



# DRAFT BASIC ASSESSMENT REPORT

for

## DOORNHOEK 1 PV

On

Portion 18 of the Farm Doornhoek No. 372-IP

In terms of the

National Environmental Management Act (Act No. 107 of 1998, as amended) & 2014 Environmental Impact Regulations

Prepared for Applicant: Doornhoek PV (Pty) Ltd.

Date: 13 May 2022

Author of Report: Dale Holder

Author Email: dale@cape-eaprac.co.za

Report Reference: CML734/04

Department Reference: 2022-04-0001 (Pre-Application Reference)

Case Officer: Mr Herman Alberts

**Cape EAPrac**

Cape Environmental Assessment Practitioners

Tel: +27 44 874 0365 PO Box 2070, George 6530  
Fax: +27 44 874 0432 17 Progress Street, George

[www.cape-eaprac.co.za](http://www.cape-eaprac.co.za)




# DOCUMENT TRACKING

## DOCUMENT HISTORY

REVISION	DATE	AUTHOR
Draft Basic Assessment Report	13 May 2022	Dale Holder
Final Basic Assessment Report	Pending	Dale Holder
Draft Environmental Management Programme	13 May 2022	Dale Holder
Final Environmental Management Programme	Pending	Dale Holder

## APPROVAL FOR RELEASE

NAME	TITLE	SIGNATURE
Dale Holder	Senior Environmental Practitioner	

## DISTRIBUTION

DISTRIBUTION LIST
Department of Forestry, Fisheries and the Environment
Doornhoek PV (Pty) Ltd
Registered and Potential Interested and Affected Parties

## SUBMISSION AND CORRESPONDENCE

SUBMISSION / CORRESPONDENCE	DATE
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Draft Basic Assessment Report Submitted	13 May 2022
Draft Basic Assessment Report Acknowledged	Pending
Comment on Draft Basic Assessment Report	Pending
Final Basic Assessment Report Submitted	Pending

**APPOINTED ENVIRONMENTAL ASSESSMENT PRACTITIONER:**

Cape EAPrac Environmental Assessment Practitioners

PO Box 2070

George

6530

Tel: 044-874 0365

Fax: 044-874 0432

**Report written & compiled by:** Dale Holder (Ndip Nature Conservation), who has over 16 years' experience as an environmental practitioner.

**Registrations:** Director, Louise-Mari van Zyl (MA Geography & Environmental Science [US]; Registered Environmental Assessment Practitioner with the Interim Certification Board for Environmental Assessment Practitioners of South Africa, EAPSA). Ms van Zyl has over fifteen years' experience as an environmental practitioner.

**PURPOSE OF THIS REPORT:**

I&AP Review and Comment

**APPLICANT:**

Doornhoek PV (Pty) Ltd

**CAPE EAPRAC REFERENCE NO:**

CML734/04

**DEPARTMENT REFERENCE:**

2022-04-0001 (Pre-Application Reference)

**SUBMISSION DATE:**

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in terms of the

National Environmental Management Act, 1998 (Act No. 107 of 1998 as amended) & Environmental Impact Regulations 2014 (as amended)

## Doornhoek 1 PV

Portion 18 of the Farm Doornhoek No. 372-IP.

Submitted for:

### Stakeholder Review & Comment

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Report Issued by:

Cape Environmental Assessment Practitioners

Tel: 044 874 0365 PO Box 2070

Fax: 044 874 0432 17 Progress Street, George 6530

Web: [www.cape-eaprac.co.za](http://www.cape-eaprac.co.za)

## REPORT DETAILS

<b>Title:</b>	Draft Basic Assessment Report for Doornhoek 1 PV
<b>Purpose of this report:</b>	<p>This Draft Basic Assessment Report is made available to all registered and potential Interested and Affected Parties (I&amp;APs) for review and comment and all comments received will be incorporated into the Final Basic Assessment Report that will be submitted to the competent authority for decision making.</p> <p>This BAR forms part of a series of reports and information sources that are being provided during the Basic Assessment Process for the proposed Doornhoek 1 PV near Haartbeesfontein in the North West Province. Registered I&amp;APs will be given an opportunity to comment on the following reports as part of this environmental process:</p> <ul style="list-style-type: none"> <li>- Draft Basic Assessment Report,</li> <li>- All Specialist Studies, and</li> <li>- Draft Environmental Management Programme.</li> </ul> <p>In accordance with the regulations, the objectives of an environmental process are to, through a consultative process:</p> <ul style="list-style-type: none"> <li>(a) identify the relevant policies and legislation relevant to the activity;</li> <li>(b) motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;</li> <li>(c) identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;</li> <li>(d) identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;</li> <li>(e) identify the key issues to be addressed in the assessment phase;</li> <li>(f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and</li> <li>(g) identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.</li> </ul> <p>The Draft Basic Assessment Report is available to all registered and potential interested and affected parties for a 30-day review and comment period extending from <b>13 May 2022 – 13 June 2022</b>.</p> <p>All comments received during this comment period will be incorporated into the Final BAR that will be submitted to the DFFE for Decision making.</p>
<b>Prepared for:</b>	Doornhoek PV (Pty) Ltd
<b>Published by:</b>	Cape Environmental Assessment Practitioners (Pty) Ltd. (Cape EAPrac)
<b>Authors:</b>	Mr Dale Holder
<b>Cape EAPrac Ref:</b>	CML734/04
<b>DEA Case officer &amp; Ref. No:</b>	Mr Herman Alberts - 2022-04-0001 (Pre-Application Reference)
<b>Date:</b>	13 May 2022
<b>To be cited as:</b>	<i>Cape EAPrac</i> , 2022. Draft Basic Assessment Report for Doornhoek 1 PV. Report Reference: CML734/04. George.

# TECHNICAL CHECKLIST

The following technical checklist is included as a quick reference roadmap for the proposed project.

Applicant Details		
<b>Applicant Details</b>	Applicant Name:	Doornhoek PV (Pty) Ltd  Doornhoek PV (Pty) Ltd is a Special Purpose Vehicle (SPV) incorporated for the sole purpose of developing, constructing, and operating a proposed 115 MW solar PV facility and associated infrastructure located on Portion 18 of the Farm Doornhoek No. 372-IP.
	Company Registration Number:	2022 / 421783 / 07
	BBBEE Status:	NA
	Project Name:	Doornhoek 1
Site Details		
<b>Size of the property</b>	Description and Size in hectares of the affected property.	Portion 18 of the Farm Doornhoek No. 372-IP.  Approx 608.5790 Ha
<b>Size of the study area</b>	Size in ha of initial study area.	Approx 1790 Ha  Portion 18 of the Farm Doornhoek No. 372-IP, Portion 21 of the Farm Doornhoek No. 372-IP; and Remainder of Portion 2 of the Farm Doornhoek No. 372-IP. Formed part of the initial study area.
<b>Development Footprint</b>	This includes the total footprint of PV panels, auxiliary buildings, onsite substation, inverter stations and internal roads.	Approx. 200 hectares.
Technology Details		
<b>Capacity of the facility</b>	Capacity of facility (in MW)	Net generation (contracted) capacity of up to 115 MWac
<b>Solar Technology selection</b>	Type of technology	<ul style="list-style-type: none"> <li>• PV modules and mounting structures (monofacial or bifacial) with fixed, single or double axis tracking mounting structures;</li> <li>• Inverters and transformers;</li> <li>• Battery Energy Storage System (BESS);</li> <li>• Site and internal access roads (up to 8 m wide);</li> <li>• Operation and Maintenance buildings including a gate house and security building, control centre, offices, warehouses and workshops for storage and maintenance.</li> <li>• Temporary and permanent laydown area;</li> <li>• Perimeter fencing and security infrastructure;</li> <li>• Rainwater Tanks; and</li> <li>• Grid connection infrastructure, including:                             <ul style="list-style-type: none"> <li>• 33kV cabling between the project components and the facility substation                                     <ul style="list-style-type: none"> <li>• A 132kV facility substation</li> <li>• A 132kV Eskom switching station</li> <li>• A Loop-in-Loop out (LILLO) overhead 132kV power line between the Eskom switching station and the existing Watershed–Klerksdorp 1 132kV power line.</li> </ul> </li> </ul> </li> </ul>

		For the Loop-in-Loop out (LLO) overhead 132kV power line, a corridor (from the proposed Eskom switching station to the existing Watershed–Klerksdorp 1 132kV power line) has been assessed to allow for micro-siting.
	Structure height	Solar panels with a maximum height of $\pm 2.5$ m above the ground
	Surface area to be covered (including associated infrastructure such as roads)	Approximately 200 ha
	Structure orientation	Fixed-tilt: north-facing at a defined angle of tilt Single or double axis tracking: mounted in a north-south orientation, tracking from east to west.
	Laydown area dimensions	Temporary Laydown Area: $\pm 5$ ha  Permanent Laydown Area: Less than $\pm 1$ ha will remain in place for operations
<b>Storage Solution</b>	BESS	Battery Energy Storage System (BESS). Area: up to $\pm 4$ ha Capacity: Unspecified Technology: solid-state/ non-liquid type batteries.
<b>Grid Connection</b>		
	Size and capacity of on-site substation	It is estimated that the maximum size of the substation/switching station will not exceed 1 ha (this includes the IPP substation and the Eskom switching station). The substation will have switchgear portals up to 15 m in height and possible lightning masts up to 25 m in height.  The facility substation will collect the power from the facility and transform it from medium voltage (up to 33 kV) to high voltage (up to 132 kV).  Each facility will require inverter-stations, transformers, switchgear and internal electrical reticulation (underground cabling).  Powerline Capacity : 132 kV Powerline Length: up to 200m
	Length and capacity of on-site powerlines / cabling.	
<b>Auxiliary Infrastructure</b>		
<b>Other infrastructure</b>	Additional Infrastructure	<ul style="list-style-type: none"> <li>• Auxiliary buildings of approximately 1 ha, including (but not limited to) a gate house and security building, control centre, offices, warehouses and workshops for storage and maintenance.</li> <li>• Rain water tanks; and</li> <li>• Electrified perimeter fencing not exceeding 5 m in height.</li> </ul>
	Details of access roads	The access roads will not exceed 8 m in width for the wearing course. The total width including all stormwater management structures will not exceed 10 m wide. The majority of the access road will comprise expansion of sections of existing farm roads, while a small section will comprise sections of a new road.
	Details of internal roads	A network of gravel internal access roads and perimeter roads with a width of up to $\pm 6$ m, will be constructed to provide access to the various components of each facility.

The Applicant, Doornhoek PV (Pty) Ltd, is proposing the construction of a photovoltaic (PV) solar energy facility (known as the Doornhoek 1 PV facility) located on a site approximately 11km north of Klerksdorp in the North West Province. The solar PV facility will comprise several arrays of PV panels and associated infrastructure and will have a contracted capacity of up to 115MW. The development area is situated within the City of

Matlosana Local Municipality within the Dr Kenneth Kaunda District Municipality. The site is accessible via an existing district road located adjacent to the east of the development area.

The proposed Doornhoek 1 PV facility and associated infrastructure will be located on Portion 18 of the Farm Doornhoek No. 372-IP. The project site is located within the Klerksdorp Renewable Energy Development Zones (REDZ).

An additional up to 50MW PV facility (Doornhoek 2 PV Facility) is concurrently being considered on the same property and is being assessed through a separate Basic Assessment process.

The proposed Doornhoek 1 PV Facility will cover approximately 200ha and will include the following infrastructure:

- PV modules and mounting structures
- Inverters and transformers
- Battery Energy Storage System (BESS)
- Site and internal access roads (up to 8m wide)
- Operation and Maintenance buildings including a gate house and security building, control centre, offices, warehouses and workshops for storage and maintenance.
- Temporary and permanent laydown area
- Grid connection infrastructure, including:
  - 33kV cabling between the project components and the facility substation
  - A 132kV facility substation
  - A 132kV Eskom switching station
  - A Loop-in-Loop out (LILO) overhead 132kV power line between the Eskom switching station and the existing Watershed–Klerksdorp 1 132kV power line.

## LOCATION OF PREFERRED ALTERNATIVE<sup>1</sup>

The co-ordinates of the preferred alternative are reflected in the table below.<sup>2</sup>

Doornhoek 1 PV	Latitude	Longitude
North-West Corner	26°43'36.11"S	26°37'09.76"E
North-East Corner	26°43'10.81"S	26°38'53.17"E
South-West Corner	26°44'03.67"S	26°37'17.27"E
South-East Corner	26°43'37.90"S	26°38'49.94"E

Access Road	Latitude	Longitude
Start	26°43'43.47"S	26°39'06.01"E
Middle	26°43'43.15"S	26°38'45.54"E
End	26°43'44.46"S	26°38'26.71"E

<sup>1</sup> The footprint of Doornhoek 1 PV is not rectangular. The co-ordinates reflected in this table indicate the corner points that are furthest east and west.



Powerline Corridor <sup>3</sup>	Latitude	Longitude
Start	26°43'42.91"S	26°38'25.98"E
Middle	26°43'42.94"S	26°38'23.84"E
End	26°43'42.93"S	26°38'23.03"E

Substations <sup>4</sup>	Latitude	Longitude
Doornhoek 1 PV Eskom Substation	26°43'42.91"S	26°38'25.98"E
Doornhoek 1 PV IPP Substation	26°43'41.97"S	26°38'27.98"E

## CONTENTS OF A BASIC ASSESSMENT REPORT.

Appendix 1 of Regulation 326 of the 2014 EIA Regulations (as amended) contains the required contents of a Basic Assessment Report. The checklist below serves as a summary of how these requirements were incorporated into this Basic Assessment Report.

Requirement	Details
(1) A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include -	
(a) Details of - The EAP who prepared the report; and The expertise of the EAP, including, a curriculum vitae.	The report was compiled by Dale Holder of Cape EAPrac. The author has 18 years' experience as an EAP and holds a ND Nature Conservation qualification.  The CV of the EAP and Company Profile is included as Annexure J4 of this report.
(b) The location of the activity, including – The 21-digit Surveyor General code of each cadastral land parcel; Where available, the physical address and farm name; Where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.	<u>PV Facility</u> C00900000000037200018  <u>Powerline</u> C00900000000037200018  ± 11km north of Klerksdorp in the North West Province  <b><u>Doornhoek 1 PV</u></b> <u>North-West</u> 26°43'36.11"S    26°37'09.76"E <u>North-East</u> 26°43'10.81"S    26°38'53.17"E <u>South-West</u> 26°44'03.67"S    26°37'17.27"E <u>South-East</u> 26°43'37.90"S    26°38'49.94"E  <b><u>Access Road</u></b> <u>Start</u> 26°43'43.47"S    26°39'06.01"E <u>Middle</u> 26°43'43.15"S    26°38'45.54"E <u>End</u> 26°43'44.46"S    26°38'26.71"E  <b><u>Powerline Corridor</u></b> <u>Start</u> 26°43'42.91"S    26°38'25.98"E <u>Middle</u> 26°43'42.94"S    26°38'23.84"E <u>End</u> 26°43'42.93"S    26°38'23.03"E

<sup>3</sup> The powerline is assessed as a corridor, please refer to the plans in appendix A B and D depicting this corridor. The co-ordinates reflected in this table depict a straight line from the approximate centrepoint of the Eskom side of the on site substation to the existing Klerksdorp Watershed 132kV line.

<sup>4</sup> These are reflected as the approximate centrepoint of these substations.

Requirement	Details						
	<p><b>Substations</b></p> <table border="0"> <tr> <td><u>Eskom Substation</u></td> <td>26°43'42.91"S</td> <td>26°38'25.98"E</td> </tr> <tr> <td><u>IPP Substation</u></td> <td>26°43'41.97"S</td> <td>26°38'27.98"E</td> </tr> </table>	<u>Eskom Substation</u>	26°43'42.91"S	26°38'25.98"E	<u>IPP Substation</u>	26°43'41.97"S	26°38'27.98"E
<u>Eskom Substation</u>	26°43'42.91"S	26°38'25.98"E					
<u>IPP Substation</u>	26°43'41.97"S	26°38'27.98"E					
<p>(c) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or On land where the property has not been defined, the coordinates within which the activity is to be undertaken.</p>	<p>Refer to Appendix A and B of this report.</p>						
<p>(d) a description of the scope of the proposed activity, including - All listed and specified activities triggered and being applied for; and A description of the activities to be undertaken including associated structures and infrastructure.</p>	<p>The relevant listed activities are captured in Section 3.1.2 The description of the activity is provided in Section 2 of this report with graphic representation provided in Appendix B.</p>						
<p>(e) A description of the policy and legislative context within which the development is proposed, including – An identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and . How the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks and instruments.</p>	<p>Please refer to Section 3 of this document.</p>						
<p>(f) A motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location.</p>	<p>Please refer to Section 2.2 of this document.</p>						
<p>(g) A motivation for the preferred site, activity and technology alternative.</p>	<p>The preferred alternative has been identified as the best practicable option and is discussed in detail in section 2.4 of this report.</p>						
<p>(h) A full description of the process followed to reach the proposed preferred alternative within the site, including -</p> <ul style="list-style-type: none"> <li>• Details of all alternatives considered;</li> <li>• 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>• 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>• The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;</li> <li>• The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts -</li> </ul> <p>(aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated.</p>	<p>Section 2.4 addresses feasible and reasonable alternatives which were identified for facility. Site, layout and technological alternatives were considered.</p> <p>Details of Public Participation are included in section 8 of the report.</p> <p>A summary of all issues raised by I&amp;APs as well as the responses thereto are included in Appendix F.</p> <p>The environmental attributes of the study site are included in section 5 of the report.</p> <p>The identification and assessment of Impacts are included in section 6 of the report.</p> <p>The summary of proposed mitigation measures is included in section 7 of the report.</p> <p>The outcome of the site selection matrix is attached in Annexure E7 and is summarised in section 2.3 of the report.</p>						

Requirement	Details
<ul style="list-style-type: none"> <li>• The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;</li> <li>• 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>• The possible mitigation measures that could be applied and level of residual risk;</li> <li>• The outcome of the site selection matrix;</li> <li>• If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and</li> <li>• A concluding statement indicating the preferred alternatives, including preferred location of the activity.</li> </ul>	<p>The concluding statement is contained in section 6.14 of the report.</p>
<p>(i) A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including -  A description of all environmental issues and risks that were identified during the basic assessment process; and  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.</p>	<p>Please see Summary and Section 6 of the report and Appendix E for the specialist reports.</p>
<p>(j) An assessment of each identified potentially significant impact and risk, including -  Cumulative impacts;  The nature, significance and consequences of the impact and risk;  The extent and duration of the impact and risk;  The probability of the impact and risk occurring;  The degree to which the impact and risk can be reversed;  The degree to which the impact and risk may cause irreplaceable loss of resources; and  The degree to which the impact and risk can be mitigated.</p>	<p>Please see Section F of the report and Appendix E for the specialist reports.</p>
<p>(k) Where applicable, a summary of the findings and impact management measures identified in 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.</p>	<p>Please see Section 6 of the report and Appendix E for the specialist reports.</p>
<p>(l) An environmental impact statement which contains –</p> <ul style="list-style-type: none"> <li>• A summary of the key findings of the environmental impact assessment;</li> <li>• A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and</li> <li>• A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.</li> </ul>	<p>Section 6.23 and 6.14 of this report.</p> <p>See Appendix D</p> <p>Section 6.13 of this report.</p>
<p>(m) Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr.</p>	<p>See section 7 report.</p>

<b>Requirement</b>	<b>Details</b>
(n) 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.	See section 7 of this report.
(o) A description of assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed.	See 3.4 of this report.
(p) 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.	See section 9 of this report.
(q) Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised.	The proposed activity does include operational aspects.
(r) An undertaking under oath or affirmation by the EAP in relation to: The correctness of the information provided in the reports; The inclusion of comments and inputs from stakeholders and I&APs; The inclusion of inputs and recommendations from the specialist reports where relevant; and Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.	The declaration of the EAP is attached in Appendix G.
(s) Where applicable, details of any financial provisions for the rehabilitation, closure and ongoing post decommissioning management of negative environmental impacts.	This environmental assessment does not include application for decommissioning and closure of activities
(t) Any specific information that may be required by the competent authority.	Currently not applicable but will be included if such a request is made.
(u) Any other matters required in terms of section 24(4)(a) and (b) of the Act.	This section will be updated on receipt of the mandatory comment from the competent authority.

## **COMPETANT AUTHORITY COMMENT ON DRAFT BASIC ASSESSMENT REPORT**

This section will be updated once the DFFE provide comment on the Draft Basic Assessment Report.


# ORDER OF REPORT

## Report Summary

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Annexure E2	:	Aquatic Biodiversity compliance Statement (Scientific Aquatic Services, 2022)
Annexure E3	:	Avifaunal Impact Assessment (Pachnoda Consulting, 2022)
Annexure E4	:	Agricultural Compliance Statement (Lanz, 2022)
Annexure E5	:	Heritage and Archaeological Impact Assessment Report (Beyond Heritage, 2022)
Annexure E6	:	Palaeontology Desktop Assessment (Bamford, 2022)
Annexure E7	:	Visual Impact Assessment (Stead, 2022)
Annexure E8	:	Social Impact Assessment (Savannah Environmental, 2022)
Annexure E9	:	Technical Layout Design Report (Doornhoek PV (Pty) Ltd, 2022)
Annexure E10	:	Site Selection Motivation Report (Doornhoek PV (Pty) Ltd, 2022)
Annexure E11	:	Traffic Impact Assessment (BVi Consulting Engineers, 2022)
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## EXECUTIVE SUMMARY

### I. INTRODUCTION

Cape EAPrac has been appointed by Doornhoek PV (Pty) Ltd, hereafter referred to as the Applicant, as the independent Environmental Assessment Practitioner (EAP), to facilitate the Basic Assessment process<sup>5</sup> required in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) for the proposed development of the Doornhoek 1 PV facility and associated infrastructure on Portion 18 of the Farm Doornhoek No. 372-IP approximately 11km north of Klerksdorp in the North West Province of South Africa.

The total generation capacity of the solar facility will not exceed 115 MW<sub>AC</sub> for input into the national Eskom grid. The project will feed into the National Grid via a Loop in – Loop Out (LILO) connection to the existing Klerksdorp/Watershed 132kV overhead powerline situated on the property. The grid connection to connect this project to the National Grid is being assessed as part of this same environmental assessment process<sup>6</sup>.

The purpose of this **Draft Basic Assessment Report (BAR)** is to describe the environment to be affected, the proposed project, to present the site constraints identified by the various specialist during their site assessments and identify & assess the impacts of this development on the receiving environment. This information is herewith presented to all registered and potential Interested and Affected Parties (I&AP's), organs of state, state departments and the competent authority for review and comment.

In compliance with Chapter 6 of the 2014 EIA regulations (as amended), Draft BAR is available for a 30 - Day period extending from **13 May 2022 – 13 June 2022**.

All comments received on the Draft BAR will be incorporated into the Final BAR that will be submitted to the Department of Forestry, Fisheries and the Environment (DFFE) for consideration and decision making. After the department has taken a decision on the application, this decision will be communicated to all registered I&AP's along with details of the appeal process.

### II. RECOMMENDATION OF THIS EIA

It is the recommendation of Cape EAPrac that the development proposal, Layout Alternative 1 and the proposed grid connection corridor (LILO into the existing Klerksdorp-Watershed 132kV overhead powerline) be considered for approval by the competent Authority, subject to the outcome of the public participation process and on condition that all the suggested mitigation measures are implemented, all other legislative approvals be obtained, and that the final EMP be strictly adhered to.

Please refer to sections 6,7 and 9 of this Draft BAR for the justification of this recommendation.

### III. NEED AND DESIRABILITY

Need and desirability for this project has been considered in detail in this environmental process. The overall need and desirability in terms of developing renewable energy generation in South Africa, the North West Province and globally is considered in section 1, while the project specific need and desirability is considered in section 2.8 of this report.

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<sup>5</sup> The environmental process follows a basic assessment process, as it is located within the Klerksdorp Renewable Energy Development Zone.

<sup>6</sup> This Basic Assessment Report therefore includes the IPP side of the onsite substation, the Eskom side of the onsite substation as well as the Loop In – Loop Out (LILO) connection into the existing Klerksdorp/Watershed 132kV overhead powerline.

## IV. ENVIRONMENTAL LEGISLATIVE REQUIREMENTS

The current assessment is being undertaken in terms of the **National Environmental Management Act** (NEMA, Act 107 of 1998). This Act makes provision for the identification and assessment of activities that are potentially detrimental to the environment, and which require authorisation from the competent authority (in this case, the National Department Forestry, Fisheries and the Environment, DFFE) based on the findings of an Environmental Assessment.

The proposed development entails a number of listed activities, which require a Basic Assessment Process, which must be conducted by an independent Environmental Assessment Practitioner (EAP). Cape EAPrac has been appointed to undertake this process.

**Table 1: NEMA 2014 (As amended) listed activities applicable to Doornhoek 1 PV.**

Listed activity as described in GN R.983, 984 and 985	Description of project activity that triggers listed activity
<b>Listing Notice 1 - Regulation GN R. 983 – Basic Assessment</b>	
<b>GNR 983 Item 11:</b> The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;	The proposal includes MV cabling of up to 33 kilovolts as well on site substations and an overhead powerline with a capacity of up to 132 kilovolts.
<b>GNR 983 Item 24:</b> The development of a road— (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;	The proposed main access road to Doornhoek 1 PV will be up to 8m wide, but with the inclusion of side drains and gavel embankments will be up to 10m and will exceed the threshold of this activity. Portions of the main access road will constitute expansion of the exiting farm access road, however, some portions will constitute the development of a new road.
<b>GNR 983 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: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;	The proposed Doornhoek 1 PV development is considered to be commercial use and the total footprint size is up to 200 hectares and as such will exceed the 1 hectare threshold of this activity.
<b>GNR 983 Item 56:</b> The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre— (ii) where no reserve exists, where the existing road is wider than 8 metres;	The existing access road from the main road will be widened by more than 6m in some place to accommodate the required geometry for heavy vehicle turning.
<b>Listing Notice 2 - Regulation GN R. 984 - Scoping and Environmental Impact Reporting</b>	
<b>GNR 984 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 Doornhoek 1 PV will have a generation capacity of up to 115 megawatts.
<b>GNR 984 Item 15:</b> The clearance of an area of 20 hectares or more of indigenous vegetation.	The proposed Doornhoek 1 PV will require the clearance of an area of approximately 200ha and as such exceeds the threshold of this activity.
<b>Listing Notice 3 - Regulation GN R. 985 – Basic Assessment</b>	
<b>GNR 985 Item 4:</b> The development of a road wider than 4 metres with a reserve less than 13,5 metres. h. North West	The proposed main access road will have a maximum width of 10m while the internal roads will have a maximum width of 6m. Portions of the main access and internal roads fall within a CBA identified in the North West Province Biodiversity Sector Plan.

Listed activity as described in GN R.983, 984 and 985	Description of project activity that triggers listed activity
i. A protected area including municipal or provincial nature reserves as contemplated by NEMPAA or other legislation. iv. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority; vi. Areas within 5 kilometres from protected areas identified in terms of NEMPAA or from a biosphere reserve.	Portion 18 of the Farm Doornhoek 372-IP is designated as a private nature reserve (Bosworth Private Nature Reserve) in the South African Protected Area Database. Portions of the main and internal roads are within 5 kilometres of the Faan Meintjies Private Nature Reserve.
<b>GNR 985 Item 12:</b> The clearance of an area of 300 square metres or more of indigenous vegetation. h. North West ii. A protected area including including municipal and protected nature reserves as contemplated by NEMPAA or other legislation. iv. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority;	Portion 18 of the Farm Doornhoek 372-IP is designated as a private nature reserve (Bosworth Private Nature Reserve) in the South African Protected Area Database. The clearance of more than 300 square metres will occur within this farm portion.  A portion of Doornhoek 1 PV falls within a CBA identified in the North West Province Biodiversity Sector Plan. Development of the facility in these areas will include the clearance of more than 300 square metres of indigenous vegetation.
<b>GNR 985 Item 18:</b> The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. h. North West i. A protected area including municipal or provincial nature reserves as contemplated by NEMPAA or other legislation. ii. Areas within 5km from protected areas identified in terms of NEMPAA or a Biosphere Reserve. v. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority;	Portion 18 of the Farm Doornhoek 372-IP is designated as a private nature reserve (Bosworth Private Nature Reserve) in the South African Protected Area Database. The widening of portions of the existing access road will be required on this farm portion. Portions of the main and internal roads are within 5 kilometres of the Faan Meintjies Private Nature Reserve A portion of Doornhoek 1 PV falls within a CBA identified in the North West Province Biodiversity Sector Plan. The main access and some of the internal roads of Doornhoek 1 PV occur within this CBA.

**NOTE:** Basic Assessment (BA) as well as Scoping and Environmental Impact Reporting (S&EIR) Activities are being triggered by the proposed development, but since the project is contained in a legislated REDZ, the EIA Process will follow a Basic Assessment process.

Before any of the above-mentioned listed activities can be undertaken, authorisation must be obtained from the relevant authority, in this case the DFFE. Should the Department approve the proposed activity, the Environmental Authorisation does not exclude the need for obtaining relevant approvals from other Authorities who has a legal mandate in respect of the activity.

## V. DEVELOPMENT PROPOSAL

The Applicant, Doornhoek PV (Pty) Ltd, is proposing the construction of a photovoltaic (PV) solar energy facility (known as the Doornhoek 1 PV facility) located on a site approximately 11km north of Klerksdorp in the North West Province. The solar PV facility will comprise several arrays of PV panels and associated infrastructure and will have a contracted capacity of up to 115MW. The development area is situated within the City of Matlosana Local Municipality within the Dr Kenneth Kaunda District Municipality. The site is accessible via an existing district road located adjacent to the east of the development area.

The proposed Doornhoek 1 PV facility and associated infrastructure will be located on Portion 18 of the Farm Doornhoek No. 372-IP. The project site is located within the Klerksdorp Renewable Energy Development Zones (REDZ).

An additional up to 50MW PV facility (Doornhoek 2 PV Facility) is concurrently being considered on the same property and is being assessed through a separate Basic Assessment process.



The proposed Doornhoek 1 PV Facility will cover approximately 200ha and will include the following infrastructure:

- PV modules and mounting structures
- Inverters and transformers
- Battery Energy Storage System (BESS)
- Site and internal access roads (up to 8m wide)
- Operation and Maintenance buildings including a gate house and security building, control centre, offices, warehouses and workshops for storage and maintenance.
- Temporary and permanent laydown area
- Grid connection infrastructure, including:
  - 33kV cabling between the project components and the facility substation
  - A 132kV facility substation
  - A 132kV Eskom switching station
  - A Loop-in-Loop out (LILO) overhead 132kV power line between the Eskom switching station and the existing Watershed–Klerksdorp 1 132kV power line.

## VI. PROFESSIONAL INPUT

The following professionals<sup>7</sup> have provided input into this environmental process:

- |                                |   |                                   |
|--------------------------------|---|-----------------------------------|
| 1. Terrestrial Biodiversity    | - | Biodiversity Africa               |
| 2. Avifaunal                   | - | Pachnoda Consulting               |
| 3. Heritage                    | - | Beyond Heritage                   |
| 4. Archaeology                 | - | Beyond Heritage                   |
| 5. Palaeontology               | - | Prof Marion Bamford               |
| 6. Agricultural Potential      | - | Mr Johann Lanz                    |
| 7. Visual                      | - | Visual Resource Management Africa |
| 8. Aquatic Biodiversity        | - | Scientific Aquatic Services       |
| 9. Social                      | - | Savannah Environmental            |
| 10. Engineering aspects        | - | Doornhoek PV (Pty) Ltd            |
| 11. Stormwater                 | - | SRK Consulting                    |
| 12. Traffic and Transportation | - | BVi Consulting Engineers.         |
| 13. Planning Aspects           | - | Townscape Planning Solutions      |

## VII. PLANNING CONTEXT

The land use planning process involves the following:

- Application for amendment of the Klerksdorp Land Use Management Scheme, 2005, in terms of the City of Matlosana Draft Spatial Planning and Land Use Management By-law, 2016, read with the Spatial Planning and Land Use Management Act, Act 16 of 2013 by the rezoning of a portion of Portion 18 of the Farm Doornhoek No. 372, I.P., North West from “Agricultural” to “Special” to accommodate a renewable energy structure (Doornhoek 1 PV Facility) on the property, submitted to the City of Matlosana Municipality.

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<sup>7</sup> Note that not all of these professionals are considered specialists as contemplated in chapter 3 of Regulation 326. Studies such as Engineering, Stormwater, Traffic, and planning constitute “technical” studies, rather than specialist studies and as such, the requirements in appendix 6 of R326 do not apply to all these professionals

## VIII. ASSESSMENT OF IMPACTS

This section simply lists the potential key potential impacts that were identified and assessed by the various specialists (more details on the significance and ratings of these impacts are provided in section 6.4 – 6.11 below and in the specialist reports attached in Appendix E).

### **Terrestrial Biodiversity Impacts Assessed<sup>8</sup>**

#### Construction Phase Terrestrial Biodiversity Impacts

- The direct loss of vegetation types and associated plant species, including species of conservation concern.
- The direct loss of faunal habitats.
- Clearing of vegetation also creates breaks in habitat leading to habitat fragmentation and edge effects.

#### Operational Phase Terrestrial Biodiversity Impacts

- The clearing of vegetation and subsequent disturbance to the soil, and therefore seed bank, can lead to the infestation of alien invasive plant species and other ruderal species.

#### Decommissioning Phase Terrestrial Biodiversity Impacts

- Heavy machinery associated with clearing of vegetation and decommissioning of the solar PV facility and access roads will increase ambient noise levels and dust emissions resulting in some species vacating the area.
- The movement of construction machinery within the site, may cause unintentional mortalities of faunal species.

### **Agricultural Impacts Assessed<sup>9</sup>**

#### Construction Phase Agricultural Impacts

- Loss of agricultural potential by occupation of land.
- Loss of agricultural potential by soil degradation

#### Operational Phase Agricultural Impacts

- Enhanced agricultural potential through increased financial security for farming operations.<sup>10</sup>
- Improved security against stock theft and other crime due to the presence of security infrastructure and security personal at the facility.<sup>11</sup>

### **Avifaunal Impacts Assessed**

#### Construction Phase Avifaunal Impacts

- Loss of habitat and displacement of birds
- Creation of "new" avian habitat and bird pollution

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<sup>8</sup> Terrestrial Impacts Assessed, include the assessment of impacts on Plant and Animal Species as per the environmental themes and protocols.

<sup>9</sup> The agricultural impacts identified apply equally to all phases of the development.

<sup>10</sup> This is deemed to be a positive agricultural impact.

<sup>11</sup> This is deemed to be a positive agricultural impact.

### Operational Phase Avifaunal Impacts

- Collision trauma caused by photovoltaic panels (the "lake-effect")
- Interaction with overhead power lines and reticulation
- Physical disturbances and habitat destruction caused during construction and maintenance.

### Decommissioning Phase Avifaunal Impacts

- Loss of habitat and displacement of birds

## **Aquatic Biodiversity Impacts Assessed**

The aquatic biodiversity specialist concluded that no freshwater resources as defined in the National Water Act are present on site. The proposed footprint has furthermore been set back to be outside of the 500m Zone of Regulation from any watercourse. The proposed project is therefore unlikely to have any impact on Aquatic Biodiversity.

## **Heritage Impacts Assessed<sup>12</sup>**

- Impact on the Existing Farmstead (DH002)
- Impact assessment of the proposed project on the Stone Age Scatter (DH003)

## **Visual Impacts Assessed**

### Construction Phase Visual Impacts

- Loss of site landscape character due to the removal of vegetation and the construction of the PV structures and associated infrastructure.
- Wind-blown dust due to the removal of large areas of vegetation.
- Possible soil erosion from temporary roads crossing drainage lines.
- Wind-blown litter from the laydown and construction sites.

### Operational Phase Visual Impacts

- Loss of site landscape character due to the operation of the PV structures and associated infrastructure.
- Visual intrusion to adjacent property owners and road users.

### Decommissioning Phase Visual Impacts

- Movement of large vehicles required for the removal of the PV panels, power lines, mono-poles and substations.
- Wind-blown dust from impacts to vegetation.
- Wind-blown litter from the laydown and construction sites.

## **Traffic Impacts Assessed**

### Construction Phase Traffic Impacts

- Increased Traffic on regional haulage routes
- Increased traffic on local routes
- Construction and maintenance of Gravel Roads in the Vicinity of the Site

### Operational Phase Traffic Impacts

- Increased Traffic during operational Phase.

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<sup>12</sup> Impact on heritage resources will occur in the construction phase and that impact will remain.

Decommissioning Phase Traffic Impacts

- Increased traffic on local routes
- Construction and maintenance of Gravel Roads in the Vicinity of the Site

**Social Impacts Assessed**

Construction Phase Social Impacts

- Direct and indirect employment opportunities
- Economic multiplier effects
- Influx of jobseekers and change in population
- Safety and security impacts
- Impacts on daily living and movement patterns
- Nuisance impacts, including noise and dust
- Visual impacts and sense of place impacts

Operational Phase Social Impacts

- Direct and indirect employment opportunities
- Development of non-polluting, renewable energy infrastructure
- Contribution to Local Economic Development (LED) and social upliftment
- Visual and sense of place impacts
- Impacts associated with the loss of agricultural land

**IX. IMPACT SUMMARY**

The table below summarises the significance (with mitigation) of all impacts assessed in the sections above<sup>13</sup>. For ease of easy references, impacts are visually reflected using the following colour scheme<sup>14</sup>.

- All positive impacts (regardless of their significance)
- Neutral or Negligible negative impacts
- Low negative impacts
- Moderate negative impacts
- High and Very High negative impacts



Summary of the significance of impacts associated with Doornhoek 1 PV <sup>15</sup>.

Impact	Significance / Status
<b>Terrestrial Biodiversity Impacts (Construction Phase)</b>	
Loss of Klerksdorp Thornveld	Moderate Negative
Loss of near intact Vaal Vet Sandy Grassland <sup>16</sup>	None
Loss of plant species of conservation concern	Moderate Negative
Loss of Faunal Habitat	Moderate Negative
Disruption of Ecosystem Function and Process	Moderate Negative

<sup>13</sup> In order to attain these outcomes, the mitigation measures reflected in section 7 of the report need to be implemented.

<sup>14</sup> Where specialist ratings fall across 2 of the groups, the worst case is reflected in the quick reference.

<sup>15</sup> This includes cumulative impacts associated with the facility

<sup>16</sup> The project Infrastructure has been designed to avoid the impacts on the endangered near intact Vaal-Vet Sandy Grassland.

<b>Impact</b>	<b>Significance / Status</b>
Disturbance to faunal species and potential reduction in abundance and mortality of species	Moderate Negative
<b>Terrestrial Biodiversity Impacts (Operational Phase)</b>	
Infestation of Alien Plant Species	Low Negative
<b>Terrestrial Biodiversity Impacts (Decommissioning Phase)</b>	
Loss of indigenous vegetation	Moderate Negative
Disturbance to Faunal Species and potential reduction in abundance and mortality of Faunal Species	Low Negative
<b>Cumulative Terrestrial Biodiversity Impacts</b>	
Loss of Klerksdorp Thornveld	Moderate - Negative
Loss of near intact Vaal Vet Sandy Grassland <sup>17</sup>	None
Loss of plant species of conservation concern	Moderate Negative
Loss of Faunal Habitat	Moderate Negative
Disruption of Ecosystem Function and Process	Moderate - Negative
Disturbance to faunal species and potential reduction in abundance and mortality of species	Low - Negative
Infestation of Alien Plant Species	Low - Negative
Loss of indigenous vegetation	Moderate Negative
Disturbance to Faunal Species and potential reduction in abundance and mortality of Faunal Species	Low - Negative
<b>Agricultural Impacts (All phases)</b>	
Loss of agricultural potential by occupation of land	Low Negative
Loss of agricultural potential by soil degradation	Low Negative
Dust impact	Low Negative
Enhanced agricultural potential through increased financial security for farming operations (positive impact)	Low Positive
<b>Cumulative Agricultural Impacts</b>	
Regional loss of agricultural land, with a consequent decrease in agricultural production	Low Negative
<b>Visual Impacts (Construction phase)</b>	
Short-term landscape change from the current rural agricultural sense of place to the semi-industrial Renewable Energy landscape.	Moderate Negative
<b>Visual Impacts (Operational phase)</b>	
Long-term landscape change from the current rural agricultural sense of place to the semi-industrial Renewable Energy landscape.	Moderate Negative
<b>Visual Impacts (Decommissioning phase)</b>	
Short-term landscape change from the removal of the PV structures, followed by rehabilitation of the impacted areas back to agricultural lands.	Low Negative
<b>Cumulative Visual Impacts</b>	
Short-term landscape change from the current rural agricultural sense of place to the semi-industrial Renewable Energy landscape.	Moderate Negative
Long-term landscape change from the current rural agricultural sense of place to the semi-industrial Renewable Energy landscape.	Moderate Negative
Short-term landscape change from the removal of the PV structures, followed by rehabilitation of the impacted areas back to agricultural lands.	Low Negative
<b>Aquatic Impacts (Construction Phase)</b>	
Impacts on Aquatic Biodiversity During the Construction Phase	None
<b>Aquatic Impacts (Operational Phase)</b>	
Impacts on Aquatic Biodiversity During the Operational Phase	None
<b>Aquatic Impacts (Decommissioning Phase)</b>	
Impacts on Aquatic Biodiversity During the Decommissioning Phase	None
<b>Social Impacts (Construction Phase)</b>	
Direct and indirect employment opportunities	Medium Positive
Economic multiplier effects	Medium Positive

<sup>17</sup> The project Infrastructure has been designed to avoid the impacts on the endangered near intact Vaal-Vet Sandy Grassland.

<b>Impact</b>	<b>Significance / Status</b>
Influx of jobseekers and change in population	Low Negative
Safety and security impacts	Low Negative
Impacts on daily living and movement patterns	Moderate Negative
Nuisance impacts, including noise and dust	Low Negative
Visual impacts and sense of place impacts	Low Negative
<b>Social Impacts (Operational Phase)</b>	
Direct and indirect employment opportunities	Medium Positive
Development of non-polluting, renewable energy infrastructure	Medium Positive
Contribution to Local Economic Development (LED) and social upliftment	Medium Positive
Visual and sense of place impacts	Low Negative
Impacts associated with the loss of agricultural land	Low Negative
<b>Cumulative Social Impacts</b>	
Employment, skills and business opportunities	Medium Positive
change to the local economy with an in-migration of labourers, businesses and jobseekers to the area	Moderate Negative
Visual impact and impact on the sense of place and landscape character	Moderate Negative
<b>Avifaunal Impacts (Construction Phase)</b>	
Losses of natural habitat and displacement of birds through physical transformation, modifications, removals and land clearance	Moderate Negative
The creation of novel or new avian habitat for commensal bird species or superior competitive species	Low Negative
<b>Avifaunal Impacts (Operational Phase)</b>	
Avian collision impacts related to the PV facility during the operation phase (collision with the PV panels).	Moderate Negative
Avian collision impacts related to overhead power lines during operation.	Low Negative
Avian electrocution related to the new distribution lines during operation.	Low Negative
<b>Avifaunal Impacts (Decommissioning Phase)</b>	
Losses of natural habitat and displacement of birds through physical transformation, modifications, removals and land clearance	Moderate Negative
The creation of novel or new avian habitat for commensal bird species or superior competitive species	Low Negative
<b>Traffic Impacts (Construction Phase)</b>	
Increased Traffic on regional haulage routes	Low Negative
Increased traffic on local routes	Low Negative
Construction and maintenance of Gravel Roads in the Vicinity of the Site	Low Negative
<b>Traffic Impacts (Operational Phase)</b>	
Increased Traffic During operational Phase	Low Negative
<b>Phase Traffic Impacts (Decommissioning)</b>	
Increased Traffic on regional haulage routes	Low Negative
Increased traffic on local routes	Low Negative
Construction and maintenance of Gravel Roads in the Vicinity of the Site	Low Negative
<b>Cumulative Traffic Impacts</b>	
Increased traffic on regional haulage routes	Low Negative
<b>Impacts on identified Heritage Features</b>	
Impact on the Existing Farmstead (DH002)	Low Negative
Impact on Stone Age Scatter (DH001)	Low Negative
<b>Cumulative Heritage Impacts</b>	
Disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.	Low Negative

## X. IMPACT STATEMENT

The majority of impacts range from medium positive to medium negative. All medium-high, high, very high and critical negative impacts have been avoided by the avoidance of sensitive features and habitats or have been mitigated to acceptable levels via the risk adverse approach to the development outlined in section 2.23 and 2.24 of this report.

None of the participating specialists identified any impacts that remain high or very-high after mitigation. The preferred layout (Layout Alternative 1) avoids the main sensitive features, (most notably the intact Vaal Vet Sandy Grassland, the Avifaunal buffers from existing secretary bird nest and impoundments, the preferential flow path, sensitive archaeological features and hill).

The affected area is therefore considered suitable for development and there are no impacts associated with Doornhoek 1 PV that cannot be mitigated to an acceptable level. With the enhancement measures suggested by the Social Specialist, high positive impacts on Creation of employment and business opportunities, Economic Multiplier effects, Generation income for affected landowner and Cumulative impact on local economies can be expected.

As such there are no fatal flaws or high post-mitigation impacts that should prevent the development from proceeding. The preferred alternative in this assessment (Layout Alternative 1), and its associated short grid connections can be supported subject to the implementation of the mitigation measures outlined in section 7 of the report.

A map showing the proposed activity in relation to the key sensitive features is in attached in Appendix D. All sensitive features along with their appropriate buffers are shown in this plan. As required by the EMPr, all areas outside of the proposed development footprint are to be demarcated as no go areas.

Please refer to the table in the section above listing the key impacts and their significance post mitigation for the preferred alternative. This section must be read in conjunction with the suggested mitigation measures listed in section 7 of this Report.

## XI. CONCLUSIONS & RECOMMENDATIONS

This environmental process is currently being undertaken to present proposals to the public and potential I&APs and to identify and assess environmental impacts, issues and concerns raised as a result of the proposed development.

*Cape EAPrac* is of the opinion that the information contained in this Basic Assessment Report and the documentation attached hereto is sufficient to allow the I&APs to apply their minds to the potential negative and/or positive impacts associated with the development, in respect of the activities applied for.

This environmental process has not identified any fatal flaws with the proposal and as such it is our reasoned view that the project should be considered for authorisation, subject to the outcome of the public participation process and on condition that all the mitigation measures outlined in section 7 of the report are adopted and implemented. All specialists concur that the development as proposed (Layout Alternative 1) can be considered for approval subject to the implementation of all mitigation measures. All impacts range from medium positive to medium negative and all high, very high and critical negative impacts have been avoided by the risk adverse approach or mitigated to acceptable levels.

All stakeholders are requested to review the Draft BAR and the associated appendices, and provide comment, or raise issues of concern, directly to *Cape EAPrac* within the specified 30-day comment period. All comments received during this comment period will be considered, responded and included in the Final BAR that will be submitted to DFFE for decision making.

**It is the recommendation of Cape EAPrac that the development proposal, Layout Alternative 1 and the proposed grid connection corridor (LILo into the existing Klerksdorp – Watershed 132kV overhead powerline) be considered for approval by the competent Authority, subject to the outcome of the public participation process and on condition that all the suggested mitigation measures are implemented, all other legislative approvals be obtained, and that the final EMPr be strictly adhered to.**

# DRAFT BASIC ASSESSMENT REPORT

## 1 INTRODUCTION

Cape EAPrac has been appointed by Doornhoek PV (Pty) Ltd, hereafter referred to as the Applicant, as the independent Environmental Assessment Practitioner (EAP), to facilitate the Basic Assessment process required in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) for the proposed development of the Doornhoek 1 PV facility and associated infrastructure on Portion 18 of the Farm Doornhoek No. 372-IP approximately 11km north of Klerksdorp in the North West Province of South Africa.

The total generation capacity of the solar facility will not exceed 115 MWAC for input into the national Eskom grid. The project will feed into the National Grid via a Loop in – Loop Out (LILO) connection to the existing Klerksdorp/Watershed 132kV overhead powerline situated on the property. The grid connection to connect this project to the National Grid is being assessed as part of this same environmental assessment process.

The purpose of this Draft Basic Assessment Report (BAR) is to describe the environment to be affected, the proposed project, to present the site constraints identified by the various specialist during their site assessments and identify & assess the impacts of this development on the receiving environment. This information is herewith presented to all registered and potential Interested and Affected Parties (I&AP's), organs of state, state departments and the competent authority for review and comment.

In compliance with Chapter 6 of the 2014 EIA regulations (as amended), Draft BAR is available for a 30 - Day period extending from **13 May 2022 – 13 June 2022**.

All comments received on the Draft BAR will be incorporated into the Final BAR that will be submitted to the Department of Forestry, Fisheries and the Environment (DFFE) for consideration and decision making. After the department has taken a decision on the application, this decision will be communicated to all registered I&AP's along with details of the appeal process.

### 1.1 RECOMMENDATION OF THIS EIA

It is the recommendation of Cape EAPrac that the development proposal, Layout Alternative 1 and the proposed grid connection corridor (LILO into the existing Klerksdorp – Watershed 132kV powerline) be considered for approval by the competent Authority, subject to the outcome of the public participation process and on condition that all the suggested mitigation measures are implemented, all other legislative approvals be obtained, and that the final EMP be strictly adhered to.

### 1.2 OVERVIEW OF ALTERNATIVE ENERGY IN SOUTH AFRICA AND THE NORTH WEST PROVINCE<sup>18</sup>

The section below provides an overview of the potential benefits associated with the renewable energy sector in South Africa. Given that South Africa supports the development of renewable energy at national level, the intention is not to provide a critical review of renewable energy. The focus is therefore on the contribution of renewable energy, specifically in terms of supporting economic development.

The Renewable Energy Independent Power Producers Procurement Programmes (REIPPPP)<sup>19</sup> primary mandate is to secure electrical energy from the private from renewable energy sources.

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<sup>18</sup> This section has been prepared with input from the social specialist. Please also refer to the Social Impact Assessment Attached in Annexure E8.

<sup>19</sup> It is proposed that the Doornhoek 1 PV will form part of the REIPPPP.



The programme is designed to reduce the country's reliance on fossil fuels, stimulate an indigenous renewable energy industry and contribute to socio-economic development and environmentally sustainable growth. The REIPPPP has been designed not only to procure energy but has also been structured to contribute to the broader national development objectives of job creation, social upliftment and broadening of economic ownership.

By the end of June 2020, the REIPPPP had made the following significant impacts in terms of energy supply:

- 6 422 MW of electricity had been procured from 112 Renewable Energy Independent Power Producers (IPPs) in seven bid rounds.
- 4 276 MW of electricity generation capacity from 68 IPP projects has been connected to the national grid.
- 49 461 GWh of energy has been generated by renewable energy sources procured under the REIPPPP since the first project became operational in November 2013.

Renewable energy IPPs have proved to be very reliable. Of the 68 projects that have reached COD, 64 projects have been operational for longer than a year. The energy generated over the past 12-month period for these 64 projects is 11 079 GWh, which is 93% of their annual energy contribution projections (P50) of 11 882 GWh over a 12-month delivery period. Twenty-eight (24) of the 64 projects (38%) have individually exceeded their P50 projections.

In line with international experience, the price of renewable energy is increasingly cost competitive when compared with conventional power sources. The REIPPPP has effectively captured this global downward trend with prices decreasing in every bid window. Energy procured by the REIPPPP is progressively more cost effective and has approached a point where the wholesale pricing for new coal- and renewable-generated energy intersect.

The document notes that the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) has attracted significant investment in the development of the REIPPs into the country. The total investment (total project costs<sup>20</sup>), including interest during construction, of projects under construction and projects in the process of closure is R209.7 billion (this includes total debt and equity of R209.2 billion, as well as early revenue and VAT facility of R0.5 billion).

To date, the REIPPPP has attracted R41.8 billion in foreign investment and financing in the seven bid windows.

The REIPPPP also contributes to Broad Based Black Economic Empowerment and the creation of black industrialists. In this regard, Black South Africans own, on average, 33% of projects that have reached financial close (BW1-BW4), which is 3% higher than the 30% target. This includes black people in local communities that have ownership in the IPP projects that operate in or near their communities and represents the majority share of total South African Entity Participation.

On average, black local communities own 9% of projects that have reached financial close. This is well above the 5% target. In addition, an average of 21% shareholding by black people in engineering, procurement, and construction (EPC) contractors has been attained for projects that have reached financial closure. This is higher than 20% target. The shareholding by black people in operating companies of IPPs has averaged 24% (against the targeted 20%) for the 68 projects in operation (i.e. in BW1–4).

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<sup>20</sup> Total project costs means the total capital expenditure to be incurred up to the commercial operations date in the design, construction, development, installation, and or commissioning of the project)

To date, a total of 52 603 job years<sup>21</sup> have been created for South African citizens, of which 42 355 job years were in construction and 10 248 in operations. These job years should rise further past the planned target as more projects enter the construction phase. Employment opportunities across all five active bid windows are 126% of the planned number during the construction phase (i.e. 33 707 job years), with 23 projects still in construction and employing people. The number of employment opportunities is therefore likely to continue to grow beyond the original expectations. By the end of June 2020, 68 projects had successfully completed construction and moved into operation. These projects created 33 449 job years of employment, compared to the anticipated 23 619. This was 42% more than planned.

The emission reductions for the programme during the preceding 12 months (June 2019-June 2020) is calculated as 11.5 million tonnes CO<sub>2</sub> (MtonCO<sub>2</sub>) based on the 1 1313 GWh energy that has been generated and supplied to the grid over this period. This represents 56% of the total projected annual emission reductions (20.5MtonCO<sub>2</sub>) achieved with only partial operations. A total of 50.2 Mton CO<sub>2</sub> equivalent reduction has been realised from programme inception to date.

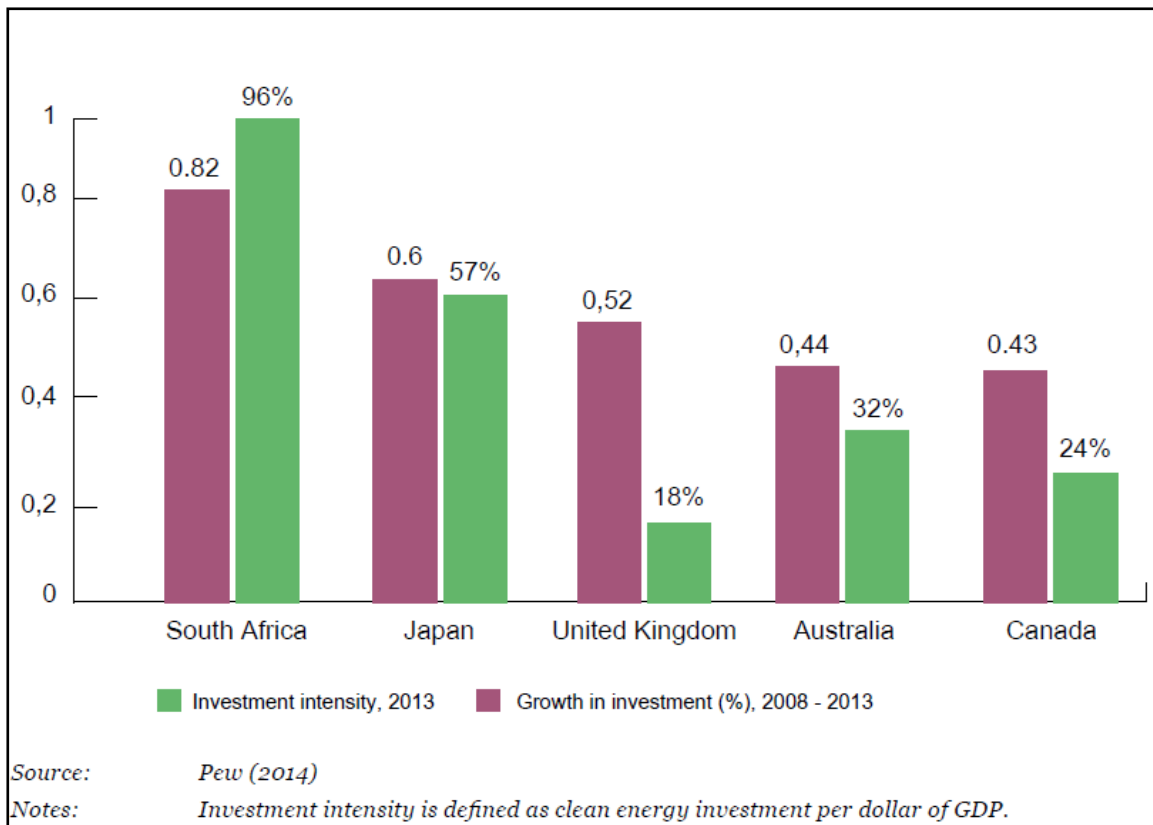
The Green Jobs Study notes that South Africa has one of the most carbon-intensive economies in the world, therefore making the greening of the electricity mix a national imperative. Within this context the study notes that the green economy could be an extremely important trigger and lever for enhancing a country's growth potential and redirecting its development trajectory in the 21<sup>st</sup> century.

The REIPPPP introduced in 2011, has by all accounts been highly successful in quickly and efficiently delivering clean energy to the grid. Increasingly competitive bidding rounds have led to substantial price reductions.

A 20-year sovereign guarantee on the power purchase agreement (PPA) and, especially, ideal solar power conditions, have driven the investment case for Renewable Energy in South Africa. In this regard South Africa has been identified as one of the worlds' leading clean energy investment destinations

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<sup>21</sup> The equivalent of a full-time employment opportunity for one person for one year



**Figure 1:** South Africa as a global lead clean energy investment destination

With regard to local economic development, the REIPPPP sets out various local economic development requirements with stipulated minimum threshold and aspirational targeted levels, which each bidder must comply with. Based on the Broad-Based Black Economic Empowerment Codes, this requirement comprises the following components which make up a scorecard:

- Ownership by black people and local communities,
- Job creation,
- Local content,
- Management control,
- Preferential procurement,
- Enterprise development, and
- Socio-economic development.

### 1.3 ASSUMPTIONS & LIMITATIONS

This section provides a brief overview of *specific assumptions and limitations* having an impact on this environmental application process:

- It is assumed that the information on which this report is based (specialist studies and project information, as well as existing information) is **correct, factual and truthful**.
- The proposed development is **in line** with the statutory planning vision for the area, most notably the local Spatial Development Plan as well as the Klerksdorp REDZ, and thus it is assumed that issues such as the cumulative impact of development in terms of character of the area and its resources, have been taken into account during the strategic planning for the area.
- It is assumed that all the relevant **mitigation and management measures** and agreements specified in this report will be implemented in order to ensure minimal negative impacts and maximum environmental benefits.

- It is assumed that due consideration will be given to the **discrepancies in the digital mapping** (PV panel array layouts against possible constraints), caused by differing software programs, and that it is understood that the ultimate/final positioning of solar array will only be confirmed on-site with the relevant specialist/s.
- The Department of Water and Sanitation **will consider the submission of a water use application** necessary for allowing the use of water from any water resource on site. The assumption at this stage is made that water provision for construction and operations is to be obtained from the local municipality.
- It is assumed that Stakeholders and Interested and Affected Parties notified of the availability of this will submit all relevant **comments within the designated 30-days** review and comment period, so that these can included in the Final BAR to be timeously submitted to the competent authority, the Department of Forestry, Fisheries and the Environment, for consideration and decision making.

The assumptions and limitations of the various specialist studies are included in their respective reports attached in Appendix E.

## 2. PROPOSED ACTIVITY

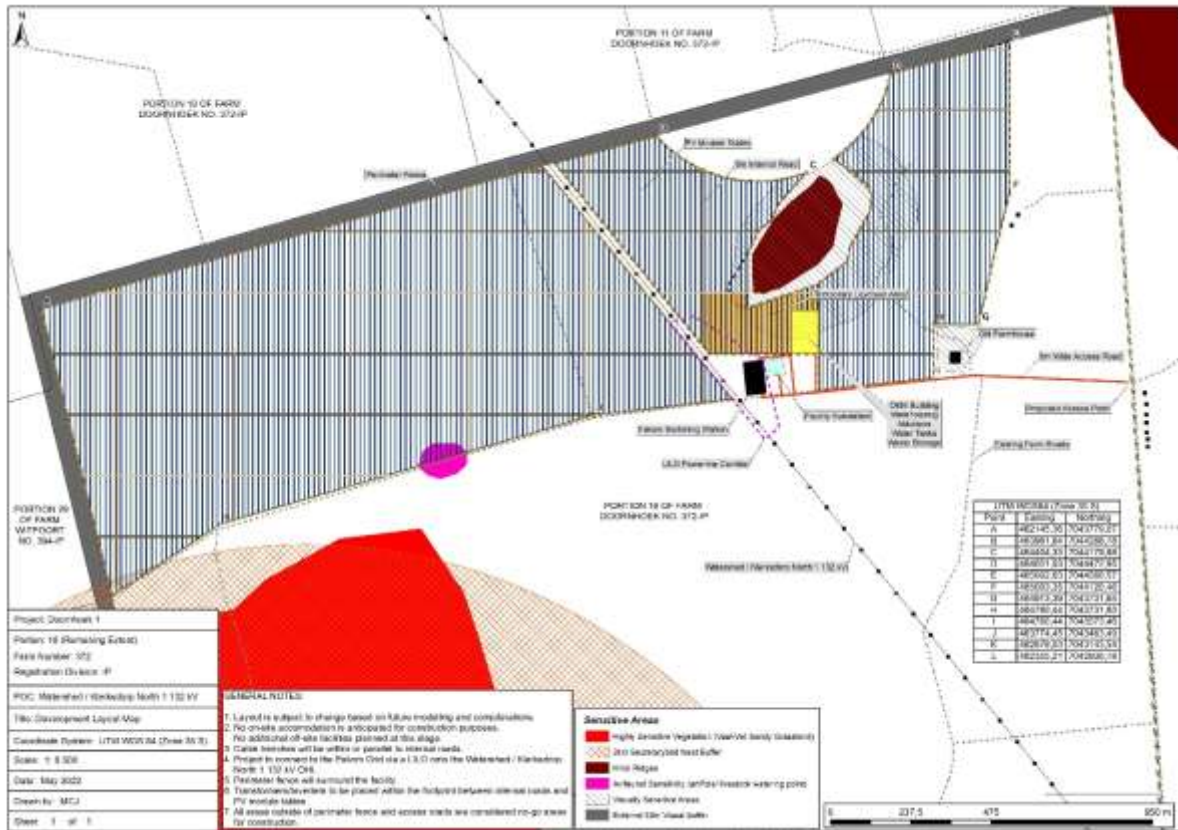
The Applicant, Doornhoek PV (Pty) Ltd, is proposing the construction of a photovoltaic (PV) solar energy facility (known as the Doornhoek 1 PV facility) located on a site approximately 11km north of Klerksdorp in the North West Province. The solar PV facility will comprise several arrays of PV panels and associated infrastructure and will have a contracted capacity of up to 115MW. The development area is situated within the City of Matlosana Local Municipality within the Dr Kenneth Kaunda District Municipality. The site is accessible via an existing district road located adjacent to the east of the development area.

The proposed Doornhoek 1 PV facility and associated infrastructure will be located on Portion 18 of the Farm Doornhoek No. 372-IP. The project site is located within the Klerksdorp Renewable Energy Development Zones (REDZ).

An additional up to 50MW PV facility (Doornhoek 2 PV Facility) is concurrently being considered on the same property and is being assessed through a separate Basic Assessment process.

The proposed Doornhoek 1 PV Facility will cover approximately 200ha and will include the following infrastructure:

- PV modules and mounting structures
- Inverters and transformers
- Battery Energy Storage System (BESS)
- Site and internal access roads (up to 8m wide)
- Operation and Maintenance buildings including a gate house and security building, control centre, offices, warehouses and workshops for storage and maintenance.
- Temporary and permanent laydown area
- Grid connection infrastructure, including:
  - 33kV cabling between the project components and the facility substation
  - A 132kV facility substation
  - A 132kV Eskom switching station
  - A Loop-in-Loop out (LILO) overhead 132kV power line between the Eskom switching station and the existing Watershed–Klerksdorp 1 132kV power line.



**Figure 2:** Proposed layout of Doornhoek 1 PV, showing key project components (Please also refer to the full-scale plans attached in Appendix D).

Doornhoek 1 PV will have a net generating capacity of up to 115 MW with an estimated maximum footprint of ± 200 ha.

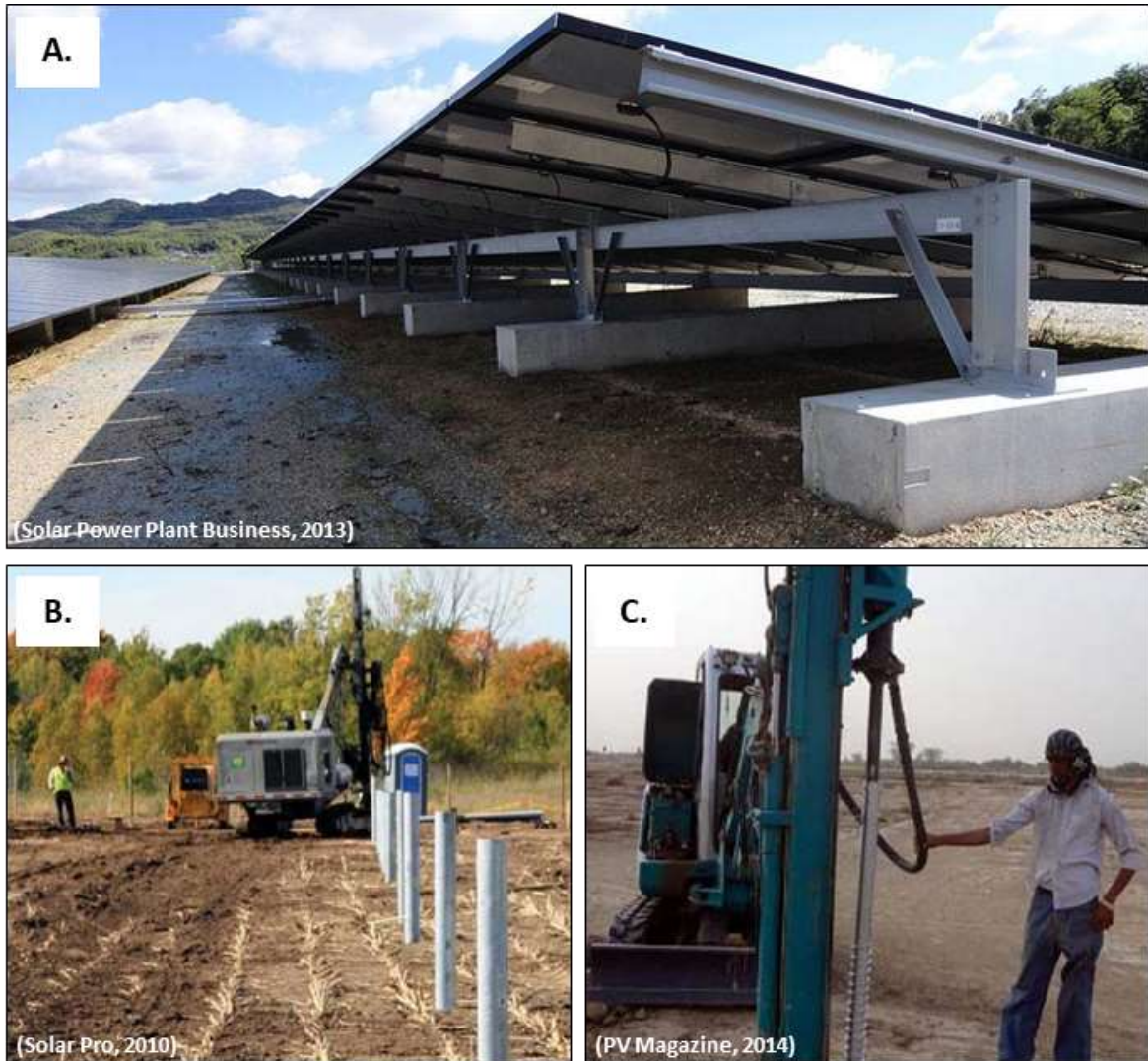
According to the Technical Layout Design Report, attached in Annexure E9, the following key components will form part of the proposed Doornhoek 1 PV development.

## 2.1 SOLAR ARRAY

Solar PV modules are connected in series to form a string. A number of strings are then wired in parallel to form an array of modules. PV modules are mounted on structures that are either fixed, north-facing at a defined angle, or mounted to a single or double axis tracker to optimise electricity yield.

## 2.2 MOUNTING STRUCTURES

Various options exist for mounting structure foundations, which include cast / pre-cast concrete, driven / rammed piles, or ground / earth screws mounting systems. The typical mounting structures are shown in the figure below.



**Figure 3:** Mounting Structures. A) Cast Concrete Foundation. B) Driven/ Rammed Steel Pile. C) Ground / Earth Screw (Doornhoek PV (Pty) Ltd)

The impact on agricultural resources and production of these options are considered to be the same, however concrete is least preferred due the effort required at a decommissioning phase in order to remove the concrete from the soil, and therefore its impact on the environment. Doornhoek 1 will therefore aim to make the most use of either driven / rammed piles, or ground / earth screws mounting systems, and only in certain instances resort to concrete foundations should geotechnical studies necessitate this.

The images below show typical examples of the preferred mounting technology during and after installations (Photos: Cape EAPrac).



**Figure 4:** Pre-drilling of holes prior to the ramming of steel piles.

Note that the vegetation is not completely removed prior to the drilling and installation of the piles.



**Figure 5:** pre-drilled holes are backfilled with a wet sand mixture and steel piles placed in position ready for ramming.

The predrilled holes are backfilled on a continuous basis to ensure that no fauna is trapped in the holes



**Figure 6:** Ramming of steel piles into the pre-drilled / backfilled holes.

Note that the ramming machines follow the same entry and exit routes as the drilling rigs in order to reduce the impacts of trampling and compaction.



**Figure 7:** Completed ramming and assembly showing vegetation remaining intact beneath the modules.



**Figure 8:** Showing vegetation re-establishing along the driplines of the arrays within weeks after installation.



## 2.3 AUXILIARY BUILDINGS

The auxiliary buildings will comprise of the following as a minimum:

- Control Building / Centre;
- Offices;
- Warehouses and workshops for storage and maintenance;
- Staff Lockers and ablutions; and
- Gate house / security offices.

The total area occupied by auxiliary buildings is approximately 1 ha, excluding the facility substation / switching station.

## 2.4 GRID CONNECTION AND CABLING

It is proposed to connect the Doornhoek 1 Solar Facility to the National Grid via a new overhead 132kV electrical transmission line, which will connect via a Loop in Loop out (LILO) connection into the existing Watershed–Klerksdorp 1 132kV powerline. The powerline will have a maximum length of 200m, a maximum height of 32m and maximum servitude width of 52m. The Doornhoek 1 substation / switching station will be up to approximately 1 ha in size. An assessment corridor for the LILO connection has been proposed to allow for micro-siting of infrastructure.

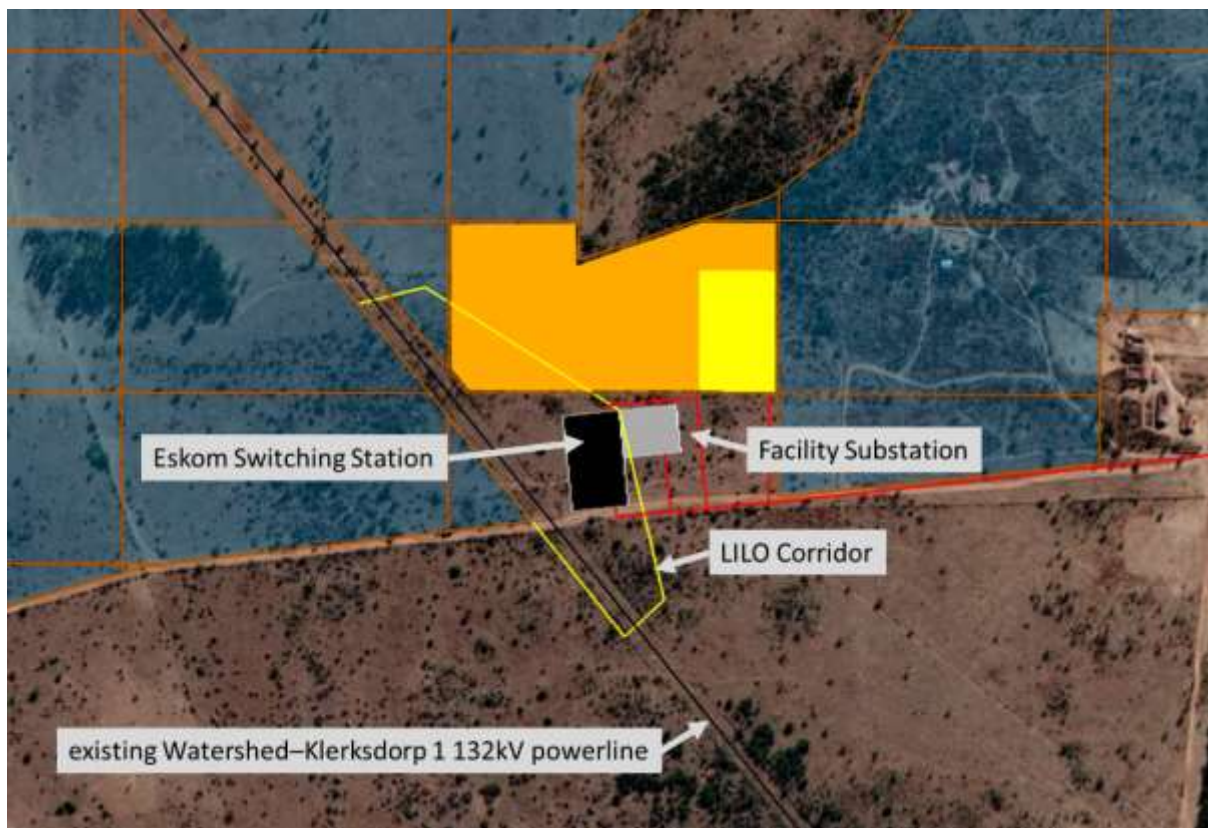


Figure 9: Proposed Grid Connection

A 115 MW<sub>AC</sub> installation will require specific electrical components to meet the national grid code requirements in order to generate and supply electricity into the national grid.

The conversion from DC (modules) to AC is achieved by means of inverter stations. A single inverter station is connected to a number of solar arrays and will be placed along the internal service roads for ease of access. A number of inverter stations will be installed for the solar facility (either centralized or string inverters), each of which is connected to the substation/switching station.

Final placement of the inverter stations and substation/switching station will need to take ground conditions into consideration. Interconnecting electrical cabling will be trenched where practical and will follow internal access roads to the greatest extent. Sensitive areas will consequently be avoided as far as possible, or alternatively, cables will be fastened above ground to the mounting structures so as to avoid excessive excavation works and clearing of vegetation.

## 2.5 BATTERY STORAGE

Renewable energy can currently achieve lower costs than fossil fuels. By incorporating energy storage technologies into renewable energy facilities, electricity can be stored during generation peaks and supplied during demand peaks.

Lower costs coupled with improved efficiencies, high energy density, lightweight design and low environmental risks, make non-liquid/ solid-state (e.g. Lithium battery technologies) the preferred alternative (refer to standalone Battery Storage Technical Development Report).

Doornhoek 1 BESS will cover a maximum area of approximately 4 ha.

## 2.6 ACCESS AND INTERNAL ROADS

The project site will be accessed from an unnamed district road, which runs along the eastern boundary of the site. The proposed access road will mostly follow an existing gravel farm road that may require widening up to 10 m (inclusive of storm water infrastructure). Where new sections of road need to be constructed (or lengthened), this will be gravel/hard surfaced access road and only tarred if necessary.

The internal road network of the solar facility (including the perimeter road) will be gravelled roads, approximately 6m in width.



**Figure 10:** Internal and main access roads for Doornhoek 1 PV.

## 2.7 SERVICES REQUIRED

The following external services will be required during the construction and operation of the Proposed Doornhoek 1 PV development. The City of Matlosana Local Municipality has been approached for confirmation of availability of services where appropriate.

### 2.7.1 Water

Water required during the construction and operation phases will be sourced from (in order of priority):

- The Local Municipality (LM) - Specific arrangements will be agreed with the LM in a Service Level Agreement (SLA). Most likely the water will be either trucked in, or otherwise made available for collection at their Water Treatment Plant via a metered standpipe.
- Investigation into a third-party water supplier which may include a private services company.
- The investigation of drilling a borehole on site, which includes complete geohydrological testing, groundwater census and a Water Use License Application (WULA) in terms of section 21a of the National Water Act, 1998.

## 2.7.2 Electricity

Electricity will be needed during the construction period as well as the operation period in the support offices, security systems etc. Electricity supply during construction will be arranged with either the LM or Eskom Distribution, via an 11kV or 22kV feeder line.

In addition, diesel/petrol generators for electricity generation may be used during the construction period.

## 2.7.3 Waste Management

### 2.7.3.1 Solid waste

During the construction phase, solid waste will mainly be in the form of construction material, excavated substrate and domestic solid waste. All waste will be disposed of in scavenger proof bins and temporarily placed in a central location for removal by the contractor. Any other waste and excess material will be removed once construction is complete and disposed of at a registered waste facility. Excess excavation material will either be spoiled offsite at a registered facility or used for landscaping berms within the overall PV footprint.

### 2.7.3.2 Sewerage

During the construction phase, chemical ablution facilities will be utilised. These ablution facilities will be maintained, serviced and emptied by an appointed contractor, who will dispose of the effluent at a licensed facility off site. Once construction is complete, the chemical ablution facilities will be removed from the construction site. A conservancy tank which will be regularly emptied by a registered service provider will be installed at the Operations & Maintenance building and on-site substation.

### 2.7.3.3 Hazardous substances

During the construction phase, use of the following hazardous substances is anticipated:

- Cement associated with the piling activities and construction of buildings and inverter station plinths;
- Petrol/diesel for construction plant; and
- Limited amounts of lubricants and transformer oils.

Temporary storage and disposal of hazardous waste will be done in compliance with relevant legislation (i.e., stored in covered containers with appropriate bunding). Refuelling areas to be in designated positions, with suitable mitigation to reduce the risk of hydrocarbon spills. In Terms of the EMPr, Spill kits will be available on site to clean up any minor spillages.



**Figure 11:** Hydrocarbon Spill Kits must be in place within the site camp and in the field within 500 m of any drilling or ramming activity.

## 2.8 TRANSPORT OF COMPONENTS AND STAFF

A Traffic Impact Assessment and Transportation Study was compiled by BVi consulting engineers and is attached in Appendix E11. The following section relating to the transportation of project components and staff to the site has been summarised from this study.

### 2.8.1 Port of Entry

The closest port of entry to the site is the Durban Harbour. An alternative port of entry that has been considered is the Saldanha Bay Harbour. The distance from the Durban Harbour is approximately 665 km and from Saldanha Bay Harbour measures approximately 1 340 km.

#### 2.8.1.1 Preferred Port of entry – Durban

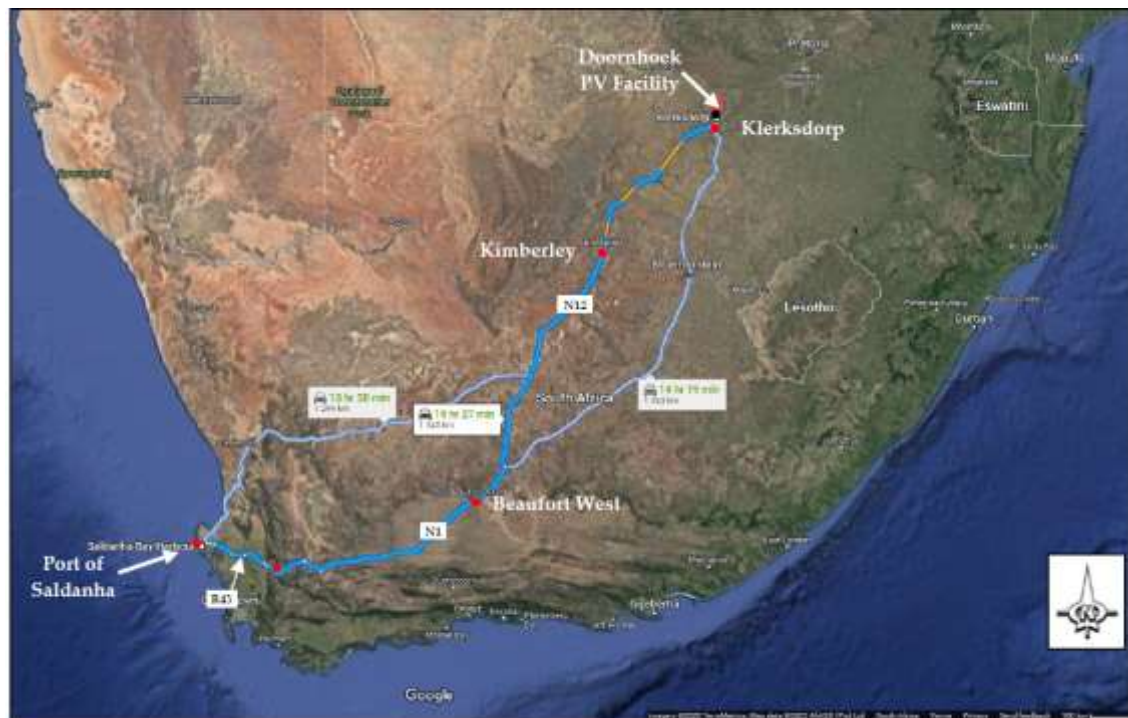
Due to the distance, the preferred port of entry for imported components has been identified as Durban Harbour.



**Figure 12:** Preferred Transport Route from Durban Harbour to Doornhoek 1 PV facility (BVi Consulting Engineers, 2022).

Durban Harbour is currently the largest harbour in South Africa and is the closest harbour to the site. It is recognised that effort is being made to shift cargo from Durban Harbour to Richards Bay Harbour and East London Harbour. The Durban Harbour is proposed as the preferred harbour along the eastern coast.

2.8.1.2 Alternative Port of Entry - Saldanha



**Figure 13:** Alternative Transport Route from Suldanha Harbour to Doornhoek 1 PV facility (BVi Consulting Engineers, 2022).

Saldanha Bay Harbour is considered a suitable alternative on the western coast. The route has been analysed and shows routes along national roads, catering for freight transport.

## 2.8.2 Haulage of Transformer and Substation Components

Transformer and substation components are envisaged to form part of the regional trips. It is anticipated that these components would be imported and transported from the preferred harbour (Saldanha or Durban Harbour) as abnormal loads. It would very likely be assembled in Johannesburg and transported to the Doornhoek 1 PV Facility site, also requiring abnormal load transport. The distance from Johannesburg to Doornhoek 1 PV Facility is approximately 185 km, along the N12. It should be noted that only 1-2 abnormal load trips per site is expected for Doornhoek 1 PV Facility. Abnormal load transportation is therefore considered to be isolated and would have a negligible impact on traffic over the construction phase of the project.

## 2.8.3 Haulage of Other Plant, Construction Material and Equipment

In addition to transporting the specialised equipment, the normal civil engineering construction materials, plant and equipment will need to be transported to the site (e.g. sand, stone, cement, gravel, water, compaction equipment, concrete mixers, etc.). Other components, such as electrical cables, pylons and substation transformers, will also be transported to site during construction. The transport of these items will generally be conducted with normal heavy loads vehicles, except for the transformers as previously discussed. Cement will be sourced from local manufacturers in nearby towns. All other civil construction materials, needed for concrete and wearing course, will be obtained from a local licensed quarry off-site. These trips can be classified as local trips as vehicles will not be travelling over a very long distance.

## 2.8.4 Transport of Construction Personnel

It is anticipated that construction personnel and labour would originate from neighbouring towns. These trips can be classified as local trips as vehicles will not be travelling over a very long distance.

## 2.8.5 Route Clearance

The vehicles used to transport the photovoltaic equipment are standard container trucks. The transformers will be transported as abnormal loads. At this stage of the project, the routes and areas for clearance cannot be established and should be confirmed with the freight carriers at a later stage of the project. However, no new obstacles (e.g. low overhead services, cattle grids, narrow bridges, etc.) are expected for abnormal load haulage as similar projects in close proximity to the proposed development may have previously cleared areas along transport routes.

## 2.9 PROJECT NEED AND DESIRABILITY

In keeping with the requirements of an integrated Environmental Impact process, the DEA&DP *Guidelines on Need and Desirability (2010 & 2011)*<sup>22</sup> were referenced to provide the following estimation of the activity in relation to the broader societal needs. The concept of need and desirability can be explained in terms of its two components, where *need* refers to *time*, and *desirability* refers to *place*. Questions pertaining to these components are answered in the Sections below. The section above (overview to alternative energy in South Africa and the North West Province) considers the overall need for alternative, so-called 'green energy' in light of the known environmental burdens associated with the impact of coal power generation through which most of our country's electricity is currently being generated. Associated aspects such as air pollution, water use and carbon tax are discussed in order to further explain the need and desirability for 'green energy' projects in general. This section however considers the need and desirability of this specific project at this point in time.

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<sup>22</sup> The Western Cape Guidelines were considered in this instance, as the North West Province and the National Department does not have alternative guidelines.

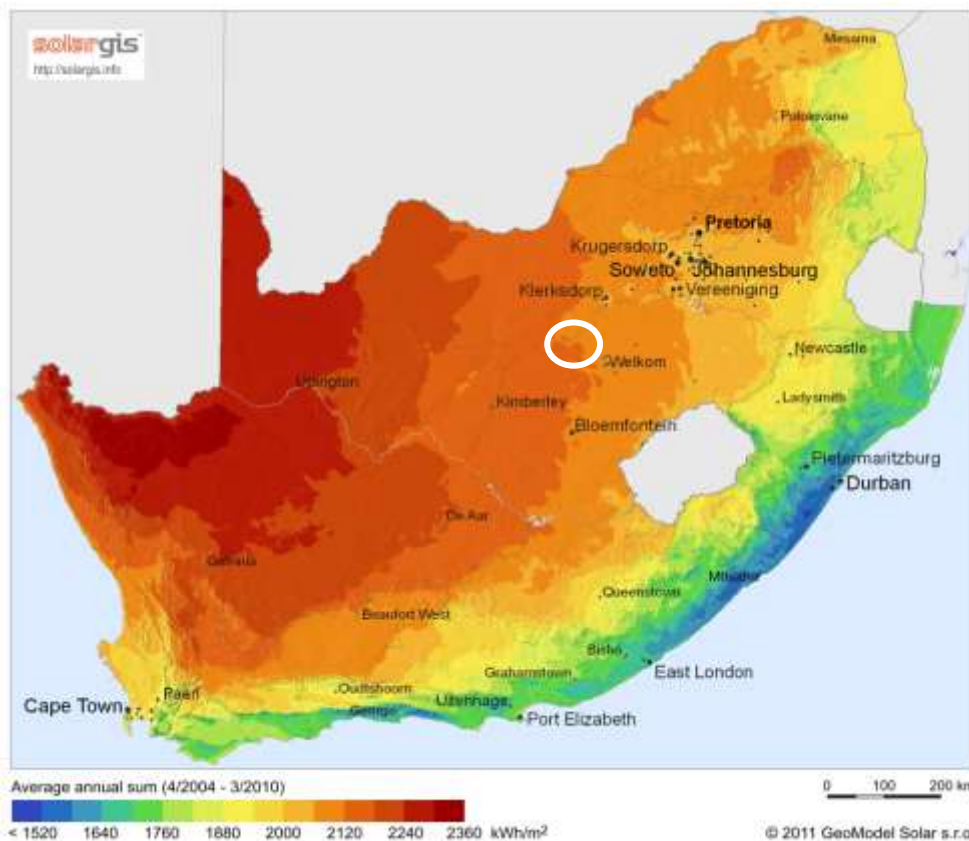
**2.9.1 Feasibility consideration<sup>23</sup>**

The commercial feasibility for the proposed up to 115 MW<sub>AC</sub> Doornhoek 1 PV to be built on private land near Klerksdorp, has been informed by its contextual location, and economic, social and environmental impacts and influence (with due consideration to the project falling within a REDZ). The project has gathered sufficient information and conducted studies of the site and the region to make qualified and reliable assumptions on the project's various impacts.

**2.9.2 Solar Resource & Energy Production**

The economic viability of a solar PV facility is directly dependent on the annual solar irradiation at the site. The proposed site receives some of the highest Global Horizontal Irradiation (GHI) outside of the Northern Cape, South Africa. From a regional site selection perspective, this region is considered to be preferred for solar energy development by virtue of its annual solar irradiation values. The GHI for the area derived from the World Bank Group's Global Solar Atlas is approximately 2 094 kWh/m<sup>2</sup>/annum.

The irradiation level is an important factor in a highly competitive bidding environment under REIPPPP; the economic viability of a project is a critical success factor.



**Figure 14:** Global Horizontal Irradiation of Doornhoek 1 Project (Solar GIS in Doornhoek PV (Pty) Ltd, 2022)

**2.9.3 Access to Grid**

Ease of access into the Eskom electricity grid is vital to the viability of a solar PV facility. Projects which are in close proximity to a connection point and/or demand centre are favourable, and reduce the losses

<sup>23</sup> Please refer to the Site Selection Motivation Report attached in Annexure E10, for further details on the project feasibility.

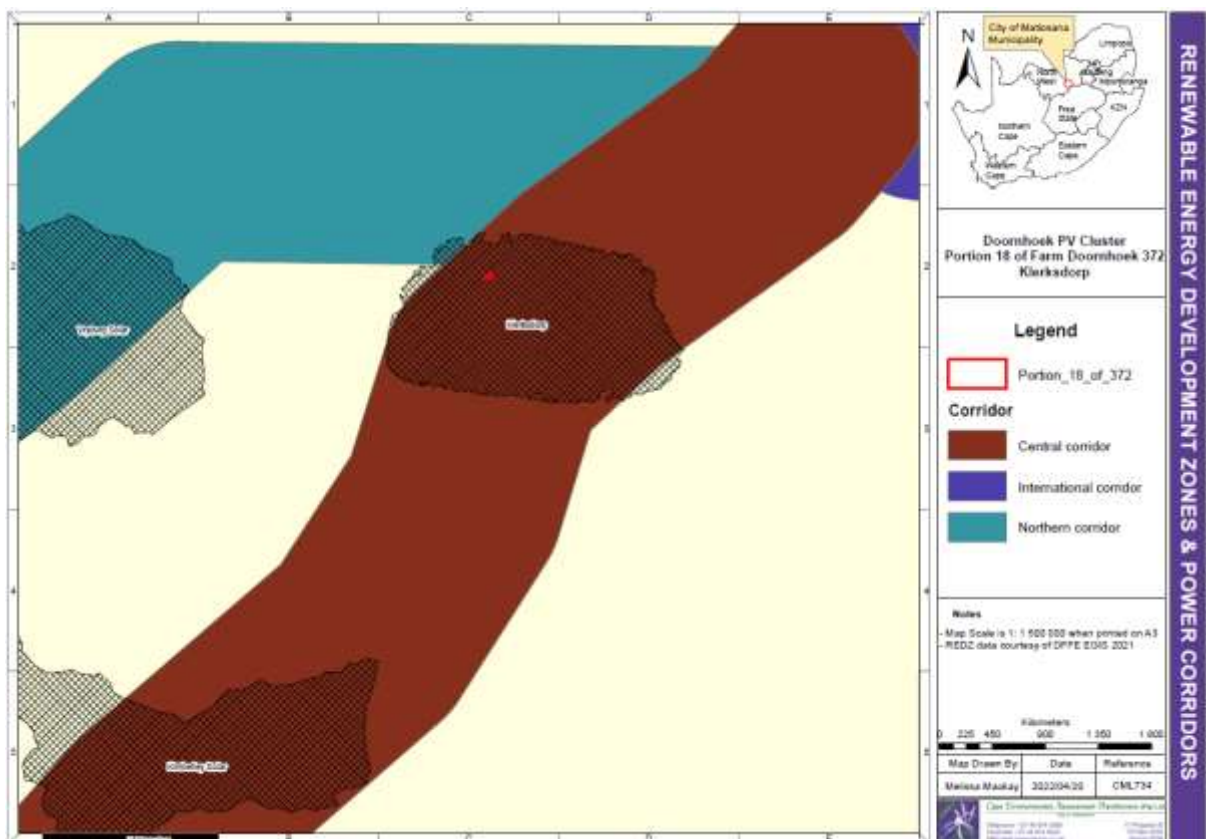
associated with power transmission. The proposed Doornhoek 1 PV will connect to the national grid via an extremely short powerline (Maximum of 200m).

2.9.3.1 Strategic Transmission Corridors

Eskom’s ‘2040 Transmission Network Study’ has drawn on various scenarios to determine the grid’s development requirements, as well as to identify critical power corridors for future strategic development.

The national power corridors consisting of five transmission power corridors of 100 km in width have been gazetted by the Department of Environmental Affairs (DEA) following the outcome of the strategic environmental assessment (SEA) which aimed to identify environmentally acceptable routes over which long-term environmental impact assessment (EIA) approvals can be secured.

Doornhoek 1 falls within the Central corridor.



**Figure 15:** The Doornhoek 1 PV within the central corridor and Klerksdorp REDZ.

2.9.3.2 North West Supply Area Generation Connection Capacity

Doornhoek 1 falls within the North West Supply Area, and more specifically, the Carletonville local area.

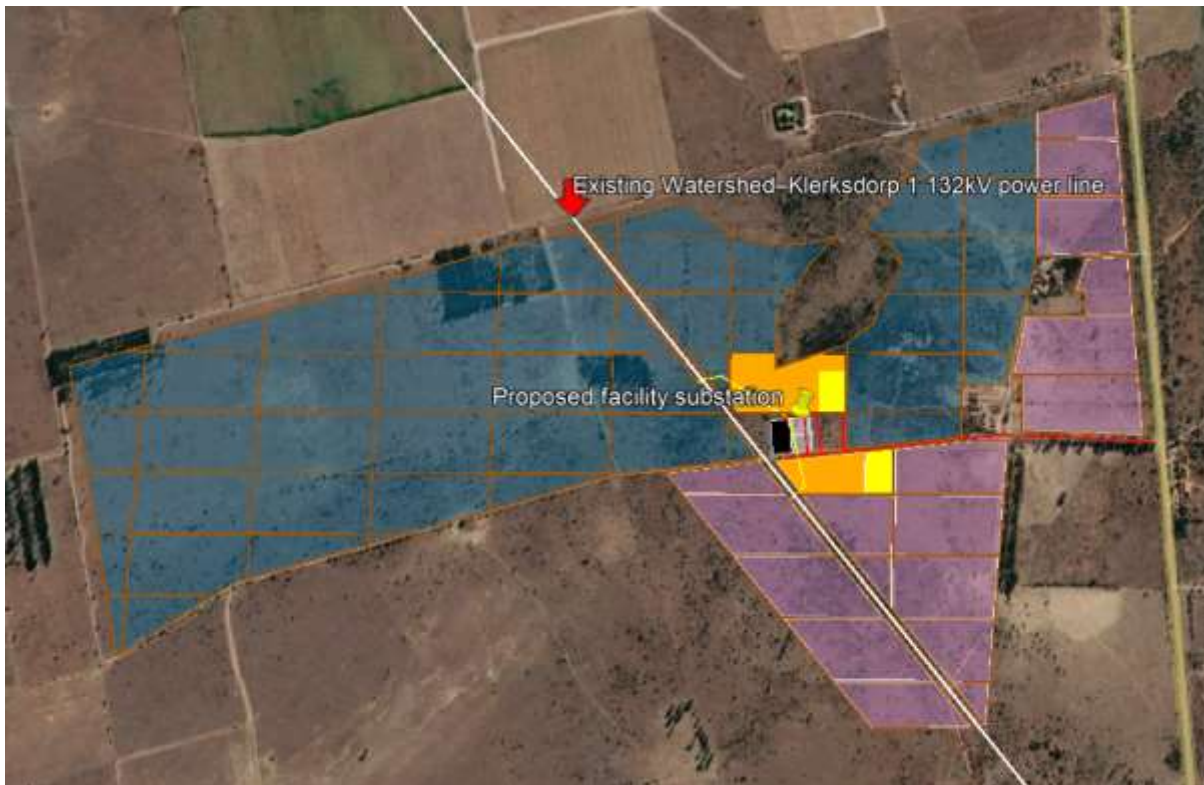
With the exception of Mookodi and Pluto, the North West supply area has transformation capacity at all the substations, and furthermore, has available transfer capacity at all the substations.

2.9.3.3 Proximity to Watershed–Klerksdorp 1 132kV power line

Ease of access into the Eskom electricity grid is vital to the viability of a solar PV facility. Projects which are in close proximity to a connection point and/or demand centre are favourable, and reduce the losses associated with power transmission.

Doornhoek 1 proposes to connect into the existing Watershed–Klerksdorp 1 132kV power line via a Loop in Loop out (LILO) connection approximately 200 m south-east of the facility substations.





**Figure 16:** Doornhoek 1 PV (blue polygon) Facility Substation in relation to Watershed–Klerksdorp 132kV power line

#### 2.9.4 Site Suitability

Among the outstanding characteristics of the Doornhoek 1 PV site is it is relatively flat, sufficient medium sensitivity environments (the proposed layout plan was able to avoid all areas with a high sensitivity and very high sensitivity) and accessible location, facilitating the delivery of bulky PV panel infrastructure, and the construction and assembly process. The proximity of the site to the main road decreases the impact on secondary roads from the traffic going to and from Doornhoek 1 PV during construction and operations.

The preferred alternative has been developed in such a way as to avoid all high sensitivity areas (the footprint is contained entirely within medium and low sensitivity areas).

The extremely close proximity of the existing Eskom Watershed-Klerksdorp 132 kV powerline also allows for connection via a very short distribution line. As the site is not used for intensive agricultural purposes, Doornhoek 1 PV will therefore not significantly interfere with the agricultural productivity of the area.

#### 2.9.5 Social and Economic impact

Please refer to the Social Impact Assessment Report in Annexure E8 for a detailed description of the social environment. The social impact assessment concluded that the potential social impacts associated with the proposed Doornhoek 1 PV range from high positive, to low negative.

The findings of the Social Impact also indicate that the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) has resulted in significant socio-economic benefits, both at a national level and at a local, community level. These benefits are linked to foreign Direct Investment, local employment and procurement and investment in local community initiatives.

#### 2.9.6 Employment & Skills Transfer

The benefits of renewable energy facilities to local regions are not confined to the initial investment in the project. They also provide a reliable and on-going income for landowners and municipality, creating direct employment opportunities for locals, as well as flow-on employment for local businesses through provision of products and services to the project and its employees.

Doornhoek 1 PV will have a positive impact on local employment. During the estimated 18-month construction phase, the project will employ approximately 350 individuals of various qualifications. The majority will be provided by the local labour market.

During operations, Doornhoek 1 PV is expected to have up to 60 employment opportunities ranging from security staff to administration and artisans. Due to the fact that there is limited local skilled labour in the field of renewable energy, the employment structure will likely consist of local and outside capacity. To guarantee successful operations over the lifetime of the investment, Doornhoek 1 PV will likely use the skills of outside labour to cross-train local specialists. This cross training and skills development will take place especially in the area of technical maintenance and administration.

### 2.9.7 Need (time)

In accordance with the guidelines on need and desirability, a project should be able to answer a series of questions to demonstrate need. These are highlighted in the table below:

Table 2: Project Need Analysis

Need	Discussion	
<p>Is the land use considered within the timeframe intended by the existing approved Spatial Development Framework (SDF)? (I.e., is the proposed development in line with the projects and programmes identified as priorities within the credible IDP?</p>	<p>Yes</p>	<p>As per the North West Provincial Spatial Development Framework (PSDF) (2017) electricity within the province is primarily provided by Eskom to re-distributors – mainly municipalities (10%), commercial (5%), agriculture (5%), mining (30%), industrial (30%) and Residential (20%). Electricity for supply to the North West Province is mostly generated by Eskom’s Matimba coal-fired Power Station in Limpopo which will in future be augmented by Eskom’s Medupi coal-fired Power Station.</p> <p>According to the North West PSDF the proposed project site is located within the Mahikeng Distribution Area, which is characterised by minor developments, including Commercial, Industrial, and Major Electrification; and has a projected growth of 125MW (Eskom, 2015).</p> <p>Eskom’s Transmission Development Plan 2015 – 2024 represents the transmission network infrastructure investment requirements over the 10 year period between 2015 and 2024. Projects proposed for the North West Province for the next 10 years include the introduction of 400kV power lines and transformation to support or relieve the existing networks. Five transmission power corridors have been identified as critical to providing a flexible and robust network that could respond to meet the needs of future IPPs and IRP requirements</p> <p>Section 5.2.1 of the SDF, Natural Systems Synthesis, notes that the Annual Horizontal Solar Radiation is fairly high – 2000 – 2100 kWh/m<sup>2</sup>, increasing towards the north. Similarly, wind speeds of 6 – 8m/s are also fairly high. The section notes that both these sources could be potential energy generators.</p> <p>Considering the above, it can be concluded that the area is suitable for PV development in terms of the SDF.</p>
<p>Should the development occur here at this point in time?</p>	<p>Yes</p>	<p>The proposed Doornhoek 1 PV energy facility is to be located outside the Klerksdorp urban edge, but within a legislated REDZ, and would promote diversification to the local economy as well as serve as a catalyst for further expansion in the stream of sustainable renewable energy development within this REDZ. As outlined in the section above, the all the substations in the Northwest Supply area (excluding Mookodi and Pluto) have existing excess</p>

Need	Discussion	
		capacity in order to accommodate the development right away (thus reducing the opportunity costs).
Does the community / area need the activity and the associated land use concerned?	Yes	<p>The City of Matlosana Local Municipality identified the opportunity for a renewable energy project through their SDF and IDP processes, which include public participation.</p> <p>The proposed Doornhoek 1 PV development will allow for a diversification of employment, skills and contribute to the potential development of small business associated with its construction, operation and maintenance activities.</p> <p>The proposed Doornhoek 1 PV development will contribute electricity to the constrained North West and National electrical network, contributing to a provincial and national need. Doornhoek 1 PV has been designed in such a way so as to avoid or minimise potential negative impacts of the local environment while enhancing potential positive impacts, locally and regionally.</p>
Are the necessary services with adequate capacity currently available?	partially	<p>Doornhoek 1 PV requires the installation of an overhead power line to connect to the existing Eskom Doornhoek Substation (feed into the national grid system), as well as a very short access road from the existing main road.</p> <p>The cost of supplying the new infrastructure will be covered by the Applicant, and the impacts thereof have been assessed in this environmental process.</p> <p>The water required for the construction and operation of Doornhoek 1 PV will be sourced from the City of Matlosana Local Municipality (preferred option) and will be supplemented by stored rainwater.</p> <p>The applicant may at a later stage consider the utilisation of groundwater to supplement this supply, this will however be subject to approval in terms of the National Water Act.</p> <p>Construction waste (general waste) will be disposed of at the existing landfill sites. Defunct and damaged modules identified during construction will be returned to the supplier for recycling and/or disposal.</p>
Is this development provided for in the infrastructure planning of the municipality?	Yes	Yes. Attracting private investment and the employment opportunities associated with renewable energy development are identified as priority strategies to create sustainable urban and rural settlements.
Is this project part of a national programme to address an issue of national concern or importance?	Yes	In order to meet the increasing power demand within South Africa, Eskom has set a target of 30% of all new power generation to be derived from independent power producers (IPPs). The Applicant is one such IPP which intends to generate up to 115MW of electricity from the proposed Doornhoek 1 PV, for input into the national grid (via the existing Eskom Doornhoek Substation). The proposed Doornhoek 1 PV is also situated within a legislated REDZ.

### 2.9.8 Desirability (place)

In accordance with the guidelines on need and desirability, a project should be able to answer a series of questions to demonstrate desirability. These are highlighted in the table below:

Table 3: Project Desirability Analysis

Desirability	Discussion	
Is the development the best practicable environmental option for this land / site?	Yes	<p>The target property is outside the Klerksdorp Urban Edge, within a legislated REDZ. The property has a relatively poor agricultural potential due to various limiting factors.</p> <p>These factors have rendered the property vacant with minimal extensive agriculture limited land use option alternatives. Considering these factors, it is very unlikely to be considered for an alternative land use such as urban development.</p> <p>The property is listed as a private nature reserve within the South African Protected Areas Database, it is however evident that it is not utilised for any conservation purposes (please refer to the discussions relating to the National Environmental Management: Protected Areas Act in section 3 of this report)</p> <p>The property is furthermore not within an area earmarked for the expansion of protected areas, nor does the footprint contain any unique biodiversity features. The area is thus unlikely to be considered for conservation use.</p>
Would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?	No	<p>The City of Matlosana Integrated Development Strategy focuses on the following issues:</p> <ul style="list-style-type: none"> <li>• The regeneration of the manufacturing sector</li> <li>• The growth of tourism and the linkages to the sector</li> <li>• The growth of agriculture</li> <li>• The development and growth of the information technology sector</li> <li>• The re-skilling of the labour force</li> <li>• The regeneration of industrial areas and CBD's and upgrade of residential areas</li> <li>• Facilitate the utilization of co-operatives in the municipality's procurement system</li> <li>• Facilitate the growth and contribution of SMME's.</li> </ul> <p>The proposed solar energy facility will contribute to job creation, economic growth and development in the region, which will be KPA 2 of the City of Matlosana IDP.</p>
Would the approval of this application compromise the integrity of the existing approved environmental management priorities for the area?	unlikely	<p>According to the national vegetation map (Mucina &amp; Rutherford 2018), the solar development site lies entirely within two vegetation types that is classified as Least Threatened and Endangered. Portions of the site are situated in a CBA 1.</p> <p>The terrestrial ecology specialist has confirmed that the project infrastructure has been positioned to avoid impacts on near-intact Vaal-Vet Sandy Grassland which is the endangered vegetation type within the CBA planning unit. Infrastructure has instead been located within the Klerksdorp Thornveld which is listed as Least Concern.</p> <p>The terrestrial ecology specialist furthermore confirmed that portions of CBA 1 in the facility area have been historically cultivated and has recommended to rather view these areas as Ecological Support Areas instead of CBAs.</p>
Do location factors favour this land use at this place?	Yes	<p>The region has been identified as being one of the most viable areas for solar energy generation outside of the Northern Cape due to the following factors:</p> <ul style="list-style-type: none"> <li>• Excellent solar radiation (compared to other regions);</li> <li>• Close to existing main transport routes and access points;</li> <li>• Close to connection points to the local and national electrical grid;</li> </ul> <p>and</p>

Desirability	Discussion	
		<ul style="list-style-type: none"> <li>• Outside of very high and high sensitivity areas.</li> </ul> <p>The proposed site is furthermore situated within a legislated REDZ and as such has been subjected to a detailed Strategic Environmental Assessment in which highly sensitive landscapes were already excluded from these areas.</p> <p>The ecological sensitive areas on and surrounding the solar site have informed the optimal location and layout for the proposed solar project, with minimal impact to the receiving environment, subject to implementation of mitigation measures.</p>
How will the activity or the land use associated with the activity applied for, impact on sensitive natural and cultural areas?	Yes	<p>The alternatives considered for the solar development have been iteratively designed and informed by various investigations and assessments that considered both the natural and cultural landscapes. The natural and culturally sensitive areas have been identified and where possible, avoided to prevent negative impacts on such areas.</p>
How will the development impact on people's health and wellbeing?	Yes	<p>The site is located outside of the Klerksdorp Urban Edge and as a result is unlikely to impact negatively on the community's health and wellbeing.</p>
Will the proposed activity or the land use associated with the activity applied for, result in unacceptable opportunity costs?	Unlikely	<p>The next best land use alternative to the solar facility is limited agriculture (the status-quo). However, the proposed development site does not have any significant agricultural value and has not been utilised for any intensive agricultural purposes during recent times. The carrying capacity of the site is too low to generate noteworthy financial benefit from agricultural activities. The development of the proposed solar facility would constitute the loss of approximately 200ha of the overall property. The economic benefits and opportunities that the proposed solar development holds for the landowner and the local economy of the municipal area cannot be recovered from the current or potential agricultural activities.</p> <p>The opportunity costs in terms of the water-use requirements of Doornhoek 1 PV are within acceptable bounds if one considers the minimal demand on the resources.</p>
Will the proposed land use result in unacceptable cumulative impacts?	Unlikely.	<p>The sites are within the legislated REDZ have been identified as an area with high potential for renewable energy generation:</p> <p>The potential for further, future solar developments in the area cannot be discounted (as many have already been approved or are in progress). However, these will have synergistic benefits for the economy and growth of the area, while the contribution to cumulative habitat loss in the area associated with this and potential future solar development would be relatively small in relation to the land resources available, with low impacts restricted to the local area.</p>

### 2.10 SITE SELECTION PROCESS

The site selection process followed a two-stage approach; firstly, to select the properties for the proposed development (in the case of Doornhoek 1, this was Portion 18 of the Farm Doornhoek No. 372-IP and secondly, to select the footprint of the proposed development within the farm portion.

### 2.10.1 Property Selection<sup>24</sup>

In choosing a site for the development of a solar PV project, the developer goes through a process of evaluating a number of possible alternative sites in terms of the criteria that would make a viable site worth bidding in the REIPPPP.

The REIPPPP is a very competitive program and a site that is marginally less suitable from a solar resource or development cost perspective has less chance of securing a successful bid. Much effort is placed into evaluating and selecting the best available sites. Please refer to the site selection motivation report in Annexure E10 from which the following has been summarised.

The main criteria used in the evaluation of the alternative development sites are amongst others.

- Proximity to towns with a Need for Socio-Economic Upliftment
- Solar Irradiation
- Access To Grid
- Renewable Energy Development Zone
- Consideration of Food Production and Security
- Proximity to Access Road for Transportation of Material and Components
- Landowner Support

These are discussed separately below.

#### 2.10.1.1 Proximity to towns with a Need for Socio-Economic Upliftment

The proposed PV facility is situated approximately 11km north of Klerksdorp in the North West Province within the jurisdiction of the City of Matlosana Local Municipality within the Dr Kenneth Kaunda District Municipality.

Mining is the dominant economic activity of the district. Additional sectors in terms of employment are social services, trade and farming.

The declining mining industry has resulted in the number of people living in poverty in the City of Matlosana almost doubling between 1996 and 2011. Although Klerksdorp has always been the main economic hub of the greater municipal area, it has not specifically been involved in the mining activities but has maintained the function of a regional service centre in terms of agricultural supplies, retail facilities, schools and medical services which stretches further than the boundaries of the Dr Kenneth Kaunda District Municipality into the North West Province and even Botswana. It is precisely this notion which has helped sustain the area in a period of considerable mining decline over the last 20 years.

The overarching direction of City of Matlosana IDP articulates a vision for economic growth and development, provision of basic services (service delivery improvement) and infrastructure development. Due to the close proximity to Klerksdorp town, local labour and service providers would be easy to source. In this regard the development has the potential to support private sector investment and create employment and skills development opportunities within the Klerksdorp area and surrounds.

#### 2.10.1.2 Solar Irradiation

The economic viability of a solar PV facility is directly dependent on the annual solar irradiation at the site. This is discussed separately under feasibility considerations in section 2.9.

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<sup>24</sup> This section is summarised from the technical design report in annexure E9.

### 2.10.1.3 Access to Grid

Please refer to section 2.9 of the report, where feasibility considerations relating to access to the Grid are discussed in more detail.

### 2.10.1.4 Renewable Energy Development Zone

The Strategic Environmental Assessment (SEA) for wind and solar PV energy in South Africa (CSIR, 2013) identified eight (8) Renewable Development Zones (REDZs). The REDZs identified areas where large scale renewable energy facilities can be developed in a manner that limits significant negative impacts on the environment while yielding the highest possible socio-economic benefits to the country.

Doornhoek 1 is located within the Klerksdorp REDZ (REDZ10), which was formally gazetted in 2018. The area has therefore been identified as suitable for the establishment of renewable energy facilities, specifically large scale solar farms.

### 2.10.1.5 Consideration of Food Production and Security

The designation of the REDZ has taken into account the country's need to balance renewable energy development against the need to ensure the conservation of land required for agricultural production and national food security.

According to the agricultural specialist, the land selected for Doornhoek 1 is of limited land capability and is not suitable or used for crop production. There is not a scarcity of such agricultural land in South Africa and its conservation for agricultural production is therefore not a priority.

### 2.10.1.6 Proximity to Access Road for Transportation of Material and Components

The site for this development is located off a local district road, which provides multiple farms in the area with access to the greater road network. The road is a two-lane surfaced road and links to District Road in Klerksdorp, to the south of the site. The major routes in the immediate vicinity of the site are the R30 to the west of the site, N12 to the south of the site and R507 to the north-west of the site.

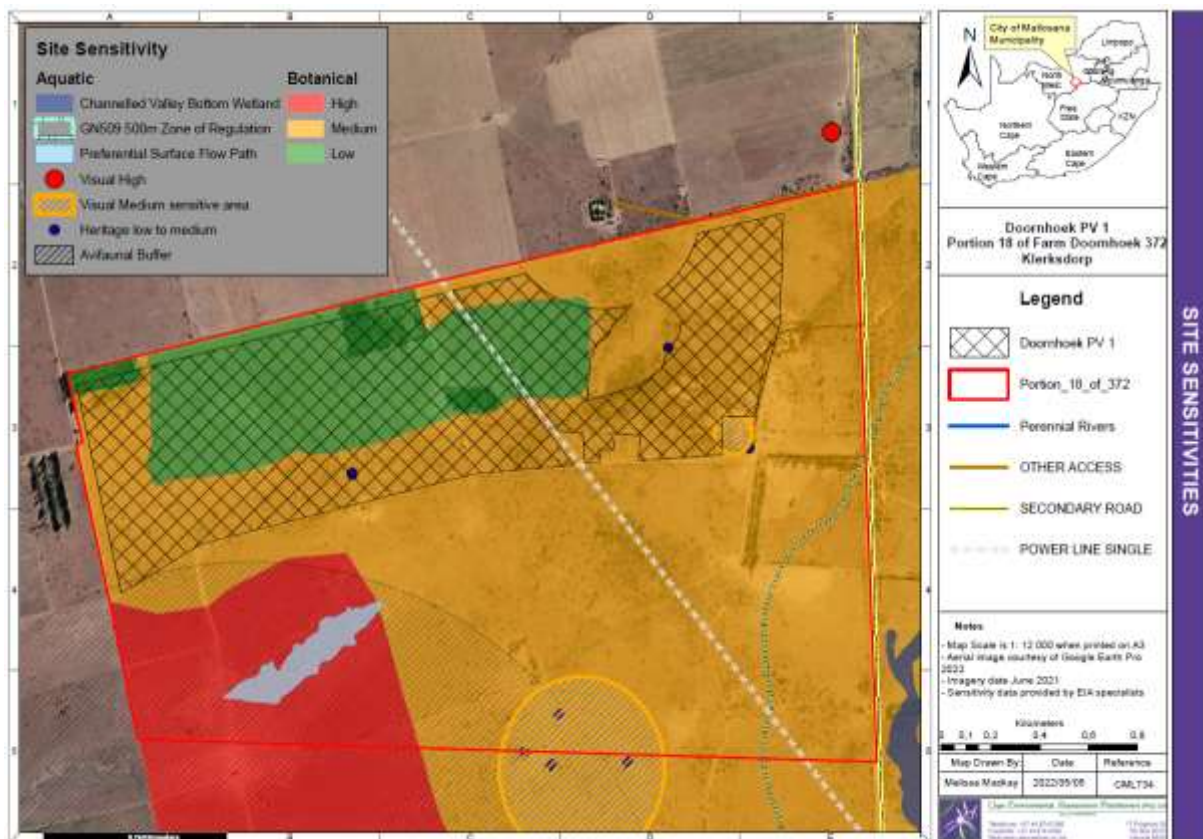
As material and components would need to be transported to the project site during the construction phase of the project, the accessibility of the site was a key factor in determining the viability of the project, particularly taking transportation costs (direct and indirect) into consideration and the impact of this on project economics and therefore the ability to submit a competitive bid under the Department of Energy's (DoE) REIPPPP.

### 2.10.1.7 Landowner Support

The selection of a site where the landowner is supportive of the development of renewable energy is essential for ensuring the success of the project. The support from the landowner for the development to be undertaken on the affected property has been solidified by the provision of the consent for the project to proceed on the property through the signing of a land lease agreement with the developer.

### 2.10.1.8 Environmental Sensitivity

Availability of large areas with few environmental constraints can be a restraining factor for the development of a solar PV facility. The proposed project site is approximately 200ha. The availability of sufficient low and medium sensitivity areas was paramount in property selection.



**Figure 17:** Site Sensitivity Plan for Doornhoek 1 PV. The proposed facility has been positioned to fall entirely within the low and medium sensitivity areas.

## 2.10.2 Footprint selection

The selection of the proposed footprint followed a risk adverse, bottom-up approach in order to ensure that the impacts of the proposed developments can be avoided as far as possible. This avoidance approach reduces the degree of mitigation required in order ensure that potential environmental impacts are within acceptable levels. Please refer to the Technical Layout Development Report attached in Annexure E19 for further information.

It is customary to develop the final / detailed construction layout of the Solar Facility only once an Independent Power Producer (IPP) is awarded a successful bid under the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), after which major contracts are negotiated and final equipment suppliers identified.

An initial assessment area was first determined, and this formed part of the study area for the specialist baseline assessments. The preferred footprint was then selected taking into account the sensitivities identified by the participating specialists.

### 2.10.2.1 Initial Assessment Area

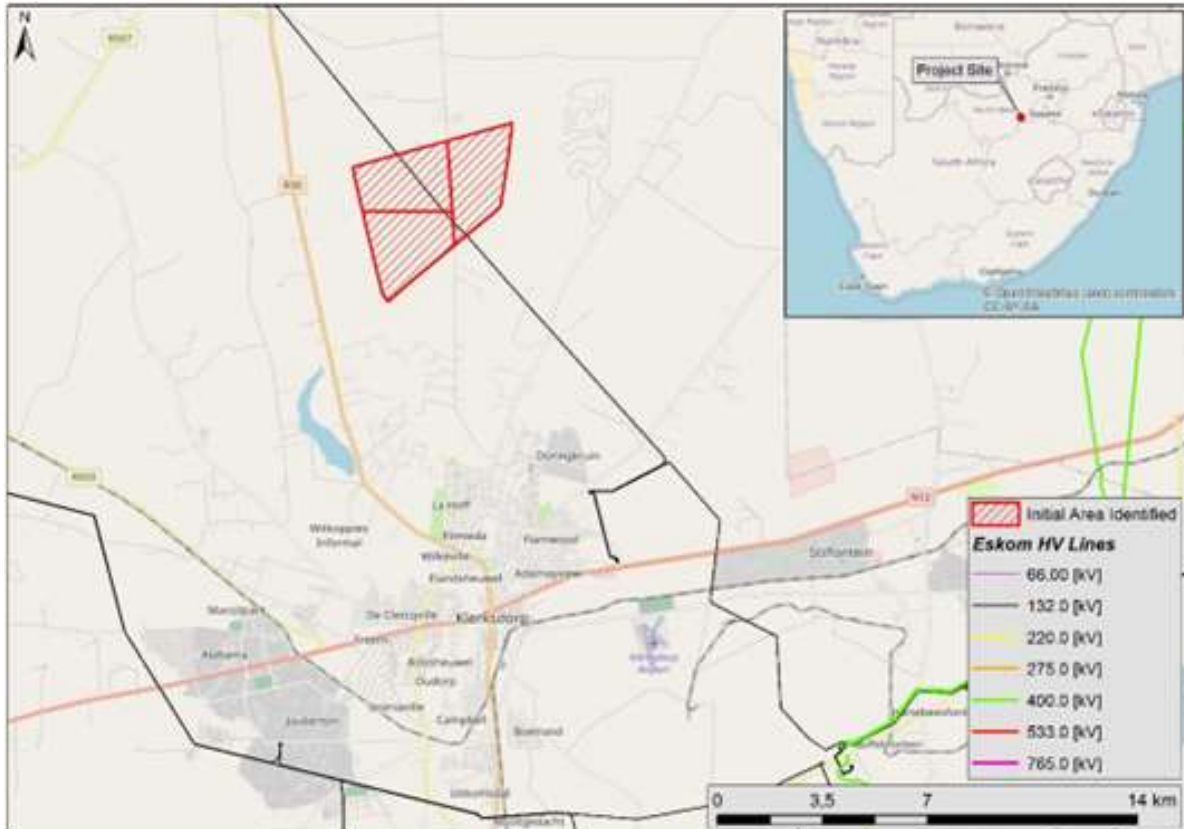
Initially three properties, situated near Klerksdorp, were identified for the potential solar energy development. These included

- Portion 18 of the Farm Doornhoek No. 372-IP;
- Portion 21 of the Farm Doornhoek No. 372-IP; and
- Remainder of Portion 2 of the Farm Doornhoek No. 372-IP.



This was based on the favourable location characteristics which included: a strong solar resource; location within a REDz; a viable grid connection; close proximity to towns with a need for socio-economic upliftment; land availability; land owner support; flat topography; no conflict to on-site and surrounding land use practices; easy accessibility; favourable wind and dust considerations; and distance from airports.

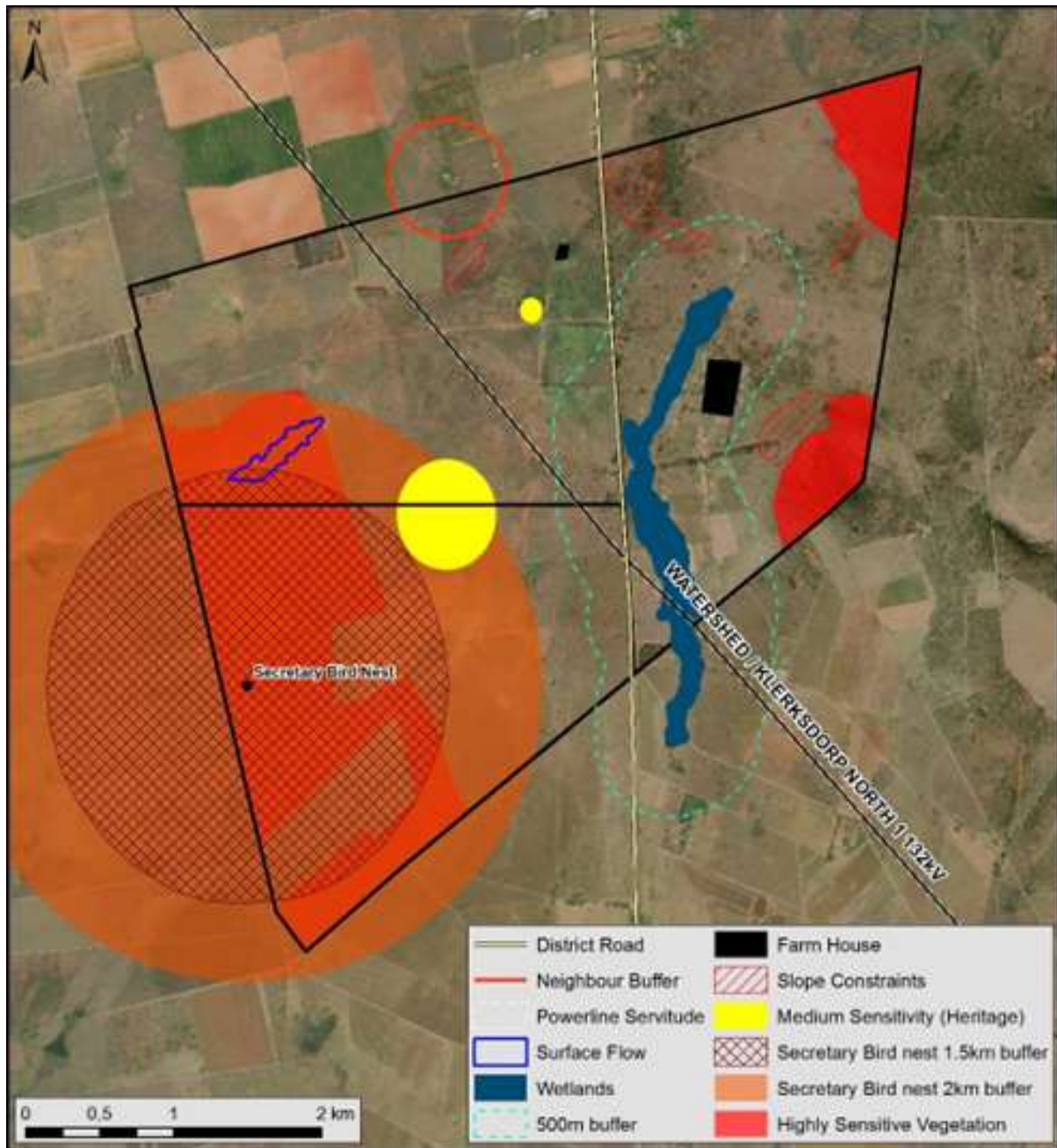
This initial conceptual area was  $\pm 1790$  ha.



**Figure 18:** Initial Conceptual Area

#### 2.10.2.2 Environmental Screening

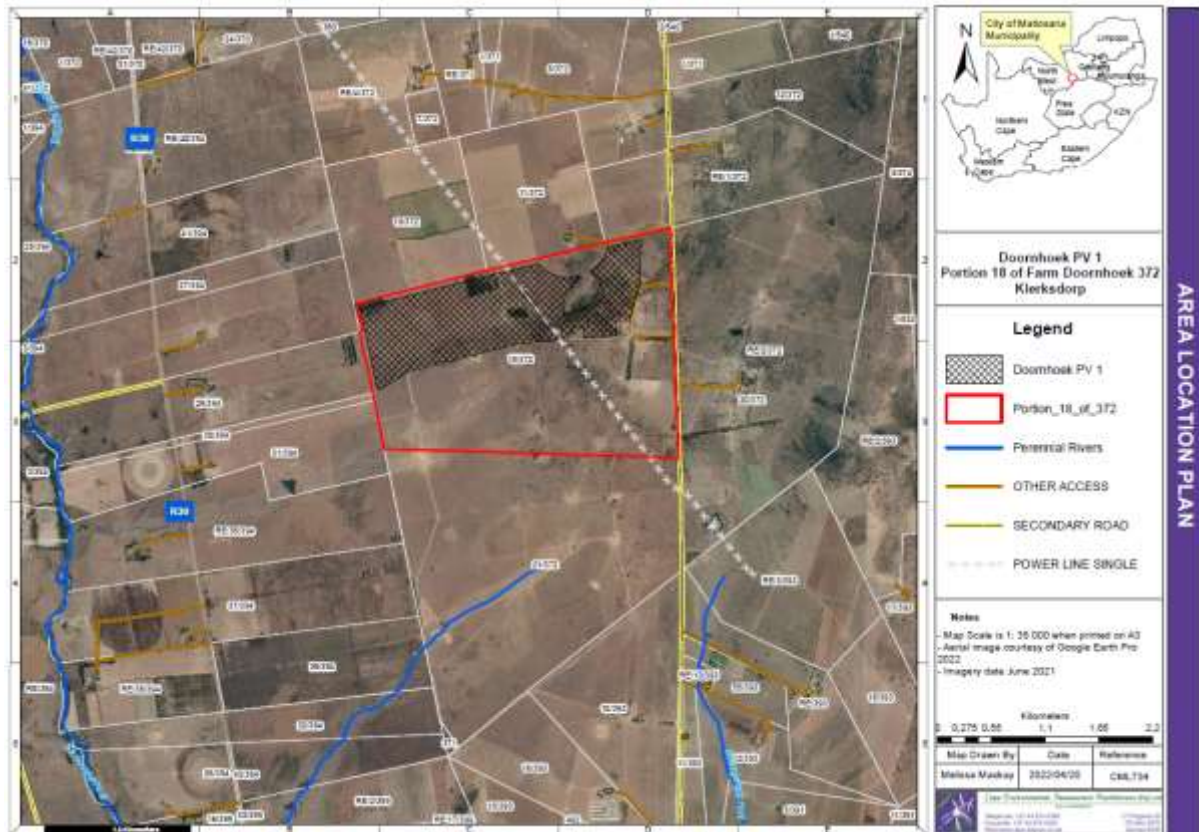
Following the identification of the initial conceptual area, a detailed environmental and technical screening exercise was undertaken. This included site assessments and sensitivity mapping by various specialists.



**Figure 19:** Potential constraints identified within the initial study area.

2.10.2.3 Preferred Footprint Selection.

Following the initial site screening exercise, it was envisaged to develop three solar facilities across all available areas that were not highly sensitive (approximately 600 ha), on the western side of the district road. However, after further consultation with the visual specialist and considering the potential visual massing effect of 600 ha of solar PV panels, it was decided to reduce the footprint significantly and develop two solar facilities covering 280 ha on Portion 18 of the Farm Doornhoek No. 372-IP 5. The preferred footprint for Doornhoek 1 PV was selected taking into account the specialists sensitivities as well as the concern of the visual specialist relating to visual massing.



**Figure 20:** Proposed Doornhoek 1 footprint (200 ha) located within portion 18 of the Farm 372.

This extensive upfront consultation with the various specialists mitigated many of the impacts associated with the planning and design phase.

## 2.11 CONSIDERATION OF ALTERNATIVES

Doornhoek 1 PV will consist of solar PV technology with fixed, single or double axis tracking mounting structures, with a net generation (contracted) capacity of up to 115 MW<sub>AC</sub> as well as associated infrastructure.

In terms of the guidelines on consideration of alternatives, alternatives can include:

- Site Alternatives (please refer to the site selection process detailed in section 2.10).
- Technology Alternatives (please refer to section 2 where technology alternatives are discussed in further detail).
- Layout Alternatives (discussed below).

In compliance with the regulations, as a minimum, the No-Go Alternative must be considered and assessed.

### 2.11.1 Layout Alternatives

As mentioned earlier in this report (when describing the footprint selection process), a much larger preliminary study area was analysed by relevant specialists to determine the sensitivity. The preferred layout was then developed taking into account the sensitivities identified by the participating specialists.

Therefore, the preferred layout alternative (Layout Alternative 1) within the initial assessment area was the only layout alternative assessed for Doornhoek 1 PV. Layout Alternative 1 avoids all high and very high sensitivity features as well as the buffers identified by the participating specialists.

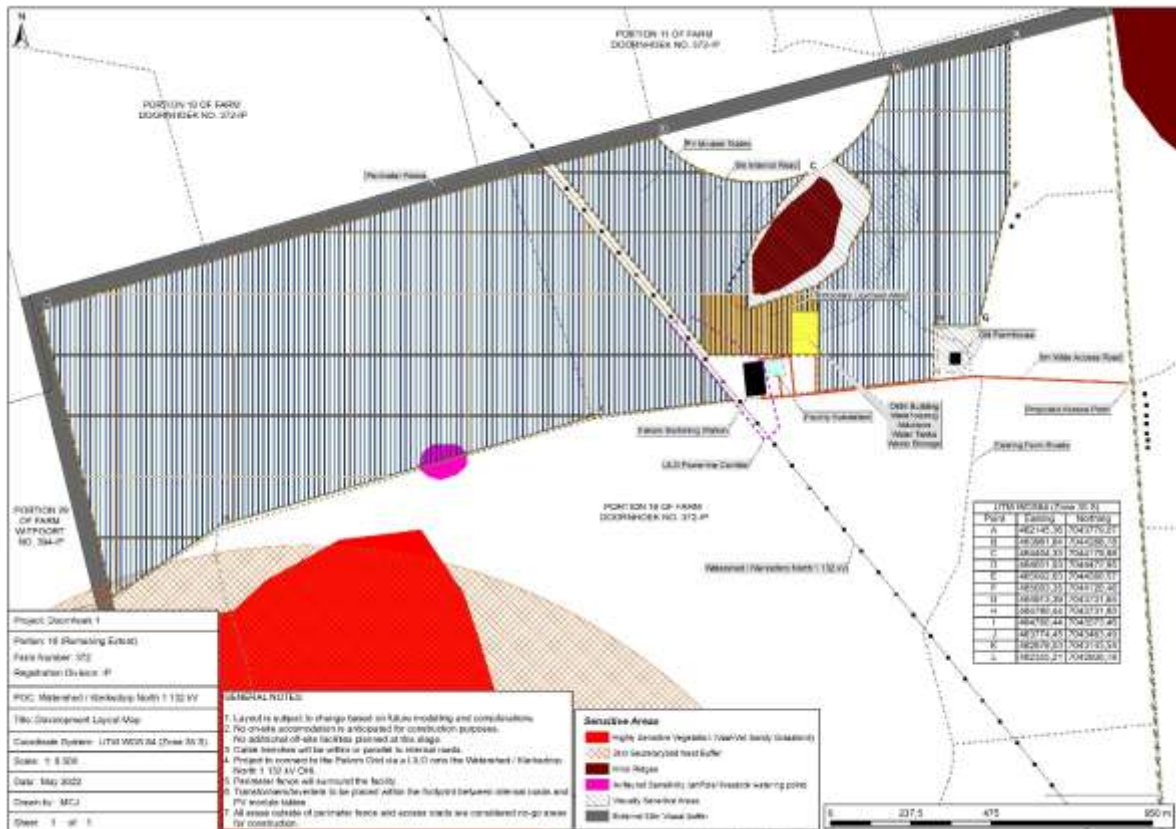


Figure 21: Preferred layout (Layout Alternative 1) for Doornhoek 1 PV.

This preferred layout proposed in this report (Layout Alternative 1) has thus gone through multiple stages of refinement until its current stage and is considered to be the best practicable environmental option.

**2.11.2 Grid Connection Alternatives**

Doornhoek 1 PV will connect directly into the adjacent existing Watershed – Klerksdorp 132kV overhead powerline. This will be a very short powerline (a maximum of 200m) and as such no alignment alternatives can be considered.

**2.11.3 Access Road Alternatives**

As detailed in section 2 of this report, the preferred access identified by the Traffic Specialist is the existing farm access road.



**Figure 22:** Existing farm access road that will be utilised to access Doornhoek 1 PV.

The majority of the access road to the PV facility will follow this existing access road.

Considering that the existing access is deemed to be suitable, no alternative access roads were considered.

#### **2.11.4 The no-go alternative**

The no-go Alternative (or status quo) proposes that Doornhoek 1 PV does not go ahead and that the area within a Renewable Energy Development Zone will remain undeveloped as it is currently.

The land on which the Doornhoek 1 PV is proposed is currently vacant. It is currently used for limited livestock grazing activities, however due to a combination of factors, it has no potential for irrigated crop cultivation (this has been confirmed by the Agricultural Specialist).

The solar-power generation potential of the area, particularly in proximity to the existing Watershed – Klerksdorp 132kV overhead line and within the REDZ is significant and will persist should the no-go alternative occur.

The no-go alternative will limit the potential associated with the land and the area as a whole for ensuring energy security locally, as well as the meeting of renewable energy targets on a provincial and national scale. Should the no-go alternative be considered, the positive impacts associated with Doornhoek 1 PV (increased revenue for the farmer, economic investment, local employment and generation of electricity from a renewable resource) will not be realised.

The no-go alternative is thus not considered a favourable option in light of the benefits associated with the proposed Doornhoek 1 PV; however, it will be used as a baseline from which to determine the level and significance of potential impacts associated with the proposed Doornhoek 1 PV.

### 2.11.5 Comparison of Initial Assessment Area and Layout Alternative 1.

The table below reflects the key environmental advantages and disadvantages of the preferred layout (Layout Alternative 1) and the initial assessment area.

**Table 4:** Comparison of Advantages and Disadvantages of Layout Alternatives described above.

Alternative	Preference	Reasons (incl. potential issues)
<b>PV Layout Alternatives</b>		
Layout Alternative 1	Preferred	<ul style="list-style-type: none"> <li>- Limited to habitat of Medium and low Sensitivity.</li> <li>- Topographically suitable.</li> <li>- Avoids all high and very high ecologically sensitive areas.</li> <li>- Avoids all high and very high hydrologically sensitive areas.</li> <li>- Avoids all very high avifaunal sensitive areas (Most notably the Secretary bird nest and associated buffer).</li> </ul>
Preliminary Development Area	Portions Less Preferred, eliminated from further assessment	<ul style="list-style-type: none"> <li>- Portions of the initial assessment area are topographically unsuitable for the development of PV.</li> <li>- Portions of the initial assessment area consist of high and very high ecologically sensitive areas.</li> <li>- Portions of the initial assessment area high and very high hydrologically sensitive areas.</li> <li>- Portions of the initial assessment area are within areas with a very high avifaunal sensitivity and their buffers.</li> </ul>

Layout alternative 1 will be assessed against the no go alternative for the purposes of this Basic Assessment.

## 2.12 PROJECT PROGRAMME AND TIMELINES

As mentioned previously Doornhoek 1 PV is intended to be bid into the REIPPPP in Bid Window 6. The programme has definite and stringent timelines that the project needs to meet. The implementation schedule below is based on the best available information we have at this time and is subject to change.

**Table 5:** Preliminary implementation schedule.

	Description	Timeline
1	Expected REIPPPP submission date (6th round)	Third Quarter of 2022
2	Preferred bidders selected	First Quarter 2023
3	Finalisation of agreements	Second Quarter 2023
4	Procurement of infrastructure	First Quarter 2024
5	Construction	2024
6	Commissioning	2024

The table above clearly depicts the dependence of the project on the REIPPPP's timelines. Any delay or acceleration within the REIPPPP will have a corresponding effect on the timelines of the projects. Also, as mentioned, no official public submission date for Round 6 has been communicated by the DoE.

**NOTE:** Doornhoek 1 PV intends submitting their bid during the 6<sup>th</sup> bidding window or thereafter if unsuccessful in immediate bidding rounds. Due to the uncertainty regarding the timing of these bidding windows, the Department is herewith requested that the validity period of the environmental authorisation (if authorised) be for the full 10 year allowable in terms of the regulations.

### 3. LEGISLATIVE AND POLICY FRAMEWORK

The legislation that is relevant to this study is briefly outlined below. These environmental requirements are not intended to be definitive or exhaustive but serve to highlight key environmental legislation and responsibilities only.

#### 3.1 NATIONAL LEGISLATION

This section deals with nationally promulgated or nationally applicable legislation associated with the proposed Doornhoek 1 PV <sup>25</sup>.

##### 3.1.1 The Constitution of the Republic of South Africa

The Constitution of the Republic of South Africa (Act 108 of 1996) states that everyone has a right to a non-threatening environment and that reasonable measures are applied to protect the environment. This includes preventing pollution and promoting conservation and environmentally sustainable development, while promoting justifiable social and economic development.

The Constitution and Bill of Rights provides 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:
  - prevent pollution and ecological degradation
  - promote conservation; and
  - secure ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development.

NEMA (discussed below) is the enabling legislation to ensure this primary right is achieved.

##### 3.1.2 National Environmental Management Act (NEMA)

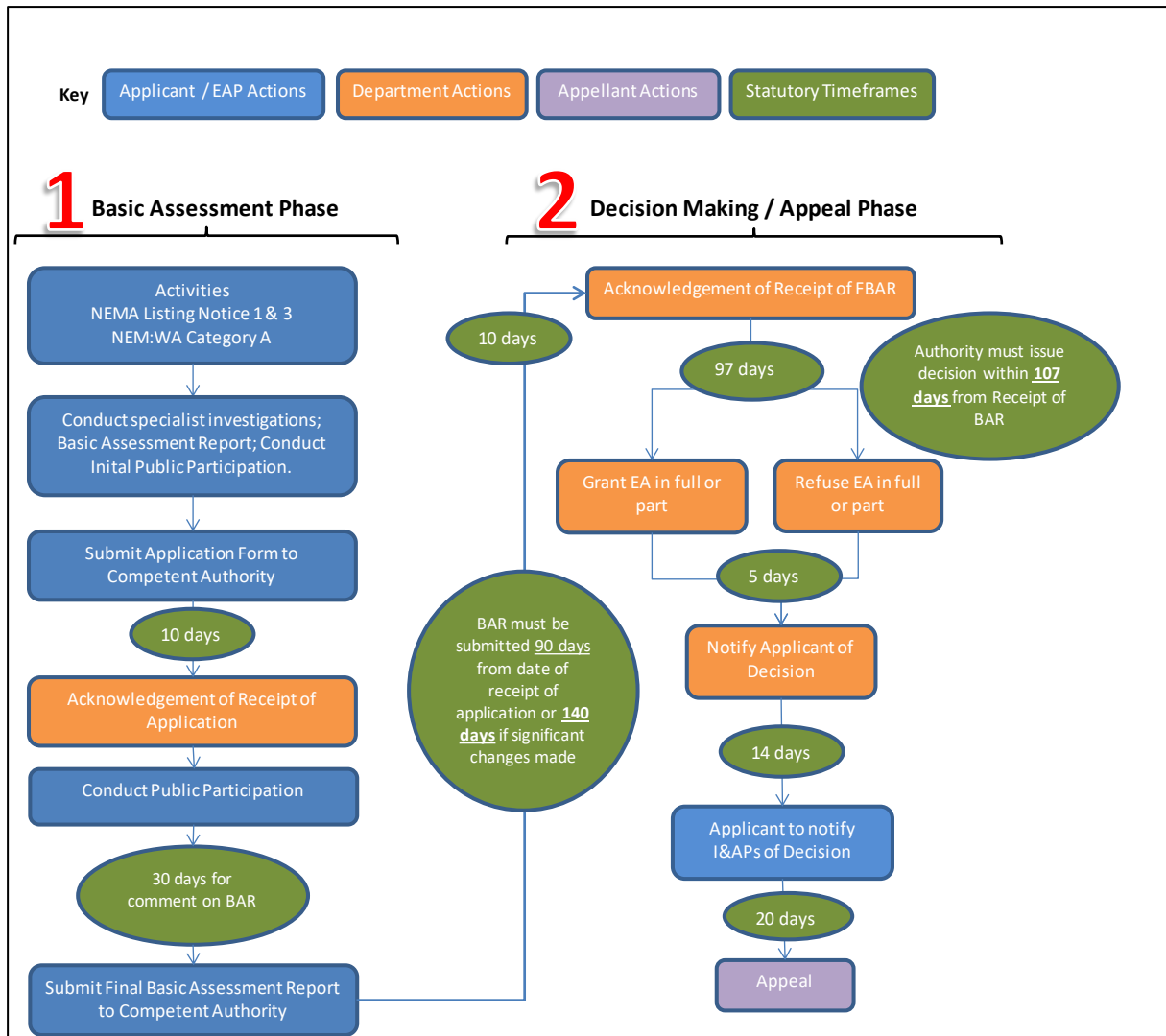
The current assessment is being undertaken in terms of the **National Environmental Management Act (NEMA, Act 107 of 1998)**<sup>26</sup>. This Act makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the competent authority (in this case, the national Department of Environmental Affairs, DEA) based on the findings of an Environmental Assessment.

The proposed development entails a number of listed activities, which would normally require a Scoping & Environmental Impact Reporting process, but due to the project falling within a legislated REDZ, only requires a Basic Assessment Process. Such a process must be conducted by an independent EAP. Cape EAPrac has been appointed to undertake this process. The figure below depicts a summary of the Basic Assessment process.

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<sup>25</sup> This section has been prepared with input from the Social Specialist (see Annexure E9)

<sup>26</sup> The Minister of Water and Environmental Affairs promulgated new regulations in terms of Chapter 5 of the National Environmental Management Act (NEMA, Act 107 of 1998), viz, the Environmental Impact Assessment (EIA) Regulations 2014 (as amended in April 2017). These regulations came into effect on 08 December 2014 (amended on 07 April 2017) and replace the EIA regulations promulgated in 2006 and 2010.



**Figure 23:** Summary of Basic Assessment Process in terms of the 2014 Regulations (as amended). The listed activities associated with the proposed development, as stipulation under 2014 Regulations **327, 325 and 324** are as follows:

**Table 6:** NEMA 2014 (As amended in April 2017) listed activities applicable to Doornhoek 1 PV.

Listed activity as described in GN R.983, 984 and 985	Description of project activity that triggers listed activity
<b>Listing Notice 1 - Regulation GN R. 983 – Basic Assessment</b>	
<b>GNR 983 Item 11:</b> The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;	The proposal includes MV cabling of up to 33 kilovolts as well on site substations and an overhead powerline with a capacity of up to 132 kilovolts.
<b>GNR 983 Item 24:</b> The development of a road— (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;	The proposed main access road to Doornhoek 1 PV will be up to 8m wide, but with the inclusion of side drains and gavel embankments will be up to 10m and will exceed the threshold of this activity. Portions of the main access road will constitute expansion of the exiting farm access road, however, some portions will constitute the development of a new road.
<b>GNR 983 Item 28:</b> Residential, mixed, retail, commercial, industrial or institutional developments where such land	The proposed Doornhoek 1 PV development is considered to be commercial use and the total footprint size is up to 200



Listed activity as described in GN R.983, 984 and 985	Description of project activity that triggers listed activity
<p>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>hectares and as such will exceed the 1 hectare threshold of this activity.</p>
<p><b>GNR 983 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>(ii) where no reserve exists, where the existing road is wider than 8 metres;</p>	<p>The existing access road from the main road will be widened by more than 6m in some place to accommodate the required geometry for heavy vehicle turning..</p>
<p><b>Listing Notice 2 - Regulation GN R. 984 - Scoping and Environmental Impact Reporting</b></p>	
<p><b>GNR 984 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,</p>	<p>The proposed Doornhoek 1 PV will have a generation capacity of up to 115 megawatts.</p>
<p><b>GNR 984 Item 15:</b> The clearance of an area of 20 hectares or more of indigenous vegetation.</p>	<p>The proposed Doornhoek 1 PV will require the clearance of an area of approximately 200ha and as such exceeds the threshold of this activity.</p>
<p><b>Listing Notice 3 - Regulation GN R. 985 – Basic Assessment</b></p>	
<p><b>GNR 985 Item 4:</b> The development of a road wider than 4 metres with a reserve less than 13,5 metres.</p> <p>h. North West</p> <p>i. A protected area including municipal or provincial nature reserves as contemplated by NEMPAA or other legislation.</p> <p>iv. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority;</p> <p>vi. Areas within 5 kilometres from protected areas identified in terms of NEMPAA or from a biosphere reserve.</p>	<p>The proposed main access road will have a maximum width of 10m while the internal roads will have a maximum width of 6m.</p> <p>Portions of the main access and internal roads fall within a CBA identified in the North West Province Biodiversity Sector Plan.</p> <p>Portion 18 of the Farm Doornhoek 372-IP is designated as a private nature reserve (Bosworth Private Nature Reserve) in the South African Protected Area Database.</p> <p>Portions of the main and internal roads are within 5 kilometres of the Faan Meintjies Private Nature Reserve.</p>
<p><b>GNR 985 Item 12:</b> The clearance of an area of 300 square metres or more of indigenous vegetation.</p> <p>h. North West</p> <p>ii. A protected area including including municipal and protected nature reserves as contemplated by NEMPAA or other legislation.</p> <p>iv. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority;</p>	<p>Portion 18 of the Farm Doornhoek 372-IP is designated as a private nature reserve (Bosworth Private Nature Reserve) in the South African Protected Area Database. The clearance of more than 300 square metres will occur within this farm portion.</p> <p>A portion of Doornhoek 1 PV falls within a CBA identified in the North West Province Biodiversity Sector Plan. Development of the facility in these areas will include the clearance of more than 300 square metres of indigenous vegetation.</p>
<p><b>GNR 985 Item 18:</b> The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.</p> <p>h. North West</p> <p>i. A protected area including municipal or provincial nature reserves as contemplated by NEMPAA or other legislation.</p> <p>ii. Areas within 5km from protected areas identified in terms of NEMPAA or a Biosphere Reserve.</p> <p>v. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority;</p>	<p>Portion 18 of the Farm Doornhoek 372-IP is designated as a private nature reserve (Bosworth Private Nature Reserve) in the South African Protected Area Database. The widening of portions of the existing access road will be required on this farm portion.</p> <p>Portions of the main and internal roads are within 5 kilometres of the Faan Meintjies Private Nature Reserve</p> <p>A portion of Doornhoek 1 PV falls within a CBA identified in the North West Province Biodiversity Sector Plan. The main access and some of the internal roads of Doornhoek 1 PV occur within this CBA.</p>

**NOTE:** Basic Assessment as well as S&EIR Activities are being triggered by the proposed development, but since the project is contained in a legislated REDZ, the Environmental Application Process will follow a Basic Assessment process.

Before any of the above-mentioned listed activities can be undertaken, authorisation must be obtained from the relevant authority, in this case the DEA. Should the Department approve the proposed activity, the Environmental Authorisation does not exclude the need for obtaining relevant approvals from other Authorities who have a legal mandate in respect of the activity.

### 3.1.3 National Environmental Management: Protected Areas Act (Act 57 of 2003)

The National Environmental Management: Protected Areas (NEMPAA) Act 57 of 2003 intends:

- To provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes;
- For the establishment of a national register of all national, provincial and local protected areas;
- For the management of those areas in accordance with national norms and standards; and
- For intergovernmental co-operation and public consultation in matters concerning protected areas;

NEMPA replaces the relevant provisions of the Environmental Conservation Act (Act 73 of 1989).

The objectives of the Act are the objectives of this Act are:

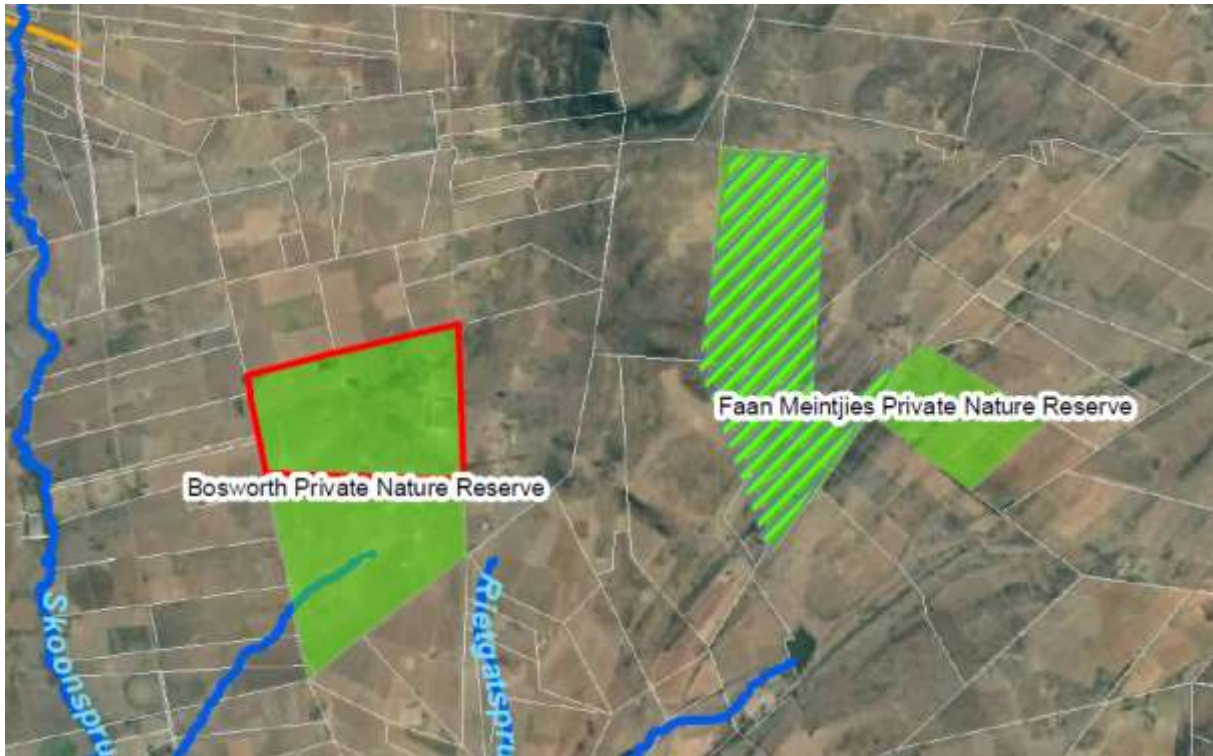
- to provide, within the framework of national legislation, including the National Environmental Management Act, for the declaration and management of protected areas;
- to provide for co-operative governance in the declaration and management of protected areas;
- to effect a national system of protected areas in South Africa as part of a strategy to manage and conserve its biodiversity;
- to provide for a diverse and representative network of protected areas on state land, private land, communal land and marine waters;
- to promote sustainable utilisation of protected areas for the benefit of people, in a manner that would preserve the ecological character of such areas;
- to promote participation of local communities in the management of protected areas, where appropriate; and
- to provide for the continued existence of South African National Parks.

Various regulations and notices as outlined in the table below have been published in terms of the NEMPAA and have been considered in this Basic Assessment Process.

**Table 7:** Regulations and notices published in terms of the National Environmental Management Protected Areas Act, that has been considered in the preparation of this Basic Assessment Report

DESCRIPTION	NOTICE DETAILS
Regulations for the Proper Administration of Special Nature Reserves, National Parks and World Heritage Sites	GNR 1061 in Government Gazette 28181, dated 28 October 2005. Commencement date: 28 October 2005
Regulations for the Proper Administration of Nature Reserves	GNR 99 in Government Gazette 35021, dated 8 February 2012. Commencement date: 8 February 2012.
Norms and Standards for the Management Of Protected Areas in South Africa	GN 382 in Government Gazette 39878 dated 31 March 2016. Commencement date: 31 March 2016.
Norms and Standards for the Inclusion of Private Nature Reserves in the Register of Protected Areas of South Africa	GN 1157 in Government Gazette 41224 dated 3 November 2017. Commencement date: 3 November 2017.
Cultural Heritage Survey Guidelines and Assessment Tools for Protected Areas in South Africa	GN 1356 in Government Gazette 41306 dated 8 December 2017. Commencement date: 8 December 2017.

According to the South African Protected Areas Database (SAPAD), both portions 18 and 21 of the Farm Doornhoek 372 (the proposed facilities only affect portion 18) are listed in the spatial information as constituting a private nature reserve.



**Figure 24:** Portion 18 of 372 (red polygon) depicted as forming part of the Bosworth Private Nature Reserve in the SAPAD spatial database.

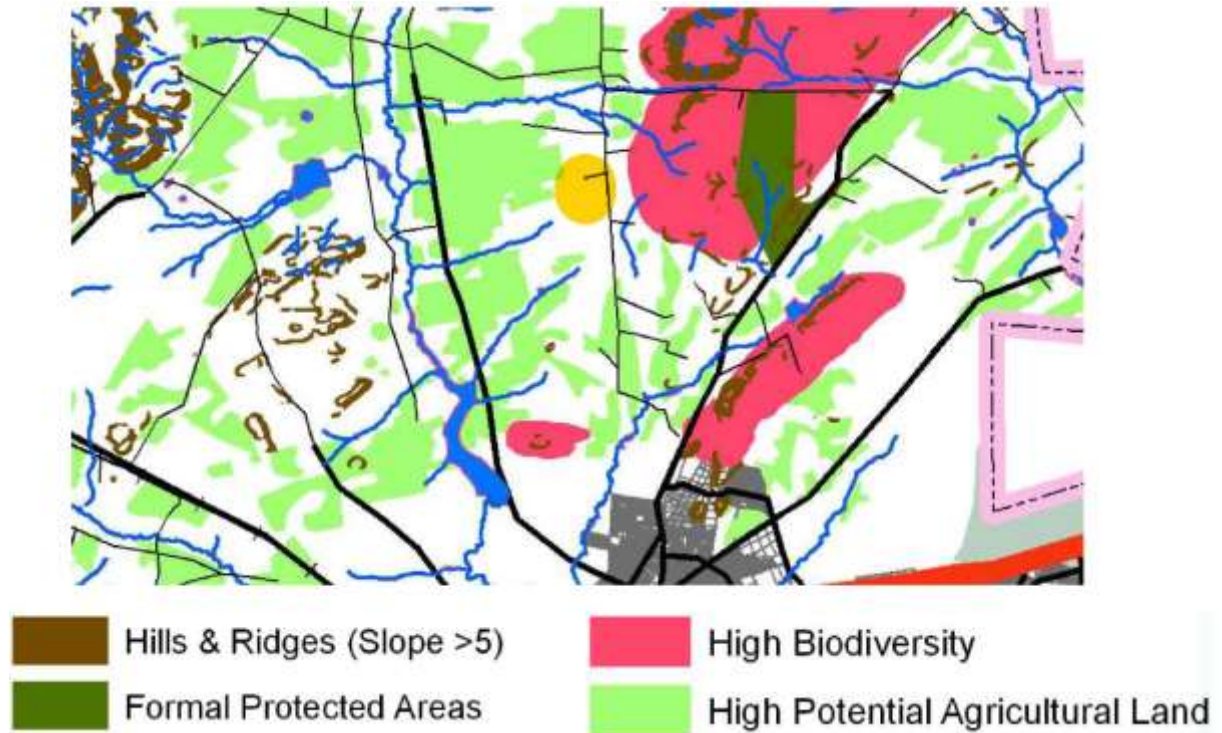
According to the spatial database, the following attributes are associated with the Bosworth Private Nature Reserve.

WDPAID	555563762
CUR_NME	Bosworth Private Nature Reserve
WMCM_TYPE	National
MAJ_TYPE	PA
SITE_TYPE	Nature Reserve
D_DECLAR	1955/08/17
LEGAL_STAT	Designated
GIS_AREA	1213.04
PROC_DOC	<a href="https://portal.environment.gov.za/PortalDownloads/PACA_Gazettes/PA/NR/Bosworth_Private_NR.pdf">https://portal.environment.gov.za/PortalDownloads/PACA_Gazettes/PA/NR/Bosworth_Private_NR.pdf</a>

**Figure 25:** Spatial Attributes of Bosworth Nature Reserve.

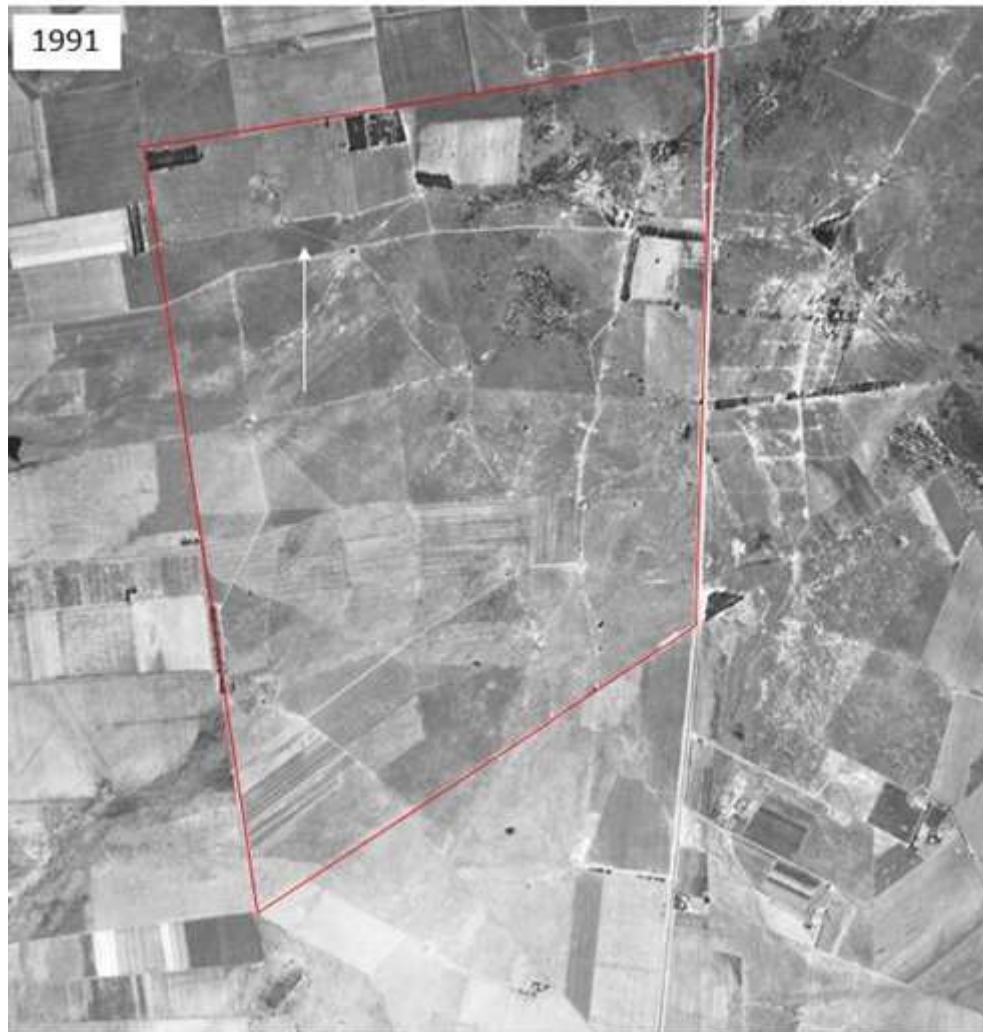
The proclamation documents for this reserve are not available. The protected area status is only reflected on the SAPAD 2021 Q4 dataset (and previous datasets back to Q4 2020). It is not however listed as a protected area in the NPAES dataset nor technical document.

The City of Matlosana Spatial Development Framework does not include these portions as protected areas (the nearby Faan Meintjies Private Nature Reserve is however included).



**Figure 26:** Excerpt of the City of Matlosana Spatial Development Framework showing the approximate position of Doornhoek 1 PV (orange circle)

Analysis of historical Aerial imagery (back to 1991) and discussions with the current landowners have indicated that the site has historically been used for livestock grazing and not for any conservation purposes.



**Figure 27:** 1991 Aerial Photograph showing that the site has historically been used for agricultural purposes.

Further to the agricultural use of the property, it must also be noted that the property is also formally Zoned for Agricultural purposes. In terms of the norms and standards for inclusion of private nature reserves in the register of protected areas, it is important to note that none of the criteria for inclusion as a private Nature Reserve are met, namely:

- Agreements with landowners – There are no agreements with the landowners, nor are there any restrictive conditions on the title deed for the property.
- Management authority assigned - There is no management authority assigned.
- Management plan in place – There is no management plan in place for this protected area.

Notwithstanding the above, the current environmental process provides application and assessment of the proposed activities on the private nature reserve. The DEFF protected areas directorate have also been engaged to provide further input in this regard.

### **3.1.4 National Environmental Management: Biodiversity (Act 10 of 2004)**

The National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA) provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The Draft National List of Threatened Ecosystems (Notice 1477 of 2009, Government Gazette No 32689, 6 November 2009) has been gazetted for public comment.

The list of threatened terrestrial ecosystems supersedes the information regarding terrestrial ecosystem status in the NSBA 2004. In terms of the EIA regulations, a basic assessment report is required for the transformation or removal of indigenous vegetation in a critically endangered or endangered ecosystem regardless of the extent of transformation that will occur. **Doornhoek PV 1 falls within two vegetation types with a status of Least Concern and Endangered.**

NEMBA also deals with endangered, threatened and otherwise controlled species. The Act provides for listing of species as threatened or protected, under one of the following categories:

- **Critically Endangered:** any indigenous species facing an extremely high risk of extinction in the wild in the immediate future.
- **Endangered:** any indigenous species facing a high risk of extinction in the wild in the near future, although it is not a critically endangered species.
- **Vulnerable:** any indigenous species facing an extremely high risk of extinction in the wild in the medium-term future; although it is not a critically endangered species or an endangered species.
- **Protected species:** any species which is of such high conservation value or national importance that it requires national protection. Species listed in this category include, among others, species listed in terms of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Certain activities, known as Restricted Activities, are regulated by a set of permit regulations published under the Act. These activities may not proceed without environmental authorization.

Doornhoek 1 PV is located in the Klerksdorp Thornveld (Least concern) and Vaal – Vet Sandy Grassland (Endangered) vegetation types. The Terrestrial biodiversity specialist has however confirmed that the proposed project footprint does not encroach into the intact Val Vet Sandy Grassland on Site.

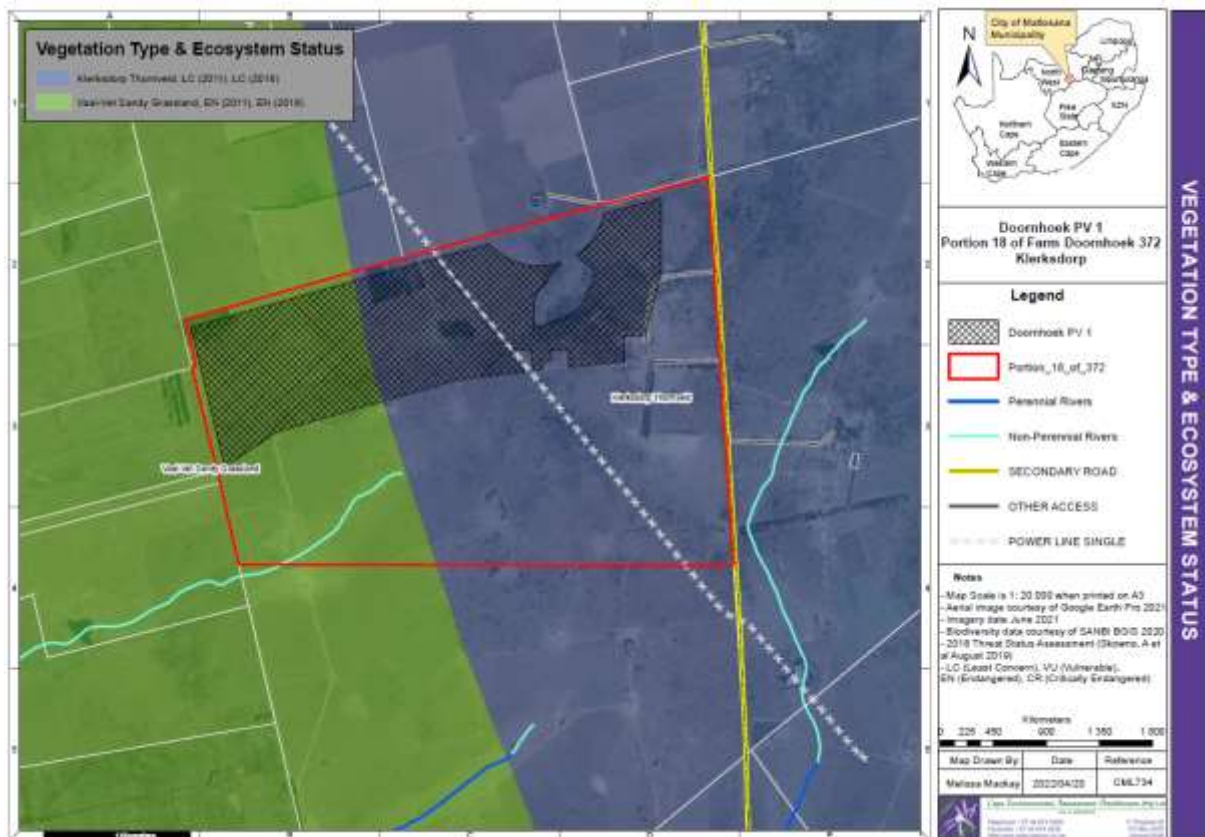


Figure 28: Vegetation Type and Ecosystem Status for Doornhoek 1 PV.

The Attributes of these two vegetation types are shown below:

#### 3.1.4.1 Gh 10 Vaal-Vet Sandy Grassland

**Distribution:** In South Africa the Vaal-Vet Sandy Grassland is present in the North-West Province and Free State Province. Vaal-Vet Sandy Grassland ranges from south of Lichtenburg and Ventersdorp to Klerksdorp, Leeudoringstad, Bothaville and to the Brandfort areas north of Bloemfontein. Altitude ranges from 1 220 – 1560 m for the entire vegetation type (Mucina & Rutherford 2006).

**Vegetation and landscape features:** Plains-dominated landscape with some scattered, slightly undulating plains and hills. Mainly low-tussock grasslands with an abundant karroid element are present. Dominance of *Themeda triandra* is an important feature of this vegetation unit. Locally low cover of *Themeda triandra* and the associated increase in *Elionurus muticus*, *Cymbopogon pospischilii* and *Aristida congesta* is attributed to heavy grazing and/or erratic rainfall. Geology and soils: Aeolian and colluvial sand overlying sandstone, mudstone, and shale of the Karoo Supergroup (mostly the Ecca group) as well as older Ventersdorp Supergroup and basement gneiss in the north (Mucina & Rutherford 2006).

**Climate:** Warm-temperate, summer-rainfall climate, with overall mean annual precipitation of 530 mm. High summer temperatures. Severe frost (37 days per year on average) occurs in winter (Mucina & Rutherford 2006).

**Important taxa** of the Vaal-Vet Sandy Grassland listed by Mucina & Rutherford (2006): Graminoids: *Antheophora pubescens*, *Aristida congesta*, *Chloris virgata*, *Cymbopogon caesius*, *Cynodon dactylon*, *Digitaria argyrograptia*, *Elionurus muticus*, *Eragrostis chloromelas*, *Eragrostis lehmanniana*, *Eragrostis plana*, *Eragrostis trichophora*, *Heteropogon contortus*, *Panicum gilvum*, *Setaria sphacelata*, *Themeda triandra*, *Tragus berteronianus*, *Brachiaria serrata*, *Cymbopogon pospischilii*, *Digitaria eriantha*, *Eragrostis curvula*, *Eragrostis obtusa*, *Eragrostis superba*, *Panicum coloratum*, *Pogonarthria squarrosa*, *Trichoneura grandiglumis*, *Tripharis andropogonoides*. Herbs: *Stachys spathulata*, *Barleria macrostegia*, *Berkheya onopordifolia* var. *onopordifolia*, *Chamaesyce inaequilatera*, *Geigeria aspera* var. *aspera*, *Helichrysum caespitium*, *Hermannia depressa*, *Hibiscus pusillus*, *Monsonia burkeana*, *Rhynchosia adenodes*, *Selago densiflora*, *Vernonia oligocephala*. Geophytic Herbs: *Bulbine narcissifolia*, *Ledebouria marginata*. Succulent Herb: *Tripteris aghillana* var. *integrifolia*. Low shrubs: *Felicia muricata*, *Pentzia globosa*, *Anthospermum rigidum* subsp. *pumilum*, *Helichrysum dregeanum*, *Helichrysum paronychioides*, *Ziziphus zeyheriana*.

#### 3.1.4.2 Klerksdorp Thornveld (Gh 13)

**Distribution:** In South Africa the Klerksdorp Thornveld is present in the North West Province in two sets of patches, one in the Wolmaransstad, Ottosdal and Hartbeesfontein region, and the other from the Botsalano Game Park north of Mafikeng in the vicinity of Madibogo in the south. Altitude for the entire vegetation type is 1260 – 1580 m (Mucina & Rutherford 2006).

**Vegetation and landscape features:** Plains or slightly irregular undulating plains with open to dense *Acacia* karroo bush clumps in dry grasslands (Mucina & Rutherford 2006). Geology and soils: Shale, slate and quartzite of the Pretoria Group with interlaid diabase sills and Hekpoort lava supporting relatively shallow and rocky soils (Glenrosa and Mispah forms). Equally represented are eutrophic red plinthic soils (Hutton form) derived mainly from a thick succession of volcanics and sediments of the Ventersdorp Supergroup (Mucina & Rutherford 2006).

**Climate:** Warm-temperate, summer-rainfall region, with overall mean annual precipitation of 533 mm. Summer temperatures are high. Frequent frosts occur in winter (Mucina & Rutherford 2006).

**Important taxa** of the Klerksdorp Thornveld listed by Mucina & Rutherford (2006): Small Trees: *Acacia* karroo, *Acacia caffra*, *Celtis africana*, *Searsia lancea*, *Ziziphus mucronata*. Tall Shrubs: *Acacia hebeclada*, *Diospyros lycioides* subsp. *lycioides*, *Ehretia rigida*, *Grewia flava*, *Gymnosporia buxifolia*, *Searsia pyroides*, *Tarchonanthus camphoratus*. Woody Climber: *Asparagus africanus*. Low Shrubs: *Asparagus laricinus*, *Asparagus suaveolens*, *Felicia muricata*, *Anthospermum hispidulum*,

Anthospermum rigidum subsp. pumilum, Aptosimum elongatum, Gnidia capitata, Gomphocarpus fruticosus subsp. fruticosus, Helichrysum dregeanum, Leucas capensis, Pavonia burchellii, Pentzia globosa, Solanum supinum var. supinum, Triumfetta sonderi, Ziziphus zeyheriana. Graminoids: Aristida congesta, Cynodon dactylon, Eragrostis lehmanniana, Eragrostis trichophora, Microcloa caffra, Panicum coloratum, Sporobolus fimbriatus, Themeda triandra, Andropogon shirensis, Anthephora pubescens, Aristida junciformis subsp. galpinii, Aristida stipitata subsp. graciliflora, Brachiaria nigropedata, Brachiaria serrata, Bulbostylis burchellii, Cymbopogon pospischilii, Digitaria eriantha, Diheteropogon amplexens, Elionurus muticus, Eragrostis curvula, Eragrostis obtusa, Eragrostis racemosa, Eragrostis superba, Eustachys paspaloides, Heteropogon contortus, Setaria sphacelata, Sporobolus africanus, Tragus berteronianus, Trichoneura grandiglumis, Triraphis andropogonoides. Herbs: Acalypha angustata, Acanthospermum australe, Berkheya onopordifolia var. onopordifolia, Berkheya setifera, Blepharis integrifolia var. clarkei, Chamaesyce inaequilatera, Chascanum adenostachyum, Dicoma macrocephala, Helichrysum nudifolium var. nudifolium, Hermannia lancifolia, Hibiscus pusillus, Justicia anagalloides, Lippia scaberrima, Nidorella microcephala, Nolletia ciliaris, Pollichia campestris, Rhyncosia adenodes, Salvia radula, Selago densiflora, Teucrium trifidum, Tolpis capensis. Geophytic Herbs: Bulbine narcissifolia, Ledebouria marginata, Ornithogalum tenuifolium subsp. tenuifolium, Raphionacme hirsuta. Herbaceous Climber: Rhyncosia venulosa.

### 3.1.5 Conservation of Agricultural Resources Act – CARA (Act 43 of 1983):

The Conservation of Agricultural Resources Act (CARA) provides for the regulation of control over the utilisation of the natural agricultural resources in order to promote the conservation of soil, water and vegetation and provides for combating weeds and invader plant species. CARA defines different categories of alien plants:

- Category 1 - prohibited and must be controlled;
- Category 2 – must be grown within a demarcated area under permit; and
- Category 3 - ornamental plants that may no longer be planted, but existing plants may remain provided that all reasonable steps are taken to prevent the spreading thereof, except within the flood lines of water courses and wetlands.

The abundance of alien plant species on the Doornhoek 1 PV site is very low. The ecological specialist has however confirmed that alien invasive succulent tree *Opuntia ficus-indica* occurs in some places.

The Department of Agriculture, Land Reform and Rural Development is guided by Act 43 of 1983.

In order to comply with their mandate in terms of this legislation, the applicant is required to take note of the following:

Article 7.(3)b of Regulation 9238: Conservation of Agriculture Resources, 1983 (Act 43 of 1983) deals with the Utilisation and protection of vleis, marshes, water sponges and water courses

- 7.(1) “no land user shall utilize the vegetation in a vlei, marsh or water sponge or within the flood area of a water course or within 10 meters horizontally outside such flood area in a manner that causes or may cause the deterioration of or damage to the natural agriculture resources.”
- (3)(b) “cultivate any land on his farm unit within the flood area of a water course or within 10 meters horizontally outside the flood area of a water course”.

Kindly refer to the Aquatic Biodiversity Impact Assessment in Appendix E2 for a discussion of potential impacts on the freshwater resources on site. The preferred footprint for Doornhoek 1 PV has been developed in such a way as to avoid all surface water resources and their associated buffers.

### 3.1.6 The Subdivision of Agricultural Land, Act 70 Of 1970

The Subdivision of Agricultural Land Act 70 of 1970 (SALA”) came into operation on 2 January 1971. The Department of Agriculture administers the Subdivision of Agricultural Land Act No. 70 of 1970. Subdivision of agricultural land, therefore, requires consent from the Department of Agriculture.



The Department of Agriculture is considered a commenting authority on this environmental process, but will be a decision-making authority on the SALA application which will take place after the project receives an EA.

### 3.1.7 National Water Act, No 36 of 1998

Section 21c & i of the National Water Act (NWA) requires the Applicant to apply for authorisation from the Department of Water and Sanitation for an activity in, or in proximity to any watercourse. Such an application would be required for any access road or PV infrastructure that crosses any watercourse.

Section 21(a) of the National Water Act is related to the abstraction of water from a water resource (including abstraction of groundwater); a Water Use Licence (WUL) would be required for such abstraction.

Water required for the construction and operation of Doornhoek 1 PV is to be sourced from the City of Matlosana Local Municipality who will be engaged to provide comment on availability. Should the applicant in the future, wish to utilise groundwater for the purposes of construction or operation of the facility, such use will require a licence in terms of Section 21(a) of the NWA.

The Aquatic Biodiversity Specialist (See Annexure E2) confirmed no wet response areas or features meeting the definition of a watercourse as contained in the National Water Act, 1998 (Act No. 36 of 1998) were identified within the study area, nor within the investigation area, thus the aquatic sensitivity of the study area was confirmed as 'low'.

### 3.1.8 National Forests Act (No. 84 of 1998):

The National Forests Act (NFA) provides for the protection of forests as well as specific tree species, quoting directly from the Act: "*no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a licence or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated*".

The terrestrial ecology specialist did not record any species protected in terms of the National Forest Act within the development footprint. Should any of these protected species be identified during the detailed ecological walkthrough that will take place prior to construction, a permit for the removal of these will need to be obtained from the National Department of Forestry, Fisheries and the Environment (Forestry Directorate).

### 3.1.9 National Heritage Resources Act, 25 of 1998

The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act (Act No. 25 of 1999). The South African Heritage Resources Authority (SAHRA) is the enforcing authority in the North West Province and is registered as a Stakeholder for this environmental process.

In terms of Section 38 of the National Heritage Resources Act, Heritage North West will comment on the detailed Heritage Impact Assessment (HIA) where certain categories of development are proposed. Section 38(8) also makes provision for the assessment of heritage impacts as part of an EIA process.

The National Heritage Resources Act requires relevant authorities to be notified regarding this proposed development, as the following activities are relevant:

- the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- any development or other activity which will change the character of a site exceeding 5 000 m<sup>2</sup> in extent; and

- the re-zoning of a site exceeding 10 000 m<sup>2</sup> in extent.

Furthermore, in terms of Section 34(1), no person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the SAHRA, or the responsible resources authority (in this case, Heritage North West).

- In terms of Section 36 (3), no person may destroy, damage, alter, exhume or remove from its original position, or otherwise disturb, any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority, without a permit issued by the SAHRA, or a provincial heritage authority (in this case, Heritage North West).
- In terms of Section 35 (4), no person may destroy, damage, excavate, alter or remove from its original position, or collect, any archaeological material or object, without a permit issued by the SAHRA, or the responsible resources authority (In this Case, Heritage North West).

Mr Jaco Van der Walt of Beyond Heritage prepared a heritage impact assessment (Annexure E5).

This Heritage Impact Assessment along with this Draft Basic Assessment Report will be submitted to SAHRA via their SAHRIS system for comment in terms of section 38 of the National Heritage Resources Act.

### **3.1.10 National Energy Act (No. 34 of 2008)**

The purpose of the National Energy Act (No. 34 of 2008) is to ensure that diverse energy resources are available, in sustainable quantities and at affordable prices, to the South African economy in support of economic growth and poverty alleviation; while taking environmental management requirements into account. In addition, the Act also provides for energy planning, and increased generation and consumption of Renewable Energies.

The objectives of the Act, are to amongst other things, to:

- Ensure uninterrupted supply of energy to the Republic.
- Promote diversity of supply of energy and its sources.
- Facilitate energy access for improvement of the quality of life of the people of the Republic.
- Contribute to the sustainable development of South Africa's economy.

The National Energy Act therefore recognises the significant role which electricity plays growing the economy while improving citizens' quality of life. The Act provides the legal framework which supports the development of Renewable Energy facilities for the greater environmental and social good and provides the backdrop against which South Africa's strategic planning regarding future electricity provision and supply takes place.

## **3.2 PROVINCIAL LEGISLATION**

This section deals with provincially promulgated or provincially applicable legislation associated with the proposed Doornhoek 1 PV <sup>27</sup>.

### **3.2.1 Astronomy Geographic Advantage Act, 2007 (Act No 21 Of 2007)**

The purpose of the Act is to preserve the geographic advantage areas that attract investment in astronomy. The entire Northern Cape Province, excluding the Tsantsabane Municipality, has been declared an astronomy advantage area. The Northern Cape optical and radio telescope sites were declared core astronomy advantage areas. The Act allowed for the declaration of the Southern Africa

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<sup>27</sup> This section includes input from the Social specialist (Annexure E9)

Large Telescope (SALT), Meerkat and Square Kilometre Array (SKA) as astronomy and related scientific endeavours that has to be protected.

Chapter 2 of the act allows for the declaration of astronomy advantage areas whilst Chapter 3 pertains to the management and control of astronomy advantage areas. Management and control of astronomy advantage areas include, amongst others, the following:

- Restrictions on use of radio frequency spectrum in astronomy advantage areas;
- Declared activities in core or central astronomy advantage area;
- Identified activities in coordinated astronomy advantage area; and
- Authorisation to undertake identified activities.

The Doornhoek 1 PV facility is not within the Geographic Advantage Area, as it is situated outside of the Northern Cape. It was furthermore found to be situated more than 580km from the closest SKA station (SKA004).



**Figure 29:** Proposed Doornhoek 1 PV in relation to the SKA Declared Areas

The South African SKA Project Office and the South African Radio Astronomy Observatory (SARAO) have been registered as a key stakeholder on this environmental process and have been requested to provide input in terms of the Astronomy Geographic Advantage Act and potential impact to SKA.

### 3.2.2 North West Provincial Development Plan (PDP) 2030 (2013)

The North West Provincial Development Plan (PDP), 2030, is largely based on, and intended to apply the objectives of, the National Development Plan (NDP) 2030. The overall targets of the PDP have been identified as follows:

By 2030:

- Eliminate income poverty: reduce the percentage of the population living in poverty from 46% to 0% in 2030.
- Reduce inequality: the Gini coefficient should fall from 0.61 to 0.53.

- The targets for poverty reduction and the GINI coefficient compliments the national targets set out for the elimination of poverty and reduction of inequality.
- The unemployment rate should fall from 24% in 2010 to 14% by 2020 and to 6% by 2030. This requires an additional 815 000 jobs. Total employment should rise from 748 000 to 1 563 000.
- The NDP projects that total employment should rise from 13 million to 24 million in South-Africa. 7% of additional jobs that has to be created will be located in the North West Province. By 2030 the North West will be responsible for 6.5% of employment in South-Africa.
- The provincial Gross Value Added (GVA) should increase by 2.9 times in real terms. Such growth will require an average annual Gross Value Added (GVA) growth of 5.4%.

The development of Doornhoek 1 PV has the potential to contribute towards a number of the targets set by the PDP, including:

- Job creation and increased income, which would have a positive impact on the current unemployment rate, standard of living, levels of inequality, and poverty levels within the Province.
- Contribute towards the capita income, and improve on labour force participation rates.
- Production of clean energy.

### **3.2.3 North West Provincial Growth and Development Strategy (PGDS) 2004 - 2014**

The North West Provincial Growth and Development Strategy (PGDS) provides a framework for integrated and sustainable growth and economic development for the province and its people. Challenges facing the Province can be summarised as follows: the Province is mostly rural in nature; has a low population density, and relative inadequate infrastructure, especially in the remote rural areas; has inherited an enormous backlog in basic service delivery and maintenance that will take time to eradicate; the population is predominantly poor with high levels of illiteracy and dependency that seriously affect their productivity and ability to compete for jobs; is characterised by great inequalities between the rich and poor as well as disparities between urban and rural; is faced with HIV / AIDS as a social and economic challenge; available resources are unevenly distributed, and there is limited potential for improved delivery of services and growth. From the above, job creation and poverty eradication together with the low level of expertise and skills; stand out as the greatest challenges to be resolved within the Province.

Goals and objectives of the PGDS are to fight poverty and unemployment, improve the low level of expertise and skills which are classified as both immediate and long term goals and require primary goals for sustained growth and economic development. The proposed solar farm will contribute to employment creation and skills development which is in line with the goals and objectives of the North West PGDS.

The North West PGDS aims at building a sustainable economy to eradicate poverty and improve social development. The proposed solar farm will contribute to growth and development of the local area by expanding the economic base and creating employment opportunities.

Renewable Energy Strategy for the North West Province (2012) In 2012 the North West Province's then Department of Economic Development, Environment, Conservation and Tourism (DEDECT) developed the Renewable Energy Strategy for the North West Province. The strategy was developed in response to the need of the North West Province to participate meaningfully within South Africa's RE sector. The RE strategy aims to improve the North West Province's environment, reduce its contribution to climate change, and alleviate energy poverty, whilst promoting economic development and job creation whilst developing its green economy.

According to the strategy the North West Province consumes approximately 12% of South Africa's available electricity, and is rated as the country's fourth largest electricity consuming province. This is mainly due to the high demand of the electrical energy-intensive mining and related industrial sector, with approximately 63% of the electricity supplied to the province being consumed in its mining sector.

While the strategy recognises that South Africa has an abundance of RE resources available, it is cognisant of the fact that the applicability of these RE resources depend on a number of factors and as a result are not equally viable for the North West Province. The RE sources that were identified to hold the most potential and a competitive strength for the North West Province are Solar Energy (photovoltaic as well as solar water heaters), Municipal Solid Waste, hydrogen and fuel cell technologies, bio-mass, and energy efficiency.

The advantages and benefits for the North West Province associated with the implementation and use of RE technologies include:

- Provision of energy for rural communities, schools and clinics that are far from the national electricity grid.
- Creation of an environment where access to electricity provides rural communities with the opportunity to create an economic base via agricultural and home-based industries and Small, Medium and Micro Enterprises (SMMEs) in order to grow their income-generating potential.
- The supply of water within rural communities.
- It would result in less time taken for the collection of wood and water, thus improving the quality of life within communities and specifically for women.
- Improved health through the reduced use of fuelwood as energy source for cooking and heating that causes respiratory and other hazards.
- Solar water heating for households in urban and rural settings, reducing the need for either electricity (in urban settings) and fuelwood (in rural settings) to heat water, thus lowering our National peak demand and conservation of woodlands in a sustainable manner.
- Large-scale utilisation of renewable energy will also reduce the emissions of carbon dioxide, thus contributing to an improved environment.
- The fact that RE go hand-in-hand with energy efficiency, it will result in additional financial benefit and the need for smaller RE systems.
- The development of a strong localised RE industry within the NWP holds substantial potential for Black Economic Empowerment (BEE) and job creation within the Province.
- The establishment of a strong RE base in the North West Province, especially in the manufacturing of fuel cells could stimulate the market for Platinum Group Metals (PGM), which would in turn help the local mining sector.

This is due to RE sources having considerable potential for increasing security of supply by diversifying the energy supply portfolio and increasingly contributes towards a long-term sustainable energy future. In terms of environmental impacts, RE results in the emission of less GHGs than fossil fuels, as well as fewer airborne particulates, and other pollutants. Furthermore, RE generation technologies save on water consumption in comparison with coal-fired power plants.

### **3.2.4 North West Provincial Spatial Development Framework (2017)**

As per the North West Provincial Spatial Development Framework (PSDF) (2017) electricity within the province is primarily provided by Eskom to re-distributors – mainly municipalities (10%), commercial (5%), agriculture (5%), mining (30%), industrial (30%) and Residential (20%). Electricity for supply to the North West Province is mostly generated by Eskom's Matimba coal-fired Power Station in Limpopo which will in future be augmented by Eskom's Medupi coal-fired Power Station.

According to the North West PSDF the proposed project site is located within the Mahikeng Distribution Area, which is characterised by minor developments, including Commercial, Industrial, and Major Electrification; and has a projected growth of 125MW (Eskom, 2015).

Eskom's Transmission Development Plan 2015 – 2024 represents the transmission network infrastructure investment requirements over the 10 year period between 2015 and 2024. Projects proposed for the North West Province for the next 10 years include the introduction of 400kV power lines and transformation to support or relieve the existing networks. Five transmission power corridors

have been identified as critical to providing a flexible and robust network that could respond to meet the needs of future IPPs and IRP requirements.

### 3.2.5 Renewable Energy Strategy for the North West Province (2012)

The Renewable Energy Strategy (RES) notes that the North West Province is the fourth largest electricity consuming province in South Africa (12%). The bulk of electricity is currently obtained from conventional coal-fired plants in Mpumalanga. Approximately 63% of the electricity supplied to the NWP is consumed in its mining sector. Many rural communities within the NWP are affected by energy poverty – a legacy of historic neglect and underdevelopment – and make use of wood fuel, with impacts on the environment and health. At the same time, the emerging renewables sector holds potential for employment creation, green manufacturing, and commercial energy generation (linked to the IPP). The key objectives of the RES are therefore to:

- Reduce the North West Province's contribution to climate change;
- alleviate energy poverty; and
- Promote economic development and job creation in the province by developing a green economy.

Various renewable energy source options were investigated in the RES. Solar (photovoltaic as well as solar water heaters), Municipal Solid Waste, hydrogen and fuel cell technologies, biomass, and energy efficiency were identified as sub-sectors/ sources which hold the greatest competitive potential in the NWP.

With regard to solar, the RES notes that the NWP has a very good potential with daily average solar radiation rates of greater than 8 000 MJ/m<sup>2</sup>. Only the Northern Cape Province (NCP) receives more radiation than the NWP.

During the status quo assessment no barriers to the generation and use of solar PV systems within the NWP were identified, except for the only slightly lower levels of solar irradiation levels compared to the NCP and parts of Limpopo. The RES notes that this could potentially be offset by sufficient economies of scale. The NWP has sufficient land area available, and the electricity grid infrastructure is good in the areas of high economic activity and in the proximity of the numerous mines and related large industries concentrated in certain areas of the NWP. The infrastructure in the NWP is also generally good in the same areas. This implies that, although the NWP is not a preferred destination for Solar PV projects, it can be made one if some of the general barriers are removed for project developers by the Province.

Based on the above, the following key actions are proposed for the NWP with regard to Solar PV:

- Identify a suitable entity linked to the NWPG to drive the opportunities associated with solar PV projects under the RE IPP.
- The NWP should initiate a project as part of the implementation plan to identify suitable areas within the NWP which complies with the following requirements:
  - Suitable and proven measured levels of solar irradiation.
  - Long-term lease or option agreements possible.
  - Good grid infrastructure in close proximity.
  - Suitable connection point into the electricity grid.
  - Low impact on agriculture and environment.
  - Suitable access to and around site for effective execution.
  - In close proximity to communities that could benefit from local economic development and job creation.

- The NWPG should also explore the possibility of packaging the most suitable and viable land areas for solar PV project developers to attract them to the NWP.
- The NWP should focus on developing the local content of components for the PV industry.

### 3.3 REGIONAL AND MUNICIPAL LEGISLATION

This section deals with regionally and municipally promulgated or regionally or municipally applicable legislation associated with the proposed Doornhoek 1 PV <sup>2829</sup>.

#### 3.3.1 Dr Kenneth Kaunda District Municipality Integrated Development Plan (IDP), 2017 – 2022

The objectives of the Spatial Development Framework (SDF) of Dr Kenneth Kaunda DM are:

- Diversification of the economic base
- Accelerating growth in agriculture, tourism, industries, and export sectors (metals, clothing, textiles, agro-processing, mineral beneficiation and manufacturing)
- Innovation and competitiveness in manufacturing sector is manufacturing sector is critical component in the strategy to significantly increase the potential of the manufacturing sector to contribute towards the overall development of the district
- Ensure sustainability by identifying possible conflict zones between proposed development and environmental sensitive areas
- Bringing marginalized communities into economic mainstream
- SMME development and skills development
- Strengthening and concentration of developments along N12
- Identification of available land and infrastructure to accommodate development along the corridor

The vision of Dr Kenneth Kaunda District Municipality (DKKDM) is to be a catalyst for Economic Development in the region of the North West Province, benefitting all communities in the designated area of jurisdiction. The goal is to assist municipalities with the implementation of key local economic development projects, by championing investment in or supporting business development for selected high impact projects to stimulate economic growth, job creation and economic diversification in the district region.

The proposed solar energy facility falls in line with the SDF within the IDP. The development will contribute to assisting the District Municipality in achieving economic growth and building a sustainable economy through the field of renewable energy.

#### 3.3.2 City of Matlosana Integrated Development Plan (IDP), 2017 – 2022

The City of Matlosana Integrated Development Strategy focuses on the following issues:

- The regeneration of the manufacturing sector
- The growth of tourism and the linkages to the sector
- The growth of agriculture
- The development and growth of the information technology sector
- The re-skilling of the labour force
- The regeneration of industrial areas and CBD's and upgrade of residential areas

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<sup>28</sup> This section includes input from the Social specialist (Annexure E9)

<sup>29</sup> This section includes legislation applicable to both the District (Category C) and Local (Category B) municipalities.

- Facilitate the utilization of co-operatives in the municipality's procurement system
- Facilitate the growth and contribution of SMME's.

The City of Matlosana's IDP has moved from forming to storming then to norming; now they are proceeding to performing. The overarching direction of CMLM IDP articulates a vision for economic growth and development, provision of basic services (service delivery improvement) and infrastructure development. The proposed solar energy facility will contribute to job creation, economic growth and development in the region, which will be KPA 2 of the City of Matlosana IDP.

### **3.4 GUIDELINES, POLICIES AND AUTHORITATIVE REPORTS**

This section includes relevant Guidelines, Policies and Authoritative reports applicable to the proposed Doornhoek 1 PV.

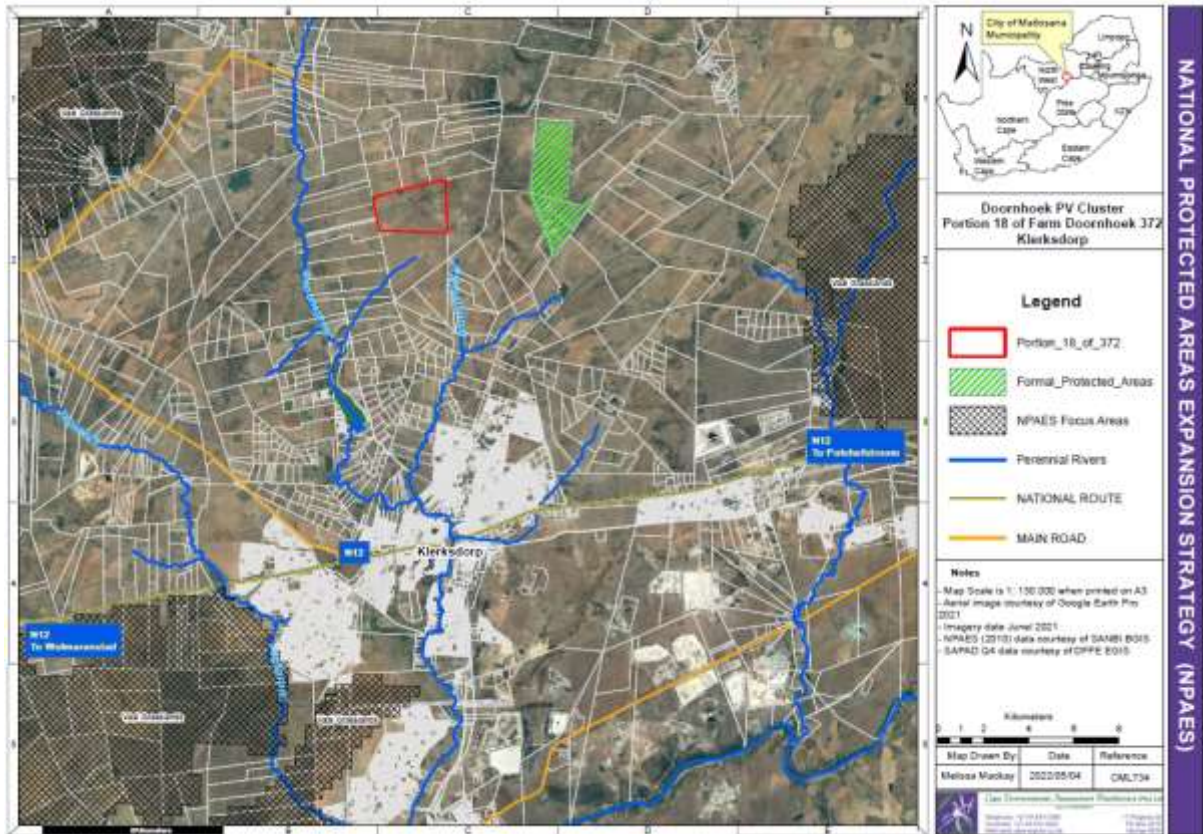
#### **3.4.1 National Protected Area Expansion Strategy (NPAES) for S.A. 2008 (2010)**

Considering that South Africa's protected area network currently falls far short of sustaining biodiversity and ecological processes, the NPEAS aims to achieve cost-effective protected area expansion for ecological sustainability and increased resilience to Climate Change. Protected areas, recognised by the National Environmental Management: Protected Areas Act (Act 57 of 2003), are considered formal protected areas in the NPAES. The NPAES sets targets for expansion of these protected areas, provides maps of the most important protected area expansion, and makes recommendations on mechanisms for protected area expansion.

The NPAES identifies 42 focus areas for land-based protected area expansion in South Africa. These are large intact and un-fragmented areas suitable for the creation or expansion of large, protected areas. The property is designated as a private nature reserve (Bosworth Private Nature Reserve) and the closest other protected area is the Faan Meintjies Nature Reserve situated approximately 4km to the East of the site.

The closest focus area is the Vaal Grasslands Focus Area situated approximately 15km's west of the Study Site.





**Figure 30:** Doornhoek 1 PV in relation to the NPAES Expansion Areas.

It is noteworthy that the Bosworth Private Nature Reserve, as depicted in the SAPAD dataset is not indicated as a Formal Protected Area in the NPAES.

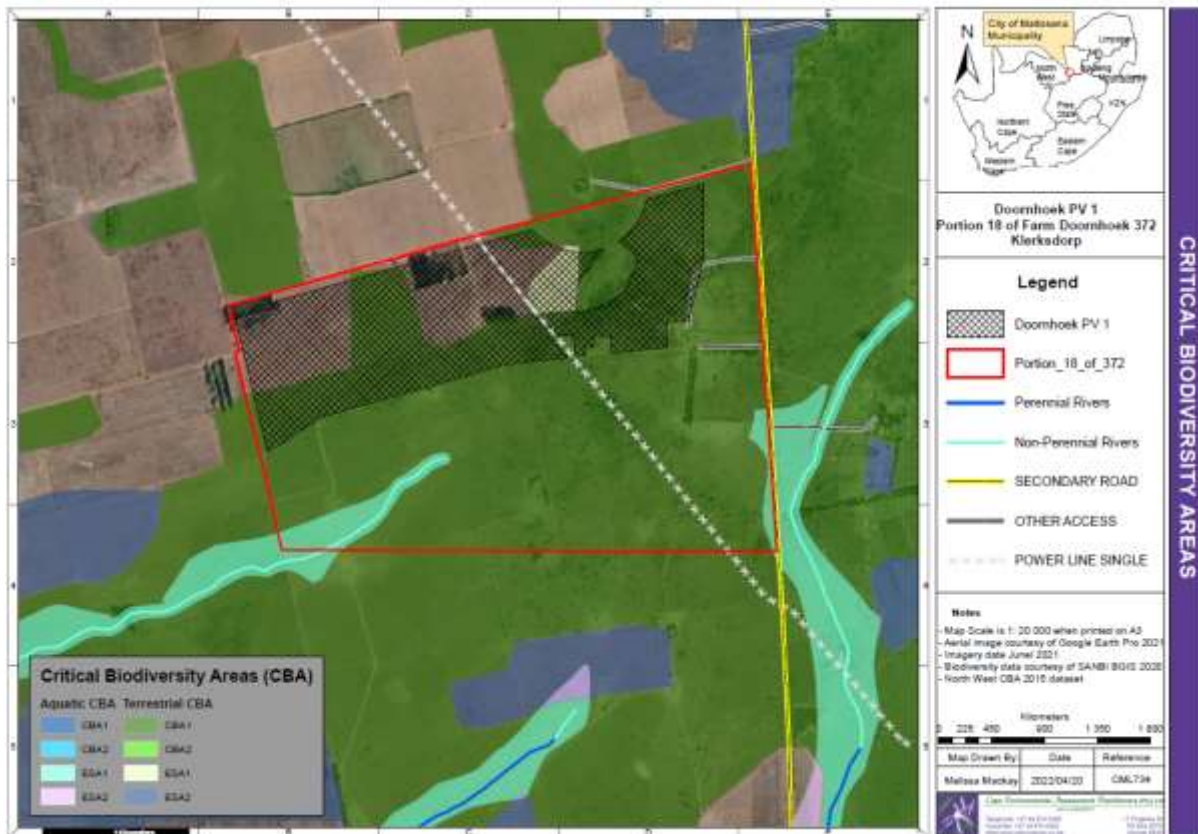
### 3.4.2 North West Province Biodiversity Sector Plan (2017)

A Critical Biodiversity Areas (CBA) Map is a spatial plan for ecological sustainability. It identifies a set of biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole.

The North West Biodiversity Sector Plan gives legal status to the CBA Map through the National Environmental Management: Biodiversity Act (Act 10 of 2004),

The North West Biodiversity Spatial Plan classifies areas into Critical Biodiversity Areas (CBA1), Degraded Critical Biodiversity Areas (CBA2), Ecological Support Areas (ESA1 & ESA2), Other Natural Areas (ONA) and Protected Areas (PA). The figure below shows that the Doornhoek 1 PV overlaps with areas classified as:

- CBA1 and
- ONA.



**Figure 31:** Doornhoek 1 PV in relation to Critical Biodiversity Areas.

The Ecological Specialist has confirmed that portions of CBA 1 within the facility area have been historically cultivated and has recommended that these areas be considered as Ecological Support Areas instead of CBAs.

**3.4.3 White Paper on the Renewable Energy Policy of the Republic of South Africa (2003)**

The White Paper on Renewable Energy Policy of 2003 supplements Government’s predominant policy on energy as set out in the White Paper on the Energy Policy of the Republic of South Africa (DME, 1998). The policy recognises the potential of Renewable Energy and aims to create the necessary conditions for the development and commercial implementation of Renewable Energy technologies. The position of the White Paper on Renewable Policy is based on the integrated resource planning criterion of:

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

The White Paper on Renewable Energy Policy sets out Government’s vision, policy principles, strategic goals and objectives for promoting and implementing Renewable Energy in South Africa. The country relies heavily on coal to meet its energy needs due to its abundant, and fairly accessible and affordable coal resources. However, massive Renewable Energy resources that can be sustainable alternatives to fossil fuels, have so far remained largely untapped. The White Paper on Renewable Energy Policy fosters the uptake of Renewable Energy in the economy and has a number of objectives that include: ensuring equitable resources are invested in renewable technologies; directing public resources for implementation of Renewable Energy technologies; introducing suitable fiscal incentives for Renewable Energy and; creating an investment climate for the development of the Renewable Energy sector.

The White Paper on Renewable Energy Policy set a target of 10 000GWh to be generated from Renewable Energy by 2013 to be produced mainly from biomass, wind, solar and small-scale hydro.

The target was subsequently reviewed in 2009 during the Renewable Energy summit of 2009. The objectives of the White Paper on Renewable Energy Policy are considered in six focal areas, namely; financial instruments, legal instruments, technology development, awareness raising, capacity building and education, and market based and regulatory instruments. The policy supports the investment in Renewable Energy facilities as they contribute towards ensuring energy security through the diversification of energy supply, reducing GHG emissions and the promotion of Renewable Energy sources.

#### 3.4.4 White Paper on the Energy Policy of the Republic of South Africa (1998)

The White Paper on Energy Policy places emphasis on the expansion of energy supply options to enhance South Africa's energy security. This can be achieved through increased use of renewable energy and encouraging new entries into the generation market. South Africa has an attractive range of cost-effective renewable resources, taking into consideration social and environmental costs. Government policy on renewable energy is thus concerned with meeting the following challenges:

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

The policy states that the advantages of Renewable Energy include; minimal environmental impacts during operation in comparison with traditional supply technologies, generally lower running costs, and high labour intensities. Disadvantages include; higher capital costs in some cases; lower energy densities; and lower levels of availability, depending on specific conditions, especially with sun and wind-based systems. Nonetheless, renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future. The White Paper on Energy Policy therefore supports the advancement of Renewable Energy sources and ensuring energy security through the diversification of supply.

#### 3.4.5 Integrated Energy Plan, 2016

The development of a National Integrated Energy Plan was envisaged in the White Paper on the Energy Policy of the Republic of South Africa of 1998 and, in terms of the National Energy Act, 2008 (Act No. 34 of 2008), the Minister of Energy is mandated to develop and, on an annual basis, review and publish the Integrated Energy Plan in the Government Gazette. The purpose of the Integrated Energy Plan is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development.

The Integrated Energy Plan notes that South Africa needs to grow its energy supply to support economic **expansion and** in so doing, alleviate supply bottlenecks and supply-demand deficits. In addition, it is essential that all citizens are provided with clean and modern forms of energy at an affordable price. As part of the Integrated Energy Planning process, eight key objectives were identified, namely:

- Objective 1: Ensure security of supply;
- Objective 2: Minimise the cost of energy;
- Objective 3: Promote the creation of jobs and localisation;
- Objective 4: Minimise negative environmental impacts from the energy sector;
- Objective 5: Promote the conservation of water;
- Objective 6: Diversify supply sources and primary sources of energy;
- Objective 7: Promote energy efficiency in the economy; and
- Objective 8: Increase access to modern energy.

The Integrated Energy Plan provides an assessment of current energy consumption trends within different sectors of the economy (i.e., agriculture, commerce, industry, residential and transport) and

uses this information to identify future energy requirements, based on different scenarios. The scenarios are informed by different assumptions on economic development and the structure of the economy and also take into account the impact of key policies such as environmental policies, energy efficiency policies, transport policies and industrial policies, amongst others.

Based on this information the Integrated Energy Plan then determines the optimal mix of energy sources and technologies to meet those energy needs in the most cost-effective manner for each of the scenarios. The associated environmental impacts, socio-economic benefits and macroeconomic impacts are also analysed. The Integrated Energy Plan is therefore focused on determining the long-term energy pathway for South Africa, taking into account a multitude of factors which are embedded in the eight objectives.

As part of the analysis four key scenarios were developed, namely the Base Case, Environmental Awareness, Resource Constrained and Green Shoots scenarios:

- The Base Case Scenario assumes that existing policies are implemented and will continue to shape the energy sector landscape going forward. It assumes moderate economic growth in the medium to long term;
- The Environmental Awareness Scenario is characterised by more stringent emission limits and a more environmentally aware society, where a higher cost is placed on externalities caused by the supply of energy;
- The Resource Constrained Scenario in which global energy commodity prices (i.e., coal, crude oil and natural gas) are high due to limited supply;
- The Green Shoots Scenario describes an economy in which the targets for high economic growth and structural changes to the economy, as set out in the National Development Plan, are met.

The Integrated Energy Plan notes that South Africa should continue to pursue a diversified energy mix which reduces reliance on a single or a few primary energy sources. In terms of renewable energy, the document refers to wind and solar energy. The document does however appear to support solar over wind noting that solar PV and CSP with storage present excellent opportunities to diversify the electricity mix, to produce distributed generation and to provide off-grid electricity. Solar technologies also present the greatest potential for job creation and localisation. Incentive programmes and special focused programmes to promote further development in the technology, as well as solar roll-out programmes should be pursued.

### **3.4.6 Integrated Resource Plan for Electricity (2010-2030)**

The Integrated Resource Plan (IRP) for Electricity 2010 – 2030 is a subset of the Integrated Energy Plan and constitutes South Africa's national electricity plan. The primary objective of the IRP is to determine the long-term electricity demand and detail how this demand should be met in terms of generating capacity, type, timing and cost. The IRP also serves as input to other planning functions, including amongst others, economic development and funding, and environmental and social policy formulation.

The current iteration of the IRP, led to the Revised Balanced Scenario (RBS) that was published in October 2010. Following a round of public participation which was conducted in November / December 2010, several changes were made to the IRP model assumptions. The document outlines the proposed generation new-build fleet for South Africa for the period 2010 to 2030. This scenario was derived based on a cost-optimal solution for new-build options (considering the direct costs of new build power plants), which was then "balanced" in accordance with qualitative measures such as local job creation.

The Policy-Adjusted IRP reflects recent developments with respect to prices for renewables. In addition to all existing and committed power plants, the plan includes 9.6GW of nuclear; 6.25GW of coal; 17.8GW of renewables; and approximately 8.9GW of other generation sources such as hydro, and gas.

### 3.4.7 National Development Plan 2030 (2012)

The National Development Plan 2030 is a plan prepared by the National Planning Commission in consultation with the South African public which is aimed at eliminating poverty and reducing inequality by 2030. The National Development Plan aims to achieve this by drawing on the energies of its people, growing and inclusive economy, building capabilities, enhancing the capacity of the state and promoting leaderships and partnerships throughout society. While the achievement of the objectives of the National Development Plan requires progress on a broad front, three priorities stand out, namely:

- Raising employment through faster economic growth.
- Improving the quality of education, skills development and innovation.
- Building the capability of the state to play a developmental, transformative role.

In terms of the Energy Sectors role in empowering South Africa, the National Development Plan envisages that, by 2030, South Africa will have an energy sector that promotes:

- Economic growth and development through adequate investment in energy infrastructure. The sector should provide reliable and efficient energy service at competitive rates, while supporting economic growth through job creation.
- Social equity through expanded access to energy at affordable tariffs and through targeted, sustainable subsidies for needy households.
- Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change.

The National Development Plan aims to provide a supportive environment for growth and development, while promoting a more labour-absorbing economy. The proposed project will assist in reducing carbon emissions targets and creating jobs in the local area as well as assist in creating a competitive infrastructure based on terms of energy contribution to the national grid.

### 3.4.8 The New Growth Path Framework

The aim of the New Economic Growth Path Framework is to enhance growth, employment creation and equity. Central to the New Growth Path is a massive investment in infrastructure as a critical driver of jobs across the economy. In this regard the framework identifies investments in five key areas namely: energy, transport, communication, water and housing.

The New Growth Path also identifies five other priority areas as part of the programme, through a series of partnerships between the State and the private sector. The Green Economy as one of the five priority areas to create jobs, including expansions in construction and the production of technologies for solar, wind and biofuels. In this regard clean manufacturing and environmental services are projected to create 300 000 jobs over the next decade.

### 3.4.9 National Infrastructure Plan

The South African Government adopted a National Infrastructure Plan in 2012. The aim of the plan is to transform the economic landscape while simultaneously creating significant numbers of new jobs and strengthen the delivery of basic services. The plan also supports the integration of African economies. In terms of the plan Government will invest R827 billion over the next three years to build new and upgrade existing infrastructure. The aim of the investments is to improve access by South Africans to healthcare facilities, schools, water, sanitation, housing and electrification. The plan also notes that investment in the construction of ports, roads, railway systems, electricity plants, hospitals, schools and dams will contribute to improved economic growth.

As part of the National Infrastructure Plan, Cabinet established the Presidential Infrastructure Coordinating Committee (PICC). The Committee identified and developed 18 strategic integrated projects (SIPS). The SIPs cover social and economic infrastructure across all nine provinces (with an emphasis on lagging regions) and consist of:

- Five geographically focussed SIPs;
- Three spatial SIPs;
- Three energy SIPs;
- Three social infrastructure SIPs;
- Two knowledge SIPs;
- One regional integration SIP;
- One water and sanitation SIP.

The three energy SIPS that are related to Doornhoek 1 PV are SIP 8, 9 and 10.

**Table 8:** Strategic Infrastructure applicable to Doornhoek 1 PV

<b>SIP 8: Green energy in support of the South African economy</b>
Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010); Support bio-fuel production facilities.
<b>SIP 9: Electricity generation to support socio-economic development</b>
Accelerate the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances; Monitor implementation of major projects such as new power stations: Medupi, Kusile and Ingula.
<b>SIP 10: Electricity transmission and distribution for all</b>
Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. Align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity.

Although this project aligns with these 3 SIP's, it will only receive formal SIP status once it is selected as a preferred bidder under the REIPPPP.

### 3.4.10 Strategic Environmental Assessment (SEA) for Wind and Solar PV energy in South Africa

The Strategic Environmental Assessment (SEA) for wind and solar PV energy in South Africa (CSIR, 2013) identified eight (8) Renewable Development Zones (REDZs). The REDZs identified areas where large scale renewable energy facilities can be developed in a manner that limits significant negative impacts on the environment while yielding the highest possible socio-economic benefits to the country.

The Phase 2 SEA identified a further 3 REDZ, which were formally gazetted in 2021. The Doornhoek 1 PV site is located within the Klerksdorp REDZ, which was formally gazetted as part of the Phase 2 REDZ in 2021. The area has therefore been identified as suitable for the establishment of renewable energy facilities, specifically large-scale solar farms.

### 3.4.11 Conservation of Migratory Species of Wild Animals

Conservation of Migratory Species of Wild Animals (also known as CMS or the Bonn Convention) is an intergovernmental treaty and is the most appropriate instrument to deal with the conservation of terrestrial, aquatic and avian migratory species. The convention includes policy and guidelines with regards to the impact associated with man-made infrastructure. CMS requires that parties (South Africa is a signatory) take measures to avoid migratory species from becoming endangered (Art II, par. 1 and 2) and to make every effort to prevent the adverse effects of activities and obstacles that seriously impede or prevent the migration of migratory species i.e., power lines (Art 111, par. 4b and 4c).

An Avifaunal Specialist has been appointed to consider the impact of the proposed Doornhoek 1 PV facility as well as the LILO grid connection (Annexure E2). Birdlife Africa South Africa has also been given an opportunity to comment in this regard.

### 3.4.12 The Agreement on the Convention of African-Eurasian Migratory Water Birds

The Agreement on the Conservation of African-Eurasian Migratory Water birds (AEWA) is an intergovernmental treaty dedicated to the conservation of migratory waterbirds and their habitat across Africa, Europe, the Middle East Central Asia, Greenland and the Canadian Archipelago. The AEWA covers 255 species of birds ecologically dependent on wetlands for at least part of their annual cycle and is a legally binding agreement by all contracting parties (South Africa included) to guarantee the conservation of migratory waterbirds within their national boundaries through species and habitat protection and the management of human activities. As mentioned above, an Avifaunal Specialist has been appointed to consider the impact of the proposed Doornhoek 1 PV facility as well as the LILO grid connection (Annexure E3). Birdlife Africa South Africa has also been given an opportunity to comment in this regard.

### 3.4.13 Guidelines to minimise the impacts on birds of Solar Facilities and Associated Infrastructure in South Africa

The “Guidelines to minimise the impact on birds of Solar Facilities and Associated Infrastructure in South Africa” (Smit, 2012) is perhaps the most important (although not legally binding) document from an avifaunal impact perspective currently applicable to solar development in South Africa. The guidelines are published by BirdLife South Africa (BLSA) and detail the recommended procedure for conducting an avifaunal specialist study as well as list all of the potential impacts of interactions between birds and solar facilities and associated infrastructure. We are aware of changes to the BLSA best-practise guidelines recently published at the Birds and Renewable Energy Forum in Johannesburg (2015) and although the revised requirements are still a work in progress and have not yet been ratified, they will inform this assessment where applicable. Please refer to Annexure E3 for a copy of the Avifaunal assessment undertaken for this project.

### 3.4.14 Environmental Impact Assessment Guideline for Renewable Energy Projects

The Minister of Environmental Affairs published the Environmental Impact Assessment Guideline for Renewable Energy in terms of section 24J of the National Environmental Management Act, 1998 (Act No. 107 of 1998) on 16 October 2016.

In pursuit of promoting the country’s Renewable Energy development imperatives, the Government has been actively encouraging the role of Independent Power Producers (IPPs) to feed into the national grid. Through its REIPPPP, the DoE has been engaging with the sector in order to strengthen the role of IPPs in renewable energy development. Launched during 2011, the REIPPPP is designed so as to contribute towards a target of 3 725 MW, and towards socio-economic and environmentally sustainable development, as well as to further stimulate the renewable industry in South Africa.

In order to facilitate the development of the first phase of IPPs in South Africa, these guidelines have been written to assist project planning, financing, permitting, and implementation for both developers and regulators. 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);
- Other interested and affected parties (as determined by the project location and/or scope).

This guideline aims to ensure that all potential environmental issues pertaining to renewable energy projects are adequately and timeously assessed and addressed as necessary so as to ensure sustainable roll-out of these technologies by creating a better understanding of the environmental approval process for renewable energy projects.

The guidelines list the following possible environmental impacts associated with the development of solar energy facilities.

**Table 9:** Potential environmental impacts of solar energy projects (Adapted from DEA, 2015) showing where they have been considered in this report.

Impact Description	Relevant Legislation	Applicability to this project
Visual Impact	NEMA	Specialist input attached in Annexure E8.
Noise Impact (CSP)	NEMA	Not applicable, as CSP is not considered as a technology alternative.
Land Use Transformation (fuel growth and production)	NEMA, NEMPAA, NHRA	Not Applicable to PV. Agricultural specialist input however attached in Annexure E4
Impacts on Cultural Heritage	NEMA, NHRA	Heritage impact assessment attached in Annexure E4, and E6.
Impacts on Biodiversity	NEMA, NEMBA, NEMPAA, NFA	Biodiversity specialist input attached in Annexure E1 and E2 (Terrestrial Biodiversity and Aquatic Biodiversity)
Impacts on Water Resources	NEMA, NEMICMA, NWA, WSA	The project will obtain water directly from the local municipality. A freshwater ecologist has assessed the potential impacts on freshwater resources (Annexure E2).
Hazardous Waste Generation (CSP and PV)	NEMA, NEMWA, HAS	The EMPr makes provision for damaged and defunct PV infrastructure for dismantling and re-use.
Electromagnetic Interference	NEMA	The nearest SKA station has been identified as SKA 004, at more than 500 km from the proposed Doornhoek 1 PV.  SKA have been given an opportunity to provide comment in this regard.
Aircraft Interference	NEMA, MSA	The SA CAA have been automatically registered as an interested and affected party on this environmental process. There are no airports nor landing strips in the vicinity of the proposed site.
Loss of Agricultural Land	SALA	Agricultural specialist input is attached in Annexure E4
Sterilisation of mineral resources	MPRDA	The Department of Mineral Resources has been registered as an I&AP on this environmental process.

Assuming an IPP project triggers the need for BA or S&EIR under the EIA regulations (which in this case is a Basic Assessment), included in the assessment process is the preparation of an environmental management programme (EMPr). Project-specific measures designed to mitigate negative impacts and enhance positive impacts should be informed by good industry practice and are to be included in the EMPr. Potential mitigation measures for solar energy projects include but are not limited to:



- Conduct pre-disturbance surveys as appropriate to assess the presence of sensitive areas, fauna, flora and sensitive habitats;
- Plan visual impact reduction measures such as natural (vegetation and topography) and engineered (berms, fences, and shades, etc.) screens and buffers;
- Utilise existing roads and servitudes as much as possible to minimise project footprint;
- Site projects to avoid construction too near pristine natural areas and communities;
- Locate developments away from important habitat for faunal species, particularly species which are threatened or have restricted ranges, and are collision-prone or vulnerable to disturbance, displacement and/or habitat loss;
- Fence sites as appropriate to ensure safe restricted access;
- Ensure dust abatement measures are in place during and post construction;
- Develop and implement a storm water management plan;
- Develop and implement waste management plan; and
- Re-vegetation with appropriate indigenous species to prevent dust and erosion, as well as establishment of alien species.

The recommendations of these guidelines have been explicitly considered in this scoping process and where necessary, additional specialist input has been obtained. Please see section 6 of this BAR for a full assessment of impacts.

### 3.4.15 Sustainability Imperative

The norm implicit to our environmental law is the notion of sustainable development (“SD”). SD and sustainable use and exploitation of natural resources are at the core of the protection of the environment. SD is generally accepted to mean development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. The evolving elements of the concept of SD *inter alia* include the right to develop; the pursuit of equity in the use and allocation of natural resources (the principle of intra-generational equity) and the need to preserve natural resources for the benefit of present and future generations. Economic development, social development and the protection of the environment are considered the pillars of SD (the triple bottom line).

“Man-land relationships require a holistic perspective, an ability to appreciate the many aspects that make up the real problems. Sustainable planning has to confront the physical, social, environmental and economic challenges and conflicting aspirations of local communities. The imperative of sustainable planning translates into notions of striking a balance between the many competing interests in the ecological, economic and social fields in a planned manner. The ‘triple bottom line’ objectives of sustainable planning and development should be understood in terms of economic efficiency (employment and economic growth), social equity (human needs) and ecological integrity (ecological capital).”

As was pointed out by the Constitutional Court, SD does not require the cessation of socio-economic development but seeks to regulate the manner in which it takes place. The idea that developmental and environmental protection must be reconciled is central to the concept of SD - it implies the accommodation, reconciliation and (in some instances) integration between economic development, social development and environmental protection. It is regarded as providing a “conceptual bridge” between the right to social and economic development, and the need to protect the environment.

Our Constitutional Court has pointed out that the requirement that environmental authorities must place people and their needs at the forefront of their concern so that environmental management can serve their developmental, cultural and social interests, can be achieved if a development is sustainable. “*The very idea of sustainability implies continuity. It reflects the concern for social and developmental equity*”

*between generations, a concern that must logically be extended to equity within each generation. This concern is reflected in the principles of inter-generational and intra-generational equity which are embodied in both section 24 of the Constitution and the principles of environmental management contained in NEMA.” [Emphasis added.]*

In terms of NEMA sustainable development requires the integration of the relevant factors, the purpose of which is *to ensure that development serves present and future generations.*<sup>30</sup>

It is believed that the proposed up to 115MW Doornhoek 1 PV supports the notion of sustainable development by presenting a reasonable and feasible alternative to the existing vacant land use type, which has limited agricultural potential due the lack of water and infrastructure.

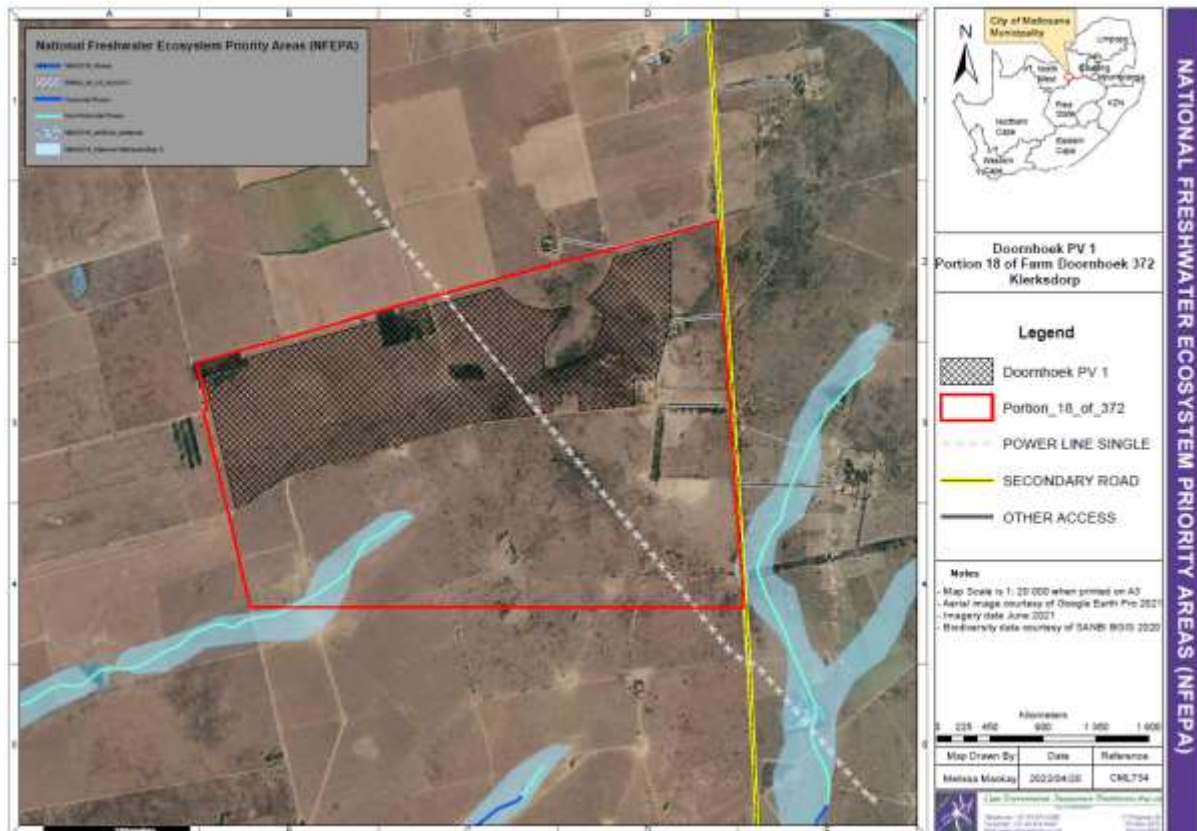
Furthermore, the proposed alternative energy project (reliant on a natural renewable resource – solar energy) is in line with the national and global goal of reducing reliance on fossil fuels, thereby providing long-term benefits to future generations in a sustainable manner.

### **3.4.16 National Freshwater Ecosystem Priority Area Status**

The National Freshwater Ecosystem Priority Areas (NFEPA) database forms part of a comprehensive approach to the sustainable and equitable development of South Africa’s scarce water resources. This database guides how many rivers, wetlands and estuaries, and which ones, should remain in a natural or near-natural condition to support the water resource protection goals of the National Water Act (Act 36 of 1998). This directly applies to the National Water Act, which feeds into Catchment Management Strategies, water resource classification, reserve determination, and the setting and monitoring of resource quality objectives (Nel *et al.*, 2011). The NFEPA’s are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act’s biodiversity goals (NEM:BA) (Act 10 of 2004), informing both the listing of threatened freshwater ecosystems and the process of bioregional planning provided for by this Act (Nel *et al.*, 2011). No FEPA rivers nor wetlands are within the PV Development Footprint.

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<sup>30</sup> Refer to definition of “sustainable development” in section 1 of NEMA.



**Figure 32:** Doornhoek 1 PV in relation to the National Freshwater Ecosystem Priority Areas.

### 3.4.17 DFFE Screening Tool and Protocols

A screening tool report was generated for the proposed Doornhoek 1 PV and is attached in Appendix I. The outcomes of the various environmental theme’s sensitivity as well as the level of study required by the protocols, are summarised in the table below.

**Table 10:** Sensitivity of the environmental themes and studies to be undertake in terms of these sensitivities.

Environmental Theme	Sensitivity	Required investigation	Discussion / Compliance
Agriculture Theme	High	Agricultural Impact Assessment	This High theme rating was disputed by the agricultural specialist who confirmed the whole site to be medium, See Annexure E4
Animal Species Theme	Medium	Animal Species compliance statement	This forms part of the Terrestrial Biodiversity Impact Assessment attached in Annexure E1.
Aquatic Biodiversity Theme	Low	Aquatic Compliance Statement	An Aquatic Compliance Statement is attached in Annexure E2.
Archaeological and Cultural Heritage Theme	Low	Heritage Compliance Statement.	Notwithstanding the low theme sensitivity, a Heritage Impact Assessment has been undertaken and is attached in Annexure E5 and 6
Civil Aviation (Solar PV) Theme	Medium	Compliance Statement	The South African Civil Aviation Authority will be provided an opportunity to

Environmental Theme	Sensitivity	Required investigation	Discussion / Compliance
			comment in this regard. The applicant will also apply for an obstacle certificate from CAA.
Landscape (Solar) Theme	Very High	Visual and Landscape Impact Assessment	A Visual Impact Assessment has been undertaken and is attached in appendix E7.
Plant Species Theme	Medium	Compliance Statement	This forms part of the Terrestrial Biodiversity Impact Assessment attached in Annexure E1.
RFI Theme	Medium	Compliance Statement	The South African Square Kilometre Array SKA-SA and SARA0 will be requested to provide professional comment in this regard.
Terrestrial Biodiversity Theme	Very High	Terrestrial Biodiversity Impact Assessment	The terrestrial biodiversity assessment is attached in annexure E1.

The table below reflects the specialist studies recommended in the DEA Screening tool and whether they will be included in the Draft EIR.

**Table 11:** Specialist Studies recommended in the DEA Screening Tool.

Study Recommended	Discussion
Agricultural Impact Assessment	Has been undertaken. See Annexure 4 of this BAR
Landscape/Visual Impact Assessment	Has been undertaken. See Annexure E7 of this BAR
Archaeological and Cultural Heritage Impact Assessment	Has been undertaken. See Annexures E5 of this BAR
Palaeontology Impact Assessment	Has been undertaken. See Annexure E6 of this BAR
Terrestrial Biodiversity Impact Assessment	Has been undertaken. See Annexure E1 of this BAR
Aquatic Biodiversity Impact Assessment	Has been undertaken. See Annexure 2 of this BAR
Avian Impact Assessment	Has been undertaken. See Annexure E3 of this BAR
Civil Aviation Assessment	Has not been undertaken – The closest airstrip was identified as the Klerksdorp Airfield situated approximately 17 km from the Site. The South Avian Civil Aviation Authority will be given an opportunity to comment on this Basic Assessment Process. The applicant will submit an obstacle application (Part 30-27) to the South African Civil Aviation Authority.
Defence Assessment	Has Not been undertaken – the South African National Defence Force will be provided with an opportunity to comment on this Basic Assessment Process.
RFI Assessment	Has not been undertaken – The Doornhoek 1 PV facility is not within the Geographic Advantage Area, as it is situated outside of the Northern Cape. It was furthermore found to be situated more than 580km from the closest SKA station (SKA004).  The South African SKA Project Office and the South African Radio Astronomy Observatory (SARA0) have been registered as a key stakeholder on this environmental

	process and have been requested to provide input in terms of the Astronomy Geographic Advantage Act and potential impact to SKA.
Geotechnical Assessment	Has not been undertaken – The Council for Geoscience will be approached for comment in this regard.
Socio-Economic Assessment	Has been undertaken. See Annexure E8 of this BAR
Plant Species Assessment	Has been undertaken. See Annexure E1 of this BAR
Animal Species Assessment	Has been undertaken. See Annexure E1 of this BAR

## 4. PLANNING CONTEXT

A planning statement prepared by Townscape Planning Solutions is attached in Appendix E13.

The following planning statement outlines the details of the planning process, as well as the responsibilities of the land use planning specialist, specifically pertaining to the projects envisioned on the abovementioned property:

- The property is located within the City of Matlosana Municipality and any process of land use change will be subject to the Scheme Regulations and Municipal Planning By-laws of the said Municipality.
- The property is currently zoned as “Agricultural” in terms of the Klerksdorp Land Use Management Scheme, 2005. In order to allow for the development of a Renewable Energy Facility thereon, application for the amendment of the scheme by the rezoning of the applicable portion of the property from “Agricultural” to “Special” will have to be launched.
- The application will be compiled and submitted in terms of the Spatial Planning and Land Use Management Act, Act 16 of 2013 (SPLUMA), as well as the City of Matlosana Spatial Planning and Land Use Management By-law, 2016.
- SPLUMA retracts the Removal of Restrictions Act, Act 84 of 1967, and any title deed restrictions on the property may be removed at the discretion of the local authority in terms of SPLUMA.

The town planning process may therefore be summarized in the following table:

Task	Detail	Outcome
1	Pre application information gathering (Application requirements)	All the documentation is available and signed off by client and other professionals.
2	Compilation of applications	Application ready for submission
3	Submission of applications	City of Matlosana Municipality confirms that a complete and compliant application has been submitted
4	Statutory requirements of the applications	Successful in complying with all requirements in terms of Section 62(1) of the City of Matlosana Spatial Planning and Land Use Management By-law, 2016.
5	Follow the application through City of Matlosana Municipality	To ensure that all relevant departments commended on application.
6	Approval application	That positive approvals are granted
7	Complying to conditions in approval document	To ensure that the client knows of any limitations on the Conditions of Approval (PCP) and extent of timeframes allowed to proclaim the amendment scheme.

## 5. SITE DESCRIPTION AND ATTRIBUTES

The following sections provide a description of the natural environment, built environment and social and economic context of Portion 18 of the Farm Doornhoek No. 372-IP, with particular focus on the site location for the proposed Doornhoek 1 PV.

### 5.1 LOCATION & BUILT ENVIRONMENT

The target property, Portion 18 of the Farm Doornhoek No. 372-IP, is located in the Dr Kenneth Kaunda District of the North West Province, within the jurisdiction area of the City of Matlosana Local Municipality. The property is approximately 608.57 hectares in size and is located North of Klerksdorp.

The proposed Doornhoek 1 PV site is accessed from the existing district road between Klerksdorp and Ventersdorp.

According to the heritage specialist, structures on site include a large historical farmstead with associated out buildings covering an area of approximately 100 x 100m. The farmstead was indicated to be more than 100 years old by the owner. Most of the structures are fairly intact although degraded and were built from quarried stone blocks and mortar. Certain portions are still in use for various farming activities. The proposed footprint of Doornhoek 1 PV facility avoids this historical farmstead.

Other structures include:

- A Small stone packed kraal with prominent walls. The kraal is about 10 x 5m in size and is situated on a small rocky hill.
- Remnants of a packed stone foundation that is mostly buried under the thick grass cover. Only a small section of the packed stone foundation is still visible.
- Remnants of a packed stone foundation or structure situated on the corner of a fence line. Some features at this location may be the remnants of packed stone graves.

These structures were confirmed to be outside of the footprint of Doornhoek 1 PV facility.



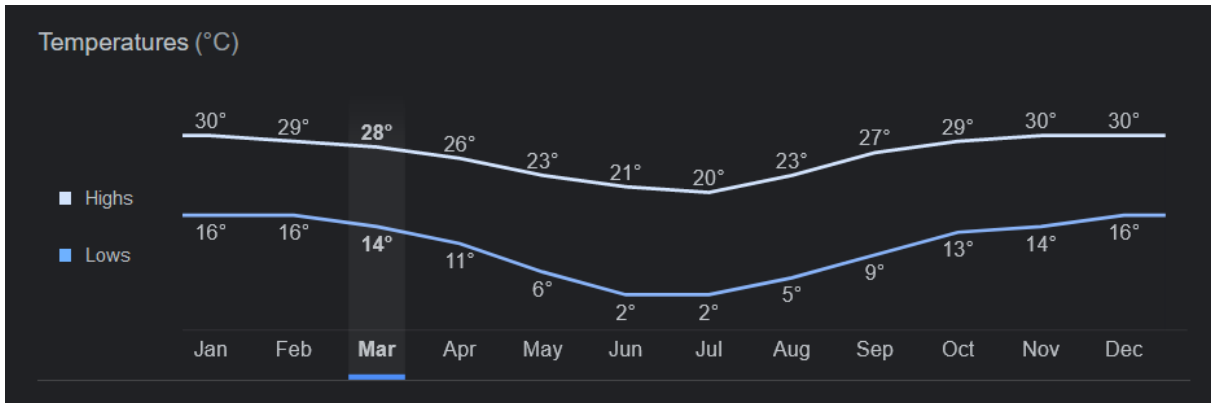
**Figure 33:** Showing existing structures on the property, but outside of the project footprint (van der Walt, 2022)

### 5.2 GEOLOGY & SOILS

According to the Agricultural specialist, the underlying geology is Ventersdorp lava and Witwatersrand quartzite, shale and slate. A single land type, namely Bc23 covers the site. This land type is dominated by shallow soils on underlying rock and rock outcrops cover 22% of the land type. The field investigation confirmed the dominance of shallow soils on underlying rock.

### 5.3 CLIMATE

The area is characterised as having a moderate to cold semi-arid climate with maximum temperatures occurring in December and January and minimum temperatures occurring in June and July.



**Figure 34:** Average monthly temperatures in the project area.

The area receives a mean annual average rainfall of approximately 601mm. Precipitation is highest in January and lowest in June and August.



**Figure 35:** Average Monthly Rainfall in the project area.

### 5.4 TOPOGRAPHY

According to the Visual Specialist, Appendix E7, the regional topography is dominated by the Skoonspruit River Valley which trends in a north-south direction. The Project area is located on the south-west facing slopes of this valley at an average elevation of 1390mamsl.

Within the immediate regional topographic context, the minimum elevation is 1300mamsl within the Skoonspruit river drainage below Klerksdorp – roughly 12km south of the site. From here, the topography rises relatively consistently in a northerly direction towards the project area, which is located slightly below a local highpoint (1440mamsl). Regional highpoints of over 15000mamsl are located roughly 6km to the northeast and 12km to the west of the project area.

In terms of site topography, the project area includes a wide spur which trends in a northerly and easterly direction towards the local highpoint consisting of a small hill roughly 1km to the northeast.



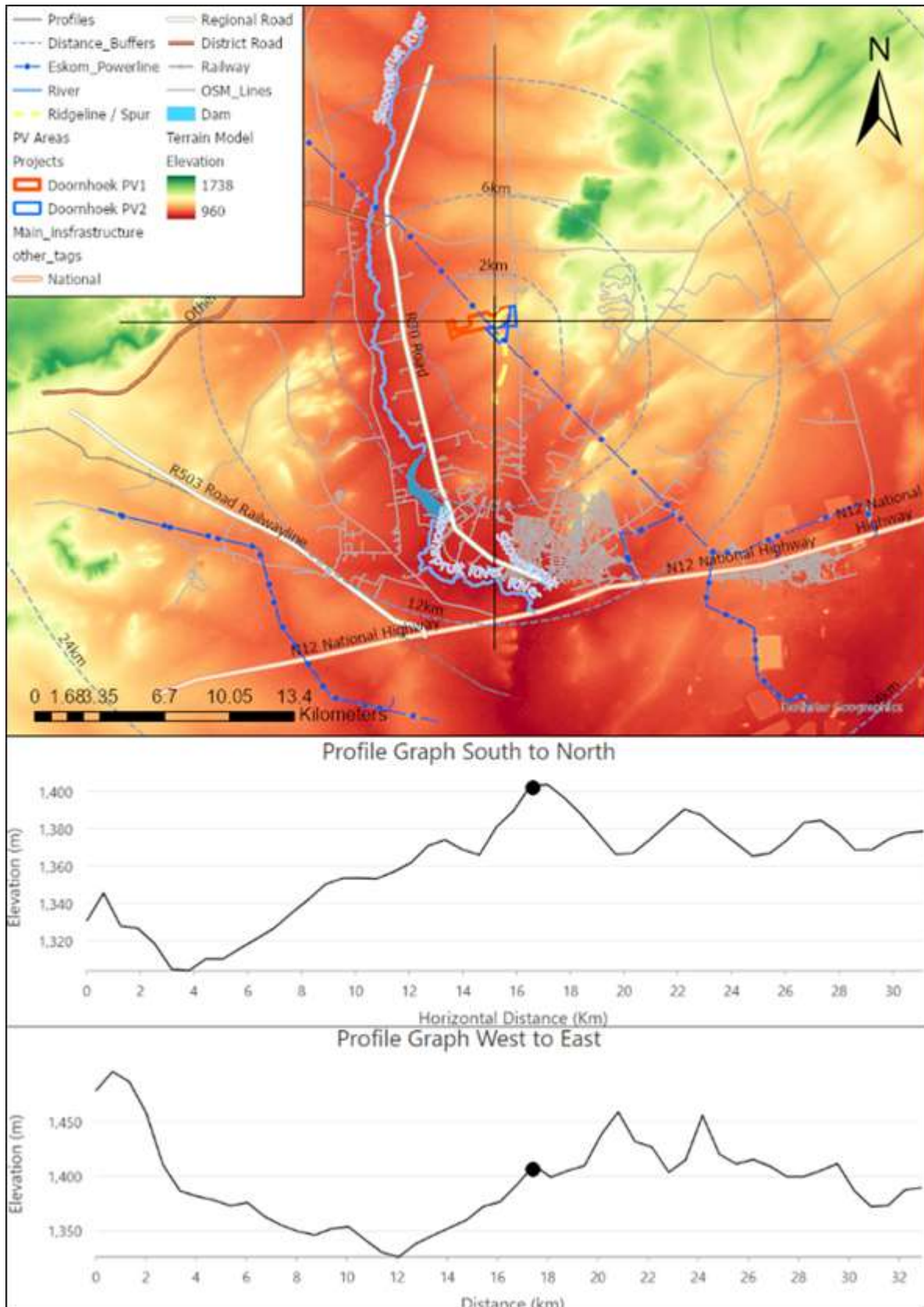


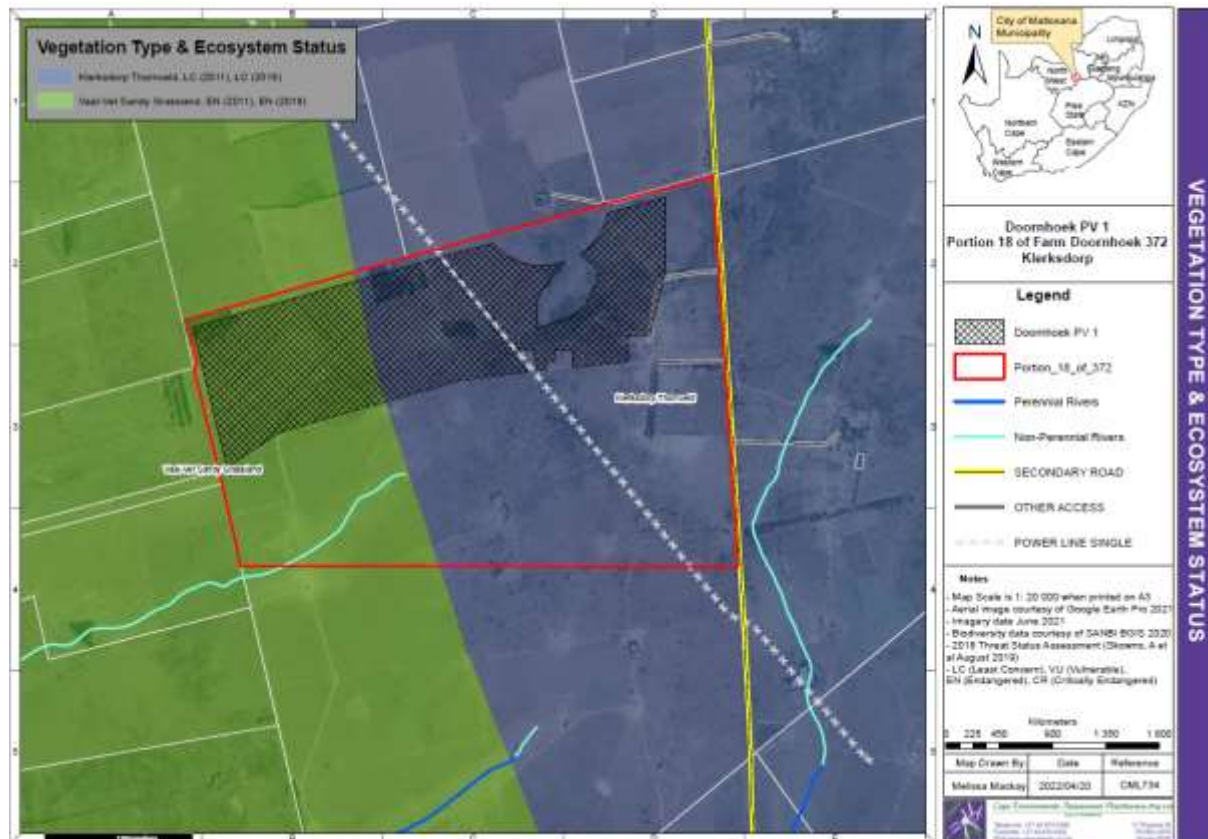
Figure 36: Regional elevation and East to West and North to South profiles map (Stead, 2022)

## 5.5 BOTANICAL COMPOSITION OF THE SITE

Biodiversity Africa undertook a Botanical Impact Assessment which formed part of larger Terrestrial Ecosystems Impact Assessment. Please refer to the Terrestrial Biodiversity Impact Assessment attached in **Annexure E1** from which the following has been drawn.

### 5.5.1 Broad-Scale Vegetation Patterns

Site is situated in the Klerksdorp Thornveld and the Vaal Vet Sandy Grassveld vegetation types as per the image below.



**Figure 37:** Broad Scale Vegetation Types Associated with Doornhoek 1 PV.

#### 5.5.1.1 Gh 10 Vaal-Vet Sandy Grassland

**Distribution:** In South Africa the Vaal-Vet Sandy Grassland is present in the North-West Province and Free State Province. Vaal-Vet Sandy Grassland ranges from south of Lichtenburg and Ventersdorp to Klerksdorp, Leeudoringstad, Bothaville and to the Brandfort areas north of Bloemfontein. Altitude ranges from 1 220 – 1560 m for the entire vegetation type (Mucina & Rutherford 2006).

**Vegetation and landscape features:** Plains-dominated landscape with some scattered, slightly undulating plains and hills. Mainly low-tussock grasslands with an abundant karroid element are present. Dominance of *Themeda triandra* is an important feature of this vegetation unit. Locally low cover of *Themeda triandra* and the associated increase in *Elionurus muticus*, *Cymbopogon pospischilii* and *Aristida congesta* is attributed to heavy grazing and/or erratic rainfall. Geology and soils: Aeolian and colluvial sand overlying sandstone, mudstone, and shale of the Karoo Supergroup (mostly the Ecca group) as well as older Ventersdorp Supergroup and basement gneiss in the north (Mucina & Rutherford 2006).

**Climate:** Warm-temperate, summer-rainfall climate, with overall mean annual precipitation of 530 mm. High summer temperatures. Severe frost (37 days per year on average) occurs in winter (Mucina & Rutherford 2006).

**Important taxa** of the Vaal-Vet Sandy Grassland listed by Mucina & Rutherford (2006): Graminoids: *Antheophora pubescens*, *Aristida congesta*, *Chloris virgata*, *Cymbopogon caesius*, *Cynodon dactylon*, *Digitaria argyrograpta*, *Elionurus muticus*, *Eragrostis chloromelas*, *Eragrostis lehmanniana*, *Eragrostis plana*, *Eragrostis trichophora*, *Heteropogon contortus*, *Panicum gilvum*, *Setaria sphacelata*, *Themeda triandra*, *Tragus berteronianus*, *Brachiaria serrata*, *Cymbopogon pospischilii*, *Digitaria eriantha*, *Eragrostis curvula*, *Eragrostis obtusa*, *Eragrostis superba*, *Panicum coloratum*, *Pogonarthria squarrosa*, *Trichoneura grandiglumis*, *Triraphis andropogonoides*. Herbs: *Stachys spathulata*, *Barleria macrostegia*, *Berkheya onopordifolia* var. *onopordifolia*, *Chamaesyce inaequilatera*, *Geigeria aspera* var. *aspera*, *Helichrysum caespitium*, *Hermannia depressa*, *Hibiscus pusillus*, *Monsonia burkeana*, *Rhynchosia adenodes*, *Selago densiflora*, *Vernonia oligocephala*. Geophytic Herbs: *Bulbine narcissifolia*, *Ledebouria marginata*. Succulent Herb: *Tripteris aghillana* var. *integrifolia*. Low shrubs: *Felicia muricata*, *Pentzia globosa*, *Anthospermum rigidum* subsp. *pumilum*, *Helichrysum dregeanum*, *Helichrysum paronychioides*, *Ziziphus zeyheriana*.

#### 5.5.1.2 Klerksdorp Thornveld (Gh 13)

**Distribution:** In South Africa the Klerksdorp Thornveld is present in the North West Province in two sets of patches, one in the Wolmaransstad, Ottosdal and Hartbeesfontein region, and the other from the Botsalano Game Park north of Mafikeng in the vicinity of Madibogo in the south. Altitude for the entire vegetation type is 1260 – 1580 m (Mucina & Rutherford 2006).

**Vegetation and landscape features:** Plains or slightly irregular undulating plains with open to dense *Acacia* karroo bush clumps in dry grasslands (Mucina & Rutherford 2006). Geology and soils: Shale, slate and quartzite of the Pretoria Group with interlaid diabase sills and Hekpoort lava supporting relatively shallow and rocky soils (Glenrosa and Mispah forms). Equally represented are eutrophic red plinthic soils (Hutton form) derived mainly from a thick succession of volcanics and sediments of the Ventersdorp Supergroup (Mucina & Rutherford 2006).

**Climate:** Warm-temperate, summer-rainfall region, with overall mean annual precipitation of 533 mm. Summer temperatures are high. Frequent frosts occur in winter (Mucina & Rutherford 2006).

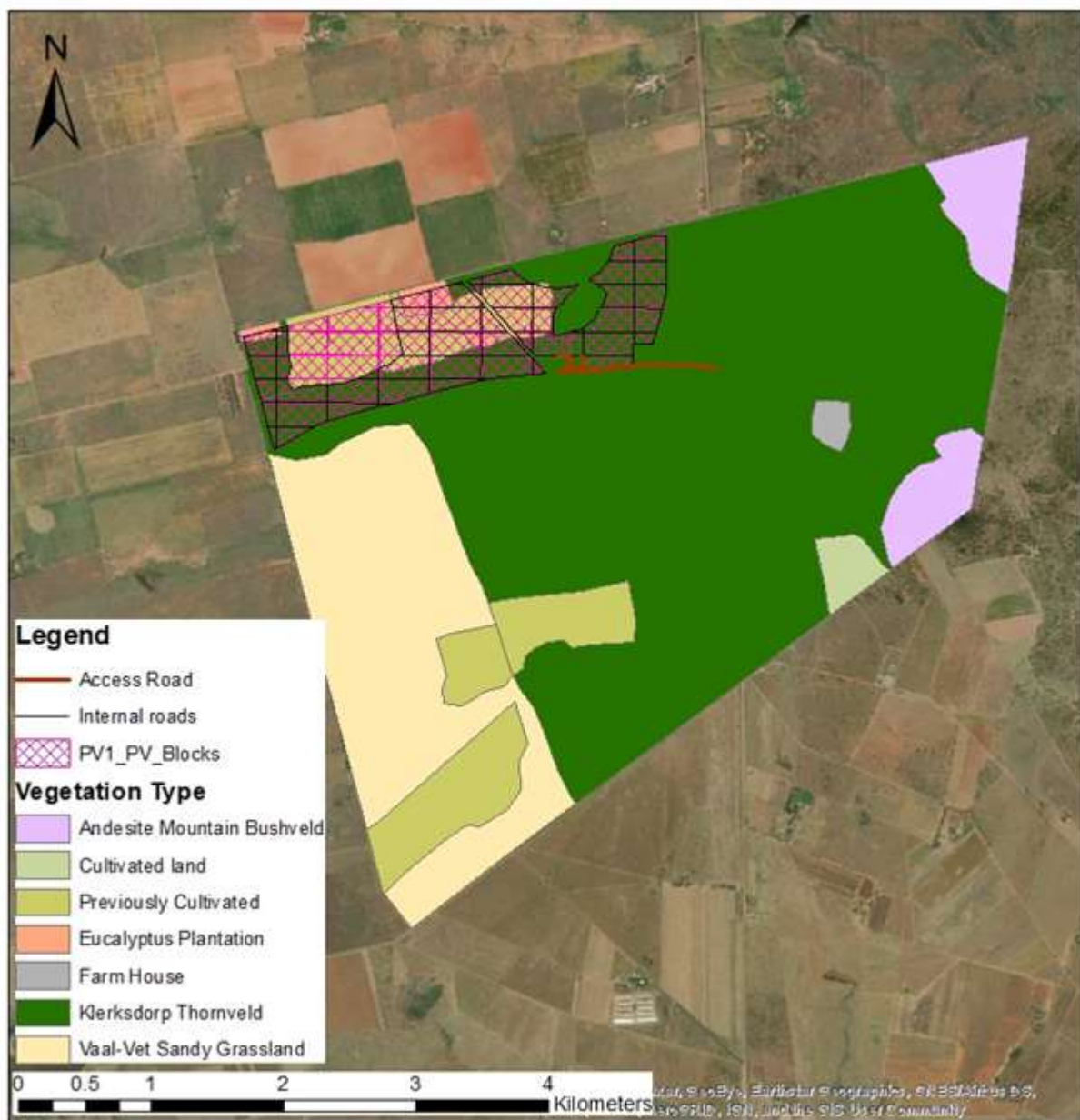
**Important taxa** of the Klerksdorp Thornveld listed by Mucina & Rutherford (2006): Small Trees: *Acacia* karroo, *Acacia caffra*, *Celtis africana*, *Searsia lancea*, *Ziziphus mucronata*. Tall Shrubs: *Acacia hebeclada*, *Diospyros lycioides* subsp. *lycioides*, *Ehretia rigida*, *Grewia flava*, *Gymnosporia buxifolia*, *Searsia pyroides*, *Tarchonanthus camphoratus*. Woody Climber: *Asparagus africanus*. Low Shrubs: *Asparagus larcinus*, *Asparagus suaveolens*, *Felicia muricata*, *Anthospermum hispidulum*, *Anthospermum rigidum* subsp. *pumilum*, *Aptosimum elongatum*, *Gnidia capitata*, *Gomphocarpus fruticosus* subsp. *fruticosus*, *Helichrysum dregeanum*, *Leucas capensis*, *Pavonia burchellii*, *Pentzia globosa*, *Solanum supinum* var. *supinum*, *Triumfetta sonderi*, *Ziziphus zeyheriana*. Graminoids: *Aristida congesta*, *Cynodon dactylon*, *Eragrostis lehmanniana*, *Eragrostis trichophora*, *Microcloa caffra*, *Panicum coloratum*, *Sporobolus fimbriatus*, *Themeda triandra*, *Andropogon shirensis*, *Antheophora pubescens*, *Aristida junciformis* subsp. *galpinii*, *Aristida stipitata* subsp. *graciliflora*, *Brachiaria nigropedata*, *Brachiaria serrata*, *Bulbostylis burchellii*, *Cymbopogon pospischilii*, *Digitaria eriantha*, *Diheteropogon amplexans*, *Elionurus muticus*, *Eragrostis curvula*, *Eragrostis obtusa*, *Eragrostis racemosa*, *Eragrostis superba*, *Eustachys paspaloides*, *Heteropogon contortus*, *Setaria sphacelata*, *Sporobolus africanus*, *Tragus berteronianus*, *Trichoneura grandiglumis*, *Triraphis andropogonoides*. Herbs: *Acalypha angustata*, *Acanthospermum australe*, *Berkheya onopordifolia* var. *onopordifolia*, *Berkheya setifera*, *Blepharis integrifolia* var. *clarkei*, *Chamaesyce inaequilatera*, *Chascanum adenostachyum*, *Dicoma macrocephala*, *Helichrysum nudifolium* var. *nudifolium*, *Hermannia lancifolia*, *Hibiscus pusillus*, *Justicia anagalloides*, *Lippia scaberrima*, *Nidorella microcephala*, *Nolletia ciliaris*, *Pollichia campestris*, *Rhynchosia adenodes*, *Salvia radula*, *Selago densiflora*, *Teucrium trifidum*, *Tolpis*

capensis. Geophytic Herbs: *Bulbine narcissifolia*, *Ledebouria marginata*, *Ornithogalum tenuifolium* subsp. *tenuifolium*, *Raphionacme hirsuta*. Herbaceous Climber: *Rhynchosia venulosa*.

### 5.5.2 Habitats & Plant Communities

The ecological specialist refined the broad scale vegetation map and identified the following habitat types during the study site.

- Andesite Mountain Bushveld,
- Cultivated Land,
- Previously Cultivated Land,
- Eucalyptus Plantation,
- Klerksdorp Thornveld, and
- Vaal Vet Sandy Grassland.



**Figure 38:** Habitat types present within the study site (Biodiversity Africa, 2022)

Thirty-five species were recorded by the specialist within the project site and area of influence. Of these thirty-five species, one is an alien invasive species, three are listed as a Schedule 4 species and thirty-two are listed as Least Concern on the South African Red Data List.

**Table 12:** Species recorded on site and their conservation status

Family	Scientific name	Red List	PNCO
HYACINTHACEAE	<i>Albuca setosa</i>	Least Concern	-
ASPHODELACEAE	<i>Aloe greatheadii</i>	Least Concern	Schedule 4
AMARYLLIDACEAE	<i>Ammocharis coranica</i>	Least Concern	Schedule 4
SCROPHULARIACEAE	<i>Aptosimum elongatum</i>	Least Concern	-
APOCYNACEAE	<i>Asclepias stellifera</i>	Least Concern	-
ASPARAGACEAE	<i>Asparagus sp.</i>	Least Concern	-
AMARYLLIDACEAE	<i>Boophone disticha</i>	Least Concern	Schedule 4
ASPHODELACEAE	<i>Bulbine cf narcissifolia</i>	Least Concern	-
ASPHODELACEAE	<i>Bulbine favosa</i>	Least Concern	-
APOCYNACEAE	<i>Carissa bispinosa</i>	Least Concern	-
VERBENACEAE	<i>Chascanum hederaceum</i>	Least Concern	-
BORAGINACEAE	<i>Ehretia rigida</i>	Least Concern	-
POACEAE	<i>Eragrostis superba</i>	Least Concern	-
EBENACEAE	<i>Euclea crispa</i>	Least Concern	-
MALVACEAE	<i>Grewia flava</i>	Least Concern	-
HYPOXIDACEAE	<i>Hypoxis hemerocallidea</i>	Least Concern	-
THYMELAEACEAE	<i>Lasiosiphon capitatus</i>	Least Concern	-
HYACINTHACEAE	<i>Ledebouria inquinata</i>	Least Concern	-
HYACINTHACEAE	<i>Ledebouria luteola</i>	Least Concern	-
OLEACEAE	<i>Olea europaea subsp. Africana</i>	Least Concern	-
CACTACEAE	<i>Opuntia ficus-indica</i>	Category 1b invasive	-
PLANTAGINACEAE	<i>Plantago lanceolata</i>	Least Concern	-
ANACARDIACEAE	<i>Searsia cf leptodictya</i>	Least Concern	-
ANACARDIACEAE	<i>Searsia lancea</i>	Least Concern	-
ANACARDIACEAE	<i>Searsia pyroides</i>	Least Concern	-
ASTERACEAE	<i>Senecio inaequidens</i>	Least Concern	-
FABACEAE	<i>Senegalia hereroensis</i>	Least Concern	-
POACEAE	<i>Setaria sphacelata</i>	Not Evaluated	-
ASTERACEAE	<i>Stoebe plumosum</i>	Least Concern	-
POACEAE	<i>Themeda triandra</i>	Least Concern	-
FABACEAE	<i>Vachellia karroo</i>	Least Concern	-
RHAMNACEAE	<i>Ziziphus zeyheriana</i>	Least Concern	-
POACEAE	<i>Cynadon dactylon</i>	Least Concern	-
POACEAE	<i>Aristida sp.</i>	Least Concern	-
POACEAE	<i>Cymbopogon sp.</i>	Least Concern	-



**Figure 39:** Vaal-vet Grassland found on the property but outside of the project footprint (Biodiversity Africa, 2022)



**Figure 40:** Klerksdorp Thornveld found within the project site (The Biodiversity Company, 2022)

### 5.5.3 Species of conservation concern.

One species of conservation concern (Sensitive species 1261<sup>31</sup>) was listed by the DFFE screening report and one near threatened (NT) species (*Pearsonia bracteata*) was listed on the POSA website as occurring within the area.

**Table 13:** Species of conservation concern and the likelihood of occurrence on site (Biodiversity Africa, 2022)

Species	Conservation Status	Likelihood of Occurrence	Comment
<i>Pearsonia bracteata</i>	Near Threatened	Moderate	This species is known from 8-14 locations between Wolkberg and Pretoria to Klerksdorp and is associated with plateau grassland (von Staden, 2011). Available habitat on site is degraded and heavily grazed and as such the likelihood of occurrence of this species is moderate.
Sensitive species 1261	Vulnerable	Moderate	This species occurs from Lichtenberg to Wolmaransstad and Sasolburg and is associated with sandy loam soils in thornveld and Themeda grassland. Available habitat on site is degraded and heavily grazed and as such the likelihood of occurrence of this species is moderate.

## 5.6 TERRESTRIAL FAUNAL COMPONENT OF THE SITE

Biodiversity Africa undertook an Animal Species Assessment which formed part of larger Terrestrial Biodiversity Impact Assessment. Please refer to the Terrestrial Biodiversity Impact Assessment attached in **Annexure E1** from which the following has been drawn.

### 5.6.1 Amphibians

The project area is included in the distribution of 18 amphibian species of which 14 have been confirmed within the same QDS as the project area.

**Table 14:** Amphibian Species with a distribution that includes the project area (The Biodiversity Company, 2022)

Family	Scientific name	Common name	Red list category
Bufonidae	<i>Schismaderma carens</i>	Red Toad	Least Concern
Bufonidae	<i>Sclerophrys capensis</i>	Raucous Toad	Least Concern
Bufonidae	<i>Sclerophrys garmani</i>	Olive Toad	Least Concern (IUCN, 2016)
Bufonidae	<i>Sclerophrys gutturalis</i>	Guttural Toad	Least Concern (IUCN, 2016)
Bufonidae	<i>Sclerophrys poweri</i>	Power's Toad	Least Concern
Hyperoliidae	<i>Kassina senegalensis</i>	Bubbling Kassina	Least Concern
Microhylidae	<i>Phrynomantis bifasciatus</i>	Banded Rubber Frog	Least Concern
Phrynobatrachidae	<i>Phrynobatrachus natalensis</i>	Snoring Puddle Frog	Least Concern (IUCN, 2013)
Pipidae	<i>Xenopus laevis</i>	Common Platanna	Least Concern
Pyxicephalidae	<i>Amietia delalandii</i>	Delalande's River Frog	Least Concern (2017)

<sup>31</sup> To protect the identity of species that are susceptible to collection by poachers, best practice guidelines require that these species are referred to by their species number denoted by SANBI.

Family	Scientific name	Common name	Red list category
Pyxicephalidae	<i>Amietia fuscigula</i>	Cape River Frog	Least Concern (2017)
Pyxicephalidae	<i>Cacosternum boettgeri</i>	Common Caco	Least Concern (2013)
Pyxicephalidae	<i>Pyxicephalus adspersus</i>	Giant Bull Frog	Near Threatened
Pyxicephalidae	<i>Strongylopus fasciatus</i>	Striped Stream Frog	Least Concern

No amphibians were observed during the field survey.

One species of conservation concern has a distribution which includes the project area, namely, the Giant Bull Frog (*Pyxicephalus adspersus*) which was listed as regionally Near-Threatened, but has since been downgraded to Least Concern by the IUCN SSC Amphibian Specialist Group.

## 5.6.2 Reptiles

The North West Province hosts 57 reptile species of which one is listed as vulnerable and three are endemic. Approximately 53 of these reptile species have a distribution range that includes the project area of which 32 have been observed within the same QDS as the project area.

**Table 15:** Reptile Species with a distribution that includes the project area (The Biodiversity Company, 2022)

Family	Scientific name	Common name	Red list category
			(SARCA 2014)
<b>Lizards</b>			
Agamidae	<i>Agama aculeata distanti</i>	Distant's Ground Agama	Least Concern
Agamidae	<i>Agama atra</i>	Southern Rock Agama	Least Concern
Chamaeleonidae	<i>Chamaeleo dilepis</i>	Common Flap-neck Chameleon	Least Concern
Gekkonidae	<i>Hemidactylus mabouia</i>	Common Tropical House Gecko	Least Concern
Gekkonidae	<i>Lygodactylus capensis</i>	Common Dwarf Gecko	Least Concern
Gekkonidae	<i>Pachydactylus capensis</i>	Cape Gecko	Least Concern
Gerrhosauridae	<i>Gerrhosaurus flavigularis</i>	Yellow-throated Plated Lizard	Least Concern
Lacertidae	<i>Nucras holubi</i>	Holub's Sandveld Lizard	Least Concern
Scincidae	<i>Panaspis wahlbergii</i>	Wahlberg's Snake-eyed Skink	Least Concern
Scincidae	<i>Trachylepis capensis</i>	Cape Skink	Least Concern
Scincidae	<i>Trachylepis punctatissima</i>	Speckled Rock Skink	Least Concern
Scincidae	<i>Trachylepis varia sensu lato</i>	Common Variable Skink Complex	Least Concern
Varanidae	<i>Varanus albigularis albigularis</i>	Rock Monitor	Least Concern
Varanidae	<i>Varanus niloticus</i>	Water Monitor	Least Concern
<b>Snakes</b>			
Colubridae	<i>Crotaphopeltis hotamboeia</i>	Red-lipped Snake	Least Concern
Colubridae	<i>Dasypeltis scabra</i>	Rhombic Egg-eater	Least Concern
Cordylidae	<i>Cordylus vittifer</i>	Common Girdled Lizard	Least Concern
Elapidae	<i>Hemachatus haemachatus</i>	Rinkhals	Least Concern
Elapidae	<i>Naja nivea</i>	Cape Cobra	Least Concern
Lamprophiidae	<i>Boaedon capensis</i>	Brown House Snake	Least Concern
Lamprophiidae	<i>Lamprophis aurora</i>	Aurora House Snake	Least Concern
Lamprophiidae	<i>Lycophidion capense capense</i>	Cape Wolf Snake	Least Concern



Family	Scientific name	Common name	Red list category
			(SARCA 2014)
Lamprophiidae	<i>Psammophis brevirostris</i>	Short-snouted Grass Snake	Least Concern
Lamprophiidae	<i>Psammophylax tritaeniatus</i>	Striped Grass Snake	Least Concern
Lamprophiidae	<i>Pseudaspis cana</i>	Mole Snake	Least Concern
Typhlopidae	<i>Afrotyphlops bibronii</i>	Bibron's Blind Snake	Least Concern
Typhlopidae	<i>Rhinotyphlops lalandei</i>	Delalande's Beaked Blind Snake	Least Concern
Viperidae	<i>Bitis arietans arietans</i>	Puff Adder	Least Concern
Viperidae	<i>Causus rhombeatus</i>	Rhombic Night Adder	Least Concern
Tortoises and Terrapins			
Pelomedusidae	<i>Pelomedusa galeata</i>	South African Marsh Terrapin	Not evaluated
Testudinidae	<i>Kinixys lobatsiana</i>	Lobatse Hinged Tortoise	Least Concern
Testudinidae	<i>Stigmochelys pardalis</i>	Leopard Tortoise	Least Concern

No reptile species of conservation concern have a distribution range which includes the project area.

### 5.6.3 Mammals

The QDS within which the project area occurs has confirmed the historical occurrence of 65 mammal species of which 55 could occur within the project area, namely, nine antelope species, 18 carnivore species, two primate species, four hare species, nine rodent species and the Aardvark, Hyrax, shrew and hedgehog species. Mammal species recorded during the field survey include the Warthog (*Phacochoerus africanus*), South African Ground Squirrel (*Xerus inauris*), Yellow Mongoose (*Cynictis penicillate*), Meerkat (*Suricata suricatta*) and Steenbok.

**Table 16:** Mammal Species with a distribution that includes the project area (The Biodiversity Company, 2022)

Family	Scientific name	Common name	Red list category
Artiodactyla			
Bovidae	<i>Damaliscus pygargus phillipsi</i>	Blesbok	Least Concern
Bovidae	<i>Pelea capreolus</i>	Vaal Rhebok	Near Threatened
Bovidae	<i>Raphicerus campestris</i>	Steenbok	Least Concern
Bovidae	<i>Redunca arundinum</i>	Southern Reedbuck	Least Concern
Bovidae	<i>Redunca fulvorufula</i>	Mountain Reedbuck	Least Concern
Bovidae	<i>Sylvicapra grimmia</i>	Bush Duiker	Least Concern
Bovidae	<i>Taurotragus oryx</i>	Common Eland	Least Concern
Bovidae	<i>Tragelaphus scriptus</i>	Bushbuck	Least Concern
Bovidae	<i>Tragelaphus strepsiceros</i>	Greater Kudu	Least Concern
Suidae	<i>Phacochoerus africanus</i>	Common Warthog	Least Concern
Carnivores			
Canidae	<i>Canis mesomelas</i>	Black-backed Jackal	Least Concern
Canidae	<i>Vulpes chama</i>	Cape Fox	Least Concern
Felidae	<i>Caracal caracal</i>	Caracal	Least Concern
Felidae	<i>Leptailurus serval</i>	Serval	Near Threatened
Felidae	<i>Pantherus pardus</i>	Leopard	Vulnerable

Family	Scientific name	Common name	Red list category
Felidae	<i>Felis nigripes</i>	Black-footed Cat	Vulnerable
Herpestidae	<i>Atilax paludinosus</i>	Marsh Mongoose	Least Concern
Herpestidae	<i>Cynictis penicillata</i>	Yellow Mongoose	Least Concern
Herpestidae	<i>Herpestes sanguineus</i>	Slender Mongoose	Least Concern
Herpestidae	<i>Ichneumia albicauda</i>	White-tailed Mongoose	Least Concern
Herpestidae	<i>Suricata suricatta</i>	Meerkat	Least Concern
Hyaenidae	<i>Hyaena brunnea</i>	Brown Hyena	Near Threatened
Hyaenidae	<i>Proteles cristata</i>	Aardwolf	Least Concern
Mustelidae	<i>Aonyx capensis</i>	African Clawless Otter	Near Threatened
Mustelidae	<i>Hydructus maculicollis</i>	Spotted-necked Otter	Near Threatened
Viveridae	<i>Genetta maculata</i>	Common Large-spotted Genet	Least Concern
Viverridae	<i>Genetta genetta</i>	Common Genet	Least Concern
Viverridae	<i>Genetta tigrina</i>	Cape Genet (Cape Large-spotted Genet)	Least Concern
<b>Primates</b>			
Cercopithecidae	<i>Chlorocebus pygerythrus</i>	Vervet Monkey	Least Concern
Cercopithecidae	<i>Chlorocebus pygerythrus</i>	Vervet Monkey (subspecies pygerythrus)	Least Concern
Cercopithecidae	<i>Papio ursinus</i>	Chacma Baboon	Least Concern
<b>Lagomorph</b>			
Leporidae	<i>Lepus capensis</i>	Cape Hare	Least Concern
Leporidae	<i>Lepus saxatilis</i>	Scrub Hare	Least Concern
Leporidae	<i>Pronolagus randensis</i>	Jameson's Red Rock Hare	Least Concern
Pedetidae	<i>Pedetes capensis</i>	South African Spring Hare	Least Concern
<b>Rodents</b>			
Bathyergidae	<i>Cryptomys hottentotus</i>	Southern African Mole-rat	Least Concern
Hystriidae	<i>Hystrix africae australis</i>	Cape Porcupine	Least Concern
Muridae	<i>Aethomys namaquensis</i>	Namaqua Rock Mouse	Least Concern
Muridae	<i>Rhabdomys pumilio</i>	Xeric Four-striped Grass Rat	Least Concern
Sciuridae	<i>Paraxerus cepapi</i>	Smith's Bush Squirrel	Least Concern
Sciuridae	<i>Xerus inauris</i>	South African Ground Squirrel	Least Concern
Thryonomyidae	<i>Thryonomys swinderianus</i>	Greater Cane Rat	Least Concern
Muridae	<i>Otymys auratus</i>	Vlei Rat	Near Threatened
Nesomyidae	<i>Mystromys albicaudatus</i>	White-tailed Rat	Vulnerable
<b>Tubulidentata</b>			
Orycteropodidae	<i>Orycteropus afer</i>	Aardvark	Least Concern
<b>Hyracoidea</b>			
Procaviidae	<i>Procavia capensis</i>	Cape Rock Hyrax	Least Concern
<b>Eulipotyphla</b>			
Erinaceidae	<i>Atelerix frontalis</i>	Southern African Hedgehog	Near Threatened

Family	Scientific name	Common name	Red list category
Soricidae	<i>Myosorex varius</i>	Forest Shrew	Least Concern

Four vulnerable and seven near threatened mammal species have a distribution which includes the project area. Of these species, only three (Southern African Hedgehog, Grey Rhebok and Serval) have a high likelihood of occurrence within the project area of influence. Since the Serval is typically associated with watercourses and the rhebok with ridges, the likelihood that the project will have a direct impact on these species' habitat is low. The hedgehog prefers dense vegetation and rocky outcrops for nesting and foraging and as such the likelihood of it using the project site is low as neither of these habitat requirements are present.

### 5.7 AVIFAUNAL COMPONENT OF THE STUDY SITE

Mr Lukas Niemand of Pachnoda consulting undertook an Avifaunal Assessment for the proposed Doornhoek 1 PV. Please refer to the Avifaunal Impact Assessment attached in **Annexure E3** from which the following general descriptions of the avifauna on site has been drawn.

The avifaunal specialist identified the following avifaunal habitat types across the study site:

- Open savannoid grassland with bush clump mosaics:
- Short Klerksdorp Thornveld
- Dense bushveld on outcrops
- Secondary (regenerating) grassland on old agricultural land/pastures
- Dense short Grewia-Vachellia shrubveld
- Artificial livestock watering points
- Transformed areas and Eucalyptus plantations.

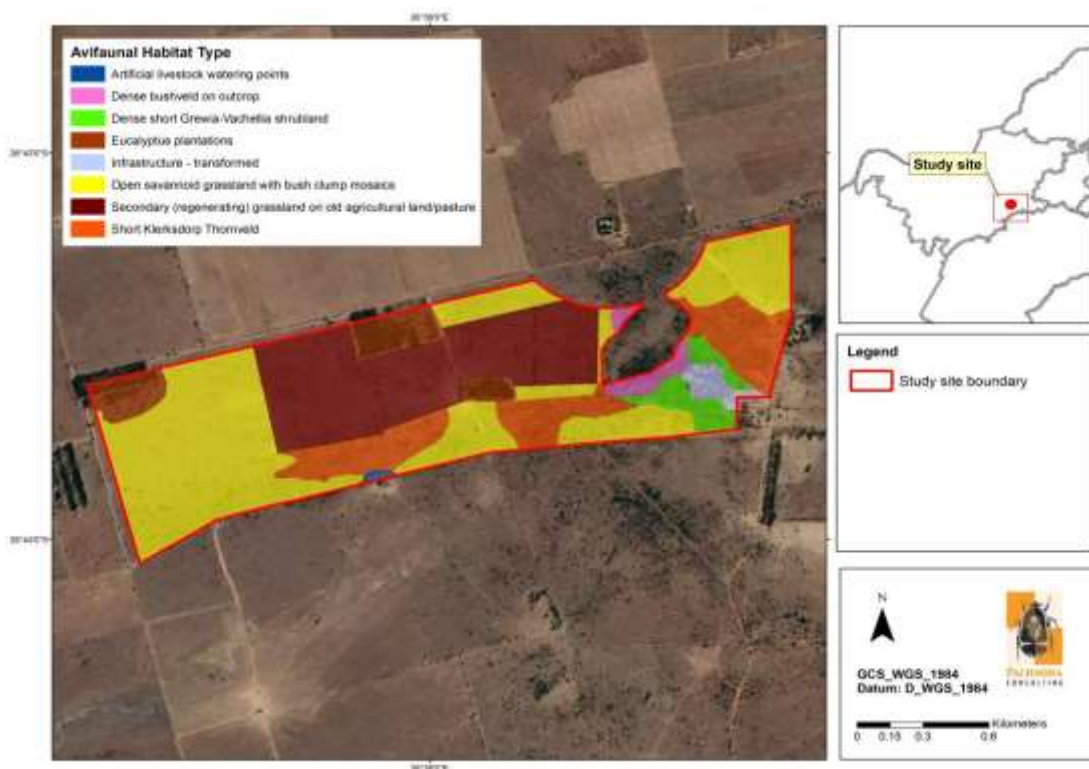


Figure 41: Avifaunal Habitat Map (Pachnoda, 2022).

Approximately 223 bird species are expected to occur in the wider study area. This equates to 23 % of the approximate 987 species listed for the southern African subregion (and approximately 26 % of the 871 species recorded within South Africa).

However, the species richness obtained from the pentad grid 2640\_2635 corresponding to the project area was slightly higher than the expected number of species, with 231 species recorded. The latter mainly includes waterbird and shorebird taxa which were predominantly absent from the study site due to the absence of suitable wetland habitat.

Of the 223 bird species expected to occur in the project area, 11 are threatened or near threatened species, 16 are southern African endemics and 25 are near-endemic species. In addition, one threatened species (Secretarybird *Sagittarius serpentarius*) was observed on habitat immediately adjacent to the study site. Furthermore, 10 southern African endemics and 14 near-endemic species were confirmed on the study site and the immediate surroundings.

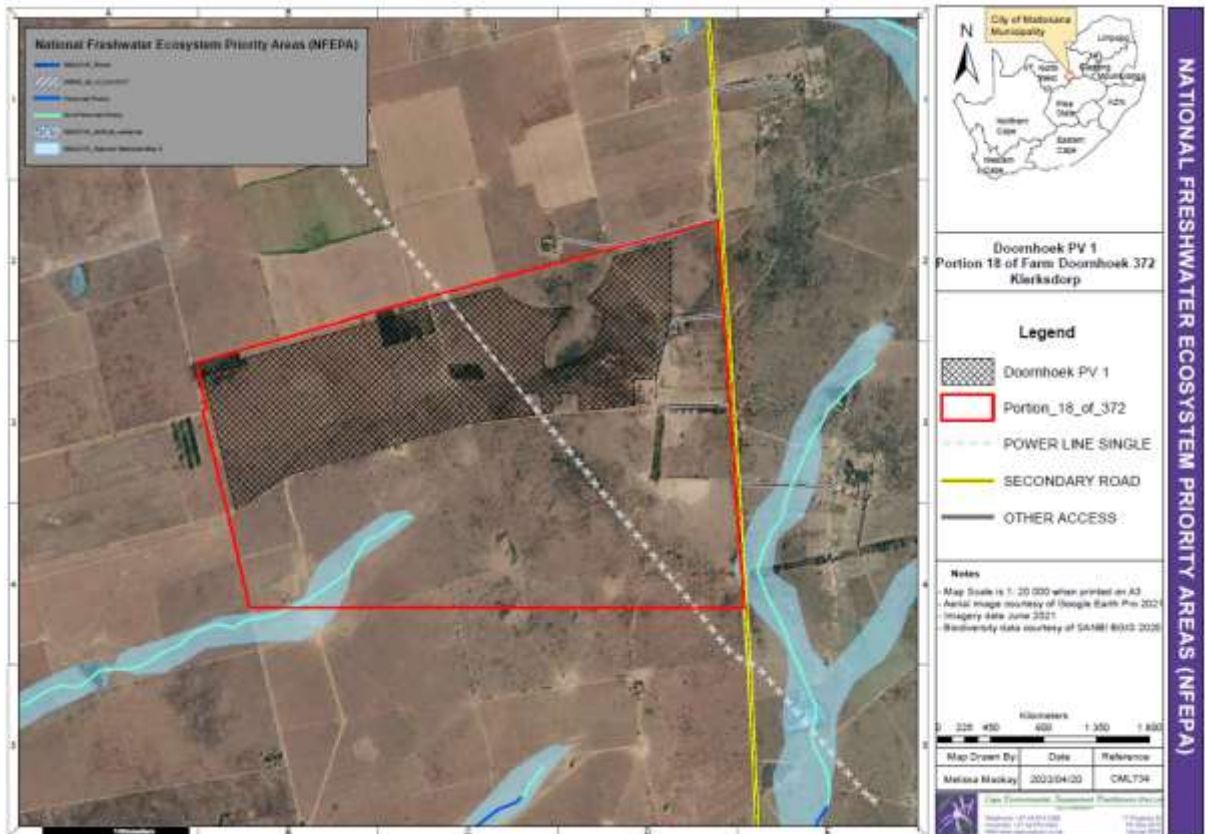
Prominent wetland features and waterbodies are absent from the study site and surroundings, thereby explaining the low richness of waterfowl, wading birds and shorebird taxa on the study site. However, two small impoundments are located between 1.3 and 2.5 km south-west of the study site, with another small dam located approximately 1 km east of the study site. These impoundments could attract additional waterbird and shorebird species to the study area.

## **5.8 AQUATIC COMPOSITION OF THE STUDY SITE**

Scientific Aquatic Services (SAS) undertook an Aquatic Ecosystems Assessment. Please refer to the Aquatic Biodiversity Compliance Statement attached in **Annexure E2** from which the following has been drawn.

The aquatic specialist confirmed that no features meeting the definition of a watercourse as contained in the National Water Act, 1998 (Act No. 36 of 1998) were identified within the study area, nor within the investigation area, thus the aquatic sensitivity of the study area was confirmed as 'low'.

A single unchanneled valley bottom wetland (indicated as a seep wetland by the NBA, 2018) was identified immediately adjacent to, but outside of the south-eastern boundary of the investigation area.



**Figure 42:** Seep wetland present within the property boundary, but outside of the proposed footprint.

The wetland flows north to south, and forms an unnamed tributary of the Rietgatspruit River, situated approximately 7.6 km south of the study area. A formal assessment of the wetland was not undertaken as it is situated further than 500 m from the study area and is protected from the proposed development in the study area by the tar road forming part of the eastern border of the study area.

The area indicated in the south-west as a ‘seep’ wetland by the NBA (2018) was investigated. No floral or soil morphological indicators indicative of a wet response or of wetland characteristics were identified. However, the area is low-lying and is likely to convey water to downgradient wetland systems situated further than 1 km from the study area and may be important for recharge of those systems.

### 5.9 SOCIO ECONOMIC CONTEXT

This section is summarised from the Social Impact Assessment undertaken by Savannah Environmental (Appendix E8) and provides an overview of the spatial context of the Province, District Municipality, and Local Municipality within which Doornhoek 1 PV is proposed, and furthermore provides the socio-economic basis against which potential social issues have been identified and assessed.

**Table 17:** Spatial Context of the study area for the development of the Doornhoek 1 PV Facility and associated infrastructure

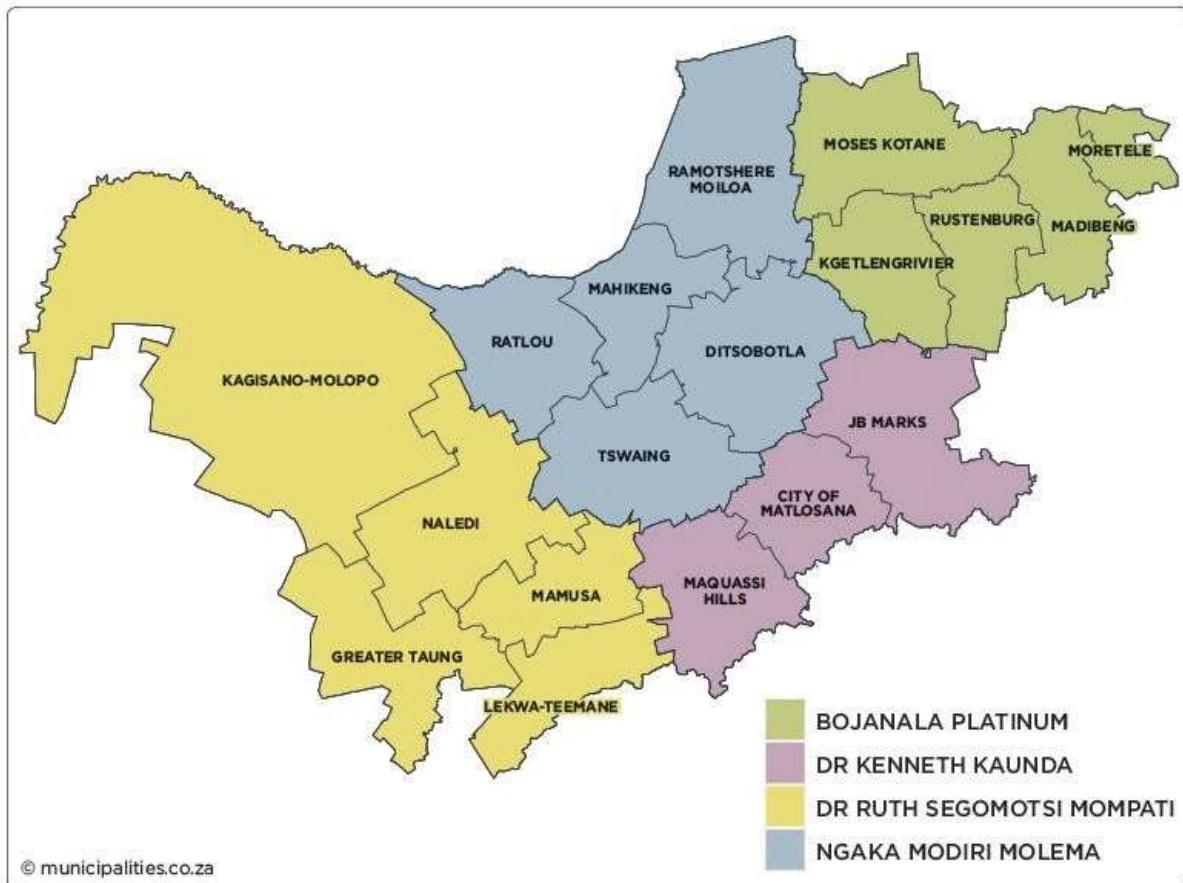
<b>Province</b>	North West Province
<b>District Municipality</b>	Dr Kenneth Kaunda District Municipality
<b>Local Municipality</b>	City of Matlosana Local Municipality
<b>Ward number(s)</b>	1 & 18
<b>Nearest town(s)</b>	Klerksdorp

### 5.9.1 North West Province

The North West Province is situated in the central-northern extent of South Africa. The Province is bordered by Northern Cape Province to the west, and south-west; Free State Province to the south; Gauteng Province to the east; Limpopo Province to the north-east; and Botswana to the north. It occupies an area of land approximately 104 882km<sup>2</sup> in extent, making it South Africa’s 6th largest in terms of area; and has a population of 3 509 953 (2011) and population density of 33/km<sup>2</sup> (2011), making it South Africa’s 7th most densely populated Province.

The North West Province is characterised by altitudes ranging from 920 - 1782m amsl, which makes it one of the provinces with the most uniform terrain. The central and western extents of the Province are characterised by gently undulating plains, while the eastern extent is characterised as mountainous, and includes the Magaliesberg mountain range. Ancient igneous rock formations dominate the north-eastern and north-central extent of the Province; and the Gatsrand between Potchefstroom and Carletonville is considered to be one of the most ancient preserved landscapes in the world. The geology of the Province is significant given its mineral resources which are rich in platinum, gold, uranium, iron, chrome, manganese and diamonds.

In terms of land use patterns, approximately 69% of the North West Province is in a natural, or near-natural state; while 31% of the province is irreversibly modified as a result of croplands (25.6%), urban (3.5%), and mining (0.7%) activities. The Province is predominantly rural with the main economic activities comprising mining and agriculture. The North West Province comprises 4 Districts, namely Bojanala Platinum, Ngaka Modiri Molema, Dr Ruth Segomotsi Mompati, and Dr Kenneth Kaunda.



**Figure 43:** Districts and local municipalities within the North West Province (Savannah, 2022)

### 5.9.2 Dr Kenneth Kaunda DM

The Dr Kenneth Kaunda District Municipality (DKKDM) is situated at the southern part of the North West Province and borders both the Gauteng (located 65km south-west of Johannesburg) and the Free State

Province. The DKKDM is the smallest of the four districts and is made up of five local municipalities namely, Ventersdorp, Tlokwe, City of Matlosana, Lekwa Teename and Maquassi Hills.

Mining is the dominant economic activity of the district, Additional sectors in terms of employment are social services, trade and farming. Potchefstroom is home to several tertiary institutions and training centres while the economic base for Ventersdorp is agriculture. The main economic sectors in the DKKDM include mining, trade, finance, business services, manufacturing, construction, government services and agriculture.

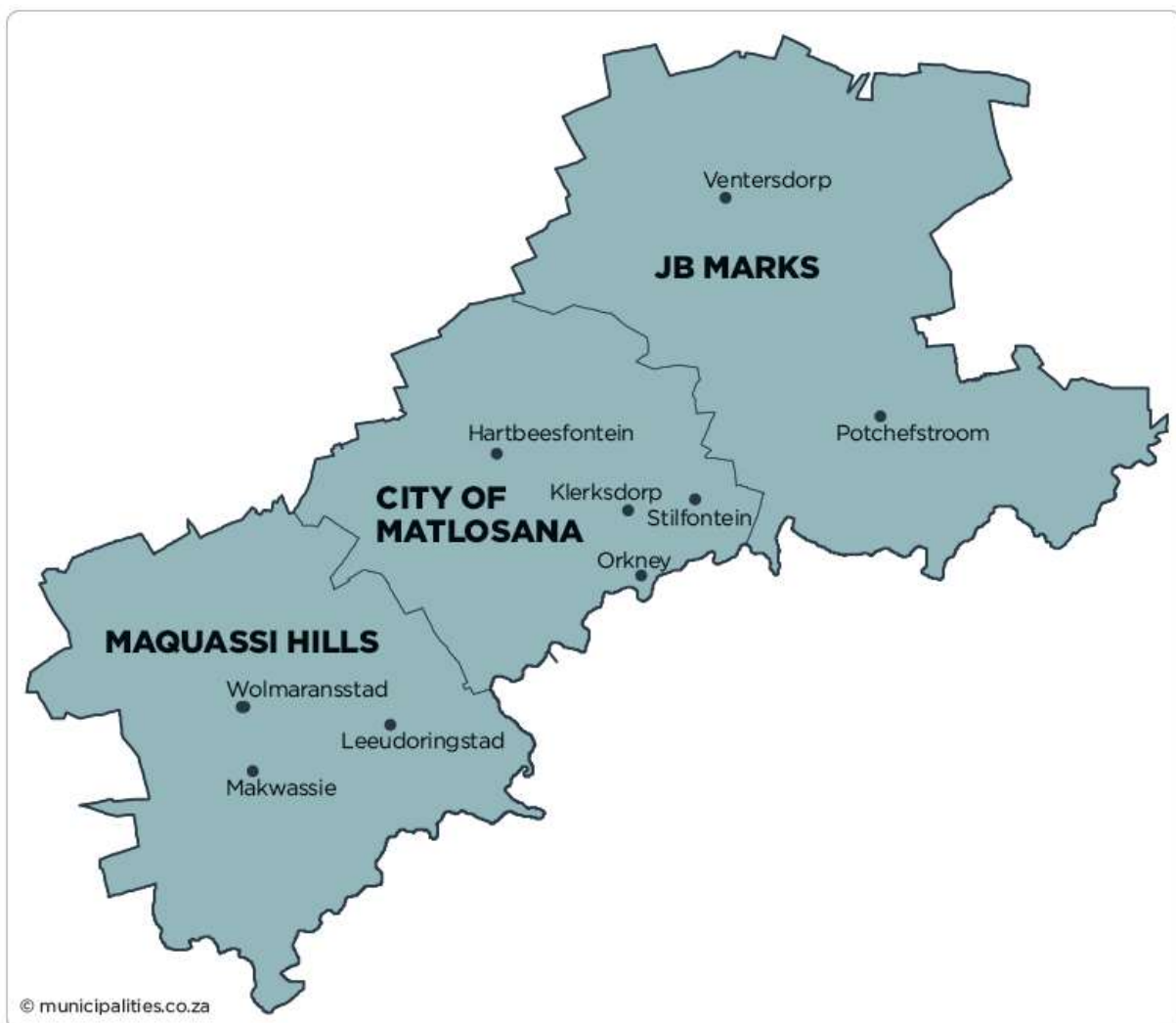
The district is serviced by several primary roads, with the N12 Treasure Corridor forming the main development axis in the district and serving as a potential concentration point for future industrial, commercial and tourism development. DKKDM is a region with a rich and diverse natural and cultural heritage, with the potential for sustained economic growth. The major cities/towns in the District municipality include, Hartbeesfontein, Klerksdorp, Leeudoringstad, Makwassie, Orkney, Potchefstroom, Stilfontein, Ventersdorp, Witpoort and Wolmaransstad.

### 5.9.3 City of Matlosana Local Municipality

The City of Matlosana Local Municipality (CMLM) is located in the DKKDM in the North West Province. It is one of four local municipalities in this district. The major towns are Hartbeesfontein, Klerksdorp, Orkney and Stilfontein (Local government handbook, 2021). The CMLM is also located 115km south of Rustenburg and the platinum belt. Klerksdorp, Jouberton, Alabama, Manzilpark, Orkney, Kanana, Vaal Reefs, Stilfontein, Khuma, Tigane and Hartebeesfontein area all areas that form part of the CMLM. The following characteristics are found within the CMLM (South African Cities Network, 2012):

- Klerksdorp was originally established and developed as a regional service centre between the gold mining areas on the Rand and the diamond mining fields in the Cape in the late 1800s. The paper makes the specific point that this historical role as regional/rural service centre has helped to mitigate the impact of mine downscaling since the early 1990s. Although Klerksdorp has always been the main economic hub of the greater municipal area, it has not specifically been involved in the mining activities but has maintained the function of a regional service centre in terms of agricultural supplies, retail facilities, schools and medical services which stretches further than the boundaries of the Dr Kenneth Kaunda District Municipality into the North West Province and even Botswana. It is precisely this notion which has helped sustain the area in a period of considerable mining decline over the last 20 years.
- Since the early 1990s but more specifically since 2001, mining activities have downscaled drastically. This downscaling also led to nearly 75% of the original workforce in 1996 being retrenched by 2011. It seems as if significant percentages of these retrenchment packages have been reinvested in the area because the housing market has improved despite the decrease in employment. Entrepreneurial activities have also intensified due to compulsory self-employment advancements. The City of Matlosana case study can therefore be strongly linked to the research that has been completed in terms of mining downscaling and closures.
- The declining mining industry has resulted in the number of people living in poverty in the City of Matlosana almost doubling between 1996 and 2011. This is due to the fact that the municipal area is characterised by high unemployment levels (19.6%) – albeit the fact that this percentage is somewhat lower than the national average.
- Although the economic decline of the area is similar to that experienced in the Free State Goldfields the overall impact in Matlosana seems significantly less than in the Free State Goldfields. The rapid economic decline of the area has been buffered by (1) the regional service character of the area (2) a business focus which has expanded into Botswana (3) proximity to platinum belt (4) proximity to Gauteng (in fact some researchers view the areas as a spatial extension of Gauteng) and more specifically, proximity to the West Rand.

- Currently, the N12 Treasure Route puts Klerksdorp in the centre of new developments. Towards the west of the N12, developments comprise residential development, retail nodes and mixed land usages. This is where the new Rio Casino Resort and shell garage (future truck inn) was developed as well as a Tower Mall retail centre to open at the end of 2013. The east of this corridor is earmarked for bulk services, with projects like a regional shopping complex, integrated housing, IT Call Centre, and light industry (medical and mining supplies show potential). This development has also affected the decentralisation of business into the northern suburbs of Klerksdorp and business activities along the N12. These activities probably have two main implications. In the first place the emphasis on new trade space probably confirms the regional service role of the town. In fact the distance of influence has probably increased over the past 20 years. Secondly, the corridor development suggests the importance of the link with Gauteng.
- Like many other cities and towns in South Africa, old infrastructure is a matter of concern. The old infrastructure systems are already in need of drastic upgrades and continuous maintenance – this pressure will only increase, resulting in various challenges. At the same time the historic role related to mining has created significant problems for municipal management in the advent of mine downscaling and closure. One such an example is the inability of the municipality to institute an appropriate billing system.
- The notion of becoming a metropolitan area is high on the agenda of The City of Matlosana. The conceptual idea is to link up with Tlokwe and form a metro on the N12 corridor development.



**Figure 44:** Local Municipalities within the Dr Kenneth Kaunda District (Savannah, 2022)



## 5.9.4 Baseline Description of the Social Environment

The table below provides a baseline summary of the socio-economic profile of the City of Matlosana Local Municipality within which Doornhoek 1 PV Facility is proposed. To provide context against which the Local Municipality's socio-economic profile can be compared, the socio-economic profiles of the Dr Kenneth Kaunda District, North West Province, and South Africa have also been provided where applicable. The data presented in this section have been derived from the 2011 Census, the North West Provincial Spatial Development Framework (PSDF), and the Dr Kenneth Kaunda DM and City of Matlosana LM IDPs.

**Table 18:** Baseline description of the socio-economic characteristics of the area within which the Doornhoek 1 PV Facility (Savannah, 2022)

<b>Location characteristics</b>
<ul style="list-style-type: none"> <li>• The project is proposed within the North West Province, the province located to the west of the major population centre of Gauteng Province.</li> <li>• The project is proposed within the City of Matlosana LM of the Dr Kenneth Kaunda DM.</li> <li>• The City of Matlosana LM is approximately 3 608.6km<sup>2</sup> in extent.</li> </ul>
<b>Population characteristics</b>
<ul style="list-style-type: none"> <li>• The City of Matlosana LM has a population of 417 282 which is about three-fifths of the figure in Dr Kenneth Kaunda 742,822.</li> <li>• The LM occupies an area of land approximately 3 608.6km<sup>2</sup> in extent and has a population density of 115.6/km<sup>2</sup>.</li> <li>• According to estimates based on the population growth rate of SA Statistics (1.04%) and the Matlosana Socio-Economic Report.</li> <li>• Population growth and household growth has declined over time. This can be ascribed to the fact that the local economy has become less dependent on the mining sector with the tertiary sectors growing in the long term.</li> <li>• Downscaling in terms of economic activity in the LM has led to nearly 80% of the original workforce in 1996 being retrenched by 2016.</li> <li>• The declining mining industry has resulted in the number of people living in poverty in the City of Matlosana almost doubling between 1999 and 2019.</li> <li>• The average annual household growth between 1996 and 2019 was 3.46%.</li> <li>• The dependency ratio is high at 50.7% of the KM population (that is half the local population) which puts pressure on the Economically Active Population and local municipalities.</li> <li>• The dependency ration indicates the number of individuals that are below the age of 15 and over the age of 65, that are dependent on the Economically Active Population (individuals that are aged 15-64 that are either employed or actively seeking employment).</li> </ul>
<b>Economic, education and household characteristics</b>
<ul style="list-style-type: none"> <li>• According to Census 2011 the unemployment rate for the LM is high at 32.7% whilst youth unemployment rate is 43.1%.</li> <li>• There is 40.4% of the population which is employed under the LM. 4.3% represent discouraged work – seeker, 35.7% are not economically active whilst 19.6% are unemployed.</li> <li>• The LM is largely populated by potentially economically active and young people.</li> <li>• There is a high number of households that fall within a low-income category and within the poverty level, this is being 62.1% of the local population.</li> <li>• A low percentage of households fall within the middle-income category (33.1% of the population) and high income category (4.7%).</li> <li>• Majority of the population live in urbanised areas within formal dwellings.</li> <li>• A large number of people in the LM have access to basic services.</li> <li>• Approximately 69.9% have completed Grade 9 or higher which is a little higher than the rate of Dr Kenneth Kaunda 67.26%</li> <li>• According to Census 2011, R2 400 is the average annual income for employed children between 15 and 17.</li> <li>• 13.6% of children between 15 and 17 are in the labour force.</li> <li>• There is 526 households with heads under 18 years old and 9.3% of child-headed households that are informal dwellings (shacks).</li> <li>• There is 45.4% child-headed households with women as their head.</li> <li>• The average child-headed household income for the LM is R2400.</li> </ul>
<b>Services</b>
<ul style="list-style-type: none"> <li>• According to Community Survey 2016, 96.2% of the population are getting water from regional or local service provider which is a little higher than the rate of Dr Kenneth Kaunda (93.33%)</li> </ul>

- 48.3% have piped water inside the yard, 47.8% have piped water inside the house, 1.8% have public/communal tap whilst 0.7% have borehole outside the yard.
- 3.7% have no access to electricity and which is about three quarters of the rate in Dr Kenneth Kaunda (5.12%)
- 77.7% have in-house prepaid meter, 17.2% in-house conventional meter, 3.7% have no access to electricity and 1.1% use other source (not paying for)
- 95.7% have access to flush or chemical toilets which is a little higher than the rate in Dr Kenneth Kaunda 90.07%, whilst 2% have no access to any toilets.
- 94.1% are getting refuse disposal from local authority, private company or community members, which is about 10% higher than the rate in Dr Kenneth Kaunda (82.71%).

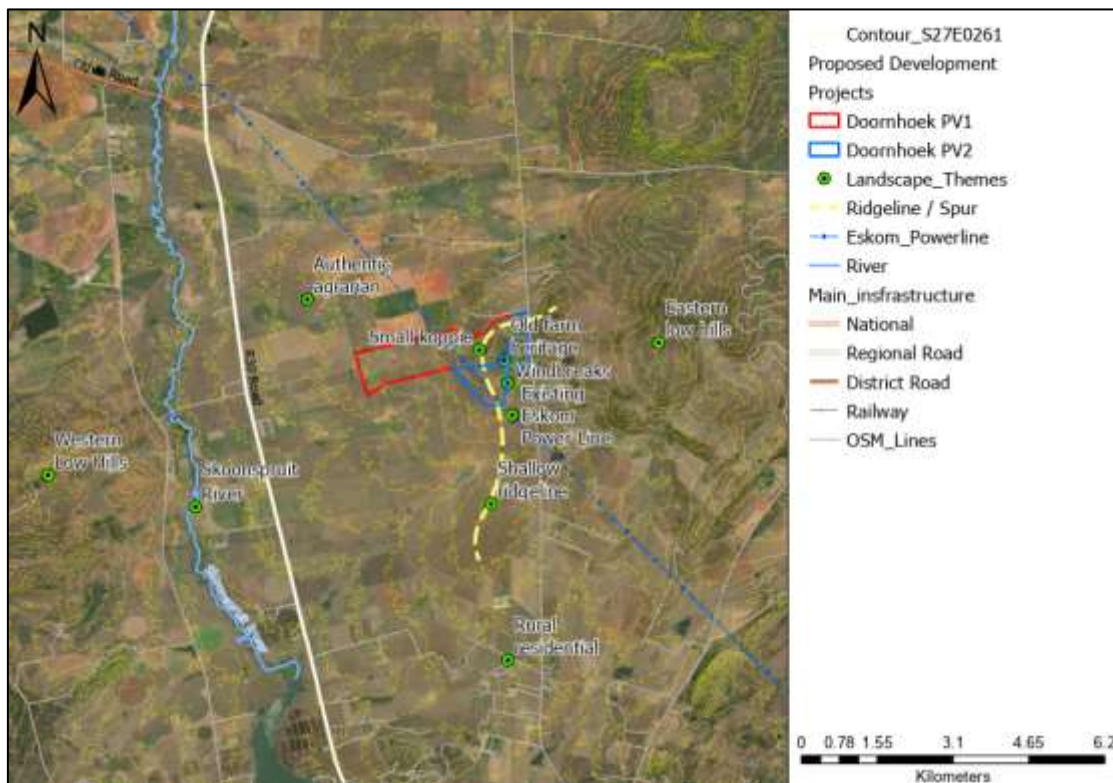
**5.10 VISUAL CONTEXT**

Mr Stephen Stead of Visual Resource Management Africa (VRMA) undertook a Visual Impact Assessment of the proposed Doornhoek 1 PV (See Appendix E7). The following visual context was determined from this study.

**5.10.1 Landscape Context**

The Matlosana municipal area has a slightly irregular undulating topography dictated by the Vredefort event, which brought about the Vredefort Dome near Parys. The height above sea level ranges between 1 300m and 1 600m, increasing in a general north-westerly direction. The ridges and hills of Klerksdorp have a characteristic range of different aspects, slopes, altitudes, soils and hydrological conditions.

The main access road through the valley is the R30 located to the west of the property, with a smaller paved road directly adjacent the property to the east. Minor gravel farm roads service the area as well. In terms of mining, no mining dumps or tailings are visible which could degrade the local landscape setting. A single 132kV Eskom power line runs diagonally across the site and is supported by lattice type structure. While visible in the landscape, it is not a dominating feature and results in limited site landscape degradation.



**Figure 45.** Local landscape themes map (Stead 2022)

### 5.10.2 Regional Landscape Topography

The regional topography is dominated by the Skoonspruit River Valley which trends in a north-south direction. The Project area is located on the south-west facing slopes of this valley at an average elevation of 1390mamsl.

Within the immediate regional topographic context, the minimum elevation is 1300mamsl within the Skoonspruit river drainage below Klerksdorp – roughly 12km south of the site. From here, the topography rises relatively consistently in a northerly direction towards the project area, which is located slightly below a local highpoint (1440mamsl). Regional highpoints of over 15000mamsl are located roughly 6km to the northeast and 12km to the west of the project area.

In terms of site topography, the project area includes a wide spur which trends in a northerly and easterly direction towards the local highpoint – a small hill roughly 1km to the northeast. There are no defined drainage lines on the site, being located at upper limits of the local watershed. The majority of the site drains in a south-westerly direction towards the Skoonspruit River.

### 5.10.3 Viewshed Analysis

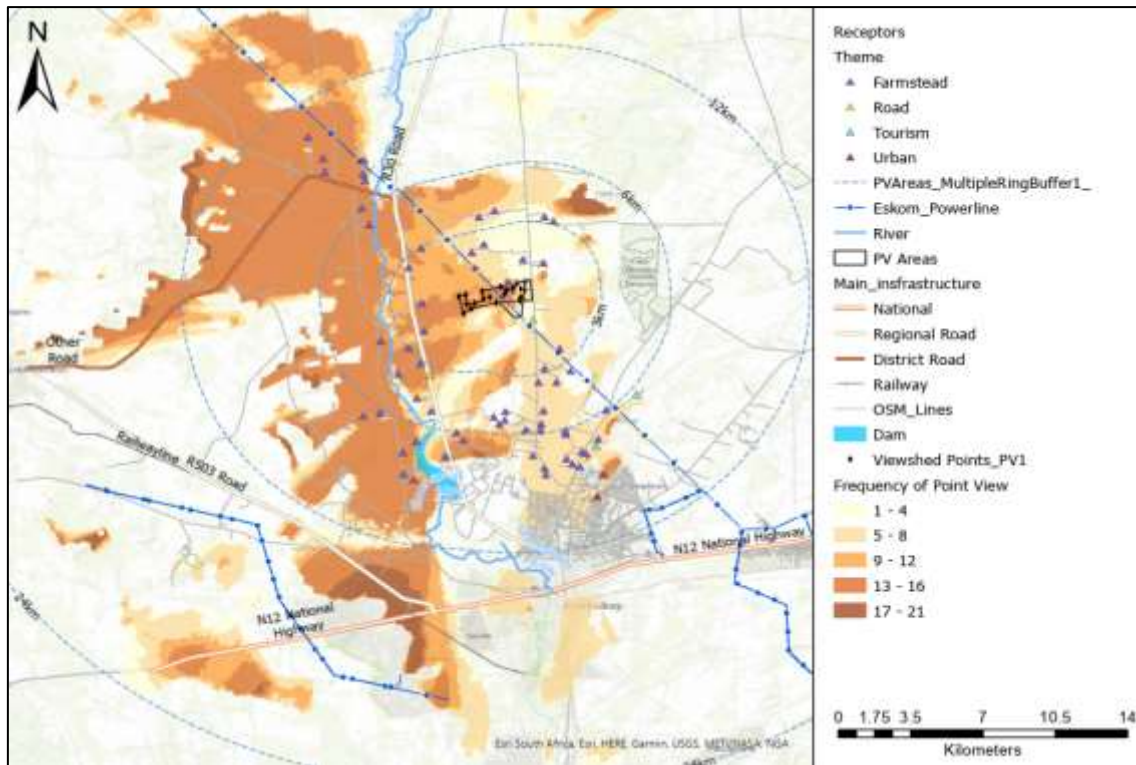
A viewshed analysis was undertaken for the site making use of NASA SRTM 30m Digital Elevation Model data. An Offset value representing the height of the PV panels was used to represent the approximate height of the proposed development as reflected in the table below. The viewshed was also capped at a defined extent to take atmospheric influences into consideration where the landscape change would not be clearly visible from.

**Table 19:** Proposed Project Heights Table

Proposed Activity	Approx. Height (m)	Terrain Model Extent
Doornhoek PV Solar Facility	2.5m	24km

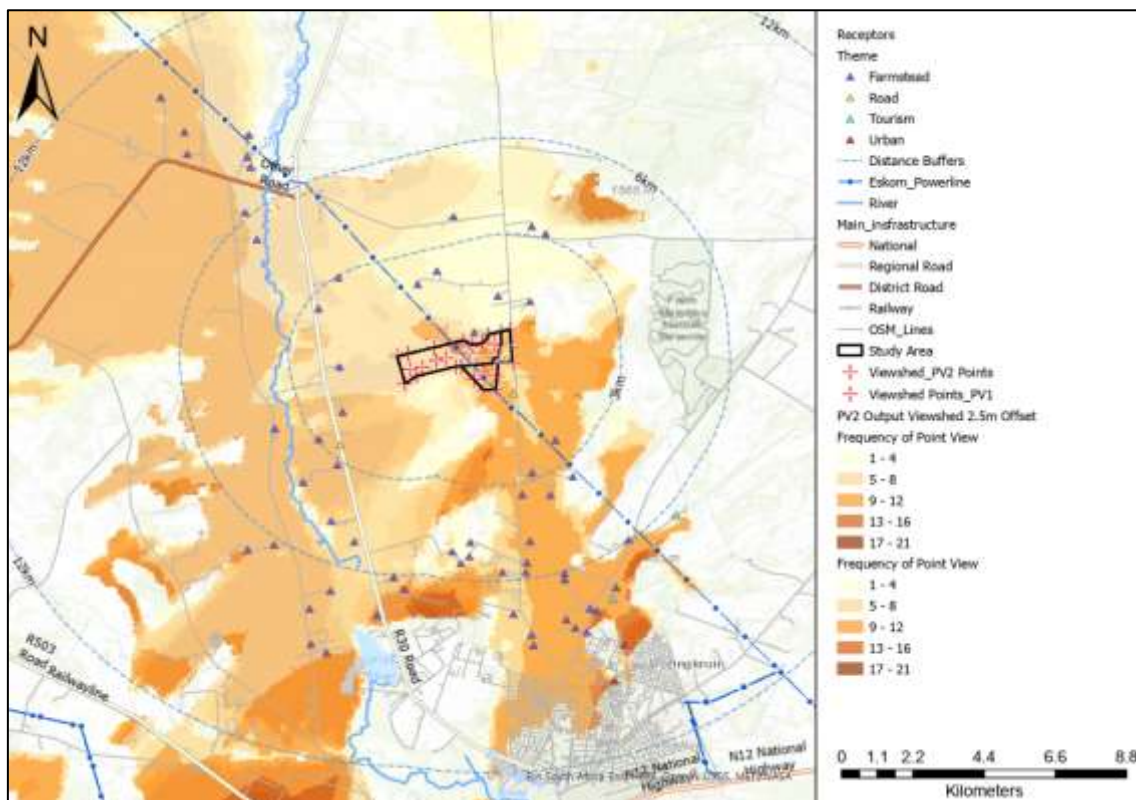
The viewshed is skewed to the west, northwest and southwest of the site, and extends over 24km from the site. Coverage in this direction is relatively high, given the prominent location of the site in the landscape. The expected Zone of Visual Influence is likely to be contained within the 10km distance given the relative topographic prominence.

Visual coverage changes from almost 100% within 2km of the site to less than 40% within 12km of the site. Eight receptors are located within the 2km zone of visual influence, all of which are remote farmsteads and are defined as Key Observation Points (KOPs). Numerous additional rural residences are located within the 6km zone of visual influence, mainly towards the south, towards Klerksdorp, and west, along the Skoonspruit River valley. Three additional KOPs are located in the 6km zone of visual influence.



**Figure 46:** Viewshed analysis map (Stead, 2022)

From a cumulative effect, the combined PV viewshed depicts a similar spatial spread, with more intensity of visibility to the west. Close proximity northern and western receptors would have partial views of the project, with southern rural residential receptors located in the medium to low intensity area to the south of the proposed project.



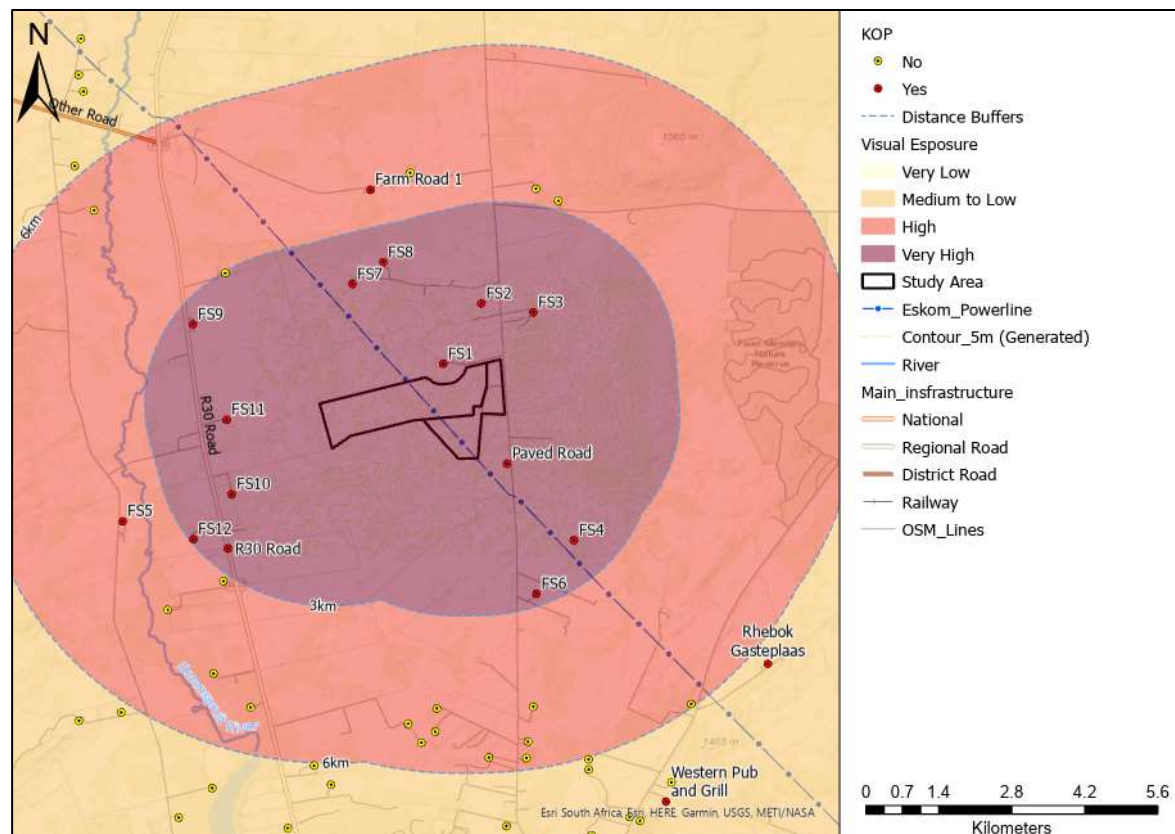
**Figure 47:** Viewshed analysis map of both PV projects.

### 5.11 RECEPTORS AND KEY OBSERVATION POINTS

The following receptors have been identified as Key Observation Points and should be used as locations to assess the suitability of the landscape change.

**Table 20: Key Observation points (Stead, 2022)**

Name	POINT_X	POINT_Y	Theme	Exposure	Motivation
FS1	26.64061	-26.7198	Farmstead	Very High	Very high exposure and higher levels of scenic quality related to rural and peri-urban landscape context.
FS2	26.64718	-26.7095	Farmstead	Very High	
FS3	26.65615	-26.711	Farmstead	Very High	
FS7	26.62497	-26.7061	Farmstead	Very High	
FS8	26.63029	-26.7024	Farmstead	Very High	
FS9	26.59752	-26.713	Farmstead	Very High	
FS10	26.60416	-26.7423	Farmstead	Very High	
FS11	26.60332	-26.7295	Farmstead	Very High	
FS12	26.59755	-26.75	Farmstead	Very High	
FS5	26.58539	-26.747	Farmstead	Very High	
FS4	26.66316	-26.7502	Farmstead	Very High	
FS6	26.65668	-26.7594	Farmstead	Very High	
Rhebok Gasteplaas	26.6966	-26.7715	Tourism	Medium	Medium level of exposure but making use of visual resources within clear view of project that could influence the local sense of place.
Western Pub and Grill	26.67903	-26.7952	Tourism	Medium	Very High and High Exposure to roads around the study area that currently have higher levels of scenic quality.
Farm Road 1	26.6281	-26.6899	Farm Road	High	
Paved Road	26.65163	-26.737	Road	Very High	
R30 Road	26.6035	-26.7516	Road	Very High	



**Figure 48: Receptor Key Observation Point and Visual Exposure Map (Stead, 2022)**

## 6. IMPACT ASSESSMENT

This section of the report was completed with input from the following specialists:

- Terrestrial Biodiversity (Biodiversity Africa, 2022)
- Avifauna (Pachnoda Consulting, 2022)
- Plant Species (Biodiversity Africa, 2022)
- Animal Species (Biodiversity Africa, 2022)
- Aquatic Biodiversity (Scientific Aquatic Services, 2022)
- Agricultural (Johan Lanz, 2022)
- Palaeontology (Prof Marion Bamford, 2022)
- Archaeology and Heritage (Beyond Heritage, 2022)
- Visual (Stephen Stead, 2022)
- Socio Economic (Savannah Environmental, 2022)
- Traffic Impact Assessment (BVi consulting Engineers, 2022)
- Stormwater Management (SRK, 2022)

The impacts will firstly be discussed per specialist discipline and then summarised in the impact summary and statement below.

### 6.1 ASSESSMENT METHODOLOGY

All possible impacts need to be assessed – the **direct, in-direct as well as cumulative impacts**. The following general assessment methodology has been applied:

- **Nature of the impact:** impacts associated with the proposed Doornhoek 1 PV have been described in terms of whether they are negative or positive and to what extent.
- **Duration of impacts:** Impacts were assessed in terms of their anticipated duration:
  - Short term (e.g., during the construction phase – 0 – 2 years )
  - Medium term (e.g., during part or all of the operational phase – 2 - 20 years)
  - Long term (e.g., > 20 years)
  - Permanent (e.g., where the impact is for all intents and purposes irreversible)
  - Discontinuous or intermittent (e.g., where the impact may only occur during specific climatic conditions or during a particular season of the year)
- **Intensity or magnitude:** The size of the impact (if positive) or its severity (if negative):
  - Low, where the receiving environment (biophysical, social, economic, cultural etc) is negligibly affected or where the impact is so low that the remedial action is not required;
  - Medium, where the receiving environment (biophysical, social, economic, cultural etc) is altered, but not severely affected, and the impact can be remedied successfully; and
  - High, where the receiving environment (biophysical, social, economic, cultural etc) would be substantially (i.e., to a very large degree) affected. If a negative impact, could lead to irreplaceable loss of a resource and/or unacceptable consequences for human wellbeing.
- **Probability:** Should describe the likelihood of the impact actually occurring indicated as:
  - Improbable, where the possibility of the impact is very low either because of design or historic experience;

- Probable, where there is a distinct possibility that the impact will occur;
- Highly probable, where it is most likely that the impact will occur; or
- Definite, where the impact will occur regardless of any prevention measures.
- **Significance:** The significance of impacts can be determined through a synthesis of the assessment criteria. Significance can be described as:
  - Low, where it would have negligible effect on the receiving environment (biophysical, social, economic, cultural etc), and on the decision;
  - Medium, where it would have a moderate effect on the receiving environment (biophysical, social, economic, cultural etc), and should influence the decision;
  - High, where it would have, or there would be a high risk of, a large effect on the receiving environment (biophysical, social, economic, cultural etc). These impacts should have a major influence on the decision;
  - Very high, where it would have, or there would be a high risk of, an irreversible negative impact on the receiving environment (biophysical, social, economic, cultural etc) and irreplaceable loss of natural capital/resources or a major positive effect on human well-being. Impacts of very high significance should be a central factor in decision-making.
  - Provision should be made for with and without mitigation scenarios.
- **Reversibility:**
  - Reversible, the impact can be managed to a low to high degree and is not permanent; or
  - Irreversible, the impact can only be managed to a limited degree and is permanent.
- **Confidence:** The level of confidence in predicting the impact can be described as:
  - Low, where there is little confidence in the prediction, due to inherent uncertainty about the likely response of the receiving ecosystem, or inadequate information;
  - Medium, where there is a moderate level of confidence in the prediction, or
  - High, where the impact can be predicted with a high level of confidence
- **Consequence:** What will happen if the impact occurs
  - Insignificant, where the potential consequence of an identified impact will not cause detrimental impact to the receiving environment;
  - Significant, where the potential consequence of an identified impact will cause detrimental impact to the receiving environment.
  - Provision must be made for with and without mitigation scenarios.

The impacts should also be assessed in terms of the following aspects:

- **Status of the impact**

The specialist should determine whether the impacts are negative, positive or neutral (“cost – benefit” analysis). The impacts are to be assessed in terms of their effect on the project and the environment. For example, an impact that is positive for the proposed development may be negative for the environment. It is important that this distinction is made in the analysis.

- **Cumulative impact**

Consideration must be given to the extent of any accumulative impact that may occur due to the proposed development. Such impacts must be evaluated with an assessment of similar developments planned and already in the environment. Such impacts will be either positive or negative, and will be graded as being of negligible, low, medium or high impact.

Care must be taken to ensure that where cumulative impacts can occur that these impacts are considered and categorised as **additive** (incremental or accumulative); **interactive**, **sequential** or **synergistic**.

Based on a synthesis of the information contained in the above-described procedure, the specialists assessed the potential impacts in terms of the following significance criteria:

- **No significance:** The impacts do not influence the proposed development and/or environment in any way.
- **Low significance:** The impacts will have a minor influence on the proposed development and/or environment. These impacts require some attention to modification of the project design where possible, or alternative mitigation.
- **Moderate significance:** The impacts will have a moderate influence on the proposed development and/or environment. The impact can be ameliorated by a modification in the project design or implementation of effective mitigation measures.
- **High significance:** The impacts will have a major influence on the proposed development and/or environment.

Where relevant, all specialists have assessed the preferred footprint (Layout Alternative 1) and the No-Go Alternative 1 using the abovementioned general methodology as a Basis. Please note that each specialist utilises rating and weighting criteria specific to their discipline in order to determine the significance of specific impacts.

## 6.2 IDENTIFICATION OF IMPACTS ASSESSED

This section simply lists the potential key impacts identified and assessed by the various specialists (more details on the significance and ratings of these impacts are provided in section 6.4 – 6.11 below and in the specialist reports attached in Appendix E).

### 6.2.1 Terrestrial Biodiversity Impacts Assessed<sup>32</sup>

#### Construction Phase Terrestrial Biodiversity Impacts

- The direct loss of vegetation types and associated plant species, including species of conservation concern.
- The direct loss of faunal habitats.
- Clearing of vegetation also creates breaks in habitat leading to habitat fragmentation and edge effects.

#### Operational Phase Terrestrial Biodiversity Impacts

- The clearing of vegetation and subsequent disturbance to the soil, and therefore seed bank, can lead to the infestation of alien invasive plant species and other ruderal species.

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<sup>32</sup> Terrestrial Impacts Assessed, include the assessment of impacts on Plant and Animal Species as per the environmental themes and protocols.



### Decommissioning Phase Terrestrial Biodiversity Impacts

- Heavy machinery associated with clearing of vegetation and decommissioning of the solar PV facility and access roads will increase ambient noise levels and dust emissions resulting in some species vacating the area.
- The movement of construction machinery within the site, may cause unintentional mortalities of faunal species.

## **6.2.2 Agricultural Impacts Assessed<sup>33</sup>**

### Construction Phase Agricultural Impacts

- Loss of agricultural potential by occupation of land.
- Loss of agricultural potential by soil degradation

### Operational Phase Agricultural Impacts

- Enhanced agricultural potential through increased financial security for farming operations.<sup>34</sup>
- Improved security against stock theft and other crime due to the presence of security infrastructure and security personal at the facility.<sup>35</sup>

## **6.2.3 Avifaunal Impacts Assessed**

### Construction Phase Avifaunal Impacts

- Loss of habitat and displacement of birds
- Creation of "new" avian habitat and bird pollution

### Operational Phase Avifaunal Impacts

- Collision trauma caused by photovoltaic panels (the "lake-effect")
- Interaction with overhead power lines and reticulation
- Physical disturbances and habitat destruction caused during construction and maintenance.

### Decommissioning Phase Avifaunal Impacts

- Loss of habitat and displacement of birds

## **6.2.4 Aquatic Biodiversity Impacts Assessed**

The aquatic biodiversity specialist concluded that no freshwater resources as defined in the National Water Act are present on site. The proposed footprint has furthermore been set back to be outside of the 500m Zone of Regulation from any watercourse. The proposed project is therefore unlikely to have any impact on Aquatic Biodiversity.

## **6.2.5 Heritage Impacts Assessed<sup>36</sup>**

- Impact on the Existing Farmstead (DH002)
- Impact assessment of the proposed project on the Stone Age Scatter (DH003)

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<sup>33</sup> The agricultural impacts identified apply equally to all phases of the development.

<sup>34</sup> This is deemed to be a positive agricultural impact.

<sup>35</sup> This is deemed to be a positive agricultural impact.

<sup>36</sup> Impact on heritage resources will occur in the construction phase and that impact will remain.

## 6.2.6 Visual Impacts Assessed

### Construction Phase Visual Impacts

- Loss of site landscape character due to the removal of vegetation and the construction of the PV structures and associated infrastructure.
- Wind-blown dust due to the removal of large areas of vegetation.
- Possible soil erosion from temporary roads crossing drainage lines.
- Wind-blown litter from the laydown and construction sites.

### Operational Phase Visual Impacts

- Loss of site landscape character due to the operation of the PV structures and associated infrastructure.
- Visual intrusion to adjacent property owners and road users.

### Decommissioning Phase Visual Impacts

- Movement of large vehicles required for the removal of the PV panels, power lines, mono-poles and substations.
- Wind-blown dust from impacts to vegetation.
- Wind-blown litter from the laydown and construction sites.

## 6.2.7 Traffic Impacts Assessed

### Construction Phase Traffic Impacts

- Increased Traffic on regional haulage routes
- Increased traffic on local routes
- Construction and maintenance of Gravel Roads in the Vicinity of the Site

### Operational Phase Traffic Impacts

- Increased Traffic During operational Phase.

### Decommissioning Phase Traffic Impacts

- Increased traffic on local routes
- Construction and maintenance of Gravel Roads in the Vicinity of the Site

## 6.2.8 Social Impacts Assessed

### Construction Phase Social Impacts

- Direct and indirect employment opportunities
- Economic multiplier effects
- Influx of jobseekers and change in population
- Safety and security impacts
- Impacts on daily living and movement patterns
- Nuisance impacts, including noise and dust
- Visual impacts and sense of place impacts

### Operational Phase Social Impacts

- Direct and indirect employment opportunities
- Development of non-polluting, renewable energy infrastructure
- Contribution to Local Economic Development (LED) and social upliftment
- Visual and sense of place impacts
- Impacts associated with the loss of agricultural land

### 6.3 SITE SENSITIVITY CONSTRAINTS AND POTENTIAL RISKS & IMPACTS

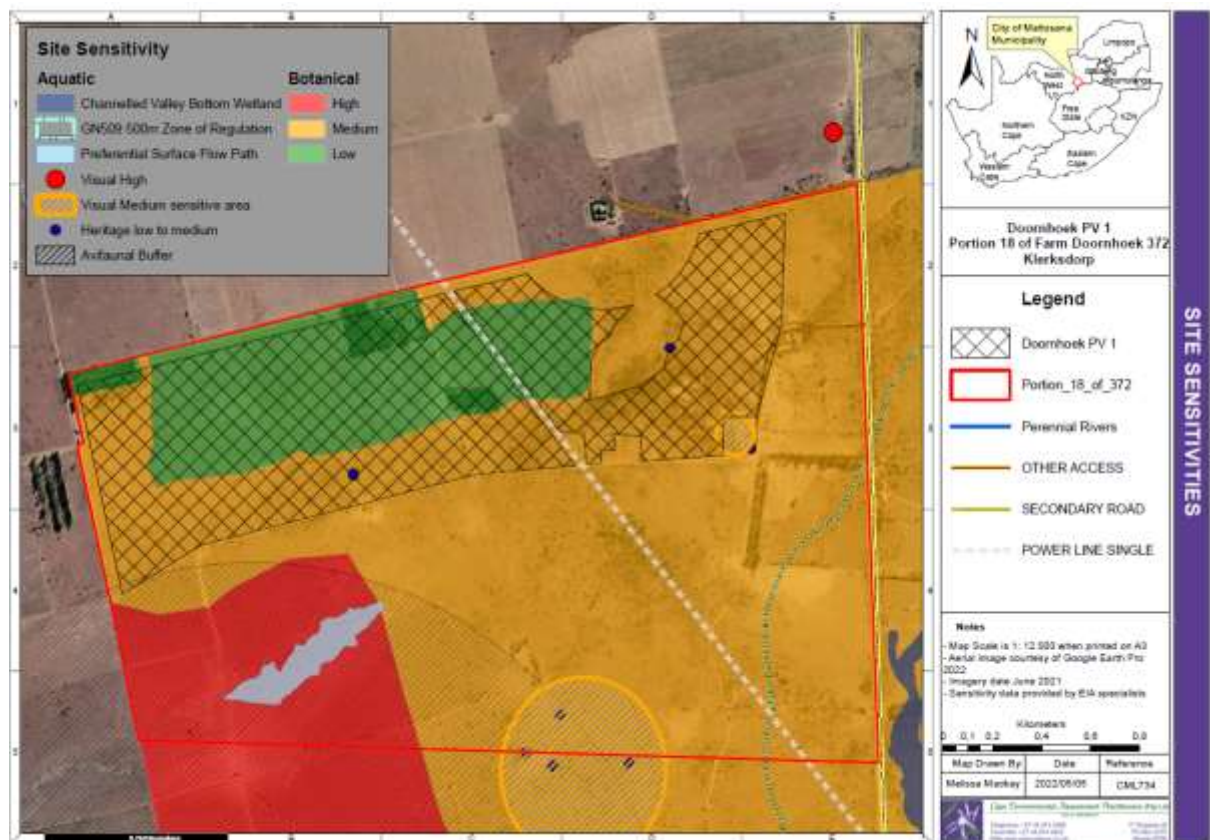
The following spatial site-specific constraints were identified by various specialists and the EAP during the initial stage of the environmental process.

**Table 21:** Summary of potential site constraints identified during the initial phase of the BAR Process, and which are assessed in the section below.

Specialist Discipline	Site Constraints
Terrestrial Biodiversity	Near-intact Vaal-Vet Sandy Grassland Andesite Mountain Bushveld
Animal Species	Sensitive habitats associated with the Vaal Vet Sandy Grassland.
Plant Species	Sensitive habitats associated with the Vaal Vet Sandy Grassland.
Aquatic Biodiversity	Wetland Seep and watercourse in the south west of the property.
Avifauna	Secretary Bird Nest and associated buffer. Water impoundments.
Agricultural	No specific spatial constraints identified.
Heritage	No specific spatial constraints identified
Visual	Class 1 Visual Resources associated with the ridge/hill.
Traffic	No specific spatial constraints identified.
Social	No specific spatial constraints identified.
Stormwater	No specific spatial constraints identified.

The preferred layout (layout alternative 1) was developed to exclude the near intact Vaal-Vet Sandy Grassland, the Andesite Mountain Bushveld, the wetland seep and preferential flow path, the secretary bird nest and buffer as well as the water impoundments and their buffer.

The Class 1 visual resource associated with the hill has been largely avoided by the exclusion of the steep slopes associated with the hill from the proposed footprint of the PV.



**Figure 49:** Doornhoek PV 1 Showing the exclusion of the identified sensitive areas.

Kindly refer to section 2.9 and section 2.10 above and the detailed layout plan in Appendix D for details as to how the preferred alternative incorporated these sensitive features.

In summary, the following sensitive features were all entirely avoided by the preferred footprint of Doornhoek 1 PV:

- All high sensitivity vegetation areas.
- All avifaunal buffers
- All Aquatic resources
- The hill forming part of the class 1 visual resource.

### 6.4 TERRESTRIAL BIODIVERSITY IMPACTS

A Terrestrial Biodiversity Impact Assessment (covering Animal Species, Plant Species and Terrestrial Biodiversity) was undertaken by Biodiversity Africa and is attached in Annexure E1. The following has been summarised from this assessment.

The following potential impacts were identified by the specialist and are assessed in the tables below:

- The direct loss of vegetation types and associated plant species, including species of conservation concern
- The direct loss of faunal habitats
- Clearing of vegetation also creates breaks in habitat leading to habitat fragmentation and edge effects
- The clearing of vegetation and subsequent disturbance to the soil, and therefore seed bank, can lead to the infestation of alien invasive plant species and other ruderal species
- Heavy machinery associated with clearing of vegetation and construction of the solar PV facility and access roads will increase ambient noise levels and dust emissions resulting in some species vacating the area
- The movement of construction machinery within the site, may cause unintentional mortalities of faunal species

#### 6.4.1 Construction and Terrestrial Biodiversity Impacts

**Table 22:** Assessment of Construction Phase Terrestrial Biodiversity Impacts.

Nature: Loss of Klerksdorp Thornveld		
	Without Mitigation	With Mitigation
Extent / Spatial Scope	Local	Local
Duration	Permanent	Permanent
Magnitude / Severity	Moderate	Moderate
Probability	Definite	Definite
Significance	Moderate	<b>Moderate</b>
Status	Negative	Negative
Reversibility.	Irreversible	Irreversible
Can impact be mitigated?	Difficult	
Mitigation:	<ul style="list-style-type: none"> <li>• Construction vehicles and machinery must not encroach into identified 'no-go' areas or areas outside the project footprint.</li> <li>• Topsoil (20 cm, where possible) must be collected and stored in an area of low (preferable) and medium sensitivity and used to rehabilitate impacted areas that are no longer required during the operational phase (e.g. laydown areas).</li> <li>• Only indigenous species must be used for rehabilitation.</li> </ul>	

	<ul style="list-style-type: none"> <li>• Where possible, lay down areas must be located within previously disturbed sites.</li> <li>• Employees must be prohibited from making open fires during the construction phase.</li> <li>• Employees must be prohibited from collecting plants. It is recommended that spot checks of pockets and bags are done on a regular basis to ensure that no unlawful harvesting of plant species is occurring.</li> <li>• An alien invasive management plan for the site must be created.</li> <li>• An in-situ search and rescue plan must be developed and implemented for succulents and geophytes that will be impacted by the construction of the project site.</li> <li>• Plant translocation to adjacent suitable habitat may only be done for species that are not range restricted and for populations that have not been quantified as regionally significant.</li> <li>• In such cases that this is not feasible, any requirement for translocation must be discussed with the relative authorities prior to translocation taking place.</li> <li>• The vegetation under the solar panels will be brushcut during the construction and operational phases. The vegetation should be allowed to return to its natural state once the infrastructure has been decommissioned.</li> </ul>
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Nature: Loss of near intact Vaal Vet Sandy Grassland <sup>37</sup>		
	Without Mitigation	With Mitigation
Extent / Spatial Scope	None	None
Duration	None	None
Magnitude / Severity	None	None
Probability	None	None
Significance	None	None
Status	None	None
Reversibility.	None	None
Can impact be mitigated?	Not necessary	
Mitigation:	None	

Nature: Loss of plant species of conservation concern		
	Without Mitigation	With Mitigation
Extent / Spatial Scope	Localised	Localised
Duration	Long Term	Long Term
Magnitude / Severity	Moderate	Moderate
Probability	May occur	May occur
Significance	High	Moderate

<sup>37</sup> The project Infrastructure has been designed to avoid the impacts on the endangered near intact Vaal-Vet Sandy Grassland.

<b>Status</b>	Negative	Negative
<b>Reversibility.</b>	Reversible	Reversible
<b>Can impact be mitigated?</b>	Achievable	
<b>Mitigation:</b>	.Same mitigations as listed above.	

<b>Nature: Loss of Faunal Habitat</b>		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent / Spatial Scope</b>	Localised	Localised
<b>Duration</b>	Permanent	Permanent
<b>Magnitude / Severity</b>	Moderate	Moderate
<b>Probability</b>	Definate	Definate
<b>Significance</b>	High	Moderate
<b>Status</b>	Negative	Negative
<b>Reversibility.</b>	Reversible	Reversible
<b>Can impact be mitigated?</b>	Difficult	
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>• Rehabilitation efforts must provide habitat for faunal species by placing logs and rocks at strategic sites to provide shelter for small mammals and reptiles.</li> <li>• Construction vehicles and machinery must not encroach into identified 'no-go' areas or areas outside the project footprint.</li> <li>• Employees must be prohibited from making open fires during the construction phase to prevent uncontrolled run-away fires</li> </ul>	

<b>Nature: Disruption of Ecosystem Function and Process</b>		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent / Spatial Scope</b>	Localised	Localised
<b>Duration</b>	Permanent	Permanent
<b>Magnitude / Severity</b>	Moderate	Moderate
<b>Probability</b>	Probable	Probable
<b>Significance</b>	Moderate	<b>Moderate</b>
<b>Status</b>	Negative	Negative
<b>Reversibility.</b>	irreversible	irreversible
<b>Can impact be mitigated?</b>	Difficult	
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>• Rehabilitate laydown areas</li> <li>• Use existing access roads and upgrade these where necessary</li> <li>• The property to the south of the project infrastructure should remain intact to ensure the continued functioning of the ecological corridor that facilitates the movement of plant and animal species</li> </ul>	

<b>Nature: Disturbance to faunal species and potential reduction in abundance and mortality of species</b>		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent / Spatial Scope</b>	Localised	Localised

<b>Duration</b>	Short Term	Short Term
<b>Magnitude / Severity</b>	Moderate	Moderate
<b>Probability</b>	Definite	Definite
<b>Significance</b>	Low	Low
<b>Status</b>	Negative	Negative
<b>Reversibility.</b>	Reversible	Reversible
<b>Can impact be mitigated?</b>	Difficult	
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>• All night lighting must be minimised and if required, only down lighting must be used and placed as low as practical and low light emitting bulbs (LED's).</li> <li>• Vehicles and machinery must meet best practice standards this will minimise noise and vibrations.</li> <li>• Staff and contractors' vehicles must comply with speed limits of maximum of 40km/hr</li> <li>• Project must start and be completed within the minimum timeframe. i.e. may not be started and left incomplete.</li> <li>• ECO (or relevant person) to walk ahead of clearing construction machinery and move slow moving species, e.g. tortoises, out of harms way and into suitable neighbouring habitat.</li> <li>• Any faunal species that may die as a result of construction must be recorded (photographed, gps co-ord) and if somewhat intact preserved and donated to SANBI or nearest university or museum.</li> <li>• Any faunal species observed onsite must be recorded (photographed, gps co-ord) and loaded onto iNaturalist.</li> <li>• Staff and contractors are not permitted to capture, collect or eat any faunal species onsite.</li> <li>• No animals may be killed by any staff and/or contractors related to the project, including snakes. An individual/s must be trained in snake handling to relocate snakes.</li> </ul>	

### 6.4.2 Operational Phase Terrestrial Biodiversity impacts

**Table 23:** Assessment of Operational Phase Terrestrial Biodiversity Impacts.

<b>Nature:</b> Infestation of Alien Plant Species		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent / Spatial Scope</b>	Study Area	Study Area
<b>Duration</b>	Permanent	Permanent
<b>Magnitude / Severity</b>	Severe	Severe
<b>Probability</b>	Definite	Probable
<b>Significance</b>	High	<b>Low</b>
<b>Status</b>	Negative	Negative
<b>Reversibility.</b>	Reversible	Reversible
<b>Can impact be mitigated?</b>	Achievable	
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>• The site must be checked regularly for the presence of alien invasive species. When alien invasive species are found, immediate action must be taken to remove them.</li> <li>• The prickly pears currently noted on site must be removed and disposed of.</li> </ul>	

	<ul style="list-style-type: none"> <li>• An alien invasive management plan must be incorporated into the EMPr.</li> <li>• The ECO must create a list with accompanying photographs of possible alien invasive species that could occur on site prior to construction. This photo guide must be used to determine if any alien invasive species are present.</li> </ul>
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### 6.4.3 Decommissioning Phase Terrestrial Biodiversity Impacts

**Table 24:** Assessment of Decommissioning Phase Terrestrial Biodiversity Impacts.

<b>Nature:</b> Loss of indigenous vegetation		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent / Spatial Scope</b>	Study Area	Study Area
<b>Duration</b>	Permanent	Permanent
<b>Magnitude / Severity</b>	Moderate	Moderate
<b>Probability</b>	Definite	Definite
<b>Significance</b>	Moderate	<b>Moderate</b>
<b>Status</b>	Negative	Negative
<b>Reversibility.</b>	Reversible	Reversible
<b>Can impact be mitigated?</b>	Difficult	
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>• Construction vehicles and machinery must not encroach into identified 'no-go' areas or areas outside the project footprint.</li> <li>• Topsoil (20 cm, where possible) must be collected and stored in an area of low sensitivity and used to rehabilitate impacted areas that are no longer required during the operational phase (e.g. laydown areas).</li> <li>• Only indigenous species must be used for rehabilitation.</li> <li>• Lay down areas must not be located within any sensitive features such as watercourses, drainage lines or on rocky outcrops.</li> <li>• Employees must be prohibited from making open fires during the construction phase.</li> <li>• Employees must be prohibited from collecting any plants.</li> <li>• An alien invasive management plan for the site must be created</li> </ul>	

<b>Nature:</b> Disturbance to Faunal Species and potential reduction in abundance and mortality of Faunal Species		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent / Spatial Scope</b>	Localised	Localised
<b>Duration</b>	Short term	Short Term
<b>Magnitude / Severity</b>	Severe	Severe
<b>Probability</b>	Definite	Definite
<b>Significance</b>	Low	<b>Low</b>
<b>Status</b>	Negative	Negative
<b>Reversibility.</b>	Reversible	Reversible
<b>Can impact be mitigated?</b>	Difficult	
<b>Mitigation:</b>	Implementation of all mitigations identified for the construction phase.	



#### 6.4.4 Concluding Statement – Terrestrial Biodiversity Impacts

The field survey assessed the Site Ecological Index (SEI) for the two vegetation types present within the PAOI. The near-intact Vaal-Vet Sandy Grassland (Endangered) was found to have an SEI of high and the Klerksdorp Thornveld (Least Concern) was determined to have an SEI of Medium. Project infrastructure has been designed to avoid impacts to the near-intact Vaal-Vet Sandy Grassland by placing it in previously cultivated land and Klerksdorp Thornveld. This has ensured that there are negligible impacts to the endangered vegetation type.

No amphibian or reptile species of conservation concern has distribution ranges that include the project area. Four vulnerable and seven near threatened mammal species have a distribution which includes the project area. Of these species, only three (Southern African Hedgehog, Grey Rhebok and Serval) have a high likelihood of occurrence within the PAOI. Since the serval is typically associated with watercourses and the rhebok with ridges, the likelihood that the project will have a direct impact on these species' habitat is low. The hedgehog prefers dense vegetation and rocky outcrops for nesting and foraging and as such the likelihood of it using the project site is low as neither of these habitat requirements are present.

Project infrastructure will impact 4.7% of the remaining extent of Klerksdorp Thornveld. The field survey determined that this habitat is characterised by a relatively low diversity throughout most of the site.

The planning unit in which the project is located is listed as a CBA1. However a portion of the site along the northern boundary was previously cultivated and some areas are currently planted with Eucalyptus. As mentioned previously, subsequent to the publication of the North West Biodiversity Spatial Plan, SANBI published guides for developing Critical Biodiversity Area maps. These guidelines require that degraded or secondary natural areas are classified as ESAs, and not CBAs and as such the previously cultivated areas should be viewed as ESAs rather than CBAs. Additionally, the underlying reasons for the site being a CBA1 was due to it being an ecological corridor. Given that the infrastructure is situated on the edge of the CBA (now ESA) and will result in the loss of 6.3% of the corridor in the project boundary, the functioning of the corridor will not be significantly impacted by project infrastructure and the processes and conservation of these features can continue.

Project infrastructure has been designed to avoid sensitive features such as the endangered near-intact Vaal-Vet Sandy Grassland and to minimise the impact on the functioning of the area as an ecological corridor. Further to the above, impacts on the terrestrial plant and faunal species and associated habitats can be reduced to acceptable levels through the implementation of mitigation measures. The specialist is therefore of the opinion that the development can proceed provided the recommendations contained in this report are implemented.

#### 6.5 AVIFAUNAL IMPACTS

An Avifaunal Impact Assessment was undertaken by Mr Lukas Niemand of Pachnoda Consulting and is attached in Annexure E3. The following has been summarised from this assessment.

The specialist identified the following avifaunal impacts that have been assessed further in the tables below:

- Loss of habitat and displacement of birds
- Creation of "new" avian habitat and bird pollution
- Collision trauma caused by photovoltaic panels (the "lake-effect")
- Interaction with overhead power lines and reticulation
- Areas where bird collisions are likely to be high could be ameliorated by marking the lines with
- Physical disturbances and habitat destruction caused during construction and maintenance

### 6.5.1 Construction Phase Avifaunal Impacts

**Table 25:** Assessment of Avifaunal Impacts during the construction phase.

<b>Nature:</b> Losses of natural habitat and displacement of birds through physical transformation, modifications, removals and land clearance. This impact is mainly restricted to the construction phase and is permanent.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Local	Local
<b>Duration</b>	Permanent	Permanent
<b>Magnitude</b>	Moderate	Moderate
<b>Probability</b>	Highly Probable	Highly Probable
<b>Significance</b>	Medium	Medium
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Low	Low
<b>Irreplaceable loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	Yes, to some extent	Yes, to some extent
<b>Mitigation:</b> It is difficult to mitigate against the loss of habitat since clearing of vegetation (or habitat) will be required for the infrastructure associated with the project. Both the PV facility and associated infrastructure occur predominantly on habitat types of medium and low-medium sensitivity. The best practicable mitigation will be to consolidate infrastructure to areas where existing impacts occur.		

<b>Nature:</b> The creation of novel or new avian habitat for commensal bird species or superior competitive species. This is expected to occur during the operation phase of the facility.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Footprint	Footprint
<b>Duration</b>	Medium-term	Medium-term
<b>Magnitude</b>	Minor	Minor
<b>Probability</b>	Probable	Improbable
<b>Significance</b>	Low	Low
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Moderate	Moderate
<b>Irreplaceable loss of resources?</b>	No	No
<b>Can impacts be mitigated?</b>	Yes, with experimentation	Yes
<b>Mitigation:</b> Apply bird deterrent devices and remove nest structures constructed on infrastructure associated with the PV facility under the guidance of the ECO.		

### 6.5.2 Operational Phase Avifaunal Impacts

**Table 26:** Assessment of Avifaunal Impacts During the operational phase

<b>Nature:</b> Avian collision impacts related to the PV facility during the operation phase (collision with the PV panels).		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Local	Local
<b>Duration</b>	Long-term	Long-term
<b>Magnitude</b>	Moderate	Low
<b>Probability</b>	Probable	Probable
<b>Significance</b>	Medium	Medium
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Low	Low
<b>Irreplaceable loss of resources?</b>	No, although threatened species are present in the area, these could become displaced while waterbirds are uncommon due to the absence of prominent water/wetland features in the area.	No
<b>Can impacts be mitigated?</b>	Yes, to some extent	Yes, to some extent

**Mitigation:**

Apply bird deterrent devices to the panels for birds that may mistake the panels for open water and to prevent them from landing on the panels. If pre-construction and post-construction monitoring predicts and/or confirms any bird mortalities, an option is to employ video cameras at selected areas to document bird mortalities and to conduct direct observations and carcass searches on a regular and systematic basis.

**Nature:** Avian collision impacts related to overhead power lines during operation.

	Without mitigation	With mitigation
<b>Extent</b>	Local	Local
<b>Duration</b>	Long-term	Long-term
<b>Magnitude</b>	Low	Minor
<b>Probability</b>	Probable	Probable
<b>Significance</b>	Low	Low
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Low	Low
<b>Irreplaceable loss of resources?</b>	Yes (to some extent), owing to the potential loss of large terrestrial bird and certain bird of prey species	Yes
<b>Can impacts be mitigated?</b>	Yes	Yes

**Mitigation:**

Apply bird deterrent devices to the power lines and make use of "bird-friendly" pylon structures (if pylons are used). Avoid the placement of any cattle feedlots, kraals and watering points in close proximity to any overhead electrical infrastructure in order to avoid attracting birds of prey or scavenger species such as vultures to the study site. To aid post-construction monitoring and/or monitoring of bird mortality rates, it is advised to conduct direct observations and carcass searches on a regular and systematic basis.

**Nature:** Avian electrocution related to the new distribution lines during operation.

	Without mitigation	With mitigation
<b>Extent</b>	Local	Local
<b>Duration</b>	Long-term	Long-term
<b>Magnitude</b>	Low	Minor
<b>Probability</b>	Probable	Probable
<b>Significance</b>	Low	Low
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Low	Low
<b>Irreplaceable loss of resources?</b>	Yes (to some extent), owing to the potential loss of large terrestrial bird and certain bird of prey species	Yes
<b>Can impacts be mitigated?</b>	Yes, to some extent	Yes, to some extent

**Mitigation:**

Avoid the placement of any cattle feedlots, kraals and watering points in close proximity to any overhead electrical infrastructure in order to avoid attracting birds of prey or scavenger species such as vultures to the study site. Grazing of cattle at or in close proximity to distribution lines should be monitored and preferably be avoided (to minimise potential livestock carcasses near distribution lines). Make use of bird-friendly pylons and bird guards as recommended by EWT.

### 6.5.3 Decommissioning Phase Avifaunal Impacts

The decommissioning avifaunal impacts are deemed to be the same as the construction phase impacts. Please see the tables above for an assessment of the construction phase impacts, that will apply equally to decommissioning.

### 6.5.4 Concluding Statement – Avifauna

Eight prominent avifaunal habitat types were identified on the study site, and consisted of open savannoid grassland with bush clump mosaics, short Klerksdorp Thornveld, dense bushveld on outcrops, secondary (regenerating) grassland on old agricultural fields, dense short Grewia-Vachellia

shrubveld, artificial livestock watering points, Eucalyptus plantations and transformed areas consisting of build-up land. The highest number of bird species and bird individuals were observed from the dense bushveld on outcrops, dense thornveld/shrubveld and from the artificial livestock watering points. Approximately 223 bird species were expected to occur in the wider study area, of which 118 species were observed in the study site and immediate surroundings. The expected richness included 11 threatened or near threatened species, 16 southern African endemics and 25 are near-endemic species. The endangered Secretarybird (*Sagittarius serpentarius*) was confirmed from open grassland habitat south of the study site, with a nest located 1.9km south of the study site. Ten southern African endemics and 14 near-endemic species were confirmed on the study site and immediate surroundings.

The proposed PV layout did not overlap with a prescribed Secretarybird buffer area, whereby an evaluation of potential and likely impacts on the avifauna revealed that the impact significance was moderate to low after mitigation (depending on the type of impact). In addition, the study site did not overlap with any major avian flyway, which explains the low occurrence of waterbird taxa at the study site.

No fatal-flaws were identified during the assessment, although it is strongly recommended that the proposed mitigation measures and monitoring protocols be implemented during the construction and operational phase of the project.

## 6.6 AGRICULTURAL IMPACTS

Mr Johann Lanz completed a specialist assessment of the potential impacts of Doornhoek 1 PV on the agricultural environment. A copy of this assessment is attached in Annexure E3, and the outcome of the assessment is summarised below.

The agricultural specialist identified 3 potential direct negative impacts on agricultural resources:

- **Loss of agricultural potential by occupation of land** - Agricultural land directly occupied by the development infrastructure will become unavailable for agricultural use, with consequent potential loss of agricultural productivity and employment. This impact is relevant only in the construction phase. No further loss of agricultural land use occurs in subsequent phases.
- **Loss of agricultural potential by soil degradation** – This impact only becomes relevant once the land is returned to agricultural land use after decommissioning. Soil can be degraded by impacts in three different ways: erosion; topsoil loss; and contamination. Erosion can occur as a result of the alteration of the land surface run-off characteristics, which can be caused by construction related land surface disturbance, vegetation removal, and the establishment of hard surface areas including roads. Loss of topsoil can result from poor topsoil management during construction related excavations. Hydrocarbon spillages from construction activities can contaminate soil. Soil degradation will reduce the ability of the soil to support vegetation growth. This impact occurs only during the construction and decommissioning phases. Due to the very low slope of the land, the site has a low susceptibility to soil erosion.
- **Dust impact** – The disturbance of the soil surface, particularly during construction, will generate dust that can negatively impact surrounding veld and farm animals.

The specialist furthermore identified two positive agricultural impacts:

- **Enhanced agricultural potential through increased financial security for farming operations** - Reliable income will be generated by the farming enterprises through the lease of the land to the energy facility. This is likely to increase their cash flow and financial security and could improve farming operations and productivity through increased investment into farming.
- **Improved security against stock theft and other crime due to the presence of security infrastructure and security personal at the facility.**

### 6.6.1 Assessment of Agricultural Impacts

All agricultural impacts of this proposed development are assessed as being of **low significance**. For the following reasons:

- The proposed development will occupy land that is of very limited land capability and is totally unsuitable for the production of cultivated crops. There is not a scarcity of such agricultural land in South Africa and its conservation for agriculture is not therefore a priority.
- The proposed development poses a low risk in terms of causing soil degradation, which can be adequately and fairly easily managed by mitigation management actions. In addition, the degradation risk is only to land of low agricultural value, and the significance of the impact is therefore low.
- The proposed development offers some positive impact on agriculture by way of improved financial security for farming operations, as well as wider, societal benefits.

### 6.6.2 Cumulative agricultural impacts

DEFF compliance for this project requires considering all renewable energy applications within a 30km radius. There are no other renewable energy project applications within 30km of the proposed site on the DEFF database. However, there is an additional project associated with this one, the Doornhoek 2 PV facility with a capacity of 50MW.

The cumulative impact is affecting an agricultural environment that has been declared a REDZ precisely because it is an environment that can accommodate numerous renewable energy developments without exceeding acceptable levels of agricultural land loss.

In quantifying the cumulative impact, the area of land taken out of agricultural production (grazing) as a result of the two developments (total generation capacity of 165 MW) will amount to a total of approximately 280 hectares. As a proportion of the total area within a 30km radius (approximately 282,700 ha), this amounts to only 0.10% of the surface area. That is well within an acceptable limit in terms of loss of grazing land, of which there is no particular scarcity in the country. This is particularly so when considered within the context of the following point.

In order for South Africa to achieve its renewable energy generation goals, agriculturally zoned land will need to be used for renewable energy generation. It is far more preferable to incur a cumulative loss of lower potential agricultural land in a region which has been designated as a REDZ, than to lose agricultural land that has a higher potential, and that is much scarcer, to renewable energy development elsewhere in the country.

As discussed above, 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 included in the EMP. If the risk for each individual development is low, then the cumulative risk is also low.

Due to all of the considerations discussed above, the cumulative impact of loss of agricultural land use will not have an unacceptable negative impact on the agricultural production capability of the area. The proposed development is therefore acceptable in terms of cumulative impact, and it is therefore recommended that it is approved.

### 6.6.3 Concluding Statement - Agriculture

The agricultural impact of this proposed development is assessed here as being of 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. This is substantiated by the following points:

- The proposed development will occupy only land that is of limited land capability and is not suitable or used for crop production. There is not a scarcity of such agricultural land in South Africa and its conservation for agricultural production is not therefore a priority.
- The amount of agricultural land loss is within the allowable development limits prescribed by the agricultural protocol. These limits reflect the national need to conserve valuable agricultural land and therefore to steer, particularly renewable energy developments, onto land with lower agricultural production potential.
- The proposed development also offers some 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 agriculture. The area between and underneath the panels 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 is within a REDZ, which is an area that has specifically been designated within South Africa for the prioritisation of renewable energy development. The designation of the REDZ has taken into account the country's need to balance renewable energy development against the need to ensure the conservation of land required for agricultural production and national food security.
- The proposed development will also have the wider societal benefits of generating additional income and employment in the local economy. In addition, it will contribute to the country's need for energy generation, particularly renewable energy that has lower environmental and agricultural impact, on a national scale, than existing, coal powered energy generation.

Therefore, from an agricultural impact point of view, the proposed development is considered acceptable and the specialist has recommended that it be approved.

## **6.7 HERITAGE IMPACTS**

A detailed Heritage Impact Assessment including an Archaeological Impact Assessment and Palaeontology Impacts Assessment was undertaken by Mr Jaco van der Walt of Beyond Heritage with palaeontological input from professor Marian Bamford. A copy of these assessments are attached in Annexures E5 and E6 and the outcome of the various assessments are summarised below.

Impacts to heritage resources without mitigation within the project footprint will be permanent and negative and occur during the pre-construction and construction activities. The farmstead recorded at DH002 is assumed to be older than 60 years and is therefore protected by the NHRA due to their age but will not be directly impacted on by the proposed layout.

Similarly, the Stone Age scatter DH003 are located outside of the Project footprint but on the periphery of the PV facility. This low density scatter is out of context and scattered too sparsely to be significant apart from mentioning it in this report. The isolated MSA artefact (DH001) is of low significance and do not warrant further mitigation.

The proposed project area is also situated near the Bosworth Rock engraving National Monument (7 km northeast of the Project). This site is located well away from the impact area and will not be affected by the proposed project.

**Table 27.** Impact assessment of the proposed project on the Existing Farmstead (DH002)

<b>Nature:</b> During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Local	Local
<b>Duration</b>	Permanent	Permanent
<b>Magnitude</b>	Moderate	Low
<b>Probability</b>	Improbable	Improbable
<b>Significance</b>	Low	<b>Low</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Not reversible	Not reversible
<b>Irreplaceable loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	NA	NA
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>• Implementation of a chance find procedure for the Project;</li> <li>• Heritage walkdown of the final impact areas prior to construction;</li> <li>• Visual recommendations for the structures at DH002 as per the Visual Impact Assessment by Stead (2022) should be adhered to;</li> <li>• Known heritage sites (apart from DH001) in the area should be indicated on development plans and avoided during all phases of the Project.</li> </ul>		

**Table 28:** Impact assessment of the proposed project on the Stone Age Scatter (DH001)

<b>Nature:</b> During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Local	Local
<b>Duration</b>	Permanent	Permanent
<b>Magnitude</b>	Moderate	Low
<b>Probability</b>	Improbable	Improbable
<b>Significance</b>	Low	<b>Low</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Not reversible	Not reversible
<b>Irreplaceable loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	NA	NA
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>• Implementation of a chance find procedure for the Project;</li> <li>• Heritage walkdown of the final impact areas prior to construction;</li> <li>• Visual recommendations for the structures at DH002 as per the Visual Impact Assessment by Stead (2022) should be adhered to;</li> <li>• Known heritage sites (apart from DH001) in the area should be indicated on development plans and avoided during all phases of the Project.</li> </ul>		

### 6.7.1 Concluding Statement - Heritage

The Project area is marked by Quaternary sands and soils and is used for cultivation and grazing. However, some heritage sites are known in the wider geographical area consisting of Rock Engraving sites, one which is a National Monument located ~ 7 km northeast of the Project. Heritage finds in the Project area are limited to ruins of a farmstead (DH002) and a low-density scatter of Stone Age material (DH 003) both located outside of the Project footprint and will not be directly impacted on. An isolated MSA artefact recorded as an observation point (DH001) is located within the Project footprint but is of low significance and do not warrant further mitigation. No known heritage sites of significance will be directly impacted on by the current layout.

According to the SAHRA Paleontological sensitivity map the study area is of insignificant to moderate paleontological significance, and an independent study was conducted for this aspect. The

palaeontology specialist concluded that it is extremely unlikely that any fossils would be preserved in the overlying soils and sands of the Quaternary and recommended that the project be authorised with a Fossil Chance Find Protocol to be added to the EMPr.

The impact to heritage resources can be mitigated to an acceptable level provided that the recommendations in this report are adhered to.

## 6.8 VISUAL IMPACTS

Mr Steven Stead of Visual Resource Management Africa (VRMA) undertook a detailed visual impact assessment of the proposed Doornhoek 1 PV. A copy of this assessment is attached in Annexure E8 of the BAR and a summary outcome thereof is provided below.

The visual specialist identified the following impacts that have been assessed in the tables below.

### Construction:

- Loss of site landscape character due to the removal of vegetation and the construction of the PV structures and associated infrastructure.
- Wind-blown dust due to the removal of large areas of vegetation.
- Possible soil erosion from temporary roads crossing drainage lines.
- Wind-blown litter from the laydown and construction sites.

### Operation:

- Loss of site landscape character due to the operation of the PV structures and associated infrastructure.
- Visual intrusion to adjacent property owners and road users.

### Decommissioning:

- Movement of large vehicles required for the removal of the PV panels, power lines, mono-poles and substations.
- Wind-blown dust from impacts to vegetation.
- Wind-blown litter from the laydown and construction sites.

### 6.8.1 Construction Phase Visual Impacts

**Table 29:** Assessment of Visual Impacts during the construction phase.

<b>Nature:</b> Short-term landscape change from the current rural agricultural sense of place to the semi-industrial Renewable Energy landscape.		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent / Spatial Scope</b>	Local	Local
<b>Duration</b>	Short term	Short term
<b>Magnitude / Severity</b>	High	Medium - Low
<b>Probability</b>	Likely	Likely
<b>Significance</b>	High	<b>Medium</b>
<b>Status</b>	Negative	Negative
<b>Reversibility.</b>	Medium	Medium
<b>Can impact be mitigated?</b>	Medium	
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>• Exclude the Hill Buffer area is excluded from the final development footprint.</li> <li>• Retain all trees within the 50m boundary buffer area, as well as the outer rows of the gum-tree windbreaks.</li> </ul>	



	<ul style="list-style-type: none"> <li>• Limit the height of the PV panels to max. 2.5m above the ground.</li> <li>• Plant trees around the stone house heritage complex.</li> <li>• Dust mitigation.</li> </ul>
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### 6.8.2 Operational Phase Visual Impacts

**Table 30:** Assessment of Visual Impacts during the Operational phase.

<b>Nature:</b> Long-term landscape change from the current rural agricultural sense of place to the semi-industrial Renewable Energy landscape.		
	Without Mitigation	With Mitigation
<b>Extent / Spatial Scope</b>	Local	Local
<b>Duration</b>	Long Term	Long Term
<b>Magnitude / Severity</b>	Medium - High	Medium
<b>Probability</b>	Likely	Likely
<b>Significance</b>	High	<b>Medium</b>
<b>Status</b>	Negative	Negative
<b>Reversibility.</b>	Medium	Medium
<b>Can impact be mitigated?</b>	Medium	
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>• Allow nature growth of the trees in the buffer without the trees becoming a fire risk.</li> <li>• Allow cattle access to the buffer areas to keep managing grasslands and retain a link to the rural agricultural sense of place.</li> </ul>	

### 6.8.3 Decommissioning Phase Visual Impacts

**Table 31:** Assessment of Visual Impacts during the decommissioning phase.

<b>Nature:</b> Short-term landscape change from the removal of the PV structures, followed by rehabilitation of the impacted areas back to agricultural lands.		
	Without Mitigation	With Mitigation
<b>Extent / Spatial Scope</b>	Local	Local
<b>Duration</b>	Short Term	Short Term
<b>Magnitude / Severity</b>	Medium	Medium
<b>Probability</b>	Likely	Likely
<b>Significance</b>	Medium	<b>Low</b>
<b>Status</b>	Negative	Negative
<b>Reversibility.</b>	Medium	Medium
<b>Can impact be mitigated?</b>	Medium	
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>• Dust suppression measures.</li> <li>• Litter management measures.</li> <li>• Rehabilitation of impacted areas to agriculturally viable grasslands.</li> </ul>	

#### 6.8.4 Concluding Statement – Visual

Located on a relatively prominent spur within the valley context of the Skoonspruit River, the viewshed extends across many farming/ small farming and rural residential receptors located within the Skoonspruit River Valley with many receptors identified. Although not pristine, the Skoonspruit River Valley does have value as a landscape resource, with no dominating mining landforms to degrade landscape character. The specialist stated that the development should only be considered with mitigation.

With mitigation, the visual intrusion of the proposed semi-industrial landscape can be moderated to some degree, with the use of existing and new tree plantings providing a partial mitigation against the risks of skyline intrusion, and rural landscape degradation. The smaller development parcels that were defined during the EIA process would have less visibility to the surrounding rural receptors.

Retaining of the existing gum tree windbreaks that are located on the ridgeline, would reduce the skyline visual intrusion to some degree. The landscape also includes a 132KV Eskom power line that does degrade the local landscape character of the ridgeline to some degree. There are also many trees in the landscape that currently reduce the visibility of the site for close proximity and southern receptors.

As the site is located within the Klerksdorp REDZ, and the size, skyline intrusion area and height of the PV panels have been significantly reduced, the recommendation of the Landscape and Visual Impact Assessment is that development should only take place with mitigation.

### 6.9 AQUATIC BIODIVERSITY IMPACTS

An Aquatic Biodiversity Compliance Statement was undertaken by Scientific Aquatic Services and is attached in Annexure E2. The following section has been summarised from this study.

The aquatic biodiversity specialist concluded that no freshwater resources as defined in the National Water Act are present on site. The proposed footprint has furthermore been set back to be outside of the 500m Zone of Regulation from any watercourse. The proposed project is therefore unlikely to have any impact on Aquatic Biodiversity.

### 6.10 SOCIAL IMPACTS

Savannah Environmental undertook a Social Impact Assessment of the proposed Doornhoek 1 PV. A copy of this assessment is included in **Annexure E8**, and the following summary is provided in this regard.

#### 6.10.1 Assessment of social impacts associated with the construction phase

The Social Specialist identified the following impacts that are assessed in the table below.

- Direct and indirect employment opportunities
- Economic multiplier effects
- Influx of jobseekers and change in population
- Safety and security impacts
- Impacts on daily living and movement patterns
- Nuisance impacts, including noise and dust
- Visual impacts and sense of place impacts

**Table 32:** Assessment of positive social impacts during the construction phase

<b>Nature:</b> The creation of direct and indirect employment opportunities during the construction phase of the project.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Local - Regional	Local - Regional
<b>Duration</b>	Short term	Short term

<b>Magnitude</b>	Minor	Moderate
<b>Probability</b>	Highly Probable	Definite
<b>Significance</b>	<b>Low</b>	<b>Medium</b>
<b>Status (positive or negative)</b>	Positive	Positive
<b>Reversibility</b>	N/A	N/A
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>To enhance the local employment, skills development and business opportunities associated with the construction phase the following measures should be implemented:</li> <li>It is recommended that local employment policy is adopted to maximise the opportunities made available to the local labour force. Doornhoek PV (Pty) Ltd should make it a requirement for contractors to implement a 'locals first' policy, especially for semi and low skilled job categories. Enhance employment opportunities for the immediate local area Matlosana Local Municipality, if this is not possible, then the broader focus areas should be considered for sourcing workers.</li> <li>In the recruitment selection process; consideration must be given to women during recruitment process</li> <li>It is recommended to set realistic local recruitment targets for the construction phase</li> <li>Training and skills development programmes should be initiated prior to the commencement of the construction phase</li> </ul>		

<b>Nature:</b> Significance of the impact from the economic multiplier effects from the use of local goods and services.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Local - Regional	Local - Regional
<b>Duration</b>	Short term	Short term
<b>Magnitude</b>	Low	Moderate
<b>Probability</b>	Highly Probable	Definite
<b>Significance</b>	<b>Medium</b>	<b>Medium</b>
<b>Status (positive or negative)</b>	Positive	Positive
<b>Reversibility</b>	N/A	N/A
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>A local procurement policy should be adopted to maximise the benefit to the local economy and the existing local SMMEs.</li> <li>A database of local companies, specifically Historically Disadvantaged Individuals (HDIs) which qualify as potential service providers (e.g. construction companies, security companies, catering companies, waste collection companies, transportation companies etc.) should be created and companies listed thereon should be invited to bid for project-related work where applicable.</li> <li>Local procurement must be encouraged along with engagement with local authorities and business organisations to investigate the possibility of procurement of construction materials, goods and products from local suppliers where feasible.</li> </ul>		

<b>Nature:</b> In-migration of labourers in search of employment opportunities, and a resultant change in population, and increase in pressure on local resources and social networks, or existing services and infrastructure.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Local	Local
<b>Duration</b>	Short term	Short term
<b>Magnitude</b>	Moderate	Low
<b>Probability</b>	Improbable	Improbable
<b>Significance</b>	<b>Low</b>	<b>Low</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Yes	
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impacts be mitigated?</b>	Yes	

<p><b>Mitigation:</b></p> <ul style="list-style-type: none"> <li>• Develop and implement a recruitment protocol in consultation with the municipality and local community leaders. Ensure that the procedures for applications for employment are clearly communicated.</li> <li>• Develop and implement a local procurement policy which prioritises “locals first” to prevent the movement of people into the area in search of work.</li> <li>• Engage with local community representatives prior to construction to facilitate the adoption of the local’s first procurement policy.</li> <li>• Provide transportation for workers to ensure workers can easily access their place of employment and do not need to move closer to the project site.</li> <li>• Compile and implement a grievance mechanism.</li> <li>• Appoint a Community Liaison Officer (CLO) to assist with the procurement of local labour.</li> <li>• Prevent the recruitment of workers at the construction site.</li> <li>• Implement a method of communication whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.</li> <li>• Establish clear rules and regulations for access to the construction site.</li> <li>• Appoint a security company and implement appropriate security procedures to ensure that workers to not remain on site after working hours.</li> <li>• Inform local community organisations and policing forums of construction activities and times and the duration of the construction phase.</li> </ul>
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**Nature:** Temporary increase in safety and security concerns associated with the influx of people during the construction phase.

	Without mitigation	With mitigation
<b>Extent</b>	Local	Local
<b>Duration</b>	Short term	Short term
<b>Magnitude</b>	High	Moderate
<b>Probability</b>	Probable	Improbable
<b>Significance</b>	<b>Medium</b>	<b>Low</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Yes	
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impacts be mitigated?</b>	Yes	

<p><b>Mitigation:</b></p> <ul style="list-style-type: none"> <li>• Working hours must preferably be restricted to daylight hours during the construction phase. Where deviation of working hours is required, it must be approved by the relevant local authorities and surrounding landowners must be notified.</li> <li>• All vehicles must be road worthy, and drivers must be licensed, obey traffic rules, follow speed limits and made aware of the potential road safety issues.</li> <li>• Construction vehicles should be inspected regularly by the EPC contractor to ensure their road worthiness.</li> <li>• Adequate and strategically placed traffic warning signs and control measures must be placed along the gravel farm access roads to warn road users of the construction activities taking place for the duration of the construction phase. Warning signs must be visible at all times, and especially at night and must be maintained throughout the construction phase.</li> <li>• Implement penalties for reckless driving as a way to enforce compliance to traffic rules.</li> <li>• Avoid heavy vehicle activity through residential areas during “peak” hours (when children are taken to school, people driving to work, etc.).</li> <li>• The developer and EPC contractor must ensure that all fencing along access roads is maintained in the present condition or repaired if disturbed or damaged due to construction activities.</li> <li>• The developer and EPC Contractor must ensure that the roads utilised for construction activities are either maintained in the present condition or upgraded if damaged (i.e. wear and tear) due to construction activities.</li> <li>• A protocol for communication must be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.</li> <li>• Undertake information sessions with the surrounding communities, and affected and adjacent landowners, prior to construction in order to ensure that communities are fully informed of the project to be developed in its final form. This must be undertaken through the appointment of a CLO.</li> </ul>
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<b>Nature:</b> Temporary increase in traffic disruptions and movement patterns during the construction phase.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Local – Regional	Local – regional
<b>Duration</b>	Short term	Short term
<b>Magnitude</b>	High	Moderate
<b>Probability</b>	Probable	Probable
<b>Significance</b>	<b>Medium</b>	<b>Medium</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Yes	
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>Working hours must preferably be restricted to daylight hours during the construction phase. Where deviation of working hours is required, it must be approved by the relevant local authorities and surrounding landowners must be notified.</li> <li>All vehicles must be road worthy, and drivers must be licensed, obey traffic rules, follow speed limits and made aware of the potential road safety issues.</li> <li>Construction vehicles should be inspected regularly by the EPC contractor to ensure their road worthiness.</li> <li>Adequate and strategically placed traffic warning signs and control measures must be placed along the gravel farm access roads to warn road users of the construction activities taking place for the duration of the construction phase. Warning signs must be visible at all times, and especially at night and must be maintained throughout the construction phase.</li> <li>Implement penalties for reckless driving as a way to enforce compliance to traffic rules.</li> <li>Avoid heavy vehicle activity through residential areas during “peak” hours (when children are taken to school, people driving to work, etc.).</li> <li>The developer and EPC contractor must ensure that all fencing along access roads is maintained in the present condition or repaired if disturbed or damaged due to construction activities.</li> <li>The developer and EPC Contractor must ensure that the roads utilised for construction activities are either maintained in the present condition or upgraded if damaged (i.e. wear and tear) due to construction activities.</li> <li>A protocol for communication must be implemented whereby procedures to lodge complaints are set out for the local community to express any complaints or grievances with the construction process.</li> <li>Undertake information sessions with the surrounding communities, and affected and adjacent landowners, prior to construction to ensure that communities are fully informed of the project to be developed in its final form. This must be undertaken through the appointment of a CLO.</li> <li>The placement of the power line route within the grid connection corridor must avoid the sensitive land uses undertaken by the affected landowners as far as possible. Consultation with the affected landowners must be undertaken in this regard.</li> </ul>		

<b>Nature:</b> Nuisance impacts in terms of temporary increase in noise and dust.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Local	Local
<b>Duration</b>	Short term	Short term
<b>Magnitude</b>	High	Moderate
<b>Probability</b>	Highly probable	Probable
<b>Significance</b>	<b>Medium</b>	<b>Low</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Yes	
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>The movement of heavy vehicles associated with the construction phase through populated areas should be timed to avoid weekends, public holidays and holiday periods, where feasible.</li> </ul>		

- Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.
- A speed limit of 40km/hr should be implemented on gravel roads.
- Ensure all vehicles are road worthy, drivers are licensed and are made aware of the potential noise and dust issues.
- A CLO should be appointed. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.
- A stakeholder management plan must be implemented by the EPC contractor to address neighbouring farmer concerns regarding safety and security.

<b>Nature:</b> Intrusion impacts from construction activities will have an impact on the area's "sense of place".		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Local	Local
<b>Duration</b>	Short term	Short term
<b>Magnitude</b>	Low	Low
<b>Probability</b>	Highly probable	Probable
<b>Significance</b>	<b>Low</b>	<b>Low</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Yes	
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>• Limit noise generating activities to daylight working hours and avoid weekends and public holidays.</li> <li>• The movement of heavy vehicles associated with the construction phase should be timed to avoid weekends, public holidays and holiday periods where feasible.</li> <li>• Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.</li> <li>• All vehicles must be road-worthy and drivers must be licensed and made aware of the potential road safety issues and need for strict speed limits.</li> <li>• Communication, complaints and grievance channels must be implemented and contact details of the CLO must be provided to the relevant local communities.</li> <li>• Ensure proper management and tidiness of the construction site.</li> <li>• Implement the relevant mitigation measures as recommended in the Visual Impact Assessment.</li> </ul>		

**6.10.2 Assessment of social Impacts Associated with the operational phase.**

The social specialist identified both positive and negative impacts associated with the operational phase of the development, these impacts were identified as follows:

- Direct and indirect employment opportunities
- Development of non-polluting, renewable energy infrastructure
- Contribution to Local Economic Development (LED) and social upliftment
- Visual and sense of place impacts
- Impacts associated with the loss of agricultural land

An assessment of both these positive and negative impacts are included in the tables below.

**Table 33:** Assessment of social impacts during the operational phase.

<b>Nature:</b> The creation of employment opportunities and skills development opportunities during the operation phase.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Local-Regional	Local-regional
<b>Duration</b>	Long-term	Long-term
<b>Magnitude</b>	Low	Low
<b>Probability</b>	Highly probable	Definite

<b>Significance</b>	<b>Medium</b>	<b>Medium</b>
<b>Status (positive or negative)</b>	Positive	Positive
<b>Reversibility</b>	N/A	
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impacts be mitigated?</b>	Yes	
<p><b>Mitigation:</b></p> <ul style="list-style-type: none"> <li>It is recommended that a local employment policy is adopted by the developer to maximise the project opportunities being made available to the local community. Enhance employment opportunities for the immediate local area, City of Matlosana Local Municipality, if this is not possible, then the broader focus areas should be considered for sourcing employees.</li> <li>The recruitment selection process should seek to promote gender equality and the employment of women wherever possible</li> <li>The developer should establish vocational training programs for the local employees to promote the development of skills.</li> </ul>		

<b>Nature:</b> Renewable energy as an alternative		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Local-Regional	Local-Regional-National
<b>Duration</b>	Long-term	Long-term
<b>Magnitude</b>	Minor	Minor
<b>Probability</b>	Definite	Definite
<b>Significance</b>	<b>Medium</b>	<b>Medium</b>
<b>Status (positive or negative)</b>	Positive	Positive
<b>Reversibility</b>	Yes	
<b>Irreplaceable loss of resources?</b>	Yes	
<b>Can impacts be mitigated?</b>	No	
<p><b>Mitigation:</b> None identified.</p>		

<b>Nature:</b> Local upliftment and contribution to the economy		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Local-Regional- National	Local-Regional-National
<b>Duration</b>	Long-term	Long-term
<b>Magnitude</b>	Moderate	High
<b>Probability</b>	Highly probable	Highly probable
<b>Significance</b>	<b>Medium</b>	<b>Medium</b>
<b>Status (positive or negative)</b>	Positive	Positive
<b>Reversibility</b>	N/A	
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impacts be mitigated?</b>	Yes	
<p><b>Mitigation:</b></p> <ul style="list-style-type: none"> <li>A CNA must be conducted to ensure that the LED and social upliftment programmes proposed by the project are meaningful.</li> <li>Ongoing communication and reporting are required to ensure that maximum benefit is obtained from the programmes identified, and to prevent the possibility for such programmes to be misused.</li> <li>The programmes should be reviewed on an ongoing basis to ensure that they are best suited to the needs of the community at the time (bearing in mind that these are likely to change over time).</li> </ul>		

<b>Nature:</b> Visual impacts and sense of place impacts associated with the operation phase of the visual PV Facility.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Local	Local

<b>Duration</b>	Long-term	Long-term
<b>Magnitude</b>	Low	Minor
<b>Probability</b>	Highly Probable	Probable
<b>Significance</b>	<b>Medium</b>	<b>Low</b>
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	Yes	
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>Maintain and manage the associated infrastructure to be in a good and neat condition to ensure that no degradation of the area and the associated infrastructure servitude takes place and impacts the visual quality of the area.</li> <li>Implement the relevant mitigation measures as recommended in the Visual Impact Assessment.</li> </ul>		

<b>Nature:</b> Loss of agricultural land and overall productivity because of the operation of the proposed project on an agricultural property.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Local	Local-regional
<b>Duration</b>	Long-term	Long-term
<b>Magnitude</b>	Moderate	Low
<b>Probability</b>	Probable	Improbable
<b>Significance</b>	<b>Medium Negative</b>	<b>Medium Negative</b>
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	Yes	
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>Keep the project footprint as small as possible.</li> <li>Avoid interference with current agricultural activities undertaken within the affected properties.</li> </ul>		

### 6.10.3 Concluding Statement - Social

The social specialist has confirmed that the proposed project is unlikely to result in permanent damaging social impacts. From a social perspective it is concluded that the project is acceptable subject to the implementation of the recommended mitigation and enhancement measures and management actions identified for the project. Considering the findings of the report and the potential for mitigation and management of impacts, it is the reasoned opinion of the specialist that the project can be authorised from a social perspective.

### 6.11 TRAFFIC IMPACTS

BGI consulting Engineers undertook a Traffic Impact Assessment of the proposed Doornhoek 1 PV. A copy of this assessment is included in **Annexure E13**, and the following summary is provided in this regard.

The Traffic Specialist assessed the following impacts in the Tables below.

#### Construction Phase Traffic Impacts

- Increased Traffic on regional haulage routes
- Increased traffic on local routes
- Construction and maintenance of Gravel Roads in the Vicinity of the Site

#### Operational Phase Traffic Impacts

- Increased Traffic During operational Phase.



### 6.11.1 Construction Phase Traffic Impacts

**Table 34:** Assessment of Construction Phase Traffic Impacts

<b>Nature:</b> Increased Traffic on regional haulage routes		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent / Spatial Scope</b>	Regional	Regional
<b>Duration</b>	Short Term	Short Term
<b>Magnitude / Severity</b>	Small	Small
<b>Probability</b>	Probable	Probable
<b>Significance</b>	<b>Low</b>	<b>Low</b>
<b>Status</b>	Negative	Negative
<b>Irreplaceable loss of resources / Sensitivity of receiving environment</b>	No Loss	No Loss
<b>Reversibility</b>	Completely	Completely
<b>Can impact be mitigated</b>	Yes	
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>• Stagger Trips</li> <li>• Schedule deliveries so that peak hour traffic in local towns is not impacted by construction traffic.</li> </ul>	

<b>Nature:</b> Increased traffic on local routes		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent / Spatial Scope</b>	Local	Local
<b>Duration</b>	Short Term	Short Term
<b>Magnitude / Severity</b>	Small	Small
<b>Probability</b>	Probable	Probable
<b>Significance</b>	Low	<b>Low</b>
<b>Status</b>	Negative	Negative
<b>Irreplaceable loss of resources / Sensitivity of receiving environment</b>	No Loss	No Loss
<b>Can impact be mitigated</b>	Yes	
<b>Reversibility</b>	Completely	Completely
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>• Stagger Trips</li> <li>• Schedule deliveries so that peak hour traffic in local towns is not impacted by construction traffic</li> </ul>	

<b>Nature:</b> Construction and maintenance of Gravel Roads in the Vicinity of the Site		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent / Spatial Scope</b>	Local	Local
<b>Duration</b>	Short Term	Short Term
<b>Magnitude / Severity</b>	Small	Small
<b>Probability</b>	Probable	Probable

<b>Significance</b>	<b>Low</b>	<b>Low</b>
<b>Status</b>	Neutral	Neutral
<b>Irreplaceable loss of resources / Sensitivity of receiving environment</b>	No Loss	No Loss
<b>Can impact be mitigated</b>	Yes	
<b>Reversibility</b>	Completely	
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>Maintenance of all lower order roads to be undertaken by the contractor.</li> </ul>	

### 6.11.2 Operational Phase Traffic Impacts

**Table 35:** Assessment of Operational Phase Traffic Impacts

<b>Nature:</b> Increased Traffic During operational Phase		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent / Spatial Scope</b>	Local	Local
<b>Duration</b>	Long Term	Long Term
<b>Magnitude / Severity</b>	Small	Small
<b>Probability</b>	Probable	Probable
<b>Significance</b>	<b>Low</b>	<b>Low</b>
<b>Status</b>	Neutral	Neutral
<b>Irreplaceable loss of resources / Sensitivity of receiving environment</b>	No Loss	No Loss
<b>Reversibility</b>	Completely	
<b>Can impact be mitigated</b>	Yes, to a limited extent	
<b>Mitigation:</b>	None required as operational phase traffic will be negligible	

### 6.11.3 Decommissioning Phase Traffic Impacts

The decommissioning impacts are deemed to be similar to those assessed for the construction phase. Please refer to the impact assessment tables for Construction phase traffic impacts, which will apply equally to the decommissioning impacts.

### 6.11.4 Concluding Statement – Traffic

The major traffic impact occurs during the construction phase of the project. The impact of the construction trip generation, on the predicted 2026 (estimated time of construction) traffic volumes on the local and the regional transportation routes are expected to be low.

Only 1-2 abnormal load trips per site is expected for Doornhoek 1 PV Facility. Abnormal load transportation is therefore considered to be isolated and would have a negligible impact on traffic over the construction phase of the project.

The specialist concluded that the development of the Doornhoek 1 PV Facility on Portion 18 of the Farm Doornhoek No. 372-IP near Klerksdorp in the North West Province can therefore be supported from a traffic engineering perspective.

## 6.12 CUMULATIVE IMPACT ASSESSMENT

This section is summarised from the cumulative impact assessments that took place by each of the participating specialists. For further details in this regard, the reader is referred to the specialist assessments contained in **Appendix E**.

Where appropriate, certain specialists did include a cumulative assessment of a much wider area than the accepted 30km radius.

The 2014 EIA Regulations (as amended) (GNR 326) define a cumulative impact as follows:

“Cumulative impact in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.”

A Strategic Environmental Assessment process was undertaken by the CSIR in order to identify geographical areas most suitable for the rollout of Renewable Energy projects and the supporting electricity grid network. The aim of the assessment was to designate REDZs within which such development will be incentivised and streamlined. Subsequent to the SEA, these REDZ have been gazetted. Doornhoek 1 PV is within one of these Gazetted REDZ and as such deemed more suitable for such development on a cumulative scale.

Cumulative impacts that could occur due to the development of solar energy facilities and associated infrastructure in close proximity to each other include impacts such as:

- Visual impacts
- Socio-economic impacts
- Loss of vegetation and the inability to achieve conservation targets
- Impacts to soil and agricultural potential
- Impacts on heritage resources (particularly relating to Archaeology resources)
- Impacts on Surface water resources

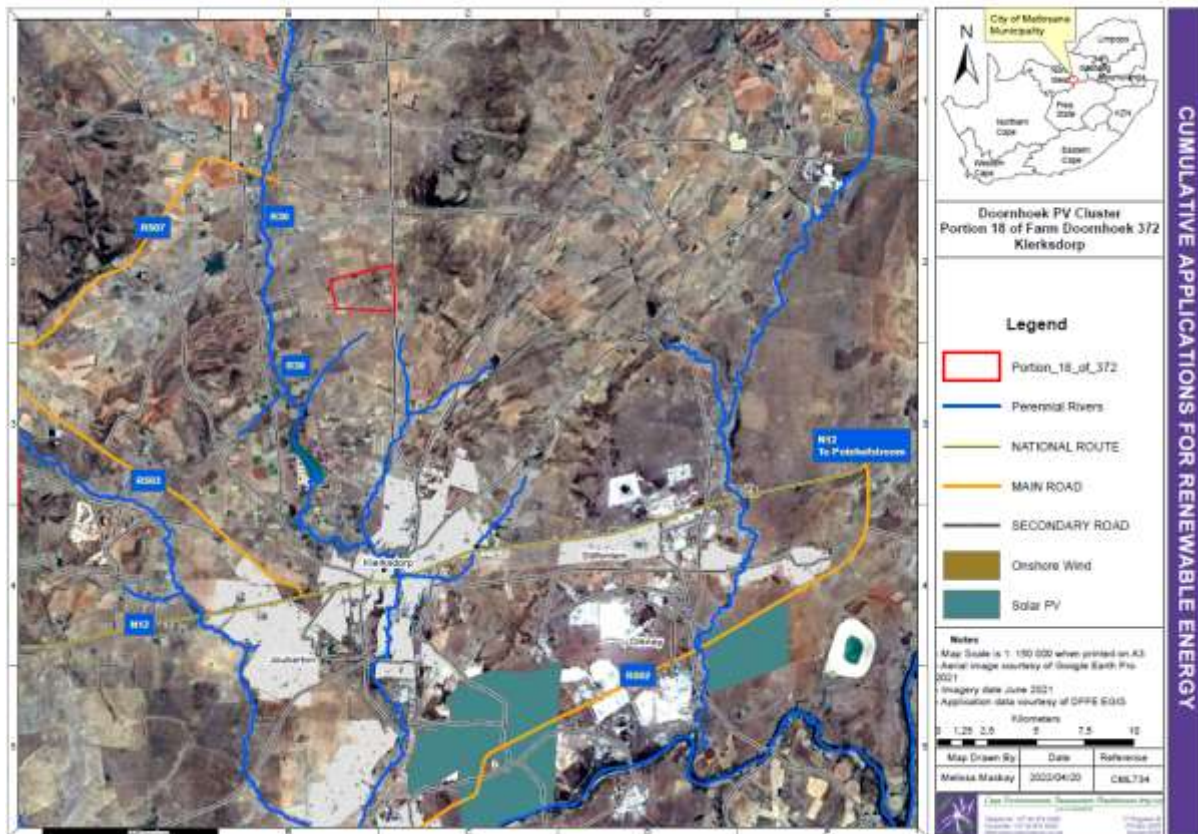
In terms of possible cumulative impacts, one needs to look at the presence of similar facilities on the farm portion as well as the greater landscape.

- Cumulative impacts due to the cumulative effects of Doornhoek 1 PV added to all other renewable energy facilities in the Immediate Area. These impacts need to be managed through strategic spatial planning documents such as an SEA and SDF and not through individual EIA processes.
- Cumulative impacts due to the cumulative effects of the 2 Solar Facilities proposed to be located in close proximity to one another (i.e Doornhoek 1 PV and Doornhoek 2 PV).

According the DFFE Database of renewable energy facilities, there are 4 renewable energy facilities within 30km of Doornhoek 1 PV <sup>38</sup>..

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<sup>38</sup> Excluding those currently proposed as part of the Doornhoek PV Cluster (i.e. Doornhoek 1 and Doornhoek 2).



**Figure 50:** Renewable Energy Facilities within proximity of Portion 18 of the Farm Doornhoek No. 372-IP.

The table below reflects the other renewable energy facilities in close proximity to the proposed Doornhoek 1 PV

**Table 36:** Renewable Energy Facilities in proximity to Hoodia PV and their status

#	Project	Technology	Status
1	Doornhoek 2 PV	PV	In Process
2	Buffels Solar	PV	Authorised
3	Buffels Solar 1	PV	Authorised
4	Witkop Solar PV II	PV	Authorised
5	Kabi Vaalkop PV	PV	Authorised

Cape EAPrac does not have details on the exact configuration of these facilities<sup>39</sup>, however, based on the assumption that each facility will have a maximum generation capacity of 100MW and will on average result in the transformation of a maximum of 250ha, one expect the cumulative transformation of approximately 1180 hectares of the two vegetation types present (i.e. Klerksdorp Thornveld and Vaal Vet Sandy Grassland) within 30km of this development. It must be noted that other than the two Projects proposed as part of the Doornhoek Cluster, all other projects within 30 Km are situated South of Klerksdorp in proximity to the Watershed MTS and mostly within the Vaal Reef Dolomite Sinkhole vegetation type.

**Table 37:** Potential habitat transformation proximity to Doornhoek 1 PV.

Status	Transformation Area in Hectares
In operation	0
Under construction	0
Authorised	1000

<sup>39</sup> Actual footprints of the 2 projects proposed as part of the Doornhoek Cluster are known.

EIA in Progress	180
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It is impossible to foresee how many of these projects will reach preferred bidder status in terms of the REIPPPP and will eventually be constructed. As a worst-case scenario one can assume a total cumulative transformation of 1180 hectares (based on the currently available information).

It is important to note that the projects in the area affect the Klerksdorp Thornveld Vegetation type, Vaal Vet Sandy Grassland Vegetation and Vaal Reef Dolomite Sinkhole woodland and as such the cumulative impact in the landscape will not be limited to a single habitat type.

Potential cumulative impacts identified for the project include various negative impacts such as loss of habitat, visual massing, loss of agricultural land an influx jobseekers and change in the area's sense of place, but also include positive cumulative impacts on the economy, business development, and employment.

The following table summarises the significance of the cumulative impacts assessed by the various specialists.

**Table 38:** Assessment of Cumulative Impacts associated with Doornhoek 1 PV <sup>40</sup>.

Impact	Significance / Status
<b>Cumulative Terrestrial Biodiversity Impacts</b>	
Loss of Klerksdorp Thornveld	Moderate - Negative
Loss of near intact Vaal Vet Sandy Grassland <sup>41</sup>	None
Loss of plant species of conservation concern	Moderate Negative
Loss of Faunal Habitat	Moderate Negative
Disruption of Ecosystem Function and Process	Moderate - Negative
Disturbance to faunal species and potential reduction in abundance and mortality of species	Low - Negative
Infestation of Alien Plant Species	Low - Negative
Loss of indigenous vegetation	Moderate Negative
Disturbance to Faunal Species and potential reduction in abundance and mortality of Faunal Species	Low - Negative
<b>Cumulative Agricultural Impacts</b>	
Regional loss of agricultural land, with a consequent decrease in agricultural production	Low Negative
<b>Cumulative Visual Impacts</b>	
Short-term landscape change from the current rural agricultural sense of place to the semi-industrial Renewable Energy landscape.	Moderate Negative
Long-term landscape change from the current rural agricultural sense of place to the semi-industrial Renewable Energy landscape.	Moderate Negative
Short-term landscape change from the removal of the PV structures, followed by rehabilitation of the impacted areas back to agricultural lands.	Low Negative
<b>Cumulative Social Impacts</b>	
Employment, skills and business opportunities	Medium Positive
change to the local economy with an in-migration of labourers, businesses and jobseekers to the area	Moderate Negative
Visual impact and impact on the sense of place and landscape character	Moderate Negative
<b>Cumulative Traffic Impacts</b>	
Increased traffic on regional haulage routes	Low Negative
<b>Cumulative Heritage Impacts</b>	
Disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.	Low Negative

<sup>40</sup> This includes cumulative impacts associated with the facility

<sup>41</sup> The project Infrastructure has been designed to avoid the impacts on the endangered near intact Vaal-Vet Sandy Grassland.

As can be seen in the table above cumulative impacts range from medium positive to moderate negative and no high cumulative impacts are expected.

### 6.13 IMPACT ASSOCIATED WITH PROTECTED AREA STATUS OF THE PROPERTY.

As 3.1.3 of this report, the property is listed on the South African Protected Areas Database as constituting a private nature reserve known as Bosworth Nature Reserve.

Notwithstanding this designation, it has been confirmed that the property has not been used for any conservation purposes in the past or currently. This statement is corroborated by the following:

1. Analysis of historical Aerial Photographs indicates that the property has been historically utilised for agricultural purposes.
2. The landowner has confirmed that the property has not been used for conservation purposes and has always been utilised for agricultural (mostly extensive) use.
3. The property is zoned for agricultural use.
4. The property is not designated for conservation use in the Spatial Development Framework.
5. The property is not identified as a protected area nor focus area in the National Protected Areas Expansion Strategy.
6. There are no title deed restrictions associated with conservation use on the property.

Considering the above, it is clear, that although designated as a private nature reserve in the SAPAD spatial dataset, it does not align with the Objectives of the National Environmental Management: Protected Areas Act.

Notwithstanding this, it is important to note that the conservation worthy habitat on the property will be retained and not impacted upon by the proposed PV facility. The existing Biodiversity pattern and process function of the remnant natural areas on the property will be retained.

The DFFE protected areas directorate have been engaged to provide further guidance on the status of the spatial designation and any additional requirements that may be applicable for the development of portions of this property.

### 6.14 IMPACT SUMMARY

The table below summarises the significance (with mitigation) of all impacts assessed in the sections above<sup>42</sup>.

For ease of easy references, impacts are visually reflected using the following colour scheme<sup>43</sup>.

All positive impacts (regardless of their significance)  
 Neutral or Negligible negative impacts  
 Low negative impacts  
 Moderate negative impacts  
 High and Very High negative impacts



**Table 39:** Summary of the significance of impacts associated with Doornhoek 1 PV <sup>44</sup>.

<sup>42</sup> In order to attain these outcomes, the mitigation measures reflected in section 7 of the report need to be implemented.

<sup>43</sup> Where specialist ratings fall across 2 of the groups, the worst case is reflected in the quick reference.

<sup>44</sup> This includes cumulative impacts associated with the facility

Impact	Significance / Status
<b>Terrestrial Biodiversity Impacts (Construction Phase)</b>	
Loss of Klerksdorp Thornveld	Moderate Negative
Loss of near intact Vaal Vet Sandy Grassland <sup>45</sup>	None
Loss of plant species of conservation concern	Moderate Negative
Loss of Faunal Habitat	Moderate Negative
Disruption of Ecosystem Function and Process	Moderate Negative
Disturbance to faunal species and potential reduction in abundance and mortality of species	Moderate Negative
<b>Terrestrial Biodiversity Impacts (Operational Phase)</b>	
Infestation of Alien Plant Species	Low Negative
<b>Terrestrial Biodiversity Impacts (Decommissioning Phase)</b>	
Loss of indigenous vegetation	Moderate Negative
Disturbance to Faunal Species and potential reduction in abundance and mortality of Faunal Species	Low Negative
<b>Cumulative Terrestrial Biodiversity Impacts</b>	
Loss of Klerksdorp Thornveld	Moderate - Negative
Loss of near intact Vaal Vet Sandy Grassland <sup>46</sup>	None
Loss of plant species of conservation concern	Moderate Negative
Loss of Faunal Habitat	Moderate Negative
Disruption of Ecosystem Function and Process	Moderate - Negative
Disturbance to faunal species and potential reduction in abundance and mortality of species	Low - Negative
Infestation of Alien Plant Species	Low - Negative
Loss of indigenous vegetation	Moderate Negative
Disturbance to Faunal Species and potential reduction in abundance and mortality of Faunal Species	Low - Negative
<b>Agricultural Impacts (All phases)</b>	
Loss of agricultural potential by occupation of land	Low Negative
Loss of agricultural potential by soil degradation	Low Negative
Dust impact	Low Negative
Enhanced agricultural potential through increased financial security for farming operations (positive impact)	Low Positive
<b>Cumulative Agricultural Impacts</b>	
Regional loss of agricultural land, with a consequent decrease in agricultural production	Low Negative
<b>Visual Impacts (Construction phase)</b>	
Short-term landscape change from the current rural agricultural sense of place to the semi-industrial Renewable Energy landscape.	Moderate Negative
<b>Visual Impacts (Operational phase)</b>	
Long-term landscape change from the current rural agricultural sense of place to the semi-industrial Renewable Energy landscape.	Moderate Negative
<b>Visual Impacts (Decommissioning phase)</b>	
Short-term landscape change from the removal of the PV structures, followed by rehabilitation of the impacted areas back to agricultural lands.	Low Negative
<b>Cumulative Visual Impacts</b>	
Short-term landscape change from the current rural agricultural sense of place to the semi-industrial Renewable Energy landscape.	Moderate Negative
Long-term landscape change from the current rural agricultural sense of place to the semi-industrial Renewable Energy landscape.	Moderate Negative
Short-term landscape change from the removal of the PV structures, followed by rehabilitation of the impacted areas back to agricultural lands.	Low Negative

<sup>45</sup> The project Infrastructure has been designed to avoid the impacts on the endangered near intact Vaal-Vet Sandy Grassland.

<sup>46</sup> The project Infrastructure has been designed to avoid the impacts on the endangered near intact Vaal-Vet Sandy Grassland.

Impact	Significance / Status
<b>Aquatic Impacts (Construction Phase)</b>	
Impacts on Aquatic Biodiversity During the Construction Phase	None
<b>Aquatic Impacts (Operational Phase)</b>	
Impacts on Aquatic Biodiversity During the Operational Phase	None
<b>Aquatic Impacts (Decommissioning Phase)</b>	
Impacts on Aquatic Biodiversity During the Decommissioning Phase	None
<b>Social Impacts (Construction Phase)</b>	
Direct and indirect employment opportunities	Medium Positive
Economic multiplier effects	Medium Positive
Influx of jobseekers and change in population	Low Negative
Safety and security impacts	Low Negative
Impacts on daily living and movement patterns	Moderate Negative
Nuisance impacts, including noise and dust	Low Negative
Visual impacts and sense of place impacts	Low Negative
<b>Social Impacts (Operational Phase)</b>	
Direct and indirect employment opportunities	Medium Positive
Development of non-polluting, renewable energy infrastructure	Medium Positive
Contribution to Local Economic Development (LED) and social upliftment	Medium Positive
Visual and sense of place impacts	Low Negative
Impacts associated with the loss of agricultural land	Low Negative
<b>Cumulative Social Impacts</b>	
Employment, skills and business opportunities	Medium Positive
change to the local economy with an in-migration of labourers, businesses and jobseekers to the area	Moderate Negative
Visual impact and impact on the sense of place and landscape character	Moderate Negative
<b>Avifaunal Impacts (Construction Phase)</b>	
Losses of natural habitat and displacement of birds through physical transformation, modifications, removals and land clearance	Moderate Negative
The creation of novel or new avian habitat for commensal bird species or superior competitive species	Low Negative
<b>Avifaunal Impacts (Operational Phase)</b>	
Avian collision impacts related to the PV facility during the operation phase (collision with the PV panels).	Moderate Negative
Avian collision impacts related to overhead power lines during operation.	Low Negative
Avian electrocution related to the new distribution lines during operation.	Low Negative
<b>Avifaunal Impacts (Decommissioning Phase)</b>	
Losses of natural habitat and displacement of birds through physical transformation, modifications, removals and land clearance	Moderate Negative
The creation of novel or new avian habitat for commensal bird species or superior competitive species	Low Negative
<b>Traffic Impacts (Construction Phase)</b>	
Increased Traffic on regional haulage routes	Low Negative
Increased traffic on local routes	Low Negative
Construction and maintenance of Gravel Roads in the Vicinity of the Site	Low Negative
<b>Traffic Impacts (Operational Phase)</b>	
Increased Traffic During operational Phase	Low Negative
<b>Phase Traffic Impacts (Decommissioning)</b>	
Increased Traffic on regional haulage routes	Low Negative
Increased traffic on local routes	Low Negative
Construction and maintenance of Gravel Roads in the Vicinity of the Site	Low Negative
<b>Cumulative Traffic Impacts</b>	
Increased traffic on regional haulage routes	Low Negative
<b>Impacts on identified Heritage Features</b>	
Impact on the Existing Farmstead (DH002)	Low Negative
Impact on Stone Age Scatter (DH001)	Low Negative
<b>Cumulative Heritage Impacts</b>	



Impact	Significance / Status
Disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.	Low Negative

## 6.15 IMPACT STATEMENT

The majority of impacts range from medium positive to medium negative. All medium-high, high, very high and critical negative impacts have been avoided by the avoidance of sensitive features and habitats or have been mitigated to acceptable levels via the risk adverse approach to the development outlined in section 2.23 and 2.24 of this report.

None of the participating specialists identified any impacts that remain high or very-high after mitigation. The preferred layout (Layout Alternative 1) avoids the main sensitive features, (most notably the intact Vaal Vet Sandy Grassland, the Avifaunal buffers from existing secretary bird nest and impoundments, the preferential flow path, sensitive archaeological features and hill).

The affected area is therefore considered suitable for development and there are no impacts associated with Doornhoek 1 PV that cannot be mitigated to an acceptable level. With the enhancement measures suggested by the Social Specialist, high positive impacts on Creation of employment and business opportunities, Economic Multiplier effects, Generation income for affected landowner and Cumulative impact on local economies can be expected.

As such there are no fatal flaws or high post-mitigation impacts that should prevent the development from proceeding. The preferred alternative in this assessment (Layout Alternative 1), and its associated short grid connections can be supported subject to the implementation of the mitigation measures outlined in section 7 of the report.

A map showing the proposed activity in relation to the key sensitive features is in attached in Appendix D. All sensitive features along with their appropriate buffers are shown in this plan. As required by the EMPr, all areas outside of the proposed development footprint are to be demarcated as no go areas..

Please refer to the table in the section above listing the key impacts and their significance post mitigation for the preferred alternative. This section must be read in conjunction with the suggested mitigation measures listed in section 7 of this Report.

The table below shows the listed activities applied for with a reference of where the impacts associated with the specific activity are assessed by specialists.

**Table 40:** Specialist Impact Assessment of Listed Activities.

Listed Activity	Specialist Assessed
<b>Listing Notice 1 - Regulation GN R. 983 – Basic Assessment</b>	
<b>GNR 983 Item 11:</b> The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;	Annexure E1.E2, E3.E4, E5, E6, E7, E8
<b>GNR 983 Item 24:</b> The development of a road— (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;	Annexure E1.E2, E3, E11
<b>GNR 983 Item 28:</b> Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian	Annexure E1.E2, E3.E4, E5, E6, E7, E8

Listed Activity	Specialist Assessed
<p>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><b>GNR 983 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>(ii) where no reserve exists, where the existing road is wider than 8 metres;</p>	Annexure E1.E2, E3, E11
<b>Listing Notice 2 - Regulation GN R. 984 - Scoping and Environmental Impact Reporting</b>	
<p><b>GNR 984 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,</p>	Annexure E1.E2, E3.E4, E5, E6, E7, E8
<p><b>GNR 984 Item 15:</b> The clearance of an area of 20 hectares or more of indigenous vegetation.</p>	Annexure E1.E2, E3.E4, E5, E6, E7, E8
<b>Listing Notice 3 - Regulation GN R. 985 – Basic Assessment</b>	
<p><b>GNR 985 Item 4:</b> The development of a road wider than 4 metres with a reserve less than 13,5 metres.</p> <p>h. North West</p> <p>i. A protected area including municipal or provincial nature reserves as contemplated by NEMPAA or other legislation.</p> <p>iv. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority;</p> <p>vi. Areas within 5 kilometres from protected areas identified in terms of NEMPAA or from a biosphere reserve.</p>	Annexure E1.E2, E3.E4, E5, E6, E7, E8
<p><b>GNR 985 Item 12:</b> The clearance of an area of 300 square metres or more of indigenous vegetation.</p> <p>h. North West</p> <p>ii. A protected area including including municipal and protected nature reserves as contemplated by NEMPAA or other legislation.</p> <p>iv. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority;</p>	Annexure E1.E2, E3.E4, E5, E6, E7, E8
<p><b>GNR 985 Item 18:</b> The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.</p> <p>h. North West</p> <p>i. A protected area including municipal or provincial nature reserves as contemplated by NEMPAA or other legislation.</p> <p>ii. Areas within 5km from protected areas identified in terms of NEMPAA or a Biosphere Reserve.</p> <p>v. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority;</p>	Annexure E1.E2, E3.E4, E5, E6, E7, E8

## 7. MITIGATION MEASURES

Please refer to the table below, which summarises the mitigation measures recommended by both the Specialists and Cape EAPrac. This table summarises the mitigations, and details whether they should be included as conditions of approval, or whether they have been included as actions in the EMPr. The table furthermore reflects to which stage of the development the proposed mitigation measures are applicable. In instances where suggested mitigations have already been incorporated into the design phase, they have been reflected as such.

**Table 41:** Recommended mitigation measures required for the construction, operation and decommissioning of the Doornhoek 1 PV development.

Mitigation	Condition of Approval	Included in EMPr	Construction <sup>47</sup> Phase	Operational Phase	Decommissioning Phase
<b>Aquatic Biodiversity</b>					
Implementation of the Stormwater Management Plan attached in appendix E12	✓		✓	✓	
<b>Terrestrial Biodiversity</b>					
Construction vehicles and machinery must not encroach into identified 'no-go' areas or areas outside the project footprint.		✓	✓		✓
Topsoil (20 cm, where possible) must be collected and stored in an area of low (preferable) and medium sensitivity and used to rehabilitate impacted areas that are no longer required during the operational phase (e.g. laydown areas).		✓	✓		✓
Only indigenous species must be used for rehabilitation.		✓	✓		✓
Where possible, lay down areas must be located within previously disturbed sites		✓	✓		
Employees must be prohibited from making open fires during the construction phase		✓	✓		
Employees must be prohibited from collecting plants. It is recommended that spot checks of pockets and bags are done on a regular basis to ensure that no unlawful harvesting of plant species is occurring.		✓	✓		✓
An alien invasive management plan for the site must be created.		✓		✓	
An in-situ search and rescue plan must be developed and implemented for succulents and geophytes that will be impacted by the construction of the project site.		✓	✓		
Plant translocation to adjacent suitable habitat may only be done for species that are not range restricted and for populations that have not been quantified as regionally significant.		✓	✓		

<sup>47</sup> In this instance, the construction phase includes mitigation measures associated with pre-construction and planning.

Mitigation	Condition of Approval	Included in EMPr	Construction <sup>47</sup> Phase	Operational Phase	Decommissioning Phase
In such cases that this is not feasible, any requirement for translocation must be discussed with the relative authorities prior to translocation taking place		✓	✓		
The vegetation under the solar panels will be brushcut during the construction and operational phases. The vegetation should be allowed to return to its natural state once the infrastructure has been decommissioned		✓		✓	
Rehabilitation efforts must provide habitat for faunal species by placing logs and rocks at strategic sites to provide shelter for small mammals and reptiles		✓	✓	✓	
Construction vehicles and machinery must not encroach into identified 'no-go' areas or areas outside the project footprint.		✓	✓		
Employees must be prohibited from making open fires during the construction phase to prevent uncontrolled run-away fires		✓	✓		
Rehabilitate laydown areas		✓	✓	✓	
Use existing access roads and upgrade these where necessary	Already incorporated into the design				
The property to the south of the project infrastructure should remain intact to ensure the continued functioning of the ecological corridor that facilitates the movement of plant and animal species		✓	✓		
All night lighting must be minimised and if required, only down lighting must be used and placed as low as practical and low light emitting bulbs (LED's).		✓	✓	✓	
Vehicles and machinery must meet best practice standards this will minimise noise and vibrations.		✓	✓		✓
Staff and contractors' vehicles must comply with speed limits of maximum of 40km/hr		✓	✓		
Project must start and be completed within the minimum timeframe. i.e. may not be started and left incomplete.		✓	✓		
ECO (or relevant person) to walk ahead of clearing construction machinery and move slow moving species, e.g. tortoises, out of harms way and into suitable neighbouring habitat.		✓	✓		
Any faunal species that may die as a result of construction must be recorded (photographed, gps co-ord) and if somewhat intact preserved and donated to SANBI or nearest university or museum.		✓	✓		
Any faunal species observed onsite must be recorded (photographed, gps co-ord) and loaded onto iNaturalist.		✓	✓		

Mitigation	Condition of Approval	Included in EMPr	Construction <sup>47</sup> Phase	Operational Phase	Decommissioning Phase
Staff and contractors are not permitted to capture, collect or eat any faunal species onsite.		✓	✓		
No animals may be killed by any staff and/or contractors related to the project, including snakes. An individual/s must be trained in snake handling to relocate snakes.		✓	✓		✓
The site must be checked regularly for the presence of alien invasive species. When alien invasive species are found, immediate action must be taken to remove them.		✓	✓	✓	✓
The prickly pears currently noted on site must be removed and disposed of.		✓	✓		
An alien invasive management plan must be incorporated into the EMPr		✓		✓	
The ECO must create a list with accompanying photographs of possible alien invasive species that could occur on site prior to construction. This photo guide must be used to determine if any alien invasive species are present		✓	✓	✓	
<b>Visual</b>					
The 150m buffer around the hill due to ridgeline prominence should be retained as a No-go area. The PV layout should be amended to exclude this area. This area should be set aside for conservation with thornveld tree growth encouraged	✓		✓		
The external 50m buffer (with respect to the PV area) should be retained as a skyline intrusion mitigation from existing trees, and planting of further screening trees.	✓		✓		
The gum-tree windbreaks adjacent to the skyline area are key screening elements and are important in retaining the rural agricultural landscape associated with the stone house heritage. These trees also reduce skyline intrusion and massing of PV on the skyline buffer area. As such, this buffer area needs to be managed as a component of the PV project. To reduce the effects of the gum tree windbreaks creating shade/ tree fall onto the PV area, the row of trees closer to the PV area can be felled prior to development of the PV site. The row away from the PV area need to be retained for the duration of the project.		✓	✓		
To reduce the visual intrusion created by the white paint required for the BESS containers, early planting of screening trees directly adjacent to the BESS area needs to be undertaken		✓	✓		
A row of trees around the Stone House complex needs to be planted as a windbreak (every 5m) to retain the local landscape character of the old farm		✓	✓		

Mitigation	Condition of Approval	Included in EMPr	Construction <sup>47</sup> Phase	Operational Phase	Decommissioning Phase
complex. This area can be incorporated into the administration area working within heritage building specifications.					
Limit the height of the PV panels to 2.5m above ground level.	Already incorporated into design of the facility				
Thornveld trees surrounding the proposed PV sites should be retained for visual screening. Young thornveld trees that will be removed from the PV development area need to be relocated to the buffer area such that there are trees spaced every 20 m.		✓	✓		
In order to retain the functional rural agricultural sense of place, the buffer areas around the PV site should be fenced off (retain existing farm fencing) and used for cattle grazing to reduce the risk of fire.		✓		✓	
Following the removal of the vegetation, wind blown dust during construction should be monitored by the ECO to ensure that it does not become a nuisance factor to the local receptors. Should excessive dust be generated from the movement of vehicles on the roads such that the dust becomes visible to the immediate surrounds, dust-retardant measures should be implemented under authorisation of the ECO		✓	✓		
Topsoil from the footprints of the road and structures should be dealt with in accordance with EMP.		✓	✓		
The buildings should be painted a grey-brown colour		✓	✓		
Fencing around the offices and laydown area should be simple, diamond shaped (to catch wind-blown litter) and appear transparent from a distance. The fences should be checked on a monthly basis for the collection of litter caught on the fence.		✓	✓		
Fencing should be placed around the PV panels and not extend up to the boundary. Electric fencing can be used. There should be no security lighting along the fence line		✓	✓		
Signage on the adjacent road should be moderated.		✓	✓		
Lights at night have the potential to significantly increase the visual exposure of the proposed project. It is recommended that mitigations be implemented to reduce light spillage		✓		✓	
No overhead lighting should be used.		✓		✓	
Control of lights at night to allow only local disturbance to the current dark sky night landscape (refer to appendix for general guidelines).		✓		✓	
Continued erosion control and management of dust.		✓		✓	
Continue management of the 50m screening buffer such that grasslands and trees do not become a fire risk.		✓		✓	
All structures should be removed and where possible, recycled.		✓			✓

Mitigation	Condition of Approval	Included in EMPr	Construction <sup>47</sup> Phase	Operational Phase	Decommissioning Phase
Building structures should be broken down (including foundations).		✓			✓
The rubble should be managed according to NEMWA and deposited at a registered landfill if it cannot be recycled or reused.		✓			✓
All compacted areas should be rehabilitated according to a rehabilitation specialist.		✓			✓
Monitoring for soil erosion should be undertaken on a routine basis.		✓			✓
<b>Traffic</b>					
It is proposed that the access roads in close proximity to the site be investigated for rehabilitation prior to construction and be maintained during construction in order to mitigate against the possibility of damaged goods due to poor road infrastructure.		✓	✓		
The formalisation of the site access point, will likely be a requirement as part of the wayleave approval of the local and provincial roads authorities		✓	✓		
Adequate traffic accommodation signage must be erected and maintained on either side of the access throughout the construction period of the project.		✓	✓		
While no construction of the PV facility occurs within the servitude, the construction and provision of internal roads that cross the servitude need to be according to Eskom wayleave requirements.		✓	✓		
<b>Avifauna</b>					
It is difficult to mitigate against the loss of habitat when fixed infrastructure is applied. However, proper site selection of the facility is key to reducing the predicted impacts.	Already incorporated into the design of the facility.				
Concentrate all surface infrastructure on habitat of medium to low avifaunal sensitivity. The development footprint of the various individual facilities must be kept as small as possible and sensitive habitats must be avoided.	Already incorporated into design of the facility				
Where possible, existing access roads should be used and the construction of new roads should be kept to a minimum.	Already incorporated into the design of the facility				
Prevent an overspill of construction activities into areas that are not part of the proposed construction site - development should not interfere with the proposed Secretarybird buffer area		✓	✓		
Use indigenous plant species native to the study site during landscaping and rehabilitation		✓	✓	✓	✓
All internal electrical reticulation should be placed underground, while the alignment of the power line and substation should be placed parallel to existing lines.		✓	✓		

Mitigation	Condition of Approval	Included in EMPr	Construction <sup>47</sup> Phase	Operational Phase	Decommissioning Phase
Apply bird deterrent devices at selective areas (for example at the corners and middle part of the facility) to the PV panels to discourage birds from colonising the infrastructure or to discourage birds from constructing nests. These could include visual or bio-acoustic deterrents such as highly reflective rotating devices, anti-perching devices such as bird guards, scaring or chasing activities involving the use of trained dogs or raptors and/or netting. Nests should be removed when nest-building attempts are noticed under the guidance of the ECO.		✓	✓	✓	
Reduce or minimise the use of outdoor lighting to avoid attracting birds to the lights or to reduce potential disorientation to migrating birds.		✓	✓	✓	
Use indigenous plant species native to the study area during landscaping and rehabilitation.		✓	✓	✓	
Implement an additional bird survey (pre-construction surveys - see section dealing with monitoring and EMP) during the peak wet season to obtain quantified data on the occurrence or flyways of waterbird taxa. The data will enable informed decisions regarding the use of deterrent devices.		✓		✓	
Apply bird deterrent devices to the panels at selective areas (for example at the corners and middle part of the facility) to discourage birds from colonising/colliding with the infrastructure. These could include visual or bio-acoustic deterrents such as highly reflective rotating devices, anti-perching devices such as bird guards, scaring or chasing activities involving the use of trained dogs or raptors and/or netting. An option is to employ video cameras at selected areas to document bird mortalities.		✓	✓	✓	
Apply systematic reflective/dynamic markers to the boundary fence to increase the visibility of the fence for approaching birds (e.g. korhaan taxa) and to avoid potential bird collisions with the fence structure.		✓	✓	✓	
Reduce or minimise the use of outdoor lighting to avoid attracting birds to the lights or to reduce potential disorientation to migrating birds.		✓	✓	✓	
All internal electrical infrastructure and cabling should be placed underground.		✓	✓	✓	
It is advised that all infrastructure be fenced to prevent cattle from accessing into the facility. Avoid the placement of cattle feedlots, kraals and watering points in close proximity to overhead electrical infrastructure. A safe distance of at least 100 m from any overhead powerline is recommended. It is advised that grazing cattle at or in close proximity to distribution lines (c. 100 m) be monitored (to avoid the risk of livestock carcasses near distribution lines, which may attract vultures and other scavenging		✓	✓	✓	



Mitigation	Condition of Approval	Included in EMPr	Construction <sup>47</sup> Phase	Operational Phase	Decommissioning Phase
birds and the increased the risk of collision or electrocution by overhead lines). In the event that a carcass is located, it should immediately be removed from the area.					
EWT should be consulted on an appropriate pylon design to be used for the project (if pylons are to be used). In general, the proposed pylon design must incorporate the following design parameters:		✓	✓	✓	
The clearances between the live components should be as wide as possible within the design limitations/capabilities of the power line.		✓	✓	✓	
The height of the tower should allow for unrestricted movement of terrestrial birds between successive pylons.		✓	✓	✓	
The live components should be “bundled” to increase the visibility for approaching birds.		✓	✓	✓	
Bird streamers” should be eliminated by discouraging birds from perching above the conductors. In addition, conductors should be strung below the pole to avoid bridging the air gap by perching birds of prey.		✓	✓	✓	
<b>Heritage</b>					
Implementation of a chance find procedure for the Project;		✓	✓		
Heritage walkdown of the final impact areas prior to construction;	✓	✓	✓		
Visual recommendations for the structures at DH002 as per the Visual Impact Assessment by Stead (2022) should be adhered to;		✓	✓		
Known heritage sites (apart from DH001) in the area should be indicated on development plans and avoided during all phases of the Project.	Already incorporated into design.				

## 8. PUBLIC PARTICIPATION PROCESS

Section 41 in Chapter 6 of regulation 982 details the public participation process that has to take place as part of an environmental process. The table below provides a quick reference to show how this environmental process has or intends to comply with these legislated requirements relating to public participation.

Please refer to **Appendix F**, where all evidence of public participation is included.

**Table 42:** Public participation requirements in terms of S41 of R982

Regulated Requirement	Description
(1) If the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an environmental authorisation in respect of such activity, obtain the written	Proof of landowner consent for Doornhoek 1 PV is attached in Annexure G2.

Regulated Requirement	Description
<p>consent of the landowner or person in control of the land to undertake such activity on that land.</p> <p>(2) Sub regulation (1) does not apply in respect of-</p> <p>(a) linear activities;</p>	
<p>The person conducting a public participation process must take into account any relevant guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of an application or proposed application which is subjected to public participation by -</p>	
<p>(a) fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of -</p> <p>(i) the site where the activity to which the application or proposed application relates is or is to be undertaken; and</p> <p>(ii) any alternative site;</p>	<p>A site notice was placed at three positions along the property boundary along the main road.</p> <p>Photographic evidence and the location of these notices is attached in Annexure F3.</p>
<p>(b) giving written notice, in any of the manners provided for in section 47D of the Act, to -</p>	
<p>(i) the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;</p>	<p>The landowner has been requested to notify any tenants on the property. There are no tenants that fall within the footprint of the proposed PV.</p>
<p>(ii) owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;</p>	<p>Owners of adjacent properties have been notified of this environmental process. Such owners have been requested to inform the occupiers of the land of this environmental process. Please refer to Annexure F4 for copies of these notifications</p>
<p>(iii) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;</p>	<p>The ward councillor has been notified of this environmental process.</p> <p>Please refer to Annexure F4 for copies of these notifications</p>
<p>(iv) the municipality which has jurisdiction in the area;</p>	<p>The City of Matlosana municipality (Planning and Technical Services) as well as the Dr Kenneth Kaunda District Municipality have been notified of this environmental process.</p> <p>Please refer to Annexure F4 for copies of these notifications.</p>
<p>(v) any organ of state having jurisdiction in respect of any aspect of the activity; and</p>	<p>Please refer to section Annexure F1 showing the list of organs of state that were notified as part of this environmental process.</p> <p>Please refer to Annexure F4 for copies of these notifications.</p>
<p>(vi) any other party as required by the competent authority;</p>	<p>The DFFE has been given an opportunity to comment on this Draft BAR, any other parties identified will be given an opportunity to comment.</p>
<p>(c) placing an advertisement in -</p> <p>(i) one local newspaper; or</p> <p>(ii) any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;</p>	<p>An advert calling for registration of I&amp;APs and notifying of the availability of the Draft Basic Assessment Report was placed in Die Noordwester local newspaper.</p> <p>Please refer to Annexure F3 for a copy of this advertisement.</p> <p>There is currently no official Gazette that has been published specifically for the purpose of providing public notice of applications</p>
<p>(d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph (c)(ii);and</p>	<p>Adverts were not placed in provincial or national newspapers, as the potential impacts will not extend beyond the borders of the municipal area.</p>
<p>(e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desirous of but unable to participate in the process due to -</p> <p>(i) illiteracy;</p>	<p>Notifications have included provision for alternative engagement in the event of illiteracy, disability or any other disadvantage. In such instances, Cape EAPrac will engage with such individuals in such a manner as agreed on with the competent authority.</p>

Regulated Requirement	Description
(ii) disability; or (iii) any other disadvantage.	
(3) A notice, notice board or advertisement referred to in sub regulation (2) must - (a) give details of the application or proposed application which is subjected to public participation; and (b) state - (i) whether basic assessment or S&EIR procedures are being applied to the application; (ii) the nature and location of the activity to which the application relates; (iii) where further information on the application or proposed application can be obtained; and (iv) the manner in which and the person to whom representations in respect of the application or proposed application may be made.	Please refer to Annexure F3.
(4) A notice board referred to in sub regulation (2) must - (a) be of a size at least 60cm by 42cm; and (b) display the required information in lettering and in a format as may be determined by the competent authority.	Please refer to Annexure F3.
(5) Where public participation is conducted in terms of this regulation for an application or proposed application, sub regulation (2)(a), (b), (c) and (d) need not be complied with again during the additional public participation process contemplated in regulations 19(1)(b) or 23(1)(b) or the public participation process contemplated in regulation 21(2)(d), on condition that - (a) such process has been preceded by a public participation process which included compliance with sub regulation (2)(a), (b), (c) and (d); and (b) written notice is given to registered interested and affected parties regarding where the - (i) revised basic assessment report or, EMPr or closure plan, as contemplated in regulation 19(1)(b); (ii) revised environmental impact report or EMPr as contemplated in regulation 23(1)(b); or (iii) environmental impact report and EMPr as contemplated in regulation 21(2)(d); may be obtained, the manner in which and the person to whom representations on these reports or plans may be made and the date on which such representations are due.	This will be complied with if final reports are produced later on in the environmental process.
(6) When complying with this regulation, the person conducting the public participation process must ensure that - (a) information containing all relevant facts in respect of the application or proposed application is made available to potential interested and affected parties; and (b) participation by potential or registered interested and affected parties is facilitated in such a manner that all potential or registered interested and affected parties are provided with a reasonable opportunity to comment on the application or proposed application. (7) Where an environmental authorisation is required in terms of these Regulations and an authorisation, permit or licence is required in terms of a specific environmental management Act, the public participation process contemplated in this Chapter may be combined with any public participation processes prescribed in terms of a specific environmental management Act, on condition that	All reports that are submitted to the competent authority will be subject to a public participation process. These include: Draft BAR Draft EMPr All specialist reports that form part of this environmental process.

Regulated Requirement	Description
all relevant authorities agree to such combination of processes.	

## 8.1 REGISTRATION OF KEY STAKEHOLDERS

A number of key stakeholders were automatically registered and were given an opportunity to comment on the Draft BAR. Copies and proof of these notifications are included in **Annexure F4**. A list of key stakeholders registered for this process included in the table below.

**Table 43:** Key Stakeholders automatically registered as part of the Environmental Process

Stakeholders Registered		
Neighbouring property owners	Department of Environmental Affairs (North West)	Department of Water and Sanitation
North West Department of Transport and Public Works	City of Matlosana Municipality	Department of Science and Technology
City of Matlosana Ward Councillor	South African National Roads Agency Limited	The Council for Scientific and Industrial Research
South African Heritage Resources Agency	Heritage North West	The South African Square Kilometre Array
Catchment Management Agency	Department of Health	The South African Civil Aviation Authority
Department of Forestry, Fisheries and the Environment: Biodiversity Conservation Directorate	Department of Minerals and Energy	Affected Landowners
Provincial Department of Agriculture	Eskom	Department of Communications
Endangered Wildlife Trust.	Department of Mineral Resources	SENTECH
North West Department of Agriculture and Nature Conservation	Birdlife South Africa.	South African National Defence Force.
Department of Forestry, Fisheries and the Environment – Protected Areas Directorate.	ATNS	Department of Water and Sanitation

## 8.2 PUBLIC PARTICIPATION PLAN

A Public Participation Plan was submitted in compliance with regulation GNR660 published on 05 June 2020 in terms of the Disaster Management Act. During the pre application meeting the case officer indicated that it is no longer required to submit a public participation plan. This environmental process therefore complies with the regulations, but also takes into account the public participation plan submitted.

In compliance with section 5.1 and annexure 2 of these regulations a public participation plan must be presented to the competent authority for approval prior to implementation. The mechanism of a pre-application meeting was utilised to present this plan to the Department for approval. The public participation plan was approved by the Department.

Section 40(2) in Chapter 6 of regulation 982 requires that the public participation process contemplated in this regulation must provide access to all information that reasonably has or may have the potential to influence any decision with regard to an application unless access to that information is protected by law and must include consultation with—

- (a) the competent authority;
- (b) every State department that administers a law relating to a matter affecting the environment relevant to an application for an environmental authorisation;
- (c) all organs of state which have jurisdiction in respect of the activity to which the application relates; and
- (d) all potential, or, where relevant, registered interested and affected parties.

In order to comply with this requirement, all parties listed in sub sections a, b and c above with full digital copies of the Draft Basic Assessment Report (DBAR), Draft Environmental Management Programme and all specialist studies and plans. Such digital copies have been provided to the competent authority via the file upload portal. Copies of the documentation to organs of state and state departments have been provided via two digital platforms (website and direct download link). Where such authorities do not have access to digital platforms, sanitised copies of the documentation will be provided to such parties on their request.

In terms of point d above, all Interested & Affected Parties (I&APs) that are identified or register as part of the process will be provided access to the Draft BAR via the following:

1. The digital copy of the documentation that will be on the Cape EAPrac website and direct download link.
2. Potential and registered I&APs will be informed that copies of the documentation can be provided via postal, or courier services should they not have access to the digital platforms.

### **8.3 AVAILABILITY OF DRAFT BASIC ASSESSMENT REPORT.**

This Draft Basic Assessment report is available to all Registered and Potential Interested and Affected Party for a 30 day-comment period extending from **13 May 2022 – 13 June 2022**.

## **9. CONCLUSION AND RECOMMENDATIONS**

This environmental process is currently being undertaken to present proposals to the public and potential I&APs and to identify and assess environmental impacts, issues and concerns raised as a result of the proposed development.

*Cape EAPrac* is of the opinion that the information contained in this Basic Assessment Report and the documentation attached hereto is sufficient to allow the I&APs to apply their minds to the potential negative and/or positive impacts associated with the development, in respect of the activities applied for.

This environmental process has not identified any fatal flaws with the proposal and as such it is our reasoned view that the project should be considered for authorisation, subject to the outcome of the public participation process and on condition that all the mitigation measures outlined in section 7 of the report are adopted and implemented. All specialists concur that the development as proposed (Layout Alternative 1) can be considered for approval subject to the implementation of all mitigation measures. All impacts range from medium positive to medium negative and all high, very high and critical negative impacts have been avoided by the risk adverse approach or mitigated to acceptable levels.

All stakeholders are requested to review the Draft BAR and the associated appendices, and provide comment, or raise issues of concern, directly to *Cape EAPrac* within the specified 30-day comment period. All comments received during this comment period will be considered, responded and included in the Final BAR that will be submitted to DFFE for decision making.

**It is the recommendation of Cape EAPrac that the development proposal, Layout Alternative 1 and the proposed grid connection corridor (LILo into the existing Klerksdorp – Watershed 132kV overhead powerline) be considered for approval by the competent Authority, subject to the outcome of the public participation process and on condition that all the suggested mitigation measures are implemented, all other legislative approvals be obtained, and that the final EMPr be strictly adhered to.**

## **9.1 REMAINDER OF ENVIRONMENTAL PROCESS**

The following process is to be followed for the remainder of the environmental process:

- All registered I&AP's are provided with an opportunity to review and comment on this document.
- All comments will be considered and responded to and the proposed development adapted where necessary.
- The Final BAR will then be submitted to the DFFE for consideration and decision-making;
- The DFFE's decision (Environmental Authorisation) and the appeal process will be communicated with all registered I&APs.

## 10. ABBREVIATIONS

AIA	Archaeological Impact Assessment
BGIS LUDS	Biodiversity Geographic Information System Land Use Decision Support
CBA	Critical Biodiversity Area
CDSM	Chief Directorate Surveys and Mapping
CEMPr	Construction Environmental Management Programme
DEA	Department of Environmental Affairs
DEA&NC	Department of Environmental Affairs and Nature Conservation
DME	Department of Minerals and Energy
DSR	Draft Scoping Report
EAP	Environmental Impact Practitioner
EHS	Environmental, Health & Safety
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
ESA	Ecological Support Area
GPS	Global Positioning System
GWh	Giga Watt hour
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
kV	Kilo Volt
LUDS	Land Use Decision Support
LUPO	Land Use Planning Ordinance
MW	Mega Watt

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NEMA	National Environmental Management Act
NEMBA	National Environmental Management: Biodiversity Act
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act
NPAES	National Protected Area Expansion Strategy
NSBA	National Spatial Biodiversity Assessment
NWA	National Water Act
PM	Post Meridien; “Afternoon”
PSDF	Provincial Spatial Development Framework
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
S.A.	South Africa
SACAA / CAA	South African Civil Aviation Authority
SAHRA	South African National Heritage Resources Agency
SANBI	South Africa National Biodiversity Institute
SANS	South Africa National Standards
SDF	Spatial Development Framework
TOPS	Threatened and Protected Species



## 11. REFERENCES

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<sup>48</sup> This reference list excludes specialist studies that form part of this environmental process, and which are contained in Annexure E1 – E12

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