



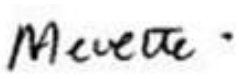
**BONSMARA SOLAR PV (RF) (PTY) LTD**

---

**Proposed Development of the  
Bonsmara Solar PV Facility and  
Associated Infrastructure near  
Kroonstad in the Free State Province**

**Draft Environmental Impact Assessment  
Report**

Issue Date: 6 April 2023  
Revision no.: 1.0  
Project No. 17869  
DFFE Reference Number: 14/12/16/3/3/2/2228

|                         |  |
|-------------------------|--|
| <b>Date:</b>            | 6 April 2023   |
| <b>Document Title:</b>  | Proposed Development of the Bonsmara Solar PV Facility and Associated Infrastructure near Kroonstad in the Free State Province: Draft Environmental Impact Assessment Report |
| <b>Revision Number:</b> | 1.0  |
| <b>Author:</b>          | Michelle Guy (EAP)<br><i>Pr.Sci.Nat Reg No. 126338</i><br><i>EAPASA Reg No. 2019/868</i>   |
| <b>Checked by:</b>      | Michelle Nevette<br><i>Cert.Nat.Sci Rev No. 120356</i><br><i>EAPASA Reg No. 2019/1560</i>  |
| <b>Approved by:</b>     | Michelle Nevette<br><i>Cert.Nat.Sci Rev No. 120356</i><br><i>EAPASA Reg No. 2019/1560</i>  |
| <b>Signature:</b>       |   |
| <b>Client:</b>          | Bonsmara Solar PV (RF) (Pty) Ltd   |

### **Confidentiality Statement**

**© SiVEST SA (Pty) Ltd**  
**All rights reserved**

*Copyright is vested in SiVEST SA (Pty) Ltd in terms of the Copyright Act (Act 98 of 1978). This report is strictly confidential and is to be used exclusively by the recipient.*

*Under no circumstances should this report or information contained therein be distributed, reprinted, reproduced or transmitted in any form or by any means, electronic or mechanical, without the written consent of SiVEST SA (Pty) Ltd.*

# **KEY PROJECT INFORMATION**

## **PROJECT DESCRIPTION**

The application site being assessed (which incorporates the farm portions / properties listed above) is approximately 1004 hectares (ha) in extent.

It is anticipated that the proposed Solar PV energy facility will include PV fields (arrays) comprising of multiple PV panels. In summary, the proposed Bonsmara Solar Energy Facility (SEF) development will include the following components:

- PV development area of 326 ha
- PV modules and mounting structures (monofacial or bifacial) with fixed, single or double axis tracking mounting structures. The modules will be either crystalline silicon or thin film technology. Each panel will be approximately 2.5m above ground.
- Site and internal access roads, up to 6m wide, will provide access to the PV arrays. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary.
- Operation and maintenance (O&M) building (including offices, warehouses, workshops, canteen, visitors centre, ablution facilities and staff lockers), occupying a site of approximately 5000 m<sup>2</sup>.
- Battery Energy Storage System (BESS) of approximately 2 ha;
- Temporary construction laydown/staging area during construction phase approximately 2 ha in size (which will become the permanent laydown area for the BESS during the operational phase);
- Associated stormwater management infrastructure;
- Auxiliary buildings (offices, parking etc.) approximately 1 ha in size.
- One new 33/132kV on-site substation (facility substation) occupying an area of up to approximately 1 ha.
- Medium voltage cabling will link the PV facility to the facility substation / grid connection infrastructure. These cables will be laid underground wherever technically feasible (up to 33kV).
- Galvanized palisade perimeter fencing;
- Rainwater and/or groundwater storage tanks and associated water transfer infrastructure.
- Water will be sourced from either the Local Municipality, supplied from a private contractor and trucked in, from existing boreholes located within the application site or from a new borehole if none of these options are available.

| <b>Component</b>                 | <b>Description / Dimensions</b>                |
|----------------------------------|--|
| Location of site (centre point)  | 27°46'10.08"S 27°18'34.64"E                    |
| Application site area            | 1004 ha  |
| PV development area              | 326 ha   |
| SG codes                         | F02000000000063600000<br>F02000000000063600001 |
| Export capacity                  | Up to 100 MW                                   |
| Proposed technology              | PV modules and mounting structures             |
| Max panel height from the ground | 2.5m   |

**BONSMARA SOLAR PV (RF) (PTY) LTD**

Prepared by:



Project No. 17869  
Description Proposed Bonsmara Solar PV Facility  
Revision No. 1.0

Date: April 2023

Page i

| Component                                    | Description / Dimensions  |
|--|---|
| Substation area                              | 1 ha  |
| Battery Energy Storage Area (BESS)           | 2 ha  |
| Capacity of on-site and collector substation | 33/132kV  |
| O&M building area                            | 5000 m <sup>2</sup>   |
| Temporary Construction Laydown area          | 2 ha  |
| Width of internal access roads               | Approximately 6 m   |
| Site Access                                  | Access to the site shall be from the R76 between Kroonstad and Steynrus. The site is situated approximately 12 km from Kroonstad. |
| Proximity to grid connection                 | Approximately 2 km from application site  |
| Height of fencing                            | Approximately 3.5 m high  |
| Type of fencing                              | Galvanized palisade fencing   |

## **COORDINATES**

The bend point coordinates of the site have been included below:

| <b>BONSMARA SEF: APPLICATION SITE</b>              |               |               |
|--|---------------|---------------|
| <b>COORDINATES AT CORNER POINTS (DD MM SS.sss)</b> |               |               |
| <b>POINT</b>                                       | <b>SOUTH</b>  | <b>EAST</b>   |
| 1  | 27°45'19.63"S | 27°17'36.88"E |
| 2  | 27°44'58.69"S | 27°20'0.41"E  |
| 3  | 27°44'41.92"S | 27°20'18.09"E |
| 4  | 27°44'42.63"S | 27°20'20.19"E |
| 5  | 27°44'42.32"S | 27°20'23.08"E |
| 6  | 27°44'41.19"S | 27°20'24.88"E |
| 7  | 27°44'39.93"S | 27°20'26.19"E |
| 8  | 27°44'39.65"S | 27°20'27.90"E |
| 9  | 27°44'40.40"S | 27°20'31.86"E |
| 10   | 27°44'40.79"S | 27°20'32.68"E |
| 11   | 27°47'19.58"S | 27°19'23.11"E |
| 12   | 27°47'18.60"S | 27°19'20.30"E |

| <b>BONSMARA SEF: SUBSTATION, BESS AND ASSOCIATED INFRASTRUCTURE LOCATION</b> |               |               |
|--|---------------|---------------|
| <b>COORDINATES AT CORNER POINTS (DD MM SS.sss)</b>                           |               |               |
| <b>POINT</b>   | <b>SOUTH</b>  | <b>EAST</b>   |
| 1  | 27°46'10.04"S | 27°18'23.30"E |

BONSMARA SOLAR PV (RF) (PTY) LTD

Prepared by:



Project No. 17869  
Description Proposed Bonsmara Solar PV Facility  
Revision No. 1.0

Date: April 2023

Page ii

| <b>BONSMARA SEF: SUBSTATION, BESS AND ASSOCIATED INFRASTRUCTURE LOCATION</b> |               |               |
|--|---------------|---------------|
| <b>COORDINATES AT CORNER POINTS (DD MM SS.sss)</b>                           |               |               |
| <b>POINT</b>   | <b>SOUTH</b>  | <b>EAST</b>   |
| 2  | 27°46'1.62"S  | 27°18'37.95"E |
| 3  | 27°46'6.75"S  | 27°18'42.97"E |
| 4  | 27°46'8.01"S  | 27°18'43.29"E |
| 5  | 27°46'11.34"S | 27°18'42.28"E |
| 6  | 27°46'18.36"S | 27°18'30.24"E |
| <b>COORDINATES AT CENTRE POINT (DD MM SS.sss)</b>                            |               |               |
| <b>POINT</b>   | <b>SOUTH</b>  | <b>EAST</b>   |
| 7  | 27°46'10.08"S | 27°18'34.64"E |

Please note that all the supporting infrastructure described above (e.g., substation, BESS, temporary laydown, O&M building etc.) will be located within a 15ha area that has been identified on site.

# BONSMARA SOLAR PV FACILITY

## DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

### EXECUTIVE SUMMARY

#### INTRODUCTION AND PROJECT DESCRIPTION

Bonsmara Solar PV (RF) (Pty) Ltd is proposing to construct the Bonsmara Solar PV Facility (SEF) and associated infrastructure approximately 12 km south-east of Kroonstad in the Moqhaka Local Municipality and the Fezile Dabi District, in the Free State Province (**DFFE Reference Number: 14/12/16/3/3/2/2228**). The overall objective of the proposed development is to generate electricity by means of renewable energy technologies capturing solar energy to feed into the national grid. The proposed development will have a maximum total generation capacity of up to 100 megawatt (MW).

SiVEST Environmental Division has subsequently been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment (EIA) process for the proposed construction and operation of the Bonsmara SEF and associated infrastructure. The proposed development requires an Environmental Authorisation (EA) from the National Department Forestry, Fisheries and the Environment (DFFE). However, the provincial authority (i.e. the Free State Department of Economic, Small Business Development, Tourism and Environmental Affairs (DESTEA)) will also be consulted. The EIA for the proposed development will be conducted in terms of the EIA Regulations, 2014 (as amended) promulgated in terms of Chapter 5 of the NEMA. In terms of these regulations, a full EIA process is required for the proposed development. All relevant legislation and guidelines will be consulted during the EIA process and will be complied with at all times.

In order to evacuate the energy generated by the SEF to supplement the national grid, Bonsmara Solar PV (RF) (Pty) Ltd is proposing two grid connection alternatives which will be assessed in a separate Grid Basic Assessment Report (BAR). The Competent Authority for the Grid BAR will be the provincial authority (i.e. DESTEA).

The SEF and grid connection infrastructure will require separate Environmental Authorisations (EAs) and are subject to separate Environmental Impact Assessment (EIA) and Basic Assessment (BA) processes respectively. The proposed grid connection infrastructure will be handed over to Eskom once constructed (Eskom grid connection works). The substations will include an Eskom portion (switching station) and an Independent Power Producer (IPP) portion (facility substation) hence the facility substations will be included in the respective SEF EIAs and the Eskom switching stations in the respective associated grid connection infrastructure BA in order to allow for handover to Eskom.

Although the SEF and associated grid connection infrastructure (switching station and overhead power line) will be assessed separately, a single public participation process is being undertaken to consider both of the proposed projects [i.e., one (1) SEF EIA and one (1) grid connection BA].

---

**BONSMARA SOLAR PV (RF) (PTY) LTD**

**Project No.** 17869  
**Description** Proposed Bonsmara Solar PV Facility  
**Revision No.** 1.0

**Date:** April 2023

Prepared by:



Page iv

## APPLICABILITY OF NEMA EIA REGULATIONS, 2014 (AS AMENDED IN 2017)

The following activities are applied for:

| Activity No(s): | Relevant Basic Assessment Activity(ies) as set out in Listing Notices 1 of the EIA Regulations, 2014 as amended   |
|-----------------|---|
| 11 (i)          | <b>GN R. 327 (as amended) Item 11:</b> The development of facilities or infrastructure for the transmission and distribution of electricity—<br><br>(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.  |
| 12 (ii) (a) (c) | <b>GN R. 327 (as amended) Item 12:</b> The development of:<br>ii) infrastructure or structures with a physical footprint of 100 square metres or more;<br><br>where such development occurs-<br>(a) within a watercourse;<br>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.  |
| 19              | <b>GN R. 327 (as amended) Item 19:</b> The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;  |
| 24 (ii)         | <b>GN R. 327 (as amended) Item 24:</b> The development of a road -<br><br>ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres.  |
| 28 (ii)         | <b>GN R. 327 (as amended) Item 28:</b> 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:<br><br>(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; |
| 48 (i) (a) (c)  | <b>GN R. 327 (as amended) Item 48:</b> The expansion of-<br><br>(i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more;<br><br>where such expansion occurs—<br><br>(a) within a watercourse; or<br>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;                    |
| 56 (ii)         | <b>GN R. 327 Item 56:</b> The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre -<br><br>(i) where the existing reserve is wider than 13,5 metres; or<br>(ii) where no reserve exists, where the existing road is wider than 8 metres –   |
| Activity No(s): | Relevant Scoping and EIA Activity(ies) as set out in Listing Notices 2 of the EIA Regulations, 2014 as amended  |
| 1               | <b>GN R. 325 (as amended) Item 1:</b> The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more.   |
| 15              | <b>GN R. 325 (as amended) Item 15:</b> The clearance of an area of 20 hectares or more of indigenous vegetation.  |

BONSMARA SOLAR PV (RF) (PTY) LTD

Prepared by:



Project No. 17869  
Description Proposed Bonsmara Solar PV Facility  
Revision No. 1.0

Date: April 2023

Page v

| Activity No(s):                     | Relevant Basic Assessment Activity(ies) as set out in Listing Notice 3 of the EIA Regulations, 2014 as amended   |
|-------------------------------------|--|
| 4 b. i (bb) (gg)                    | <p><b>GN R. 324 (as amended) Item 4:</b> The development of a road wider than 4m with a reserve less than 13.5 metres.</p> <p><b>b. Free State</b><br/> i. Outside Urban Areas:<br/> (bb) National Protected Area Expansion Strategy Focus areas;<br/> (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, excluding disturbed areas</p>  |
| 12 b. (iv)                          | <p><b>GN R. 324 (as amended) Item 12:</b> 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>b. Free State</b><br/> iv. Areas within a watercourse or wetland; or within 100 meters from the edge of a watercourse or wetland</p>   |
| 14 ii. (a) (c) b (i) (bb) (ff) (hh) | <p><b>GN R. 324 (as amended) Item 14:</b> The development of—</p> <p>(ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs—</p> <p>(a) within a watercourse; or<br/> (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</p> <p>excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.</p> <p><b>b. Free State</b><br/> i. Outside urban areas:<br/> (bb) National Protected Area Expansion Strategy Focus areas;<br/> (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;<br/> (hh) 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, excluding disturbed areas</p> |
| 18 b (i) (bb) (gg) (hh)             | <p><b>GN R. 324 (as amended) Item 18:</b> The widening of a road by more than 4 meters, or the lengthening of a road by more than 1 kilometer-</p> <p><b>b. Free State</b><br/> i. Outside urban areas:<br/> (bb) National Protected Area Expansion Strategy Focus areas;<br/> (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, excluding disturbed areas<br/> (hh) Areas within a watercourse or wetland; or within 100m from the edge of a watercourse or wetland.</p>   |
| 23 ii. (a) (c) b (i) (bb) (gg)      | <p><b>GN R. 3245 (as amended) Item 23:</b> The expansion of—</p> <p>(ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more; where such expansion occurs—</p> <p>(a) within a watercourse;<br/> (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</p>   |



|  |  |
|--|--|
|  | <p>excluding the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.</p> <p><b>b. Free State</b></p> <p>i. Outside urban areas:</p> <p>(bb) National Protected Area Expansion Strategy Focus areas;</p> <p>(gg) Areas within 10 kilometers from national parks or world heritage sites or 5 kilometers from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas</p> |
|--|--|

## DETAILS OF ALTERNATIVES CONSIDERED

No other location alternatives are being considered. The proposed project site has topography which is suitable for the development of a SEF and is in close proximity to a grid connection that has been identified to have sufficient capacity to evacuate the generation. In addition, the proposed site is easily accessible off the R76 regional road. The site is therefore considered highly suitable for the proposed development of a SEF and no other locations have been considered.

No other activity alternatives are being considered. Concentrated solar power (CSP) technology would not be suitable for this site because it requires a flat surface, has a high visual impact and requires large volumes of water. In addition, CSP has not been catered for in the IRP2019. The climatic conditions show that the wind resource in the area is not suitable for a wind energy facility.

Specialist studies identified the environmental constraints upfront and a layout that maximises the footprint was chosen. Therefore, site layout alternatives were not assessed. However, the layout was refined throughout the process to incorporate the constraints identified from the various specialists. The SEF has been designed to avoid sensitive areas as far as possible. In terms of the BESS, laydown areas and substations etc., these are all optimally located in the south-east corner of the site, closest to the grid connection point and access roads.

The no-go alternative will result in the current status quo being maintained as far as the avifauna, ecological and the aquatic systems are concerned. The no-go option would therefore eliminate any additional impact on the ecological integrity of the proposed development site. The no-go option would also mean that the social environment is not affected as the status quo remains. This also means that all the positive aspects associated with the project would not materialise. Consequently, there would be no job creation, no revenue streams into the local economy and municipal coffers, and a lost opportunity to enhance the National Grid with a renewable source of energy. The no-go alternative will not be taken forward to the EIA phase for further assessment.

## PUBLIC PARTICIPATION PROCESS TO BE UNDERTAKEN FOR THE EIA PHASE

The following will be undertaken during the EIA Phase (as per the approved Final Scoping and Plan of Study):

- The I&AP database will be updated as and when necessary during the execution of the EIA.

BONSMARA SOLAR PV (RF) (PTY) LTD

Project No. 17869  
 Description Proposed Bonsmara Solar PV Facility  
 Revision No. 1.0

Date: April 2023

Prepared by:



Page vii

- A 30-day comment period will be provided to I&APs to review the Draft EIA Report. Copies of the Draft EIA Report will be provided to the regulatory and commenting authorities as well. The Draft EIA Report will also be available for download on a link to be provided.
- All parties on the I&AP database will be notified via email, sms or fax of the opportunity to review the Draft EIA Report, the review period and the process for submitting comments on the report.
- All comments received from I&APs and the responses thereto will be included in the final EIA Report, which will be submitted to DFFE.
- A copy of the Draft EIA Report will be made available at the Moqhaka Local Municipality – Hill Street, Kroonstad, Free State Province, South Africa.
- A Comments and Response Report will be updated and included in the Final EIA Report, which will record the date that issues were raised, a summary of each issue, and the response of the team to address the issue. The Final EIA report with all comments included will be submitted to DFFE for review and approval.
- All I&APs will be notified via email, sms or fax after having received written notice from DFFE on the final decision on the application. These notifications will include the process required to lodge an appeal, as well as the prescribed timeframes in which documentation should be submitted.

## POSITIVE AND NEGATIVE IMPACTS ASSOCIATED WITH THE PROPOSED BONSMARA SEF

| Impact  | Pre-mitigation | Post-mitigation |
|---|----------------|-----------------|
| <b>CONSTRUCTION</b>   |                |                 |
| <b>Impacts to Biophysical Systems</b>   |                |                 |
| <b>Aquatic / Freshwater</b>   |                |                 |
| Loss of aquatic species of special concern  | Low            | Low             |
| Damage or loss of riparian systems, ephemeral watercourses and wetland systems in the construction phase  | Medium         | Low             |
| Potential impact on localised surface water quality (construction materials and fuel storage facilities) during the construction and decommissioning phases   | Medium         | Low             |
| <b>Terrestrial Ecology</b>  |                |                 |
| Vegetation - Permanent or temporary loss of indigenous vegetation cover because of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.  | Medium         | Low             |
| Flora Species - Loss of flora species of special concern during pre-construction site clearing activities. Numerous species of special concern are potentially present within the affected area, which could be destroyed during site preparation.  | Medium         | Low             |
| Alien Invasive Species - Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established. | Medium         | Low             |
| Erosion - Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after   | Medium         | Low             |
| Ecological Processes - Disturbances to ecological processes. Activity may result in disturbances to ecological processes.   | Medium         | Low             |

BONSMARA SOLAR PV (RF) (PTY) LTD

Prepared by:



Project No. 17869  
Description Proposed Bonsmara Solar PV Facility  
Revision No. 1.0

Date: April 2023

Page viii

| Impact  | Pre-mitigation | Post-mitigation |
|---|----------------|-----------------|
| Aquatic and Riparian Processes - Aquatic and Riparian processes. Diversion and increased velocity of surface water flows – Changes to the hydrological regime and increased potential for erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of species of special concern.   | Medium         | Low             |
| Faunal Habitat - Loss of Faunal Habitat: Activity will result in the loss of habitat for faunal species.  | Medium         | Low             |
| Faunal Processes - Disruptions to faunal processes Including barriers to movement and gene dispersal.   | Medium         | Low             |
| Faunal Species - Loss of faunal SSC due to construction activities: Activities associated with bush clearing and ploughing, killing of perceived dangerous fauna, may lead to increased mortalities among faunal species.   | Medium         | Low             |
| <b>Agricultural – compliance statement – none identified</b>  |                |                 |
| <b>Avifaunal</b>  |                |                 |
| Habitat Destruction   | High           | Low             |
| Disturbance of bird roosts  | Medium         | Low             |
| Disturbance due to noise such as, machinery movements and maintenance operations  | Medium         | Low             |
| <b>Geotech</b>  |                |                 |
| Disturbance/ displacement/ removal of soil and rock   | Low            | Low             |
| Soil Erosion  | Low            | Low             |
| <b>Impacts to Socio-Economic Component</b>  |                |                 |
| <b>Social</b>   |                |                 |
| Noise impact - Noise at the site and the construction vehicles ferrying the panels and building materials   | Low            | Low             |
| Impacts on biodiversity - Habitat loss to make way for large-scale solar facilities.  | Medium         | Low             |
| Loss of agricultural land - Is a function of the size of the area of land that is impacted and the production potential, of that impacted land.   | Medium         | Low             |
| Cultural heritage impacts - If the solar PV facility is located near sacred areas, cultural practices will be affected. Recent archaeological field assessment conducted for other solar PV facilities located approximately 10km from the proposed development area identified some cultural remains but with varied value and preservation. It is likely that similar heritage resources may be present within this development area. (CTS Heritage, 2022). | Medium         | Low             |
| Visual impacts - The glint and glare surrounding the high reflectivity of the solar PV panels may distract motorists and aircraft.  | Medium         | Low             |
| Graves - Identification of human remains indicating a former burial place or the simple existence of a known cemetery during construction.  | Medium         | Low             |
| Road and traffic hazards - Heavy construction vehicles on poor roads will cause potholes to form, and accidents will rise.  | Medium         | Low             |
| Land use and space requirements - Requirements for land and space to have the installation of the solar PV's.   | Low            | Low             |
| Social impacts: Job creation - Creation of jobs and local economic opportunities  | Medium         | Low             |
| <b>Heritage</b>   |                |                 |

BONSMARA SOLAR PV (RF) (PTY) LTD

Prepared by:



Project No. 17869  
Description Proposed Bonsmara Solar PV Facility  
Revision No. 1.0

Date: April 2023

Page ix

| <b>Impact</b>   | <b>Pre-mitigation</b> | <b>Post-mitigation</b> |
|---|-----------------------|------------------------|
| Impacts to archaeological heritage resources - Construction activities that take place near to archaeological resources may result in their destruction   | Medium                | Low                    |
| Impacts to palaeontological resources - Construction activities that take place near to palaeontological resources may result in their destruction  | Medium                | Low                    |
| Impacts to the cultural landscape - Construction activities that take place near to cultural landscape elements may result in their destruction   | Medium                | Low                    |
| <b>Visual</b>   |                       |                        |
| Visual impacts related to earthworks and construction infrastructure, plant and materials on site.  | Medium                | Low                    |
| <b>OPERATIONAL</b>  |                       |                        |
| <b>Impacts to Biophysical Systems</b>   |                       |                        |
| <b>Aquatic / Freshwater</b>   |                       |                        |
| Impact on aquatic systems through the possible increase in surface water runoff on form and function during the operational phase   | Medium                | Low                    |
| <b>Terrestrial Ecology</b>  |                       |                        |
| Alien Invasive Species - Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established. | Medium                | Low                    |
| Erosion - Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.   | Medium                | Low                    |
| Ecological Processes - Disturbances to ecological processes. Activity may result in disturbances to ecological processes. barriers to movement and gene dispersal.  | Medium                | Low                    |
| Aquatic and Riparian processes. Diversion and increased velocity of surface water flows – Changes to the hydrological regime and increased potential for erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of species of special concern.  | Medium                | Low                    |
| Disruptions to faunal processes Including barriers to movement and gene dispersal.  | Medium                | Low                    |
| <b>Agricultural - compliance statement – none identified</b>  |                       |                        |
| <b>Avifaunal</b>  |                       |                        |
| Disturbance due to noise such as, machinery movements and maintenance operations  | Low                   | Low                    |
| Bird mortalities  | Medium                | Medium                 |
| Loss of Bird Foraging Habitat   | Medium                | Low                    |
| Disruption of bird migratory pathways   | Medium                | Low                    |
| The attraction of some novel bird species due to the development of a solar farm with associated infrastructure such as lake effect, perches, nest and shade opportunities  | Medium                | Low                    |
| Chemical pollution spills   | Medium                | Low                    |
| <b>Geotech</b>  |                       |                        |
| Soil Erosion  | Low                   | Low                    |
| <b>Impacts to Socio-Economic Component</b>  |                       |                        |
| <b>Social</b>   |                       |                        |

| Impact  | Pre-mitigation | Post-mitigation |
|---|----------------|-----------------|
| Hazardous material generation - Hydrochloric, sulphuric, and nitric acids are used to clean and purify the silicon wafer.   | High           | Medium          |
| Impacts on water resources - There is no need for water for electricity generation.   | Medium         | Low             |
| Visual impacts - The glint and glare surrounding the high reflectivity of the solar PV panels may distract motorists and aircraft.  | Medium         | Low             |
| Cultural Heritage - Location of operations near cultural sites may disrupt cultural practices.  | Medium         | Low             |
| Job creation for construction workers- Increased employment providing skills development and local economic empowerment   | Medium         | Medium          |
| <b>Heritage</b>   |                |                 |
| Impacts to archaeological heritage resources - Operational activities that take place near to archaeological resources may result in their destruction  | Medium         | Low             |
| Impacts to palaeontological resources - Operational activities that take place near to Palaeontological resources may result in their destruction   | Medium         | Low             |
| Impacts to the cultural landscape - Operational activities that take place near to cultural landscape elements may result in their destruction  | Medium         | Low             |
| <b>Visual</b>   |                |                 |
| Altered Sense of Place and Visual Intrusion caused by the PV Array  | Medium         | Medium          |
| Altered Sense of Place and Visual Intrusion caused by the BESS, Substation and Internal Grid Infrastructure   | Medium         | Medium          |
| Visual Discomfort and Impaired Visibility resulting from Glint and Glare  | Medium         | Low             |
| Altered Visual Quality caused by Light Pollution at Night   | Medium         | Low             |
| <b>DECOMMISSIONING</b>  |                |                 |
| <b>Impacts to Biophysical Systems</b>   |                |                 |
| <b>Aquatic / Freshwater</b>   |                |                 |
| Loss of aquatic species of special concern  | Low            | Low             |
| Damage or loss of riparian systems, ephemeral watercourses and wetland systems in the construction phase  | Medium         | Low             |
| Potential impact on localised surface water quality (construction materials and fuel storage facilities) during the construction and decommissioning phases   | Medium         | Low             |
| <b>Terrestrial Ecology</b>  |                |                 |
| Vegetation - Permanent or temporary loss of indigenous vegetation cover because of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.  | Medium         | Low             |
| Alien Invasive Species - Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established. | Medium         | Low             |
| Erosion - Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.   | Medium         | Low             |
| <b>Agricultural – none identified</b>   |                |                 |
| <b>Avifaunal</b>  |                |                 |
| Disruption of bird migratory pathways   | Medium         | Low             |
| <b>Geotech</b>  |                |                 |

| Impact   | Pre-mitigation | Post-mitigation |
|--|----------------|-----------------|
| Disturbance/ displacement/ removal of soil and rock  | Low            | Low             |
| Soil Erosion   | Low            | Low             |
| <b>Impacts to Socio-Economic Component</b>   |                |                 |
| <b>Social</b>  |                |                 |
| Hazardous material and waste generation - There are no recycling facilities or established scientific methods of disposing of the solar panels after the end of their useful lives.  | High           | Low             |
| The aesthetic value of land is lost - Land scarification will occur during the decommissioning of the solar plants.  | Medium         | Low             |
| Socio- economic impacts – Job loses  | High           | Medium          |
| <b>Heritage</b>  |                |                 |
| Impacts to archaeological heritage resources - Decommissioning activities that take place near to Archaeological resources may result in their destruction   | Medium         | Low             |
| Impacts to palaeontological resources - Decommissioning activities that take place near to Palaeontological resources may result in their destruction  | Medium         | Low             |
| Impacts to the cultural landscape - Decommissioning activities that take place near to cultural landscape elements may result in their destruction   | Medium         | Low             |
| <b>Visual</b>  |                |                 |
| Altered Sense of Place caused by the decommissioning activities  | Medium         | Low             |
| <b>CUMULATIVE</b>  |                |                 |
| <b>Impacts to Biophysical Systems</b>  |                |                 |
| <b>Aquatic / Freshwater</b>  |                |                 |
| Cumulative Impact of various proposed projects and associated grid lines on the natural environment - The cumulative assessment considers the various proposed renewable projects that occur within a 35km radius of this site, where the author has either been involved in the assessment of these projects and or review of the past assessments as part of any required Water Use Licenses     | Low            | Low             |
| <b>Terrestrial Ecology</b>   |                |                 |
| Permanent or temporary loss of indigenous vegetation cover because of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.  | Medium         | Low             |
| Loss of flora species of special concern during pre-construction site clearing activities. Numerous species of special concern are potentially present within the affected area, which could be destroyed during site preparation.   | Medium         | Low             |
| Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established. | Medium         | Low             |
| Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.  | Medium         | Low             |
| Disturbances to ecological processes. Activity may result in disturbances to ecological processes.   | Medium         | Low             |
| Aquatic and Riparian processes. Diversion and increased velocity of surface water flows – Changes to the hydrological regime and increased potential for erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of species of special concern.   | Medium         | Low             |
| Loss of Faunal Habitat: Activity will result in the loss of habitat for faunal species.  | Medium         | Low             |

BONSMARA SOLAR PV (RF) (PTY) LTD

Prepared by:



Project No. 17869  
Description Proposed Bonsmara Solar PV Facility  
Revision No. 1.0

Date: April 2023

Page xii

| Impact   | Pre-mitigation | Post-mitigation |
|--|----------------|-----------------|
| Disruptions to faunal processes Including barriers to movement and gene dispersal.   | Medium         | Low             |
| Loss of faunal SSC due to construction activities: Activities associated with bush clearing and ploughing, killing of perceived dangerous fauna, may lead to increased mortalities among faunal species. | Medium         | Low             |
| <b>Agricultural – compliance statement - none identified</b>   |                |                 |
| <b>Avifaunal</b>   |                |                 |
| Habitat loss   | High           | n/a             |
| Collison mortality (vehicle)   | Medium         | Low             |
| <b>Geotech – none identified</b>   |                |                 |
| <b>Impacts to Socio-Economic Component</b>   |                |                 |
| <b>Social</b>  |                |                 |
| Eco-friendly - Promotes good air quality given that it is a clean energy source.   | Medium         | Very High       |
| Disposal of the solar PV cells - during decommissioning  | Medium         | Low             |
| Visual impacts - There are several substations and powerlines in the area, already affecting the visual quality and sense of place in this modified rural landscape.                                     | High           | Low             |
| <b>Heritage</b>  |                |                 |
| Impacts to archaeological heritage resources - Cumulative destruction of significant archaeological heritage   | Medium         | Low             |
| Impacts to palaeontological resources - Cumulative destruction of significant palaeontological heritage  | Medium         | Low             |
| Impacts to the cultural landscape - Cumulative impact to the cultural landscape  | Medium         | Low             |
| <b>Visual</b>  |                |                 |
| Altered Sense of Place caused by the PV facility   | Medium         | Low             |

## SPECIALIST STUDIES

The following specialist studies have been undertaken for the project and their main findings and recommendations are included below:

| Specialist Study | Findings   | Recommendations  |
|------------------|--|--|
| Aquatic          | The project overall has aligned the proposed footprint with the aquatic features, allowing for retention of much of the natural environment so that the systems should remain largely unaffected. Therefore, the PV site is such that it carries a low intensity impact on the aquatic resources. Some areas will require clearing, namely the associated roads and cables that may need to cross some of the aquatic systems. | <ul style="list-style-type: none"> <li>A pre-construction walkthrough with an aquatic specialist is recommended and they can assist with the development of the stormwater management plan and Aquatic Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout, especially for the tower positions for the grid connections/s.</li> <li>Use the smallest possible working corridor. Outside the working corridor, all watercourses are to be considered no go areas. Any unnecessary intrusion into these areas is prohibited. Where intrusion is required, the</li> </ul> |

BONSMARA SOLAR PV (RF) (PTY) LTD

Prepared by:



Project No. 17869  
Description Proposed Bonsmara Solar PV Facility  
Revision No. 1.0

Date: April 2023

Page xiii

MK-R-801 Rev..05/18

| Specialist Study | Findings  | Recommendations   |
|------------------|---|---|
|                  | <p>The overall and cumulative impacts, as assessed, are linked to instances where complete avoidance was not possible, or the nature of the activities involve a potential risk to aquatic resources even at great distance. Overall, it is expected that the impact on the environment would be Low (-). Noteworthy areas, that have been avoided by the PV areas, include the Very High Sensitivity areas as shown in this report.</p> <p>Based on the findings of this study, the specialist finds no reason to withhold an authorisation of any of the proposed activities, assuming that key mitigations measures are implemented, coupled with a micro-siting walkdown once all information is available.</p> | <p>working corridor must be kept to a minimum and demarcated clearly, before any construction commences.</p> <ul style="list-style-type: none"> <li>• The channel profile, regardless of the current state of the river / water course, will be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist during a pre-construction walkdown.</li> <li>• Water diversions must be temporary in nature and no permanent walls, berms or dams may be installed within a watercourse. Sandbags used in any diversion or for any other activity within a watercourse must be in a good condition, so that they do not burst and empty sediment into the watercourse. Upon completion of the construction at the site, the diversions shall be removed to restore natural flow patterns. Under no circumstance shall a new channel or drainage canals be excavated to divert water away from construction activities.</li> <li>• Any fauna (frogs, snakes, etc.) that are found within the construction area must be moved to the closest point of similar habitat type outside of the areas to be impacted.</li> <li>• It is the contractor's responsibility to continuously monitor the area for newly established alien species during the contract and establishment period, which if present must be removed. Removal of these species shall be undertaken in a way which prevents any damage to the remaining indigenous species and inhibits the re-infestation of the cleaned areas.</li> </ul> |
| Terrestrial      | No National Parks are situated within 10 km of the site and a single Private nature Reserve is situated within 5 km of the site, the Erfdeel Private Nature Reserve which abuts the   | <ul style="list-style-type: none"> <li>• Natural vegetation does not have an elevated conservation status and is not designated a Critical Biodiversity Area status but rather an Ecological Support</li> </ul>   |

BONSMARA SOLAR PV (RF) (PTY) LTD

Prepared by:



Project No. 17869  
Description Proposed Bonsmara Solar PV Facility  
Revision No. 1.0

Date: April 2023

Page xiv

MK-R-801 Rev..05/18



| Specialist Study | Findings  | Recommendations   |
|------------------|---|---|
|                  | <p>north-eastern boundary of the site. The actual PV is just under 3 km (2.8 km) from this reserve which is deemed to be sufficient. No specific guidelines are provided for such buffers in regional planning guidelines.</p> <p>Some rocky areas are present, in particular a series of small hills situated surrounding the dam on Portion 1 of Farm Scheveningen 636. These have been excluded from the PV layout, other than grid connection alternative which will not have any significant impact. Steep slopes are generally not likely to be suitable for PV facilities.</p> <p>Due to having a low conservation status, the grassland habitat is deemed to have a moderate sensitivity status and would provide a suitable footprint for the proposed activity, bearing in mind watercourse and ecological process and connectivity buffers which have been incorporated into the design to incorporate an undeveloped network for connectivity purposes within the site and the surrounding landscape, due to ESA designation.</p> <p>All impacts are deemed to be medium before and low after mitigation.</p> | <p>Area. This does not preclude for further development, as long as ecological connectivity and processes are accommodated, and further assessment will identify most suitable areas that would minimise biodiversity loss. As a minimum, the conservation target of the vegetation unit (24 %) should be retained across the site as well as a contiguous network with the site and the surrounding landscape as a corridor or series of viable ecological corridors, which is significantly exceeded.</p> <ul style="list-style-type: none"> <li>Watercourses, Riverine (Riparian) &amp; Wetland areas, dams and rivers as well as rocky hills are not suitable and have been excluded from any development footprint other than for strategic infrastructure requirements including the grid connection powerlines.</li> </ul> |
| Agricultural     | <p>The entire site was verified in this assessment as being of medium sensitivity for impacts on agricultural resources with a land capability value of 6. The land was assessed as being of insufficient land capability for viable and sustainable future crop production. The cropping potential of the site is limited by the</p>   | <ul style="list-style-type: none"> <li>A system of storm water management, which will prevent erosion, will be an inherent part of the engineering on site. Any occurrences of erosion must be attended to immediately and the integrity of the erosion control system at that point must be amended to prevent further erosion from occurring there.</li> </ul>  |

| Specialist Study | Findings   | Recommendations   |
|------------------|--|---|
|                  | <p>shallow soils which are limited by dense clay and weathered bedrock in the subsoil.</p> <p>Two potential negative mechanisms of agricultural impact were identified, occupation of land, and soil erosion and degradation. Two positive mechanisms of agricultural impact were identified as increased financial security for farming operations, and improved security against stock theft and other crime. All of these are likely to have a low impact on future agricultural production potential and are therefore assessed as having low significance.</p> <p>The conclusion of this assessment is that the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site. Instead, the development is an opportunity for a renewable energy facility to be integrated with agricultural production in a way that provides benefits to agriculture and leads to little loss of future agricultural production potential.</p> | <ul style="list-style-type: none"> <li>Any excavations done during the construction phase, in areas that will be re-vegetated at the end of the construction phase, must separate the upper 30 cm of topsoil from the rest of the excavation spoils and store it in a separate stockpile. When the excavation is back-filled, the topsoil must be back-filled last, so that it is at the surface. Topsoil should only be stripped in areas that are excavated. Across the majority of the site, it will be much more effective for rehabilitation, to retain the topsoil in place. If levelling requires significant cutting, topsoil should be temporarily stockpiled and then re-spread after cutting, so that there is a covering of topsoil over the entire surface before the panels are mounted. It will be advantageous to have topsoil and vegetation cover below the panels during the operational phase to control dust and erosion.</li> </ul> <p>The impact of the proposed development on the agricultural production capability of the site is assessed as being acceptable because of the above factors. Therefore, from an agricultural impact point of view, it is recommended that the development be approved.</p> |
| Avifauna         | <p>The CBAs of the Free State designated that majority of the site falls within an ESA1. Avoidance mitigation could be applied wherever possible to project infrastructure design and limit the amount of habitat impacted.</p> <p>The wet season results were highly significant given the highly significant density increase in observed avifauna which was representative of an abundance of food and breeding</p>   | <ul style="list-style-type: none"> <li>All recommended buffering be strictly adhered to where possible.</li> <li>All recommended mitigation measures be applied preconstruction, post construction and operations.</li> <li>The Prescribed engineering mitigation measures (for wetland related impacts) must be supported by a pre-construction and Construction Phase rehabilitation plan to be commissioned prior to commencement of construction activities.</li> </ul>   |

| Specialist Study | Findings   | Recommendations   |
|------------------|--|---|
|                  | <p>resources. However, even in optimal conditions, the diversity of priority species was low and the abundance number of priority species and SCC was moderate.</p> <p>A total of 56 priority species priority species has the possibility of occurring within and around the study area, although only ten (10) Red Listed species have been identified as present or highly likely and most are of moderate likelihood to occur within the project footprint and most will be irregular foraging visitors and not resident. Two red listed species were recorded, namely Double-banded Courser and African Marsh Harrier (EN).</p> <p>The proposed solar project has the potential to be of low to medium sensitivity from an avifaunal point of view. Some of the priority bird species are not habitat bound to the area for nesting and/or foraging purposes and is therefore important to focus on the some of the most significant cumulative impacts for the proposed solar project.</p> | <ul style="list-style-type: none"> <li>An EMPr for the Construction Phase must be created and be subsequently updated every three years (during Operation) in order to reevaluate the effectiveness of the mitigations. All mortalities must be recorded.</li> </ul>  |
| Geotechnical     | <p>The topography over the assessment area is generally flat and undulating terrain sloping between 2° to 4°. Minor portions of the site have slope angles up to 10° adjacent to small ridges. The site is underlain by alternating sandstone, mudstone and siltstone of Adelaide Subgroup, Beaufort Group, Karoo Supergroup. A portion of the eastern section of the site is underlain by porphyritic lava, amygdale-free and amygdaloidal lava of the Klipriviersberg Group forming part of the Ventersdorp Supergroup.</p>  | <p>No fatal flaws or 'no-go' areas have been identified that would render any assessment areas unsuitable from a geological and geotechnical perspective. No geologically or geotechnically sensitive areas were identified within or near the assessment area. It is recommended however that areas of steeper slope gradients are avoided when determining the final infrastructure layout.</p> |

| Specialist Study | Findings  | Recommendations   |
|------------------|---|---|
|                  | <p>Some geotechnical constraints have been identified, primarily shallow and outcropping bedrock which may cause excavation difficulties, localised steep slopes and existing borrow pit areas. These constraints may be mitigated via standard engineering design and construction measures.</p>   |   |
| Social           | <p>For the proposed project, the identified environmental and socio-economic benefits outweigh the negative environmental impacts, making the project beneficial, although this is subject to a comprehensive assessment of the impacts from the findings of the full impact assessment report.</p> <p>From an environmental standpoint, it is determined that the adverse effects from the planning to the decommissioning stages are within acceptable parameters and can be adequately mitigated. This assessment's conclusion is that the project offers a chance to integrate a renewable energy facility with agricultural production in a way that improves agriculture and causes little loss of possible future agricultural productivity. On the other hand, the glare and sparkle from the solar PV panels' high reflectivity can harm eyes and impair drivers and pilots of aircraft.</p> | <p>For a social perspective, it will create skilled and unskilled jobs during the construction and operational phases. While skilled employment will be open to experts from across the country, unskilled labour may be mostly reserved for local people. Skills transfer may also be one of the positive impacts of the project on local people. Positive outcomes have a moderate to high impact significance.</p> |
| Heritage         | <p>No elements of high cultural landscape value have been identified within close proximity to the area proposed for development. While dominated by agricultural activities, the naturally undulating landscape is intermittently interrupted by powerlines and</p>  | <p>Based on the outcomes of this report, it is not anticipated that the proposed development of the solar energy facility and its associated grid connection infrastructure will negatively impact on significant heritage resources on condition that:</p>   |

BONSMARA SOLAR PV (RF) (PTY) LTD

Prepared by:



Project No. 17869  
Description Proposed Bonsmara Solar PV Facility  
Revision No. 1.0

Date: April 2023

Page xviii

| Specialist Study | Findings   | Recommendations  |
|------------------|--|--|
|                  | <p>railway lines which detract from the visual quality of the surrounding area.</p> <p>No archaeological heritage resources of significance were identified as being impacted in the layout provided. Further, highly significant Early and Middle Stone Age open sites were identified within the property but are not impacted directly in the layout provided - KS6, KS7 and KS8. These sites are graded IIIB for their greater scientific value associated with their sub-surface and, likely in-situ, deposits. It is recommended that none of these sites be impacted by the development through the implementation of a 100m no-development buffer around these sites. Furthermore, areas of higher archaeological sensitivity have been identified around the koppies and the pan located within the broader development area. It is recommended that no development takes place within this identified area. The present layout assessed in this report does not impact on this archaeologically sensitive area.</p> <p>No fossiliferous outcrop was detected in the proposed development area. However, loose, fragmented and weathered tree fossils and well-preserved trace fossils were detected. The latter was probably brought in from nearby areas and placed near the homestead (now in ruins). However, the apparent rarity of well-preserved fossil heritage in the proposed development footprint suggests that the impact of the development will be</p> | <ul style="list-style-type: none"> <li>• A no development buffer of 50m is implemented around sites KS3 and KS4</li> <li>• A no development buffer of 100m is implemented around sites KS6, KS7 and KS8</li> <li>• The area identified as having higher levels of archaeological sensitivity in Figure 6 must not be impacted by any development activities.</li> <li>• The attached Chance Fossil Finds procedure must be implemented for the duration of construction activities</li> <li>• Although all possible care has been taken to identify sites of cultural importance during the investigation of the study area, it is always possible that hidden or subsurface sites could be overlooked during the assessment. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils, burials or other categories of heritage resources are found during the proposed development, work must cease in the vicinity of the find and SAHRA must be alerted immediately to determine an appropriate way forward.</li> </ul> |

BONSMARA SOLAR PV (RF) (PTY) LTD

Prepared by:



Project No. 17869  
Description Proposed Bonsmara Solar PV Facility  
Revision No. 1.0

Date: April 2023

Page xix

MK-R-801 Rev..05/18

| Specialist Study | Findings  | Recommendations  |
|------------------|---|--|
|                  | <p>of a Low significance in palaeontological terms. It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. The construction of the development may thus be permitted in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources.</p>   |  |
| <p>Visual</p>    | <p>The proposed project introduces a man-made artefact into an agricultural environment, changing the fabric of a large area (~326 ha). The surrounding area also features a 132 kV powerline traversing the landscape.</p> <p>The undulating landscape provides some VAC for the PV facility. The proposed project is anticipated to have a limited impact on highly sensitive receptors due to the limited number of highly sensitivity visual receptors directly adjacent to the project area. However, railway passengers and motorists – to a greater degree – will have the greatest visibility of the site. This visibility is anticipated to be moderated by their low sensitivity as transient and temporary receptors.</p> <p>This project will be largely incongruent with the existing agricultural landscape. As such, visual impacts include altered sense of place, visual intrusion, nuisance from glint and glare and light pollution.</p> <p>The VIA demonstrates that the project will generally result in a</p> | <ul style="list-style-type: none"> <li>• Limit vegetation clearance and the footprint of construction to what is absolutely essential.</li> <li>• Consolidate the footprint of the construction camp to a functional minimum.</li> <li>• Avoid excavation, handling and transport of materials which may generate dust under very windy conditions.</li> <li>• Keep stockpiled aggregates and sand covered to minimise dust generation.</li> <li>• Keep construction site tidy.</li> <li>• Fence the perimeter of the site with a green or black fencing.</li> <li>• Ensure that the roof colour of the proposed buildings blends into the landscape.</li> <li>• Establish screening (e.g. vegetation) of &gt; 2 m in height between the south-western boundary of the PV array and the R76, where technically feasible and in consultation with a qualified botanist and / or landscaper and the project operator.</li> <li>• Establish screening (e.g. vegetation) of &gt; 1.5 m in height along the north-eastern boundary of the PV array, where technically feasible and in consultation with a qualified botanist and / or landscaper and the project operator.</li> </ul> |

| Specialist Study | Findings  | Recommendations |
|------------------|---|-----------------|
|                  | <p>moderate visual impact and is not located within a REDZ. The construction, operational, decommissioning and cumulative impacts are deemed to be acceptable on the assumption that the mitigation measures are implemented.</p> <p>Based on the assessment and the assumption that the mitigation measures will be implemented, the specialist is of the opinion that the visual impacts of the project are acceptable and, from a visual perspective, there is no reason not to authorise the project.</p> |                 |

## ENVIRONMENTAL IMPACT STATEMENT

Bonsmara Solar PV (RF) (Pty) Ltd is proposing to construct the Bonsmara Solar PV Facility (SEF) and associated infrastructure approximately 12 km south-east of Kroonstad in the Moqhaka Local Municipality and the Fezile Dabi District, in the Free State Province. The overall objective of the proposed development is to generate electricity by means of renewable energy technologies capturing solar energy to feed into the national grid.

Taking into consideration the findings of the EIA process for the proposed development and the fact that specialist recommendations have been used to inform the project design and layout of the facility, it is the opinion of the Environmental Assessment Practitioner (EAP) that the majority of the negative impacts associated with the implementation of the proposed project can be mitigated to acceptable levels. While there are potential negative environmental impacts associated with the proposed development, the extent of the positive benefits associated with the implementation of the project in terms of renewable energy supply and positive local and regional economic impact are considered to outweigh the negative impacts.

After consideration of the findings presented in the EIR and based on the preferred layout presented within this report, it is the reasoned opinion of the EAP that the proposed Bonsmara Solar PV Facility is acceptable and Environmental Authorisation could be granted.

The Bonsmara SEF will assist by converting solar energy into electricity, thereby releasing no harmful by-products into the environment which will in turn reduce the dependency on fossil fuels.

The following specialist studies have been undertaken for the project:

**BONSMARA SOLAR PV (RF) (PTY) LTD**

Project No. 17869  
Description Proposed Bonsmara Solar PV Facility  
Revision No. 1.0

Date: April 2023

Prepared by:



Page xxi

- Aquatic/Freshwater Impact Assessment
- Terrestrial Biodiversity Impact Assessment
- Agriculture and Soils Impact Assessment
- Avifaunal Impact Assessment
- Desktop Geotechnical Investigation
- Social Impact Assessment
- Heritage Impact Assessment (including Palaeontology, Archaeology and Cultural)
- Visual Impact Assessment

The specialist assessments were conducted to address the potential impacts relating to the proposed development in order to ascertain the level of each identified impact, as well as mitigation measures which may be required. A summary of the main findings of the specialists are included in Section 16 above.

The aquatic assessment (refer to **Appendix 6**) concluded that, overall, it is expected that the impact on the environment would be Low (-). The specialist finds no reason to withhold an authorisation of any of the proposed activities, assuming that key mitigations measures are implemented.

The terrestrial biodiversity assessment (refer to **Appendix 6**) concluded that due to having a low conservation status, the grassland habitat is deemed to have a moderate sensitivity status and would provide a suitable footprint for the proposed activity, bearing in mind watercourse and ecological process and connectivity buffers which have been incorporated into the design to incorporate an undeveloped network for connectivity purposes within the site and the surrounding landscape. All impacts are deemed to be medium before and low after mitigation.

The agricultural assessment (refer to **Appendix 6**) concluded that the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site. Instead, the development is an opportunity for a renewable energy facility to be integrated with agricultural production in a way that provides benefits to agriculture and leads to little loss of future agricultural production potential.

The avifaunal assessment (refer to **Appendix 6**) concluded that there is no reason why an Environmental Authorisation (EA) should not be granted, provided the applicant adheres to the recommended mitigation measures.

The geotechnical assessment (refer to **Appendix 6**) concluded no fatal flaws or 'no-go' areas have been identified that would render any assessment areas unsuitable from a geological and geotechnical perspective. It was therefore recommended that the proposed activity be authorised.

The social assessment (refer to **Appendix 6**) concluded that proposed development can be authorised. The proposed development will also have wider societal benefits by generating additional income and employment. In addition, the proposed development will contribute to the country's urgent need for reliable energy generation given Eskom's crippling blackouts. Moreover, the area being rural, solar PV's impact on agricultural viability is minimal compared to energy sources such as coal which has more of an impact on agricultural land use. All these positive impacts render the Bonsmara SEF beneficial to local communities and the country.

---

**BONSMARA SOLAR PV (RF) (PTY) LTD**

Prepared by:



Project No. 17869  
 Description Proposed Bonsmara Solar PV Facility  
 Revision No. 1.0

Date: April 2023

Page xxii



The heritage assessment (refer to **Appendix 6**) concluded that no impacts to palaeontological resources are anticipated, however it is recommended that, due to the high palaeontological sensitivity of the development area, the attached Chance Fossil Finds procedure is implemented for the duration of construction activities. In terms of the cultural landscape, no elements of high cultural landscape value have been identified within close proximity to the area proposed for development. While dominated by agricultural activities, the naturally undulating landscape is intermittently interrupted by powerlines and railway lines which detract from the visual quality of the surrounding area. No archaeological heritage resources of significance were identified as being impacted in the layout provided.

The visual assessment (refer to **Appendix 6**) concluded that, based on the assessment and the assumption that the mitigation measures will be implemented, the specialist is of the opinion that the visual impacts of the project are acceptable and, from a visual perspective, there is no reason not to authorise the project.

No location alternatives are being considered for the Bonsmara SEF as these sites were selected prior to the commencement of the EIA Process. The layout that was prepared for the Bonsmara SEF has been assessed by specialists to identify potential impacts that may arise from the development. Based on the findings of the specialists, the potential impacts identified and the outcomes of the public participation process of the Scoping Phase, the layout has been updated to avoid environmental sensitivities (except for a few roads, cabling and fences) to produce a final layout. This final layout has been further assessed by all specialists (refer to Impact Tables in **Section 14.3** and findings and recommendations in **Section 15**). No further layout alternatives have been considered as part of the EIA process. Impact assessments have been undertaken on the revised layout. No technology alternatives will be considered. CSP technology would not be suitable for this site because it requires a flat surface, has a high visual impact and requires large volumes of water. CSP was not catered for in the IRP2019. In terms of wind energy, the climatic conditions show that there is not a suitable wind resource for a wind facility. The no-go alternative is not the preferred alternative and has not been assessed as part of the EIA phase.

---

**BONSMARA SOLAR PV (RF) (PTY) LTD**

Prepared by:



**Project No.** 17869  
**Description** Proposed Bonsmara Solar PV Facility  
**Revision No.** 1.0

**Date:** April 2023

Page xxiii

MK-R-801 Rev..05/18

**BONSMARA SOLAR PV FACILITY**  
**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT**

**TABLE OF CONTENTS**

|  |           |
|--|-----------|
| <b>KEY PROJECT INFORMATION</b> .....   | <b>I</b>  |
| <b>EXECUTIVE SUMMARY</b> .....   | <b>IV</b> |
| <b>1. INTRODUCTION</b> .....   | <b>1</b>  |
| 1.1 Overview of the EIA Process .....  | 2         |
| 1.2 Content Requirements for an Environmental Impact Assessment Report .....         | 3         |
| <b>2. PROJECT TITLE</b> .....  | <b>6</b>  |
| <b>3. DETAILS OF APPLICANT</b> .....   | <b>6</b>  |
| 3.1 Name and contact details of the Applicant .....                                  | 6         |
| <b>4. DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND SPECIALISTS</b> ..... | <b>7</b>  |
| 4.1 Name and contact details of the Environmental Consultant .....                   | 7         |
| 4.2 Names and expertise of the Environmental Assessment Practitioner (EAP) .....     | 7         |
| 4.3 Names and expertise of the specialists .....                                     | 7         |
| <b>5. LOCATION OF THE ACTIVITY</b> .....   | <b>8</b>  |
| 5.1 21 Digit Surveyor General Codes and Farm names of the sites .....                | 8         |
| 5.2 Coordinates of the site .....  | 9         |
| <b>6. ACTIVITY INFORMATION</b> .....   | <b>10</b> |
| 6.1 Project Description.....   | 10        |
| 6.1.1 SEF and Associated Infrastructure .....  | 10        |
| 6.1.2 Main components of a Solar PV Facility.....                                    | 11        |
| 6.1.3 Roads .....  | 12        |
| 6.1.4 Battery Energy Storage System .....  | 12        |

BONSMARA SOLAR PV (RF) (PTY) LTD

Project No. 17869  
Description Proposed Bonsmara Solar PV Facility  
Revision No. 1.0

Prepared by:



Date: April 2023

Page xxiv

MK-R-801 Rev..05/18

|           |  |           |
|-----------|--|-----------|
| 6.1.5     | Final Proposed Layout and Technical Detail Summary .....     | 14        |
| 6.2       | NEMA Listed Activities .....                                 | 16        |
| <b>7.</b> | <b>NATIONAL WEB-BASED ENVIRONMENTAL SCREENING TOOL .....</b> | <b>20</b> |
| <b>8.</b> | <b>DESCRIPTION OF THE PHYSICAL ENVIRONMENT .....</b>         | <b>22</b> |
| 8.1       | Geographical .....   | 22        |
| 8.2       | Land Use .....   | 23        |
| 8.3       | Climate .....  | 25        |
| 8.4       | Topography .....   | 25        |
| 8.5       | Desktop Geotechnical Assessment.....                         | 26        |
| 8.6       | Aquatic/Freshwater Assessment.....                           | 29        |
| 8.6.1     | Description of Receiving Environment.....                    | 30        |
| 8.6.2     | Sensitivity Categories .....                                 | 31        |
| 8.6.3     | Summary of Findings.....                                     | 32        |
| 8.7       | Terrestrial Ecological Assessment .....                      | 32        |
| 8.7.1     | Systematic Planning Frameworks .....                         | 32        |
| 8.7.2     | Baseline Biodiversity Description .....                      | 35        |
| 8.7.3     | Site Sensitivity .....                                       | 37        |
| 8.7.4     | Summary of Findings and Recommendations .....                | 38        |
| 8.8       | Agricultural.....  | 39        |
| 8.9       | Avifauna.....  | 41        |
| 8.9.1     | Description of major bird habitats .....                     | 41        |
| 8.9.2     | Critical Biodiversity Area (CBAs) .....                      | 43        |
| 8.9.3     | Important Bird Areas.....                                    | 44        |
| 8.9.4     | Expected and Observed Fauna.....                             | 44        |
| 8.9.5     | Sensitivity.....   | 44        |
| 8.9.6     | Conclusions .....  | 46        |
| <b>9.</b> | <b>DESCRIPTION OF THE SOCIO- ECONOMIC ENVIRONMENT .....</b>  | <b>47</b> |
| 9.1       | Socio economic characteristics .....                         | 47        |
| 9.1.1     | Fezile Dabi District Municipality .....                      | 47        |
| 9.1.2     | Moqhaka Local Municipality .....                             | 47        |
| 9.1.3     | Key Findings and Recommendations.....                        | 48        |
| 9.2       | Cultural/Historical Environment.....                         | 48        |
| 9.2.1     | Cultural Landscape.....                                      | 49        |

BONSMARA SOLAR PV (RF) (PTY) LTD

Prepared by:



Project No. 17869  
Description Proposed Bonsmara Solar PV Facility  
Revision No. 1.0

Date: April 2023

Page xxv

|            |   |           |
|------------|---|-----------|
| 9.2.2      | Archaeology.....  | 49        |
| 9.2.3      | Palaeontology.....  | 51        |
| 9.3        | Visual.....   | 51        |
| 9.3.1      | Landscape Character.....  | 52        |
| 9.3.2      | Analysis of magnitude of the visual impact.....   | 54        |
| 9.3.3      | Impact Statement.....   | 59        |
| <b>10.</b> | <b>POLICY AND LEGISLATIVE CONTEXT.....</b>  | <b>59</b> |
| 10.1       | The Constitution.....   | 59        |
| 10.2       | National Environmental Management Act (107 of 1998).....  | 60        |
| 10.3       | Environmental Impact Assessment (EIA) Guideline for Renewable Energy Projects, DFFE Notice 989 of 2015..... | 61        |
| 10.4       | National Water Act (Act 36 of 1998).....  | 61        |
| 10.5       | The National Heritage Resources Act 1999 (25 of 1999).....  | 62        |
| 10.6       | National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 of 2004, as amended).....          | 63        |
| 10.7       | National Environmental Management: Protected Areas Act, 2003 (Act No.57 of 2003 as amended).....            | 63        |
| 10.8       | National Forests Act (NFA) (Act No. 84 of 1998).....  | 64        |
| 10.9       | National Veld and Forest Fire Act (Act No. 101 of 1998).....  | 65        |
| 10.10      | Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983).....                                 | 65        |
| 10.11      | National Road Traffic Act (NRTA) (Act No. 93 of 1996, as amended).....                                      | 65        |
| 10.12      | Civil Aviation Act (CAA) (Act No. 13 of 2009).....  | 66        |
| 10.13      | Astronomy Geographic Advantage Act (Act No. 21 of 2007).....  | 66        |
| 10.14      | National Energy Act (Act No. 34 of 2008).....   | 67        |
| 10.15      | Electricity Regulation Act (Act No. 4 of 2006).....   | 67        |
| 10.16      | Protection of Public Information Act (Act No. 4 of 2013).....   | 67        |
| 10.17      | Renewable Energy Development Zones (REDZs) and Strategic Transmission Corridors.....                        | 68        |
| 10.18      | Additional Relevant Legislation.....  | 69        |
| <b>11.</b> | <b>KEY DEVELOPMENT STRATEGIES AND GUIDELINES.....</b>   | <b>69</b> |
| 11.1       | Provincial Policies.....  | 71        |
| 11.2       | District and Local Municipalities.....  | 72        |
| <b>12.</b> | <b>NEED AND DESIRABILITY.....</b>   | <b>73</b> |

|             |  |           |
|-------------|--|-----------|
| <b>12.1</b> | <b>National Renewable Energy Requirement</b> .....   | 73        |
| <b>12.2</b> | <b>National Renewable Energy Commitment</b> .....  | 74        |
| <b>12.3</b> | <b>Site Suitability</b> .....  | 74        |
| 12.3.1      | Solar Resource .....   | 74        |
| 12.3.2      | Site Access .....  | 75        |
| 12.3.3      | Topography.....  | 75        |
| 12.3.4      | Environmental.....   | 75        |
| 12.3.5      | Land Availability.....   | 76        |
| 12.3.6      | Access to Grid .....   | 76        |
| <b>12.4</b> | <b>Reduce dependency on fossil fuels</b> .....   | 76        |
| <b>12.5</b> | <b>Stimulate the economy</b> .....   | 76        |
| <b>12.6</b> | <b>Job opportunities and household livelihoods</b> .....   | 77        |
| <b>12.7</b> | <b>Skills development</b> .....  | 77        |
| <b>13.</b>  | <b>MOTIVATION FOR THE PREFERRED DEVELOPMENT FOOTPRINT WITHIN THE APPROVED SITE AS CONTEMPLATED IN THE SCOPING REPORT</b> ..... | <b>78</b> |
| <b>14.</b>  | <b>DETAILS OF PROCESS FOLLOWED TO REACH THE PREFERRED OPTION</b> .....   | <b>80</b> |
| <b>14.1</b> | <b>Details of alternatives</b> .....   | <b>80</b> |
| 14.1.1      | Location/Site alternatives .....   | 81        |
| 14.1.2      | The type of activity to be undertaken.....   | 81        |
| 14.1.3      | The technology to be used in the activity .....  | 82        |
| 14.1.4      | Design or layout of the activity.....  | 82        |
| 14.1.5      | No – go option .....   | 82        |
| <b>14.2</b> | <b>Details of Public Participation Process undertaken</b> .....  | <b>83</b> |
| 14.2.1      | Public Participation Process completed for the Scoping Phase.....  | 83        |
| 14.2.2      | Public Participation Process to be undertaken for the EIA Phase .....  | 84        |
| <b>14.3</b> | <b>Impact Assessment</b> .....   | <b>86</b> |
| 14.3.1      | Planning.....  | 86        |
| 14.3.2      | Construction Phase .....   | 86        |
| 14.3.3      | Operational Phase .....  | 92        |
| 14.3.4      | Decommissioning .....  | 97        |
| 14.3.5      | Cumulative.....  | 102       |
| 14.3.6      | Comparative Assessment of Alternatives.....  | 107       |

BONSMARA SOLAR PV (RF) (PTY) LTD

Prepared by:



Project No. 17869  
Description Proposed Bonsmara Solar PV Facility  
Revision No. 1.0

Date: April 2023

Page xxvii

|      |  |            |
|------|--|------------|
| 14.4 | Concluding statement .....   | 107        |
| 15.  | <b>POSITIVE AND NEGATIVE IMPACTS OF THE PROJECT .....</b>  | <b>108</b> |
| 16.  | <b>SUMMARY OF SPECIALIST FINDINGS AND RECOMMENDATIONS .....</b>  | <b>113</b> |
| 17.  | <b>ENVIRONMENTAL IMPACT STATEMENT.....</b>   | <b>120</b> |
| 18.  | <b>ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR) AND CONDITIONS TO BE INCLUDED IN THE ENVIRONMENTAL AUTHORISATION .....</b>  | <b>123</b> |
| 19.  | <b>FINAL PROPOSED ALTERNATIVE WHICH RESOND TO THE IMPACT MANAGEMENT MEASURES, AVOIDANCE, AND MITIGATION MEASURES IDENTIFIED THROUGH THE ASSESSMENT .....</b>         | <b>124</b> |
| 20.  | <b>ASPECTS WHICH WERE CONDITIONAL TO THE FINDINGS OF THE ASSESSMENT EITHER BY THE EAP OR SPECIALIST WHICH ARE TO BE INCLUDED AS CONDITIONS OF AUTHORISATION.....</b> | <b>124</b> |
| 21.  | <b>UNCERTAINTIES, ASSUMPTIONS AND GAPS IN KNOWLEDGE ....</b>   | <b>124</b> |
| 22.  | <b>AUTHORISATION OF THE PROPOSED BONSMARA SEF PROJECT .....</b>  | <b>125</b> |
| 23.  | <b>EAP DECLARATION.....</b>  | <b>125</b> |
| 24.  | <b>DEVIATIONS FROM THE APPROVED SCOPING REPORT .....</b>   | <b>125</b> |
| 25.  | <b>INFORMATION REQUIRED BY CA (IF APPLICABLE).....</b>   | <b>125</b> |
| 26.  | <b>CONCLUSION .....</b>  | <b>125</b> |

## APPENDICES

|             |   |
|-------------|---|
| Appendix 1: | CV's of EAP's involved in the process and EAP declaration |
| Appendix 2: | Locality Map  |
| Appendix 3: | Site Development Plan                                     |
| Appendix 4: | Photographs   |
| Appendix 5: | Proof of public participation                             |
| Appendix 6: | Specialist studies and declarations                       |
| Appendix 7: | SiVEST Impact Rating System                               |
| Appendix 8: | DFFE Screening Tools                                      |
| Appendix 9: | Environmental Management Programme                        |

## LIST OF FIGURES

|   |                                    |    |
|---|------------------------------------|----|
| Figure 1: Bonsmara Regional Context .....   | 2                                  |    |
| Figure 2: Site locality .....   | 9                                  |    |
| Figure 3: Typical components of a solar PV panel .....  | 11                                 |    |
| Figure 4: Solar PV electricity generation process .....   | 12                                 |    |
| Figure 5: Typical containerized Battery Energy Storage Facility .....   | 13                                 |    |
| Figure 6: Final layout showing proposed location of showing proposed location of solar PV panels and associated infrastructure .....      | 15                                 |    |
| Figure 7: Regional context .....  | 23                                 |    |
| Figure 8: Land Cover Classification .....   | 24                                 |    |
| Figure 9: Typical site area   | Figure 10: Typical site area ..... | 24 |
| Figure 11: Typical site area  | Figure 12: Typical site area ..... | 24 |
| Figure 13: Existing 132kV powerline extending across the site and over the R76 .....  | 25                                 |    |
| Figure 14: Topography .....   | 26                                 |    |
| Figure 15: Regional geology of the site .....   | 27                                 |    |
| Figure 16: Geotechnical desktop zonation for solar PV facility .....  | 29                                 |    |
| Figure 17: Waterbodies delineated as part of the assessment .....   | 30                                 |    |
| Figure 18: Habitat Sensitivity map inclusion of aquatic habitats assessed .....   | 32                                 |    |
| Figure 19: Vegetation and Status (National) .....   | 33                                 |    |
| Figure 20: Free State Biodiversity Plan .....   | 34                                 |    |
| Figure 21: Protected areas .....  | 35                                 |    |
| Figure 22: Mapped vegetation with sensitivity .....   | 36                                 |    |
| Figure 23: Typical site vegetation – Natural grassland and typical rocky habitat .....  | 36                                 |    |
| Figure 24: Vegetation and sensitivity .....   | 38                                 |    |
| Figure 25: Proposed development footprint overlaid on agricultural sensitivity (green=low sensitivity; yellow = medium, red = high) ..... | 41                                 |    |
| Figure 26: Habitat delineation of the project footprint .....   | 42                                 |    |
| Figure 27: Rocky ridges “koppies” .....   | 43                                 |    |
| Figure 28: Critical Biodiversity Area .....   | 44                                 |    |
| Figure 29: Avifauna sensitivity map .....   | 46                                 |    |
| Figure 30: Map of heritage resources identified during archaeological and palaeontological field assessments .....                        | 50                                 |    |
| Figure 31: Rolling views of the undulating landscape .....  | 52                                 |    |
| Figure 32: Viewpoints Map .....   | 56                                 |    |
| Figure 33: Glare receptor locations .....   | 57                                 |    |
| Figure 34: Photovoltaic Power Potential in South Africa .....   | 75                                 |    |
| Figure 35: PV panel and supporting infrastructure sensitivity layout .....  | 78                                 |    |
| Figure 36: Final proposed layout / development footprint with site sensitivities .....  | 80                                 |    |

BONSMARA SOLAR PV (RF) (PTY) LTD

Prepared by:



Project No. 17869  
Description Proposed Bonsmara Solar PV Facility  
Revision No. 1.0

Date: April 2023

Page xxix

|  |     |
|--|-----|
| Figure 37: Renewable Energy Projects within 35km of the Bonsmara SEF ..... | 102 |
| Figure 38: Proposed layout put forward for authorisation .....             | 108 |
| Figure 39: Final proposed layout with site sensitivities .....             | 121 |

## LIST OF TABLES

|  |     |
|--|-----|
| Table 1: Content requirements for an Environmental Impact Assessment Report.....   | 3   |
| Table 2: Name and contact details of the applicant.....  | 6   |
| Table 3: Name and contact details of the Environmental Consultant who prepared the report .....  | 7   |
| Table 4: Names and details of the expertise of the EAP's involved in the preparation of this report ....   | 7   |
| Table 5: Names of specialists involved in the project .....  | 8   |
| Table 6: 21 Digit Surveyor General Code .....  | 8   |
| Table 7: Bend point coordinates for the Bonsmara SEF site boundary.....  | 9   |
| Table 8: Bend point coordinates for the substation, BESS, temporary laydown, operation and maintenance area, auxiliary buildings, offices .....                                    | 10  |
| Table 9: Technical Detail Summary .....  | 15  |
| Table 10: Listed activities in terms of NEMA: EIA Regulations 2014 (as amended in 2017), applicable to the proposed project .....  | 16  |
| Table 11: DFFE Screening Tool Environmental Sensitivity .....  | 20  |
| Table 12: Summary of geotechnical conditions/constraints.....  | 28  |
| Table 13: Buffer zone requirements.....  | 31  |
| Table 14: Species and habitat sensitivity rating definitions .....   | 31  |
| Table 15: Employment status in Fezile Dabi DM and Moqhaka LM .....   | 48  |
| Table 16: Heritage resources known to be located within the development area .....   | 51  |
| Table 17: Visibility from viewpoints .....   | 53  |
| Table 18: Magnitude of overall visual impact.....  | 58  |
| Table 19: The SEA for Wind and Solar PV Energy in South Africa (Phase 1 and Phase 2) (CSIR, 2015; CSIR, 2019) identified the following eleven (11) geographic areas for REDZs..... | 68  |
| Table 20: Relevant Provincial Policies for the Bonsmara Solar PV Facility .....  | 71  |
| Table 21: Relevant District and Local Municipal Policies for the Bonsmara Solar PV Facility .....  | 72  |
| Table 22: Renewable Energy Projects within 35km of the Bonsmara SEF .....  | 102 |
| Table 23: Pre and post mitigation impact ratings.....  | 108 |
| Table 24: Summary of specialist findings and recommendations.....  | 113 |

**BONSMARA SOLAR PV (RF) (PTY) LTD**

Project No. 17869  
 Description Proposed Bonsmara Solar PV Facility  
 Revision No. 1.0

Date: April 2023

Prepared by:



Page xxx



# BONSMARA SOLAR PV FACILITY

## DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

### 1. INTRODUCTION

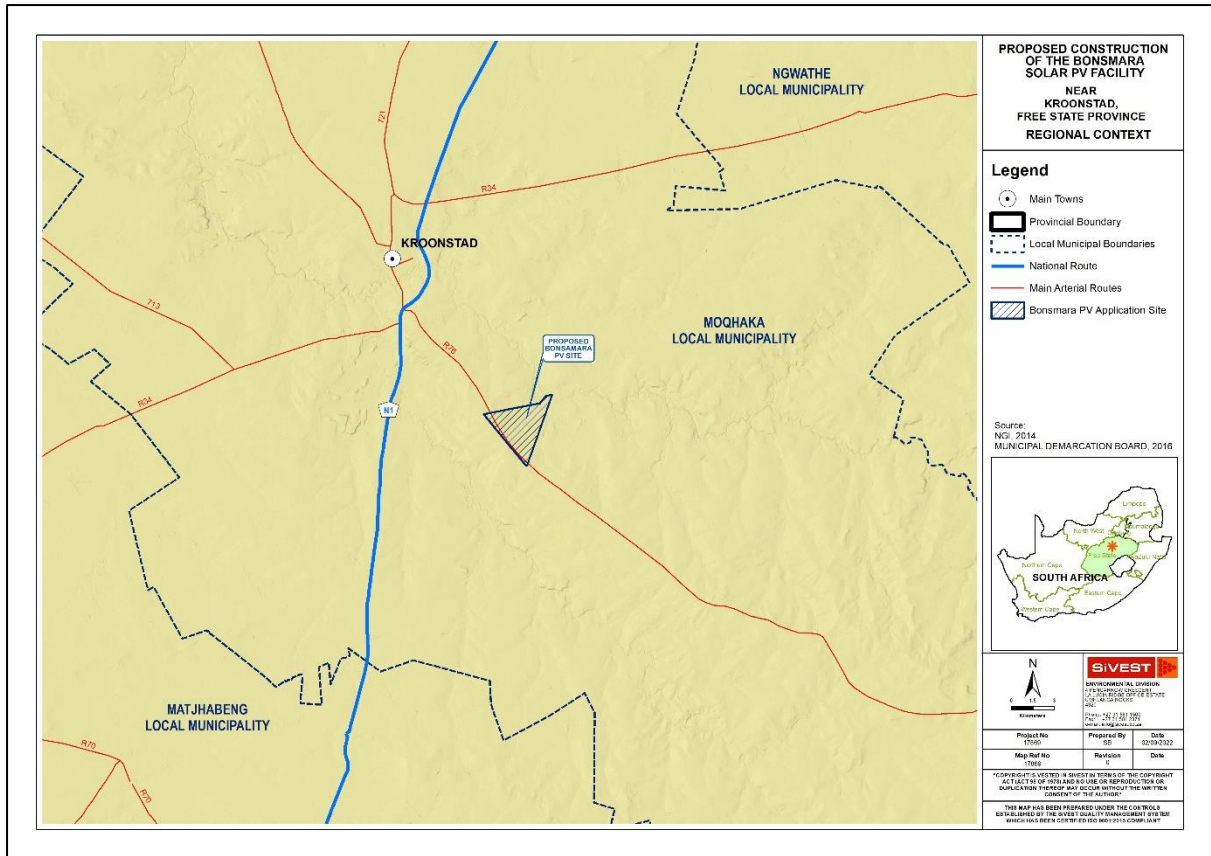
Bonsmara Solar PV (RF) (Pty) Ltd is proposing to construct the Bonsmara Solar PV Facility (SEF) and associated infrastructure approximately 12 km south-east of Kroonstad in the Moqhaka Local Municipality and the Fezile Dabi District, in the Free State Province (**Figure 1**) (**DFFE Reference Number: 14/12/16/3/3/2/2228**). The overall objective of the proposed development is to generate electricity by means of renewable energy technologies capturing solar energy to feed into the national grid. The proposed development will have a maximum total generation capacity of up to 100 megawatt (MW).

SiVEST Environmental Division has subsequently been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment (EIA) process for the proposed construction and operation of the Bonsmara SEF and associated infrastructure. The proposed development requires an Environmental Authorisation (EA) from the National Department Forestry, Fisheries and the Environment (DFFE). However, the provincial authority (i.e. the Free State Department of Economic, Small Business Development, Tourism and Environmental Affairs (DESTEA)) will also be consulted. The EIA for the proposed development will be conducted in terms of the EIA Regulations, 2014 (as amended) promulgated in terms of Chapter 5 of the NEMA. In terms of these regulations, a full EIA process is required for the proposed development. All relevant legislation and guidelines will be consulted during the EIA process and will be complied with at all times.

In order to evacuate the energy generated by the SEF to supplement the national grid, Bonsmara Solar PV (RF) (Pty) Ltd is proposing two grid connection alternatives which will be assessed in a separate Grid BAR. The Competent Authority for the Grid BAR will be the provincial authority (i.e. DESTEA).

The SEF and grid connection infrastructure will require separate Environmental Authorisations (EAs) and are subject to separate Environmental Impact Assessment (EIA) and Basic Assessment (BA) processes respectively. The proposed grid connection infrastructure will be handed over to Eskom once constructed (Eskom grid connection works). The substations will include an Eskom portion (switching station) and an Independent Power Producer (IPP) portion (facility substation) hence the facility substations will be included in the respective SEF EIAs and the Eskom switching stations in the respective associated grid connection infrastructure BA in order to allow for handover to Eskom.

Although the SEF and associated grid connection infrastructure (switching station and overhead power line) will be assessed separately, a single public participation process is being undertaken to consider both of the proposed projects [i.e., one (1) SEF EIA and one (1) grid connection BA].



**Figure 1: Bonsmara Regional Context**

### 1.1 Overview of the EIA Process

The National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA) promotes the use of scoping and EIA in order to ensure integrated environmental management. The purpose of an EIA is to provide the Authority with sufficient information to make an informed decision on whether an activity should proceed or not, and to assist with selecting an option that will provide the most benefit and cause the least impact. The EIA process should identify activities which may have a detrimental effect on the environment, and which would therefore require Environmental Authorisation prior to commencement.

This project requires an Environmental Authorisation (EA) in terms of the National Environmental Management Act (NEMA) (Act No. 107 of 1998, as amended) and the 2014 EIA Regulations (as amended). The process triggered is a Scoping and Environmental Impact Assessment report (S&EIR). All the phases including the Environmental Management Programme report (EMPr) must be prepared in terms of the NEMA and GN R. 982, (as amended by GN R. 326) and the associated activities listed under GN R. 983, GN R. 984 and GN R. 985 (as amended by GN R 327, GN R 325, and GN R 324 respectively).

#### Objectives and Overview of the Environmental Impact Assessment (EIA) Phase

The EIA Phase is a comprehensive study that addresses all the issues raised in the Scoping Phase as well as provides further assessment of the sensitivities identified by the various specialist as well as the proposed impacts of the proposed development. The main objectives of the EIA phase is to assess the significance of the impacts that may occur from the proposed development, provide mitigation measures and management recommendations to reduce the significant impacts, compile an Environmental

Management Programme for use during construction to ensure correct monitoring procedures are followed as well as to undertake further PPP.

The EAP therefore compiled a Draft Environmental Impact Assessment Report (DEIAR) and a draft Environmental Management Programme (EMPr) which is made available for public and stakeholder comment for a period of 30 days as part of the public participation process. All comments received in response to the DEIAR are then considered and responded to, incorporated into the Final EIA Phase and submitted to the Department for decision.

### Public Participation Process

Public and Stakeholder participation is a fundamental component of the EIA Process. The inclusion of the views of the affected and interested public aids in ensuring the EIA Process is open, transparent and robust, as well as that the decision-making process is equitable and fair. This in turn guides informed choice and better environmental outcomes. It further presents a valuable source of information on key impacts, potential mitigation measures and the identification and selection of feasible alternatives. This process allows the EAP to engage further with identified key stakeholders and Interested and Affected Parties (I&APs). The Draft EIA Report has been made available to all I&APs as well as Organs of State for a period of 30 days from the **6<sup>th</sup> of April 2023 until the 9<sup>th</sup> of May 2023**, following this, all comments will be included in the Comments and Response Report which will then be submitted to the Department for decision.

## 1.2 Content Requirements for an Environmental Impact Assessment Report

An Environmental Impact Assessment Report must contain the information that is necessary for the competent authority to consider and come to a decision on the application. The content requirements for an Environmental Impact Assessment Report (as provided in Appendix 3 of the EIA Regulations 2014, as amended), as well as details of which section of the report fulfils these requirements, are shown in **Table 1** below.

**Table 1: Content requirements for an Environmental Impact Assessment Report**

| Content Requirements   | Applicable Section |
|--|--------------------|
| (a) details of-<br>(i) the EAP who prepared the report; and<br>(ii) the expertise of the EAP, including a curriculum vitae;  | 4                  |
| (b) the location of the activity, including-<br>(i) the 21-digit Surveyor General code of each cadastral land parcel;<br>(ii) where available, the physical address and farm name;<br>(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;  | 5                  |
| (c) a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is-<br>(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or<br>(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken; | 5                  |
| (d) a description of the scope of the proposed activity, including-<br>(i) all listed and specified activities triggered;  | 6.2                |

| <b>Content Requirements</b>   | <b>Applicable Section</b> |
|---|---------------------------|
| (ii) a description of the activities to be undertaken, including associated structures and infrastructure;  |                           |
| (e) a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;  | 10                        |
| (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 development footprint within the approved site as contemplated in the accepted scoping report;   | 12                        |
| (g) a motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report;   | 13                        |
| (h) a full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including: <ul style="list-style-type: none"> <li>(i) details of all the alternatives considered;</li> <li>(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;</li> <li>(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;</li> <li>(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;</li> <li>(v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts— <ul style="list-style-type: none"> <li>(aa) can be reversed;</li> <li>(bb) may cause irreplaceable loss of resources; and</li> <li>(cc) can be avoided, managed or mitigated;</li> </ul> </li> <li>(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;</li> <li>(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;</li> <li>(viii) the possible mitigation measures that could be applied and level of residual risk;</li> <li>(ix) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and</li> <li>(x) a concluding statement indicating the location of the preferred alternative development footprint within the approved site as contemplated in the accepted scoping report;</li> </ul> | 14                        |
| (i) a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including—   | 14.3<br>Appendix 7        |

| <b>Content Requirements</b>  | <b>Applicable Section</b> |
|--|---------------------------|
| (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and<br>(ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;  |                           |
| (j) an assessment of each identified potentially significant impact and risk, including—<br>(i) cumulative impacts;<br>(ii) the nature, significance and consequences of the impact and risk;<br>(iii) the extent and duration of the impact and risk;<br>(iv) the probability of the impact and risk occurring;<br>(v) the degree to which the impact and risk can be reversed;<br>(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and<br>(vii) the degree to which the impact and risk can be mitigated;   | 14.3                      |
| (k) where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;  | 16                        |
| (l) an environmental impact statement which contains—<br>(i) a summary of the key findings of the environmental impact assessment;<br>(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and<br>(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives; | 17                        |
| (m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;  | 18                        |
| (n) the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;   | 19                        |
| (o) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;  | 20                        |
| (p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;   | 21                        |
| (q) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;  | 22                        |
| (r) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;   | 22                        |
| (s) an undertaking under oath or affirmation by the EAP in relation to-<br>(i) the correctness of the information provided in the report;<br>(ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and  | Appendix 1                |

| Content Requirements  | Applicable Section                             |
|---|--|
| (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and<br>(iv) 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;           |  |
| (t) where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;  | n/a  |
| (u) an indication of any deviation from the approved scoping report, including the plan of study, including—<br>(i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and<br>(ii) a motivation for the deviation; | 24   |
| (v) any specific information required by the competent authority; and   | 25   |
| (w) any other matter required in terms of section 24(4)(a) and (b) of the Act.  | All requirements have been met in this report. |
| (2) Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a scoping report, the requirements as indicated in such notice will apply.   | All requirements have been met in this report. |

## 2. PROJECT TITLE

Proposed Development of the Bonsmara Solar PV Facility (SEF) and Associated Infrastructure near Kroonstad in the Free State Province.

## 3. DETAILS OF APPLICANT

### 3.1 Name and contact details of the Applicant

**Table 2: Name and contact details of the applicant**

|                                   |  |
|-----------------------------------|--|
| <b>Business Name of Applicant</b> | Bonsmara Solar PV (RF) (Pty) Ltd   |
| <b>Physical Address</b>           | Third Floor, Sunclare Building, 21 Dreyer Street, Claremont, Cape Town         |
| <b>Postal Address</b>             | PO Box 762, Wilderness   |
| <b>Postal Code</b>                | 7708   |
| <b>Telephone</b>                  | 083 785 1492   |
| <b>Email</b>                      | <a href="mailto:mangnall@wkn-windcurrent.com">mangnall@wkn-windcurrent.com</a> |

## 4. DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND SPECIALISTS

### 4.1 Name and contact details of the Environmental Consultant

The table below provides the name and contact details of the Environmental Consultants who prepared this report:

**Table 3: Name and contact details of the Environmental Consultant who prepared the report**

|                             |  |
|-----------------------------|--|
| <b>Business Name of EAP</b> | SiVEST SA (PTY) Ltd  |
| <b>Physical Address</b>     | 4 Pencarrow Crescent, La Lucia Ridge Office Estate             |
| <b>Postal Address</b>       | PO Box 1899, Umhlanga Rocks                                    |
| <b>Postal Code</b>          | 4320   |
| <b>Telephone</b>            | 031 581 1500   |
| <b>Fax</b>                  | 031 566 2371   |
| <b>Email</b>                | <a href="mailto:michelleg@sivest.com">michelleg@sivest.com</a> |

### 4.2 Names and expertise of the Environmental Assessment Practitioner (EAP)

The table below provides the names of the EAP's who prepared this report:

**Table 4: Names and details of the expertise of the EAP's involved in the preparation of this report**

| <b>Name of representative of the EAP</b>     | <b>Educational Qualifications</b>      | <b>Professional Affiliations</b>   | <b>Experience (years)</b> |
|--|--|--|---------------------------|
| Michelle Nevette<br>( <i>Cert.Sci.Nat.</i> ) | MEnvMgt.<br>(Environmental Management) | SACNASP Registration No. 120356<br>EAPASA Registration No. 2019/1560<br>IAIA | 21                        |
| Michelle Guy<br>( <i>Pr.Sci.Nat</i> )        | MSc<br>Environmental Science           | SACNASP Registration No. 126338<br>EAPASA Registration No. 2019/868<br>IAIA  | 10                        |
| Luvanya Naidoo<br>( <i>Pr.Sci.Nat</i> )      | BSc Geography                          | SACNASP Registration No. 126107<br>EAPASA Registration No. 2019/1404<br>IAIA | 12                        |

CV's of SiVEST personnel and the EAP declaration are attached in **Appendix 1**.

### 4.3 Names and expertise of the specialists

The table below provides the names of the specialists involved in the project:

**Table 5: Names of specialists involved in the project**

| Company                   | Name of representative of the specialist | Specialist  | Educational Qualifications   | Experience (years) |
|---------------------------|--|---|--|--------------------|
| SRK Consulting            | Kelly Armstrong                          | Visual Impact Assessment                          | BSocSc (Hons)  | 4                  |
|                           | Chris Dalgliesh                          |   | BBusSci (Hons)<br>M Phil (Env)<br>EAPASA                                   | 35                 |
| CTS Heritage              | Jenna Lavin                              | Heritage Impact Assessment                        | MSc. Archaeology (UCT), CPD in Conservation of the Built Environment (UCT) | 12                 |
| Johann Lanz Consulting    | Johann Lanz                              | Agriculture and Soils Impact Assessment (desktop) | M.Sc. (Environmental Geochemistry)   | 24                 |
| Synergy Global Consulting | Teboho Mosuoetsietsi                     | Socio-economic Impact Assessment (desktop)        | Doctor of Philosophy (PhD) in Anthropology - Rhodes University (2019)      | 8                  |
|                           | Thandiwe Chidzingu                       |   | Hons Geography and MSc Geography and Environmental Studies                 | 5                  |
| n/a                       | Jamie Pote                               | Terrestrial Impact Assessment                     | BSc (Hons)<br>Pr. Sci. Nat. 115233   | 18                 |
| Enviro Insight            | Sam Laurence                             | Avifaunal Impact Assessment                       | BSc, BSc Hons,<br>M.Sc. candidate.<br>Pr. Sci. Nat.<br>Zoological Science  | 15                 |
| EnviroSci (Pty) Ltd       | Dr Brian Colloty                         | Surface Water Impact Assessment                   | Ph D (Botany – Estuaries & Mangroves)<br>Pr. Sci. Nat.<br>400268/07        | 25                 |
| GaGE Consulting (Pty) Ltd | Duan Swart                               | Desktop Geotechnical Impact Assessment            | MSc Engineering Geology<br>Pr.Sci.Nat 137543                               | 4                  |

## 5. LOCATION OF THE ACTIVITY

### 5.1 21 Digit Surveyor General Codes and Farm names of the sites

**Table 6: 21 Digit Surveyor General Code**

| SG CODE               | DESCRIPTION                                |
|-----------------------|--|
| F02000000000063600000 | PORTION 0 OF THE FARM SCHEVENINGEN NO. 636 |
| F02000000000063600001 | PORTION 1 OF THE FARM SCHEVENINGEN NO. 636 |



## 5.2 Coordinates of the site

The centre point coordinates for the sites are as follows:

- Latitude: 27° 45' 51.71" S
- Longitude: 27° 19' 13.44" E

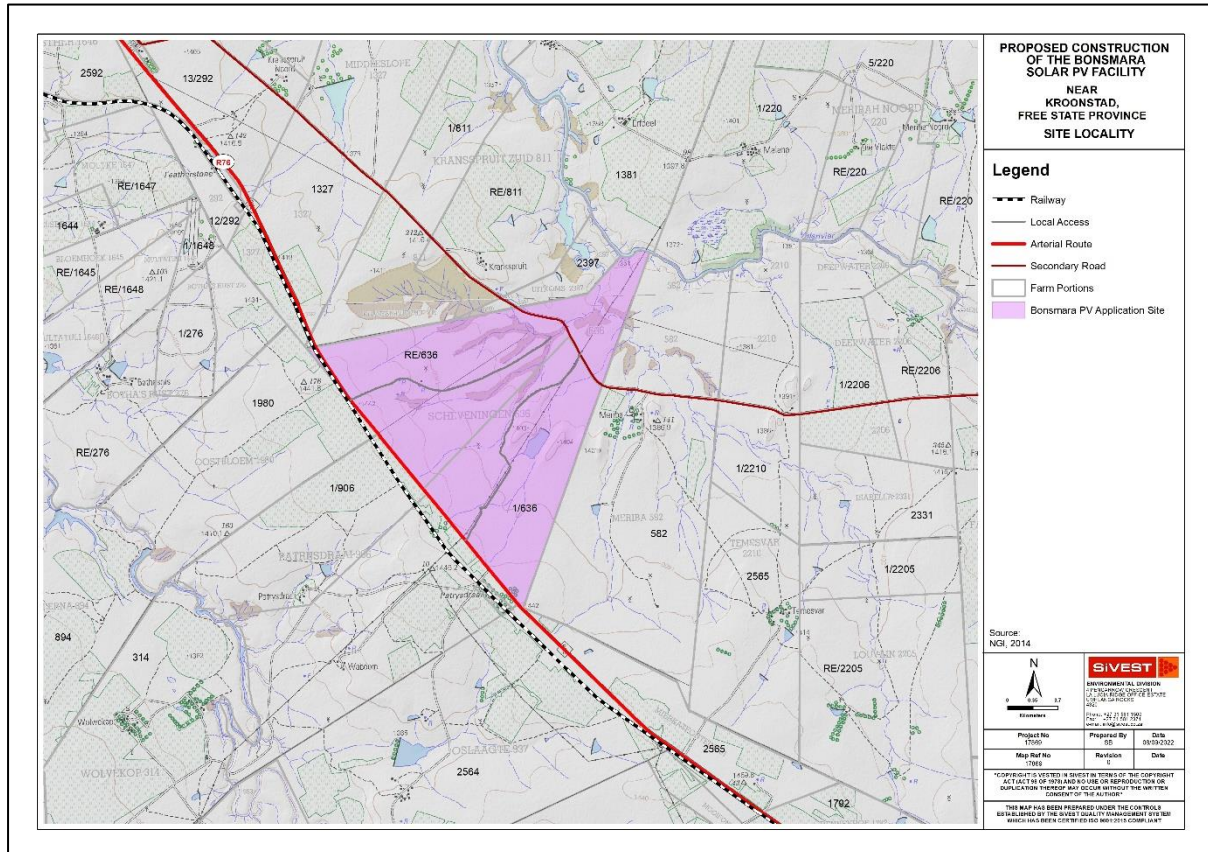


Figure 2: Site locality

The bend point coordinates of the site have been included below:

Table 7: Bend point coordinates for the Bonsmara SEF site boundary

| BONSMARA SEF: APPLICATION SITE              |               |               |
|---|---------------|---------------|
| COORDINATES AT CORNER POINTS (DD MM SS.sss) |               |               |
| POINT                                       | SOUTH         | EAST          |
| 1   | 27°45'19.63"S | 27°17'36.88"E |
| 2   | 27°44'58.69"S | 27°20'0.41"E  |
| 3   | 27°44'41.92"S | 27°20'18.09"E |
| 4   | 27°44'42.63"S | 27°20'20.19"E |
| 5   | 27°44'42.32"S | 27°20'23.08"E |
| 6   | 27°44'41.19"S | 27°20'24.88"E |
| 7   | 27°44'39.93"S | 27°20'26.19"E |
| 8   | 27°44'39.65"S | 27°20'27.90"E |
| 9   | 27°44'40.40"S | 27°20'31.86"E |

BONSMARA SOLAR PV (RF) (PTY) LTD

Prepared by:



Project No. 17869  
Description Proposed Bonsmara Solar PV Facility  
Revision No. 1.0

Date: April 2023

Page 9 of 126

| <b>BONSMARA SEF: APPLICATION SITE</b>              |               |               |
|--|---------------|---------------|
| <b>COORDINATES AT CORNER POINTS (DD MM SS.sss)</b> |               |               |
| <b>POINT</b>                                       | <b>SOUTH</b>  | <b>EAST</b>   |
| 10   | 27°44'40.79"S | 27°20'32.68"E |
| 11   | 27°47'19.58"S | 27°19'23.11"E |
| 12   | 27°47'18.60"S | 27°19'20.30"E |

**Table 8: Bend point coordinates for the substation, BESS, temporary laydown, operation and maintenance area, auxiliary buildings, offices**

| <b>BONSMARA SEF: SUBSTATION, BESS AND ASSOCIATED INFRASTRUCTURE LOCATION</b> |               |               |
|--|---------------|---------------|
| <b>COORDINATES AT CORNER POINTS (DD MM SS.sss)</b>                           |               |               |
| <b>POINT</b>   | <b>SOUTH</b>  | <b>EAST</b>   |
| 1  | 27°46'10.04"S | 27°18'23.30"E |
| 2  | 27°46'1.62"S  | 27°18'37.95"E |
| 3  | 27°46'6.75"S  | 27°18'42.97"E |
| 4  | 27°46'8.01"S  | 27°18'43.29"E |
| 5  | 27°46'11.34"S | 27°18'42.28"E |
| 6  | 27°46'18.36"S | 27°18'30.24"E |
| <b>COORDINATES AT CENTRE POINT (DD MM SS.sss)</b>                            |               |               |
| <b>POINT</b>   | <b>SOUTH</b>  | <b>EAST</b>   |
| 7  | 27°46'10.08"S | 27°18'34.64"E |

Please note that all the supporting infrastructure described above and below (e.g., substation, BESS, temporary laydown, O&M building etc.) will be located within a 15ha area that has been identified on site.

## **6. ACTIVITY INFORMATION**

### **6.1 Project Description**

#### **6.1.1 SEF and Associated Infrastructure**

The application site being assessed (which incorporates the farm portions / properties listed above) is approximately 1004 hectares (ha) in extent.

It is anticipated that the proposed Solar PV energy facility will include PV fields (arrays) comprising of multiple PV panels. In summary, the proposed Bonsmara SEF development will include the following components:

- PV development area of 326 ha
- PV modules and mounting structures (monofacial or bifacial) with fixed, single or double axis tracking mounting structures. The modules will be either crystalline silicon or thin film technology. Each panel will be approximately 2.5m above ground.
- Site and internal access roads, up to 6m wide, will provide access to the PV arrays. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary.

**BONSMARA SOLAR PV (RF) (PTY) LTD**

Prepared by:



Project No. 17869  
Description Proposed Bonsmara Solar PV Facility  
Revision No. 1.0

Date: April 2023

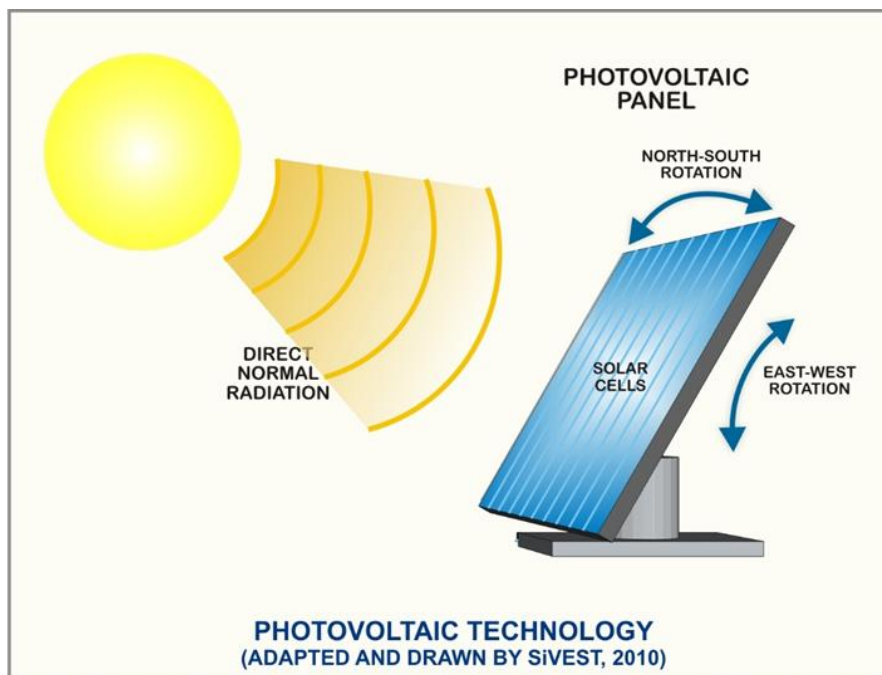
Page 10 of 126

- Operation and maintenance (O&M) building (including offices, warehouses, workshops, canteen, visitors centre, ablution facilities and staff lockers), occupying a site of approximately 5000 m<sup>2</sup>.
- Battery Energy Storage System (BESS) of approximately 2 ha;
- Temporary construction laydown/staging area during construction phase approximately 2 ha in size (which will become the permanent laydown area for the BESS during the operational phase);
- Associated stormwater management infrastructure;
- Auxiliary buildings (offices, parking etc.) approximately 1 ha in size.
- One new 33/132kV on-site substation (facility substation) occupying an area of up to approximately 1 ha.
- Medium voltage cabling will link the PV facility to the facility substation / grid connection infrastructure. These cables will be laid underground wherever technically feasible (up to 33kV).
- Galvanized palisade perimeter fencing;
- Rainwater and/or groundwater storage tanks and associated water transfer infrastructure.
- Water will either be sourced from either the Local Municipality, supplied from a private contractor and trucked in, from existing boreholes located within the application site or from a new borehole if none of these options are available.

### 6.1.2 Main components of a Solar PV Facility

It is anticipated that the proposed Solar PV energy facility will include PV fields (arrays) comprising multiple PV panels. Solar PV panels are usually arranged in rows consisting of a number of PV modules.

Please refer to the figure below for the typical components of a solar panel.

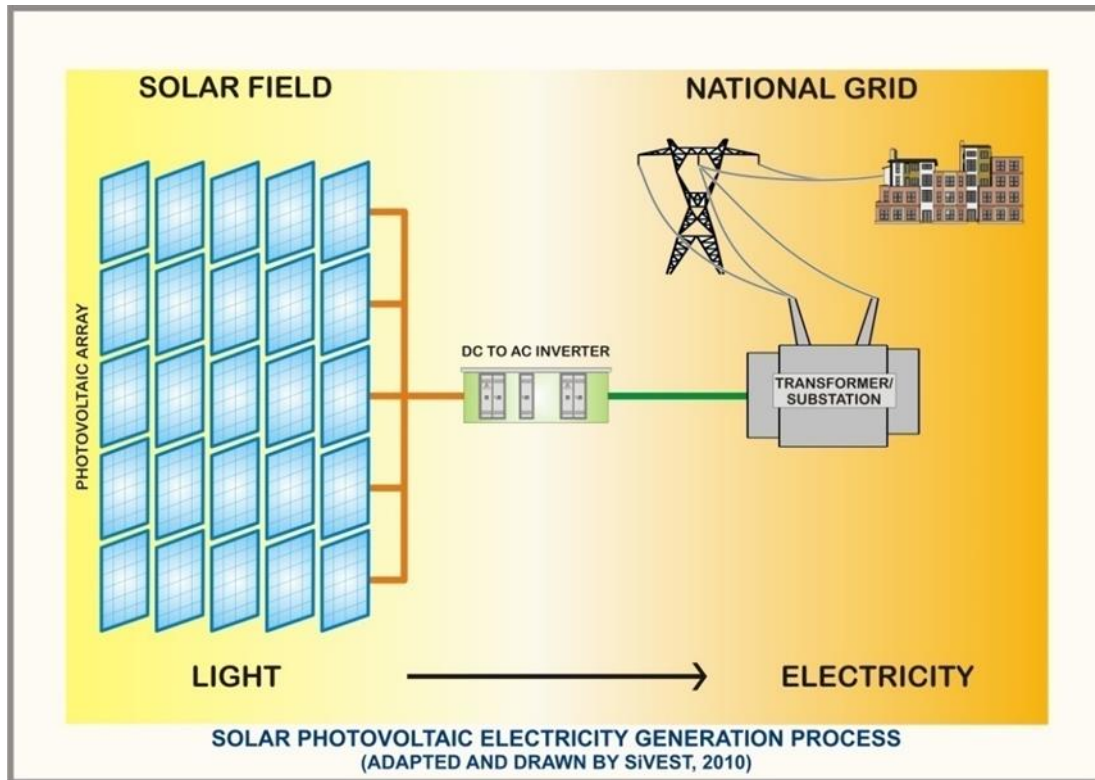


**Figure 3: Typical components of a solar PV panel**

The solar arrays are usually connected in strings, which are in turn connected to inverters. DC power from the panels will be converted into AC power in the inverters and the voltage will be typically stepped up to a medium voltage in the transformers. As mentioned, medium voltage cabling will link the solar PV energy facility to the grid connection infrastructure (132kV overhead power line and 33/132kV on-

site substation). The medium voltage cables will be run underground (wherever technically feasible) in the facility before being fed to the on-site and/or collector substation, where the voltage will typically be stepped up.

The solar PV electricity generation process is illustrated in **Figure 5** below.



**Figure 4: Solar PV electricity generation process**

### 6.1.3 Roads

The main access for the Bonsmara SEF is off the regional tarred R76 which lies adjacent to the site. Internal access roads will then be required to access the solar PV panels. The site and internal roads will have a width of up to approximately 6 m and will consist of both new roads and roads that will be upgraded.

### 6.1.4 Battery Energy Storage System

A Battery Energy Storage System (BESS) of approximately 2 ha in size is proposed to be included as part of the Bonsmara SEF. The BESS is proposed to be constructed on the site that will be used as the temporary construction laydown area during the construction phase. Two BESS technology alternatives are considered: Solid state battery electrolytes (e.g., lithium-ion (Li-ion) zinc hybrid cathode, sodium ion, zinc bromine, sodium sulphur) and Redox-flow technology.

The BESS will comprise of multiple battery units or modules housed in shipping containers and/or an applicable housing structure which is delivered pre-assembled to the project site.



**Figure 5: Typical containerized Battery Energy Storage Facility**

Typically, BESS consist of multiple battery cells that are assembled together to form modules. Each cell contains a positive electrode, a negative electrode and an electrolyte. A module may consist of thousands of cells working in conjunction. Modules are normally packaged inside containers (similar to shipping containers) and these containers are delivered pre-assembled to the PV site. The containers are raised slightly off the ground and are banded to prevent possible environmental damage resulting from any equipment malfunction.

Two main types of technology are being considered for the proposed BESS as follows:

#### Solid State Battery

Solid State Battery is a technology that uses solid electrodes and a solid electrolyte, instead of a liquid of polymer gel electrolyte used in flow batteries. The technology consists of multiple battery cells that are strung together in series to form rack mountable modules. Typically, the racks are then installed in a specially prepared shipping container to function as an integrated battery system. Of the above-mentioned electrolytes, Lithium-Ion (Li-ion) batteries appear likely to become the most common choice in the future.

#### Flow Battery

Flow Batteries differ from conventional rechargeable batteries in that the electroactive materials are not stored within the electrode; rather, they are dissolved in electrolyte solutions. The electrolytes are stored in tanks (one at the anode side, the anolyte tank; one at the cathode side, the catholyte tank). These two tanks are separated from the regenerative cell stack. The electrolytes are pumped from the tanks into the cell stacks (i.e. reaction unit) where reversible electrochemical reactions occur during charging and discharging of the system.

Flow battery systems, with electroactive materials dissolved in liquid-state electrolytes, are referred to as redox flow batteries.

The most used flow battery is the Vanadium Redox Flow Battery (VRFB), which is a type of rechargeable flow battery that employs vanadium ions in different oxidative states to store chemical potential energy.

In terms of BESS and the NEMA EIA Regulations, activities relating to storage of dangerous goods, such as Activity 14 of Listing Notice 1 and Activity 10 of Listing Notice 3, will not be triggered by the proposed battery storage facility installation, due to the following:

- A battery is not deemed to be a container; and
- Electrolytes that are used within battery storage facilities: their function is deemed to be like transformers within substations: converting high voltage electricity to lower voltage electricity for further distribution. The function of the battery is not for “storage” or “storage and handling” of a dangerous good. For flow batteries that need to be recharged, the truck will come in, recharge and leave immediately, and so there will be no temporary storage on site.

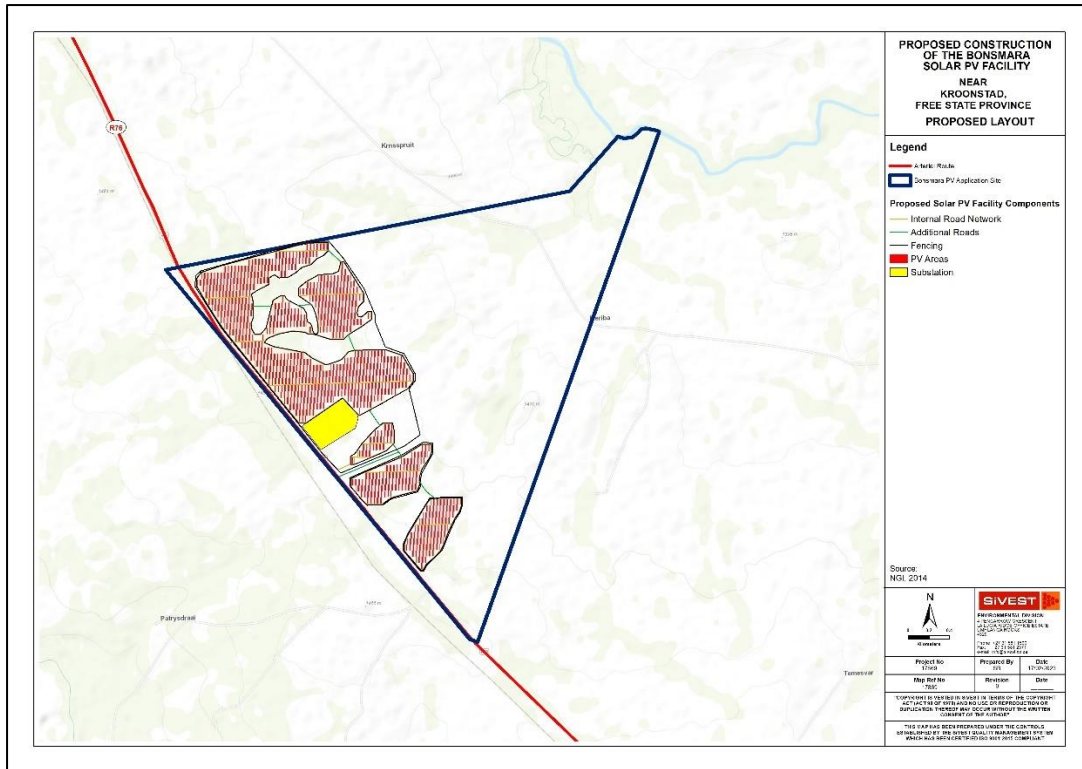
Battery storage does not trigger any listed activities relating to the generation of electricity as the technology does not ‘generate’ electricity, it simply stores electricity generated by the renewable energy facility (the Bonsmara Solar PV Facility in this instance) and discharges the stored electricity as and when required by the grid.

The preferred technology is Lithium-ion solid state battery, however, due to the ever changing preferences and improvements to battery technology, the final selection of the type of battery technology to be used will only take place during the detailed design process and after the appointment of the battery supplier.

Additional technical information as well as a high level risk assessment for the BESS has been included in **Appendix 6**.

### **6.1.5 Final Proposed Layout and Technical Detail Summary**

The Final Proposed Layout is reflected below in **Figure 6** and attached in **Appendix 3**. Photographs of the site are included in **Appendix 4**.



**Figure 6: Final layout showing proposed location of showing proposed location of solar PV panels and associated infrastructure**

The solar panels and all other project infrastructure have been placed strategically within the development area based on environmental constraints and sensitivity findings.

A summary of the project technical details is provided in **Table 9** below.

**Table 9: Technical Detail Summary**

| Component                                    | Description / Dimensions                       |
|--|--|
| Location of site (centre point)              | 27°46'10.08"S 27°18'34.64"E                    |
| Application site area                        | 1004 ha  |
| PV development area                          | 326 ha   |
| SG codes                                     | F02000000000063600000<br>F02000000000063600001 |
| Export capacity                              | Up to 100 MW                                   |
| Proposed technology                          | PV modules and mounting structures             |
| Max panel height from the ground             | 2.5m   |
| Substation area                              | 1 ha   |
| Battery Energy Storage Area (BESS)           | 2 ha   |
| Capacity of on-site and collector substation | 33/132kV                                       |
| O&M building area                            | 5000 m <sup>2</sup>                            |
| Temporary Construction Laydown area          | 2 ha   |
| Width of internal access roads               | Approximately 6 m                              |

| Component                    | Description / Dimensions  |
|------------------------------|---|
| Site Access                  | Access to the site shall be from the R76 between Kroonstad and Steynrus. The site is situated approximately 12 km from Kroonstad. |
| Proximity to grid connection | Approximately 2 km from application site  |
| Height of fencing            | Approximately 3.5 m high  |
| Type of fencing              | Galvanized palisade fencing   |

## 6.2 NEMA Listed Activities

The amended EIA Regulations promulgated under Section 24(5) of the National Environmental Management Act, Act 107 of 1998 and published in Government Notice No. R. 326 list activities which may not commence without environmental authorization from the Competent Authority. The proposed activity is identified in terms of Government Notice No. R. 327, 325 and 324 for activities which must follow a full Environmental Impact Assessment Process. The project will trigger the following listed activities:

**Table 10: Listed activities in terms of NEMA: EIA Regulations 2014 (as amended in 2017), applicable to the proposed project**

| Activity No(s):  | Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended   | Describe the portion of the proposed project to which the applicable listed activity relates.  |
|--|--|--|
| <b>Relevant Basic Assessment Activities as set out in Listing Notice 1</b> |  |  |
| 11 (i)   | <b>GN R. 327 (as amended) Item 11:</b> The development of facilities or infrastructure for the transmission and distribution of electricity—<br><br>(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.   | New on-site substations/collector switching stations will be constructed as part of the proposed development. The proposed substation / collector switching stations will be located outside urban areas and will have capacities of 33/132kV respectively.  |
| 12 (ii) (a) (c)  | <b>GN R. 327 (as amended) Item 12:</b> The development of:<br><br>ii) infrastructure or structures with a physical footprint of 100 square metres or more;<br><br>where such development occurs-<br>(a) within a watercourse;<br>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse. | Drainage lines and watercourses are scattered across the proposed site. One or more roads, fences and/or powerlines will cross these watercourses or drainage lines or be within 32m thereof.<br><br>The proposed developments will therefore entail the construction of infrastructure with physical footprints of approximately 100m <sup>2</sup> or more within a surface water feature / watercourse or within 32m of a surface water feature / watercourse. |
| 19   | <b>GN R. 327 (as amended) Item 19:</b> The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;   | The proposed development will involve the excavation, removal, infilling or depositing of any material of more than 10m <sup>3</sup> into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10m <sup>3</sup> from some of the  |



| Activity No(s):   | Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended   | Describe the portion of the proposed project to which the applicable listed activity relates.  |
|-------------------|--|--|
|                   |  | <p>identified surface water features / watercourses.</p> <p>Although the layout of the proposed developments will be designed to avoid the identified surface water features / watercourses as far as possible, some of the internal and/or access roads and fences will need to traverse the identified surface water features / watercourses. In addition, during construction of these roads, soil will need to be removed from some of the identified surface water features / watercourses.</p>   |
| 24 (ii)           | <p><b>GN R. 327 (as amended) Item 24:</b> The development of a road -</p> <p>ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres.</p>  | <p>Internal access roads will be required to access the PV panels and substations. Existing roads will be used wherever possible, however new roads will be constructed where necessary.</p>   |
| 28 (ii)           | <p><b>GN R. 327 (as amended) Item 28:</b> 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 1 hectare;</p> | <p>The total area to be developed for the proposed renewable energy facilities is greater than 1ha and occurs outside an urban area in an area currently zoned as agriculture land.</p>  |
| 48 (i) (a)<br>(c) | <p><b>GN R. 327 (as amended) Item 48:</b> The expansion of-</p> <p>(i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more;</p> <p>where such expansion occurs—</p> <p>(a) within a watercourse; or<br/>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;</p>                   | <p>The proposed development will entail the expansion (upgrading) of roads and other infrastructure by 100m<sup>2</sup> or more within a surface water feature / watercourse or within 32m from the edge of a surface water feature / watercourse.</p> <p>Although the layouts of the proposed developments will be designed to avoid the identified surface water features / watercourses as far as possible, some of the internal and access roads to be upgraded will need to traverse the identified surface water features / watercourses and construction will occur within some of the surface water features / watercourses and/or be within 32m of some of the surface water features / watercourses.</p> |

| Activity No(s):  | Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended  | Describe the portion of the proposed project to which the applicable listed activity relates.   |
|--|---|---|
| 56 (ii)  | <p><b>GN R. 327 Item 56:</b> The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre -</p> <p>(i) where the existing reserve is wider than 13,5 metres; or</p> <p>(ii) where no reserve exists, where the existing road is wider than 8 metres –</p>  | Internal access roads will be required to access the PV panels and the substation. Existing roads will be used wherever possible, although new roads will be constructed where necessary. The existing access roads will need to be upgraded by widening them more than 6m, or by lengthening them by more than 1km.  |
| <b>Relevant Scoping and EIA Activities as set out in Listing Notice 2 of the EIA Regulations, 2014 as amended</b>  |   |   |
| 1  | <b>GN R. 325 (as amended) Item 1:</b> The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more.   | The proposed development will entail the construction of a SEF where the respective electricity output will be up to 100 MW. In addition, the proposed SEF development will be located outside urban areas.   |
| 15   | <b>GN R. 325 (as amended) Item 15:</b> The clearance of an area of 20 hectares or more of indigenous vegetation.  | The proposed SEF development will involve the clearance of more than 20 ha of indigenous vegetation. Clearance will also be required for the proposed substations, internal access roads and other associated infrastructure.   |
| <b>Relevant Basic Assessment Activities as set out in Listing Notice 3 of the EIA Regulations, 2014 as amended</b> |   |   |
| 4 b. i (bb) (gg)   | <p><b>GN R. 324 (as amended) Item 4:</b> The development of a road wider than 4m with a reserve less than 13.5 metres.</p> <p><b>b. Free State</b></p> <p>i. Outside Urban Areas:</p> <p>(bb) National Protected Area Expansion Strategy Focus areas;</p> <p>(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, excluding disturbed areas</p> | The proposed development is located within 5km of a nature reserve and a portion of the site is located within areas identified as NPAES.   |
| 12 b. (iv)   | <p><b>GN R. 324 (as amended) Item 12:</b> 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>b. Free State</b></p> <p>iv. Areas within a watercourse or wetland; or within 100 meters from the edge of a watercourse or wetland</p>  | The proposed development will entail the construction of infrastructure (cabling, roads and fences) with physical footprints of approximately 300 m <sup>2</sup> or more. As such, approximately 300 m <sup>2</sup> or more of indigenous vegetation will be cleared as part of the respective proposed developments. |

| Activity No(s):                          | Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended  | Describe the portion of the proposed project to which the applicable listed activity relates.  |
|--|---|--|
| 14 (ii)(a)<br>(c)(b)(i)<br>(bb)(ff) (hh) | <p><b>GN R. 324 (as amended) Item 14:</b> The development of—</p> <p>(ii) infrastructure or structures with a physical footprint of 10 square metres or more;</p> <p>where such development occurs—</p> <p>(a) within a watercourse; or<br/>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</p> <p>excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.</p> <p><b>b. Free State</b></p> <p>i. Outside urban areas:<br/>(bb) National Protected Area Expansion Strategy Focus areas;<br/>(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;<br/>(hh) 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, excluding disturbed areas</p> | <p>The proposed development will entail the development of infrastructure with physical footprints of 10m<sup>2</sup> or more within a watercourse / surface water feature or within 32 m from the edge of a watercourse / surface water feature.</p> <p>Although the layouts of the respective proposed developments will be designed to avoid the identified surface water features / watercourse as far as possible, some of the infrastructure / structures will need to traverse the identified surface water features / watercourses.</p> <p>The construction of the infrastructure (MV cabling, roads and fences) for the development will occur within Ecosystem Support Areas located outside of urban areas and within 5km of a protected area as well as areas identified as NPAES.</p> |
| 18 (b)(i)<br>(bb)(gg)<br>(hh)            | <p><b>GN R. 324 (as amended) Item 18:</b> The widening of a road by more than 4 meters, or the lengthening of a road by more than 1 kilometer-</p> <p><b>b. Free State</b></p> <p>i. Outside urban areas:<br/>(bb) National Protected Area Expansion Strategy Focus areas;<br/>(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, excluding disturbed areas<br/>(hh) Areas within a watercourse or wetland; or within 100m from the edge of a watercourse or wetland.</p>   | <p>Internal access roads will be required to access the solar panels as well as the respective substations. Existing roads will be used wherever possible. Internal access roads will thus be widened by more than 4 m or lengthened by more than 1 km. These roads will occur within the Free State Province, outside urban areas. The widening of the roads will occur within a watercourse or wetland or within 100 m from the edge of a watercourse or wetland and be within 5km of a protected area as well as areas identified as NPAES.</p>   |

| Activity No(s):                     | Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended   | Describe the portion of the proposed project to which the applicable listed activity relates.  |
|-------------------------------------|--|--|
| 23 (ii)(a)<br>(c)(b)(i)<br>(bb)(gg) | <p><b>GN R. 3245 (as amended) Item 23:</b> The expansion of—</p> <p>(ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more; where such expansion occurs—</p> <p>(a) within a watercourse;</p> <p>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.</p> <p><b>b. Free State</b></p> <p>i. Outside urban areas:</p> <p>(bb) National Protected Area Expansion Strategy Focus areas;</p> <p>(gg) Areas within 10 kilometers from national parks or world heritage sites or 5 kilometers from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas</p> | <p>The proposed development will entail the development and expansion of roads and other infrastructure by 10m<sup>2</sup> or more within a watercourse or within 32m from the edge of a watercourse. Although the layout of the proposed development will be designed to avoid the identified surface water features as far as possible, some of the existing internal and access roads will need to traverse some of the identified surface water features.</p> <p>The proposed development within 5km of a protected area as well as areas identified as NPAES.</p> |

## 7. NATIONAL WEB-BASED ENVIRONMENTAL SCREENING TOOL

The National Web based Environmental Screening Tool is a geographically based web-enabled application which allows a proponent intending to submit an application for environmental authorisation in terms of the Environmental Impact Assessment (EIA) Regulations 2014, as amended to screen their proposed site for any environmental sensitivity.

According to the DFFE Screening Tool Report (attached in **Appendix 8**), the following themes described in **Table 11** below are applicable to the proposed development:

**Table 11: DFFE Screening Tool Environmental Sensitivity**

| Theme             | Sensitivity | Comment   |
|-------------------|-------------|---|
| Agriculture Theme | High        | <p>The Agricultural Compliance Statement is included in <b>Appendix 6</b> of the Draft EIA Report.</p> <p>This site sensitivity verification verifies the entire site as being of medium agricultural sensitivity with a land capability value of 6. The land capability value is in keeping with the soil limitations that make the site unsuitable for crop production.</p> |

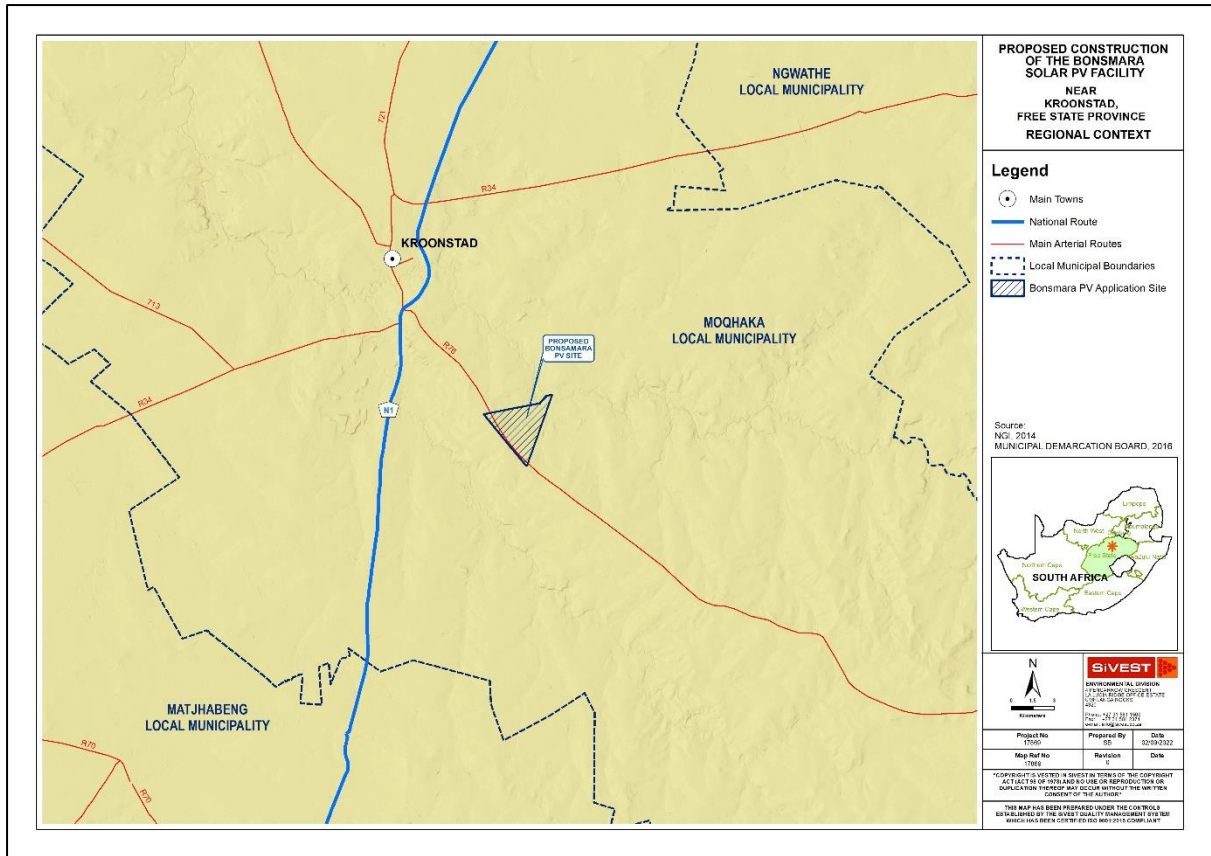
| Theme                                      | Sensitivity | Comment  |
|--|-------------|--|
| Animal Species Theme                       | Medium      | <p>The Terrestrial Ecological Report is included <b>Appendix 6</b> of the Draft EIA Report.</p> <p>The Animal Species Theme is Medium, associated with the Reptile <i>Smaug giganteus</i> (Sungazer) and Mammal Spotted Necked Otter (<i>Hydrictis maculicollis</i>). Site verification confirms that suitable habitat is present, however initial investigations did not identify Sungazer colonies within the footprint area and the most suitable habitat for Spotted Necked Otters is the Vals River, which is also outside of the proposed footprint.</p> |
| Aquatic Biodiversity Theme                 | Very High   | <p>The Surface Water Report is included in <b>Appendix 6</b> of the Draft EIA Report.</p> <p>Based on the DFFE Screening Tool, the site contains areas of very high sensitivity due to the presence of wetlands and a Strategic Water Resources Area. The remaining area within the development footprint is deemed to be of Low sensitivity.</p>  |
| Archaeological and Cultural Heritage Theme | Low         | <p>The Heritage Report is included in <b>Appendix 6</b> of the Draft EIA Report.</p> <p>No elements of high cultural landscape value have been identified within close proximity to the area proposed for development. No archaeological heritage resources of significance were identified as being impacted in the layout provided.</p>  |
| Avian Theme                                | Low         | <p>The Avifaunal Report is included in <b>Appendix 6</b> of the Draft EIA Report.</p> <p>The proposed solar project has the potential to be of low to medium sensitivity from an avifaunal point of view. Some of the priority bird species are not habitat bound to the area for nesting and/or foraging purposes</p>   |
| Civil Aviation (Solar PV) Theme            | Low         | The closest airport is the Kroonstad Airfield, located approximately 13 km from the site.  |
| Defence Theme                              | Low         | The entire site has a low sensitivity in terms of the defence theme. No further specialist study required.   |
| Landscape (Solar) Theme                    | Very High   | <p>The Visual Assessment is included in <b>Appendix 6</b> of the Draft EIA Report.</p> <p>The site sensitivity verification finds the site to be of high landscape sensitivity rather than very high as suggested by the Screening Tool.</p>   |
| Palaeontology Theme                        | Very High   | The Heritage Report is included in <b>Appendix 6</b> of the Draft EIA Report.  |

| Theme                          | Sensitivity | Comment  |
|--------------------------------|-------------|--|
|                                |             | The areas proposed for development are underlain by sediments of moderate to very high palaeontological sensitivity. No impacts to palaeontological resources are anticipated, however it is recommended that, due to the high palaeontological sensitivity of the development area, the attached Chance Fossil Finds procedure is implemented for the duration of construction activities.  |
| Plant Species Theme            | Low         | The Terrestrial Ecological Report is included <b>Appendix 6</b> of the Draft EIA Report.<br><br>The Plant Species Theme is Low with no flagged species of conservation concern.  |
| RFI Theme                      | Low         | The screening tool described the study area as low for the RFI theme. Correspondence with SARAO during the PPP will be undertaken to determine if they have any comments/requirements.   |
| Terrestrial Biodiversity Theme | Very High   | The Terrestrial Ecological Report is included <b>Appendix 6</b> of the Draft EIA Report.<br><br>The Terrestrial Biodiversity Theme is listed as Very High, with Ecological Support Area 1 & 2 (ESA) covering the site and broader surrounding area, as well as being adjacent to a private nature reserve.<br><br>The site visit and assessment confirmed that the vegetation is generally natural and thus the ESA 1 & 2 categorisation is feasible. Due to having a low conservation status, in conjunction with having an ESA rather than a CBA categorisation, the grassland habitat is deemed to have a moderate sensitivity status and would potentially provide a suitable footprint for the proposed activity. |

## 8. DESCRIPTION OF THE PHYSICAL ENVIRONMENT

### 8.1 Geographical

The proposed SEF is located approximately 12 km south-east of Kroonstad in the Moqhaka Local Municipality and the Fezile Dabi District, in the Free State Province. The regional context of the proposed application site is shown in **Figure 7** below.



**Figure 7: Regional context**

## 8.2 Land Use

The area surrounding the site is predominantly characterised by agricultural activities, small urban centres, infrastructure (roads and rail) and natural highveld grassland. Agriculture, mainly crop and cattle farming, is the predominant land use surrounding the site, with farmsteads interspersed throughout the area. National, regional and provincial roads crisscross the region, converging in Kroonstad. A railway line runs parallel to the R76 (regional road) to the south-west of the site. An existing 132 kV powerline traverses the site in a northeasterly – southwesterly direction. Refer to **Figure 8** below for a broad land cover classification.

The two farms that constitute the project site are undeveloped, covered in grasslands and small clusters of trees and used for grazing. The indigenous vegetation is mostly near natural to natural with transformed and cultivated patches more widespread in the area surrounding the proposed site. The topography is flat to gently undulating landscape supporting short grassland.

The land type across the site has a very high proportion of shallow, clay-rich soils predominantly of the Valsrivier soil form but including the Swartland, Mispah, Bonheim and Glenrosa soil forms as well as rock outcrops. These soils are all unsuitable for crop production due to their limited depth. The on-site soil investigation confirmed the dominance of these shallow, clay-rich soils across the site. The shallow soils have too little potential root volume and moisture reservoir to support viable cropping. This land is therefore only suitable for grazing.

Pictures of the typical site area are included in **Figures 9-12** with the existing powerlines in **Figure 13**.

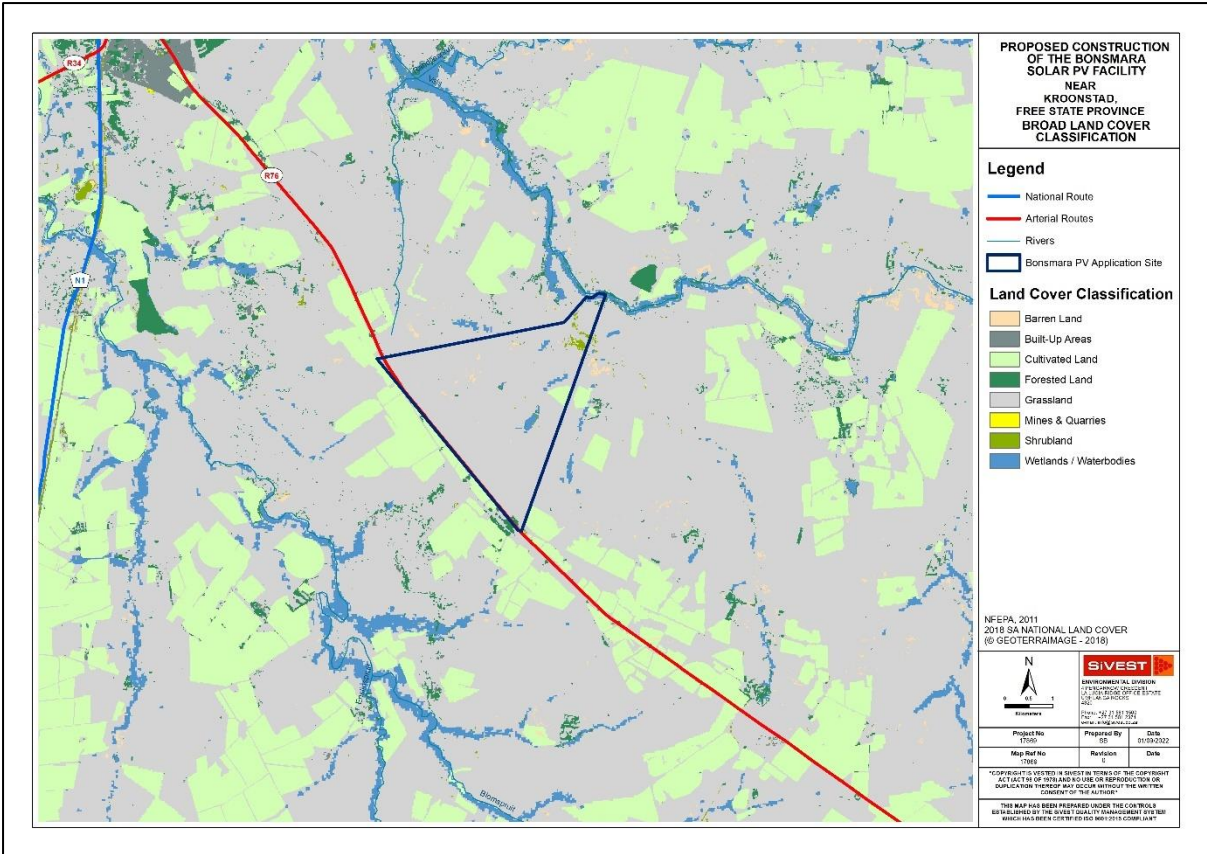


Figure 8: Land Cover Classification



Figure 9: Typical site area



Figure 10: Typical site area



Figure 11: Typical site area



Figure 12: Typical site area





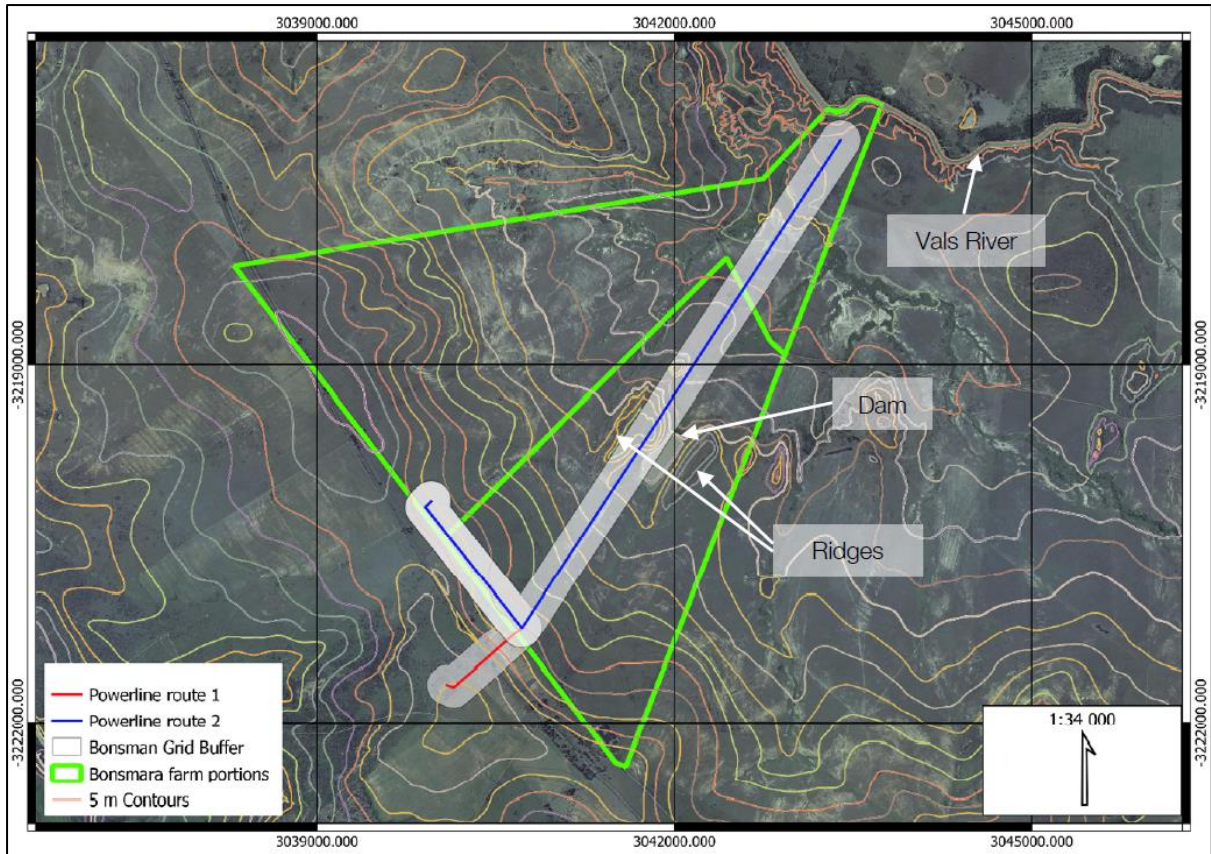
**Figure 13: Existing 132kV powerline extending across the site and over the R76**

### **8.3 Climate**

The area surrounding Kroonstad is considered to be a local steppe climate. There is little rainfall throughout the year. The area is considered to be a cold, semi-arid, climate. The average annual rainfall is 615 mm with the average temperatures of 17.4°C.

### **8.4 Topography**

The site is located on a relatively flat portion of land, on the crest of a hill, in a gently undulating landscape. The site topography slopes between 2° to 4° towards the northeast. Minor portions of the site have slope angles up to 10° adjacent to small ridges. The site exists between the elevations of 1350 m to 1435 m above mean sea level (AMSL). The undulations have caused surface water to congregate into the lower-lying valleys and formed erosion gullies and rills which occur throughout most of the site. The site drainage is expected to occur as sheetwash into the rills and gullies, becoming concentrated flow into the Vals River to the northeast of the site (**Figure 14**).



**Figure 14: Topography**

### 8.5 Desktop Geotechnical Assessment

A desktop geotechnical assessment was undertaken by Gage Consulting (report dated March 2023).

The assessment area is underlain by rock units of Beaufort Group of Karoo Supergroup and Klipriviersberg Group.

The topography over the assessment area (as discussed above) is generally flat and undulating terrain sloping between 2° to 4°. Minor portions of the site have slope angles up to 10° adjacent to small ridges. The site is underlain by alternating sandstone, mudstone and siltstone of Adelaide Subgroup, Beaufort Group, Karoo Supergroup. A portion of the eastern section of the site is underlain by porphyritic lava, amygdale-free and amygdaloidal lava of the Klipriviersberg Group forming part of the Ventersdorp Supergroup (**Figure 15**).



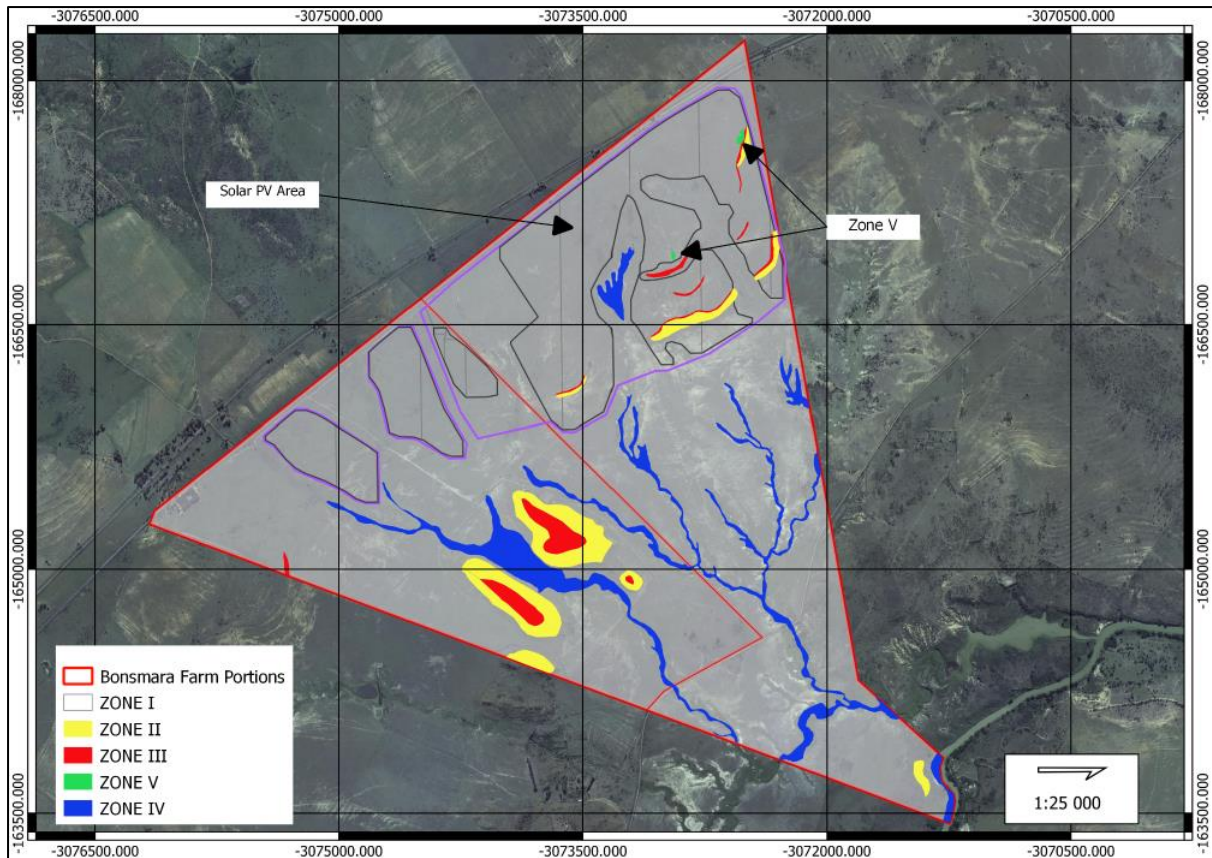
| Symbol | Age        | Sedimentary and Volcanic Rocks |                |           | Intrusive Rocks | Geological Unit Type           |
|--------|------------|--------------------------------|----------------|-----------|-----------------|--------------------------------|
|        |            | Supergroup                     | Group          | Formation |                 |                                |
|        | Quaternary | N/A                            |                |           |                 | Alluvium                       |
| Jd     | Jurassic   | -                              | -              | -         | Dykes / Sills   | Dolerite                       |
| Pa     | Permian    | Karoo                          | Beaufort       | Adelaide  | -               | Sandstone, mudstone, siltstone |
| Rk     | Randian    | Ventersdorp                    | Klipriversberg | -         | -               | Porphyritic lava               |

**Figure 15: Regional geology of the site**

The assessment area is considered suitable for the development of the proposed SEF and grid infrastructure, from a geotechnical viewpoint, provided that standard engineering design and construction measures are implemented to mitigate the identified geotechnical constraints. The anticipated geotechnical constraints and mitigation measures are summarised in **Table 12** below.

**Table 12: Summary of geotechnical conditions/constraints**

| Ground Unit | Shallow Geology                         | Geotechnical Conditions / Constraints  | Impacts on Engineering Design and Construction  |
|-------------|---|--|---|
| I           | Bedrock covered by transported material | <ul style="list-style-type: none"> <li>Sandy transported soil on surface</li> <li>Locally occurring, variably cemented ferricrete at depths between 0.50 m to 2.00 m BGL</li> <li>Residual soils sandy to clayey depending on underlying bedrock</li> <li>Possible, localised, low to medium expansive potential soil material at depth</li> <li>Localised shallow subsurface water seepage</li> </ul> | <ul style="list-style-type: none"> <li>Generally good founding conditions for structures at shallow depths</li> <li>Minor earth works required at founding level</li> <li>Conventional shallow foundations suitable</li> <li>Conventional subgrade preparation for roads</li> <li>Variable excavation conditions</li> <li>Pre-drilled holes, filled with G5 material required for ground mount PV system</li> </ul> |
| II          | Steep slopes (Talus on foot slopes)     | <ul style="list-style-type: none"> <li>Mass earthworks on gradients greater than 1:10</li> <li>Potentially unstable slopes</li> </ul>  | <ul style="list-style-type: none"> <li>Terracing and slope stabilisation required</li> </ul>  |
| III         | Outcropping / shallow bedrock           | <ul style="list-style-type: none"> <li>Hard excavation conditions</li> </ul>   | <ul style="list-style-type: none"> <li>Heavy plant machinery / pneumatic methods / required for excavations (pole planting earthworks / trenching / foundations)</li> <li>Good founding conditions for structures</li> <li>Overbreak is anticipated during trenching</li> </ul>   |
| IV          | Alluvium                                | <ul style="list-style-type: none"> <li>Loose sandy soils</li> <li>Potentially collapsible soils</li> <li>Moderate soil cover</li> <li>Moderate bedrock depth</li> <li>Increased erosion potential</li> <li>Deep erosion gullies and rills</li> </ul>   | <ul style="list-style-type: none"> <li>Deeper spread footings (found below alluvial sands)</li> <li>Soft excavation conditions becoming intermediate with depth</li> <li>Unstable trench sidewalls – shoring/battering required</li> <li>Erodible soils</li> <li>Surface drainage measures required to minimise risk of flooding and erosion</li> </ul>   |
| V           | Borrow Pits                             | <ul style="list-style-type: none"> <li>Existing borrow excavations</li> </ul>  | <ul style="list-style-type: none"> <li>Rehabilitation required</li> </ul>   |



**Figure 16: Geotechnical desktop zonation for solar PV facility**

No fatal flaws or ‘no-go’ areas have been identified that would render any assessment areas unsuitable from a geological and geotechnical perspective. No geologically or geotechnically sensitive areas were identified within or near the assessment area. It is recommended however that areas of steeper slope gradients are avoided when determining the final infrastructure layout.

The proposed developments are assessed to have a “Negative Low impact - the anticipated impact will have negligible negative effects and will require little to no mitigation” provided that the recommended mitigation measures are implemented. The remaining mitigation measures provided to minimise the impacts relate to the appropriate engineering design of earthworks and site drainage, erosion control and topsoil and spoil material management. These do not exceed civil engineering and construction best practice. It is recommended that the proposed activity be authorised.

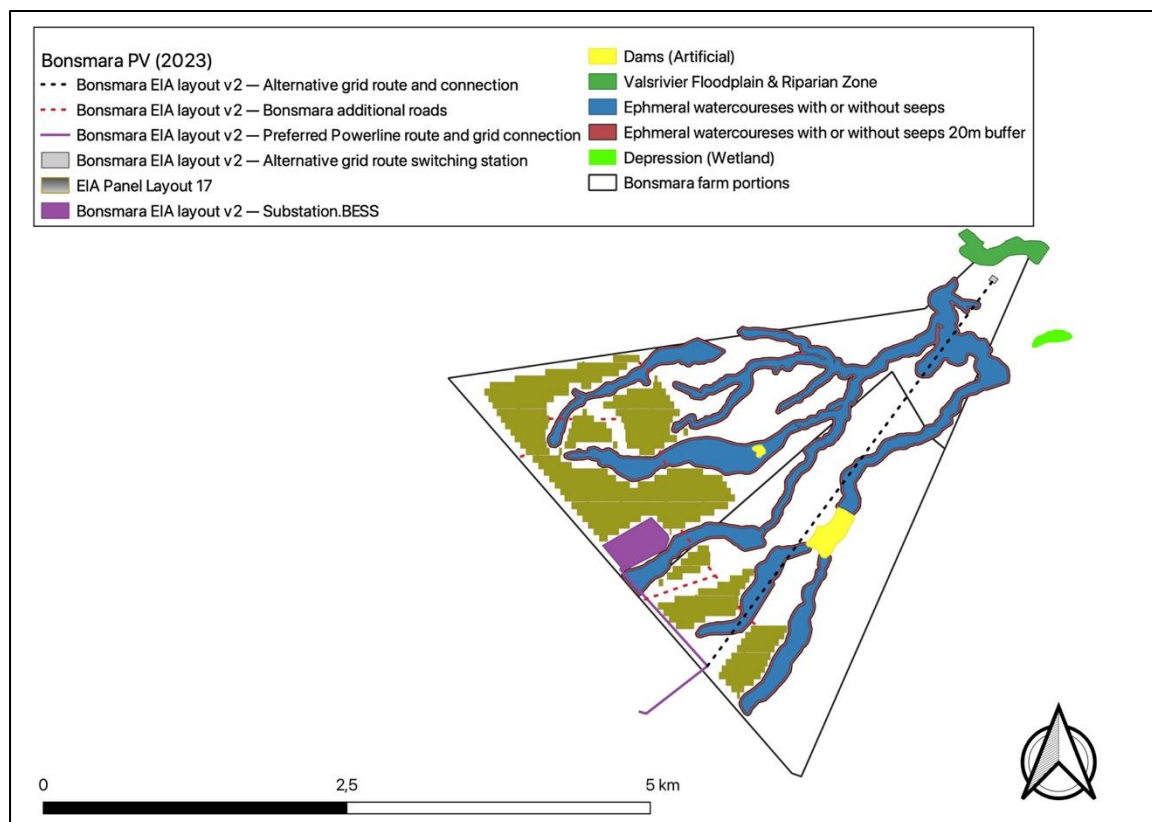
## 8.6 Aquatic/Freshwater Assessment

An Aquatic Ecological Study was undertaken by EnviroSci (report dated October 2022).

Four key aquatic habitats were observed and mapped and then rated based on their sensitivity to the proposed development (**Figure 17**). These habitats included:

- Mainstem river (Valsrivier) with riparian vegetation
- Ephemeral watercourse some with seepage areas but most with head-cuts and or erosion channels
- Depression wetland (ca. 1.4 km from the closest PV Panel Area)
- Artificial dams

The features listed above, drain the study area in a westerly region, forming part of the C60D Quinary Catchment, as these systems form part of the headwaters of the Valsrivier (Vals River), which flows beyond the site. A small portion of the PV panel area and grid (substation) falls within the C60F catchment of the Blomspruit, a tributary of the Vals River, however no watercourses associated with this catchment would be affected (situated on the catchment divide).



**Figure 17: Waterbodies delineated as part of the assessment**

### 8.6.1 Description of Receiving Environment

Present Ecological State and conservation importance – All of the systems assessed by DWS (2014) on a Sub quaternary level within the study area were rated as PES = D (SQ2473) or Largely Modified. The vegetation component scored particularly poorly due to the transformation of natural habitat and erosion.

Ecosystem services and functional importance: The assessment showed that the wetlands are highly important for the provisioning services such as water supply and agricultural uses. However, the wetlands scored poorly for the other ecosystem services assessed due to their degraded ecological state.

Aquatic Buffer Zones - Based then on the available information, the buffer model recommends a 20m buffer zone between wetland habitat and the activities. Refer to the table below:

**Table 13: Buffer zone requirements**

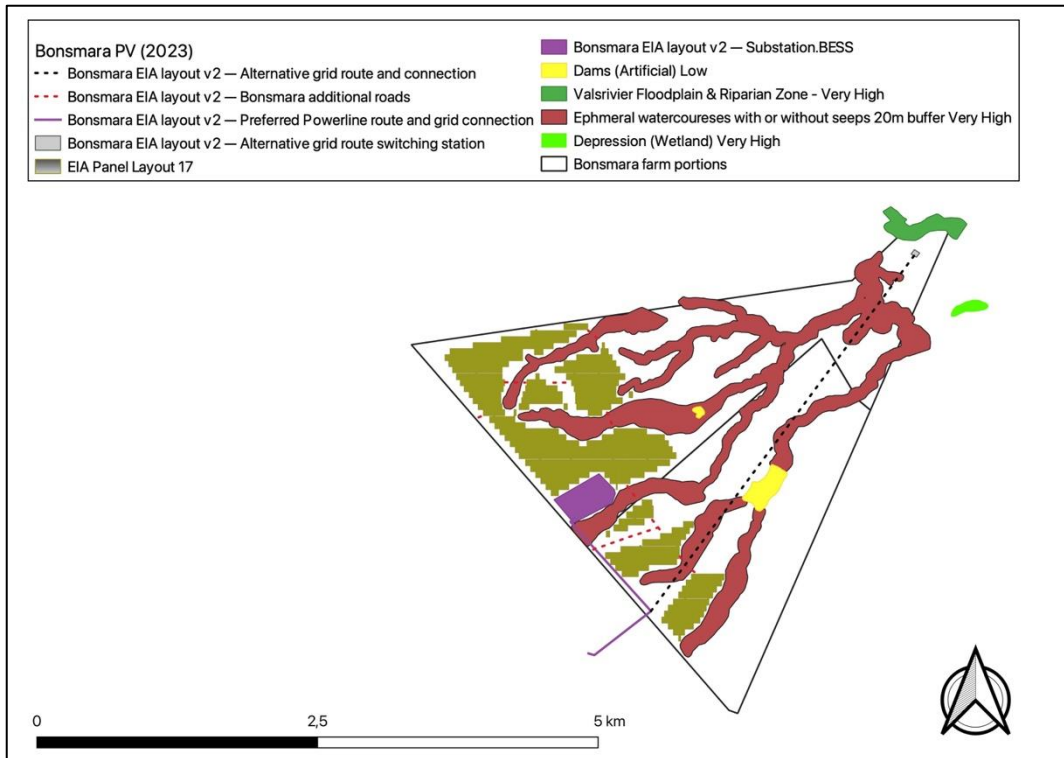
| Final aquatic impact buffer requirements (including practical management considerations) |           |
|--|-----------|
| Construction Phase   | 20        |
| Operational Phase  | 20        |
| <b>Final aquatic impact buffer requirement</b>   | <b>20</b> |

### 8.6.2 Sensitivity Categories

Using the baseline description and field data while considering the current disturbances and site characteristics, the features in **Figure 17** were identified, then categorized into one of a number of pre-determined sensitivity categories (**Table 14**) to provide, protect and/or guide the layout planning and design processes.

**Table 14: Species and habitat sensitivity rating definitions**

| Sensitivity Rating                    | Description   |
|---------------------------------------|---|
| <b>Very High (No Go)</b>              | Avoidance mitigation – no destructive development activities should be considered. Offset mitigation is not acceptable/not possible (i.e. last remaining populations of species, last remaining good condition patches of ecosystems/ unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains. |
| <b>High</b>                           | Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted; limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.  |
| <b>Medium</b>                         | Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.  |
| <b>Low</b>                            | Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.  |
| <b>Not sensitive (uncatergorised)</b> | Minimisation mitigation – development activities of medium to high impact are acceptable and restoration activities may not be required.  |



**Figure 18: Habitat Sensitivity map inclusion of aquatic habitats assessed**

### 8.6.3 Summary of Findings

The project overall has aligned the proposed footprint with the aquatic features, allowing for retention of much of the natural environment so that the systems should remain largely unaffected. Therefore, the PV site is such that it carries a low intensity impact on the aquatic resources. Some areas will require clearing, namely the associated roads and cables that may need to cross some of the aquatic systems.

The overall and cumulative impacts, as assessed, are linked to instances where complete avoidance was not possible, or the nature of the activities involve a potential risk to aquatic resources even at great distance. Overall, it is expected that the impact on the environment would be Low (-). Noteworthy areas, that have been avoided by the PV areas, include the Very High Sensitivity areas as shown in this report.

Based on the findings of this study, the specialist finds no reason to withhold an authorisation of any of the proposed activities, assuming that key mitigations measures are implemented, coupled with a micro-siting walkdown once all information is available.

## 8.7 Terrestrial Ecological Assessment

A Terrestrial Biodiversity Study was undertaken by Jamie Pote (report dated October 2022).

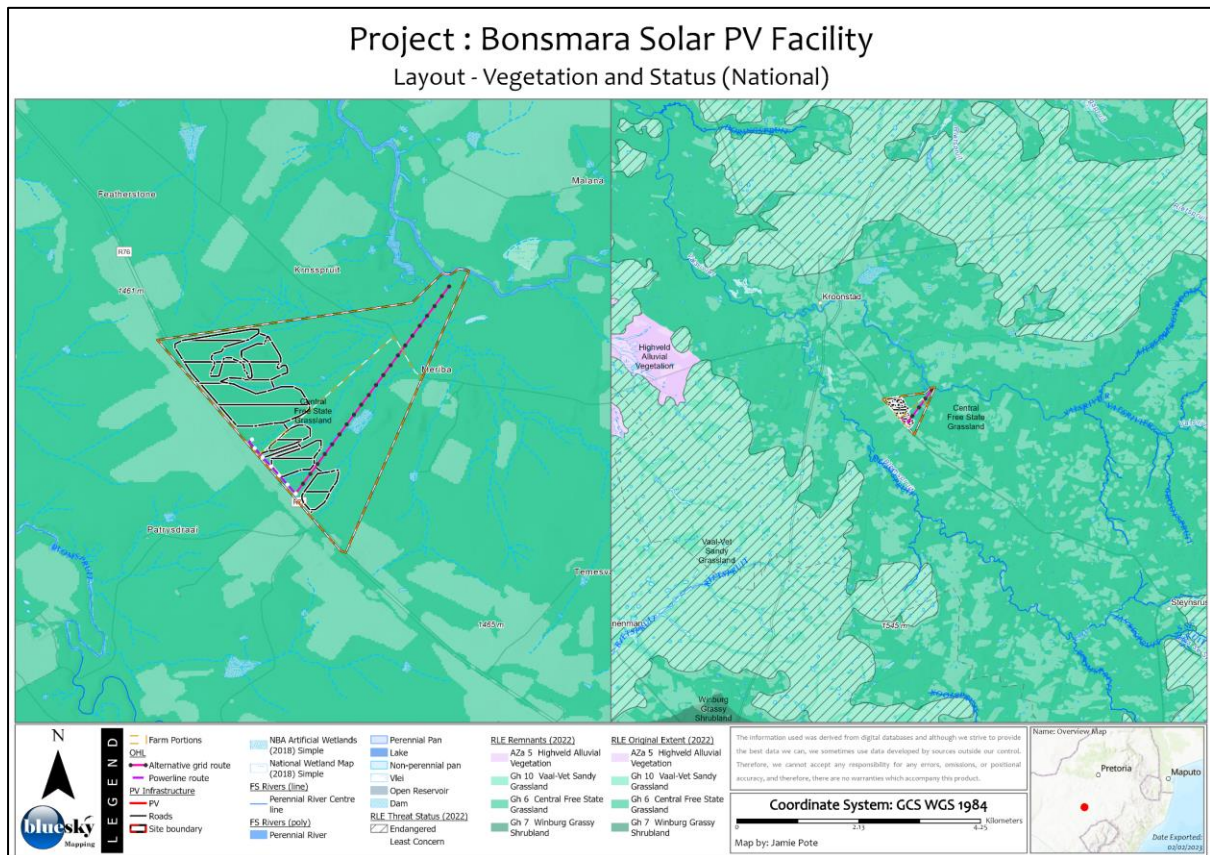
### 8.7.1 Systematic Planning Frameworks

A single vegetation unit is primarily affected by the proposed development. The site is located entirely within the Central Free State Grassland (having least concern conservation status) (**Figure 19**). Development of a portion of the site will thus not significantly affect conservation targets for the affected vegetation unit(s). Elements of Vaal-Vet Sandy Grassland (Endangered), Eastern Free State Sandy



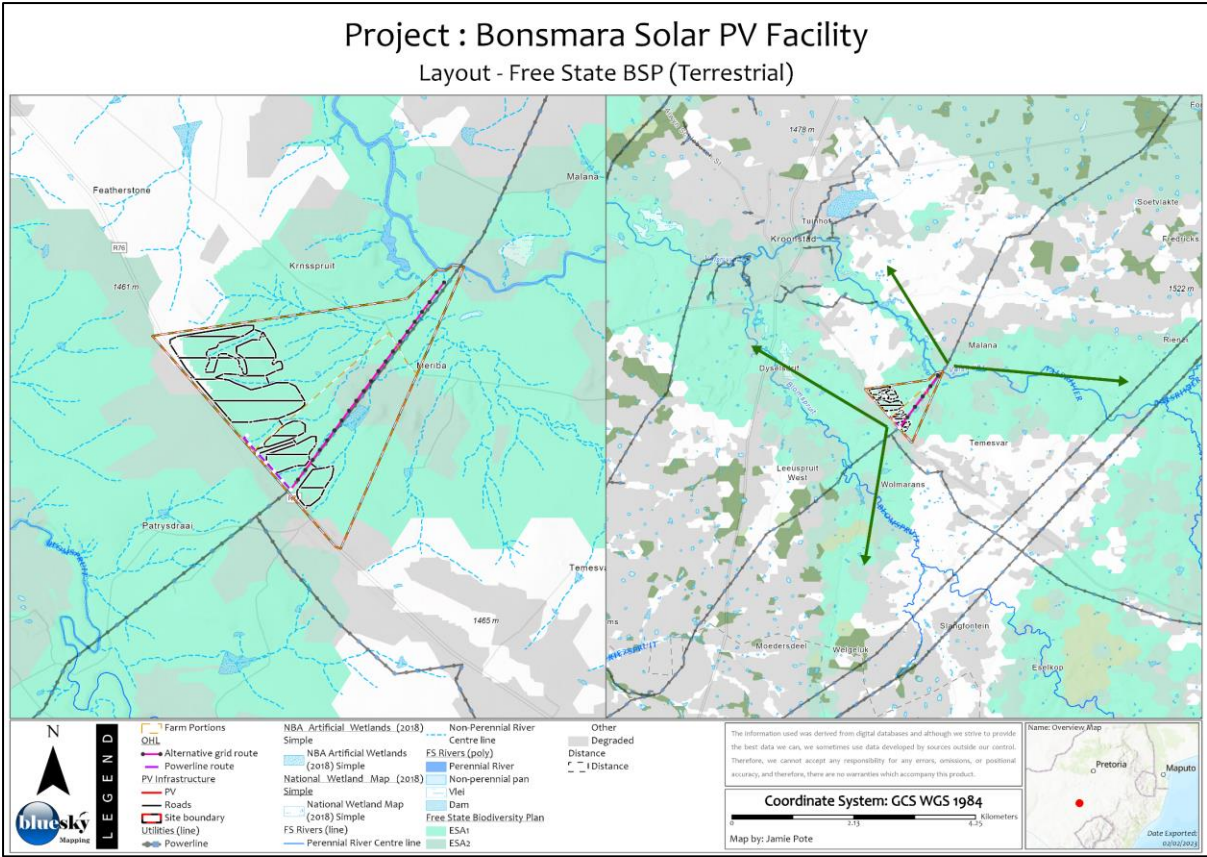
Grassland (Least Concern), and Winburg Grassy Shrubland (Least Concern) may be present on slopes and rocky hills or mesas. Highveld Alluvial Vegetation elements may be represented in alluvial or wetland areas.

As is evident from land-use coverages, the broader area surrounding the site is somewhat fragmented because of agriculture related land-use, including agriculture and urbanisation to the north. The specific site is relatively unmodified. Some erosion along watercourses and surrounding drainage lines is evident from aerial photographs supported by initial site observations, which could be indicative of historical overgrazing.



**Figure 19: Vegetation and Status (National)**

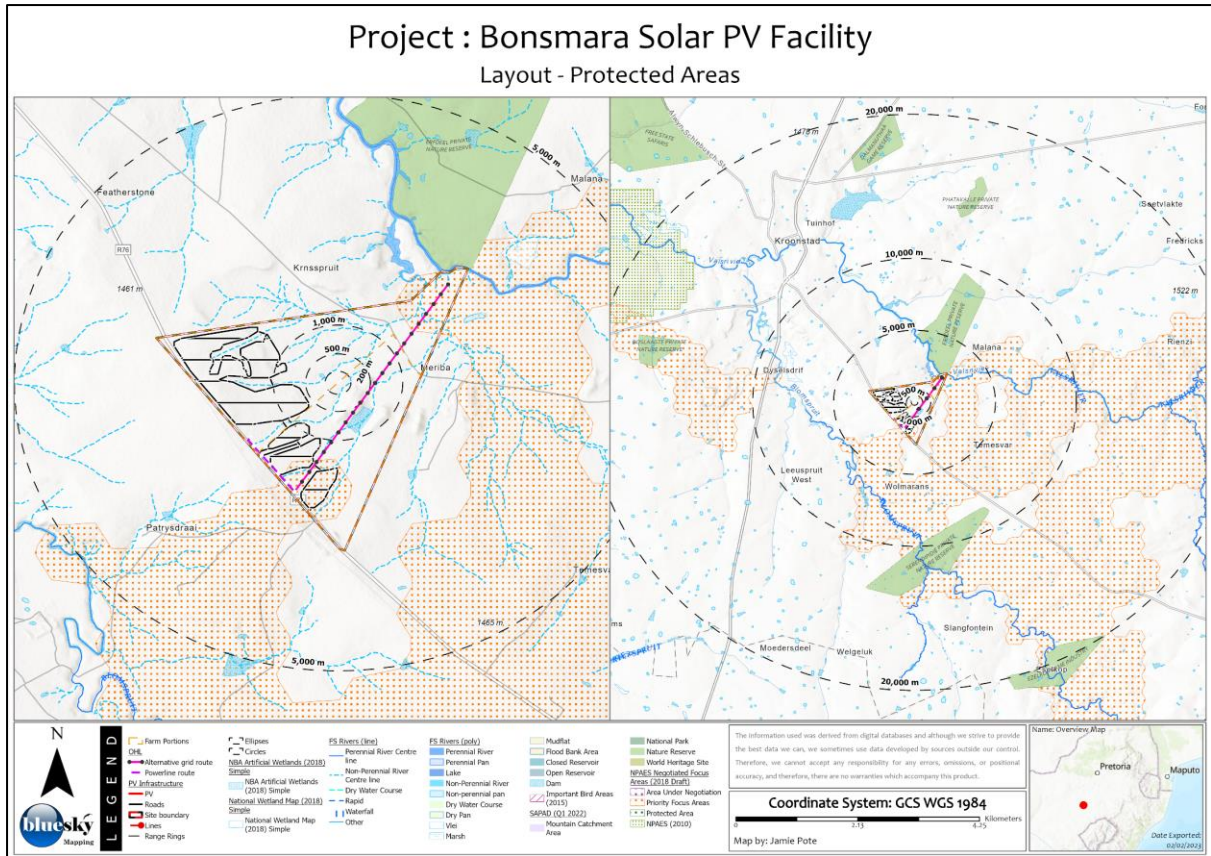
The site falls predominantly within an Ecological Support Area (ESA) 1 designated area, with patches of ESA 2, Other Natural Areas and Degraded Areas. No Critical Biodiversity Area (CBA) was located on the site (**Figure 19**).



**Figure 20: Free State Biodiversity Plan**

No National Parks are situated within 10 km of the site and a single Private nature Reserve is situated within 5 km of the site, the Erfdeel Private Nature Reserve which abuts the north-eastern boundary of the site.

Several other Private Nature Reserves are situated within the 5 km to 50 km range from the site. A portion of the site, on the southern boundary overlaps with designated NPAES. The next nearest NPAES is over 15 km to the north-west as well as several designated areas in the broader 20 – 50 km area (all designated as Freestate Highveld Grassland Focus Areas). The site is situated to the south-west of the nature reserve. No national protected areas, nor any ecological processes associated with them are likely to be affected by the proposed activity. No Marine Protected Areas or NPAES areas are directly or indirectly affected and no RAMSAR sites are affected directly or indirectly.



**Figure 21: Protected areas**

### 8.7.2 Baseline Biodiversity Description

The sites are within a predominantly commercial stock and game farming area, generally comprising dryland grazing, with associated infrastructure including buildings, dams, and other infrastructure. Indigenous vegetation is mostly near natural to natural with transformed and cultivated patches more widespread in the area surrounding the proposed site but absent within the site. The area falls within a moderate summer rainfall area.

#### Terrestrial Landscape Features

While largely grass dominated and typical of the Central Free State Grassland unit, a notable herbaceous and forbs component is evident, often patchy with several geophytes also noted, although not abundant. The broader area has low to moderate levels of transformation, primarily agriculture with small watercourses and occasional rocky hills interrupting the largely continuous grassland cover. Site verification confirms that the vegetation of the site is clearly grassland dominated, with a notable herbaceous component and the occasional tree. Watercourse sources (seeps) have a more developed tree component, mostly scattered *Vachellia (Acacia) karoo*, and does have Highveld Alluvial Vegetation elements present in riverine areas surrounding the watercourses as well as surrounding the Vals River.

The site is largely natural to near natural with some areas clearly showing indicators of degradation as well as localised erosion, mostly surrounding the incised watercourses within deep sandy alluvia, having a deep sandy substrate.

Grassland vegetation is comprised primarily of grasses including *Aristida adscensionis*, *Aristida congesta*, *Cynodon dactylon*, *Eragrostis chloromelas*, *Eragrostis curvula*, *Eragrostis plana*, *Panicum coloratum*, *Setaria sphacelata*, *Themeda triandra* and *Tragus koelerioides*. Low shrubs and herbs include *Felicia muricata*, *Anthospermum rigidum*, *Helichrysum dregeanum*, *Berkheya onopordifolia*, *Chamaesyce inaequilatera*, *Conyza pinnata*, *Hermannia depressa* and *Hibiscus pusillus*. Geophytic and Succulent species include *Oxalis depressa*, *Raphionacme dyeri* and *Tripteris aghillana*. Pockets of trees, having a bushveld appearance are also present, which are partly indicative of degradation, presence of rockier habitat and/or along watercourses or possible seep areas on upper watercourses. Typical tree species include *Vachellia karroo*, *Searsia dentata*, *Diospyros lycioides* and *Searsia rigida*.

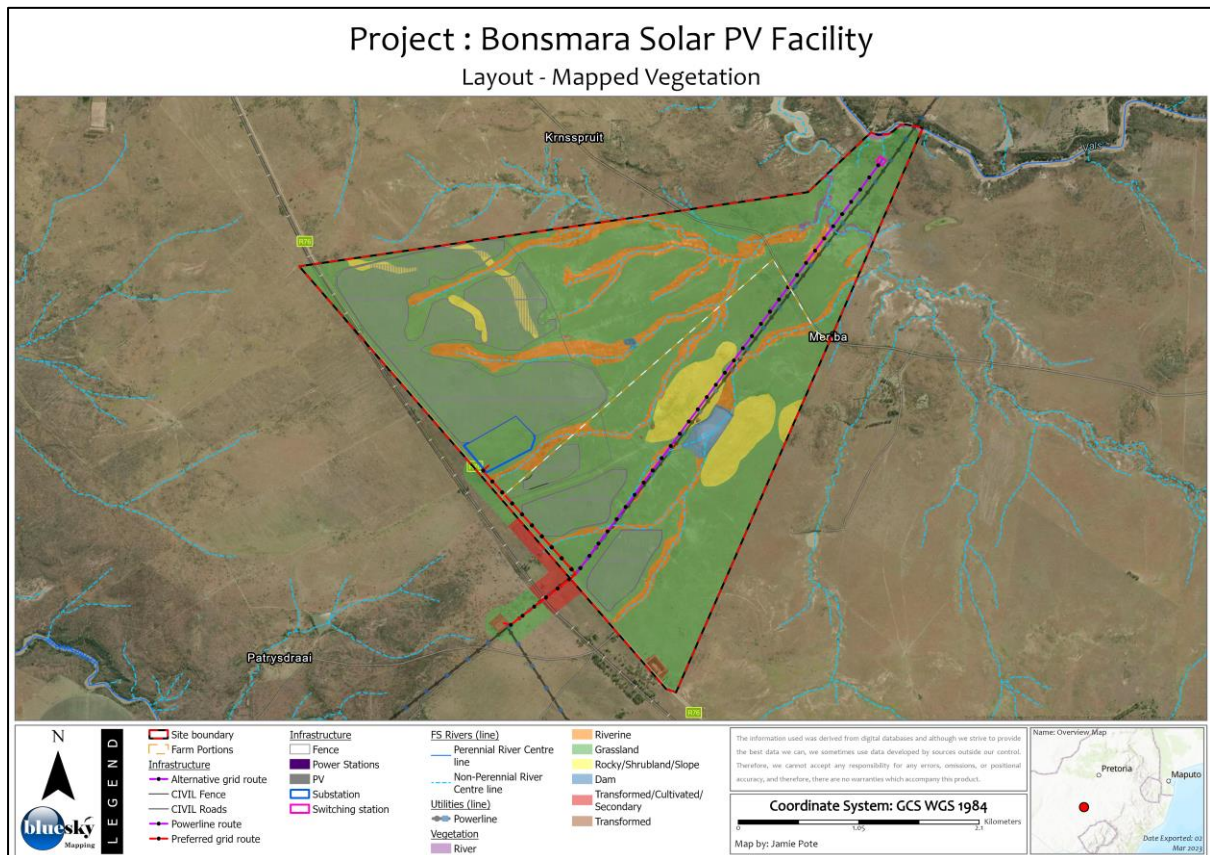


Figure 22: Mapped vegetation with sensitivity



Figure 23: Typical site vegetation – Natural grassland and typical rocky habitat

## Flora

No Vulnerable, Endangered or Critically Endangered flora species were confirmed to be present nor are known to be present in the affected area and no species are flagged in terms of the National Environmental Screening Tool, having distributions ranges that extend significantly further than the site.

## Fauna

The habitats and microhabitats present on the project site are not unique and although highly fragmented, are widespread in the broader area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to.

Mammals - The National Environmental Screening Tool identifies *Hydriectis maculicollis* (Spotted-necked Otter) as possibly occurring in the area. Preferred habitat for Spotted Necked Otter is standing or permanent water, thus it is not likely to pose any significant risk to the PV facility which is situated away from any such habitat. No permanent standing water sources likely to contain fish are present within or in close proximity to the site and all watercourses and drainage liens have been designated no go areas.

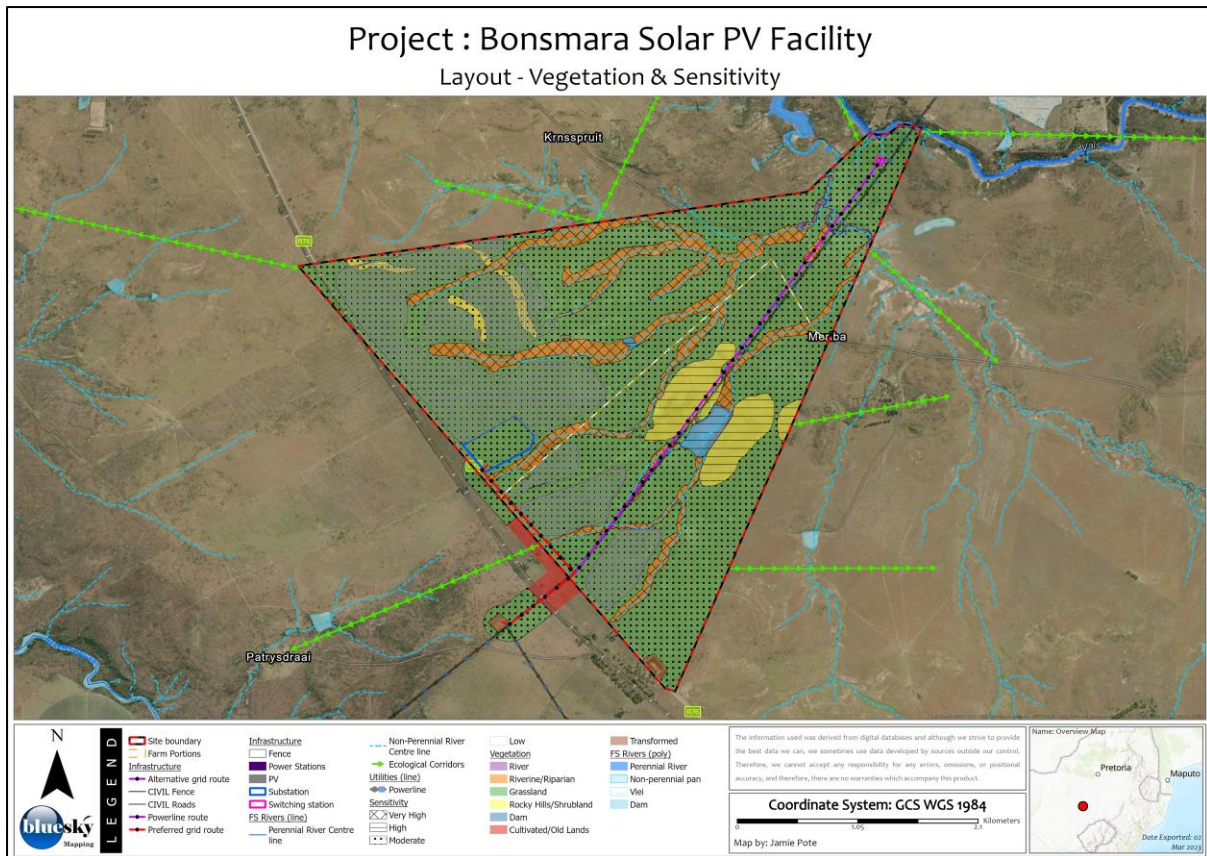
Reptiles - National Environmental Screening Tool identifies Sensitive Species 15, as possibly occurring in the area. No Sensitive Species 15 or evidence of the species was seen across the broader site and specifically the project footprint during the site survey (spring 2022 and summer 2023). Consultation with the landowner supports this observation and confirms that known localities are generally to the east and south of the project area.

### **8.7.3 Site Sensitivity**

The site sensitivity can be summarised as follows:

- Low sensitivity areas include all significantly disturbed vegetation, cultivated lands and other transformed land. All transformed areas including hardened surfaces, and dwelling have a low sensitivity.
- Moderate sensitivity sites include secondary vegetation identified in the vicinity of the activity. Moderate sensitivity habitat consists of all-natural grassland vegetation, having a Least Concern conservation status as well as being designated as ESA but not having an elevated CBA designation.
- High sensitivity areas include intact habitat having an elevated conservation status, providing critical habitat for species of conservation concern or overall elevated sensitivity where risks must be managed appropriately. High sensitivity habitat consists of man-made dams, rocky hills, that is less common in the surrounding landscape is present.
- Very High sensitivity terrestrial areas include habitat deemed to be critical habitat. Very high sensitivity habitat includes riverine and riparian habitat along watercourses, wetlands, and includes eroded areas adjacent to watercourses, which would be deemed sensitive to disturbance.
- No-go areas would include populations of threatened or protected species or areas providing critical ecological processes. Riverine areas would be considered no go areas, other than for strategic linear crossings including roads, powerlines and other such infrastructure.

A map showing the site sensitivities is included in **Figure 24** below.



**Figure 24: Vegetation and sensitivity**

### 8.7.4 Summary of Findings and Recommendations

The vegetation unit present, Central Free State Grassland, has a Least Concern status, indicating that less than 40% has been transformed regionally and there will likely be minimal loss or disruptions to ecological functioning. Development of a portion of the site will not significantly affect conservation targets for the affected vegetation unit(s), as long as at least 24 % (i.e. the conservation target) is retained.

The site is near several aquatic features or aquatic functional zones that traverse the property. The closest perennial rivers are the Vals River (Class C: Moderately Modified) to the north-east, along the north-eastern boundary of the site as well as the Blomspruit River situated further to the south and west of the site. The proposed activity is however unlikely to significantly affect these rivers (or wetlands & seeps) above surrounding levels of disturbance as long as they do not encroach into the remaining vegetation buffers around any watercourses and runoff is managed appropriately. Any aquatic, riverine or riparian habitat should be excluded from further development other than strategically sited linear activities such as access roads and powerlines.

The site falls predominantly within an ESA 1 designated area, with patches of ESA 2, Other Natural Areas and Degraded Areas. Some habitat loss is generally acceptable within these areas; however, ecological functioning and connectivity should not be compromised. Any development of the site should thus make allowances for ecological connectivity as a minimum.

No National Parks are situated within 10 km of the site and a single Private Nature Reserve is situated within 5 km of the site, the Erfdeel Private Nature Reserve which abuts the north-eastern boundary of

the site. A buffer would be recommended on the northern side of the site to incorporate an undeveloped buffer between any PV infrastructure and the Nature Reserve.

Some rocky areas are present, in particular a series of small hills situated surrounding the dam on Portion 1 of Farm Scheveningen 636. These have been excluded from the PV layout, other than grid connection alternative which will not have any significant impact. Steep slopes are generally not likely to be suitable for PV facilities.

No flora species of conservation concern with an elevated conservation status are flagged. Site survey determined that several Free State Nature Conservation Ordinance species are present, for which permits will be required. All of these species are generally widespread and not under threat.

Two faunal species of conservation concern are flagged in the screening. The Spotted Necked Otter is unlikely to be affected were it to be present, as its preferred habitat (standing water and adjacent riparian vegetation) is outside of the project footprint. Sensitive Species 15 could potentially be present but site sampling did not locate this species nor any evidence thereof within the project footprint. This correlates with known records which indicate the species is generally more prevalent to the east and south of the site. Should any be located during construction, relocation would be feasible.

Due to having a low conservation status, the grassland habitat is deemed to have a moderate sensitivity status and would provide a suitable footprint for the proposed activity, bearing in mind watercourse and ecological process and connectivity buffers which have been incorporated into the design to incorporate an undeveloped network for connectivity purposes within the site and the surrounding landscape, due to ESA designation.

All impacts are deemed to be medium before and low after mitigation.

The following is recommended:

- Natural vegetation does not have an elevated conservation status and is not designated a Critical Biodiversity Area status but rather an Ecological Support Area. This does not preclude for further development, as long as ecological connectivity and processes are accommodated, and further assessment will identify most suitable areas that would minimise biodiversity loss. As a minimum, the conservation target of the vegetation unit (24 %) should be retained across the site as well as a contiguous network with the site and the surrounding landscape as a corridor or series of viable ecological corridors, which is significantly exceeded.
- Watercourses, Riverine (Riparian) & Wetland areas, dams and rivers as well as rocky hills are not suitable and have been excluded from any development footprint other than for strategic infrastructure requirements including the grid connection powerlines.

## 8.8 Agricultural

An agricultural compliance statement and site sensitivity verification was undertaken by Johann Lanz (report dated 1 March 2023).

A map of the proposed development area overlaid on the screening tool sensitivity is given in **Figure 25** below. None of the land is classified as cropland and agricultural sensitivity is therefore purely a function of land capability. The land capability of the site on the screening tool is predominantly 6, but varies from 5 to 8. The small-scale differences in the modelled land capability across the project area are not very accurate or significant at this scale and are more a function of how the data is generated

by modelling, than actual meaningful differences in agricultural potential on the ground. On this site there is little real difference between low and medium agricultural sensitivity on the ground.

The entire site was verified in this assessment as being of medium sensitivity for impacts on agricultural resources with a land capability value of 6. The land was assessed as being of insufficient land capability for viable and sustainable future crop production. The cropping potential of the site is limited by the shallow soils which are limited by dense clay and weathered bedrock in the subsoil.

Two potential negative mechanisms of agricultural impact were identified, occupation of land, and soil erosion and degradation. Two positive mechanisms of agricultural impact were identified as increased financial security for farming operations, and improved security against stock theft and other crime. All of these are likely to have a low impact on future agricultural production potential and are therefore assessed as having low significance.

The conclusion of this assessment is that the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site. Instead, the development is an opportunity for a renewable energy facility to be integrated with agricultural production in a way that provides benefits to agriculture and leads to little loss of future agricultural production potential.

This is substantiated by the following points:

- The layout of the facility has been deliberately designed to include only land that was identified as having soil limitations that make it unsuitable for supporting viable and sustainable crop production. There is not a scarcity of such agricultural land in South Africa and it is therefore considered to be below the threshold for being prioritised for conservation as agricultural production land.
- The proposed development offers positive impact on agriculture by way of improved financial security for farming operations, as well as security benefits against stock theft and other crime.
- The PV panels will not totally exclude agricultural production. The area can still be used to graze sheep that will, in addition, be protected against stock theft within the security area of the facility.
- The loss of agricultural potential by occupation of land is not permanent. The land will become fully available again for agricultural production once the proposed activity ceases.
- The proposed development poses a low risk in terms of causing soil degradation, which can be adequately and fairly easily managed by standard, best practice mitigation management actions.
- The proposed development will also have the wider societal benefits of generating additional income and employment in the local economy.
- In addition, the proposed development will contribute to the country's urgent need for energy generation, particularly renewable energy that has much lower environmental and agricultural impact than existing, coal powered energy generation.
- All renewable energy development in South Africa decreases the need for coal power and thereby contributes to reducing the large agricultural impact that open cast coal mining has on highly productive agricultural land throughout the coal mining areas of the country.

The impact of the proposed development on the agricultural production capability of the site is assessed as being acceptable because of the above factors. Therefore, from an agricultural impact point of view, it is recommended that the development be approved.

The conclusion of this assessment on the acceptability of the proposed development and the recommendation for its approval is not subject to any conditions, other than recommended mitigation.





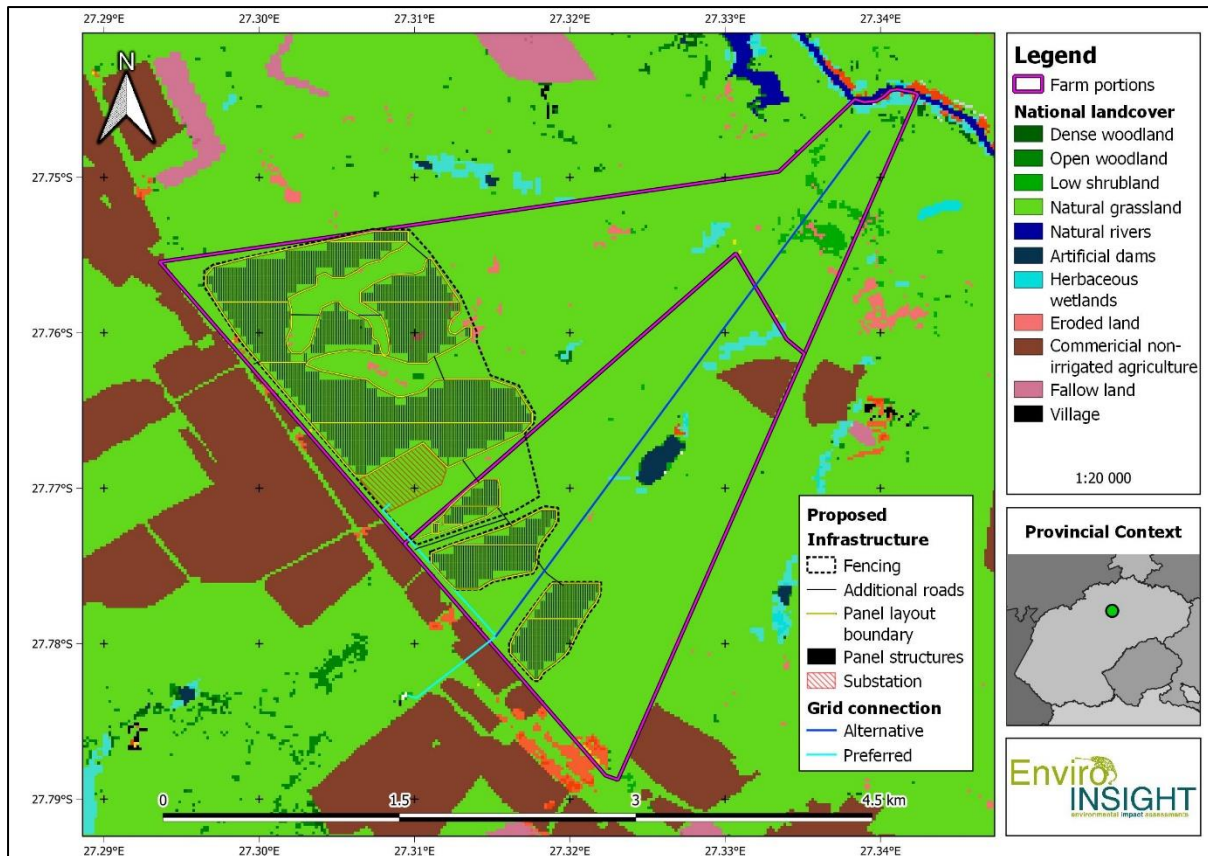
**Figure 25: Proposed development footprint overlaid on agricultural sensitivity (green=low sensitivity; yellow = medium, red = high)**

## 8.9 Avifauna

An Avifaunal Assessment was undertaken by Enviro Insight (report dated March 2023).

### 8.9.1 Description of major bird habitats

The overall habitat delineation as expressed in **Figure 26** below is more complex than the habitats described below. However, for the purposes of avifaunal monitoring, the monitoring can be confined to the below-described habitat types which will encompass all delineated habitats below.



**Figure 26: Habitat delineation of the project footprint**

Open grassland interspersed with woodland

The open grassland supports a mix of grassland, wetland and drought-tolerant grass species such as *Themeda triandra*, *Sporobolus sp.*, *Setaria sp.*, *Cynodon sp.*, *Aristida sp.*, *Eragrostis sp.*, *Digitaria sp.*, and *Heteropogon sp.* with various trees such as *Grewia sp.*, *Ziziphus sp.*, *Searsia sp.*, *Grewia sp.*, and *Senegalia sp.* interspersing the grassland habitats in low densities. The vegetation type is the most dominant type for the proposed project. Due to the vegetation type being the only habitat for the proposed study area, it is of medium sensitivity. This type of vegetation also supports many priority avifauna species expected within the study area such as large terrestrial bird species (Northern Black Korhaan), raptor species such as Black-winged Kite, Pale Chanting Goshawk and Black-chested Snake Eagle as well as the highest likelihood for Secretarybird.

Isolated small Rocky ridges “koppies”

The small rocky ridges found in and around the study area (**Figure 27**), differs in size and height but do not form extensive ridge systems and often form near isolated small “Koppies” as is typical of the habitat type. There are some relatively higher undulations to the south of the proposed project footprint. Although, no nests were found within the “koppies”, this vegetation type is of high sensitivity as it supports great habitat for different fauna and flora species found within the study area. These areas also support scattered large thorn bushes which could be ideal nesting habitat for raptors species such as Secretarybird. Although, no nests were found, it is important to protect these areas.



**Figure 27: Rocky ridges “koppies”**

#### Waterbodies

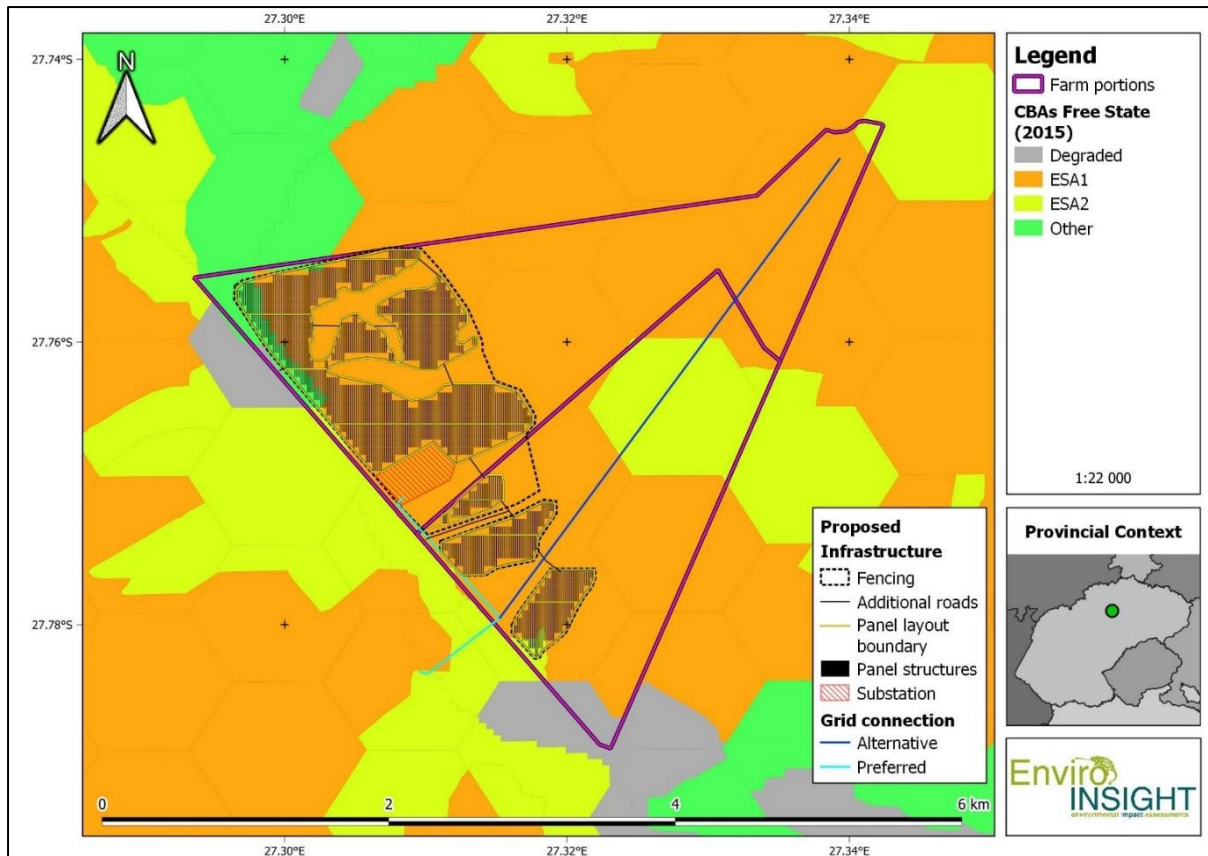
All the waterbodies found within the study area are man-made and mostly fills up after heavy rains. The main artificial waterbody impoundment situated within the study area is relatively large and has wisely been buffered from the infrastructure footprint. The smaller dams and water holes observed within the study area, did not support any waterbirds although large densities of small birds such as swifts congregated around some habitats still containing water from the excellent rains in 2022. Congregations around these habitats were primarily due to nesting habitat and a lack of standing water throughout the region during the survey period (providing a localised attractant). All waterbodies were observed during the wet season as well, so that the bird activity could be compared to the initial survey.

#### Drainage lines

The drainage lines throughout the project area were primarily herbaceous and dry with some structural differences to the surrounding Open Grasslands. Occasionally and in some localised locations, standing water still persisted within these habitats.

### **8.9.2 Critical Biodiversity Area (CBAs)**

A map of the study in relation to the 2016 Free State CBA's is presented in **Figure 28**, indicating that the study area is located mainly in ESA1 with a small portion in Other natural areas. This was supported by the field verification although this does not discount the habitats of higher sensitivity such as the Drainage Lines and Waterbodies.



**Figure 28: Critical Biodiversity Area**

### 8.9.3 Important Bird Areas

The proposed solar farm does not occur within an area of influence of any Important Bird and Biodiversity Area (IBA) with both the Willem Pretorius and Rooiberge Riemland reserves being situated more than 50 km and 75 km away respectively.

### 8.9.4 Expected and Observed Fauna

A relatively high diversity of 161 bird species for the area have been recorded within the 16 SABAP pentads in which the study area is situated. During the September 2022 site visit, a total of 79 species were recorded with an additional 32 species recorded during the January optimal wet season, totalling a total of 111.

### 8.9.5 Sensitivity

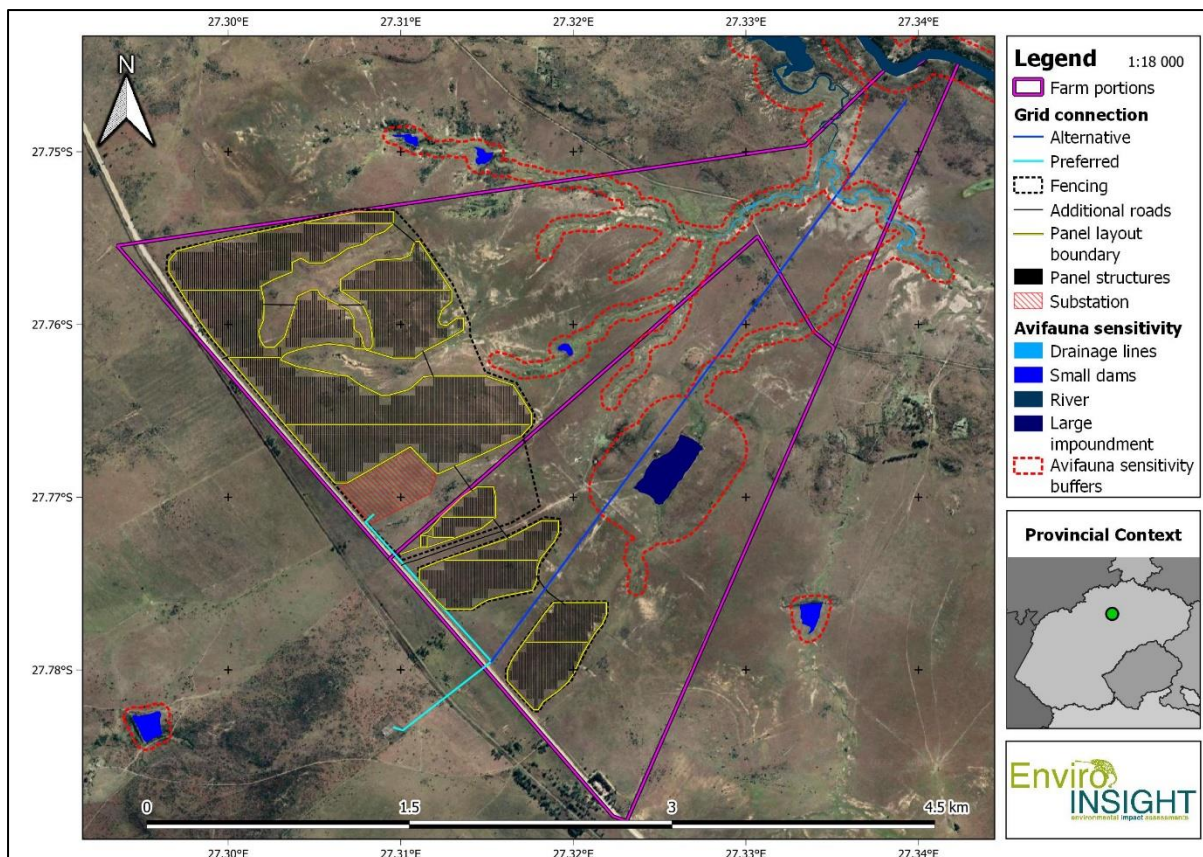
The study area is situated within the Central Free State Grassland vegetation type. The study area is not anticipated to support breeding populations of several large terrestrial bird species such as cranes, bustards and Red-Listed korhaans and large raptor species in sufficiently large densities or within breeding habitat that may be considered highly significant. However, given the size of the area, the proximity to a very large wetland impoundment and the large amount of herbaceous drainage line habitat within the project footprint, final conclusions must be subject to wet season verification under a Regime 2 survey. Thus, in order to confirm that the study area is of low sensitivity in terms of conservation of these type of bird species, a January 2023 survey was conducted as per the aforementioned methods.

The CBAs of the Free State designated that majority of the site falls within an ESA1. Avoidance mitigation could be applied wherever possible to project infrastructure design and limit the amount of habitat impacted.

A total of seventeen (17) priority species has the possibility of occurring within and around the study area, although only seven Red Listed species have been identified or highly likely and most are of moderate likelihood to occur within the project footprint and most will be irregular foraging visitors and not resident. The study area mostly consists of Open Grassland with some drainage line habitats found in parts of the proposed project footprint. The Grassland (including woodland permeations) and Koppie vegetation provides potential nesting habitat for bird species such as small Raptors, Larks, Pipits, Cisticola's and korhaan and possibly including hunting/foraging habitat for species such as Lanner Falcon, Secretary bird and other larger raptors. The woodland and ridge areas found within the project area consist of succulents and some large thorn bushes which might provide possible nesting and foraging habitat for species such as Chats and Prinia's, including sensitivity species such as the Secretarybird.

The site visit in September 2022 took place during the late dry season, which means the habitat conditions were at their least optimal. When conditions are sub-optimal, avifaunal assemblages will carry out small scale migrations to more ecologically productive habitats (such as permanent water courses) and return after the post rain green flush. Even the large artificial impoundment showed almost no significant bird activity, with expected species such as ducks, geese, stilts, stints, and plovers all but absent. However, the January 2023 Summer wet-season showed that within the drainage lines and impoundment areas, as well as the general grassland habitats, migratory patterns during summer and higher rainfall provided optimal foraging habitat for sensitive species with a possibility to occur on site such as Bustards, Storks, Waders, and a plethora of other priority species not observed during the two surveys. Accordingly, all watercourses are mapped as preliminarily sensitive and buffered at 50 metres with side of the edge of the habitat delineation (**Figure 29**).

There is an existing substation running along the southern border of the southern section of the study area. The associated powerline did not have any signs of priority bird species nests but could lead to possible nesting in the future for species such as Martial Eagle. The species abundance would be at its highest during and after the rainy season, as food resources increase more birds will fly in, including water associated bird species which will mostly be found at the larger dam north of the powerline study area.



**Figure 29: Avifauna sensitivity map**

### 8.9.6 Conclusions

The study area is situated within the Central Free State Grassland vegetation type. The study area is not anticipated to support breeding populations of several large terrestrial bird species such as cranes, bustards and Red-Listed korhaans and large raptor species in sufficiently large densities or within breeding habitat that may be considered highly significant. However, given the size of the area, the proximity to a very large wetland impoundment and the large amount of herbaceous drainage line habitat within the project footprint, final conclusions must be subject to wet season verification under a Regime 2 survey. Thus, in order to confirm that the study area is of low sensitivity in terms of conservation of these type of bird species, a January 2023 survey was conducted as per the aforementioned methods.

A total of seventeen (17) priority species has the possibility of occurring within and around the study area, although only seven Red Listed species have been identified as present or highly likely and most are of moderate likelihood to occur within the project footprint and most will be irregular foraging visitors and not resident.

The proposed solar project has the potential to be of low to medium sensitivity from an avifaunal point of view. Some of the priority bird species are not habitat bound to the area for nesting and/or foraging purposes and is therefore important to focus on some of the most significant cumulative impacts for the proposed solar project.

## 9. DESCRIPTION OF THE SOCIO- ECONOMIC ENVIRONMENT

### 9.1 Socio economic characteristics

A Socio-economic Impact Assessment was undertaken by Synergy Global Consulting (report dated February 2023).

The Free State is one of the nine provinces of South Africa. It represents 10.6% of the total land area of the country, with a total area of 130 041.5 km<sup>2</sup>, a population density of 21.8 people per km<sup>2</sup>, and a population of 2834 714. The educational levels in the Free State Province are low, with a 39.7 % matric completion rate and 68.6 % having completed Grade 9. The employment rate is 36%, with the rest of the population either unemployed (17%), discouraged job seekers (6%) or not economically employed (41%).

An estimated 4.8% (134,750) of the population in the Free State has no access to electricity, lower than the national rate of 7.29%. Approximately 74% have access to flush or chemical toilets, higher than the national rate (63.53%). On the other hand, 1.3% (36,831) have no access to any toilets in the province, which is about half the national rate of 2.39% (1,332,582). Water is provided to an estimated 94.2% (269,748) of the population by a regional or local service provider, which is approximately 10% higher than the rate in South Africa, at 86.2%. There are 946,637 formal households, less than 10% of South Africa's total of 16,923,307. An estimated 14% (132, 448) of households are informal dwellings (shacks), which is about 10% higher than the national rate of 12.96% (2,193,968).

The SEF facility will be located in the Fezile Dabi District Municipality (DM).

#### 9.1.1 Fezile Dabi District Municipality

The Fezile Dabi District Municipality is the smallest district in the province, making up 16% of its geographical area and consists of four local Municipalities. These include the following:

- Moqhaka Local Municipality;
- Metsimaholo Local Municipality;
- Ngwathe Local Municipality; and
- Mafube Local Municipality.

The main attraction, the Vredefort Dome, which is the third-largest meteorite site in the world, is located within the district, making it a tourist destination.

The vision of the municipality is to be a community-orientated entity characterised by a sound political and administrative capacity, with sustainable and enabling business environment. With the main challenges within the municipal area being poverty, and unemployment sitting at 46.03% (STATSSA 2011), this proposed project will contribute towards the creation of employment, and to some level of poverty reduction.

#### 9.1.2 Moqhaka Local Municipality

The SEF facility will be located in the Moqhaka Local Municipality. The Moqhaka LM is situated in the southern part of the Fezile Dabi DM. The former Kroonstad, Steynsrus, and Viljoenskroon Transitional Local Councils and sections of the Riemland, Kroonkop, and Koepel Transitional Rural Councils are

included in the Moqhaka Local Municipality. A large proportion of the rural population is active within the agricultural sector.

In terms of the socio-economic profile, the employment status of the district and local municipalities where the proposed Bonsmara SEF will be located is represented below.

**Table 15: Employment status in Fezile Dabi DM and Moqhaka LM**

| <b>Employment Status</b>         | <b>Fezile Dabi DM</b> | <b>Moqhaka LM</b> |
|----------------------------------|-----------------------|-------------------|
| <b>Employed</b>                  | 37%                   | 34%               |
| <b>Unemployed</b>                | 19%                   | 18%               |
| <b>Discouraged Job Seeker</b>    | 4%                    | 4%                |
| <b>Not Economically Employed</b> | 40%                   | 44%               |

A high percentage of the population within the Fezile Dabi DM is not employed, a trend reflected in Moqhaka Local Municipality.

The need for sustainable, clean energy supply, nationally, is also applicable in the Moqhaka municipal area. The Moqhaka LM IDP (2022-2027) notes that while 98% of households within the municipality have access to electricity, there is a need for the expansion of public lighting. The proposed SEF will contribute to the national grid, which, in turn, will add to the supply of electricity for communities across the country.

### 9.1.3 Key Findings and Recommendations

For the proposed project, the identified environmental and socio-economic benefits outweigh the negative environmental impacts, making the project beneficial, although this is subject to a comprehensive assessment of the impacts from the findings of the full impact assessment report.

From an environmental standpoint, it is determined that the adverse effects from the planning to the decommissioning stages are within acceptable parameters and can be adequately mitigated. The solar energy facility offers a cleaner, readily available, and cheaper energy source. Moreover, solar PV does not use water for electricity generation, so it has water-saving qualities. Although it might limit agricultural use of the site due to land occupation and degradation when the land is cleared to make room for the solar energy facilities, the development also provides an alternate source of revenue to agriculture. Agri-voltaic or dual solar projects, for instance, make use of solar PV plants to both produce energy and use the ground space beneath the panels for agricultural purposes. These projects have been launched in places like the Komati power station in Mpumalanga. This has the benefit of minimizing the negative effects of solar installations on agricultural land (Kamanzi, 2022).

This assessment's conclusion is that the project offers a chance to integrate a renewable energy facility with agricultural production in a way that improves agriculture and causes little loss of possible future agricultural productivity.

## 9.2 Cultural/Historical Environment

A Heritage Impact Assessment was undertaken by CTS Heritage (report dated February 2023).

The north-western portion of the footprint has camps that have been used historically for agricultural purposes. In some areas where cattle have aggregated for watering and feeding, the landscape is more heavily modified (trampled) which has impacted the archaeological potential of these areas



substantially. As a result of such disturbance, in these localities little of the original natural landscape - in terms of vegetation, geology and probably also archaeology – is visible today.

### 9.2.1 Cultural Landscape

According to the VIA completed for this project, “the basis for the visual character is provided by the topography, vegetation and land use of the area, which is a predominantly rural environment characterised by the undulating, vegetated landscape, albeit with pockets of settlements and regional and national roads routed through the surrounding area. The rolling expanse of vegetated landscape surrounding the site evokes a rural, undeveloped environment. The project area can therefore be defined as a modified rural landscape as it is mostly rural but settlements, powerlines and roads and railway are visible in the landscape

The visual quality of the area can be experienced through rolling views of the gentle hills in the landscape, especially from and across the site. The study area is defined by the fabric of the agricultural grazing activity taking place in the area. The naturally undulating landscape is intermittently interrupted by powerlines and railway lines which detract from the visual quality of the surrounding area. The streams, rivers and dams in the area add to the somewhat unspectacular visual quality.

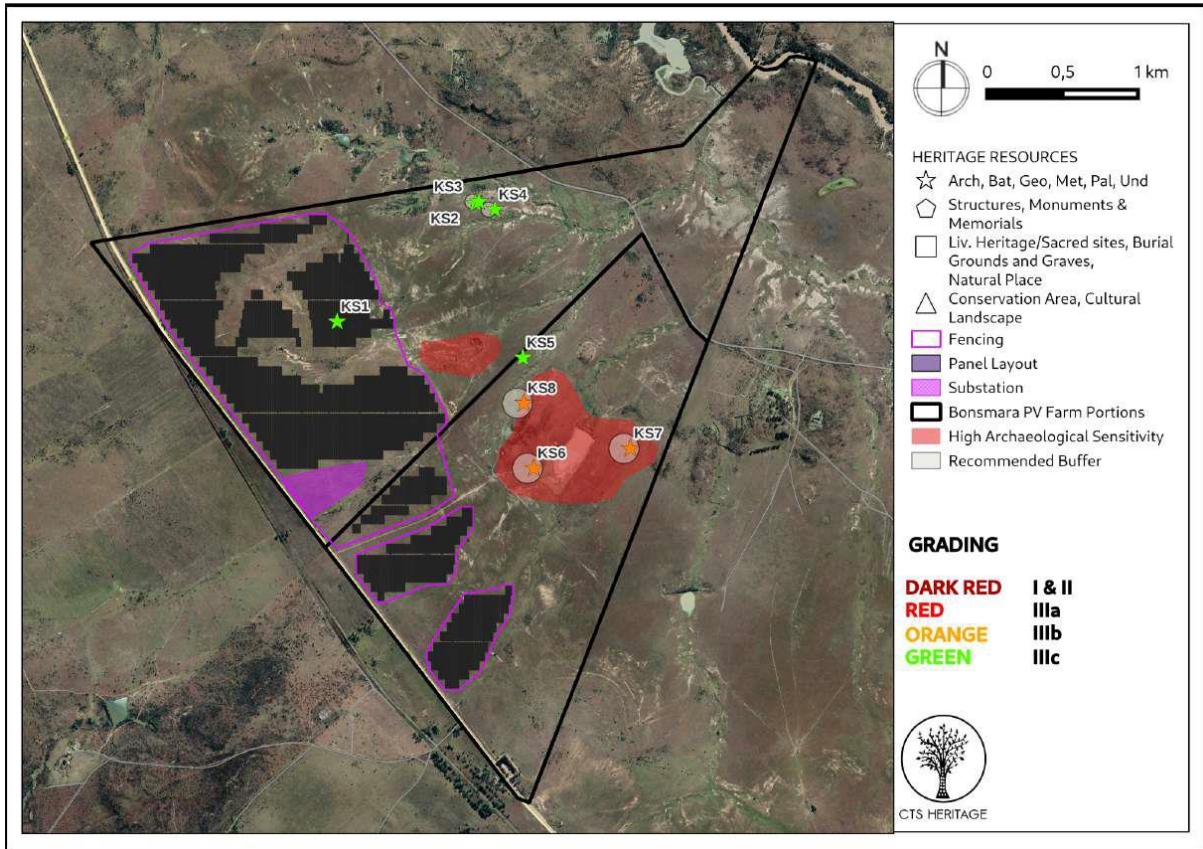
The region has scenic value in terms of its undulating natural landscape and the views over large portions of agricultural land. The natural landscape and rustic character contrast with the anthropogenic influence in the region, viz. urban development, albeit, some 12 km away. The sense of place of the surrounding area is strongly influenced by the surrounding land use, which can generally be described as a rural agricultural area.”

No elements of high cultural landscape value have been identified within close proximity to the area proposed for development. While dominated by agricultural activities, the naturally undulating landscape is intermittently interrupted by powerlines and railway lines which detract from the visual quality of the surrounding area.

### 9.2.2 Archaeology

Field assessment documented a number of stone artefact scatters in both primary and secondary contexts, located at lithic raw-material sources, in eroded river terraces and dongas, and in deflated open landscape settings. These sites suggest the area may have been traversed by Stone Age groups potentially through Pleistocene periods in both the Middle Stone Age and the later Early Stone Age. Holocene archaeology was largely not documented. The presence of substantial unworked artefact-quality raw-materials in the project area as well as relatively abundant standing water (including sedimentary evidence for active drainages in the past) were the resources that likely attracted groups there, and resulted in them leaving behavioural traces in the form of stone artefacts.

Field assessment of the footprint for the proposed development for the Bonsmara PV facility and associated grid infrastructure documented several stone artefact scatters in secondary contexts and also potential for archaeological material in primary - or close to primary - context that needs to be avoided (KS6, KS7 and KS8). Refer to **Figure 30** below. The koppies surrounding the modern pan in the south-eastern portion of the area should, in general, be completely avoided. This should not be an issue as the plans for development do not appear to encroach on the most sensitive (active) pan and koppies. The stone artefacts at KS2, KS3, KS4 and KS5 are ex-situ and occur in deflated contexts, whereas the denser ESA and MSA occupations of the koppies and associated pan margins (KS6, KS7 and KS8) need to be avoided. Refer to **Table 16** below for a list of the heritage resources identified within the development area.



**Figure 30: Map of heritage resources identified during archaeological and palaeontological field assessments**

**Table 16: Heritage resources known to be located within the development area**

| Site No. | Description  | Density | Co-ordinates    |                | Grading | Mitigation  |
|----------|--|---------|-----------------|----------------|---------|-------------|
| KS1      | Historical stone structures  | NA      | -27.76014296337 | 27.3097089584  | IIIC    | NA          |
| KS2      | Isolated Middle Stone Age core   | -1-2/m2 | -27.7530999854  | 27.31901396065 | IIIC    | NA          |
| KS3      | Middle Pleistocene scatter with MSA and ESA artefacts  | -3-6/m2 | -27.7530060242  | 27.3192510008  | IIIC    | 50m Buffer  |
| KS4      | Middle Pleistocene scatter with MSA blade production and bifacial tools                        | -3-6/m2 | -27.75347499176 | 27.3203409835  | IIIC    | 50m Buffer  |
| KS5      | Isolated Middle Stone Age core   | -3-6/m2 | -27.76228697039 | 27.32221199199 | IIIC    | NA          |
| KS6      | Dense ESA scatter. Very extensive with clear sub-surface deposit                               | -4-8/m2 | -27.76886701583 | 27.3229549638  | IIIB    | 100m Buffer |
| KS7      | ESA MSA site with partially submerged artefacts. Very extensive with clear sub-surface deposit | -3-6/m2 | -27.76768399402 | 27.3294500168  | IIIB    | 100m Buffer |
| KS8      | ESA site with large flake blanks. Very extensive with clear sub-surface deposit.               | -3-6/m2 | -27.76499197818 | 27.3222829867  | IIIB    | 100m Buffer |

No archaeological heritage resources of significance were identified as being impacted in the layout provided. Further, highly significant Early and Middle Stone Age open sites were identified within the property but are not impacted directly in the layout provided - KS6, KS7 and KS8. These sites are graded IIIB for their greater scientific value associated with their sub-surface and, likely in-situ, deposits. It is recommended that none of these sites be impacted by the development through the implementation of a 100m no-development buffer around these sites. Furthermore, areas of higher archaeological sensitivity have been identified around the koppies and the pan located within the broader development area. It is recommended that no development takes place within this identified area. The present layout assessed in this report does not impact on this archaeologically sensitive area.

### 9.2.3 Palaeontology

No fossiliferous outcrop was detected in the proposed development area. However, loose, fragmented and weathered tree fossils and well-preserved trace fossils were detected. The latter was probably brought in from nearby areas and placed near the homestead (now in ruins). However, the apparent rarity of well-preserved fossil heritage in the proposed development footprint suggests that the impact of the development will be of a Low significance in palaeontological terms. It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. The construction of the development may thus be permitted in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources.

No impacts to palaeontological resources are anticipated, however it is recommended that, due to the high palaeontological sensitivity of the development area, the attached Chance Fossil Finds procedure is implemented for the duration of construction activities.

### 9.3 Visual

A Visual Impact Assessment was undertaken by SRK Consulting (report dated March 2023).

### 9.3.1 Landscape Character

#### Land Use

The area surrounding the site is predominantly characterised by agricultural activities, small urban centres, infrastructure (roads and rail) and natural highveld grassland. Agriculture, mainly crop and cattle farming, is the predominant land use surrounding the site, with farmsteads interspersed throughout the area. National, regional and provincial roads criss-cross the region, converging in Kroonstad. A railway line runs parallel to the R76 (regional road) to the south-west of the site. An existing 132 kV powerline traverses the site in a north-easterly – south-westerly direction. The two farms that constitute the project site are undeveloped, covered in grasslands and small clusters of trees and used for grazing.

#### Visual Character

The basis for the visual character is provided by the topography, vegetation and land use of the area, which is a predominantly rural environment characterised by the undulating, vegetated landscape, albeit with pockets of settlements and regional and national roads routed through the surrounding area. The rolling expanse of vegetated landscape surrounding the site evokes a rural, undeveloped environment. The project area can therefore be defined as a modified rural landscape as it is mostly rural but settlements, powerlines and roads and railway are visible in the landscape.

#### Visual Quality

The visual quality of the area can be experienced through rolling views of the gentle hills in the landscape, especially from and across the site (**Figure 31**). The study area is defined by the fabric of the agricultural grazing activity taking place in the area. The naturally undulating landscape is intermittently interrupted by powerlines and railway lines which detract from the visual quality of the surrounding area. The streams, rivers and dams in the area add to the somewhat unspectacular visual quality.



**Figure 31: Rolling views of the undulating landscape**

## Visual Receptors

Visual receptors have been identified based on surrounding land uses, including the residential and recreational areas. The visual receptors are briefly described below and linked to viewpoints (VP) indicated in the table below:

- Surrounding residents (VP 1, VP 4 - VP 7, VP 11 - VP 12) - isolated farmsteads area interspersed throughout the area
- Railway Passengers and Personnel (VP 1 and VP 4 - A railway line extends parallel to the R76 to the south-west of the site.
- Motorists (VP 2 - VP 3, VP 6 - VP 12) - Two roads are located in close proximity to the project site; the R76 and the Unnamed Gravel Road. The south-western boundary of the site directly abuts the tarred R76, which extends in a north-westerly to south-easterly direction, connecting Kroonstad and Steynrus. The Unnamed Gravel Road branches off from the R76 to the north of the site, then extends in a south-easterly direction, and borders the site to the north-east.

**Table 17: Visibility from viewpoints**

| Viewpoint # | Location          | Co-ordinates                       | Direction of view  | Potential Receptors   | Visibility   |
|-------------|-------------------|------------------------------------|--------------------|---|--|
| VP 1        | Dennehof Farm     | 27° 49' 25.79"S<br>27° 22' 8.58"E  | Looking north-west | Farmsteads on Dennehof Farm and motorists on R76.   | <b>Not Visible</b><br>The site is visible from the farmstead and R76 due the undulating topography.  |
| VP 2        | R76 south         | 27° 47' 50.49"S<br>27° 19' 55.40"E | Looking north      | Motorists on R76.   | <b>Marginally Visible</b><br>The site is screened by tall, mature trees, limiting visibility of the site in the background from this VP.   |
| VP 3        | R76 Bonsmara      | 27° 46' 52.61"S<br>27° 18' 57.81"E | Looking north-east | Motorists on R76.   | <b>Highly Visible</b><br>The site is visible to motorists in the foreground.   |
| VP 4        | Patrijsdraai Farm | 27° 47' 7.95"S<br>27° 18' 59.98"E  | Looking north-east | Residents of farms to the west of the R76, e.g. Patrijsdraai and individuals travelling on the railway. | <b>Visible</b><br>The site is visible to motorists travelling to and from the farmsteads to the west and receptors travelling by train. The project will not be visible to the residents to the west of the site as they are located at a lower elevation than the site. |
| VP 5        | Farmstead 1       | 27° 45' 22.08"S<br>27° 15' 57.63"E | Looking south-east | Residents of Farmstead.   | <b>Not Visible</b><br>The site is not visible to the residents of this farmstead as it is located at a lower elevation than the site.  |
| VP 6        | Lan Crest         | 27° 44' 57.43"S<br>27° 15' 53.72"E | Looking south-east | Residents of Lan Crest and motorists.   | <b>Not Visible</b><br>The site is not visible to the residents or motorists as the farmstead and road are located at a lower elevation than the site   |
| VP 7        | Farmstead 2       | 27° 43' 25.46"S                    | Looking south      | Motorists travelling on the   | <b>Marginally Visible</b>  |

| Viewpoint # | Location            | Co-ordinates                             | Direction of view  | Potential Receptors  | Visibility  |
|-------------|---------------------|--|--------------------|--|---|
|             |                     | 27° 17'<br>26.58"E                       |                    | gravel road and residents of the farmstead in close proximity to VP 7. | The site is marginally visible to the farmstead in the background due to distance.  |
| VP 8        | Unnamed Gravel Road | 27° 44'<br>36.89"S<br>27° 18'<br>47.25"E | Looking south      | Motorists on unnamed gravel road.                                      | <b>Visible</b><br>The site is visible to the motorists in the background.   |
| VP 9        | Unnamed Gravel Road | 27° 45'<br>4.81"S<br>27° 19'<br>25.68"E  | Looking south-west | Motorists on unnamed gravel road                                       | <b>Visible</b><br>The site is visible to the motorists in the foreground.   |
| VP 10       | Unnamed Gravel Road | 27° 45'<br>16.95"S<br>27° 19'<br>50.77"E | Looking west       | Motorists on unnamed gravel road.                                      | <b>Visible</b><br>The site is visible to the motorists in the middleground and background.                                |
| VP 11       | Farmstead 3         | 27° 45'<br>43.29"S<br>27° 20'<br>27.21"E | Looking west       | Residents of the farmstead and motorists on unnamed gravel road.       | <b>Marginally Visible</b><br>The site will be marginally visible to the motorists in the background.                      |
| VP 12       | Farmstead 4         | 27° 43'<br>23.84"S<br>27° 20'<br>7.01"E  | Looking south-west | Residents of farmstead and motorists.                                  | <b>Not Visible</b><br>The site is not visible to the farmstead and motorists due to screening provided by the topography. |

### Sense of Place

The region has scenic value in terms of its undulating natural landscape and the views over large portions of agricultural land. The natural landscape and rustic character contrast with the anthropogenic influence in the region, viz. urban development, albeit, some 12 km away. The sense of place of the surrounding area is strongly influenced by the surrounding land use, which can generally be described as a rural agricultural area. The sense of place is not particularly distinct from the rest of the wider region and is not overly memorable.

### 9.3.2 Analysis of magnitude of the visual impact

#### Visual exposure

It is anticipated that visibility of the PV array will be moderate due to the size and nature of the project (i.e. a large ~326 ha reflective PV array located in a rural area). It is anticipated that the BESS and on-site substation will be visible to receptors to the north-west, south-east and west of the site due to the location of this infrastructure along the south-western boundary of the site. The smaller dimensions of these components are expected to limit their visibility from across the site to the north.

The viewshed analysis shows the proposed PV array will be highly visible from R76 to transient motorists, and visible from elevated areas to the north-east, east and south of the site. Few of the isolated farmsteads surrounding the site are located within areas identified as having visibility of the site. Motorists on the northern section of the R76 approaching the site will have a view of the project.

The site will be screened to motorists approaching the site from the southern section of the R76, due to undulating topography.

The visual exposure of proposed infrastructure is thus deemed moderate.

#### Visual Absorption Capacity (VAC)

Generally rural areas have a lower VAC, however the VAC of the project area is marginally increased by undulating topography and - to a far more limited extent - by grassland (veld) and small clusters of trees, providing screening to the project. The low vertical profile of the PV panels is anticipated to increase the screening potential of the vegetation and topography. However, vegetation is not able to provide screening to the associated infrastructure such as the substation and pylons (associated with the powerline). The undulating topography will marginally absorb the associated infrastructure.

Urban development can help to increase VAC, but is some distance from the project site, reducing this effect. In addition, the large ~326 ha footprint of the PV array also reduces the VAC.

The study area has a low VAC for the PV Facility.

#### Sensitivity of Visual Receptors

The sensitivity of the visual receptors potentially affected by the visual impact of the project is considered to be moderate due to the distance from farmsteads, and proximity to roads and rail infrastructure. It is anticipated that the visual receptors will be more sensitive to the PV array, on-site substation and BESS.

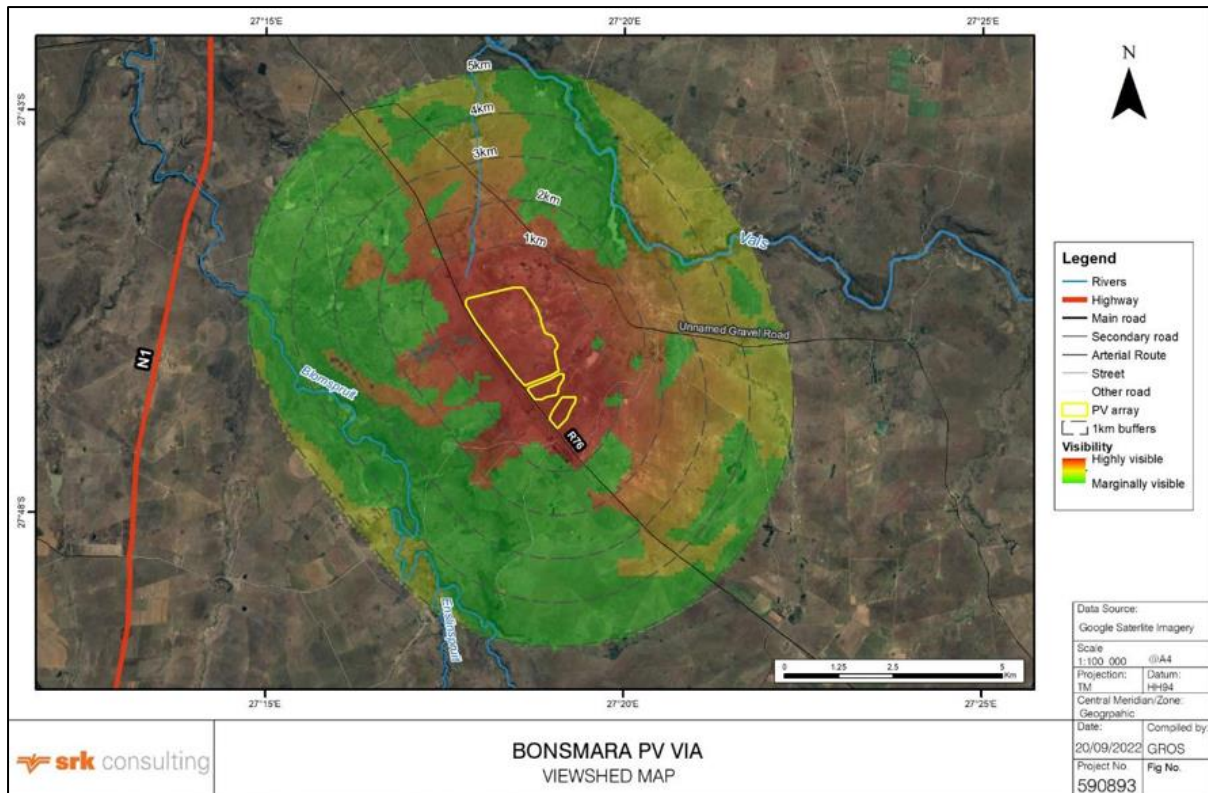
#### Viewing Distance and Visibility

A number of viewpoints were selected to indicate locations from where receptors may (or may not) view the project. The viewpoints are described in **Table 16** above and show in **Figure 32** below.

The visibility of the project can be summarised as follows:

- The project will be highly visible in the foreground to motorists travelling to the west of the site (VP 3);
- The project is visible to motorists, railway passengers and residents of farmsteads to the east and west of the site (VP 4, VP 8, VP 9, VP 10);
- The project will be only marginally visible due to distance and / or screening by vegetation to residents located- and motorists travelling- to the north, east and south of the site (VP 2, VP 7, VP 11); and
- The project will not be visible to surrounding residents and motorists over 3 km from the site largely due to intervening topography screening the site (VP 1, VP 5, VP 6, VP 12).

Overall, the visibility of the project is moderate due to the number of receptors in the foreground and middle ground, albeit transient and temporary receptors.



**Figure 32: Viewpoints Map**

Combability with Landscape Integrity

The proposed PV array will introduce a large, uniform, reflective facility into the area and will be discordant with the current land use, scale and texture of the surrounding area. The BESS will also introduce a novel structure into the landscape that is different and incongruent to the type, size and scale of the existing land use and development in the area. However, the on-site substation will be moderately consistent and congruent with the use, texture, size and form of existing infrastructure and land use surrounding the site.

The project is deemed to have low integrity with the surrounding landscape.

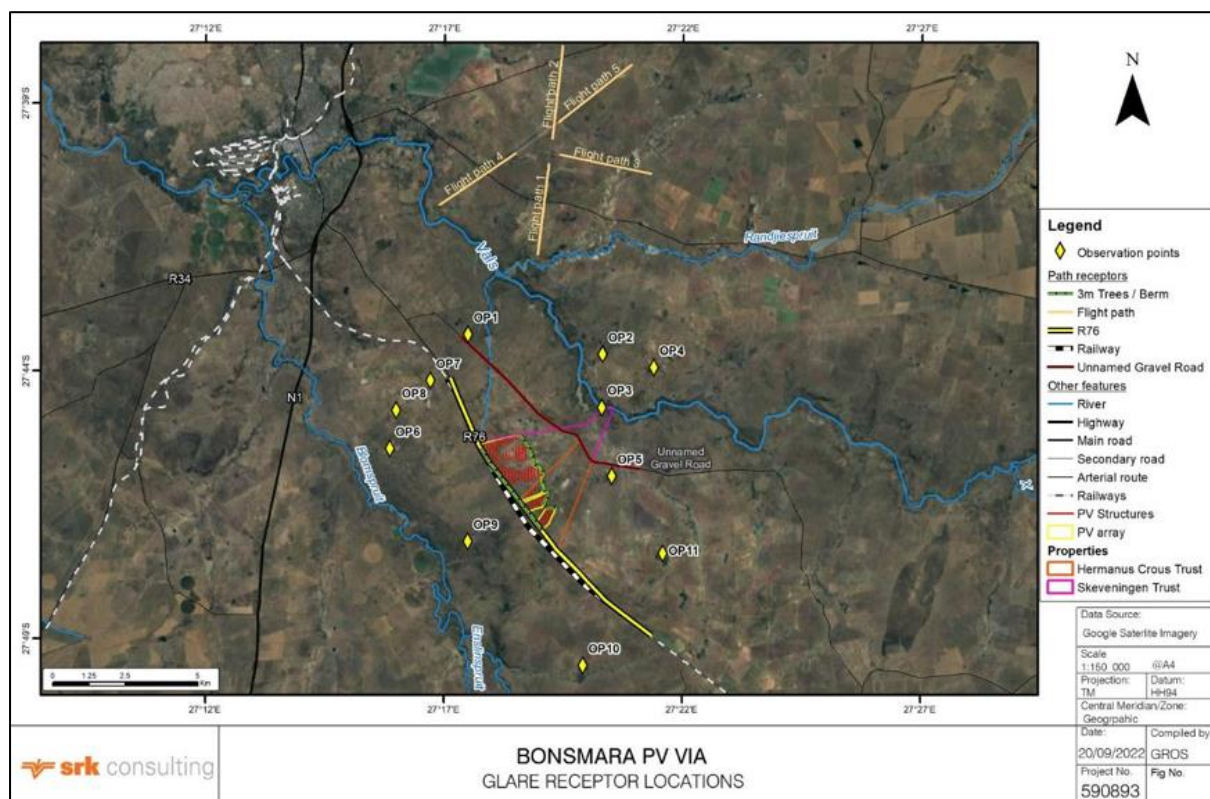
Solar Reflection

Visual receptors potentially exposed to solar reflection by this project are residents, railway passengers and personnel, and motorists. Glare modelling was conducted for the proposed layout of the PV array. Eleven observation points representative of the isolated farmsteads around the site were modelled to ascertain whether glare would be experienced by receptors (residents) in these locations, see **Figure 33** below.

The viewshed (**Figure 32**) indicates that farmsteads located to the north, east and south may have visibility of the PV facility, and as such, these receptors are susceptible to glare. To the north-west, the receptors are located further away (> 3 km) from the site and are not expected to have a view of the PV facility due to screening from intervening topography - this was verified during the site visit. Therefore, these receptors will not experience glare, but were nevertheless included in the model.



Glare experienced by motorists on the R76 and Unnamed Gravel Road was modelled in both directions (two-way road). The railway to the west of the site and the flight approach paths to the Kroonstad Airport to the north of the site were also modelled.



**Figure 33: Glare receptor locations**

The glare analysis demonstrated that glare from the PV facilities, will be experienced by visual receptors.

- OP 3 will experience < 25 minutes of glare per day between 17h00 and 18h30 between mid October and mid- February;
- OP 5 will experience < 25 minutes of glare per day between 17h00 and 18h30 between September and April;
- Motorists on the ~ 3.5 km section of the R76 directly adjacent to the PV facility will experience glare between 06h00 and 08h00 between September and April. The duration of exposure depends on the speed of travel: at 100 km/h a period of ~2 minutes is projected;
- Motorists on a ~500 m section of the Unnamed Gravel Road will experience glare between 17h00 and 19h00 between September and April. The duration of exposure depends on the speed of travel: at 50 km/h a period of ~40 seconds is projected; and
- Rail staff and passengers travelling along the ~ 3.5 km section of railway adjacent to the PV facility will experience glare between 06h00 and 08h00 between September and April. The duration of exposure depends on the speed of travel: at 80 km/h a period of ~2.5 minutes is projected.

According to the glare model report, OP 4 would experience < 30 minutes of glare per day between 17h00 and 18h00 between November and January and OP 6 would experience < 25 minutes of glare per day between 06h00 and 07h30 between September and April. However, groundtruthing on site

indicates that these OPs do not have a view of the project site due to intervening topography and vegetation.

Magnitude of Overall Visual Impact

The overall magnitude of the visual impact that is expected to result from the project is rated as moderate. The moderate visual exposure, low compatibility with landscape integrity and low VAC (for the PV Facility) are moderated by the moderate viewer sensitivity and viewing distance, with the project largely screened by vegetation and / or landscape to residents of the surrounding farmsteads.

**Table 18: Magnitude of overall visual impact**

| Criteria                        | Rating            | Comments  |
|---------------------------------|-------------------|---|
| Visual Exposure (Viewshed)      | Moderate          | The project area will be highly visible from the few elevated areas to the north-east, east and south-east of the site. The site will not be visible to the few of the isolated farmsteads surrounding the site. Motorists on the R76 will have a view of the site when travelling adjacent to the south-western boundary of the site, however beyond this portion of the R76 motorists will have limited visibility.   |
| Visual Absorption Capacity      | Low (PV Facility) | The VAC of the area is marginally increased by the undulating topography, and – to a far more limited extent – by the grassland (veld) and small clusters of trees, providing screening to the project. The low vertical profile of the PV panels is anticipated to increase the screening potential of the vegetation and topography. However, the vegetation is not able to provide screening to the associated infrastructure such as the substation and pylons. The undulating topography will marginally absorb the associated infrastructure.                             |
| Viewer Sensitivity (Receptors)  | Moderate          | Due to the distance of the project from farmsteads (moderately sensitive receptors) and the proximity to roads and rail infrastructure, viewer sensitivity is considered moderate. It is anticipated that the visual receptors will be more sensitive to the PV array, on-site substation and BESS than the proposed powerline due to their (familiarity with) existing powerlines in the landscape.  |
| Viewing Distance and Visibility | Moderate          | A number of receptors in the foreground and middleground are affected.  |
| Landscape Integrity             | Low               | The proposed PV array will introduce a large, uniform, reflective facility into the area and will be discordant with the current land use, scale and texture of the surrounding area. The BESS will also introduce a novel structure into the landscape that is different and incongruent to the type, size and scale of the existing land use and development in the area. The on-site substation and proposed 132 kV powerline will be moderately consistent and congruent with the use, texture, size and form of existing infrastructure and land use surrounding the site. |

| Criteria         | Rating   | Comments  |
|------------------|----------|---|
| Solar Reflection | Moderate | Two Ops to the east of the site, motorists on R76 and the Unnamed Gravel Road and the Rail staff and passengers will experience glare from the PV facility. No OP will be exposed to > 30 minutes of glare per day, although all Ops will experience >30 hours of glare per year. |

### 9.3.3 Impact Statement

The undulating landscape provides some VAC for the PV facility. The proposed project is anticipated to have a limited impact on highly sensitive receptors due to the limited number of highly sensitivity visual receptors directly adjacent to the project area. However, railway passengers and motorists – to a greater degree – will have the greatest visibility of the site. This visibility is anticipated to be moderated by their low sensitivity as transient and temporary receptors.

This project will be largely incongruent with the existing agricultural landscape. As such, visual impacts include altered sense of place, visual intrusion, nuisance from glint and glare and light pollution. This VIA demonstrates that the project will generally result in a moderate visual impact and is not located within a REDZ. The construction, operational, decommissioning and cumulative impacts are deemed to be acceptable on the assumption that the mitigation measures are implemented.

Based on the assessment and the assumption that the mitigation measures will be implemented, the specialist is of the opinion that the visual impacts of the project are acceptable and, from a visual perspective, there is no reason not to authorise the project.

## 10. POLICY AND LEGISLATIVE CONTEXT

The relationship between the project and certain key pieces of environmental legislation is discussed in the subsections to follow.

### 10.1 The Constitution

The Constitution of the Republic of South Africa, Act 108 of 1996 sets the legal context in which environmental law in South Africa occurs and was formulated. All environmental aspects should be interpreted within the context of the Constitution, National Environmental Management Act 107 of 1998 and the Environment Conservation Act 73 of 1989.

The Constitution has enhanced the status of the environment by virtue of the fact that an environmental right has been established (Section 24) and because other rights created in the Bill of Rights may impact on environmental management through, for example, access to health care, food and water and social security (Section 27). An objective of local government is to provide a safe and healthy environment (Section 152) and public administration must be accountable, transparent and encourage participation (Section 195(1) I to (g)).

Section 24 of the Constitution states that:

*“Everyone has the right –*

- *To an environment that is not harmful to their health or well-being; and*
- *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:*
  - Prevent pollution and ecological degradation;
  - Promote conservation and
  - Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”

The Constitution is the overarching legislation for South Africa. Although it provides for certain rights and obligations, the NEMA has been promulgated in order to manage the various spheres of both the social and natural environment.

## **10.2 National Environmental Management Act (107 of 1998)**

The National Environmental Management Act (Act No. 107 of 1998) was promulgated in 1998 but has since been amended on several occasions from this date. The act intends to provide for:

- co-operative environmental governance by establishing principles for decision-making on matters affecting the environment;
- institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state;
- to provide for the prohibition, restriction or control of activities which are likely to have a detrimental effect on the environment; and
- to provide for matters connected therewith.

NEMA is the overarching legislation which governs the EIA process and environmental management in South Africa. Sections 24 and 44 of NEMA make provision for the promulgation of regulations that identify activities which may not commence without an EA. Activities that may significantly affect the environment must be considered, investigated and assessed prior to implementation.

According to Section 2(3) of the National Environmental Management Act (NEMA) (Act No. 107 of 1998), “development must be socially, environmentally and economically sustainable”, which means the integration of these three factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.

The EIA Regulations, 2014 (as amended) identify lists of activities which have the potential to result in detrimental environmental impacts and thus require EA, subject to either “Basic Assessment” or “Scoping and Environmental Impact Assessment”. The Regulations prescribe the procedural and substantive requirements for the undertaking of EIAs and the issue of EA’s.

The proposed project triggers listed activities under Listing Notice 1, 2 and 3 (as detailed in Section 6 above), and thus requires an EA subject to an Environmental Impact Assessment (EIA) Process.

### 10.3 Environmental Impact Assessment (EIA) Guideline for Renewable Energy Projects, DFFE Notice 989 of 2015

The purpose of this document is primarily to provide guidance on the environmental management legal framework applicable to renewable energy operations and all the role players in the sector. The guideline is principally intended for use by the following stakeholder groups:

- Public Sector Authorities (as regulator and/or competent authority);
- Joint public sector authorities and project funders (e.g., Eskom, IDC, etc.);
- Private Sector Entities (as project funder / developer / consultant); and
- Other interested and affected parties (as determined by the project location and/or scope).

This guideline seeks to identify activities requiring authorisation prior to commencement of that activity and provide an interface between national EIA Regulations and other legislative requirements of various authorities.

The guidelines are applicable for the construction, installation and/or development of the following renewable energy projects:

- Concentrating Solar Power (CSP) Plant;
- Wind Energy Facility (WEF);
- Hydropower Station; and
- Photovoltaic (PV) Power Plant.

### 10.4 National Water Act (Act 36 of 1998)

The National Water Act (NWA) No 36 of 1998 was promulgated on the 20<sup>th</sup> of August 1998. This Act is important in that it provides a framework to protect water resources against over exploitation and to ensure that there is water for socio-economic and economic development, human needs and to meet the needs of the aquatic environment. The Act also recognises that water belongs to the whole nation for the benefit of all people.

Water resources as defined include a watercourse, surface water, estuary or aquifer. Specifically, a watercourse is defined as (inter alia):

- A river or spring;
- A natural channel in which water flows regularly or intermittently; and
- A wetland, lake or dam into which, or from which water flows.

Due to the possible encroachment into the wetland areas, the following Section 21 water uses in terms of the NWA may be triggered and require licensing:

- (c) impeding or diverting the flow of water in a watercourse; and
- (i) altering the bed, banks, course or characteristics of a watercourse.

In light of the above, there are a number of stipulations within the NWA that are relevant to the potential impacts on rivers, streams and wetlands that may be associated with the proposed development. An Aquatic / Freshwater Impact Assessment (**Appendix 6**) has been conducted to explore how the proposed development may impact on identified water resources as protected by the Act. Should the

proposed development require a General Authorisation (GA) or Water Use Licence (WUL), it will be determined and applied for separately prior to construction.

## 10.5 The National Heritage Resources Act 1999 (25 of 1999)

The National Heritage Resources Act promotes good management of the heritage resources of South Africa which are deemed to have cultural significance and to enable and encourage communities to ensure that these resources are maintained for future generations.

The aim of the Act is to introduce an integrated, three-tier system for the identification, assessment and management of national heritage resources (operating at a national, provincial and local level). This legislation makes provision for a grading system for the evaluation of heritage resources on three levels which broadly coincide with their national, provincial and local significance.

This Act requires investigation to determine the impact of heritage resources when developments exceed the thresholds list in section 38 (1) of the act:

- a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- b) the construction of a bridge or similar structure exceeding 50 m in length;
- c) any development or other activity which will change the character of a site—
  - (i) exceeding 5 000 m<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;
- d) the re-zoning of a site exceeding 10 000 m<sup>2</sup> in extent; or
- e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,

The proposed development would involve the development of a SEF and associated infrastructure that will change the character of more than 0.5ha, and (d), the rezoning of a site that will exceed 1ha.

Under the legislation the South African Heritage Resources Agency (SAHRA), was established, which replaced the National Monuments Council. SAHRA is responsible for the preservation of heritage resources with exceptional qualities of special national significance (Grade I sites). A Provincial Heritage Resources Authority, established in each province, will protect Grade II heritage resources which are significance within the context of a province or region. Buildings and sites of local interest (Grade III sites) is the responsibility of local authorities as part of their planning functions. In this case, the South African Heritage Resource Agency (SAHRA) will need to be consulted with extensively throughout the process.

Within the scope of this project, Section 38 of the NHRA (25 of 1999), states that, as described above, an assessment of potential heritage resources in the development area needs to be done. A Heritage Impact Assessment (HIA), Archaeological Impact Assessment (AIA), and Paleontological Impact Assessment (PIA) (**Appendix 6**) has therefore been commissioned to explore how the proposed development may impact on heritage resources and potential cultural artefacts as protected by the Act.

## **10.6 National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 of 2004, as amended)**

As the principal national act regulating biodiversity protection, the National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 of 2004), which is administered by the DFFE, is concerned with the management and conservation of biological diversity, as well as the use of indigenous biological resources in a sustainable manner.

The overarching aim of the NEM:BA, within the framework of the NEMA, is to provide for:

- The management and conservation of biological diversity within South Africa, and of the components of such biological diversity;
- The use of indigenous biological resources in a sustainable manner; and
- The fair and equitable sharing among stakeholders of benefits arising from bio-prospecting involving indigenous biological resources.

In terms of this Act, the developer has a responsibility to:

- Conserve endangered ecosystems and restriction of activities according to the categorisation of the area (not just by listed activity as specified in the EIA regulations);
- Promote the application of appropriate environmental management tools in order to ensure integrated environmental management of activities thereby ensuring that all development within the area is in line with ecological sustainable development and protection of biodiversity; and
- Limit further loss of biodiversity and conserve endangered ecosystems.

The South African National Biodiversity Institute (SANBI) was established in terms of the NEM:BA, its purpose being (inter alia) to report on the status of the country's biodiversity and the conservation status of all listed threatened or protected species and ecosystems.

The NEM:BA provides for a range of measures to protect ecosystems and for the protection of species that are threatened or in need of protection to ensure their survival in the wild, including a prohibition on carrying out a 'restricted activity' involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 7 of the Act. According to Section 57 of the Act, 'Restricted activities involving listed threatened or protected species':

A Terrestrial Biodiversity Assessment (**Appendix 6**) has been conducted to explore how the proposed development may impact on biodiversity as protected by the Act.

In addition, all relevant conservation departments (such as the SANBI and DENC) will be invited to provide comments with regards to the proposed development.

## **10.7 National Environmental Management: Protected Areas Act, 2003 (Act No.57 of 2003 as amended)**

The overarching aim of the National Environmental Management: Protected Areas Act (NEMPAA) Act No. 57 of 2003, within the framework of NEMA, is to provide for:

- the declaration and management of protected areas;
- co-operative governance in the declaration and management of protected areas;

- effect a national system of protected areas in South Africa as part of a strategy to manage and conserve its biodiversity;
- a representative network of protected areas on state land, private land and communal land;
- promote sustainable utilisation of protected areas for the benefit of people, in a manner that would preserve the ecological character of such areas;
- promote participation of local communities in the management of protected areas, where appropriate; and
- the continued existence of South African National Parks.

The proposed project is located adjacent to a Private Nature Reserve which is identified as a protected area.

### **10.8 National Forests Act (NFA) (Act No. 84 of 1998)**

The National Forest Act (NFA) (Act No. 24 of 1998) was enacted to:

- Provide for the protection, management and utilisation of forests;
- The protection of certain plant and animal life;
- The regulation of trade in forest produce; and
- The control and management of a national hiking way system and National Botanic Gardens.

The NFA enforces the necessity for a license to be obtained prior to destroying any indigenous tree in a natural forest and, subject to certain exemptions, cutting, disturbing, damaging, destroying or removing any protected tree. The list of protected trees is currently contained in GN 908 of 21 November 2014. Licenses are issued by the Minister and are subject to periods and conditions as may be stipulated.

#### Protected trees

According to this act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that 'no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister'.

#### Forests

Prohibits the destruction of indigenous trees in any natural forest without a licence.

The NFA is relevant to the proposed development as the removal and/or disturbance and/or clearance of indigenous vegetation will be required and a license in terms of the NFA may be required for this to be done.

A Terrestrial Biodiversity Assessment (**Appendix 6**) has been conducted to explore how the proposed development may impact on vegetation as protected by the Act.

In addition, all relevant conservation departments (such as the SANBI and DENC) will be invited to provide comments with regards to the proposed development.



## 10.9 National Veld and Forest Fire Act (Act No. 101 of 1998)

Provides requirements for veldfire prevention through firebreaks and required measures for firefighting. Chapter 4 of the Act places a duty on landowners to prepare and maintain firebreaks. Chapter 5 of the Act places a duty on all landowners to acquire equipment and have available personnel to fight fires.

## 10.10 Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983)

The Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983) controls the utilisation of natural agricultural resources in South Africa. The Act promotes the conservation of soil, water sources and vegetation as well as the combating weeds and invader plants. The Act requires the protection of land against soil erosion and the prevention of water logging and salinization of soils by means of suitable soil conservation works to be constructed and maintained. The utilisation of marshes, water sponges and watercourses are also addressed.

The primary objective of the Act is to conserve natural agricultural resources by:

- maintaining the production potential of land;
- combating and preventing erosion and weakening or destruction of the water resources;
- protecting vegetation; and
- combating weeds and invaders plants.

In terms of this Act, no degradation of natural land is permitted. Rehabilitation after disturbance to agricultural land is also managed by this Act. The CARA is relevant to the proposed development as the construction of a SEF as well as other components (such as the on-site switching substation and permanent guard house) may impact on agricultural resources and vegetation on the site. The Act prohibits the spreading of weeds and prescribes control measures that need to be complied with in order to achieve this. As such, measures will need to be taken to protect agricultural resources and prevent weeds and exotic plants from invading the site as a result of the proposed development.

Declared Weeds and Invaders in South Africa are categorised according to one (1) of the following categories:

- Category 1 plants: are prohibited and must be controlled.
- Category 2 plants: (commercially used plants) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread.
- Category 3 plants: (ornamentally used plants) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading thereof, except within the flood line of watercourses and wetlands.

An Agricultural and Soils Site Verification (**Appendix 6**) has been conducted to explore how the proposed development may impact on the agricultural production potential of the proposed site.

## 10.11 National Road Traffic Act (NRTA) (Act No. 93 of 1996, as amended)

The National Road Traffic Act (NRTA) (Act No. 93 of 1996, as amended) provides for all road traffic matters and is applied uniformly throughout South Africa. The Act enforces the necessity of registering and licensing motor vehicles. It also stipulates requirements regarding fitness of drivers and vehicles as well as making provision for the transportation of dangerous goods.

All the requirements stipulated in the NRTA will need to be complied with during the construction and operational phases of the proposed development.

### **10.12 Civil Aviation Act (CAA) (Act No. 13 of 2009)**

The Civil Aviation Act (CAA) (Act No. 13 of 2009) controls and regulates aviation within South Africa. It provides for the establishment of a South African Civil Aviation Authority (SACAA) and independent Aviation Safety Investigation Board in compliance with Annexure 13 of the Chicago Convention. It gives effect to various conventions related to aircraft offences, civil aviation safety and security, and provides for additional measures directed at more effective control of the safety and security of aircrafts, airports and matters connected thereto.

Although the Act is not directly relevant to the proposed development, it should be considered as the establishment of electricity distribution infrastructure (such as a substation and powerlines) may impact on aviation and air traffic safety, if located directly within aircraft flight paths.

The Air Traffic and Navigation Services Company Limited (ATNS) and the SACAA will be consulted throughout the EIA process and the required approvals will be obtained, where necessary. It is not however anticipated that any approvals will be required.

### **10.13 Astronomy Geographic Advantage Act (Act No. 21 of 2007)**

The Astronomy Geographic Advantage Act (Act No. 21 of 2007) provides for:

- The preservation and protection of areas that are uniquely suited for optical and radio astronomy; and
- Intergovernmental cooperation and public consultation on matters concerning nationally significant astronomy advantage areas and matters connected therewith.

Under Section 22(1) of the Act, the Minister has the authority to protect the radio frequency spectrum for astronomy observations within a core or central astronomy advantage area. As such, the Minister may under section 23(1) of the Act, declare that no person may undertake certain activities within a core or central Astronomy Advantage Area (AAA). 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 endeavours.

In terms of section 7(1) and 7(2) of this Act, national government established the following AAAs:

- Karoo Central AAA (GN 198 of 2014) – proposed development falls outside this AAA
- Sutherland Central AAA – proposed development falls outside this AAA
- Northern Cape AAA (GN 115 of 2010) – proposed development falls outside of this AAA

Even though the proposed development falls outside the respective AAAs, the relevant authorities, including the Square Kilometre Array (SKA) and South African Large Telescope (SALT), will be consulted throughout the EIA process.

## 10.14 National Energy Act (Act No. 34 of 2008)

South Africa has two (2) Acts that direct the planning and development of the country's electricity sector, namely:

- i. The National Energy Act of 2008 (Act No. 34 of 2008); and
- ii. The Electricity Regulation Act (ERA) of 2006 (Act No. 4 of 2006).

The National Energy Act (Act No. 34 of 2008), promulgated in 2008, has, as one (1) of its key objectives, the promotion of diversity of supply of energy and its sources. From this standpoint, the Act directly references the importance of the renewable energy (RE) sector, with a mention of the solar energy sector included. The aim is to ensure that the South African economy is able to grow and develop, fast-tracking poverty alleviation, through the availability of a sustainable, diverse energy mix. Moreover, the goal is to provide for the increased generation and consumption of RE (Republic of South Africa, 2008).

## 10.15 Electricity Regulation Act (Act No. 4 of 2006)

In 2011, the electricity regulation on new generation capacity was published under Section 35(4) of the Electricity Regulation Act (ERA) (Act No. 4 of 2006). These regulations apply to the procurement of new generation capacity by organs of state.

The objectives of the regulations include:

- To facilitate planning for the establishment of new generation capacity;
- The regulation of entry by a buyer and a generator into a Power Purchase Agreement (PPA);
- To set minimum standards or requirements for PPAs;
- The facilitation of the full recovery by the buyer of all costs efficiently incurred by it under, or in connection with, a PPA including a reasonable return based on the risks assumed by the buyer thereunder and to ensure transparency and cost reflectivity in the determination of electricity tariffs; and
- The provision of a framework for implementation of an Independent Power Producer (IPP) procurement programme and the relevant agreements concluded.

The Act establishes a National Energy Regulator as the custodian and enforcer of the National Electricity Regulatory Framework. The Act also provides for licenses and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated.

## 10.16 Protection of Public Information Act (Act No. 4 of 2013)

The Protection of Public Information Act (Act No. 4 of 2013) (POPIA) recognises the Constitutional requirement that everyone has a right to privacy.

Ultimately the Act promotes “the protection of personal information processed by public and private bodies; to introduce certain conditions so as to establish minimum requirements for the processing of personal information; to provide for the establishment of an Information Regulator to exercise certain powers and to perform certain duties and functions in terms of this Act and the Promotion of Access to Information Act, 2000 (PAIA); to provide for the issuing of codes of conduct; to provide for the rights of persons regarding unsolicited electronic communications and automated decision making; to regulate

the flow of personal information across the borders of the Republic; and to provide for matters connected therewith”.

Due to the requirements around the Public Participation Process, SIVEST will process and capture information aligned to the POPIA and always obtain consent for I&APs information to be gathered, stored and distributed for the purpose of this project.

## 10.17 Renewable Energy Development Zones and Strategic Transmission Corridors

The Strategic Environmental Assessment (SEA) for Wind and Solar PV Energy in South Africa (CSIR, 2015) originally identified eight (8) formally gazetted Renewable Energy Development Zones (REDZs) that are of strategic importance for large-scale wind and solar PV development in terms of Strategic Integrated Project 8: Green Energy in Support of the South African Economy, as well as associated strategic transmission corridors, including the rollout of its supporting transmission and distribution infrastructure, in terms of Strategic Integrated Project 10: Electricity Transmission and Distribution.

- REDZs for large-scale wind and solar photovoltaic development;
- associated Strategic Transmission Corridors which support areas where long-term electricity grid will be developed;
- process of basic assessment to be followed and reduced decision-making timeframe for processing of applications for environmental authorisation in terms of the NEMA; and
- acceptance of routes which have been pre-negotiated with all landowners as part of applications for environmental authorisations for power lines and substations.

In addition to the eight (8) formally gazetted REDZs mentioned above, the Phase 2 SEA for Wind and Solar Photovoltaic Energy in South Africa (2019) identified three (3) additional REDZs (namely REDZ 9, REDZ 10 and REDZ 11) that are of strategic importance for large scale wind and solar photovoltaic energy development. These REDZs were published under Government Notice No. 786, Government Gazette No. 43528 of 17 July of 2020, and were officially gazetted under Government Notice No. 144, Government Gazette No. 44191 of 26 February 2021.

**Table 19: The SEA for Wind and Solar PV Energy in South Africa (Phase 1 and Phase 2) (CSIR, 2015; CSIR, 2019) identified the following eleven (11) geographic areas for REDZs**

| REDZ Number | Name          | Applicability of REDZ                                     |
|-------------|---------------|---|
| REDZ 1      | Overberg      | Large-scale wind and solar photovoltaic energy facilities |
| REDZ 2      | Komsberg      | Large-scale wind and solar photovoltaic energy facilities |
| REDZ 3      | Cookhouse     | Large-scale wind and solar photovoltaic energy facilities |
| REDZ 4      | Stormberg     | Large-scale wind and solar photovoltaic energy facilities |
| REDZ 5      | Kimberley     | Large-scale solar photovoltaic energy facilities          |
| REDZ 6      | Vryburg       | Large-scale solar photovoltaic energy facilities          |
| REDZ 7      | Upington      | Large-scale solar photovoltaic energy facilities          |
| REDZ 8      | Springbok     | Large-scale wind and solar photovoltaic energy facilities |
| REDZ 9      | Emalahieni    | Large scale solar photovoltaic energy facilities          |
| REDZ 10     | Klerksdorp    | Large scale solar photovoltaic energy facilities          |
| REDZ 11     | Beaufort West | Large scale wind and solar photovoltaic energy facilities |

It should be noted that the proposed project is not located within a REDZ and will be subject to a full EIA process in terms of the NEMA, as amended, and the EIA Regulations, 2014 (as amended).

## 10.18 Additional Relevant Legislation

- White Paper on the Energy Policy of the Republic of South Africa (1998)
- Occupational Health and Safety Act (Act No. 85 of 1993) [OHSA];
- Environment Conservation Act (Act 73 of 1989) [ECA]
- Road Safety Act (Act No. 93 of 1996) [RSA];
- National Environmental Management: Air Quality Act (Act No. 39 of 2004) [NEM:AQA];
- National Environmental Management: Waste Act (Act No. 59 of 2008, as amended) [NEM;WA];
- Development Facilitation Act (Act No. 67 of 1995) [DFA];
- Promotion of Access to Information Act, (Act No. 2 of 2000); [PAIA]
- The Hazardous Substances Act (Act No. 15 of 1973) [HSA];
- Water Services Act (Act No. 108 of 1998) [WSA];
- Municipal Systems Act (Act No. 32 of 2000) [MSA];
- Subdivision of Agricultural Land Act, 70 of 1970, and
- Mineral and Petroleum Resource Development Act (Act No. 28 of 2002, as amended) [MPRDA].

## 11. KEY DEVELOPMENT STRATEGIES AND GUIDELINES

In his 2023 State of the Nation Address, President Cyril Ramaphosa announced government are taking the following measures to rapidly and significantly increase generation capacity outside of Eskom:

- *We are introducing a clear action plan to address the energy crisis and address the electricity shortfall of 4000 to 6000 megawatts (MW).*
- *The five key interventions include:*
  - *First, fix Eskom's coal-fired power stations and improve the availability of existing supply.*
  - *Second, enable and accelerate private investment in generation capacity.*
  - *Three, accelerate procurement of new capacity from renewables, gas and battery storage.*
  - *Four, unleash businesses and households to invest in rooftop solar.*
  - *Five, fundamentally transform the electricity sector to achieve long-term energy security.*
- *Improve the performance of Eskom's existing power stations so that the coal-fired power stations that provide 80% of our electricity produce the amount of electricity for which they were designed. One of the priority investment areas is to rapidly expand energy generation capacity.*
- *Eskom has launched a programme to buy excess power from private generators and has already secured 300 MW from our neighbouring countries*
- *One of the potent reforms we have embarked upon is to allow private developers to generate electricity. There are now more than 100 projects, which are expected to provide over 9 000 MW of new capacity over time.*
- *A number of companies that have participated in the renewable energy programme will soon enter construction and deliver a total of 2 800 MW of new capacity.*
- *Eskom will procure emergency power that can be deployed within six months to close the immediate gap.*
- *We are investing in new transmission lines and substations, especially in areas such as the Eastern Cape, Northern Cape and Western Cape.*
- *All of these measures will result in a massive increase in power to the grid over the next 12 to 18 months, and beyond.*
- *This power will be in line with our diverse mix of energy sources, including our current coal-fired power stations, solar, wind, gas, nuclear, hydro and battery storage.*
- *To fully implement this plan, we need strong central coordination and decisive action.*

- *The president has declared a national state of disaster to respond to the electricity crisis.*
- *And it will enable us to accelerate energy projects and limit regulatory requirements while maintaining rigorous environmental protections, procurement principles and technical standards.*
- *Focusing our attention on the energy crisis*
- *Through the Just Energy Transition Investment Plan, R1.5 trillion will be invested in our economy over the next five years in new frontiers such as renewable energy, green hydrogen and electric vehicles.*
- *Several new sectors are emerging in the economy, such as major green hydrogen, electric vehicles and fuel cells.*
- *The Northern Cape has already attracted well over R100 billion in investments in renewable energy projects.*
- *These and other massive investments in renewable energy will create jobs and stimulate local economies not only in the Northern Cape, but also in the Eastern Cape, Western Cape and Mpumalanga, turning even the most arid desert into a giant energy source.*
- *Above all, our just transition will prioritise workers and communities in vulnerable industries to ensure that no one is left behind.*

Policy decisions taken in the next decade will largely determine the dimension of the impact of climate change. Local government is in the front line of implementation and service delivery, and thus needs to pursue adequate mitigation and adaptation strategies which should include participation from the public sector, the private sector and NGOs.

The DoE gazetted its White Paper on Renewable Energy in 2003 and introduced it as a ‘policy that envisages a range of measures to bring about integration of renewable energies into the mainstream energy economy.’ At that time, the national target was fixed at 10 000 GWh (0.8 Mtoe) renewable energy contribution to final energy consumption by 2013. The White Paper proposed that this would be produced mainly from biomass, wind, solar and small-scale hydropower. It went on to recommend that this renewable energy should be utilised for power generation and non-electric technologies such as solar water heating and biofuels. Since the White Paper was gazetted, South Africa’s primary and secondary energy requirements have remained heavily fossil-fuel dependent, both in terms of indigenous coal production and use, as well as the use of imported oil resources. Alongside this, the projected electricity demand of the country has led the National utility Eskom, to embark upon an intensive build programme to secure South Africa’s longer-term energy needs, together with an adequate reserve margin.

The National Development Plan (NDP), 2011 – 2030, aims to address parts of the South African triple development challenges of poverty and inequality by 2030. In order to achieve this, numerous enabling milestones and critical actions have been formulated. One (1) of the critical actions is the formulation and implementation of interventions that aim to ensure environmental sustainability and resilience to future shocks.

The emphasis is on South African investment and assistance in the exploitation of various opportunities for low-carbon energy in the clean energy sources of Southern Africa (National Planning Commission, 2011).

A more efficient and competitive infrastructure is envisaged, particularly infrastructure that facilitates economic activity and is conducive to growth and job creation. The plan identifies key services that need strengthening; namely commercial transport, energy, telecommunications and water, while ensuring their long-term affordability and sustainability. The National Planning Commission maintains that South Africa has missed a generation of capital investment in many infrastructure opportunities

including electricity. Therefore, one (1) infrastructure investment priority is in the procurement of at least 20,000 MW of renewable energy-efficiency (National Planning Commission, 2011).

The proposed project is thus well aligned with the aims of IDP which is further detailed in the following national and provincial plans:

- National Integrated Resource Plan for Electricity (2010-2030);
- Integrated Resource Plan (IRP 2019)
- National Infrastructure Plan 2012, as amended;
- Constitution of the Republic of South Africa, 1996
- National Environmental Management Act (No. 107 of 1998) (NEMA)
- White Paper on the Energy Policy of the Republic of South Africa (1998)
- National Energy Act (No. 34 of 2008)
- Integrated Energy Plan (IEP) (2015)
- National Development Plan (NDP) 2030 (2012)
- Strategic Infrastructures (SIPs).
- Free State Provincial Growth and Development Strategy (FSGDS) (2005 – 2014)
- Free State Provincial Growth and Development Strategy (FSGDS), Revised October 2007
- Free State Provincial Spatial Development Framework (PSDF) - Executive Summary (Inception Report)
- Free State Climate Change Response Strategy (2017)
- Free State Green Economy Strategy (2014)
- Free State Investment Prospectus (2019).
- Integrated Development Plan (IDP) of the Fezile Dabi District Municipality 2016-2017
- Integrated Development Plan (IDP) of the Moqhaka Local Municipality 2021/2022.

The proposed project is also well aligned with the Fezile Dabi District Municipality 2016/2017 and the Moqhaka Local Municipality 2021/2022 (discussed further below).

## 11.1 Provincial Policies

**Table 20: Relevant Provincial Policies for the Bonsmara Solar PV Facility**

| Relevant policy  | Relevance to the proposed project   |
|--|---|
| Free State Provincial Growth and Development Strategy (FSDS) (2005 - 2014) | <p>The overarching goal of the Free State Growth and Development Strategy (FSGDS) is to align the provincial and national policies and programmes, and to guide development in terms of effective and efficient management and governance to achieve growth and development. The strategy is a living document that uses the latest business planning and evaluation tools in order to maximise the effect of all spending.</p> <p>Based on the social and economic development challenges of the province, the strategy identifies a few primary objectives, including stimulating economic development and developing and enhancing the infrastructure for economic growth and social development, poverty alleviation through human and social development, ensuring a safe and secure environment for all, and the promotion of effective and efficient governance and administration.</p> <p>The development of the energy and infrastructure development supports the overall objective of stimulating economic development and infrastructure investment towards growth and social development, by contributing to the energy mix, supply and infrastructure of the province. The development of the facility will</p> |

| Relevant policy   | Relevance to the proposed project   |
|---|---|
|   | also contribute to the alleviation of poverty through the creation of direct and indirect employment opportunities.   |
| Free State Provincial Spatial Development Framework (PSDF) - Executive Summary (Inception Report) | <p>The Free State PSDF is a provincial spatial and strategic planning policy that responds to and complies with, in particular, the National Development Plan Vision 2030 and the National Spatial Development Perspective (NSDP). The latter encourages all spheres of government to prepare spatial development plans and frameworks (such as the PSDF) that promote a developmental state in accordance with the principles of global sustainability as is advocated by, among others, the South African Constitution and the enabling legislation.</p> <p>The Free State Provincial Growth and Development Strategy states that sustainable economic development is the only effective means by which the most significant challenge of the Free State, namely poverty, can be addressed. The PSDF gives practical effect to sustainable development, which is defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.</p> <p>The proposed RE facility will contribute to sustainable economic development objectives of the Free State PSDF, through the generation of clean energy and creation of jobs and business opportunities.</p> |
| Free State Green Economy Strategy (2014)  | <p>This green economy strategy for Free State Province (FSGES) was developed in alignment with the national green economy strategy elaborated in the National Green Economy Framework and Green Economy Accord, as well as the Free State Provincial Growth and Development Strategy.</p> <p>The objective was to develop a green economy strategy to assist the province to, inter alia, improve environmental quality and economic growth, and to develop green industries and energy efficiency within the province.</p> <p>The proposed SEF development will contribute to the aim of energy efficiency and green industry while promoting economic growth, and is therefore consistent with this strategy.</p>   |
| Free State Investment Prospectus (2019)   | <p>The prospectus states that opportunities are opening up in the province for the energy sector, including renewable energy. Rezoning for the development of multiple solar energy facilities has already been undertaken in the province. The development of a Solar Farm in the Moqhaka LM is seen as a driver of growth along the banks of the Orange River.</p> <p>Considering future opportunities available for the development of renewable energy facilities (including solar PV facilities), the development of the Bonsmara SEF is considered to be in-line with the Investment Prospectus of the Province.</p>  |

## 11.2 District and Local Municipalities

The strategic policies at a district and local levels have similar objectives for the respective areas, namely, to accelerate economic growth, create jobs, and uplift communities. The proposed Bonsmara SEF is considered to align with the aims of these policies. A brief review of the most relevant district and local municipal policies is provided in the table below.

**Table 21: Relevant District and Local Municipal Policies for the Bonsmara Solar PV Facility**

| Relevant policy        | Relevance to the proposed project   |
|------------------------|---|
| Integrated Development | The vision of the municipality is to be a community-orientated entity characterised by a sound political and administrative capacity, with sustainable and enabling |



| Relevant policy   | Relevance to the proposed project   |
|---|---|
| Plan (IDP) of the Fezile Dabi District Municipality 2016-2017                   | business environment. With the main challenges within the municipal area being poverty, and unemployment sitting at 46.03% (STATSSA 2011), this proposed project will contribute towards the creation of employment, and to some level of poverty reduction.  |
| Integrated Development Plan (IDP) of the Moqhaka Local Municipality (2022-2027) | The need for sustainable, clean energy supply, nationally, is also applicable in the Moqhaka municipal area. The Moqhaka LM IDP (2022-2027) notes that while 98% of households within the municipality have access to electricity, there is a need for the expansion of public lighting. The proposed SEF will contribute to the national grid, which, in turn, will add to the supply of electricity for communities across the country. |

The review of relevant legislation, policies and documentation pertaining to the proposed development indicates that the establishment of the solar farm and associated infrastructure is supported at a national, provincial, and local levels, and that the proposed project will contribute positively towards several targets and policy aims.

## 12. NEED AND DESIRABILITY

### 12.1 National Renewable Energy Requirement

In 2010, South Africa had 44,157 MW of power generation capacity installed. Current forecasts indicate that by 2025, the expected growth in demand will require the current installed power generation capacity to be almost doubled to approximately 74,000 MW (SAWEA, 2010).

This growing demand, fuelled by increasing economic growth and social development within Southern Africa, is placing increasing pressure on South Africa's existing power generation capacity. Coupled with this, is the growing awareness of environmental impact, climate change and the need for sustainable development. Despite the worldwide concern regarding Greenhouse Gas (GHG) emissions and climate change, South Africa continues to rely heavily on coal as its primary source of energy, while most of the countries renewable energy resources remain largely untapped (DME, 2003). There is therefore an increasing need to establish a new source of generating power in SA within the next decade.

The use of renewable energy technologies, as one (1) of a mix of technologies needed to meet future energy consumption requirements is being investigated as part of Eskom's long-term strategic planning and research process. It must be remembered that solar energy is plentiful, renewable, widely distributed, clean and reduces GHG emissions when it displaces fossil-fuel derived from electricity. In this light, renewable solar energy can be seen as desirable.

The REIPPP programme and the competitive nature of the bidding process has resulted in significant lowering of solar and wind tariff prices since 2011. Further projects will increase the competitive nature of the REIPPP program and further result in cost savings to South African consumers.

## 12.2 National Renewable Energy Commitment

In support of the need to find solutions for the current electricity shortages, the increasing demand for energy, as well as the need to find more sustainable and environmentally friendly energy resources, South Africa has embarked on an infrastructure growth programme supported by various government initiatives. These include the National Development Plan (NDP), the Presidential Infrastructure Coordinating Commission (PICC), the DoE's IRP, the National Strategy for Sustainable Development, the National Climate Change Response White Paper, the Presidency of the Republic of South Africa's Medium-Term Framework, and the National Treasury's Carbon Tax Policy Paper.

The Government's commitment to growing the renewable energy industry in South Africa is also supported by the White Paper on Renewable Energy (2003) which sets out the Government's principals, goals and objectives for promoting and implementing renewable energy in South Africa. In order to achieve the long-term goal of achieving a sustainable renewable energy industry, the DoE has set a target of contributing 17,8GW of renewable energy to the final energy consumption by 2030. This target is to be produced mainly through, wind and solar; but also through biomass and small scale hydro (DME, 2003; IRP, 2010). Further renewable energy targets have been proposed within the latest IRP, which was gazetted in 2019.

The 2019 Integrated Resource Plan (2019) (IRP2019) was released on 18 October 2019 and includes the following capacity allocation:

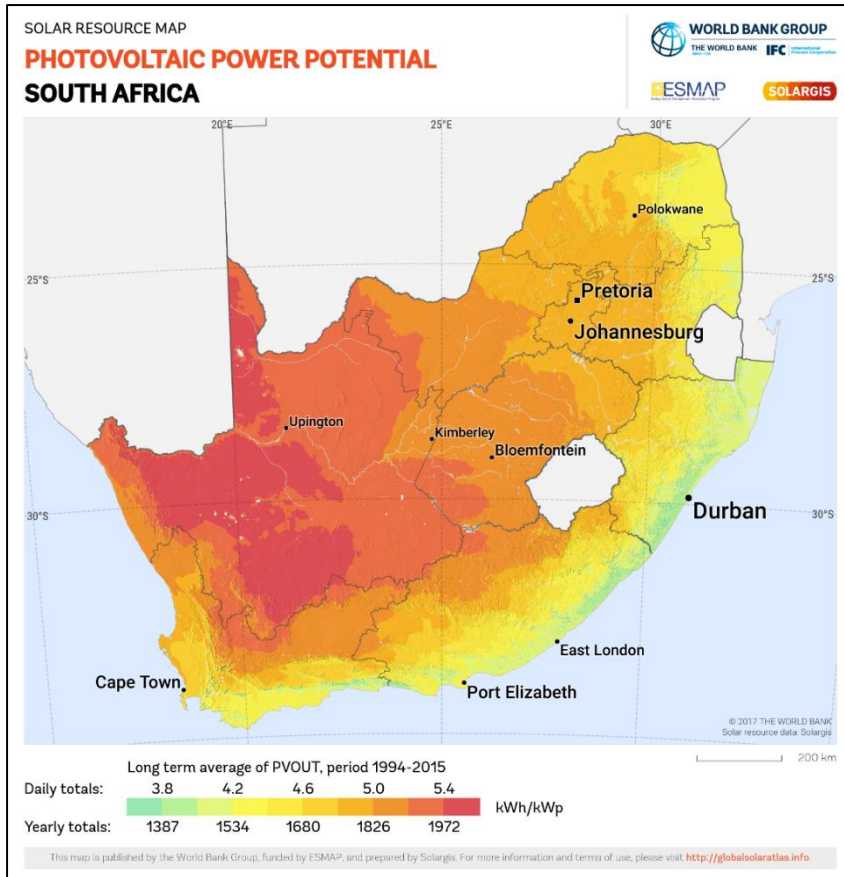
- 1 500 MW of new coal power (noting that there will be decommissioning of coal capacity over the period);
- 2 500 MW of hydro power;
- 6 000 MW solar;
- 14 400 MW wind;
- 2 000 MW of storage;
- 3 000 MW from gas.

## 12.3 Site Suitability

The selection of a potential site for the proposed solar PV energy facility included several key aspects, namely solar resource, climate, topography, environmental, grid connections and access to the site. As mentioned, the proposed project site has been identified through a pre-feasibility desktop analysis based on the estimation of the solar energy resource as well as other determining factors.

### 12.3.1 Solar Resource

According to the Photovoltaic Power Potential map (2020 *The World Bank, Source: Global Solar Atlas 2.0, Solar resource data: Solargis*) in **Figure 34** below, the Free State has a very high solar potential when compared to other provinces. The project site is thus suitable for the establishment of the proposed solar PV energy facility. Based on an estimation of the solar energy resource as well as pre-feasibility studies conducted by the applicant, the site has been identified as optimal for the proposed Bonsmara Solar PV Energy Facility.



**Figure 34: Photovoltaic Power Potential in South Africa**

### 12.3.2 Site Access

The main access route to the proposed Bonsmara SEF the regional tarred road (R76) which runs adjacent to the proposed site. The site therefore has good access and is situated approximately 12km from the town of Kroonstad.

### 12.3.3 Topography

The site identified for the Bonsmara SEF is relatively flat, homogenous and north facing which is preferential for a solar facility in South Africa.

### 12.3.4 Environmental

The applicant conducted an extensive environmental screening/pre-feasibility process using various available desktop data and tools to determine the suitability of the site.

Furthermore, key environmental specialists were consulted with to identify any potential impacts/environmental constraints which may be associated with a proposed SEF at the onset of the project. An agricultural specialist, terrestrial ecologist and freshwater ecologist were appointed to undertake detailed pre-feasibility assessments which was used to determine the preliminary layout which has taken into account most of the environmental sensitivities from the onset. The National Department of Environmental Affairs (DEA) screening tool was also utilized to generate a site sensitivity report for the proposed project to guide the level of specialist input that would be required.

### 12.3.5 Land Availability

While the proposed project site is not located in an identified REDZs, the development of the proposed solar PV energy facility is still considered to be important for South Africa as it will reduce the country's overall environmental footprint from power generation (including externality costs), and thereby steer the country on a pathway towards sustainability. The proposed development will provide socio-economic benefits to the region it is situated in and will have a high commercial attractiveness. In addition, the negative environmental impacts associated with the proposed development can be mitigated to acceptable levels.

All affected landowners have given their consent and have signed letters of consent for the undertaking of the Scoping and EIA Process and the subsequent development of the proposed Bonsmara Solar PV project.

In terms of the agricultural assessment, the land was assessed as being of insufficient land capability for viable and sustainable future crop production. The cropping potential of the site is limited by the shallow soils limited by dense clay and weathered bedrock in the subsoil. As such, it is not envisioned that farming activities will be negatively impacted by the proposed development.

### 12.3.6 Access to Grid

Grid connection suitability is the next fundamental element which drives the project location. The proposed project site has good grid connection potential and is in close proximity to a grid connection.

**The site is considered suitable for the reasons provided above. The investigation of an alternative site is not proposed. There is therefore no Site alternative for the Bonsmara SEF.**

## 12.4 Reduce dependency on fossil fuels

At present, more than 90% of South Africa's energy is generated by coal-fired power stations. Apart from the fact that these are finite resources that will eventually run out, fossil fuels are also harmful to the environment when used to produce electricity. During combustion, fossil fuels such as coal emit many by-products into the atmosphere, two (2) of which are carbon dioxide (CO<sub>2</sub>) and sulphur dioxide (SO<sub>2</sub>). Both these gases have been shown to contribute to the worsening climate crisis. Solar is a free and infinite resource that occurs naturally in the environment. Converting solar energy into electricity releases no harmful by-products into the environment and will reduce the dependency on fossil fuels.

## 12.5 Stimulate the economy

A significant portion of the capital expenditure envisaged for the project will be spent on procurement of goods and services within South Africa and specifically within the Free State Province. If goods and services are procured locally (i.e. within South Africa), it increases the production of the respective industries. This has a positive impact on the national economy and economies of the municipalities where inputs are procured.

The proposed development has the potential to stimulate the demand for other industries, among others construction services, engineering service, transport services, steel structures, cement and other aggregates, and electrical equipment. At the local level, increase in demand for accommodation, personal services, perishable and non-perishable goods is expected, which will stimulate the local

economies of the towns and settlements, where labour will be procured from or where migrant workers will be temporarily located.

Some of the local businesses could benefit from sub-contracting opportunities, if the construction companies appointed by the developer implement a local community procurement policy, and consumer expenditure of the construction crew. Furthermore, the demand for hospitality services (including accommodation and catering in the town of Kroonstad and other nearby towns) is expected to increase and provide for much-needed stimulus for the local economy.

## **12.6 Job opportunities and household livelihoods**

Solar energy projects create both temporary and permanent job opportunities in South Africa for both skilled and unskilled workers. According to the Social Impact Assessment, the erection of solar PV in the area will create employment opportunities for both skilled and unskilled workers during the construction stage. If recruitment processes are efficiently managed, work opportunities can be localised as much as possible, with a trend visible in the industry that local people will be most ready to take up unskilled jobs, while employment requiring specialised skills tends to attract specialists from across the country. Business opportunities associated with the construction phase may also be open for local enterprises, especially in the supply of goods and services, such as food and other essential supplies.

In addition to those benefitting from direct employment created at the project, various multiplier effects will assist in temporarily supporting existing jobs in the businesses offering services and goods that will be procured during construction activities. The increased temporary income earned by these businesses will, in turn, stimulate consumer spending, creating another round of multiplier effect, positively impacting on the employment situation in the area. There will be opportunities for skills development (refer below) and training.

## **12.7 Skills development**

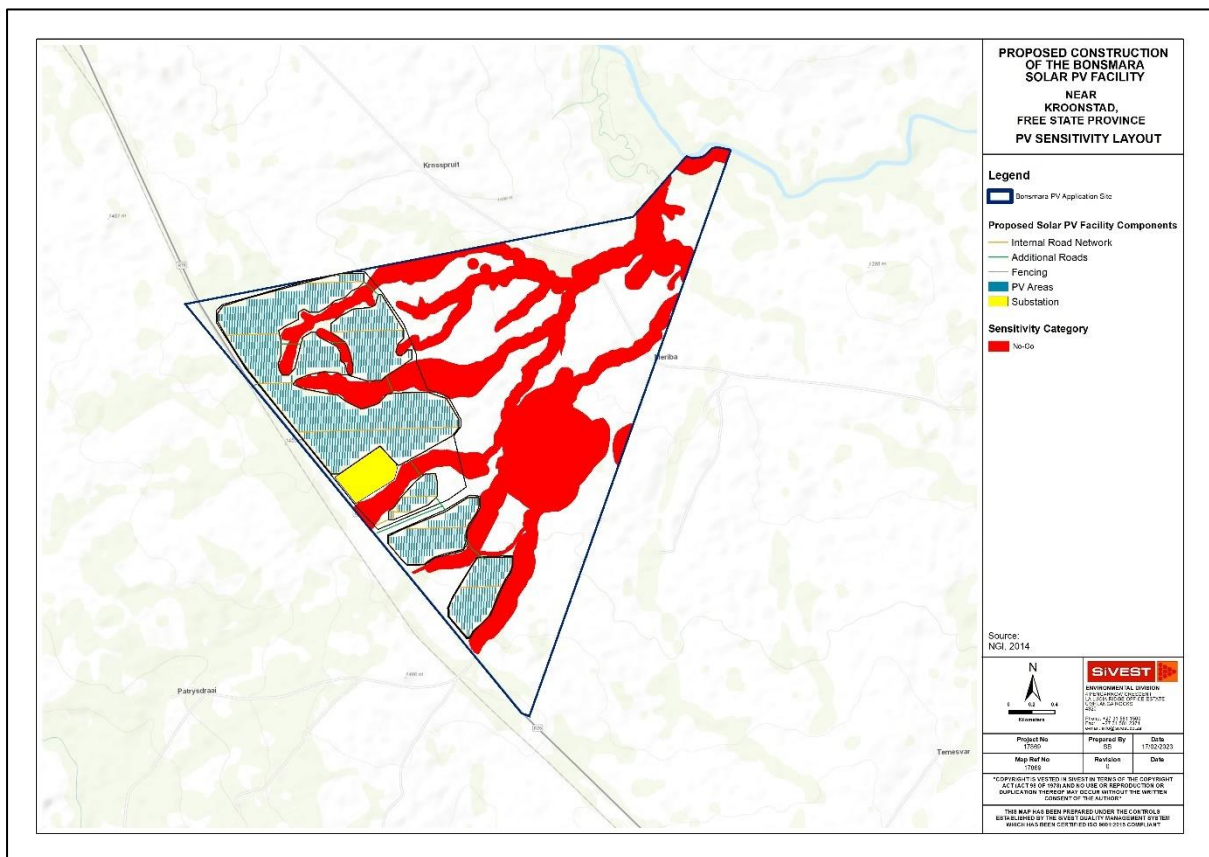
In addition to the job creation, there is valuable opportunities for skills enhancement/development/training and knowledge transfer as quite often input from experts are required in this field. Therefore, opportunities for guiding and training of local workers is created. A variation of skill sets is required ranging from semi-skilled construction workers to highly skilled engineers. The skill set of the majority of the municipality's residents comprises of low-skills, which means that with proper planning and recruitment strategies, many of the local unemployed residents could be hired as temporary construction workers on site provided they satisfy any other recruitment criteria.

Those employed will either develop new skills or enhance current skills. This insinuates that inexperienced workers will have the opportunity to attain and develop new skills, while experienced workers will further improve their existing skills. Albeit the employment is temporary, the skills attained will be of long-term benefit to employees. However, as any skills set it will need to be supported and practised on a regular basis to maintain its currency.

### 13. MOTIVATION FOR THE PREFERRED DEVELOPMENT FOOTPRINT WITHIN THE APPROVED SITE AS CONTEMPLATED IN THE SCOPING REPORT

The layout that was included in the Scoping Phase reporting has been refined based on specialist input and a final proposed layout has been compiled for approval (refer to **Figure 35** and **36** below). The proposed layout / preferred development footprint that is being put forward is the most feasible layout configuration. The layout has been refined based on information from the pre-screening phase through to the impact assessment phase which has resulted in a layout where all panels and supporting infrastructure (except for certain roads and/or fences) avoids all sensitivities identified.

All constraints identified to date as indicated in the sensitivity mapping below have been taken into account and the PV panels and supporting infrastructure shifted where necessary to inform the proposed layout for the Bonsmara SEF. All PV panels and associated infrastructure (including the substation, BESS and O&M Building) are placed outside of the no-go areas (which are inclusive of the associated buffers) identified by specialists. Refer to **Figure 35** below of the SEF and supporting infrastructure layout.



**Figure 35: PV panel and supporting infrastructure sensitivity layout**

The provided layout (revised by scoping phase inputs) has, to a large degree, avoided any sensitive aquatic features and associated buffer areas, significantly reducing the potential overall impact and risk to aquatic resources on the study site. The aquatic specialist has stated that the only exception to development within the no-go areas is road crossings and transmission lines provided they adhere to the recommendations as contained in the EMP and are suitably mitigated.

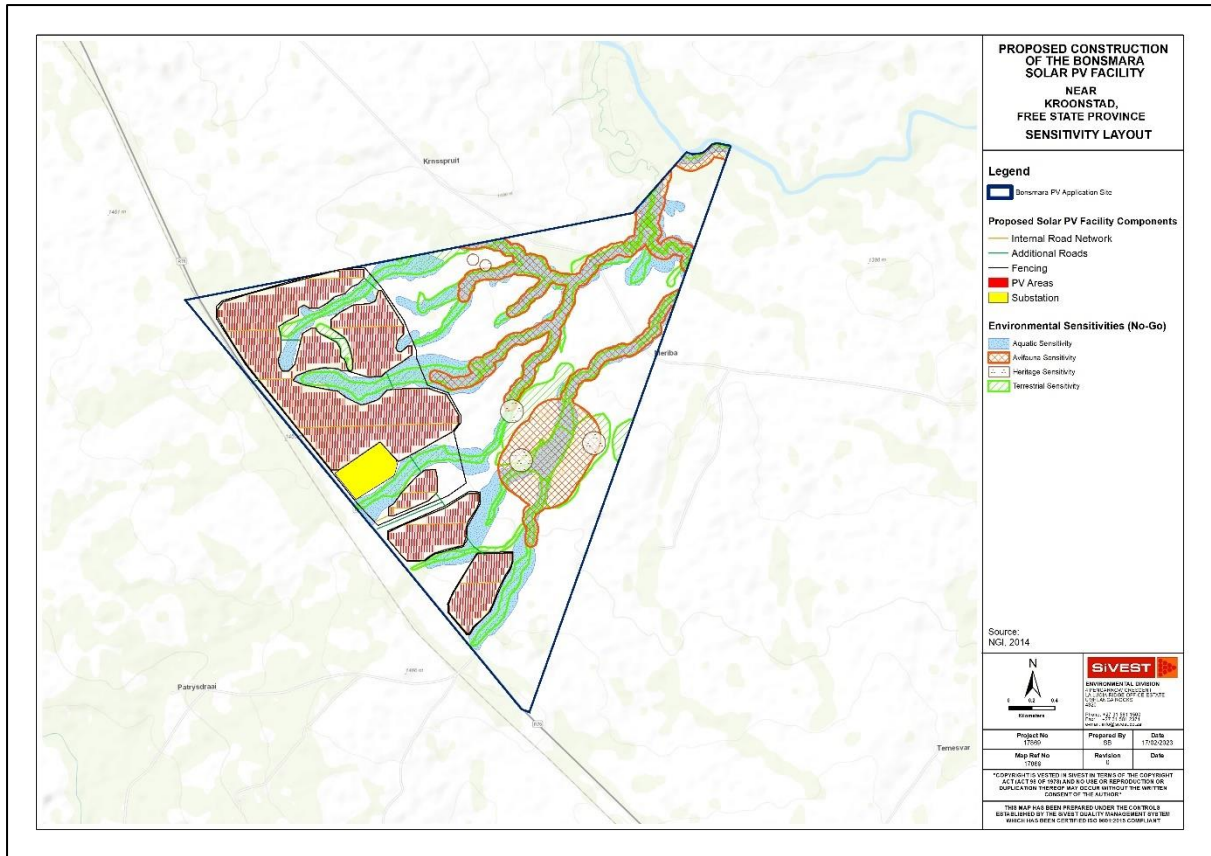
The terrestrial specialist confirmed that, due to having a low conservation status, the grassland habitat is deemed to have a moderate sensitivity status and would provide a suitable footprint for the proposed activity, bearing in mind watercourse and ecological process and connectivity buffers which have been incorporated into the design to incorporate an undeveloped network for connectivity purposes within the site and the surrounding landscape. The terrestrial specialist confirmed that all impacts are deemed to be medium before and low after mitigation.

The avifaunal specialist confirmed that overall there are no reasons why an environmental authorisation shouldn't be granted provided the recommendations provided in the report are met. The overall low significance post-mitigation should be interpreted that the project risks are within acceptable levels.

No fatal flaws have been identified by any of the specialists and all impacts can be mitigated to acceptable levels. During the construction phase, all of the post-mitigation scores are low. In terms of terms of job creation and economic opportunities, a positive rating was identified from a social perspective during the construction phase.

Similarly, during the operation phase almost all of the post-mitigation scores were identified as low. A medium negative rating was identified by the visual specialist with regards to the altered sense of place and visual intrusion caused by the PV array and BESS/substation. While it is acknowledged that infrastructure will have an impact on the sense of place within the landscape, the heritage specialist has acknowledged that from a cultural perspective, the naturally undulating landscape is already intermittently interrupted by powerlines and railway lines which detract from the visual quality of the surrounding area. The visual specialist did not identify this as a fatal flaw. A medium negative impact was also identified by the avifaunal specialist in term of bird mortalities both pre-and post mitigation. A positive medium impact was identified for job creation during the operational phase.

For the decommissioning phase, all negative impacts were identified as low, except for the impact of job losses as a result of decommissioning of the facility which was a negative medium impact. Cumulatively, all negative impacts were identified as low, with the exception of habitat loss identified by the avifaunal specialist who stated that the impact cannot be mitigated quantitatively.



**Figure 36: Final proposed layout / development footprint with site sensitivities**

The following updates have been made to the layout:

- All PV panels are located outside of the no-go areas identified by specialists.
- The substation, BESS and offices and buildings have been placed in areas deemed acceptable by the specialists.
- Some associated roads and cables do cross drainage lines in some instances, however existing crossings will be used as far as possible. Specialist recommendations and mitigations will be applied in areas where crossing of drainage lines / watercourses is required.

The proposed final layout has therefore considered the sensitivities identified throughout the process and has informed the final proposed development footprint and layout put forward for authorisation.

## 14. DETAILS OF PROCESS FOLLOWED TO REACH THE PREFERRED OPTION

### 14.1 Details of alternatives

As per Chapter 1 of the EIA regulations (2014), as amended, feasible and reasonable alternatives are required to be considered during the EIA process. Alternatives are defined as “*different means of meeting the general purpose and requirements of the activity*”. These alternatives may include:

- (a) The property on which or location where it is proposed to undertake the activity;
- (b) The type of activity to be undertaken;
- (c) The design or layout of the activity;

**BONSMARA SOLAR PV (RF) (PTY) LTD**

Prepared by:



**Project No.** 17869  
**Description** Proposed Bonsmara Solar PV Facility  
**Revision No.** 1.0

Date: April 2023

Page 80 of 126



- (d) The technology to be used in the activity;
- (e) The operational aspects of the activity; and
- (f) The option of not implementing the activity.

Each of these alternatives are discussed in relation to the proposed development in the sections below. The EIA Regulations, 2010 guideline document stipulates that the environmental investigation needs to consider feasible alternatives for the proposed development. The developer should be encouraged to consider alternatives that would meet the objective of the original proposal and which could have an acceptable impact on the environment. The role of alternatives in the EIA process is therefore to find the most effective way of meeting the need and purpose of the proposal, either through enhancing the environmental benefits of the proposed activity, and/or through reducing or avoiding potentially significant negative impacts.

#### **14.1.1 Location/Site alternatives**

Prior to the initiation of the EIA, alternative properties / sites were considered for the location of the proposed development. As discussed above, the selection of a potential solar farm site includes several key aspects including solar resource, grid connection suitability/infrastructure as well as environmental and social constraints, topography and access. This proposed project site was selected based on the above criteria ahead of other regional properties / sites due to the cumulative assessment of all criteria. This internal process takes several weeks to complete and ensures that the least environmentally sensitive property / site is selected in the specific region of development.

Based on the reasons above no site alternatives have been considered during the EIA process for this proposed development. The placement of solar energy facilities is dependent on the factors discussed above, all of which are favourable at the proposed site location. The proposed project site has topography which is suitable for the development of a SEF and is in close proximity to a grid connection that has been identified to have sufficient capacity to evacuate the generation. In addition, the proposed site is easily accessible off the R76 regional road. The site is therefore considered highly suitable for the proposed development of a SEF and no other locations have been considered.

#### **14.1.2 The type of activity to be undertaken**

No other activity alternatives have been considered. Renewable Energy developments in South Africa are highly desirable from a social, environmental and development perspectives respectively. The importance of renewable energy has been outlined in **Section 10** and **11** above highlighting national, district and local support. CSP technology would not be suitable for this site because it requires a flat surface, has a high visual impact and requires large volumes of water. CSP was not catered for in the IRP2019. In terms of wind energy, the climatic conditions show that there is not a suitable wind resource for a wind facility.

South Africa is under immense pressure to provide clean sources of electricity generating capacity in order to reduce the current electricity demand from aging and polluting coal-fired power stations. With the global focus on climate change, the government is under severe pressure to explore alternative energy sources in addition to coal-fired power stations. Although solar energy is not the only solution to solving the energy crisis in South Africa, it is a suitable sustainable solution to the energy crisis and this project could contribute to addressing the problem. This project will thus aid in achieving South Africa's goals in terms of sustainability, energy security, mitigating energy cost risks, local economic development and national job creation.

### 14.1.3 The technology to be used in the activity

The importance of renewable energy has been outlined in **Section 10** and **11** above highlighting national, district and local support. As stated above, CSP technology would not be suitable for this site because it requires a flat surface, has a high visual impact and requires large volumes of water. CSP was not catered for in the IRP2019. In terms of wind energy, the climatic conditions show that there is not a suitable wind resource for a wind facility.

### 14.1.4 Design or layout of the activity

Specialist studies identified the environmental constraints upfront and a layout that maximises the footprint was chosen. Therefore, site layout alternatives were not assessed. However, the layout was further refined to incorporate the constraints identified from the various specialists. The SEF has been designed to avoid sensitive areas as far as possible.

### 14.1.5 No – go option

The option of not implementing the activity, or the “no-go” alternative, has been investigated in the EIA process. South Africa is under immense pressure to provide clean sources of electricity generating capacity in order to reduce the current electricity demand from aging and polluting coal-fired power stations. With the global focus on climate change, the government is under severe pressure to explore alternative energy sources in addition to coal-fired power stations. Although solar energy is not the only solution to solving the energy crisis in South Africa, not establishing the proposed SEF and associated infrastructure would be detrimental to the mandate that the government has set to promote the implementation of renewable energy. It is a suitable sustainable solution to the energy crisis and this project could contribute to addressing the problem. This project will thus aid in achieving South Africa’s goals in terms of sustainability, energy security, mitigating energy cost risks, local economic development and national job creation.

The no-go alternative assumes that the proposed project will not go ahead i.e. it is the option of not developing the proposed Bonsmara SEF. This alternative would result in no environmental, social or economic impacts (positive or negative) from the proposed project on the site or surrounding local area.

The following implications could occur if the no-go alternative is implemented (i.e. the proposed project does not proceed):

- Aquatic - Should the project not proceed, then current status quo with regard the environment would remain unchanged. Overall, the area is largely in a natural state. However present-day impacts do occur in localised areas and included the following:
  - Increase in unpalatable species due to past grazing activities;
  - Erosion as a result of road crossings;
  - Several farm dams; and
  - Undersized culverts within present day road crossings.
- Agriculture - The no-go alternative considers impacts that will occur to the agricultural environment in the absence of the proposed development. The one identified potential such impact is that due to non-regular rainfall in the area, which is likely to be exacerbated by climate change, agriculture in the area will come under increased pressure in terms of economic viability. The development offers an alternative income source to agriculture, but it restricts agricultural use of the site. Therefore, even though the excluded land has low agricultural production potential, the negative agricultural impact of the development is more significant than that of the no-go alternative, and so, purely from an agricultural impact perspective, the no-go alternative is the preferred alternative

between the development and the no-go. However, the no-go option would prevent the proposed development from contributing positive agricultural impacts to the farm as well as contributing to the environmental, social and economic benefits associated with the development of renewable energy in South Africa.

- Social - There is a high negative impact from a social perspective for the no-go alternative. The option of not proceeding with the project implies that all the potential benefits, such as clean, readily available and cheaper electricity, will not materialise. Moreover, the new investments that may see an improvement in the infrastructure, new job creation, skills transfer, and enhancement of the national grid with renewable energy sources would not materialize.
- Visual – The No Go alternative entails no change to the status quo, in other words, no PV facility. Should the application for the Bonsmara 100 MW PV Facility and associated infrastructure be refused the visual impacts will not be realised.

The no- go alternative is not currently the preferred alternative.

## 14.2 Details of Public Participation Process undertaken

Public participation is the cornerstone of any EIA. The principles of the National Environmental Management Act (NEMA) as well as the EIA Regulations (as amended 2017) govern the EIA process, including public participation. These include provision of sufficient and transparent information on an ongoing basis to stakeholders to allow them to comment, and ensuring the participation of previously disadvantaged people, women and the youth. All documents relating to the PP process have been included in **Appendix 5**.

### 14.2.1 Public Participation Process completed for the Scoping Phase

The aim of the Scoping phase was to collect the issues, concerns and queries of interested and affected parties (I&APs) and determine the scope of the following phase of the EIA. The main objective of the Scoping phase was to:

- Inform the stakeholders about the proposed project and the environmental assessment process to be followed;
- Provide opportunity to all parties to exchange information and express their views and concerns;
- Obtain contributions from stakeholders (including the client, consultants, relevant authorities and the public) and ensure that all issues, concerns and queries raised are fully documented;
- Evaluate the issues raised and identify the significant issues; and
- Provide comment on how these issues are to be assessed as part of the Environmental Impact Assessment Process.

The comment periods during the scoping phase were implemented according to the EIA Regulations, 2014 (as amended). The comment periods that were implemented during the scoping phase (as set out by the EIA Regulations, 2014) were as follows:

#### **Comment and review period for the Draft Scoping Report (DSR)**

- The DSR underwent a 30-day comment and review period that ran from the 1<sup>st</sup> of November 2022 until the 1<sup>st</sup> of December 2022 (excluding public holidays).
- An I&AP database was compiled which included all affected landowners, adjacent landowners, occupiers of affected and adjacent land, other I&APs, key stakeholders (such as OoS) and other surrounding project developers. The I&AP database is included in **Appendix 5**.

- Issuing of the notifications and initial landowner consultation was circulated to all I&APs on the 27<sup>th</sup> of October 2022 as part of the Draft Scoping Report (proof included in **Appendix 5**).
- Placement of site notices in English and Afrikaans (as per regulations) were placed along the entrance road to the application site and around the site itself on 19<sup>th</sup> October 2022 (proof included in the Scoping Report).
- Notification letters were sent via E-mail or sms.
- Public notification of the EIA process was advertised in a local newspaper (namely the Vrystaat Kroon) on 26<sup>th</sup> October 2022, as required according to Regulation 41(2) (c) of the EIA Regulations (2014), as amended. Proof included in **Appendix 5** of the Final Scoping Report.
- Reminder notifications of the closing of the DSR comment period were sent out on the 15<sup>th</sup> of November 2022, 23<sup>rd</sup> of November 2022 and 30<sup>th</sup> of November 2022 respectively to ensure that comments and/or concerns were received from the OoS and/or registered I&APs.

#### **Availability of report for review:**

- The draft Scoping report was made available on SiVESTs website for download.
- Electronic copies were made available to parties via a secure digital link upon request for the documentation.
- CDs / Flash drive were posted, if required.
- The Draft Scoping Report was located and available for review at the following location:
  - Moqhaka Local Municipality – Hill Street, Kroonstad, Free State Province, South Africa

#### **Summary of issues raised**

Issues, comments and concerns raised during the public participation process to date have been captured in the Comments and Response Report (C&RR). The C&RR provided a summary of the comments received and issues raised by I&APs and key stakeholders, as well as the responses provided. This information will be used to feed into the evaluation of environmental and social impacts and has also been taken into consideration when compiling the FSR. All comments received to date have been included in the C&RR and attached in **Appendix 5**.

**The Final Scoping Report was accepted by DFFE on the 6 February 2023.**

#### **14.2.2 Public Participation Process to be undertaken for the EIA Phase**

Public participation forms a critical component of the EIA process, as it provides all interested and affected parties with an opportunity to learn about a project, but more importantly to understand how a project will impact on them. The following will be undertaken during the EIA Phase (as per the approved Final Scoping and Plan of Study):

- The I&AP database will be updated as and when necessary during the execution of the EIA.
- A 30-day comment period will be provided to I&APs to review the Draft EIA Report. Copies of the Draft EIA Report will be provided to the regulatory and commenting authorities as well. The Draft EIA Report will also be available for download on a link to be provided.
- All parties on the I&AP database will be notified via email, sms or fax of the opportunity to review the Draft EIA Report, the review period and the process for submitting comments on the report.
- All comments received from I&APs and the responses thereto will be included in the final EIA Report, which will be submitted to DFFE.
- A copy of the Draft EIA Report will be made available at the Moqhaka Local Municipality – Hill Street, Kroonstad, Free State Province, South Africa.

**BONSMARA SOLAR PV (RF) (PTY) LTD**

Prepared by:



Project No. 17869  
Description Proposed Bonsmara Solar PV Facility  
Revision No. 1.0

Date: April 2023

Page 84 of 126

- The Comments and Response Report will be updated and included in the Final EIA Report, which will record the date that issues were raised, a summary of each issue, and the response of the team to address the issue. The Final EIA report with all comments included will be submitted to DFFE for review and approval.
- All I&APs will be notified via email, sms or fax after having received written notice from DFFE on the final decision on the application. These notifications will include the process required to lodge an appeal, as well as the prescribed timeframes in which documentation should be submitted.

### 14.3 Impact Assessment

The potential impacts for the identified environmental aspects have been assessed and mitigation measures identified below (refer **Appendix 6**).

#### 14.3.1 Planning

None identified

#### 14.3.2 Construction Phase

| ENVIRONMENTAL PARAMETER  | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE  | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION |   |   |   |   |     |       | RECOMMENDED MITIGATION MEASURES | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION |  |   |   |   |   |   |     |       |                 |     |
|--|--|--|---|---|---|---|-----|-------|---------------------------------|---|--|---|---|---|---|---|-----|-------|-----------------|-----|
|  |  | E  | P | R | L | D | I/M | TOTAL |                                 | STATUS (+ OR -)                             | S  | E | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S   |
| <b>Aquatic / Freshwater</b>  |  |  |   |   |   |   |     |       |                                 |   |  |   |   |   |   |   |     |       |                 |     |
| Impact 1: Loss of aquatic species of special concern   | The construction activities will result in the disturbance of aquatic habitats that may contain listed and or protected plant or animal species. However, none of these were observed during this assessment   | 1  | 1 | 1 | 1 | 1 | 1   | 5     | -                               | Low   | <ul style="list-style-type: none"> <li>Develop and implement a Rehabilitation and Monitoring plan post Environmental Authorisation. This must be developed following the finalisation of the panel / road layout and a walk down has been completed. This plan should include relocation of suitable plant species, but more important protect any topsoil stores and promote the collection of vegetative material and propagules / seed to assist with the revegetation of the site</li> <li>Where possible, temporary construction lay-down or assembly areas should be sited on transformed areas; and</li> <li>Rapid regeneration of plant cover must be encouraged by setting aside topsoil during earthmoving and replacing onto areas where the re- establishment of plant cover is desirable to prevent erosion.</li> </ul>   | 1 | 1 | 1 | 1 | 1 | 1   | 5     | -               | Low |
| Impact 2: Damage or loss of riparian systems, ephemeral watercourses and wetland systems in the construction phase | Construction could result in the loss of drainage systems that are fully functional and provide an ecosystem services within the site especially where new access roads are required or road upgrades will widen any current bridges or drifts. Loss can also include a functional loss, through change in vegetation type via alien encroachment for example. | 2  | 3 | 2 | 2 | 3 | 2   | 24    | -                               | Medium                                      | <ul style="list-style-type: none"> <li>A pre-construction walkthrough with an aquatic specialist is recommended and they can assist with the development of the stormwater management plan and Aquatic Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout.</li> <li>All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints and especially in areas near the proposed crossings. Where roads and crossings are upgraded, the following applies: Existing pipe culverts must be removed and replaced with suitable sized box culverts, especially where road levels are raised to accommodate any large vehicles. River levels, regardless of the current state of the river / water course must be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist during a pre-construction walkdown.</li> </ul> | 1 | 3 | 2 | 1 | 2 | 2   | 18    | -               | Low |

| ENVIRONMENTAL PARAMETER   | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE  | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION |   |   |   |   |     |       |                 |        | RECOMMENDED MITIGATION MEASURES  | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION  |   |   |   |   |     |       |                 |     |
|---|--|--|---|---|---|---|-----|-------|-----------------|--------|--|--|---|---|---|---|-----|-------|-----------------|-----|
|   |  | E  | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |  | E  | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S   |
|   |  |  |   |   |   |   |     |       |                 |        |  | <ul style="list-style-type: none"> <li>Where large cut and fill areas are required these must be stabilised and rehabilitated during the construction process, to minimise erosion and sedimentation.</li> <li>Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc).</li> <li>A detailed monitoring plan must be developed in the pre-construction phase by an aquatic specialist, where any delineated system occurs within 50 m of existing crossings.</li> </ul> |   |   |   |   |     |       |                 |     |
| Impact 3: Potential impact on localised surface water quality (construction materials and fuel storage facilities) during the construction and decommissioning phases | During construction earthworks will expose and mobilise earth materials, and a number of materials as well as chemicals will be imported and used on site and may end up in the surface water, including soaps, oils, grease and fuels, human wastes, cementitious wastes, paints and solvents, etc. Any spills during transport or while works area conducted in proximity to a watercourse has the potential to affect the surrounding biota. Leaks or spills from storage facilities also pose a risk and due consideration to the safe design and management of the 30 000l fuel storage facility must be given. Although unlikely, consideration must also be provided for the proposed Battery Energy Storage System (BESS), with regard safe handling during the construction phase. This to avoid any spills or leaks from this system | 1  | 3 | 2 | 2 | 3 | 3   | 33    | -               | Medium | <ul style="list-style-type: none"> <li>All liquid chemicals including fuels and oil, including the BESS must be stored in with secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill kits needed to contain likely worst-case scenario leak or spill in that facility, safely.</li> <li>Washing and cleaning of equipment must be done in designated wash bays, where rinse water is contained in evaporation/sedimentation ponds (to capture oils, grease cement and sediment).</li> <li>Mechanical plant and bowsers must not be refuelled or serviced within 100m of a river channel.</li> <li>All construction camps, lay down areas, wash bays, batching plants or areas and any stores should be more than 50 m from any demarcated water courses.</li> <li>Littering and contamination associated with construction activity must be avoided through effective construction camp management;</li> <li>No stockpiling should take place within or near a water course</li> <li>All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment recoverable;</li> </ul> | 1  | 3 | 2 | 1 | 2 | 2   | 18    | -               | Low |
| <b>Terrestrial Ecology</b>  |  |  |   |   |   |   |     |       |                 |        |  |  |   |   |   |   |     |       |                 |     |
| Vegetation  | Permanent or temporary loss of indigenous vegetation cover because of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.  | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>Blanket clearing of vegetation must be limited to the site. No clearing outside of footprint to take place.</li> <li>Topsoil must be striped and stockpiled separately during site preparation and replaced on completion where revegetation will take place.</li> <li>Any site camps and laydown areas requiring clearing must be located within already disturbed areas away from watercourses.</li> </ul>  | 1  | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |

| ENVIRONMENTAL PARAMETER        | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE  | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION |   |   |   |   |     |       |                 |        | RECOMMENDED MITIGATION MEASURES  | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION |   |   |   |   |     |       |                 |     |
|--------------------------------|--|--|---|---|---|---|-----|-------|-----------------|--------|--|---|---|---|---|---|-----|-------|-----------------|-----|
|                                |  | E  | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |  | E   | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S   |
| Flora Species                  | Loss of flora species of special concern during pre-construction site clearing activities. Numerous species of special concern are potentially present within the affected area, which could be destroyed during site preparation.   | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>A flora search and rescue is recommended before commencement.</li> <li>Respective permits to be obtained beforehand.</li> </ul>   | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |
| Alien Invasive Species         | Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established. | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>Alien trees and weeds must be removed from the site as per CARA/NEMBA requirements.</li> <li>A suitable weed management strategy to be implemented in construction and operation phases. • After clearing and construction is completed, an appropriate cover may be required, should natural re-establishment of grasses not take place in a timely manner along road verges. This will also minimise dust.</li> </ul>                 | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |
| Erosion                        | Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after  | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted once construction is completed.</li> <li>Topsoil must be stripped and stockpiled separately and replaced on completion.</li> <li>If natural vegetation re-establishment does not occur, a suitable grass must be applied.</li> </ul>   | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |
| Ecological Processes           | Disturbances to ecological processes. Activity may result in disturbances to ecological processes.   | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>Blanket clearing of vegetation must be limited to the development footprint, and the area to be cleared must be demarcated before any clearing commences.</li> </ul>  | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |
| Aquatic and Riparian processes | Aquatic and Riparian processes. Diversion and increased velocity of surface water flows – Changes to the hydrological regime and increased potential for erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of species of special concern.   | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>Suitable structures to be constructed at watercourse crossings that do not alter flows.</li> <li>Stormwater discharge into watercourses to be protected against erosion.</li> </ul>   | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |
| Faunal Habitat                 | Loss of Faunal Habitat: Activity will result in the loss of habitat for faunal species.  | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>Blanket clearing of vegetation must be limited to the footprint.</li> <li>It is important that clearing activities are kept to the minimum and take place in a phased manner, where applicable. This allows any smaller animal species to move into safe areas and prevents wind and water erosion of the cleared areas.</li> </ul>   | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |
| Faunal Processes               | Disruptions to faunal processes Including barriers to movement and gene dispersal.   | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>The habitats and microhabitats present on the project site are not unique and are widespread in the general area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to.</li> <li>Small mammals within the habitat on and around the affected area are generally mobile and likely to be transient to the area. They will most likely vacate the area once</li> </ul> | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |



| ENVIRONMENTAL PARAMETER               | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE   | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION |   |   |   |   |     |       |                 |        | RECOMMENDED MITIGATION MEASURES   | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION   |   |   |   |   |     |       |                 |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---------------------------------------|---|--|---|---|---|---|-----|-------|-----------------|--------|---|---|---|---|---|---|-----|-------|-----------------|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
|                                       |   | E  | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |   | E   | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                       |   |  |   |   |   |   |     |       |                 |        |   | construction commences. As with all construction sites there is a latent risk that there will be some accidental mortalities. Specific measures are made to reduce this risk. The risk of species of special concern is low, and it is unlikely that there will be any impact to populations of such species because of the activity. |   |   |   |   |     |       |                 |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Faunal Species                        | Loss of faunal SSC due to construction activities: Activities associated with bush clearing and ploughing, killing of perceived dangerous fauna, may lead to increased mortalities among faunal species.  | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>• Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. It is recommended that a faunal search and rescue be conducted before construction commences, although experience has shown that there could still be some mortalities as these species are mobile and may thus move onto site once construction is underway. A reptile handler should be on call for such circumstances.</li> <li>• Should any amphibian migrations occur between wetland areas during construction, appropriate measures (including temporarily suspending works in the affected area) should be implemented.</li> </ul>   | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low | <ul style="list-style-type: none"> <li>• A pre-commencement faunal search and rescue is recommended.</li> <li>• Respective permits to be obtained beforehand.</li> <li>• No animals are to be harmed or killed during the course of operations.</li> <li>• Workers are NOT allowed to snare any faunal species.</li> </ul> |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>Agricultural - none identified</b> |   |  |   |   |   |   |     |       |                 |        |   |   |   |   |   |   |     |       |                 |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>Avifauna</b>                       |   |  |   |   |   |   |     |       |                 |        |   |   |   |   |   |   |     |       |                 |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Habitat Destruction                   | Significant habitat loss (including foraging and breeding) and fragmentation due to displacement (avoidance of disturbance) because of infrastructure installation (panels, powerlines, roads, fences and sub surface cables) and associated dust effects. Habitat loss has the tendency to not only destroy existing habitat but also displace bird species from large areas of natural habitat. This specifically has a greater impact on bird species restricted to a specific habitat and its requirements. | 2  | 4 | 3 | 2 | 4 | 3   | 45    | -               | High   | Impacts associated with the loss of bird foraging habitat due to construction activity cannot be mitigated in relation to the majority of the habitats but can be mitigated by avoiding avifaunal specific highly sensitive areas and their associated buffers, such as the local drainage lines, impoundments, smaller watercourses, pans and rocky koppies. The overall severity of the impact can be reduced to being insignificant if avoidance mitigation is applied related to the positioning of the panels and supporting infrastructure and minimisation mitigation is applied. Finally and for all panel infrastructure, commencement of construction should be restricted to the months of February, March, April, May, June, July, August, September, October, November (latest) to minimise dust effects and subsequent destruction of the avifaunal habitats. | 2   | 2 | 2 | 2 | 3 | 2   | 22    | -               | Low |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

| ENVIRONMENTAL PARAMETER  | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE  | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION |   |   |   |   |     |       |                 |        | RECOMMENDED MITIGATION MEASURES   | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION |   |   |   |   |     |       |                 |     |
|--|--|--|---|---|---|---|-----|-------|-----------------|--------|---|---|---|---|---|---|-----|-------|-----------------|-----|
|  |  | E  | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |   | E   | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S   |
| Disturbance of bird roosts   | The destruction or disturbance of bird roosts during the construction phase  | 2  | 4 | 3 | 2 | 2 | 3   | 39    | -               | Medium | As with other impacts, this impact can be mitigated by timing of any panel construction <u>to not commence</u> in November, December and January in order to avoid breeding periods of species within the sensitive drainage lines, wetlands and the general region.  | 2   | 3 | 2 | 2 | 2 | 2   | 22    | -               | Low |
| Disturbance due to noise such as, machinery movements and maintenance operations | Disturbance (including of nesting SCC) due to noise such as, machinery movements and maintenance operations during the construction phase the proposed PV solar farm causing loss of offspring for a generation. | 3  | 3 | 1 | 2 | 4 | 3   | 39    | -               | Medium | As with other impacts, this impact can be mitigated by timing of any panel construction <u>to not commence</u> in November, December and January in order to avoid breeding periods of species within the sensitive drainage lines, wetlands and the general region.  | 3   | 2 | 1 | 2 | 3 | 2   | 22    | -               | Low |
| <b>Geotech</b>   |  |  |   |   |   |   |     |       |                 |        |   |   |   |   |   |   |     |       |                 |     |
| Disturbance/displacement/removal of soil and rock                                | Ground disturbance during access road construction, foundation earthworks, platform earthworks   | 1  | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low    | <ul style="list-style-type: none"> <li>Design access roads and pile locations to minimise earthworks and levelling based on high resolution ground contour information</li> <li>Correct topsoil and spoil management</li> </ul>   | 1   | 4 | 2 | 1 | 3 | 1   | 11    | -               | Low |
| Soil Erosion   | Increased erosion due to vegetation clearing, alteration of natural drainage   | 1  | 4 | 2 | 2 | 2 | 1   | 11    | -               | Low    | <ul style="list-style-type: none"> <li>Avoid development in preferential drainage paths</li> <li>Appropriate engineering design of road drainage and watercourse crossings</li> <li>Temporary berms and drainage channels to divert surface runoff where needed</li> <li>Landscape and rehabilitate disturbed areas timeously (e.g. regressing)</li> <li>Use designated access and laydown areas only to minimise disturbance to surrounding areas</li> </ul> | 1   | 2 | 1 | 1 | 2 | 1   | 7     | -               | Low |
| <b>Social</b>  |  |  |   |   |   |   |     |       |                 |        |   |   |   |   |   |   |     |       |                 |     |
| Noise impact   | Noise at the site and the construction vehicles ferrying the panels and building materials   | 1  | 4 | 2 | 1 | 1 | 2   | 18    | -               | Low    | <ul style="list-style-type: none"> <li>Installation of noise buffers</li> </ul>   | 1   | 2 | 1 | 1 | 1 | 1   | 6     | -               | Low |
| Impacts on biodiversity  | Habitat loss to make way for large-scale solar facilities.   | 1  | 4 | 3 | 3 | 3 | 3   | 42    | -               | Medium | <ul style="list-style-type: none"> <li>Locate developments away from important habitat for faunal species, particularly those that are threatened.</li> </ul>   | 1   | 2 | 2 | 2 | 2 | 2   | 18    | -               | Low |
| Loss of agricultural land  | Is a function of the size of the area of land that is impacted and the production potential, of that impacted land.  | 1  | 2 | 3 | 3 | 3 | 3   | 36    | -               | Medium | <ul style="list-style-type: none"> <li>Avoid land that has agricultural potential.</li> </ul>   | 1   | 1 | 2 | 2 | 2 | 2   | 16    | -               | Low |

| ENVIRONMENTAL PARAMETER                      | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE   | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION |   |   |   |   |     |       |                 |        | RECOMMENDED MITIGATION MEASURES  | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION |   |   |   |   |     |       |                 |     |
|--|---|--|---|---|---|---|-----|-------|-----------------|--------|--|---|---|---|---|---|-----|-------|-----------------|-----|
|  |   | E  | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |  | E   | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S   |
| Cultural heritage impacts                    | If the solar PV facility is located near sacred areas, cultural practices will be affected. Recent archaeological field assessment conducted for other solar PV facilities located approximately 10km from the proposed development area identified some cultural remains but with varied value and preservation. It is likely that similar heritage resources may be present within this development area. (CTS Heritage, 2022). | 1  | 2 | 2 | 2 | 3 | 3   | 30    | -               | Medium | <ul style="list-style-type: none"> <li>Construction near pristine natural regions, sacred sites, and communities should be avoided during site projects. It is important to conduct an archaeological assessment of the regions up for development and evaluate any potential implications on such resources.</li> </ul>   | 1   | 1 | 1 | 2 | 2 | 2   | 14    | -               | Low |
| Visual Impacts                               | The glint and glare surrounding the high reflectivity of the solar PV panels may distract motorists and aircraft.   | 1  | 4 | 3 | 3 | 3 | 3   | 42    | -               | Medium | <ul style="list-style-type: none"> <li>Adhere to the mitigation measures recommended by the visual specialist</li> </ul>   | 1   | 3 | 2 | 2 | 2 | 2   | 20    | -               | Low |
| Graves                                       | Identification of human remains indicating a former burial place or the simple existence of a known cemetery during construction.   | 1  | 2 | 2 | 2 | 3 | 3   | 30    | -               | Medium | <ul style="list-style-type: none"> <li>The recorded cemetery must be avoided with a 30m buffer zone. The site must be fenced and access for family members must be ensured; alternatively, the graves can be relocated, adhering to all legal requirements.</li> </ul>   | 1   | 1 | 1 | 2 | 2 | 2   | 14    | -               | Low |
| Road and traffic hazards                     | Heavy construction vehicles on poor roads will cause potholes to form, and accidents will rise.   | 1  | 4 | 3 | 3 | 3 | 3   | 42    | -               | Medium | <ul style="list-style-type: none"> <li>Ensure the nearby roadways are maintained properly, and that traffic laws for transporting workers and contractors are adhered to.</li> </ul>   | 1   | 2 | 2 | 2 | 2 | 2   | 22    | -               | Low |
| Land use and space requirements              | Requirements for land and space to have the installation of the solar PV's.   | 1  | 4 | 2 | 1 | 1 | 2   | 18    | -               | Low    | <ul style="list-style-type: none"> <li>The best alternative is the use of the utility scale PV system as it requires less space.</li> </ul>  | 1   | 2 | 1 | 1 | 1 | 1   | 6     | -               | Low |
| Social impacts: job creation                 | Creation of jobs and local economic opportunities   | 1  | 3 | 2 | 2 | 3 | 2   | 22    | +               | Medium | <ul style="list-style-type: none"> <li>Ensure local employment policy is in place and on-the-job training for unskilled workers</li> </ul>   | 1   | 2 | 1 | 1 | 2 | 1   | 7     | +               | Low |
| <b>Heritage</b>                              |   |  |   |   |   |   |     |       |                 |        |  |   |   |   |   |   |     |       |                 |     |
| Impacts to archaeological heritage resources | Construction activities that take place near to archaeological resources may result in their destruction  | 1  | 2 | 4 | 3 | 4 | 3   | 42    | -               | Medium | <ul style="list-style-type: none"> <li>A no development buffer of 50m is implemented around sites KS3 and KS4</li> <li>A no development buffer of 100m is implemented around sites KS6, KS7 and KS8</li> <li>The area identified as having higher levels of archaeological sensitivity in Figure 5 must not be impacted by any development activities.</li> <li>Should any previously unknown archaeological resources be impacted during construction, work must cease in the vicinity of the find and the relevant heritage authority must be contacted</li> </ul> | 1   | 1 | 4 | 1 | 4 | 1   | 11    | -               | Low |

| ENVIRONMENTAL PARAMETER   | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE  | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION |   |   |   |   |     |       |                 |        | RECOMMENDED MITIGATION MEASURES  | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION |   |   |   |   |     |       |                 |     |
|---|--|--|---|---|---|---|-----|-------|-----------------|--------|--|---|---|---|---|---|-----|-------|-----------------|-----|
|   |  | E  | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |  | E   | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S   |
| Impacts to palaeontological resources   | Construction activities that take place near to palaeontological resources may result in their destruction   | 1  | 2 | 4 | 3 | 4 | 3   | 42    | -               | Medium | • Implementation of the Chance Fossil Finds Procedure  | 1   | 1 | 4 | 1 | 4 | 1   | 11    | 1               | Low |
| Impacts to the cultural landscape   | Construction activities that take place near to cultural landscape elements may result in their destruction  | 1  | 2 | 4 | 3 | 4 | 3   | 42    | -               | Medium | • Implementation of the recommendations included in the VIA  | 1   | 1 | 4 | 1 | 4 | 1   | 11    | -               | Low |
| <b>Visual</b>   |  |  |   |   |   |   |     |       |                 |        |  |   |   |   |   |   |     |       |                 |     |
| Altered Sense of Place and Visual Intrusion caused by Construction Activities | Dust generated during construction will be visually unappealing and may detract from the visual quality (and sense of place) of the area. These impacts are typically limited to the immediate area surrounding the construction site, during the construction period. | 2  | 4 | 1 | 2 | 1 | 3   | 30    | -               | Medium | <ul style="list-style-type: none"> <li>Limit vegetation clearance and the footprint of construction to what is absolutely essential.</li> <li>Consolidate the footprint of the construction camp to a functional minimum.</li> <li>Avoid excavation, handling and transport of materials which may generate dust under very windy conditions.</li> <li>Keep stockpiled aggregates and sand covered to minimise dust generation.</li> <li>Keep construction site tidy.</li> </ul> | 2   | 3 | 1 | 2 | 1 | 2   | 18    | -               | Low |

**14.3.3 Operational Phase**

| ENVIRONMENTAL PARAMETER  | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE   | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION |   |   |   |   |     |       |                 |        | RECOMMENDED MITIGATION MEASURES   | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION |   |   |   |   |     |       |                 |     |
|--|---|--|---|---|---|---|-----|-------|-----------------|--------|---|---|---|---|---|---|-----|-------|-----------------|-----|
|  |   | E  | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |   | E   | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S   |
| <b>Aquatic / Freshwater</b>  |   |  |   |   |   |   |     |       |                 |        |   |   |   |   |   |   |     |       |                 |     |
| Impact 4 Impact on aquatic systems through the possible increase in surface water runoff on form and function during the operational phase | Increase in hard surface areas, and roads that require stormwater management will increase through the concentration of surface water flows that could result in localised changes to flows (volume) that would result in form and function changes within aquatic systems, which are currently ephemeral. This then increases the rate of erosions and sedimentation of downstream areas | 2  | 3 | 2 | 2 | 3 | 3   | 36    | -               | Medium | <ul style="list-style-type: none"> <li>A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems</li> <li>This stormwater control systems must be inspected on an annual basis to ensure these are functional. Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil and the re-vegetation of any disturbed riverbanks</li> </ul> | 1   | 1 | 1 | 1 | 1 | 1   | 5     | -               | Low |

| ENVIRONMENTAL PARAMETER        | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE  | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION |   |   |   |   |     |       |                 |        | RECOMMENDED MITIGATION MEASURES  | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION |   |   |   |   |     |       |                 |     |
|--------------------------------|--|--|---|---|---|---|-----|-------|-----------------|--------|--|---|---|---|---|---|-----|-------|-----------------|-----|
|                                |  | E  | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |  | E   | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S   |
| <b>Terrestrial Ecology</b>     |  |  |   |   |   |   |     |       |                 |        |  |   |   |   |   |   |     |       |                 |     |
| Alien Invasive Species         | Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established. | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>Alien trees and weeds must be removed from the site as per CARA/NEMBA requirements.</li> <li>A suitable weed management strategy to be implemented in construction and operation phases.</li> <li>After clearing and construction is completed, an appropriate cover may be required, should natural re-establishment of grasses not take place in a timely manner along road verges. This will also minimise dust.</li> </ul>  | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |
| Erosion                        | Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.  | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted once construction is completed.</li> <li>Topsoil must be stripped and stockpiled separately and replaced on completion.</li> <li>If natural vegetation re-establishment does not occur, a suitable grass must be applied.</li> </ul>   | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |
| Ecological Processes           | Disturbances to ecological processes. Activity may result in disturbances to ecological processes. barriers to movement and gene dispersal.  | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>Blanket clearing of vegetation must be limited to the development footprint, and the area to be cleared must be demarcated before any clearing commences.</li> </ul>  | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |
| Aquatic and Riparian processes | Aquatic and Riparian processes. Diversion and increased velocity of surface water flows – Changes to the hydrological regime and increased potential for erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of species of special concern.   | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>Suitable structures to be constructed at watercourse crossings that do not alter flows.</li> <li>Stormwater discharge into watercourses to be protected against erosion.</li> </ul>   | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |
| Faunal Processes               | Disruptions to faunal processes Including barriers to movement and gene dispersal.   | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>The habitats and microhabitats present on the project site are not unique and are widespread in the general area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to.</li> <li>Small mammals within the habitat on and around the affected area are generally mobile and likely to be transient to the area. They will most likely vacate the area once construction commences. As with all construction sites there is a latent risk that there will be some accidental mortalities. Specific measures are made to reduce this risk. The risk of species of special concern is low, and it is unlikely that there will be any impact to populations of such species because of the activity.</li> <li>Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. It is recommended that a faunal search and rescue be conducted before construction commences, although experience has shown that there could still be some</li> </ul> | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |

| ENVIRONMENTAL PARAMETER  | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE  | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION |   |   |   |   |     |       |                 |        | RECOMMENDED MITIGATION MEASURES  | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION   |   |   |   |   |     |       |                 |        |  |  |  |  |  |
|--|--|--|---|---|---|---|-----|-------|-----------------|--------|--|---|---|---|---|---|-----|-------|-----------------|--------|--|--|--|--|--|
|  |  | E  | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |  | E   | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |  |  |  |  |  |
|  |  |  |   |   |   |   |     |       |                 |        |  | mortalities as these species are mobile and may thus move onto site once construction is underway. A retile handler should be on call for such circumstances.<br><ul style="list-style-type: none"> <li>Should any amphibian migrations occur between wetland areas during construction, appropriate measures (including temporarily suspending works in the affected area) should be implemented.</li> </ul> |   |   |   |   |     |       |                 |        |  |  |  |  |  |
| <b>Agricultural- non identified</b>  |  |  |   |   |   |   |     |       |                 |        |  |   |   |   |   |   |     |       |                 |        |  |  |  |  |  |
| <b>Avifauna</b>  |  |  |   |   |   |   |     |       |                 |        |  |   |   |   |   |   |     |       |                 |        |  |  |  |  |  |
| Disturbance due to noise such as, machinery movements and maintenance operations | Disturbance (including of nesting SCC) due to noise such as, machinery movements and maintenance operations during the construction phase the proposed PV solar farm causing loss of offspring for a generation. | 3  | 3 | 1 | 2 | 1 | 2   | 20    | -               | Low    | No Mitigation Required   | 3   | 3 | 1 | 2 | 1 | 2   | 20    | -               | Low    |  |  |  |  |  |
| Bird mortalities   | Bird mortalities during the operational phase due to vehicle collisions, collisions with infrastructure and/or combustion.   | 3  | 3 | 2 | 2 | 2 | 3   | 36    | -               | Medium | Impacts due to bird mortalities during the operational phase are practically unavoidable for any large facility, but with the appropriate mitigation measures these impacts can be minimised. It is likely that most of the avifaunal populations will be largely displaced from the majority of the project infrastructure, although significant risks are associated with the likelihood of project vehicles flushing birds into fencing infrastructure as well as collisions of large bodied species with powerlines. Although the current overall bird activity qualifies the proposed solar development boundary as a high-density area, there are certain times of the year (and day) when it appears that large flocks of birds (such as cranes bustards and large birds of prey) are far more prevalent. All powerline infrastructure must be fitted with approved bird diverters in order to provide visibility for large-bodied birds. In all areas where service road intersects with semi natural or natural habitat, all fences that are constructed (if any) must be set back at least (strictly) 75 metres from the edge of every service road in order to allow for vulnerable species such as coursers, cranes and korhaans to obtain adequate height after being flushed by vehicle traffic. An Alternative mitigation measure and where a 75 metre buffer is not possible, new fences must be set back no more than 2 metres (directly adjacent) from the edge of service roads. Through the essential elimination of habitat, this will limit any chance of vulnerable species foraging on verge side vegetation and causing subsequent fence collisions. Finally, reflective diverters should be attached to new fencing alongside regular maintenance roads every 50 metres. | 3   | 2 | 2 | 2 | 2 | 2   | 22    | -               | Medium |  |  |  |  |  |

| ENVIRONMENTAL PARAMETER  | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE   | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION |   |   |   |   |     |       |                 |        | RECOMMENDED MITIGATION MEASURES  | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION |   |   |   |   |     |       |                 |        |
|--|---|--|---|---|---|---|-----|-------|-----------------|--------|--|---|---|---|---|---|-----|-------|-----------------|--------|
|  |   | E  | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |  | E   | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |
| Loss of Bird Foraging Habitat  | Loss of Bird Foraging Habitat   | 3  | 3 | 2 | 2 | 2 | 3   | 36    | -               | Medium | Impacts associated with the loss of bird foraging habitat due to operations can be mitigated by avoiding avifaunal specific sensitive areas and their associated buffers, such as the local drainage lines, impoundments, smaller watercourses, pans and koppies. A green buffer should be maintained around all habitats with a SEI designated as High or above.  | 3   | 2 | 2 | 2 | 2 | 2   | 22    | -               | Low    |
| Disruption of bird migratory pathways  | Disruption of bird migratory pathways during the operational phase  | 3  | 3 | 2 | 2 | 4 | 2   | 28    | -               | Medium | Migratory pathways of birds cannot be changed and the resulting impacts are unavoidable. However, severity of the impacts can be reduced with appropriate mitigation measures. Some significant discernible migratory flight pathways were able to be established which could be explained by large areas of generic habitats punctuated by some distinguishing geographic features in the landscape, such as large ridges, large impoundments, wetlands and drainage lines. The linear Drainage line habitats must be buffered by a minimum of 50 metres from the edge of the demarcated wetland. | 3   | 2 | 2 | 2 | 2 | 2   | 22    | -               | Low    |
| The attraction of some novel bird species due to the development of a solar farm with associated infrastructure such as lake effect, perches, nest and shade opportunities | The attraction of some novel bird species due to the development of a solar farm with associated infrastructure such as lake effect perches, nest and shade opportunities may cause both damage to the infrastructure through acidic defecation by certain species but also draw birds closer to infrastructure and cause significant direct mortality risks. | 3  | 2 | 2 | 2 | 3 | 2   | 24    | -               | Medium | Essentially, all habitat attractants should be eliminated so that avifaunal populations will not embedded themselves within the infrastructure over time. This includes bird diverters, perch deterrents and the application of non-polarising white tape can be used around and/or across panels to minimise reflection which can attract aquatic birds and insects (food) as panels mimic reflective surfaces of waterbodies.  | 3   | 2 | 1 | 1 | 3 | 2   | 20    | -               | Low    |
| Chemical pollution spills  | Chemicals being used to keep the PV panels clean from dust (suppressants) etc.  | 3  | 3 | 2 | 2 | 4 | 3   | 42    | -               | Medium | Application of strict chemical control procedures as per the EMP. Zero spills should be targeted and full clean up kits available in the event of any chemical spill. Soil testing subject to EMP.   | 1   | 2 | 2 | 2 | 3 | 2   | 20    | -               | Low    |
| <b>Geo-tech</b>  |   |  |   |   |   |   |     |       |                 |        |  |   |   |   |   |   |     |       |                 |        |
| Soil Erosion   | Increased erosion due to alteration of natural drainage   | 1  | 2 | 1 | 1 | 2 | 1   | 7     | -               | Low    | <ul style="list-style-type: none"> <li>Maintain access roads including drainage features</li> <li>Monitor for erosion and remediate and rehabilitate timeously</li> </ul>  | 1   | 2 | 1 | 1 | 2 | 1   | 7     | -               | Low    |
| <b>Social</b>  |   |  |   |   |   |   |     |       |                 |        |  |   |   |   |   |   |     |       |                 |        |
| Hazardous material generation  | Hydrochloric, sulphuric, and nitric acids are used to clean and purify the silicon wafer.   | 2  | 4 | 4 | 3 | 3 | 3   | 48    | -               | High   | <ul style="list-style-type: none"> <li>Research and development on safer alternatives to clean the silicon wafer.</li> </ul>   | 1   | 3 | 3 | 3 | 2 | 2   | 24    | -               | Medium |

| ENVIRONMENTAL PARAMETER  | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE  | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION |   |   |   |   |     |       |                 |        | RECOMMENDED MITIGATION MEASURES  | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION |   |   |   |   |     |       |                 |        |
|--|--|--|---|---|---|---|-----|-------|-----------------|--------|--|---|---|---|---|---|-----|-------|-----------------|--------|
|  |  | E  | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |  | E   | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |
| Impacts on water resources   | There is no need for water for electricity generation.   | 1  | 3 | 2 | 2 | 3 | 2   | 22    | +               | Medium | • Use dry cooled plants.   | 1   | 2 | 1 | 1 | 2 | 1   | 7     | +               | Low    |
| Visual impacts   | The glint and glare surrounding the high reflectivity of the solar PV panels may distract motorists and aircraft.  | 1  | 4 | 3 | 3 | 3 | 3   | 42    | -               | Medium | • Adhere to the mitigation measures recommended by the visual specialist   | 1   | 3 | 2 | 2 | 2 | 2   | 20    | -               | Low    |
| Cultural Heritage  | Location of operations near cultural sites may disrupt cultural practices.   | 2  | 3 | 3 | 2 | 2 | 3   | 36    | -               | Medium | • Locate developments away from cultural heritage sites.   | 1   | 2 | 2 | 1 | 1 | 2   | 14    | -               | Low    |
| Job creation for construction workers.                             | Increased employment providing skills development and local economic empowerment   | 2  | 4 | 2 | 2 | 3 | 2   | 26    | +               | Medium | • Implement a training and skills development programme for locals.<br>• Work closely with the appropriate municipal structures regarding establishing a social responsibility programme   | 2   | 4 | 2 | 2 | 3 | 2   | 24    | +               | Medium |
| <b>Heritage</b>  |  |  |   |   |   |   |     |       |                 |        |  |   |   |   |   |   |     |       |                 |        |
| Impacts to archaeological heritage resources                       | Operational activities that take place near to archaeological resources may result in their destruction  | 1  | 2 | 4 | 3 | 4 | 3   | 42    | -               | Medium | • A no development buffer of 50m is implemented around sites KS3 and KS4<br>• A no development buffer of 100m is implemented around sites KS6, KS7 and KS8<br>• The area identified as having higher levels of archaeological sensitivity in Figure 5 must not be impacted by any development activities.<br>• Should any previously unknown archaeological resources be impacted during construction, work must cease in the vicinity of the find and the relevant heritage authority must be contacted | 1   | 1 | 4 | 1 | 4 | 1   | 11    | -               | Low    |
| Impacts to palaeontological resources                              | Operational activities that take place near to Palaeontological resources may result in their destruction  | 1  | 2 | 4 | 3 | 4 | 3   | 42    | -               | Medium | • Implementation of the Chance Fossil Finds Procedure  | 1   | 1 | 4 | 1 | 4 | 1   | 11    | -               | Low    |
| Impacts to the cultural landscape                                  | Operational activities that take place near to cultural landscape elements may result in their destruction   | 1  | 2 | 4 | 3 | 4 | 3   | 42    | -               | Medium | • Implementation of the recommendations included in the VIA  | 1   | 1 | 4 | 1 | 4 | 1   | 11    | -               | Low    |
| <b>Visual</b>  |  |  |   |   |   |   |     |       |                 |        |  |   |   |   |   |   |     |       |                 |        |
| Altered Sense of Place and Visual Intrusion caused by the PV Array | The development of this PV array may be perceived as conflicting with the current landscape of the grassland and treescapes. The proposed PV facility is anticipated to interrupt and/or degrade views, and therefore negatively impact the sense of place and present as a visual intrusion across the landscape. | 2  | 4 | 2 | 3 | 3 | 3   | 42    | -               | Medium | • Fence the perimeter of the site with a green or black fencing.   | 2   | 3 | 2 | 2 | 3 | 3   | 36    | -               | Medium |



| ENVIRONMENTAL PARAMETER   | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE   | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION |   |   |   |   |     |       |                 |        | RECOMMENDED MITIGATION MEASURES  | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION |   |   |   |   |     |       |                 |        |
|---|---|--|---|---|---|---|-----|-------|-----------------|--------|--|---|---|---|---|---|-----|-------|-----------------|--------|
|   |   | E  | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |  | E   | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |
| Altered Sense of Place and Visual Intrusion caused by the BESS, Substation and Internal Grid Infrastructure | The BESS and internal grid connections (where possible will be installed underground). is anticipated to contribute to visual clutter on the site and therefore negatively impact the sense of place and present as a visual intrusion across the landscape.  | 2  | 4 | 2 | 3 | 3 | 2   | 28    | -               | Medium | <ul style="list-style-type: none"> <li>Fence the perimeter of the site with a green or black fencing.</li> <li>Ensure that the roof colour of the proposed buildings blends into the landscape.</li> </ul>   | 2   | 3 | 2 | 2 | 3 | 2   | 24    | -               | Medium |
| Visual Discomfort and Impaired Visibility resulting from Glint and Glare                                    | Two OPs and receptors travelling on the R76, Unnamed Gravel Road and the railway line will experience moderate glare. The exposure to glare is not considered of a level that will cause visual discomfort or impaired visibility, but may be experienced as a nuisance.  | 2  | 4 | 2 | 1 | 3 | 3   | 36    | -               | Medium | <ul style="list-style-type: none"> <li>Establish screening (e.g. vegetation) of &gt; 2 m in height between the south-western boundary of the PV array and the R76, where technically feasible and in consultation with a qualified botanist and / or landscaper and the project operator.</li> <li>Establish screening (e.g. vegetation) of &gt; 1.5 m in height along the north-eastern boundary of the PV array, where technically feasible and in consultation with a qualified botanist and / or landscaper and the project operator.</li> </ul> | 2   | 3 | 2 | 1 | 3 | 2   | 22    | -               | Low    |
| Altered Visual Quality caused by Light Pollution at Night   | The installation of lighting on the site perimeter and / or around the BESS will generate nightglow across the natural, undeveloped site and beyond. Lighting is not easily screened by vegetation or topography, and the proposed lighting for the PV facility is anticipated to contribute to nightglow from the surrounding residential areas (e.g. Kroonstad) and alter visual quality of the surrounding area. | 2  | 4 | 1 | 3 | 3 | 3   | 39    | -               | Medium | <ul style="list-style-type: none"> <li>Reduce the height of lighting masts to a workable minimum.</li> <li>Direct lighting inwards and downwards to limit light pollution.</li> </ul>  | 2   | 3 | 1 | 2 | 3 | 2   | 22    | -               | Low    |

14.3.4 Decommissioning

| ENVIRONMENTAL PARAMETER                              | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE  | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION |   |   |   |   |     |       |                 |     | RECOMMENDED MITIGATION MEASURES   | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION |   |   |   |   |     |       |                 |     |
|--|--|--|---|---|---|---|-----|-------|-----------------|-----|---|---|---|---|---|---|-----|-------|-----------------|-----|
|  |  | E  | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S   |   | E   | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S   |
| <b>Aquatic / Freshwater</b>                          |  |  |   |   |   |   |     |       |                 |     |   |   |   |   |   |   |     |       |                 |     |
| Impact 1: Loss of aquatic species of special concern | The construction activities will result in the disturbance of aquatic habitats that may contain listed and or protected plant or animal species. However, none of these were observed during this assessment | 1  | 1 | 1 | 1 | 1 | 1   | 5     | -               | Low | <ul style="list-style-type: none"> <li>Develop and implement a Rehabilitation and Monitoring plan post Environmental Authorisation. This must be developed following the finalisation of the panel / road layout and a walk down has been completed. This plan should include relocation of suitable plant species, but more</li> </ul> | 1   | 1 | 1 | 1 | 1 | 1   | 5     | -               | Low |

| ENVIRONMENTAL PARAMETER  | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE  | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION |   |   |   |   |     |       |                 | RECOMMENDED MITIGATION MEASURES | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION   |   |   |   |   |   |     |       |                 |     |  |  |  |  |  |  |  |  |
|--|--|--|---|---|---|---|-----|-------|-----------------|---------------------------------|---|---|---|---|---|---|-----|-------|-----------------|-----|--|--|--|--|--|--|--|--|
|  |  | E  | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) |                                 | S   | E | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S   |  |  |  |  |  |  |  |  |
|  |  |  |   |   |   |   |     |       |                 |                                 | important protect any topsoil stores and promote the collection of vegetative material and propagules / seed to assist with the revegetation of the site  |   |   |   |   |   |     |       |                 |     |  |  |  |  |  |  |  |  |
|  |  |  |   |   |   |   |     |       |                 |                                 | <ul style="list-style-type: none"> <li>Where possible, temporary construction lay-down or assembly areas should be sited on transformed areas; and</li> <li>Rapid regeneration of plant cover must be encouraged by setting aside topsoil during earthmoving and replacing onto areas where the re-establishment of plant cover is desirable to prevent erosion.</li> </ul>   |   |   |   |   |   |     |       |                 |     |  |  |  |  |  |  |  |  |
| Impact 2: Damage or loss of riparian systems, ephemeral watercourses and wetland systems in the construction phase | <p>Construction could result in the loss of drainage systems that are fully functional and provide an ecosystem services within the site especially where new access roads are required or road upgrades will widen any current bridges or drifts.</p> <p>Loss can also include a functional loss, through change in vegetation type via alien encroachment for example.</p> | 2  | 3 | 2 | 2 | 3 | 2   | 24    | -               | Medium                          | <ul style="list-style-type: none"> <li>A pre-construction walkthrough with an aquatic specialists is recommended and they can assist with the development of the stormwater management plan and Aquatic Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout.</li> <li>All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints and especially in areas near the proposed crossings. Where roads and crossings are upgraded, the following applies:</li> <li>Existing pipe culverts must be removed and replaced with suitable sized box culverts, especially where road levels are raised to accommodate any large vehicles.</li> <li>River levels, regardless of the current state of the river / water course must be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist during a pre-construction walkdown.</li> <li>Where large cut and fill areas are required these must be stabilised and rehabilitated during the construction process, to minimise erosion and sedimentation.</li> <li>Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc).</li> <li>A detailed monitoring plan must be developed in the pre-construction phase by an aquatic specialist, where any delineated system occurs within 50 m of existing crossings.</li> </ul> | 1 | 3 | 2 | 1 | 2 | 2   | 18    | -               | Low |  |  |  |  |  |  |  |  |
| Impact 3: Potential impact on localised surface water quality (construction)                                       | During construction earthworks will expose and mobilise earth materials, and a number of materials as well as chemicals will be imported and used on site and may end up in the surface water, including soaps, oils, grease and fuels, human wastes, cementitious wastes, paints and solvents,  | 1  | 3 | 2 | 2 | 3 | 3   | 33    | -               | Medium                          | <ul style="list-style-type: none"> <li>All liquid chemicals including fuels and oil, including the BESS must be stored in with secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill kits needed to contain likely worst-case scenario leak or spill in that facility, safely.</li> </ul>   | 1 | 3 | 2 | 1 | 2 | 2   | 18    | -               | Low |  |  |  |  |  |  |  |  |

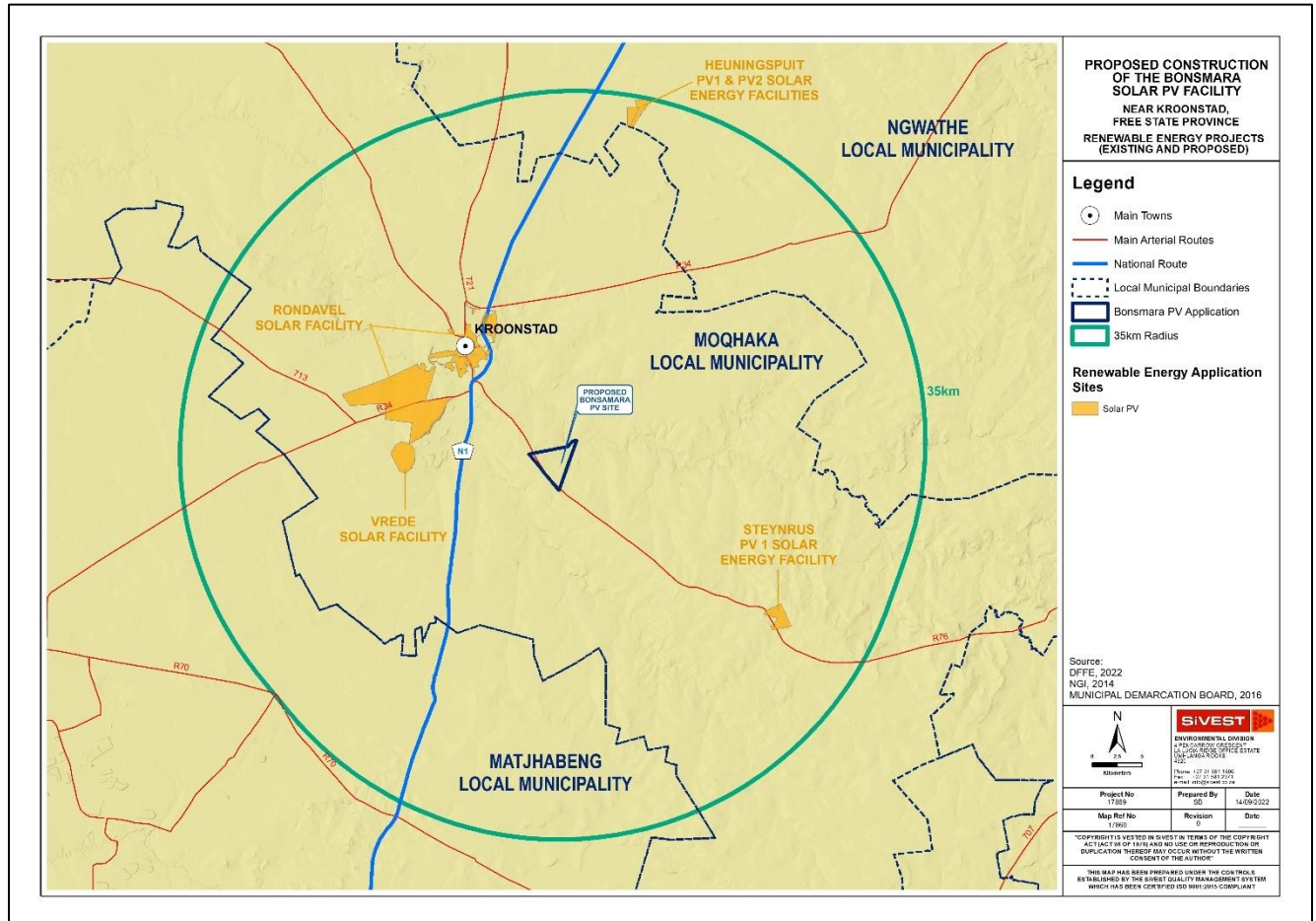
| ENVIRONMENTAL PARAMETER             | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE  | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION |   |   |   |   |     |       |                 |        | RECOMMENDED MITIGATION MEASURES   | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION   |   |   |   |   |     |       |                 |     |  |  |  |
|-------------------------------------|--|--|---|---|---|---|-----|-------|-----------------|--------|---|---|---|---|---|---|-----|-------|-----------------|-----|--|--|--|
|                                     |  | E  | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |   | E   | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S   |  |  |  |
|                                     | etc. Any spills during transport or while works area conducted in proximity to a watercourse has the potential to affect the surrounding biota. Leaks or spills from storage facilities also pose a risk and due consideration to the safe design and management of the 30 000l fuel storage facility must be given. Although unlikely, consideration must also be provided for the proposed Battery Energy Storage System (BESS), with regard safe handling during the construction phase. This to avoid any spills or leaks from this system |  |   |   |   |   |     |       |                 |        |   | <ul style="list-style-type: none"> <li>Washing and cleaning of equipment must be done in designated wash bays, where rinse water is contained in evaporation/sedimentation ponds (to capture oils, grease cement and sediment).</li> <li>Mechanical plant and bowsers must not be refuelled or serviced within 100m of a river channel.</li> <li>All construction camps, lay down areas, wash bays, batching plants or areas and any stores should be more than 50 m from any demarcated water courses.</li> <li>Littering and contamination associated with construction activity must be avoided through effective construction camp management;</li> <li>No stockpiling should take place within or near a water course</li> <li>All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment recoverable;</li> </ul> |   |   |   |   |     |       |                 |     |  |  |  |
| <b>Terrestrial</b>                  |  |  |   |   |   |   |     |       |                 |        |   |   |   |   |   |   |     |       |                 |     |  |  |  |
| Vegetation                          | Permanent or temporary loss of indigenous vegetation cover because of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.  | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>Blanket clearing of vegetation must be limited to the site. No clearing outside of footprint to take place.</li> <li>Topsoil must be striped and stockpiled separately during site preparation and replaced on completion where revegetation will take place.</li> <li>Any site camps and laydown areas requiring clearing must be located within already disturbed areas away from watercourses.</li> </ul>                   | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |  |  |  |
| Alien Invasive Species              | Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.   | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>Alien trees and weeds must be removed from the site as per CARA/NEMBA requirements.</li> <li>A suitable weed management strategy to be implemented in construction and operation phases.</li> <li>After clearing and construction is completed, an appropriate cover may be required, should natural re-establishment of grasses not take place in a timely manner along road verges. This will also minimise dust.</li> </ul> | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |  |  |  |
| Erosion                             | Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.  | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted once construction is completed.</li> <li>Topsoil must be stripped and stockpiled separately and replaced on completion.</li> <li>If natural vegetation re-establishment does not occur, a suitable grass must be applied.</li> </ul>  | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |  |  |  |
| <b>Agriculture – Non-identified</b> |  |  |   |   |   |   |     |       |                 |        |   |   |   |   |   |   |     |       |                 |     |  |  |  |
| <b>Avifauna</b>                     |  |  |   |   |   |   |     |       |                 |        |   |   |   |   |   |   |     |       |                 |     |  |  |  |

| ENVIRONMENTAL PARAMETER                           | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE   | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION |   |   |   |   |     |       |                 |        | RECOMMENDED MITIGATION MEASURES  | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION |   |   |   |   |     |       |                 |        |
|---|---|--|---|---|---|---|-----|-------|-----------------|--------|--|---|---|---|---|---|-----|-------|-----------------|--------|
|   |   | E  | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |  | E   | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |
| Disruption of bird migratory pathways             | Disruption of bird migratory pathways during the decommissioning phase  | 3  | 3 | 2 | 2 | 4 | 2   | 28    | -               | Medium | <ul style="list-style-type: none"> <li>Decommissioning of panels must not commence during the peak wet season months on November, December and January.</li> </ul>   | 3   | 2 | 2 | 2 | 2 | 2   | 22    | -               | Low    |
| <b>Geotech</b>                                    |   |  |   |   |   |   |     |       |                 |        |  |   |   |   |   |   |     |       |                 |        |
| Disturbance/displacement/removal of soil and rock | Ground disturbance during access road construction, foundation earthworks, platform earthworks  | 1  | 4 | 2 | 2 | 2 | 1   | 11    | -               | Low    | <ul style="list-style-type: none"> <li>Restore natural site topography</li> <li>Landscape and rehabilitate access roads and disturbed areas timeously (e.g. regressing)</li> </ul>   | 1   | 4 | 2 | 1 | 2 | 1   | 10    | -               | Low    |
| Soil Erosion                                      | Increased erosion due to vegetation clearing, alteration of natural drainage  | 1  | 2 | 2 | 2 | 2 | 1   | 9     | -               | Low    | <ul style="list-style-type: none"> <li>Temporary berms and drainage channels to divert surface runoff where needed</li> <li>Restore natural site topography</li> <li>Use designated access and laydown areas only to minimise disturbance to surrounding areas</li> </ul>  | 1   | 1 | 1 | 1 | 2 | 1   | 6     | -               | Low    |
| <b>Social</b>                                     |   |  |   |   |   |   |     |       |                 |        |  |   |   |   |   |   |     |       |                 |        |
| Hazardous material waste generation               | There are no recycling facilities or established scientific methods of disposing of the solar panels after the end of their useful lives. | 2  | 4 | 4 | 3 | 3 | 3   | 48    | -               | High   | <ul style="list-style-type: none"> <li>Research and development on recycling are needed to deal with the impacts.</li> </ul>   | 1   | 2 | 3 | 2 | 2 | 2   | 20    | -               | Low    |
| The aesthetic value of the land is lost.          | Land scarification will occur during the decommissioning of the solar plants.   | 1  | 4 | 2 | 3 | 3 | 3   | 39    | -               | Medium | <ul style="list-style-type: none"> <li>Implement rehabilitation, e.g., re-vegetation with indigenous species to prevent dust and erosion, as well as the establishment of alien species.</li> </ul>  | 1   | 2 | 1 | 2 | 2 | 2   | 16    | -               | Low    |
| Socio-economic impacts                            | Job losses  | 2  | 4 | 4 | 3 | 3 | 3   | 48    | -               | High   | <ul style="list-style-type: none"> <li>Organise labour transfers to areas involved in similar projects.</li> </ul>   | 2   | 3 | 3 | 2 | 2 | 2   | 24    | -               | Medium |
| <b>Heritage</b>                                   |   |  |   |   |   |   |     |       |                 |        |  |   |   |   |   |   |     |       |                 |        |
| Impacts to archaeological heritage resources      | Decommissioning activities that take place near to Archaeological resources may result in their destruction                               | 1  | 2 | 4 | 3 | 4 | 3   | 42    | -               | Medium | <ul style="list-style-type: none"> <li>A no development buffer of 50m is implemented around sites KS3 and KS4</li> <li>A no development buffer of 100m is implemented around sites KS6, KS7 and KS8</li> <li>The area identified as having higher levels of archaeological sensitivity in Figure 5 must not be impacted by any development activities.</li> <li>Should any previously unknown archaeological resources be impacted during construction, work must cease in the vicinity of the find and the relevant heritage authority must be contacted</li> </ul> | 1   | 1 | 4 | 1 | 4 | 1   | 11    | -               | Low    |

| ENVIRONMENTAL PARAMETER   | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE   | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION |   |   |   |   |     |       |                 |        | RECOMMENDED MITIGATION MEASURES   | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION |   |   |   |   |     |       |                 |     |
|---|---|--|---|---|---|---|-----|-------|-----------------|--------|---|---|---|---|---|---|-----|-------|-----------------|-----|
|   |   | E  | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |   | E   | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S   |
| Impacts to palaeontological resources                           | Decommissioning activities that take place near to Palaeontological resources may result in their destruction   | 1  | 2 | 4 | 3 | 4 | 3   | 42    | -               | Medium | • Implementation of the Chance Fossil Finds Procedure   | 1   | 1 | 4 | 1 | 4 | 1   | 11    | -               | Low |
| Impacts to the cultural landscape                               | Decommissioning activities that take place near to cultural landscape elements may result in their destruction  | 1  | 2 | 4 | 3 | 4 | 3   | 42    | -               | Medium | • Implementation of the recommendations included in the VIA   | 1   | 1 | 4 | 1 | 4 | 1   | 11    | -               | Low |
| <b>Visual</b>   |   |  |   |   |   |   |     |       |                 |        |   |   |   |   |   |   |     |       |                 |     |
| Altered Sense of Place caused by the decommissioning activities | Dust generated during decommissioning will be visually unappealing and may detract from the visual quality (and sense of place) of the area. These impacts are typically limited to the immediate area surrounding the site, during the decommissioning period. | 2  | 4 | 1 | 2 | 1 | 3   | 30    | -               | Medium | <ul style="list-style-type: none"> <li>• Limit vegetation clearance and the footprint of decommissioning to what is absolutely essential.</li> <li>• Avoid excavation, handling and transport of materials which may generate dust under very windy conditions.</li> <li>• Keep stockpiled aggregates and sand covered to minimise dust generation.</li> <li>• Keep site tidy.</li> </ul> | 2   | 3 | 1 | 2 | 1 | 2   | 18    | -               | Low |

### 14.3.5 Cumulative

Five (5) solar PV facilities (two approved and three proposed) are located within 35 km of Bonsmara PV site. The information that could be obtained for the surrounding planned renewable energy developments was taken into account as part of the cumulative impact assessment. The SEFs that were considered are indicated in the **Figure 37** and **Table 22** below:



**Figure 37: Renewable Energy Projects within 35km of the Bonsmara SEF**

**Table 22: Renewable Energy Projects within 35km of the Bonsmara SEF**

| Project Name              | Status          | MW     | Approximate Footprint |
|---------------------------|-----------------|--------|-----------------------|
| Rondavel Solar Facility   | Approved        | 100 MW | ~3 500 ha             |
| Steynrus Solar Facility   | Under Amendment | 5 MW   | ~350 ha               |
| Vrede Solar Facility      | In process      | 100 MW | ~540 ha               |
| Heuningspuit PV1 Facility | In process      | 5 MW   | ~140 ha               |
| Heuningspuit PV2 Facility | In process      | 5 MW   | ~175 ha               |

**Cumulative Impacts**

| ENVIRONMENTAL PARAMETER   | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE  | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION |   |   |   |   |     |       |                 |        | RECOMMENDED MITIGATION MEASURES   | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION |   |   |   |   |     |       |                 |     |
|---|--|--|---|---|---|---|-----|-------|-----------------|--------|---|---|---|---|---|---|-----|-------|-----------------|-----|
|   |  | E  | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |   | E   | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S   |
| <b>Aquatic / Freshwater</b>   |  |  |   |   |   |   |     |       |                 |        |   |   |   |   |   |   |     |       |                 |     |
| Cumulative Impact of various proposed projects and associated grid lines on the natural environment | The cumulative assessment considers the various proposed renewable projects that occur within a 35km radius of this site, where the author has either been involved in the assessment of these projects and or review of the past assessments as part of any required Water Use Licenses   | 1  | 1 | 1 | 1 | 1 | 1   | 5     | -               | Low    | The premise of all the reviewed or assessed projects has been the avoidance of impacts on the Very High Sensitivity environments, which have been achieved by the various proposed layouts. The only remaining impacts will be the crossing of internal roads over minor watercourse / drainage lines or areas rated as LOW sensitivity.  | 1   | 3 | 2 | 1 | 2 | 2   | 18    | -               | Low |
| <b>Terrestrial</b>  |  |  |   |   |   |   |     |       |                 |        |   |   |   |   |   |   |     |       |                 |     |
| Vegetation  | Permanent or temporary loss of indigenous vegetation cover because of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.  | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>Blanket clearing of vegetation must be limited to the site. No clearing outside of footprint to take place.</li> <li>Topsoil must be striped and stockpiled separately during site preparation and replaced on completion where revegetation will take place.</li> <li>Any site camps and laydown areas requiring clearing must be located within already disturbed areas away from watercourses.</li> </ul>                   | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |
| Flora Species   | Loss of flora species of special concern during pre-construction site clearing activities. Numerous species of special concern are potentially present within the affected area, which could be destroyed during site preparation.   | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>A flora search and rescue is recommended before commencement.</li> <li>Respective permits to be obtained beforehand.</li> </ul>  | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |
| Alien Invasive Species  | Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established. | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>Alien trees and weeds must be removed from the site as per CARA/NEMBA requirements.</li> <li>A suitable weed management strategy to be implemented in construction and operation phases.</li> <li>After clearing and construction is completed, an appropriate cover may be required, should natural re-establishment of grasses not take place in a timely manner along road verges. This will also minimise dust.</li> </ul> | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |
| Erosion   | Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.  | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted once construction is completed.</li> <li>Topsoil must be stripped and stockpiled separately and replaced on completion.</li> <li>If natural vegetation re-establishment does not occur, a suitable grass must be applied.</li> </ul>  | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |
| Ecological Processes  | Disturbances to ecological processes. Activity may result in disturbances to ecological processes.   | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>Blanket clearing of vegetation must be limited to the development footprint, and the area to be cleared must be demarcated before any clearing commences.</li> </ul>   | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |

| ENVIRONMENTAL PARAMETER        | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE  | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION |   |   |   |   |     |       |                 |        | RECOMMENDED MITIGATION MEASURES   | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION |   |   |   |   |     |       |                 |     |
|--------------------------------|--|--|---|---|---|---|-----|-------|-----------------|--------|---|---|---|---|---|---|-----|-------|-----------------|-----|
|                                |  | E  | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |   | E   | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S   |
| Aquatic and Riparian processes | Aquatic and Riparian processes. Diversion and increased velocity of surface water flows – Changes to the hydrological regime and increased potential for erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of species of special concern. | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>Suitable structures to be constructed at watercourse crossings that do not alter flows.</li> <li>Stormwater discharge into watercourses to be protected against erosion.</li> </ul>  | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |
| Faunal Habitat                 | Loss of Faunal Habitat: Activity will result in the loss of habitat for faunal species.  | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>Blanket clearing of vegetation must be limited to the footprint.</li> <li>It is important that clearing activities are kept to the minimum and take place in a phased manner, where applicable. This allows any smaller animal species to move into safe areas and prevents wind and water erosion of the cleared areas.</li> </ul>  | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |
| Faunal Processes               | Disruptions to faunal processes Including barriers to movement and gene dispersal.   | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>The habitats and microhabitats present on the project site are not unique and are widespread in the general area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to.</li> <li>Small mammals within the habitat on and around the affected area are generally mobile and likely to be transient to the area. They will most likely vacate the area once construction commences. As with all construction sites there is a latent risk that there will be some accidental mortalities. Specific measures are made to reduce this risk. The risk of species of special concern is low, and it is unlikely that there will be any impact to populations of such species because of the activity.</li> <li>Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. It is recommended that a faunal search and rescue be conducted before construction commences, although experience has shown that there could still be some mortalities as these species are mobile and may thus move onto site once construction is underway. A reptile handler should be on call for such circumstances.</li> <li>Should any amphibian migrations occur between wetland areas during construction, appropriate measures (including temporarily suspending works in the affected area) should be implemented.</li> </ul> | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |
| Faunal Species                 | Loss of faunal SSC due to construction activities: Activities associated with bush clearing and ploughing, killing of perceived dangerous fauna, may lead to increased mortalities among faunal species.   | 1  | 4 | 2 | 2 | 3 | 2   | 24    | -               | Medium | <ul style="list-style-type: none"> <li>A pre-commencement faunal search and rescue is recommended.</li> <li>Respective permits to be obtained beforehand.</li> <li>No animals are to be harmed or killed during the course of operations.</li> <li>Workers are NOT allowed to snare any faunal species.</li> </ul>  | 1   | 4 | 2 | 2 | 3 | 1   | 12    | -               | Low |



| ENVIRONMENTAL PARAMETER                      | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE   | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION |   |   |   |   |     |       |                 |        | RECOMMENDED MITIGATION MEASURES  | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION |   |   |   |   |     |       |                 |           |
|--|---|--|---|---|---|---|-----|-------|-----------------|--------|--|---|---|---|---|---|-----|-------|-----------------|-----------|
|  |   | E  | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |  | E   | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S         |
| <b>Agriculture – none-identified</b>         |   |  |   |   |   |   |     |       |                 |        |  |   |   |   |   |   |     |       |                 |           |
| <b>Avifauna</b>                              |   |  |   |   |   |   |     |       |                 |        |  |   |   |   |   |   |     |       |                 |           |
| Habitat loss                                 | Regional Saturation of SEF facilities causing habitat loss  | 2  | 4 | 3 | 2 | 4 | 3   | 45    | -               | High   | • Not able to be mitigated quantitatively  |   |   |   |   |   |     |       |                 | n/a       |
| Collison mortality (vehicle)                 | Increased roadkill due to higher traffic volumes  | 3  | 3 | 2 | 2 | 4 | 2   | 28    | -               | Medium | • Enforcement of speed limits in the PAOI as well saturation of fence infrastructure with reflective diverters   | 3   | 2 | 1 | 1 | 2 | 2   | 18    | -               | Low       |
| <b>Geotech – none identified</b>             |   |  |   |   |   |   |     |       |                 |        |  |   |   |   |   |   |     |       |                 |           |
| <b>Social</b>                                |   |  |   |   |   |   |     |       |                 |        |  |   |   |   |   |   |     |       |                 |           |
| Eco-friendly                                 | Promotes good air quality given that it is a clean energy source.   | 2  | 4 | 3 | 2 | 3 | 3   | 42    | +               | Medium | • Increased use of solar PV will improve air quality.  | 4   | 4 | 2 | 1 | 3 | 4   | 64    | +               | Very High |
| Disposal of the solar PV cells               | During decommissioning  | 1  | 4 | 2 | 3 | 3 | 3   | 39    | -               | Medium | • The absence of a well-developed technology to recycle or dispose of the solar panels remains a challenge.  | 1   | 2 | 1 | 2 | 2 | 2   | 17    | -               | Low       |
| Visual Impacts                               | There are several substations and powerlines in the area, already affecting the visual quality and sense of place in this modified rural landscape. | 3  | 4 | 4 | 2 | 3 | 3   | 48    | -               | High   | • The facilities are distant from each other and do not constitute a spatially concentrated, high-density network of PV facilities, which mitigates the visual cumulative impacts.<br>• Adhere to the mitigation measures recommended by the visual specialist   | 2   | 3 | 3 | 1 | 3 | 2   | 22    | -               | Low       |
| <b>Heritage</b>                              |   |  |   |   |   |   |     |       |                 |        |  |   |   |   |   |   |     |       |                 |           |
| Impacts to archaeological heritage resources | Cumulative destruction of significant archaeological heritage   | 1  | 2 | 4 | 3 | 4 | 3   | 42    | -               | Medium | • A no development buffer of 50m is implemented around sites KS3 and KS4<br>• A no development buffer of 100m is implemented around sites KS6, KS7 and KS8<br>• The area identified as having higher levels of archaeological sensitivity in Figure 5 must not be impacted by any development activities.<br>• Should any previously unknown archaeological resources be impacted during construction, work must cease in the vicinity of the find and the relevant heritage authority must be contacted | 1   | 1 | 4 | 1 | 4 | 1   | 11    | -               | Low       |

| ENVIRONMENTAL PARAMETER                          | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE   | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION |   |   |   |   |     |       |                 |        | RECOMMENDED MITIGATION MEASURES   | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION |   |   |   |   |     |       |                 |     |
|--|---|--|---|---|---|---|-----|-------|-----------------|--------|---|---|---|---|---|---|-----|-------|-----------------|-----|
|  |   | E  | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S      |   | E   | P | R | L | D | I/M | TOTAL | STATUS (+ OR -) | S   |
| Impacts to palaeontological resources            | Cumulative destruction of significant palaeontological heritage   | 1  | 2 | 4 | 3 | 4 | 3   | 42    | -               | Medium | • Implementation of the Chance Fossil Finds Procedure   | 1   | 1 | 4 | 1 | 4 | 1   | 11    | -               | Low |
| Impacts to the cultural landscape                | Cumulative impact to the cultural landscape   | 1  | 2 | 4 | 3 | 4 | 3   | 42    | -               | Medium | • Implementation of the recommendations included in the VIA   | 1   | 1 | 4 | 1 | 4 | 1   | 11    | -               | Low |
| <b>Visual</b>                                    |   |  |   |   |   |   |     |       |                 |        |   |   |   |   |   |   |     |       |                 |     |
| Altered Sense of Place caused by the PV facility | There are already numerous substations and powerlines in the region, already affecting visual quality and sense of place in this modified rural landscape. As such, the proposed powerlines, BESS and substations associated with these projects are not the first of their kind in the visual landscape. The Bonsmara PV facility and other proposed facilities listed above have a combined footprint of approximately ~4 705 ha; although large, the facilities are far apart and do not constitute a spatially concentrated, high density network of PV facilities, which mitigates cumulative impacts. | 2  | 4 | 1 | 3 | 3 | 2   | 26    | -               | Medium | • Encourage other project owners to implement measures to mitigate the impact of these projects on visual intrusion and altered sense of place, such as screening (vegetation) and limit the light pollution generated by these facilities. | 2   | 3 | 1 | 2 | 3 | 2   | 22    | -               | Low |

### 14.3.6 Comparative Assessment of Alternatives

Site layout alternatives have not been comparatively assessed, but rather a single layout has been refined as additional information becomes available throughout the EIA process (e.g. specialist input, additional site surveys, and ongoing stakeholder engagement). As a result, the layout provided in the Scoping Phase has been updated and all PV panels and supporting infrastructure (i.e. substation, BESS, O&M Building) are situated outside of any and all sensitive areas and buffers.

The development area presented in the draft Environmental Impact Assessment Report has been selected as a practicable option for the Bonsmara SEF considering technical preference and constraints, as well as initial No-Go layers informed by the relevant specialist during the screening studies.

### 14.4 Concluding statement

No activity alternatives are being considered. Renewable Energy development in South Africa is highly desirable from a social, environmental and development point of view. Solar energy installations are more suitable for the site. CSP technology would not be suitable for this site because it requires a flat surface, has a high visual impact and requires large volumes of water. CSP was not catered for in the IRP2019. In terms of wind energy, the climatic conditions show that there is not a suitable wind resource for a wind facility.

Site layout alternatives have not been comparatively assessed, but rather a single layout has been refined as additional information become available throughout the EIA process. The layout has therefore been refined throughout the process from the pre-screening phase through to the impact assessment phase which has resulted in a layout where all PV panels and supporting infrastructure avoids the no-go areas identified by the various specialists. The proposed layout has been assessed by the specialists in their respective specialist studies. All constraints identified to date (as well as buffer areas) as indicated in the sensitivity mapping have been taken into account and the PV panels and supporting infrastructure shifted where necessary to inform the proposed layout for the Bonsmara SEF (**Figure 38** below). This is the layout being put forward for environmental authorisation.

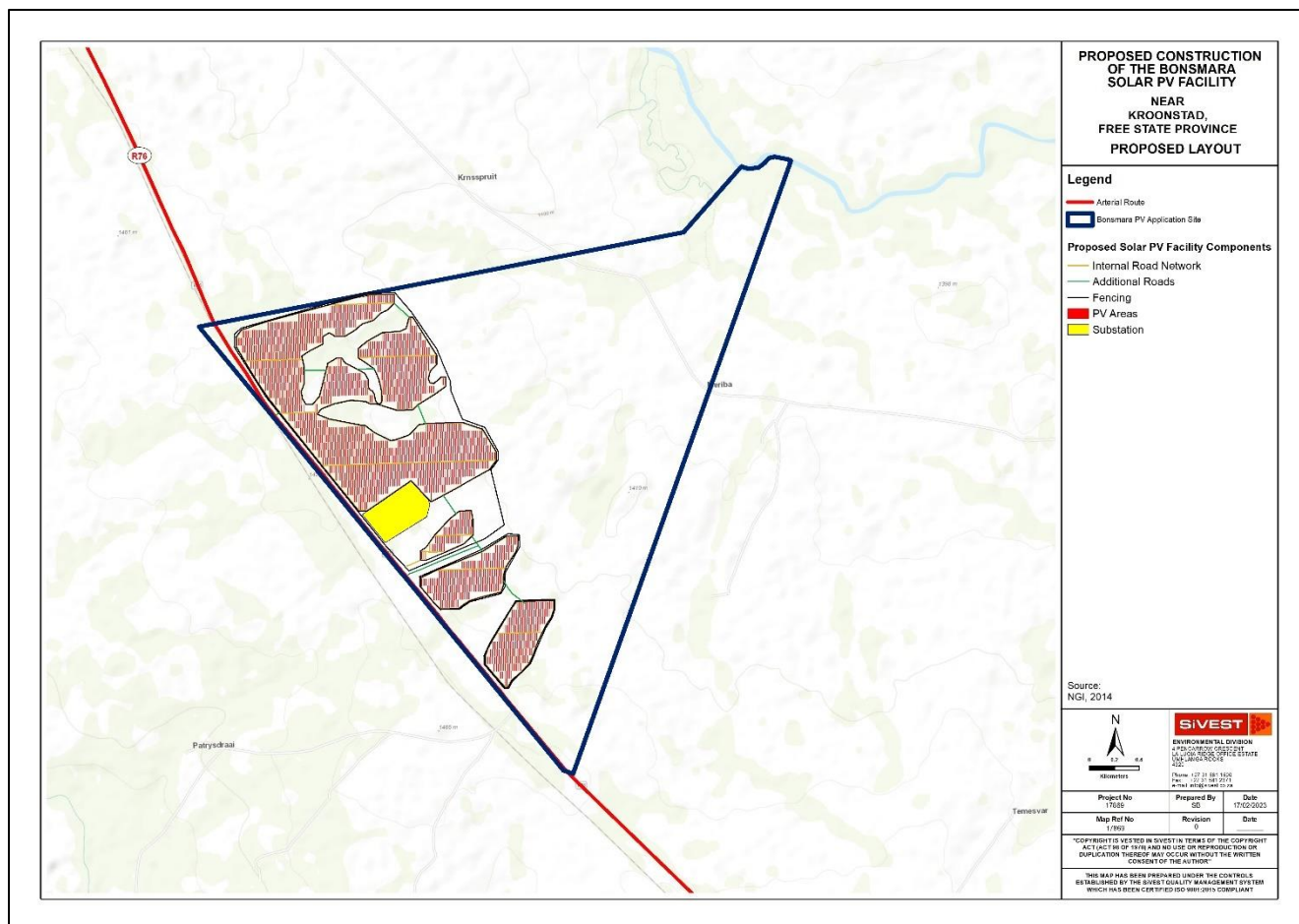


Figure 38: Proposed layout put forward for authorisation

## 15. POSITIVE AND NEGATIVE IMPACTS OF THE PROJECT

A summary of the impacts pre-mitigation and post-mitigation are provided below:

Table 23: Pre and post mitigation impact ratings

| Impact  | Pre-mitigation | Post-mitigation |
|---|----------------|-----------------|
| <b>CONSTRUCTION</b>   |                |                 |
| <b>Impacts to Biophysical Systems</b>   |                |                 |
| <b>Aquatic / Freshwater</b>   |                |                 |
| Loss of aquatic species of special concern  | Low            | Low             |
| Damage or loss of riparian systems, ephemeral watercourses and wetland systems in the construction phase  | Medium         | Low             |
| Potential impact on localised surface water quality (construction materials and fuel storage facilities) during the construction and decommissioning phases | Medium         | Low             |
| <b>Terrestrial Ecology</b>  |                |                 |

BONSMARA SOLAR PV (RF) (PTY) LTD

Project No. 17869  
Description Proposed Bonsmara Solar PV Facility  
Revision No. 1.0

Date: April 2023

Prepared by:



| Impact  | Pre-mitigation | Post-mitigation |
|---|----------------|-----------------|
| Vegetation - Permanent or temporary loss of indigenous vegetation cover because of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.  | Medium         | Low             |
| Flora Species - Loss of flora species of special concern during pre-construction site clearing activities. Numerous species of special concern are potentially present within the affected area, which could be destroyed during site preparation.  | Medium         | Low             |
| Alien Invasive Species - Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established. | Medium         | Low             |
| Erosion - Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after   | Medium         | Low             |
| Ecological Processes - Disturbances to ecological processes. Activity may result in disturbances to ecological processes.   | Medium         | Low             |
| Aquatic and Riparian Processes - Aquatic and Riparian processes. Diversion and increased velocity of surface water flows – Changes to the hydrological regime and increased potential for erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of species of special concern.   | Medium         | Low             |
| Faunal Habitat - Loss of Faunal Habitat: Activity will result in the loss of habitat for faunal species.  | Medium         | Low             |
| Faunal Processes - Disruptions to faunal processes Including barriers to movement and gene dispersal.   | Medium         | Low             |
| Faunal Species - Loss of faunal SSC due to construction activities: Activities associated with bush clearing and ploughing, killing of perceived dangerous fauna, may lead to increased mortalities among faunal species.   | Medium         | Low             |
| <b>Agricultural – compliance statement – none identified</b>  |                |                 |
| <b>Avifaunal</b>  |                |                 |
| Habitat Destruction   | High           | Low             |
| Disturbance of bird roosts  | Medium         | Low             |
| Disturbance due to noise such as, machinery movements and maintenance operations  | Medium         | Low             |
| <b>Geotech</b>  |                |                 |
| Disturbance/ displacement/ removal of soil and rock   | Low            | Low             |
| Soil Erosion  | Low            | Low             |
| <b>Impacts to Socio-Economic Component</b>  |                |                 |
| <b>Social</b>   |                |                 |
| Noise impact - Noise at the site and the construction vehicles ferrying the panels and building materials   | Low            | Low             |
| Impacts on biodiversity - Habitat loss to make way for large-scale solar facilities.  | Medium         | Low             |
| Loss of agricultural land - Is a function of the size of the area of land that is impacted and the production potential, of that impacted land.   | Medium         | Low             |

| Impact  | Pre-mitigation | Post-mitigation |
|---|----------------|-----------------|
| Cultural heritage impacts - If the solar PV facility is located near sacred areas, cultural practices will be affected. Recent archaeological field assessment conducted for other solar PV facilities located approximately 10km from the proposed development area identified some cultural remains but with varied value and preservation. It is likely that similar heritage resources may be present within this development area. (CTS Heritage, 2022). | Medium         | Low             |
| Visual impacts - The glint and glare surrounding the high reflectivity of the solar PV panels may distract motorists and aircraft.  | Medium         | Low             |
| Graves - Identification of human remains indicating a former burial place or the simple existence of a known cemetery during construction.  | Medium         | Low             |
| Road and traffic hazards - Heavy construction vehicles on poor roads will cause potholes to form, and accidents will rise.  | Medium         | Low             |
| Land use and space requirements - Requirements for land and space to have the installation of the solar PV's.   | Low            | Low             |
| Social impacts: Job creation - Creation of jobs and local economic opportunities  | Medium         | Low             |
| <b>Heritage</b>   |                |                 |
| Impacts to archaeological heritage resources - Construction activities that take place near to archaeological resources may result in their destruction   | Medium         | Low             |
| Impacts to palaeontological resources - Construction activities that take place near to palaeontological resources may result in their destruction  | Medium         | Low             |
| Impacts to the cultural landscape - Construction activities that take place near to cultural landscape elements may result in their destruction   | Medium         | Low             |
| <b>Visual</b>   |                |                 |
| Visual impacts related to earthworks and construction infrastructure, plant and materials on site.  | Medium         | Low             |
| <b>OPERATIONAL</b>  |                |                 |
| <b>Impacts to Biophysical Systems</b>   |                |                 |
| <b>Aquatic / Freshwater</b>   |                |                 |
| Impact on aquatic systems through the possible increase in surface water runoff on form and function during the operational phase   | Medium         | Low             |
| <b>Terrestrial Ecology</b>  |                |                 |
| Alien Invasive Species - Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.                                   | Medium         | Low             |
| Erosion - Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.   | Medium         | Low             |
| Ecological Processes - Disturbances to ecological processes. Activity may result in disturbances to ecological processes. barriers to movement and gene dispersal.  | Medium         | Low             |
| Aquatic and Riparian processes. Diversion and increased velocity of surface water flows – Changes to the hydrological regime and increased potential for erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of species of special concern.  | Medium         | Low             |
| Disruptions to faunal processes Including barriers to movement and gene dispersal.  | Medium         | Low             |
| <b>Agricultural - compliance statement – none identified</b>  |                |                 |
| <b>Avifaunal</b>  |                |                 |
| Disturbance due to noise such as, machinery movements and maintenance operations  | Low            | Low             |
| Bird mortalities  | Medium         | Medium          |

| Impact   | Pre-mitigation | Post-mitigation |
|--|----------------|-----------------|
| Loss of Bird Foraging Habitat  | Medium         | Low             |
| Disruption of bird migratory pathways  | Medium         | Low             |
| The attraction of some novel bird species due to the development of a solar farm with associated infrastructure such as lake effect, perches, nest and shade opportunities   | Medium         | Low             |
| Chemical pollution spills  | Medium         | Low             |
| <b>Geotech</b>   |                |                 |
| Soil Erosion   | Low            | Low             |
| <b>Impacts to Socio-Economic Component</b>   |                |                 |
| <b>Social</b>  |                |                 |
| Hazardous material generation - Hydrochloric, sulphuric, and nitric acids are used to clean and purify the silicon wafer.  | High           | Medium          |
| Impacts on water resources - There is no need for water for electricity generation.  | Medium         | Low             |
| Visual impacts - The glint and glare surrounding the high reflectivity of the solar PV panels may distract motorists and aircraft.   | Medium         | Low             |
| Cultural Heritage - Location of operations near cultural sites may disrupt cultural practices.   | Medium         | Low             |
| Job creation for construction workers- Increased employment providing skills development and local economic empowerment  | Medium         | Medium          |
| <b>Heritage</b>  |                |                 |
| Impacts to archaeological heritage resources - Operational activities that take place near to archaeological resources may result in their destruction   | Medium         | Low             |
| Impacts to palaeontological resources - Operational activities that take place near to Palaeontological resources may result in their destruction  | Medium         | Low             |
| Impacts to the cultural landscape - Operational activities that take place near to cultural landscape elements may result in their destruction   | Medium         | Low             |
| <b>Visual</b>  |                |                 |
| Altered Sense of Place and Visual Intrusion caused by the PV Array   | Medium         | Medium          |
| Altered Sense of Place and Visual Intrusion caused by the BESS, Substation and Internal Grid Infrastructure  | Medium         | Medium          |
| Visual Discomfort and Impaired Visibility resulting from Glint and Glare   | Medium         | Low             |
| Altered Visual Quality caused by Light Pollution at Night  | Medium         | Low             |
| <b>DECOMMISSIONING</b>   |                |                 |
| <b>Impacts to Biophysical Systems</b>  |                |                 |
| <b>Aquatic / Freshwater</b>  |                |                 |
| Loss of aquatic species of special concern   | Low            | Low             |
| Damage or loss of riparian systems, ephemeral watercourses and wetland systems in the construction phase   | Medium         | Low             |
| Potential impact on localised surface water quality (construction materials and fuel storage facilities) during the construction and decommissioning phases  | Medium         | Low             |
| <b>Terrestrial Ecology</b>   |                |                 |
| Vegetation - Permanent or temporary loss of indigenous vegetation cover because of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.   | Medium         | Low             |
| Alien Invasive Species - Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often | Medium         | Low             |

| Impact   | Pre-mitigation | Post-mitigation |
|--|----------------|-----------------|
| susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.   |                |                 |
| Erosion - Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.  | Medium         | Low             |
| <b>Agricultural – none identified</b>  |                |                 |
| <b>Avifaunal</b>   |                |                 |
| Disruption of bird migratory pathways  | Medium         | Low             |
| <b>Geotech</b>   |                |                 |
| Disturbance/ displacement/ removal of soil and rock  | Low            | Low             |
| Soil Erosion   | Low            | Low             |
| <b>Impacts to Socio-Economic Component</b>   |                |                 |
| <b>Social</b>  |                |                 |
| Hazardous material and waste generation - There are no recycling facilities or established scientific methods of disposing of the solar panels after the end of their useful lives.  | High           | Low             |
| The aesthetic value of land is lost - Land scarification will occur during the decommissioning of the solar plants.  | Medium         | Low             |
| Socio- economic impacts – Job loses  | High           | Medium          |
| <b>Heritage</b>  |                |                 |
| Impacts to archaeological heritage resources - Decommissioning activities that take place near to Archaeological resources may result in their destruction   | Medium         | Low             |
| Impacts to palaeontological resources - Decommissioning activities that take place near to Palaeontological resources may result in their destruction  | Medium         | Low             |
| Impacts to the cultural landscape - Decommissioning activities that take place near to cultural landscape elements may result in their destruction   | Medium         | Low             |
| <b>Visual</b>  |                |                 |
| Altered Sense of Place caused by the decommissioning activities  | Medium         | Low             |
| <b>CUMULATIVE</b>  |                |                 |
| <b>Impacts to Biophysical Systems</b>  |                |                 |
| <b>Aquatic / Freshwater</b>  |                |                 |
| Cumulative Impact of various proposed projects and associated grid lines on the natural environment - The cumulative assessment considers the various proposed renewable projects that occur within a 35km radius of this site, where the author has either been involved in the assessment of these projects and or review of the past assessments as part of any required Water Use Licenses     | Low            | Low             |
| <b>Terrestrial Ecology</b>   |                |                 |
| Permanent or temporary loss of indigenous vegetation cover because of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.  | Medium         | Low             |
| Loss of flora species of special concern during pre-construction site clearing activities. Numerous species of special concern are potentially present within the affected area, which could be destroyed during site preparation.   | Medium         | Low             |
| Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established. | Medium         | Low             |



| Impact   | Pre-mitigation | Post-mitigation |
|--|----------------|-----------------|
| Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.  | Medium         | Low             |
| Disturbances to ecological processes. Activity may result in disturbances to ecological processes.   | Medium         | Low             |
| Aquatic and Riparian processes. Diversion and increased velocity of surface water flows – Changes to the hydrological regime and increased potential for erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of species of special concern. | Medium         | Low             |
| Loss of Faunal Habitat: Activity will result in the loss of habitat for faunal species.  | Medium         | Low             |
| Disruptions to faunal processes Including barriers to movement and gene dispersal.   | Medium         | Low             |
| Loss of faunal SSC due to construction activities: Activities associated with bush clearing and ploughing, killing of perceived dangerous fauna, may lead to increased mortalities among faunal species.   | Medium         | Low             |
| <b>Agricultural – compliance statement - none identified</b>   |                |                 |
| <b>Avifaunal</b>   |                |                 |
| Habitat loss   | High           | n/a             |
| Collison mortality (vehicle)   | Medium         | Low             |
| <b>Geotech – none identified</b>   |                |                 |
| <b>Impacts to Socio-Economic Component</b>   |                |                 |
| <b>Social</b>  |                |                 |
| Eco-friendly - Promotes good air quality given that it is a clean energy source.   | Medium         | Very High       |
| Disposal of the solar PV cells - during decommissioning  | Medium         | Low             |
| Visual impacts - There are several substations and powerlines in the area, already affecting the visual quality and sense of place in this modified rural landscape.   | High           | Low             |
| <b>Heritage</b>  |                |                 |
| Impacts to archaeological heritage resources - Cumulative destruction of significant archaeological heritage   | Medium         | Low             |
| Impacts to palaeontological resources - Cumulative destruction of significant palaeontological heritage  | Medium         | Low             |
| Impacts to the cultural landscape - Cumulative impact to the cultural landscape  | Medium         | Low             |
| <b>Visual</b>  |                |                 |
| Altered Sense of Place caused by the PV facility   | Medium         | Low             |

## 16. SUMMARY OF SPECIALIST FINDINGS AND RECOMMENDATIONS

**Table 24: Summary of specialist findings and recommendations**

| Specialist Study | Findings   | Recommendations   |
|------------------|--|---|
| Aquatic          | The project overall has aligned the proposed footprint with the aquatic features, allowing for retention of much of the natural environment so that the systems should remain largely unaffected. Therefore, the PV site is such that it carries a low intensity impact on the | <ul style="list-style-type: none"> <li>A pre-construction walkthrough with an aquatic specialist is recommended and they can assist with the development of the stormwater management plan and Aquatic Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout, especially</li> </ul> |

BONSMARA SOLAR PV (RF) (PTY) LTD

Prepared by:



Project No. 17869  
Description Proposed Bonsmara Solar PV Facility  
Revision No. 1.0

Date: April 2023

Page 113 of 126

| Specialist Study | Findings   | Recommendations  |
|------------------|--|--|
|                  | <p>aquatic resources. Some areas will require clearing, namely the associated roads and cables that may need to cross some of the aquatic systems.</p> <p>The overall and cumulative impacts, as assessed, are linked to instances where complete avoidance was not possible, or the nature of the activities involve a potential risk to aquatic resources even at great distance. Overall, it is expected that the impact on the environment would be Low (-). Noteworthy areas, that have been avoided by the PV areas, include the Very High Sensitivity areas as shown in this report.</p> <p>Based on the findings of this study, the specialist finds no reason to withhold an authorisation of any of the proposed activities, assuming that key mitigations measures are implemented, coupled with a micro-siting walkdown once all information is available.</p> | <p>for the tower positions for the grid connections/s.</p> <ul style="list-style-type: none"> <li>• Use the smallest possible working corridor. Outside the working corridor, all watercourses are to be considered no go areas. Any unnecessary intrusion into these areas is prohibited. Where intrusion is required, the working corridor must be kept to a minimum and demarcated clearly, before any construction commences.</li> <li>• The channel profile, regardless of the current state of the river / water course, will be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist during a pre-construction walkdown.</li> <li>• Water diversions must be temporary in nature and no permanent walls, berms or dams may be installed within a watercourse. Sandbags used in any diversion or for any other activity within a watercourse must be in a good condition, so that they do not burst and empty sediment into the watercourse. Upon completion of the construction at the site, the diversions shall be removed to restore natural flow patterns. Under no circumstance shall a new channel or drainage canals be excavated to divert water away from construction activities.</li> <li>• Any fauna (frogs, snakes, etc.) that are found within the construction area must be moved to the closest point of similar habitat type outside of the areas to be impacted.</li> <li>• It is the contractor's responsibility to continuously monitor the area for newly established alien species during the contract and establishment period, which if present must be removed. Removal of these species shall be undertaken in a way which prevents any damage to the remaining indigenous species and inhibits the re-infestation of the cleaned areas.</li> </ul> |



| Specialist Study | Findings  | Recommendations   |
|------------------|---|---|
| Terrestrial      | <p>No National Parks are situated within 10 km of the site and a single Private nature Reserve is situated within 5 km of the site, the Erfdeel Private Nature Reserve which abuts the north-eastern boundary of the site. The actual PV is just under 3 km (2.8 km) from this reserve which is deemed to be sufficient. No specific guidelines are provided for such buffers in regional planning guidelines.</p> <p>Some rocky areas are present, in particular a series of small hills situated surrounding the dam on Portion 1 of Farm Scheveningen 636. These have been excluded from the PV layout, other than grid connection alternative which will not have any significant impact. Steep slopes are generally not likely to be suitable for PV facilities.</p> <p>Due to having a low conservation status, the grassland habitat is deemed to have a moderate sensitivity status and would provide a suitable footprint for the proposed activity, bearing in mind watercourse and ecological process and connectivity buffers which have been incorporated into the design to incorporate an undeveloped network for connectivity purposes within the site and the surrounding landscape, due to ESA designation.</p> <p>All impacts are deemed to be medium before and low after mitigation.</p> | <ul style="list-style-type: none"> <li>Natural vegetation does not have an elevated conservation status and is not designated a Critical Biodiversity Area status but rather an Ecological Support Area. This does not preclude for further development, as long as ecological connectivity and processes are accommodated, and further assessment will identify most suitable areas that would minimise biodiversity loss. As a minimum, the conservation target of the vegetation unit (24 %) should be retained across the site as well as a contiguous network with the site and the surrounding landscape as a corridor or series of viable ecological corridors, which is significantly exceeded.</li> <li>Watercourses, Riverine (Riparian) &amp; Wetland areas, dams and rivers as well as rocky hills are not suitable and have been excluded from any development footprint other than for strategic infrastructure requirements including the grid connection powerlines.</li> </ul> |
| Agricultural     | <p>The entire site was verified in this assessment as being of medium sensitivity for impacts on agricultural resources with a land capability value of 6. The land was assessed as being of insufficient land capability for viable and sustainable future crop production. The cropping potential of the site is limited by</p>   | <ul style="list-style-type: none"> <li>A system of storm water management, which will prevent erosion, will be an inherent part of the engineering on site. Any occurrences of erosion must be attended to immediately and the integrity of the erosion control system at that point must be amended to prevent further erosion from occurring there.</li> </ul>  |

| Specialist Study | Findings   | Recommendations   |
|------------------|--|---|
|                  | <p>the shallow soils which are limited by dense clay and weathered bedrock in the subsoil.</p> <p>Two potential negative mechanisms of agricultural impact were identified, occupation of land, and soil erosion and degradation. Two positive mechanisms of agricultural impact were identified as increased financial security for farming operations, and improved security against stock theft and other crime. All of these are likely to have a low impact on future agricultural production potential and are therefore assessed as having low significance.</p> <p>The conclusion of this assessment is that the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site. Instead, the development is an opportunity for a renewable energy facility to be integrated with agricultural production in a way that provides benefits to agriculture and leads to little loss of future agricultural production potential.</p> | <ul style="list-style-type: none"> <li>Any excavations done during the construction phase, in areas that will be re-vegetated at the end of the construction phase, must separate the upper 30 cm of topsoil from the rest of the excavation spoils and store it in a separate stockpile. When the excavation is back-filled, the topsoil must be back-filled last, so that it is at the surface. Topsoil should only be stripped in areas that are excavated. Across the majority of the site, it will be much more effective for rehabilitation, to retain the topsoil in place. If levelling requires significant cutting, topsoil should be temporarily stockpiled and then re-spread after cutting, so that there is a covering of topsoil over the entire surface before the panels are mounted. It will be advantageous to have topsoil and vegetation cover below the panels during the operational phase to control dust and erosion.</li> </ul> <p>The impact of the proposed development on the agricultural production capability of the site is assessed as being acceptable because of the above factors. Therefore, from an agricultural impact point of view, it is recommended that the development be approved.</p> |
| Avifauna         | <p>The CBAs of the Free State designated that majority of the site falls within an ESA1. Avoidance mitigation could be applied wherever possible to project infrastructure design and limit the amount of habitat impacted.</p> <p>The wet season results were highly significant given the highly significant density increase in observed avifauna which was representative of an abundance of food and breeding resources. However, even in optimal conditions, the diversity of priority species was low and the abundance</p>   | <ul style="list-style-type: none"> <li>All recommended buffering be strictly adhered to where possible.</li> <li>All recommended mitigation measures be applied preconstruction, post construction and operations.</li> <li>The Prescribed engineering mitigation measures (for wetland related impacts) must be supported by a pre-construction and Construction Phase rehabilitation plan to be commissioned prior to commencement of construction activities.</li> <li>An EMPr for the Construction Phase must be created and be subsequently updated every three years (during Operation) in order to</li> </ul>  |

| Specialist Study | Findings   | Recommendations   |
|------------------|--|---|
|                  | <p>number of priority species and SCC was moderate.</p> <p>A total of 56 priority species priority species has the possibility of occurring within and around the study area, although only ten (10) Red Listed species have been identified as present or highly likely and most are of moderate likelihood to occur within the project footprint and most will be irregular foraging visitors and not resident. Two red listed species were recorded, namely Double-banded Courser and African Marsh Harrier (EN).</p> <p>The proposed solar project has the potential to be of low to medium sensitivity from an avifaunal point of view. Some of the priority bird species are not habitat bound to the area for nesting and/or foraging purposes and is therefore important to focus on the some of the most significant cumulative impacts for the proposed solar project.</p> | <p>revaluate the effectiveness of the mitigations. All mortalities must be recorded.</p>  |
| Geotechnical     | <p>The topography over the assessment area is generally flat and undulating terrain sloping between 2° to 4°. Minor portions of the site have slope angles up to 10° adjacent to small ridges. The site is underlain by alternating sandstone, mudstone and siltstone of Adelaide Subgroup, Beaufort Group, Karoo Supergroup. A portion of the eastern section of the site is underlain by porphyritic lava, amygdale-free and amygdaloidal lava of the Klipriviersberg Group forming part of the Ventersdorp Supergroup.</p> <p>Some geotechnical constraints have been identified, primarily shallow and outcropping bedrock which may cause excavation difficulties, localised steep slopes and existing borrow pit areas.</p>  | <p>No fatal flaws or 'no-go' areas have been identified that would render any assessment areas unsuitable from a geological and geotechnical perspective. No geologically or geotechnically sensitive areas were identified within or near the assessment area. It is recommended however that areas of steeper slope gradients are avoided when determining the final infrastructure layout.</p> |

| Specialist Study | Findings  | Recommendations   |
|------------------|---|---|
|                  | These constraints may be mitigated via standard engineering design and construction measures.   |   |
| Social           | <p>For the proposed project, the identified environmental and socio-economic benefits outweigh the negative environmental impacts, making the project beneficial, although this is subject to a comprehensive assessment of the impacts from the findings of the full impact assessment report.</p> <p>From an environmental standpoint, it is determined that the adverse effects from the planning to the decommissioning stages are within acceptable parameters and can be adequately mitigated. This assessment's conclusion is that the project offers a chance to integrate a renewable energy facility with agricultural production in a way that improves agriculture and causes little loss of possible future agricultural productivity. On the other hand, the glare and sparkle from the solar PV panels' high reflectivity can harm eyes and impair drivers and pilots of aircraft.</p> | For a social perspective, it will create skilled and unskilled jobs during the construction and operational phases. While skilled employment will be open to experts from across the country, unskilled labour may be mostly reserved for local people. Skills transfer may also be one of the positive impacts of the project on local people. Positive outcomes have a moderate to high impact significance.  |
| Heritage         | <p>No elements of high cultural landscape value have been identified within close proximity to the area proposed for development. While dominated by agricultural activities, the naturally undulating landscape is intermittently interrupted by powerlines and railway lines which detract from the visual quality of the surrounding area.</p> <p>No archaeological heritage resources of significance were identified as being impacted in the layout provided. Further, highly significant Early and Middle Stone Age open sites were identified within the property but are not impacted directly in the layout provided - KS6, KS7 and KS8.</p>  | <p>Based on the outcomes of this report, it is not anticipated that the proposed development of the solar energy facility and its associated grid connection infrastructure will negatively impact on significant heritage resources on condition that:</p> <ul style="list-style-type: none"> <li>• A no development buffer of 50m is implemented around sites KS3 and KS4</li> <li>• A no development buffer of 100m is implemented around sites KS6, KS7 and KS8</li> <li>• The area identified as having higher levels of archaeological sensitivity in Figure 6 must not be impacted by any development activities.</li> </ul> |

| Specialist Study | Findings  | Recommendations   |
|------------------|---|---|
|                  | <p>These sites are graded IIIB for their greater scientific value associated with their sub-surface and, likely in-situ, deposits. It is recommended that none of these sites be impacted by the development through the implementation of a 100m no-development buffer around these sites. Furthermore, areas of higher archaeological sensitivity have been identified around the koppies and the pan located within the broader development area. It is recommended that no development takes place within this identified area. The present layout assessed in this report does not impact on this archaeologically sensitive area.</p> <p>No fossiliferous outcrop was detected in the proposed development area. However, loose, fragmented and weathered tree fossils and well-preserved trace fossils were detected. The latter was probably brought in from nearby areas and placed near the homestead (now in ruins). However, the apparent rarity of well-preserved fossil heritage in the proposed development footprint suggests that the impact of the development will be of a Low significance in palaeontological terms. It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. The construction of the development may thus be permitted in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources.</p> | <ul style="list-style-type: none"> <li>• The attached Chance Fossil Finds procedure must be implemented for the duration of construction activities</li> <li>• Although all possible care has been taken to identify sites of cultural importance during the investigation of the study area, it is always possible that hidden or subsurface sites could be overlooked during the assessment. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils, burials or other categories of heritage resources are found during the proposed development, work must cease in the vicinity of the find and SAHRA must be alerted immediately to determine an appropriate way forward.</li> </ul> |
| Visual           | The proposed project introduces a man-made artefact into an agricultural environment, changing the fabric of a large area (~326 ha). The surrounding  | <ul style="list-style-type: none"> <li>• Limit vegetation clearance and the footprint of construction to what is absolutely essential.</li> <li>• Consolidate the footprint of the construction camp to a functional minimum.</li> </ul>  |

| Specialist Study | Findings  | Recommendations  |
|------------------|---|--|
|                  | <p>area also features a 132 kV powerline traversing the landscape.</p> <p>The undulating landscape provides some VAC for the PV facility. The proposed project is anticipated to have a limited impact on highly sensitive receptors due to the limited number of highly sensitivity visual receptors directly adjacent to the project area. However, railway passengers and motorists – to a greater degree – will have the greatest visibility of the site. This visibility is anticipated to be moderated by their low sensitivity as transient and temporary receptors.</p> <p>This project will be largely incongruent with the existing agricultural landscape. As such, visual impacts include altered sense of place, visual intrusion, nuisance from glint and glare and light pollution.</p> <p>The VIA demonstrates that the project will generally result in a moderate visual impact and is not located within a REDZ. The construction, operational, decommissioning and cumulative impacts are deemed to be acceptable on the assumption that the mitigation measures are implemented.</p> <p>Based on the assessment and the assumption that the mitigation measures will be implemented, the specialist is of the opinion that the visual impacts of the project are acceptable and, from a visual perspective, there is no reason not to authorise the project.</p> | <ul style="list-style-type: none"> <li>• Avoid excavation, handling and transport of materials which may generate dust under very windy conditions.</li> <li>• Keep stockpiled aggregates and sand covered to minimise dust generation.</li> <li>• Keep construction site tidy.</li> <li>• Fence the perimeter of the site with a green or black fencing.</li> <li>• Ensure that the roof colour of the proposed buildings blends into the landscape.</li> <li>• Establish screening (e.g. vegetation) of &gt; 2 m in height between the south-western boundary of the PV array and the R76, where technically feasible and in consultation with a qualified botanist and / or landscaper and the project operator.</li> <li>• Establish screening (e.g. vegetation) of &gt; 1.5 m in height along the north-eastern boundary of the PV array, where technically feasible and in consultation with a qualified botanist and / or landscaper and the project operator.</li> </ul> |

**17. ENVIRONMENTAL IMPACT STATEMENT**

Bonsmara Solar PV (RF) (Pty) Ltd is proposing to construct the Bonsmara Solar PV Facility (SEF) and associated infrastructure approximately 12 km south-east of Kroonstad in the Moqhaka Local Municipality and the Fezile

**BONSMARA SOLAR PV (RF) (PTY) LTD**

Prepared by: 

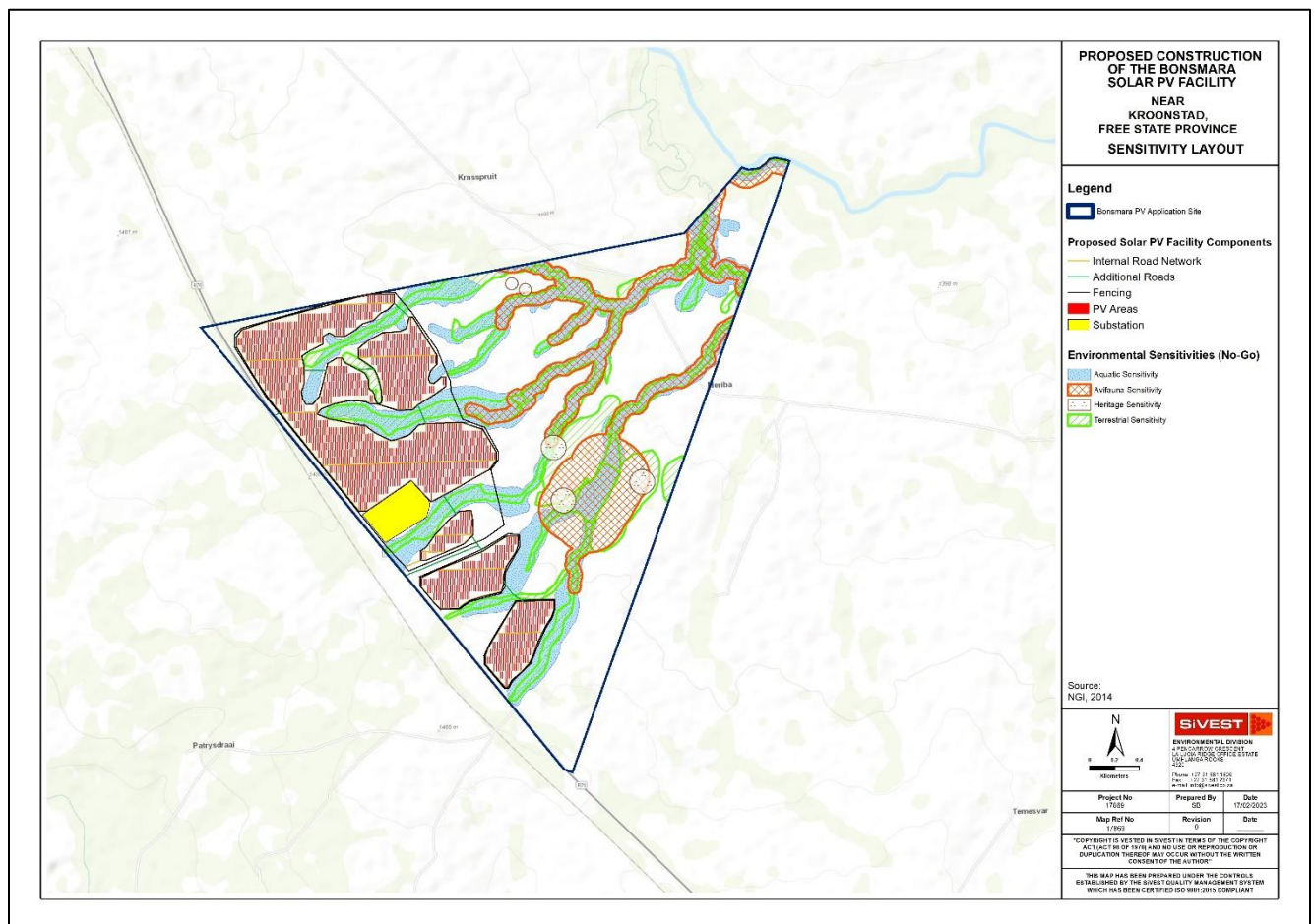
Project No. 17869  
 Description Proposed Bonsmara Solar PV Facility  
 Revision No. 1.0



Dabi District, in the Free State Province. The overall objective of the proposed development is to generate electricity by means of renewable energy technologies capturing solar energy to feed into the national grid.

Taking into consideration the findings of the EIA process for the proposed development and the fact that specialist recommendations have been used to inform the project design and layout of the facility, it is the opinion of the Environmental Assessment Practitioner (EAP) that the majority of the negative impacts associated with the implementation of the proposed project can be mitigated to acceptable levels. While there are potential negative environmental impacts associated with the proposed development, the extent of the positive benefits associated with the implementation of the project in terms of renewable energy supply and positive local and regional economic impact are considered to outweigh the negative impacts.

After consideration of the findings presented in the EIR and based on the preferred layout presented within this report, it is the reasoned opinion of the EAP that the proposed Bonsmara Solar PV Facility is acceptable and Environmental Authorisation could be granted.



**Figure 39: Final proposed layout with site sensitivities**

The Bonsmara SEF will assist by converting solar energy into electricity, thereby releasing no harmful by-products into the environment which will in turn reduce the dependency on fossil fuels.

**BONSMARA SOLAR PV (RF) (PTY) LTD**

Prepared by:



**Project No.** 17869  
**Description** Proposed Bonsmara Solar PV Facility  
**Revision No.** 1.0

**Date:** April 2023

Page 121 of 126

The following specialist studies have been undertaken for the project:

- Aquatic/Freshwater Impact Assessment
- Terrestrial Biodiversity Impact Assessment
- Agriculture and Soils Impact Assessment
- Avifaunal Impact Assessment
- Desktop Geotechnical Investigation
- Social Impact Assessment
- Heritage Impact Assessment (including Palaeontology, Archaeology and Cultural)
- Visual Impact Assessment

The specialist assessments were conducted to address the potential impacts relating to the proposed development in order to ascertain the level of each identified impact, as well as mitigation measures which may be required. A summary of the main findings of the specialists are included in **Section 16** above.

The aquatic assessment (refer to **Appendix 6**) concluded that, overall, it is expected that the impact on the environment would be Low (-). The specialist finds no reason to withhold an authorisation of any of the proposed activities, assuming that key mitigations measures are implemented.

The terrestrial biodiversity assessment (refer to **Appendix 6**) concluded that due to having a low conservation status, the grassland habitat is deemed to have a moderate sensitivity status and would provide a suitable footprint for the proposed activity, bearing in mind watercourse and ecological process and connectivity buffers which have been incorporated into the design to incorporate an undeveloped network for connectivity purposes within the site and the surrounding landscape. All impacts are deemed to be medium before and low after mitigation.

The agricultural assessment (refer to **Appendix 6**) concluded that the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site. Instead, the development is an opportunity for a renewable energy facility to be integrated with agricultural production in a way that provides benefits to agriculture and leads to little loss of future agricultural production potential.

The avifaunal assessment (refer to **Appendix 6**) concluded that there is no reason why an Environmental Authorisation (EA) should not be granted, provided the applicant adheres to the recommended mitigation measures.

The geotechnical assessment (refer to **Appendix 6**) concluded no fatal flaws or 'no-go' areas have been identified that would render any assessment areas unsuitable from a geological and geotechnical perspective. It was therefore recommended that the proposed activity be authorised.

The social assessment (refer to **Appendix 6**) concluded that proposed development can be authorised. The proposed development will also have wider societal benefits by generating additional income and employment. In addition, the proposed development will contribute to the country's urgent need for reliable energy generation given Eskom's crippling blackouts. Moreover, the area being rural, solar PV's impact on agricultural viability is minimal compared to energy sources such as coal which has more of an impact on agricultural land use. All these positive impacts render the Bonsmara SEF beneficial to local communities and the country.

---

**BONSMARA SOLAR PV (RF) (PTY) LTD**

Prepared by:



**Project No.** 17869  
**Description** Proposed Bonsmara Solar PV Facility  
**Revision No.** 1.0

**Date:** April 2023

Page 122 of 126

The heritage assessment (refer to **Appendix 6**) concluded that no impacts to palaeontological resources are anticipated, however it is recommended that, due to the high palaeontological sensitivity of the development area, the attached Chance Fossil Finds procedure is implemented for the duration of construction activities. In terms of the cultural landscape, no elements of high cultural landscape value have been identified within close proximity to the area proposed for development. While dominated by agricultural activities, the naturally undulating landscape is intermittently interrupted by powerlines and railway lines which detract from the visual quality of the surrounding area. No archaeological heritage resources of significance were identified as being impacted in the layout provided.

The visual assessment (refer to **Appendix 6**) concluded that, based on the assessment and the assumption that the mitigation measures will be implemented, the specialist is of the opinion that the visual impacts of the project are acceptable and, from a visual perspective, there is no reason not to authorise the project.

No location alternatives are being considered for the Bonsmara SEF as these sites were selected prior to the commencement of the EIA Process. The layout that was prepared for the Bonsmara SEF has been assessed by specialists to identify potential impacts that may arise from the development. Based on the findings of the specialists, the potential impacts identified and the outcomes of the public participation process of the Scoping Phase, the layout has been updated to avoid environmental sensitivities (except for a few roads, cabling and fences) to produce a final layout. This final layout has been further assessed by all specialists (refer to Impact Tables in **Section 13.3** and findings and recommendations in **Section 15**). No further layout alternatives have been considered as part of the EIA process. Impact assessments have been undertaken on the revised layout. No technology alternatives will be considered. CSP technology would not be suitable for this site because it requires a flat surface, has a high visual impact and requires large volumes of water. CSP was not catered for in the IRP2019. In terms of wind energy, the climatic conditions show that there is not a suitable wind resource for a wind facility. The no-go alternative is not the preferred alternative and has not been assessed as part of the EIA phase.

**Section 16** provides a summary of the positive and negative impacts associated with the proposed project.

## **18. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR) AND CONDITIONS TO BE INCLUDED IN THE ENVIRONMENTAL AUTHORISATION**

In accordance with Appendix 4 of the EIA Regulations, 2014 (as amended), an EMPr has been included within the EIA. The EMPr includes the impact management measures formulated by the various specialists and the recording of the proposed impact management outcomes for the development have also been included in the EMPr (**Appendix 8**).

The EMPr provides 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. The relevant management plans have also been incorporated into the EMPr (where required), which will assist in this regard. Taking into account the potential negative and significant positive impacts that the proposed development could have on the biophysical and social environment, it is the opinion of the EAP that the proposed development should be authorised subject to the following conditions of authorisation:

---

**BONSMARA SOLAR PV (RF) (PTY) LTD**

Prepared by:



**Project No.** 17869  
**Description** Proposed Bonsmara Solar PV Facility  
**Revision No.** 1.0

**Date:** April 2023

Page 123 of 126

- All of the mitigation measures identified in this EIA Report (**Section 14.3**) must be made conditions of the authorisation.
- It is important that all of the listed mitigation measures are costed for in the construction phase financial planning and budget so that the contractor and/or developer cannot give financial budget constraints as reasons for non-compliance.
- All feasible and practical mitigation measures recommended by the various specialists must be incorporated into the Final Environmental Management Programme (EMPr) and implemented, where applicable;
- The specialist recommendations included in Section 16 must be made conditions of the authorisation.
- Where applicable, monitoring should be undertaken to evaluate the success of the mitigation measures recommended by the various specialists.
- The activity-specific construction EMPr must be adhered to.
- An independent Environmental Control Officer (ECO) must be appointed by the applicant to monitor the implementation of the construction EMP. The ECO should undertake regular site inspections and compile an environmental audit report.

## **19. FINAL PROPOSED ALTERNATIVE WHICH RESOND TO THE IMPACT MANAGEMENT MEASURES, AVOIDANCE, AND MITIGATION MEASURES IDENTIFIED THROUGH THE ASSESSMENT**

The final proposed alternative is the layout that has been assessed in this report.

## **20. ASPECTS WHICH WERE CONDITIONAL TO THE FINDINGS OF THE ASSESSMENT EITHER BY THE EAP OR SPECIALIST WHICH ARE TO BE INCLUDED AS CONDITIONS OF AUTHORISATION**

None identified.

## **21. UNCERTAINTIES, ASSUMPTIONS AND GAPS IN KNOWLEDGE**

The assessment has been based by SiVEST on information sourced and provided by the Applicant, site visits conducted, specialist findings and the application of the SiVEST assessment criteria. The EAP is of the opinion that the assessment method applied is acceptable. SiVEST assumes that:

- All the information provided by the Applicant is accurate and unbiased.
- The available data, including Topocadastral maps, Orthophotographs, geological maps and Google Earth images, are reasonably accurate.
- All information contained in the specialist studies provided is accurate and unbiased.
- Refer to specialist studies (**Appendix 6**) for their specific assumptions and limitations.
- It is not always possible to involve all Interested and/or Affected Parties (I&APs) individually, however, every effort has/will be made to involve as many interested parties as possible. It is also assumed that individuals representing various associations or parties convey the necessary information to these associations / parties.

**BONSMARA SOLAR PV (RF) (PTY) LTD**

Prepared by:



Project No. 17869  
 Description Proposed Bonsmara Solar PV Facility  
 Revision No. 1.0

Date: April 2023

Page 124 of 126

- It is not possible to determine the actual degree of the impact that the development will have on the immediate environment without some level of uncertainties. Actual impacts can only be determined following construction and/or operation commences.

## **22. AUTHORISATION OF THE PROPOSED BONSMARA SEF PROJECT**

The final layout for the Bonsmara SEF has been designed to avoid no-go features on site that have been identified through the various specialist studies that have been undertaken. No fatal flaws were identified by the specialists who have undertaken their respective assessment for the project. Whilst it is acknowledged that the project will result in negative impacts, these can be mitigated to acceptable levels.

Based on the findings of the specialist studies and this assessment, provided further comments and concerns are not raised during the pending public participation process, the EAP has no reason to recommend that the project not be authorised, provided that the mitigation measures are adhered to. The conditions to be included in the Environmental Authorisation for the construction phase are listed in **Section 18** above.

The environmental authorization should be valid for a period of 10 years.

## **23. EAP DECLARATION**

The EAP declarations, CV's and qualifications for the EAP's responsible for the preparation of this report have been attached in **Appendix 1**.

## **24. DEVIATIONS FROM THE APPROVED SCOPING REPORT**

There are currently no deviations from the approved Scoping Report.

## **25. INFORMATION REQUIRED BY CA (IF APPLICABLE)**

Currently n/a.

## **26. CONCLUSION**

This EIA Report has covered activities and findings related to the scoping and EIA process for the proposed Bonsmara SEF Project. Professional experience, specialist knowledge, relevant literature and local knowledge of the area have all been used to identify the potential issues associated with the proposed project. No fatal flaws were identified during the EIA Phase. In conclusion, SiVEST, as the independent EAP, is therefore of the view that:

- The site location and project description can be authorised based on the findings of the suite of specialist assessments;
- The majority of impacts can be mitigated to low with the exception of some impacts which are rated as having a medium impact post-mitigation. In terms of the cumulative impact assessment, all of the cumulative impacts associated with the proposed development are low after the implementation of mitigation measures, except for the loss of habitat identified by the avifaunal habit which can't be mitigated. The Social specialist identified positive impacts with regards to the socio-economic environment and job creation during the construction and operational phases; and
- Through the implementation of mitigation measures, together with adequate compliance monitoring, auditing and enforcement thereof by the appointed Environmental Control Officer (ECO) as well as the competent authority, the potential detrimental negative impacts associated with the proposed development can be mitigated to acceptable levels.



**SiVEST Environmental Division**

4 Pencarrow Crescent,  
La Lucia Ridge Office Estate,  
Umhlanga Rocks, 4320  
PO Box 1899, Umhlanga Rocks, 4320  
KwaZulu-Natal, South Africa

Tel +27 31 581 1579

Email [info@sivest.com](mailto:info@sivest.com)

[www.sivest.com](http://www.sivest.com)

**Contact Person:** Michelle Guy

Email: [michelleg@sivest.com](mailto:michelleg@sivest.com)