 30 full time employment opportunities for the entire Crossroads Green Energy cluster with temporary workers/contractors for cleaning and so on during the operational phase, of which 70% will be unskilled, 25% semi-skilled 25%, and 5% skilled 5%. Based on similar projects the annual operating budget will be in the region of R 24 million (2022 Rand values), including wages.</p>			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
<p>Creation of employment and business opportunities associated with the operational phase</p>	<p><u>Direct impacts:</u></p> <ul style="list-style-type: none"> <li>» Creation of employment opportunities</li> <li>» Creation of business and procurement opportunities</li> </ul> <p><u>Indirect impacts:</u></p> <ul style="list-style-type: none"> <li>» Support for local economy.</li> <li>» Creation of training and skills development</li> </ul>	<p>Local-Regional</p>	<p>N/A</p>

	opportunities		
<p><b>Description of expected significance of impact</b></p> <p>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.</p>			
<p><b>Gaps in knowledge &amp; recommendations for further study</b></p> <p>» Collection and review of information on REIPPPP.</p>			
<p><b>Recommendations with regards to general field surveys</b></p> <p>» N/A. Desktop review of REIPPPP.</p>			

<p><b>Impact: Generate income for affected landowners</b></p> <p>The proponent will enter into rental agreements with the affected landowners for the use of the land for the establishment of the proposed PV SEF. In terms of the rental agreement the affected landowner will be paid an annual amount dependent upon the area affected. The additional income will reduce the risk to his livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as fuel, feed etc. Given the low carrying capacity of the veld the additional income represents a significant benefit for the affected landowner.</p>			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Generation of additional income for affected landowners	<p><u>Direct impacts:</u></p> <p>» Additional income to support farming</p> <p><u>Indirect impacts:</u></p> <p>» Opportunity to invest and expand farming operations and create more employment opportunities on the farm.</p>	Local	N/A
<p><b>Description of expected significance of impact</b></p> <p>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 etc.</p>			
<p><b>Gaps in knowledge &amp; recommendations for further study</b></p> <p>» Collection of information on existing farming operations and activities.</p>			
<p><b>Recommendations with regards to general field surveys</b></p> <p>» Site visit and interviews with local farmers and representatives from local farming associations etc.</p>			

<b>Impact: Benefits associated with the socio-economic development contributions</b>			
<p>The REIPPPP has been designed not only to procure energy but has also been structured to contribute to the broader national development objectives of job creation, social upliftment and broadening of economic ownership. Socio-economic development (SED) contributions are an important focus of the REIPPPP and are aimed at ensuring that local communities benefit directly from the investments attracted into the area. These contributions are linked to Community Trusts and accrue over the project operation life and, in so doing, create an opportunity to generate a steady revenue stream over an extended period. This revenue can be used to fund development initiatives in the area and support the local community. The long-term duration of the revenue stream also allows local municipalities and communities to undertake long term planning for the area.</p>			
<b>Issue</b>	<b>Nature of Impact</b>	<b>Extent of Impact</b>	<b>No-Go Areas</b>
Support for local economic development and investment	<p><u>Direct impacts:</u></p> <ul style="list-style-type: none"> <li>» Support local economic development</li> <li>» Create employment opportunities</li> <li>» Create skills development and training opportunities</li> <li>» Improve basic services</li> </ul> <p><u>Indirect impacts:</u></p> <ul style="list-style-type: none"> <li>» Up-grade local municipalities and improve quality of life of local communities</li> </ul>	Local-Regional	N/A
<p><b>Description of expected significance of impact</b></p> <p>The revenue from the proposed SEF can be used to support a number of social and economic initiatives in the area, including:</p> <ul style="list-style-type: none"> <li>» Creation of jobs.</li> <li>» Education.</li> <li>» Support for and provision of basic services.</li> <li>» School feeding schemes.</li> <li>» Training and skills development.</li> <li>» Support for SMMEs.</li> </ul>			
<p><b>Gaps in knowledge &amp; recommendations for further study</b></p> <ul style="list-style-type: none"> <li>» Collection and review of information on REIPPPP.</li> </ul> <p><b>Recommendations with regards to general field surveys</b></p> <ul style="list-style-type: none"> <li>» N/A. Desktop review of REIPPPP.</li> </ul>			

<b>Impact: Visual impact and impact on sense of place</b>			
<p>The proposed PV SEF has the potential to impact on the areas existing rural sense of place. Based on an initial assessment of the location the potential impact on the areas sense of place is likely to be limited. This will be confirmed during the assessment phase and the findings of the Visual Impact Assessment (VIA).</p>			
<b>Issue</b>	<b>Nature of Impact</b>	<b>Extent of Impact</b>	<b>No-Go Areas</b>
Impact on rural sense of place	<p><u>Direct impacts:</u></p> <ul style="list-style-type: none"> <li>» Change in rural sense of place</li> </ul> <p><u>Indirect impacts:</u></p> <ul style="list-style-type: none"> <li>» Potential impact on property values and hospitality operations.</li> </ul>	Local	N/A
<p><b>Description of expected significance of impact</b></p> <p>Renewable energy projects do have the potential to impact on an areas sense of place. In some instances, this can impact on existing or proposed tourist facilities and also on property values. In other cases, local landowners have indicated that the potential visual impacts are not regarded as an issue.</p>			
<p><b>Gaps in knowledge &amp; recommendations for further study</b></p> <ul style="list-style-type: none"> <li>» Collection of information on location of existing farming and hospitality operations and activities.</li> </ul>			
<p><b>Recommendations with regards to general field surveys</b></p> <ul style="list-style-type: none"> <li>» Site visit and interviews with local farmers and representatives from local municipality and farming and hospitality associations etc.</li> </ul>			

<b>Impact: Potential impact on property values</b>
<p>The potential visual impacts associated with the proposed PV SEF have the potential to impact on property values. Based on the results of a literature review undertaken for wind farms the potential impact on property values in rural areas is likely to be limited. In this regard a study undertaken in Australia in 2016 (Urbis Pty Ltd) found that:</p> <ul style="list-style-type: none"> <li>» Appropriately located wind farms within rural areas, removed from higher density residential areas, are unlikely to have a measurable negative impact on surrounding land values.</li> <li>» There is limited available sales data to make a conclusive finding relating to value impacts on residential or lifestyle properties located close to wind farm turbines, noting that wind farms in NSW have been constructed in predominantly rural areas.</li> </ul> <p>The impact of SEFs on property values is likely to be lower than the impact of WEFs due to the reduced visual impact. The Impact of the proposed PV SEF on property values is therefore likely to be low. These results will be confirmed based on the findings of the site visit and the VIA.</p>

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Impact on rural sense of place and associated impact on property values.	<u>Direct impacts:</u> » Change in rural sense of place and impact on property values  <u>Indirect impacts:</u> » Potential impact on hospitality operations.	Local	N/A
<b>Description of expected significance of impact</b> Renewable energy projects do have the potential to impact on an areas 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.			
<b>Gaps in knowledge &amp; recommendations for further study</b> » Collection of information on location of existing farming and hospitality operations and activities. <b>Recommendations with regards to general field surveys</b> » Site visit and interviews with local farmers and representatives from local municipality and farming and hospitality associations etc.			

<b>Impact: Potential impact on tourism</b>  The potential visual impacts associated with the PV SEF have the potential to impact on tourism facilities and tourism in the area. Based on the findings of the literature review there is limited evidence to suggest that the proposed SEF would impact on the tourism in the PKSDM and RLM at a local and regional level. The findings will be confirmed during the Assessment Phase.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Impact on existing and future tourism operations.	<u>Direct impacts:</u> » Change in rural sense of place and impact on tourism activities.  <u>Indirect impacts:</u> » Potential impact on future development of hospitality operations.	Local	N/A
<b>Description of expected significance of impact</b> 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.			
<b>Gaps in knowledge &amp; recommendations for further study</b> » Collection of information on location of existing farming and hospitality operations and activities.			



**Recommendations with regards to general field surveys**

- » Site visit and interviews with local farmers and representatives from local municipality and farming and hospitality associations etc.

**9.4.7. Traffic Impacts**

**Construction Phase**

- » Construction related traffic
- » The construction traffic would also lead to noise and dust pollution.
- » This phase also includes the construction of roads, excavations, trenching for electrical cables and other ancillary construction works that will temporarily generate the most traffic.

<b>Impact:</b> Traffic congestion due to an increase in traffic caused by the transportation of equipment, material and staff to site			
<b>Desktop Sensitivity Analysis of the Site:</b> Traffic congestion possible along the R48.			
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
<b>Description of expected significance of impact</b> 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.			
<b>Gaps in knowledge &amp; recommendations for further study</b>			
<b>Gaps</b> The following items need to be clarified: - Existing traffic volumes along the R48			

- 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 is recommended to avoid staggered intersections. 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

**Operational Phase**

- » During operation, it is expected that staff and security will visit the facility.
- » Maintenance vehicles are expected on site at times.
- » Should municipal water not be available, water will have to be transported to the site.

**POTENTIAL IMPACT TABLE – OPERATIONAL PHASE**

The traffic generated during this 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.

**Gaps in knowledge**

- The number of permanent employees

**Decommissioning Phase**

**IMPACT TABLE – DECOMMISSIONING PHASE**

This phase will have a similar impact as the Construction Phase i.e., traffic congestion, air pollution and noise pollution, as similar trips/movements are expected.

## Cumulative Impacts

- » Traffic congestion/delays on the surrounding road network.
- » Noise and dust pollution

<p><b>Impact:</b>                  Traffic congestion due to an increase in traffic.</p>			
<p><b>Desktop Sensitivity Analysis of the Site:</b>                  Traffic congestion and associated noise and dust pollution possible along the R48.</p>			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Traffic congestion	Potential traffic congestion and delays on the surrounding road network and associated noise and dust pollution.	Regional	None identified
<p><b>Description of expected significance of impact</b>                  The significance of the transport impact can be rated as high. <i>The increase in traffic cannot be completely mitigated but mitigation measures will significantly reduce the impact. Noise and dust pollution is limited to the construction and decommissioning periods.</i></p> <p><i>It should be noted that even if all the facilities are constructed and decommissioned at the same time, the roads authority will consider all applications for abnormal loads and work with all project companies to ensure that loads on the public roads are staggered and staged to ensure that the impact will be acceptable.</i></p>			
<p><b>Gaps in knowledge &amp; recommendations for further study</b></p> <ul style="list-style-type: none"> <li>- List of approved and planned renewable energy developments in the area/region.</li> </ul>			

## 9.5 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 ZionsheuveSolar PV Facility are described below and will be assessed in detail as part of the subsequent EIA phase to be conducted for the project.

### **Impact**

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

The cumulative impacts associated with Zionsheuvell Solar PV Facility have been viewed from two perspectives within this Scoping Report:

- » Cumulative impacts associated with the scale of the project (one 240MW 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 3 of the Farm Grass Pan 40) is located within 30km from several other authorised solar PV facilities. These projects include the other proposed facilities which form part of the Crossroads Green Energy Cluster and the following:

Project Name	Distance from the proposed site	Project Status
Proposed 300MW Solar Power Plant in Phillipstown area in Renosterberg Local Municipality	30 km south-east	Authorised
Mulilo Renewable Energy (Pty) Ltd Wind Energy Facility (North and South) Situated on The Plateau Near De Aar, Northern Cape Province	30 km south	Authorised
Proposed Swartwater 75MW solar PV power facility in Petrusville within Renosterburg Local Municipality, Northern Cape	17 km east	Authorised
The Proposed Scatec Solar (Pty) Ltd Photovoltaic (Solar Power) Farms in The Northern Cape Province-Kakbult	15 km west	Authorised

In addition to the authorised solar energy developments listed in **Error! Reference source not found.**, the Zionsheuveld twenty additional PV solar energy facilities are proposed for the Crossroads Green Energy development and fourteen new Solar PV facilities for the Kudu Solar Photovoltaic (PV) cluster, on the adjacent properties surrounding Remainder of the Farm Leeuwberg 79 namely:

Project Name	Affected property	Contracted Capacity
<b>Crossroads Green Energy Cluster</b>		
Koppy Alleen Solar PV Facility	Portion 5 of the Farm Koppy Alleen 83	100MW
Vrede Solar PV Facility	Portion 5 of the Farm Bas Berg 88	150MW
Tafelkop Solar PV Facility	Portion 3 of the Farm Grass Pan 40	240MW
Amper Daar Solar PV Facility	Remainder of Farm Wolwe Kuil 44	100MW
Wag-'n-Bietjie Solar PV Facility	Portion 1 of the Farm Leeuwe Berg 45	100MW
Ruspoot 1 Solar PV Facility ( <b>Option A</b> )	Portion 5 of the Farm Bokken Kraal 81 ( <b>Option A</b> )	100MW
Ruspoot 1 Solar PV Facility ( <b>Option B</b> )	Portion 4 on the Farm Knoffelfontein 74 Portion 1 on the Farm 78 Portion 2 on the Farm Leeuwberg 79 ( <b>Option B</b> )	100MW

Ruspoort 2 Solar PV Facility	Portion 2 of the Farm Leeuwberg 79	100MW
Middelplaas Solar PV Facility	Portion 4 of the Farm Grass Pan 40	100MW
Bokkraal Solar PV Facility	Remainder of the Farm Bokken Kraal 81	100MW
HCA Solar PV Facility	Portion 4 of the Farm Koppie Alleen 83	100MW
JW Solar PV Facility	Remainder of the Farm Plaas 196	240MW
Pro Deo Solar PV Facility	Portion 1 of the Farm Grass Pan 40	100MW
Uitkyk Solar PV Facility	Remainder of the Farm Plaas 197	100MW
Kareekloof Solar PV Facility	Remainder of the Farm Swart Koppies 86	100MW
JAN Solar PV Facility	Portion 1 of the Farm Schaap Kraal 38, Portion 1 of the Farm Annex Donker Hoek 89; and Remainder of Farm Kuhns Post 90	240MW
Driefontein Solar PV Facility	Portion 1 of the Farm Driefontein 87	100MW
Jagpoort Solar PV Facility	Portion 2 of the Farm Driefontein 87, Portion 3 of the Farm Driefontein 87, and Portion 2 of the Farm Kareekloof 85	150MW
Strydam Solar PV Facility	Portion 3 of the Farm Stryd Dam 107	240MW
Roodekraal Solar PV Facility	Remainder of the Farm Roode Kraal 106	150MW
Oosthuisfontein Solar PV Facility	Remainder of the Farm Oosthuisfontein 108	100MW
<b>Kudu Solar Photovoltaic (PV) cluster</b>		
Kudu Solar Facility 1 (Pty) Ltd	» Portion 0 (RE) of Farm Basberg 88	Up to 300 MWac.
Kudu Solar Facility 2 (Pty) Ltd	» Portion 3 of Farm Basberg 88	
Kudu Solar Facility 3 (Pty) Ltd	» Portion 4 of Farm Basberg 88	
Kudu Solar Facility 4 (Pty) Ltd	» Portion 2 of Farm Grass Pan 40	
Kudu Solar Facility 5 (Pty) Ltd	» Portion 0 (RE) of Farm Annex Wolve Kuil 41	
Kudu Solar Facility 6 (Pty) Ltd	» Portion 1 of Farm Annex Wolve Kuil 41	
Kudu Solar Facility 7 (Pty) Ltd	» Portion 0 (RE) of Farm Wolve Kuilen 42	
Kudu Solar Facility 8 (Pty) Ltd	» Portion 2 of Farm Wolve Kuil 43	
Kudu Solar Facility 9 (Pty) Ltd		

Kudu Solar Facility 10 (Pty) Ltd		
Kudu Solar Facility 11 (Pty) Ltd		
Kudu Solar Facility 12 (Pty) Ltd		
Kudu Solar Facility 13 (Pty) Ltd		
Kudu Solar Facility 14 (Pty) Ltd		

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 Zionsheuve!Solar PV Facility within the development area being considered for the development, including consideration of the following:

- » 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, including impacts on sense of place, impacts on local services and accommodation and impacts on the local economy.

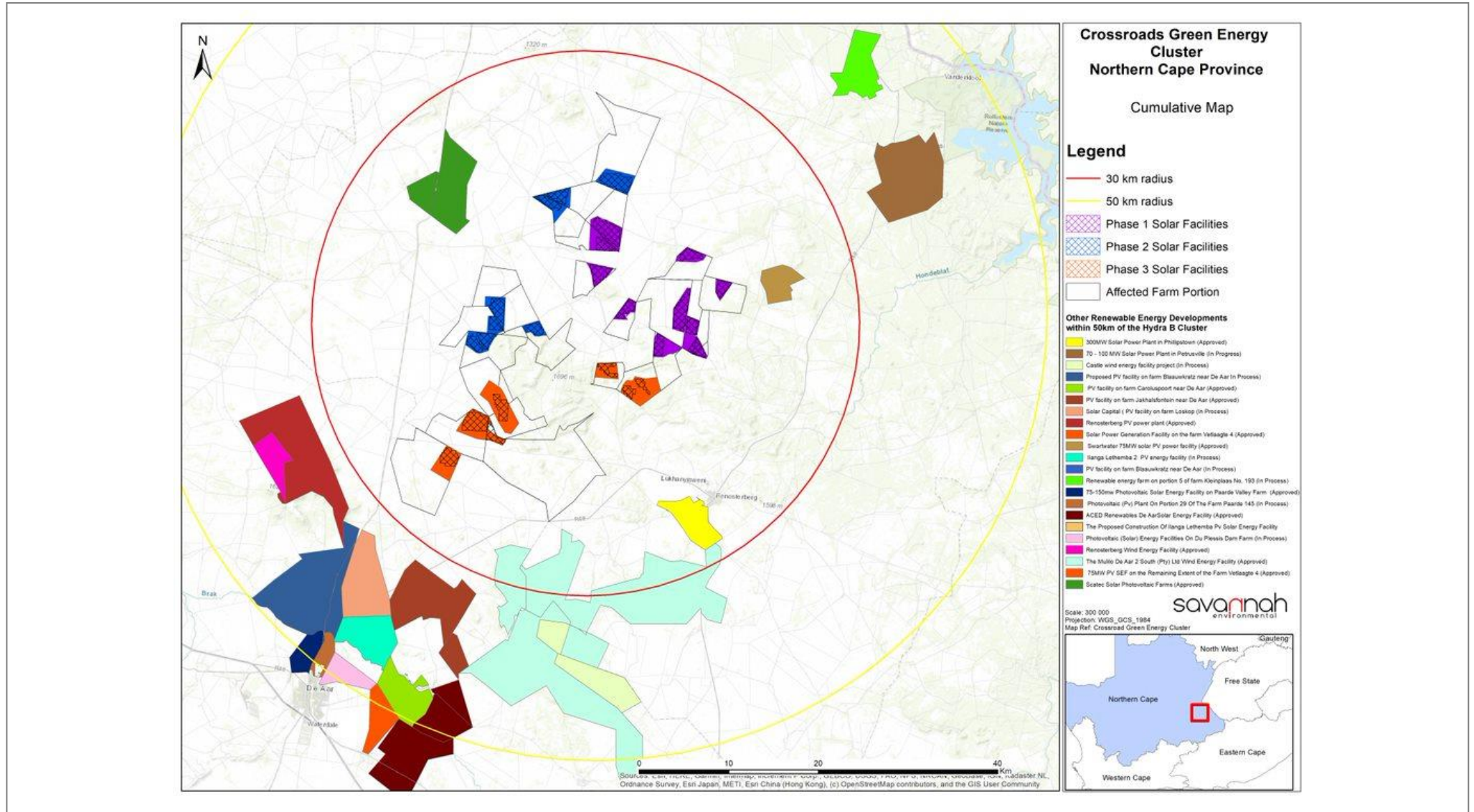
**Summary of the nature, significance, consequence, extent, duration and probability of the impacts**

- » 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 9.5:** Cumulative map illustrating other approved and/or constructed PV facilities located within the vicinity of the Zionsheuvel Solar PV project site

## CHAPTER 10: 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 Zionsheuveel Solar PV Facility 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 10.2**. Recommendations regarding investigations required to be undertaken within the detailed EIA phase are provided within the Plan of Study for EIA (**Chapter 11**).

### 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
2(1)(h)(xi) a concluding statement indicating the preferred alternatives, including the preferred location of the activity.	An overall conclusion and fatal flaw analysis regarding the Zionsheuveel Solar PV Facility is included within this chapter as a whole.

### 10.2. Overview of the Zionsheuveel Solar 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 Zionsheuveel Solar PV Facility is proposed on a site located ~6km south-east of Bethal and 1km east of Morgenon. The project site is located Remainder of Farm Leeuwberg 79 in the Renosterberg Local Municipality in the greater Pixley ka Seme District Municipality in the Northern Cape Province. The project site is located approximately 20km north of Philipstown and 30km west of Petrusville and within the Central Transmission Corridor.

The proposed facility will have a proposed contracted capacity of 240MW and will include the following infrastructure:

- » Solar PV array comprising PV modules and mounting structures (monofacial or bifacial and of fixed-tilt, single-axis tracking, and/or double-axis tracking PV technology)
- » Inverters and transformers
- » Cabling between the project components
- » Battery Energy Storage System (BESS)
- » On-site facility substation and power lines between the solar PV facility and the Eskom substation (to be confirmed and assessed through a separate process)
- » Site offices, Security office, operations and control, and maintenance and storage laydown areas
- » Access roads, 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 Zionsheuvell Solar PV Facility has been detailed in Chapter 9. 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 project site to assist in focussing the location of the development footprint for the Zionsheuvell Solar PV Facility to minimise the potential for environmental impact. The extent of the project site is ~2964ha and has been considered in this Scoping Report. A development area will be identified within the project site by the proponent for the development based on the outcome of the specialist assessments and technical considerations. 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 Zionsheuvell Solar PV Facility and associated infrastructure are anticipated to be localised and restricted to the project site itself, while operation phase impacts/benefits range from local to regional. No environmental fatal flaws were identified to be associated with the project site. 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 Zionsheuvell Solar PV Facility include:

- » Impacts on vegetation and protected plant species.
- » Direct faunal impacts.
- » Soil erosion and associated degradation of ecosystems.
- » Alien plant invasion.
- » Impacts on CBAs and broad-scale ecological processes.
- » Loss of sensitive wetland habitats and loss of/or disturbance of wetland vegetation.
- » Reduction in water quality in wetland systems.
- » Polarized light pollution.
- » Mortality of priority bird species due to collision with the solar panels and electrocution and collisions with voltage power lines within the facility.
- » Direct avifauna habitat destruction and displacement of bird species.
- » Compaction/soil stripping/transformation of land use which leads to loss of land capability Destruction of archaeological and palaeontological heritage.
- » Negative impact to significant cultural landscapes.
- » Visual impacts on the landscape and sense of place.

- » 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).

### **10.3. Site Sensitivity Analysis for the Zionsheuveld Solar PV Facility**

This section considers the sensitive features located within the project site, as identified by the independent specialists within each respective field, and also indicates the locations of the sensitive features within the project site.

The potentially sensitive areas which have been identified through the scoping study are illustrated in **Figure 10.1** and in the specialist reports included in **Appendix D to H**. The detail is based on the desktop review of available baseline information for the project site, as well as 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 Zionsheuveld Solar PV Facility.

#### **10.3.1 Terrestrial Ecology Sensitive Features**

The expectant anthropogenic activities are likely to drive habitat destruction causing displacement of fauna and flora and possibly even direct mortality. Land clearing destroys local wildlife habitat and can lead to the loss of local breeding grounds, nesting sites and wildlife movement corridors such as rivers, streams and drainage lines, or other locally important features. The removal of natural vegetation may reduce the habitat available for fauna species and may reduce animal populations and species compositions within the area.

#### **10.3.2 Freshwater Sensitive Features**

A key consideration for the impact assessment is the presence of the water resources in proximity to the project area. The available data also suggests the presence of drainage features in the area, with an expected low to medium sensitivity for these systems.

Construction 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. These disturbances could also result in the infestation and establishment of alien vegetation would affect the functioning of the systems. Leaks and/or spillages could result in contamination of the receiving water resources. Contaminated water resources are likely to have an effect on the associated biota. An increase in stormwater runoff 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.



### **10.3.3 Soils and Land Capability Sensitive Features**

Various soil forms are expected throughout the project area, of which some are commonly associated with high land capabilities. Even though the soil depth, texture and permeability of these soils ensure high land capability, the climatic capability of the area often reduces the land potential considerably. Areas characterised by "High" land potential are expected for selected areas.

The proposed development can result in the loss of land capability. The disturbances could further also result in the infestation and establishment of alien vegetation, which in turn can have a detrimental impact on soil resources. The development of the area could also result in compaction and/or erosion. Further to this, these activities could also cause leaks and/or spillages resulting 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.

### **10.3.4 Heritage Sensitive Features (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 high and very high paleontological sensitivity. According to the extract from the Council for GeoSciences Map 3024 for Colesburg, the development area is underlain by Jurassic Dolerite, the Tierberg Formation of the Eccca Group and the Adelaide Subgroup of the Beaufort Group.

As part of the Vetlaagte project in 2012, Almond completed a field-based palaeontological assessment. Almond (2012) found that "The potentially fossiliferous sediments of the Late Palaeozoic Karoo Supergroup (Eccca and Lower Beaufort Groups) that underlie the study area are almost entirely mantled in a thick layer of superficial deposits of probable Pleistocene to Recent age. These include various soils, gravels and – at least in some areas - a well-developed calcrete hardpan. The upper Eccca Group bedrocks in the northern portion of the study area contain locally abundant fossil wood (of palaeontological interest for dating and palaeoenvironmental studies), as well as low diversity non-marine trace fossil assemblages typical of the Waterford Formation, rather than the Tierberg Formation as mapped. No vertebrate fossils and only scattered woody plant impressions of the Permian Glossopteris Flora were observed within the Lower Beaufort Group rocks that are very poorly exposed in the southern portion of the Vetlaagte study area. Trace fossils, silicified wood and rare vertebrate remains (therapsids, parareptiles) of the Middle Permian Pristerognathus Assemblage Zone have recently been recorded from this succession in the De Aar region (Almond 2010b). Extensive dolerite sills and dykes of the Early Jurassic Karoo Dolerite Suite intruding the Karoo Supergroup sediments are entirely unfossiliferous, as are rare intrusive kimberlite pipe rocks of Cretaceous age. The diverse superficial deposits within the three study areas (e.g. soils, gravels, alluvium, calcrete hardpans) are of low palaeontological sensitivity as a whole. Abundant fragments of reworked fossil wood material of Eccca provenance occur widely within subsurface and surface gravels overlying the Eccca Group outcrop area."

In Bamford's assessment completed for the area in 2021, she notes that "Based on experience, other reports and the lack of any significant previously recorded fossils from the area, it is unlikely that any fossils would be preserved in the Tierberg Formation or Adelaide Subgroup. Nonetheless, a Fossil Chance Find Protocol should be added to the EMPr."

### **10.3.5 Visual Sensitive Features**

The fact that some components of the proposed Zionsheuvél Solar 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 of the project.

It is recommended that additional spatial analyses be undertaken in order to create a visual impact index that will further aid in determining potential areas of visual impact. This exercise should be undertaken for the core PV facility as well as for the ancillary infrastructure, as these structures (e.g. the BESS structures) are envisaged to have varying levels of visual impact at a more localised scale. The site-specific issues (as mentioned earlier in the report) and potential sensitive visual receptors should be measured against this visual impact index and be addressed individually in terms of nature, extent, duration, probability, severity and significance of visual impact.

This recommended work must be undertaken during the Environmental Impact Assessment (EIA) Phase of reporting for this proposed project.

### **10.3.6 Social Sensitive Features**

The proposed approach to the 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.
- » 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.

The site visit will be undertaken during the Assessment Phase of the SIA. The site visit will include interviews with key stakeholders and interested and affected parties.

### 10.3.7 Traffic Sensitive Features

This scoping report addressed key issues and alternatives to be considered for the proposed Zionsheuvél Solar PV Facility.

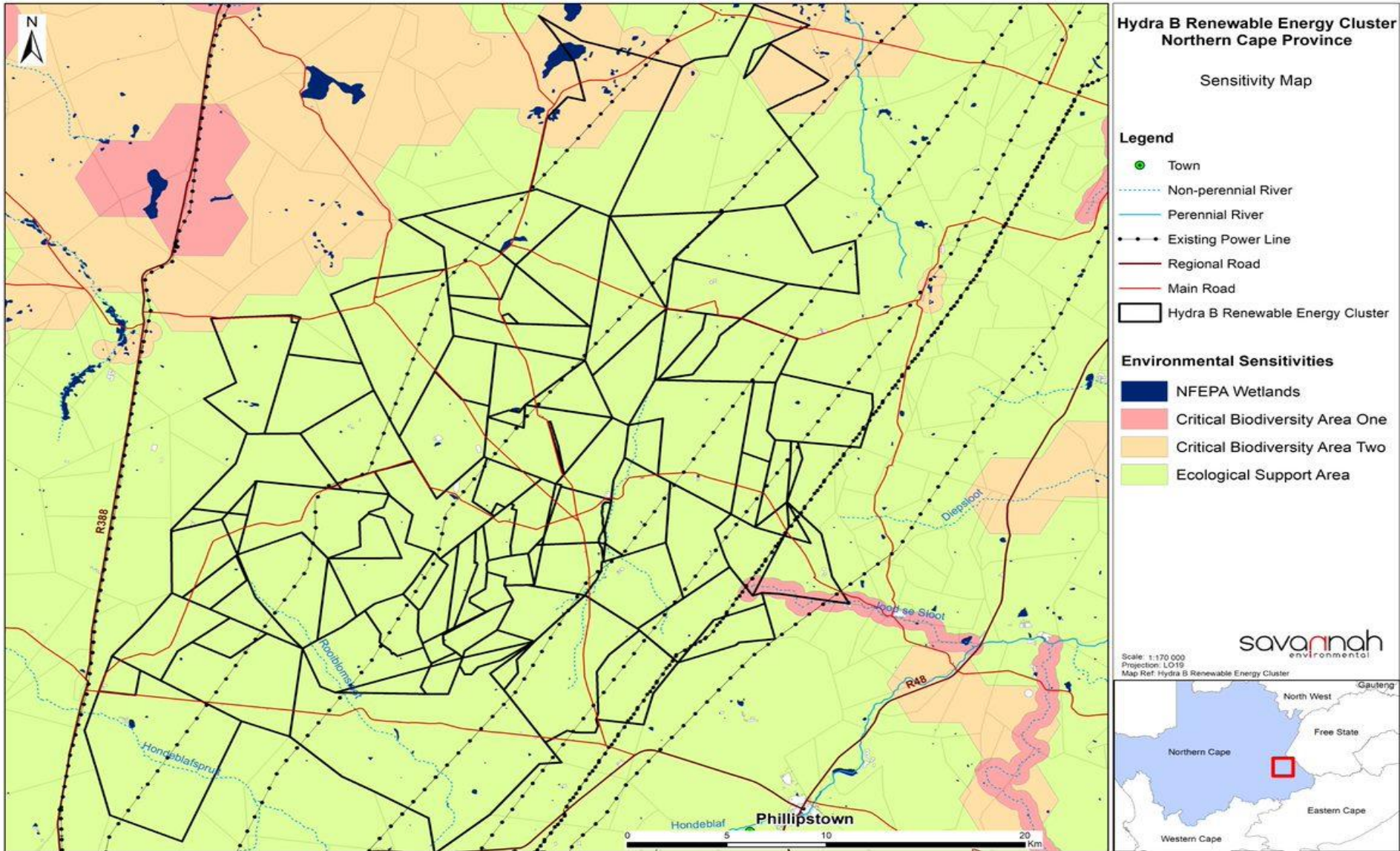
- » The preferred Port of Entry for imported components is the Port of Ngqura.
- » The proposed access road located off the R48 is deemed a suitable access road as it is an existing gravel road i.e., less expensive to upgrade.
- » It needs to be ensured that the gravel sections of the haulage routes remain in good condition and will hence need to be maintained during the additional loading of the construction phase and then reinstated after construction is completed. The gravel roads will require grading with a grader to obtain a flat even surface and the geometric design of these gravel roads needs to be confirmed at detailed design stage.
- » The construction phase traffic, although significant, will be temporary and can be mitigated to an acceptable level.
- » During operation, it is expected that staff and security will periodically visit the facility. The traffic generated during this phase will be minimal and will not have an impact on the surrounding road network.
- » The construction and decommissioning phases of a development is the only significant traffic generator and therefore noise and dust pollution will be higher during this phase. The duration of this phase is short term i.e., the impact of the traffic on the surrounding road network is temporary and solar facilities, when operational, do not add any significant traffic to the road network.

### 10.4 Overall Conclusion and Fatal Flaw Analysis

The project site for the Zionsheuvél Solar PV Facility is outlined in black in **Figure 10.1**. The findings of the Scoping Study indicate that no environmental fatal flaws are associated with the proposed project. 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 project site for the development of the facility be considered outside of the areas identified as no-go areas 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' of the mitigation hierarchy for the identification of an appropriate development footprint within the development area. Even with the appropriate avoidance of sensitive areas, there is an adequate area on the site which can accommodate the planned 150MW facility with relatively low impacts on the environment. This area is referred to as the development footprint.

With an understanding of which areas within the project site are considered sensitive to the development of the proposed facility, the developer can prepare a detailed facility 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 11** of this Scoping Report. These studies will consider the detailed facility layout produced by the developer 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 10.1:** Environmental Sensitivity Map from the results of the scoping evaluation for the Zionsheuvel Solar Energy Facility and associated infrastructure

## CHAPTER 11: PLAN OF STUDY FOR THE EIA

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

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

### 11.1 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
2(1)(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 Zionsheugel Solar PV facility is included within this chapter.

## 11.2 Objectives of the EIA Phase

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

The EIA Phase will aim to achieve the following:

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

## 11.3 Consideration of Alternatives

The following project alternatives will be investigated in the EIA:

Type of Alternatives Considered	Description of the Alternative relating to the ZionsheugelSolar PV facility
Site-specific Alternatives	Privately owned farm portions have been identified for the development of the Zionsheugel Solar PV facility, taking advantage of the site-specific characteristics such as the solar irradiation. The study area which is ~2964 ha in extent and in which a development area (~498ha) has been identified, is considered to be large enough for the development of a PV facility with a contracted capacity of up to 240MW, while allowing for avoidance of environmental sensitivities, as may be required in line with the mitigation hierarchy.
Layout Footprint Design Alternatives	The layout for the development of the Zionsheugel Solar PV facility will be designed taking cognisance of the environmental sensitivities identified during the scoping phase. The detailed facility layout 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).
'Do-nothing' Alternative	The option to not construct the Zionsheugel Solar PV facility. The 'do-nothing' alternative assumes that the site remains in its current state, that is status quo, and that the current land use practises only continue.

## 11.4 Specialist Tasks to be undertaken during 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 10.1**. 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.

**Table 10.1:** Impacts requiring further investigation during the EIA Phase, and activities to be undertaken in order to assess the significance of these potential impacts relevant to Zionsheuvvel Solar PV facility.

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
<p><b>Ecology (Flora, Fauna)</b></p>	<p><b>Sensitivity Analysis and EIA assessment</b> The following is planned for the respective assessments. The principle aim of the assessment will be to provide information to identify the risks stemming from the proposed activity and to identify potential ecological for the project. This will be achieved through the following:</p> <ul style="list-style-type: none"> <li>» Compile an expected species list and possible threatened flora and fauna species that occur within the project area;</li> <li>» Field survey to ascertain the species composition of the present flora and fauna community within the project area;</li> <li>» Field survey for the delineation, classification and assessment of wetlands within the 500 m regulated area;</li> <li>» Delineate and map the habitats and their respective sensitivities that occur within the project area;</li> <li>» Identify the manner that the proposed project impacts the ecological and evaluate the level of risk of these potential impacts; and</li> <li>» The prescription of mitigation measures and recommendations for identified risks.</li> </ul> <p><b>Assessment of Impacts for the EIA</b> The methodology described above assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts associated with an activity. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive).</p> <p>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.</p> <p><b>Environmental Management Programme</b> For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMP.</p>	<p>Lindi Steyn (The Biodiversity Company)</p>
<p><b>Avifauna</b></p>	<p><b>Sensitivity Analysis and EIA assessment</b> The avifaunal field survey to be undertaken in the EIA Phase will be comprised of the following techniques:</p> <ul style="list-style-type: none"> <li>» Visual and auditory searches - This typically comprises of meandering and using binoculars to view species from a distance without them being disturbed; and listening to species calls;</li> </ul>	

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	<p>» Point counts for the avifauna; and                      » Utilization of local knowledge.                      Relevant field guides and texts that will be consulted for identification purposes included the following:                      » Book of birds of South Africa, Lesotho and Swaziland (Taylor et al., 2015); and                      » Roberts – Birds of Southern Africa (Hockey et al., 2005).</p> <p><b>Assessment of Impacts for the EIA</b>                      The methodology described above assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts associated with an activity. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive).</p> <p>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.</p> <p><b>Environmental Management Programme</b>                      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.</p>	
<p><b>Soils</b></p>	<p><b>Sensitivity Analysis and EIA assessment</b>                      The agricultural and land capability field survey to be undertaken in the EIA Phase will be comprised of the following techniques:                      » Confirmation of the agricultural potential and land capability sensitivity for the project area;                      » Identify the manner that the proposed project impacts the ecological and agricultural considerations and evaluate the level of risk of these potential impacts.</p> <p><b>Assessment of Impacts for the EIA</b>                      This methodology described above assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive).</p>	

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	<p>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.</p> <p><b>Environmental Management Programme</b></p> <p>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.</p>	
<p><b>Visual impact</b></p>	<p><b>Sensitivity Analysis and EIA assessment</b></p> <p>The visual impact is determined 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.</p> <p>The visual impact is determined for the highest impact-operating scenario (worst-case scenario) and varying climatic conditions (i.e. different seasons, weather conditions, etc.) are not considered.</p> <p>The VIA considers potential cumulative visual impacts, or alternatively the potential to concentrate visual exposure/impact within the region.</p> <p>The following VIA-specific tasks must be undertaken:</p> <ul style="list-style-type: none"> <li>» Site visit Undertake a site visit in order to collect a photographic record of the affected environment, to verify the results of the spatial analyses and to identify any additional site-specific issues that may need to be addressed in the VIA report.</li> <li>» Determine potential visual exposure The visibility or visual exposure of any structure or activity is the point of departure for the visual impact assessment. It stands to reason that if (or where) the proposed facility and associated infrastructure were not visible, no impact would occur.</li> </ul> <p>The viewshed analyses of the proposed facility and the related infrastructure are based on a detailed digital terrain model of the study area.</p>	<p>Lourens du Plessis (LOGIS)</p>

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	<p>The first step in determining the visual impact of the proposed facility is to identify the areas from which the structures would be visible. The type of structures, the dimensions, the extent of operations and their support infrastructure are taken into account.</p> <p>» Determine visual distance/observer proximity to the facility                      In order to refine the visual exposure of the facility on surrounding areas/receptors, the principle of reduced impact over distance is applied in order to determine the core area of visual influence for this type of structure.</p> <p>Proximity radii for the proposed infrastructure are created in order to indicate the scale and viewing distance of the facility and to determine the prominence of the structures in relation to their environment.</p> <p>The visual distance theory and the observer's proximity to the facility are closely related, and especially relevant, when considered from areas with a high viewer incidence and a predominantly (anticipated) negative visual perception of the proposed facility.</p> <p>» Determine viewer incidence/viewer perception (sensitive visual receptors)                      The next layer of information is the identification of areas of high viewer incidence (i.e. main roads, residential areas, settlements, etc.) that may be exposed to the project infrastructure.</p> <p>This is done in order to focus attention on areas where the perceived visual impact of the facility will be the highest and where the perception of affected observers will be negative.</p> <p>Related to this data set, is a land use character map, that further aids in identifying sensitive areas and possible critical features (i.e., tourist facilities, protected areas, etc.), that should be addressed.</p> <p>» Determine the visual absorption capacity of the landscape                      This is the capacity of the receiving environment to absorb the potential visual impact of the proposed facility. The VAC is primarily a function of the vegetation, and will be high if the vegetation is tall, dense and continuous. Conversely, low growing, sparse and patchy vegetation will have a low VAC.</p> <p>The VAC would also be high where the environment can readily absorb the structure in terms of texture, colour, form and light / shade characteristics of the structure. On the other hand, the VAC for a structure contrasting markedly with one or more of the characteristics of the environment would be low.</p>	



Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	<p>The VAC also generally increases with distance, where discernible detail in visual characteristics of both environment and structure decreases.</p> <ul style="list-style-type: none"> <li>» Calculate the visual impact index                      The results of the above analyses are merged in order to determine the areas of likely visual impact and where the viewer perception would be negative. An area with short distance visual exposure to the proposed infrastructure, a high viewer incidence and a predominantly negative perception would therefore have a higher value (greater impact) on the index. This focusses the attention to the critical areas of potential impact and determines the potential magnitude of the visual impact.</li> </ul> <p>Geographical Information Systems (GIS) software is used to perform all the analyses and to overlay relevant geographical data sets in order to generate a visual impact index.</p> <ul style="list-style-type: none"> <li>» Determine impact significance                      The potential visual impacts are quantified in their respective geographical locations in order to determine the significance of the anticipated impact on identified receptors. Significance is determined as a function of extent, duration, magnitude (derived from the visual impact index) and probability. Potential cumulative and residual visual impacts are also addressed. The results of this section are displayed in impact tables and summarised in an impact statement.</li> <li>» Propose mitigation measures                      The preferred alternative (or a possible permutation of the alternatives) will be based on its potential to reduce the visual impact. Additional general mitigation measures will be proposed in terms of the planning, construction, operation and decommissioning phases of the project.</li> <li>» Reporting and map display                      All the data categories, used to calculate the visual impact index, and the results of the analyses will be displayed as maps in the accompanying report. The methodology of the analyses, the results of the visual impact assessment and the conclusion of the assessment will be addressed in the VIA report.</li> </ul> <p><b>Assessment of Impacts for the EIA</b>                      This methodology described above assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance</p>	

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	<p>of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive).</p> <p>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.</p> <p><b>Environmental Management Programme</b> 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.</p>	
<p><b>Heritage (Archaeology and Palaeontology)</b></p>	<p><u>The EIA Phase will include the following activities:</u></p> <p>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 Impact Assessment with specific focus on impacts to archaeological heritage will therefore be conducted, the primary objective of which is to determine the heritage features on the site as well as the significance of the cultural landscape. The following activities will be undertaken during the EIA Phase:</p> <p>» An HIA should be conducted consisting of a field-based archaeological impact assessment due to the likelihood of encountering engravings and possible graves or ruins. The area has very low palaeontological sensitivity as verified by the fieldwork carried out by Almond and Millstead. A desktop PIA should therefore be carried out as part of the HIA.</p> <p><u>Assessment of Impacts for the EIA:</u> The methodology described in <b>Section 10.6</b> 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).</p> <p>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.</p> <p><u>Environmental Management Programme:</u></p>	<p>Jenna Lavin (CTS Heritage)</p>

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	<p>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.</p>	
<p><b>Social</b></p>	<p><b>Sensitivity Analysis and EIA assessment</b></p> <p>The proposed approach to the SIA is based on the Guidelines for SIA endorsed by Western Cape Provincial Environmental Authorities (DEA&amp;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:</p> <ul style="list-style-type: none"> <li>» 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.</li> <li>» 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.;</li> <li>» 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.</li> <li>» 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.</li> <li>» 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.</li> <li>» Identification and assessment of cumulative impacts (positive and negative).</li> <li>» Identification of appropriate measures to avoid, mitigate, enhance and compensate for potential social impacts.</li> <li>» Preparation of Social Impact Assessment (SIA) Report.</li> </ul> <p>The site visit will be undertaken during the Assessment Phase of the SIA. The site visit will include interviews with key stakeholders and interested and affected parties.</p> <p><b>Assessment of Impacts for the EIA</b></p>	<p>Tony Barbour</p>

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	<p>This methodology described above assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive).</p> <p>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.</p> <p><b>Environmental Management Programme</b></p> <p>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.</p>	
<p><b>Cumulative Assessment</b></p>	<p>Assess the cumulative impacts associated with the construction and operation of more than one development (i.e., Solar PV Energy Facilities) within 30 km of the Project site on the ecological and freshwater, heritage, soil and agricultural potential, avifaunal, visual and social impacts of the area.</p> <p><u>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:</u></p> <ul style="list-style-type: none"> <li>» 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.</li> <li>» Unacceptable risk to freshwater features through disturbance associated with construction activities and increased runoff and erosion during the operation phase.</li> <li>» Unacceptable risk to avifauna through habitat loss, displacement, and collision with PV infrastructure.</li> <li>» Unacceptable loss of high agricultural potential areas presenting a risk to food security and increased soil erosion.</li> <li>» Unacceptable loss of heritage resources (including palaeontological and archaeological resources).</li> <li>» Unacceptable impact to social factors and components.</li> </ul>	<p>Considered by all specialists</p> <p>Overall assessment by Savannah Environmental</p>

## 11.6 Assessment of Potential Impacts Associated with the Project

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

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

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

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

S = Significance weighting

E = Extent

D = Duration  
M = Magnitude  
P = Probability

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

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

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 Project will result in any unacceptable loss or impact considering all the projects proposed in the area is included in the respective specialist reports.

The project applicant has the responsibility to avoid and / or minimise impacts as well as plan for their management (in terms of the 2014 EIA Regulations (GNR 326)), the mitigation of significant impacts will be discussed. Assessment of mitigated impacts will demonstrate the effectiveness of the proposed mitigation measures.

The results of the impact assessment studies and other available information will be integrated by the Savannah Environmental project team. The EIA Report will be compiled in terms of the requirements of the 2014 EIA Regulations (GNR 326) and will include:

- » The details and expertise of the **EAP** who prepared the report.
- » The **location** of the activity and a locality map illustrating the location of the proposed activity.
- » A **description** of the scope of the proposed activity including all listed activities triggered and a description of associated structures and infrastructure.

- » The **policy and legislative** context within which the development is located and an explanation of how the development complies and responds to the legislation and policy context.
- » The **need and desirability** of the proposed development of the activity in the context of the preferred location.
- » A motivation for the **preferred development footprint** within the approved site.
- » A description of the **process** followed to reach the proposed development footprint within the approved site, including:
  - \* Details of the development footprint considered.
  - \* Details of the public participation process undertaken in terms of Regulation 41 of the 2014 EIA Regulations, including copies of supporting documents.
  - \* A summary of issues raised by interested and affected parties and the manner in which the issues were incorporated.
  - \* The environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.
  - \* The impacts and risks identified including the nature, significance, consequence extent, duration and probability of the impacts, including the degree to which these impacts can be reversed, may cause irreplaceable loss of resources and can be avoided, managed or mitigated.
  - \* The methodology used for determining and ranking the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks.
  - \* Positive and negative impacts that the activity and alternatives will have on the environment and the community.
  - \* Possible mitigation measures to be applied and the level of residual risk.
  - \* A motivation for not considering alternative development locations.
  - \* A concluding statement indicating the preferred alternative development location.
  - \* A full description of the process followed to identify, assess and rank impacts of the activity and associated infrastructure on the preferred location including all environmental issues and risks that have been identified and an assessment of the significance of each issue and risk and the extent to which the issue/risk can be avoided or mitigated.
- » An **assessment** of the identified potentially significant impacts and risks.
- » A summary of the **findings and recommendations** of any specialist report and an indication as to how these findings and recommendations have been included.
- » An **environmental impact assessment** containing a summary of key findings, an environmental sensitivity map, and a summary of the positive and negative impacts and risks of the proposed activity.
- » **Recommendations** from specialist, the recording of proposed impact management **objectives** and the impact management **outcomes** for inclusion in the **EMPr** as well as inclusion as conditions of authorisation.
- » The final **alternatives** which respond to the impact management measures, avoidance and mitigation measures identified.
- » Any aspects which were **conditional** to the findings of the assessment.
- » A description of the assumptions, uncertainties and gaps in knowledge relating to the assessment and mitigation measures proposed.
- » An **opinion** as to whether the proposed activity should or should not be authorised and the conditions thereof.
- » An undertaking or **affirmation** by the EAP in relation to the correctness of the information, the inclusion of comments and inputs from stakeholders and Interested and affected parties, the inclusion of inputs and recommendations from the specialists, and any information provided by the EAP to interested and



affected parties and any responses by the EAP to comments or inputs made by interested or affected parties.

The EIA Report will be released to the public and relevant stakeholders, Organs of State and Authorities for a 30-day review period. Comments received from I&APs will be captured within a Comments and Response Report, which will be included within the EIA Report, for submission to DFFE for decision-making.

### **11.7 Authority Consultation**

Consultation with the regulating authorities (i.e., DFFE and the Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform) will continue to be undertaken and will continue throughout the EIA process. On-going consultation will include the following:

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

### **11.8 Public Participation Process**

A public participation process will be undertaken by Savannah Environmental during the EIA phase). Consultation with key stakeholders and I&APs will be on-going throughout the EIA Phase. Through this consultation process, stakeholders and I&APs will be encouraged to verify that their issues were recorded in the Scoping Phase, and to identify additional issues of concern or highlight positive aspects of the proposed project, and to comment on the findings of the EIA Phase. In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their inputs, various opportunities will be provided for stakeholders and I&APs to be involved in the EIA Phase of the process, as follows:

- » Focus group meetings (pre-arranged and I&APs invited to attend) via the use of virtual platforms (Zoom or MS Teams) or in person, as required.
- » One-on-one consultation meetings (for example with directly affected and surrounding landowners) via telephone, virtual platforms or in person.
- » Telephonic consultation sessions (consultation with various parties from the EIA project team).
- » Written, faxed or e-mail correspondence.

The EIA Report will be made available for a 30-day review period prior to finalisation and submission to the DFFE for decision-making. In order to provide an overview of the findings of the EIA process and facilitate comments, a public meeting will be held during this public review period, depending on the specific needs of the stakeholders in the area. All comments received during the public review period will be included within the final report to be submitted to the DFFE for review and decision-making.

## 11.9 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 <sup>17</sup>
Make Scoping Report available to the public, stakeholders, and authorities (30 days)	16 January 2023 to 15 February 2023
Finalisation of Scoping Report, and submission of the Final Scoping Report to DFFE	13 February 2023 to 20 February 2023
Authority acceptance of the Final Scoping Report and Plan of Study to undertake the EIA (44 days)	Within 43 days of receipt of the Final Scoping Report (i.e. March 2023/April 2023)
Make EIA Report and EMPr available to the public, stakeholders and authorities (30 days)	14 April 2023 – 14 May 2023
Finalisation of EIA Report, and submission of the Final EIA Report to DFFE	May 2023
Authority review period and decision-making (107 days)	Within 107 days of submission of the Final EIA Report to the DFFE

<sup>17</sup> Indicative dates.

## CHAPTER 12: REFERENCES

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<b>Nid</b>	<b>Report Type</b>	<b>Author/s</b>	<b>Date</b>	<b>Title</b>
104574	Heritage Scoping	Wouter Fourie	10/10/2012	Heritage Scoping Report for the Proposed Wind Farm Facility for Renosterberg Wind Energy Company (RWEC) near Petrusville, Northern Cape Province
104576	Heritage Scoping	Wouter Fourie	10/10/2012	Heritage Scoping Report for the Proposed Solar PV Facility for Renosterberg Wind Energy Company (RWEC) near Petrusville, Northern Cape Province
104804	PIA Desktop	John E Almond	01/09/2012	Palaeontological specialist assessment: desktop study PROPOSED RENOSTERBERG SOLAR PV AND WIND ENERGY FACILITIES NEAR DE AAR, NORTHERN CAPE PROVINCE

109347	AIA Phase 1	David Morris	01/12/2012	ARCHAEOLOGY SPECIALIST INPUT ON THE PROPOSED ACCESS ROAD FOR THE VANDERLINDESKRAAL PHOTOVOLTAIC SITE SITUATED NEAR HANOVER, NORTHERN CAPE
109627	PIA Phase 1	Gideon Groenewald	24/01/2013	PALAEONTOLOGICAL FIELD INVESTIGATION PHASE 1 REPORT FOR THE PROPOSED ACCESS ROAD ON THE REMAINDER OF THE FARM VAN DER LINDES KRAAL NO. 79, HANOVER, NORTHERN CAPE
126242	HIA Phase 1	Anton van Vollenhoven	30/07/2013	A REPORT ON A CULTURAL HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED SWARTWATER SOLAR PV POWER FACILITY, CLOSE TO PETRUSVILLE, NORTHERN CAPE PROVINCE
127514	Palaeontological Specialist Reports	Robert Gess	13/08/2013	Palaeontological Impact Assessment for Proposed establishment of the Swartwater Solar energy Facility, Eastern Cape
151280	Archaeological Specialist Reports	Jaco van der Walt	26/08/2013	Archeological Scoping Report for the Proposed Castle WEF near De Aar, Northern Cape Province
151284	PIA Desktop	John E Almond	31/08/2013	Palaeontological Heritage Assessment: Desktop Study
160512	Archaeological Monitoring	Lita Webley, Dave Halkett	17/03/2014	HERITAGE IMPACT ASSESSMENT: WALKDOWN OF FINAL LAYOUT OF THE LONGYUAN MULILO DE AAR 2 NORTH WIND ENERGY FACILITY, NORTHERN CAPE PROVINCE
163994		Wouter Fourie	03/08/2013	Proposed PV Facility: Heritage Impact Report
183142	Archaeological Specialist Reports	Jaco van der Walt	30/10/2014	Archaeological Impact Assessment Report for the Proposed Castle Wind Energy Facility, De Aar, Northern Cape
183143	Heritage Impact Assessment Specialist Reports	Barry Millsteed	24/11/2014	Full Palaeontological Heritage Impact Assessment Report on a Portion of a Proposed Wind Energy Generation Facility (The Castle Project); This Being on the Eastern Extent of the Farm Knapdaar 8 near De Aar, Northern Cape Province
339820	Heritage Impact Assessment Specialist Reports	Lita Webley, Jayson Orton	01/12/2011	Proposed De Aar Wind Energy Facility on the North and South Plateau, Northern Cape Province
339824	Heritage Impact Assessment Specialist Reports	Lita Webley, David Halkett	01/06/2015	Addendum: Proposed Wind Energy Facility situated on the Eastern plateau (South) near De Aar, Northern Cape Province.

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