EXIGENT

APRIL 2022

FINAL

BASIC ASSESSMENT REPORT

Proposed Antlia Energy (Pty) Ltd. and Ophiucus Energy (Pty) Ltd. Renewable PPP Energy Project, Tokologo Local Municipality, Lejweleputswa District Municipality, Free State Province.

A SYSTEMS APPROACH
APPLIED TO YOUR REQUIREMENTS

PROJECT INFORMATION

Applicant and project information	
Contact person:	Ernst Jordaan Burger
Physical address:	No 49 14th Street, Menlo Park, Pretoria
Project titles	14/12/16/3/3/1/2484: Proposed Independent Power Producers Renewable Energy Projects located on the Farm Goede Hoop 1028, Boshof RD and Farm Epsom Downs 1216, Boshof RD (Good Hope 1 Solar Park), within the Tokologo Local Municipality, Lejweleputswa District Municipality, Free State Province. 14/12/16/3/3/1/2485: Proposed Independent Power Producers Renewable Energy Projects located on the Farm Gedenksrust 1029, Boshof RD and Farm De Werf 1013, Boshof RD (Good Hope 2 Solar Park), within the Tokologo Local Municipality, Lejweleputswa District Municipality, Free State Province. This application is submitted as a combined application as per Regulation 11(4) with the issuing of multiple environmental authorisations of Regulation 25(1) and (2) of the EIA Regulations, 2014, as amended.
PROJECT 1: Good Hope Solar farm 1 and Connection Infrastructure	
Enterprise name:	Antlia Energy (Pty) Ltd.
Business registration number:	2020/871113/07
PROJECT 2: Good Hope Solar farm 2 and Connection Infrastructure	
Enterprise name:	Ophiucus Energy (Pty) Ltd.
Business registration number:	2021/534262/07

Details of the Environmental Assessment Practitioner	
Enterprise name:	Exigent Engineering Consultants CC
Contact person:	Jacolette Adam
Contact details:	jacolette@exigent.co.za
Physical address:	10 Waterways Estate, Tuzi Gazi Waterfront
Main report contributors and roles:	Mrs. Jacolette Adam (Reviewer) Ms. Madeleine Knoetze (author)

Project information	
DFFE ref nr:	14/12/16/3/3/1/2484 14/12/16/3/3/1/2485
Local Municipality:	Tokologo Local Municipality
District Municipality	Lejweleputswa District Municipality
Province:	Free State

ACRONYMS AND ABREVIATIONS

BAR	Basic Assessment Report
BID	Background Information Document
CA	Competent Authority
CARA	Conservation of Agricultural Resources Act
CBD	Central Business District
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMPr	Environmental Management Programme Report
ESMP	Environmental and Services Management Plan
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DFFE	Department of Forestry, Fisheries and the Environment
DoT	Department of Transport
DRDLR	Department of Rural Development and Land Reform
DWA	Department of Water Affairs
DWS/DHSWS	Department of Water and Sanitation / Department of Human Settlement and Water and Sanitation
EIS	Ecological Importance and Sensitivity
GG	Government Gazette
GNR	Government Notice Regulation
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IAIASA	International Association of Impact Assessments South Africa
IDP	Integrated Development Plan
NDA	National Department of Agriculture
NDP	National Development Plan
NEMA	National Environmental Management Act
NEMBA	National Environmental Management: Biodiversity Act
NEMAQA	National Environmental Management: Air Quality Act
NEMWA	National Environmental Management: Waste Act
NFA	National Forest Act
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act
NSSD	National Strategy for Sustainable Development
NWA	National Water Act
PES	Present Ecological State
PIA	Paleontological Impact Assessment
PPP	Public Participation Process
PVPP	Photovoltaic Power Plant
SANBI	South African National Biological Institute
WISA	Water Institute of South Africa
WMA	Water Management Area

CHANGES MADE FROM DRAFT BASIC ASSESSMENT REPORT TO FINAL BASIC ASSESSMENT REPORT

The facility illustrations and technical descriptions as provided in Appendix E and L, respectively, saw only minor changes adding to the level of detail to the documents without the core principles of the proposed developments changing – These updated drawings also incorporated the information from Eskom. The final Basic Assessment Report (BAR) has the following amendments as per the comments received from the I&APs and stakeholders during the 30-day commenting period of the Draft BAR:

- The following sections were separated in order to split the descriptions and impacts of the proposed projects:
    - Section 1.3 – All coordinates have been separated as requested. Centre point coordinates were provided to provide the locations and where applicable, start, mid and end point coordinates of the infrastructure.
    - Section 1.3 – The SG-codes for the respective projects have been separated.
    - Section 1.6 – Has been amended in order to further identify additional previously approved PV solar farms within a 30 km radius of the proposed developments.
    - Section 1.7 – The project descriptions have been amended in order to provide detailed project descriptions of the respective projects (As they were provided in Appendix L of the BAR).
    - Section 4 – Has been updated to fully incorporate the Alternatives as presented as provided in Appendix L of the BAR.
    - Section 5 – The Needs and Desirability of the project has been updated to include the cumulative impacts of the solar farms within a 30 km radius of the proposed developments.
    - Section 6 – The Public Participation section has been updated to include the comments received during the Public Review period of the Draft BAR.
    - Section 7 – The specialist studies have been amended, where deemed necessary, to include the impacts of the proposed powerline infrastructure (Eskom connection line).
    - Section 9 and 10 – The impacts and the cumulative impacts of the proposed developments have been amended, where applicable to address the comments presented by the commenters.
    - Section 14 – The opinion of the EAP has been amended to include the information required by the stakeholders.
- The following appendices were updated:
    - Appendix B – The comments provided by the Competent Authority have been included, as well as the correspondence regarding the title change of the proposed projects.
    - Appendix C – The Layout and Sensitivity maps have been updated in order to address the comments received.
    - Appendix E – The facility illustrates were updated in order to incorporate the planned future Eskom infrastructure leading through the proposed development area.
    - Appendix F – The following specialist assessments have been amended to take cognisance of the comments received. Furthermore, where necessary, the reports were

updated to consider the impacts of the proposed powerline infrastructure on the receiving environment, where applicable:

- The Ecological Specialist Assessment;
- The Heritage Impact Assessment;
- The Agricultural Impact Assessment; and
- The Regime 2 Avifaunal Assessment has been included.

- Appendix G – The records of the Public Participation Progress of the project has been updated to address the comments received during the Public Review Period of the Draft BAR.
- Appendix I – The EMPr of the proposed developments have been updated in order to:
  - Provide a EMPr that separates the project descriptions of the respective projects, as requested in the comments;
  - The generic EMPr applicable for projects that triggers Listed Activity 11 of Listing Notice 1 of the EIA Regulations 2014, as amended, has been included – It should be noted that no additional information (which has not been previously circulated for public participation) have been included as part of the inclusion as the site-specific mitigation measures.
- Appendix L1 – Has been amended to incorporate the changes requested through the comments.
- Appendix L2 – Has been added to include the specialist declarations as requested by the DFFE,

As part of Exigent's standard practice, the Final documents will be circulated to the public, notifying them of the availability of the Final BAR. Should any comments arise from the Final BAR, the comments will be addressed in consultation with the DFFE.

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1. Introduction

Exigent Engineering Consultants CC (hereafter referred to as Exigent) has been appointed by Antlia Energy (Pty) Ltd. (hereafter referred to as Antlia) and Ophiucus (Pty) Ltd. (hereafter referred to as Ophiucus) to conduct the Environmental Impact Assessment (EIA) process for the proposed photovoltaic (PV) power plants (PVPP), namely Good Hope 1 and 2, within the Tokologo Local Municipality (TLM) in the Lejweleputswa District Municipality.

This application is submitted as a combined application as per Regulation 11(4) with the issuing of multiple environmental authorisations of Regulation 25(1) and (2) of the EIA Regulations, 2014, as amended. The project names are indicated below:

1. Good Hope Solar Farm 1 (GH1) and Eskom Connection Powerline Corridor
2. Good Hope Solar Farm 2 (GH2) and Eskom Connection Powerline Corridor

The report will therefore make explicit statements regarding the differences between the two sites, where no distinction is indicated, the same information will apply to both sites.

The proposed project sites are located within the Kimberley Renewable Energy Development Zone 5 (also known as "Kimberley REDZ"), published under Government Notice Regulations (GNR) 114 in Government Gazette (GG) No. 41445 of 16 February 2018, in terms of Section 24(3) of the NEMA, 1998. Large scale solar PV energy facilities located within this REDZ are subject to a Basic Assessment (BA) Process in terms of the EIA Regulations of 2014, as amended, as published under the NEMA (Act 107 of 1998).

The competent authority (CA) responsible for the consideration of this proposal is the National Department of Forestry. Fisheries and Environmental Affairs (DFFE) in consultation with the Free State Department of Economic, Small Business Development, Tourism and Environmental Affairs (DESTEA) The application has been undertaken in terms of the EIA Regulations published in terms of GNR 326 of 7 April 2017 under Section 24(5) and 44 of the National Environmental Management Act (NEMA), 1998 (Act No 107 of 1998), as amended, with the intent to carry out the EIA Process (In terms of listed activities 11, 12, 19, 24, and 28 of Listing Notice 1 – GNR 983, as amended in 2017, listed activities 1, 9, and 15 in terms of Listing Notice 2 – GNR.984, as amended in 2017, as well as listed activities 4, 12 and 14 of Listing Notice 3 – GNR 985, as amended in 2017.

The Basic Assessment Report (BAR) has been compiled in accordance with the minimum requirements of the NEMA, in particular, GNR 982, as amended on 7 April 2017, which outlines the requirements of the EIA Process for the purpose of an EA in terms of NEMA, Act 107 of 1998. The minimum requirements and issues that need to be addressed in a BAR have been stipulated therein. This BAR strives to address all these requirements as per regulations. Table 1-1 below, indicates the regulations that have been addressed and the section of the DBAR where these requirements can be found.

Table 1-1. Requirements of Appendix 1 (3) of GNR 326 (as amended).

GNR 326 APPENDIX 3		DESCRIPTION OF REGULATION	SECTION	PAGE
3 (a)	(i) and (ii)	Details and expertise of the EAP.	1.1	3
3 (b)	(i) to (ii)	The location of the activity.	1.3	
3 (c)		A plan which locates the proposed activities, associated structures and infrastructure at an appropriate scale.	Appendix C	
3 (d)		A description of the scope of the proposed activity, including:		
	(i)	All listed and specified activities triggered and being applied for.	2.1.1	36
	(ii)	A description of the associated structures and infrastructure related to the development.	1.7	19
3 (e)		Description of the policy and legislative context within which the development is proposed and an explanation of the compliance with and responds to the legislation and policy context.	2	36
3 (f)		Motivation for the need and desirability for the proposed development.	5	62
3 (g)		Motivation for the preferred site, activity and technology alternative.	5.2	62
3 (h)		Description of the process followed to reach the proposed development footprint within the approved site including:		
	(i)	Details of all alternatives considered.	4	52
	(ii)	Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including supporting documents and inputs.	6	78
	(iii)	Summary of the issues raised by interested and affected parties and in indication in the manner in which the issues were incorporated, or the reasons for not including them.	6.3	79
	(iv)	Environmental attributes associated with the alternatives focussing on geographical, physical, biological, social, economic, heritage and cultural aspects.	3	45
	(v)	The impacts and risks identified including nature, significance, consequence, extent, duration and probability of impacts, including the degree to which these impacts can be reversed, cause irreplaceable loss of resources and can be avoided, managed or mitigated.	9	135
	(vi)	Methodology used in determining and ranking the nature, significance, consequence, extent, duration and probability of potential impacts and risks.	8.1	130
	(vii)	Positive and negative impacts that the proposed activity and alternatives will have on the environment and community that will be affected, focussing on geographical, physical, biological, social, economic, heritage and cultural aspects.	9	135
	(viii)	Possible mitigation measures that could be applied and level of residual risk.	9	135
	(ix)	The outcome of the site selection matrix.	4.1	52
	(x)	If no site alternatives, including alternative locations for the activity were investigated, the motivation for not considering such.	4	52
	(xi)	A concluding statement indicating the preferred alternative development location of the activity.	14	157

GNR 326 APPENDIX 3		DESCRIPTION OF REGULATION	SECTION	PAGE
3 (i)		Description of process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including:		
	(i)	A description of all environmental issues and risks that were identified during the environmental impact assessment process.	9	135
	(ii)	An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.	9	135
3 (j)	(i) to (vii)	Identified potentially significant impacts and risks including cumulative, nature, significance, extent and duration, probability, and degree to which the impact can be reversed, cause irreplaceable loss or can be mitigated.	9	135
3 (k)		Summary of the findings and impact management measures identified in any specialist reports and how they have been included in the final assessment report.	12	153
3 (l)		An Environmental Impact Statement which contains:		
	(i)	A summary of key findings of the environmental impact assessment.	11	152
	(ii)	A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on environmental sensitivities, indicating which areas should be avoided, including buffers.	14	157
	(iii)	A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	9	135
3 (m)		Based on the assessment and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for inclusion in the EMPr.	12	153
3 (n)		Aspects conditional to the findings of assessments to be included as conditions of authorisation.	12	153
3 (o)		Assumptions, uncertainties and gaps in knowledge in assessment and mitigation.	13	155
3 (p)		Opinion on authorisation and if authorised, any condition that should be made in respect to authorisation.	14	157
3 (q)		Where the proposed activity does not include operational aspects, the period for which environmental authorisation is required, date on which activity will be concluded and post construction monitoring requirements finalised.	14	157
3 (r)	(i) to (iv)	Declaration of independence.	Appendix K	
3 (s)		Where applicable, details of financial provision for rehabilitation, closure and ongoing post decommissioning management.	N/A	N/A
3 (t)		Specific information that may be required by the Competent Authority.	N/A	N/A
3 (u)		Any other matters required in terms of sections 24(4)(a) and (b) of the Act.	N/A	N/A

1.1. Environmental Assessment Practitioner

Exigent was established in 1998 providing multidisciplinary engineering and environmental services. The Exigent Environmental Business Unit provides sustainable answers within an environmental developmental framework. Our foundations are built upon ecological principles with wide ranging

expertise in environmental management and assessment processes. The qualifications and experience of the primary assessors and report compilers are listed in Table 1-2.

Table 1-2. Environmental Assessment Practitioner details.

EAP	DUTY	QUALIFICATION	EXPERIENCE
Ms Jacolette Adam	Reviewer	MSc; LLM (Environmental Law)	21 years of professional experience in the environmental sector and has been a certified Professional Natural Scientist since 2002 (400088/02) and Registered Environmental Assessment Practitioner (EAPASA) (2019/1040). She has successfully completed numerous environmental assessments throughout South Africa for a wide range of clients.
Ms Madeleine Knoetze	Author Mapping	BSc	Madeleine has 7 years of experience in the field of environmental management. She is a member of the International Association for Impact Assessments South Africa (IAIAsa). She has assisted in the completion of a numerous environmental assessments, as well as ecological and wetland assessments. She is skilful in the field of Geographic Information Systems (GIS) leading to involvement in large and small-scale mapping projects.
Ms Salona Reddy	Reviewer	BSc Hons	Salona has 4 years of work experience in the field of environmental management and ecological assessments. She obtained her BSc Hons in 2015 and has submitted her MSc for review. She has been responsible for compilation of numerous EIA and EMPs for a wide range of clients.

1.2. Project Applicants

The proposed Good Hope 1 and Good Hope 2 PVPP developments have two separate applicants and will act as individual SPVPPs. The details of the applicants have been captured below:

Table 1-3. Applicant details for the respective projects.

Applicant information	
Contact person:	Ernst Jordaan Burger
Physical address:	No 49 14th Street, Menlo Park, Pretoria
PROJECT 1: Good Hope Solar farm 1 and Connection infrastructure (GH1)	
Enterprise name:	Antlia Energy (Pty) Ltd.
Business registration number:	2020/871113/07
PROJECT 2: Good Hope Solar farm 2 and Connection infrastructure (GH2)	
Enterprise name:	Ophiucus Energy (Pty) Ltd.
Business registration number:	2021/534262/07

1.3. Project Location

The proposed developments are located with the within the TLM in the Lejweleputswa District Municipality, Free State Province. The proposed development is located within the quaternary degree grid cell 2825DA and 2825DB (Figure 1-1), with the center point coordinates located at:

Table 1-4. Centre point coordinates of the proposed developments.

Point	Latitude	Longitude
Good Hope 1	28°38'50.00"S	25°45'40.00"E
Good Hope 2	28°38'25.00"S	25°46'55.00"E

Access to both project sites are gained from an unnamed gravel road that leads off Andries Pretorius street just north of Dealesville.

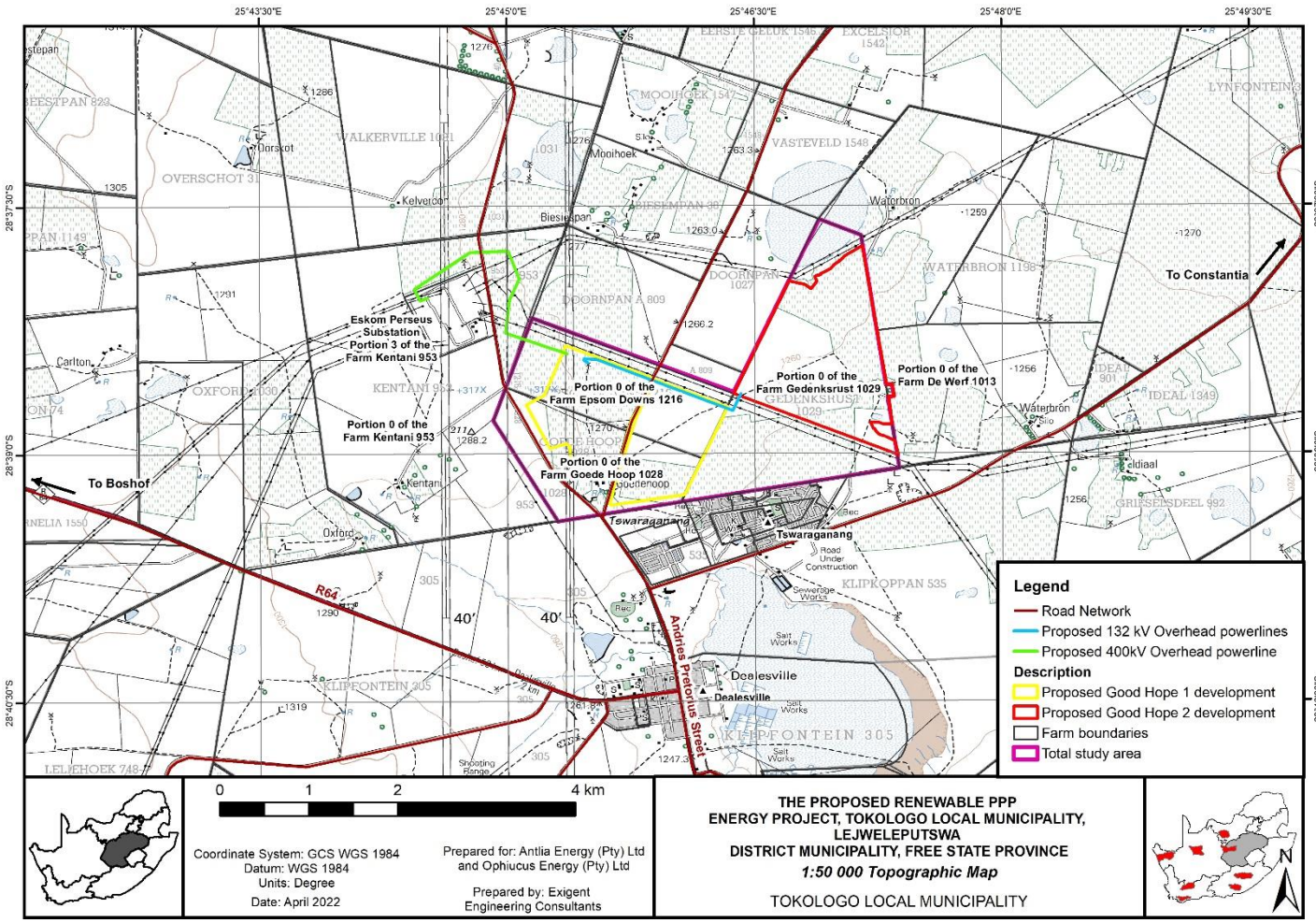


Figure 1-1. 1:50 000 Topographic representation of the proposed development study area (Indicating the Kimberley REDZ in the minimap).

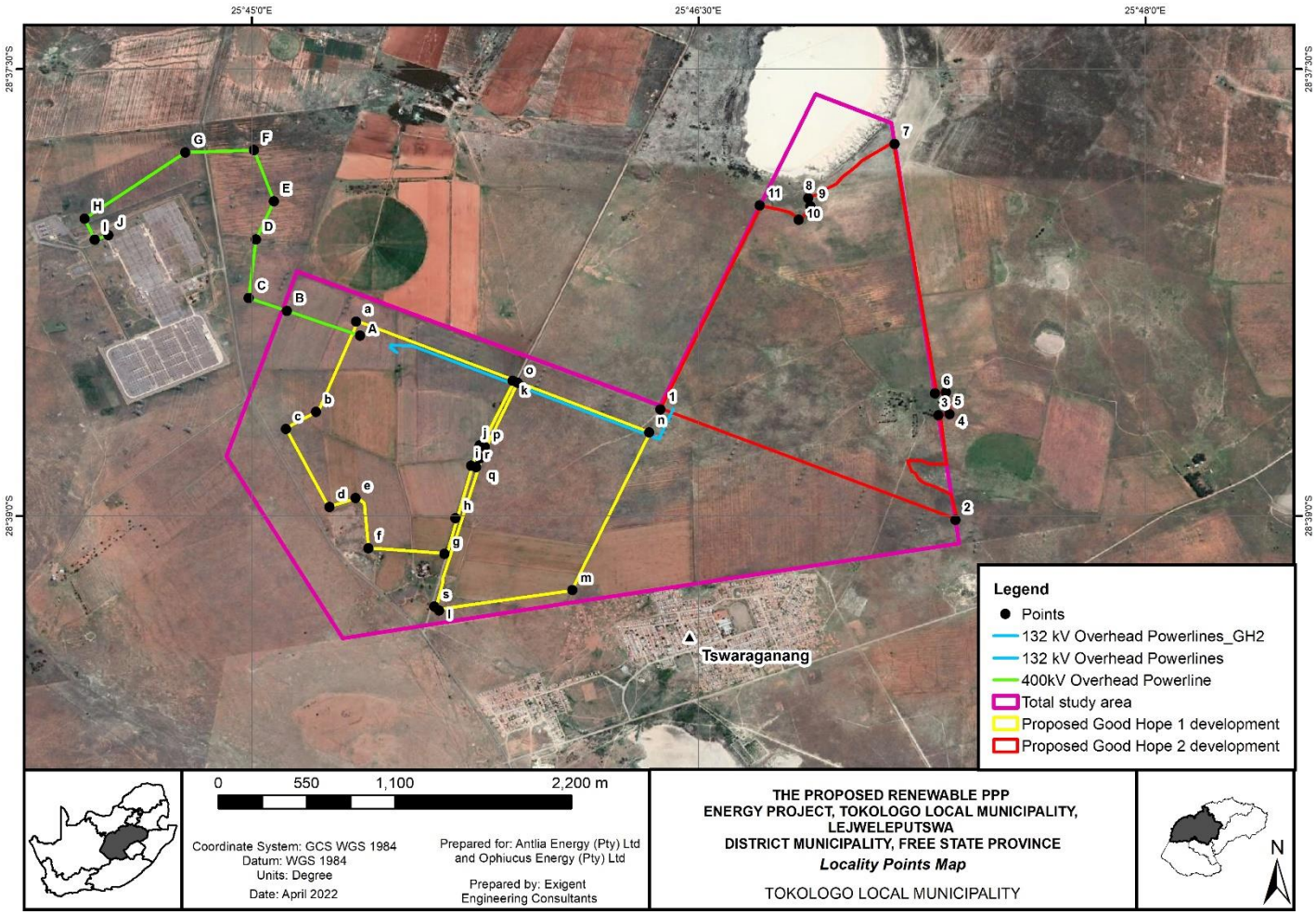


Figure 1-2. Locality map of the proposed development.

Table 1-5 below provides the corner point coordinates of the proposed project (as indicated on Figure 1-2 above).

Table 1-5. Corner point coordinates of the proposed development.

Point	Latitude	Longitude
Good Hope 1: Western portion		
a	28°38'20.82"S	25°45'21.00"E
b	28°38'39.05"S	25°45'12.92"E
c	28°38'42.46"S	25°45'6.85"E
d	28°38'58.17"S	25°45'15.60"E
e	28°38'56.40"S	25°45'20.90"E
f	28°39'6.48"S	25°45'23.47"E
g	28°39'7.64"S	25°45'38.81"E
h	28°39'0.43"S	25°45'40.98"E
i	28°38'49.89"S	25°45'44.15"E
j	28°38'45.74"S	25°45'45.91"E
k	28°38'32.75"S	25°45'52.51"E
Good Hope 1: Eastern portion		
l	28°39'19.06"S	25°45'37.74"E
m	28°39'14.92"S	25°46'4.56"E
n	28°38'43.17"S	25°46'20.05"E
o	28°38'33.13"S	25°45'53.53"E
p	28°38'46.11"S	25°45'46.93"E
q	28°38'48.32"S	25°45'45.97"E
r	28°38'50.18"S	25°45'45.21"E
s	28°39'18.25"S	25°45'36.74"E
Good Hope 2		
1	28°38'38.51"S	25°46'22.32"E
2	28°39'0.80"S	25°47'21.74"E
3	28°38'39.73"S	25°47'18.33"E
4	28°38'39.48"S	25°47'20.57"E
5	28°38'35.06"S	25°47'19.85"E
6	28°38'35.32"S	25°47'17.62"E
7	28°37'45.04"S	25°47'9.51"E
8	28°37'55.99"S	25°46'52.11"E
9	28°37'57.61"S	25°46'52.56"E
10	28°38'0.33"S	25°46'50.18"E
11	28°37'57.45"S	25°46'42.34"E
400 kV Powerline Corridor – Connection to Eskom grid (shared infrastructure)		
A	28°38'23.74"S	25°45'21.68"E
B	28°38'18.68"S	25°45'7.07"E
C	28°38'16.09"S	25°44'59.38"E
D	28°38'4.26"S	25°45'0.81"E
E	28°37'56.57"S	25°45'4.42"E
F	28°37'46.33"S	25°45'0.44"E

Point	Latitude	Longitude
G	28°37'46.77"S	25°44'46.57"E
H	28°38'0.11"S	25°44'26.31"E
I	28°38'4.33"S	25°44'28.35"E
J	28°38'3.41"S	25°44'31.10"E

Table 1-6. Coordinates of associated infrastructure for Good Hope 1.

Point	Area (m²)	Latitude	Longitude
Battery Energy Storage Facility	100,440 (10 ha)	28°38'33.23"S	25°45'20.78"E
132 kV Switching Station	11,001 (1.1 ha)	28°38'28.16"S	25°45'31.15"E
132kV/400kV Switching Station	22,560 (2.26 ha)	28°38'24.94"S	25°45'24.35"E
Warehouse A	313	28°38'29.96"S	25°45'29.89"E
Warehouse B	313	28°38'29.47"S	25°45'28.64"E
Warehouse C	313	28°38'30.32"S	25°45'28.17"E
Medium Voltage Substation 1	31.1	28°38'51.34"S	25°45'15.51"E
Medium Voltage Substation 2	31.1	28°38'51.35"S	25°45'16.60"E
Medium Voltage Substation 3	31.1	28°38'41.88"S	25°45'15.60"E
Medium Voltage Substation 4	31.1	28°38'41.87"S	25°45'16.72"E
Medium Voltage Substation 5	31.1	28°38'33.88"S	25°45'35.04"E
Medium Voltage Substation 6	31.1	28°38'34.47"S	25°45'36.13"E
Medium Voltage Substation 7	31.1	28°38'43.91"S	25°45'34.92"E
Medium Voltage Substation 8	31.1	28°38'43.92"S	25°45'36.02"E
Medium Voltage Substation 9	31.1	28°38'53.41"S	25°45'34.82"E
Medium Voltage Substation 10	31.1	28°38'53.42"S	25°45'35.91"E
Medium Voltage Substation 11	31.1	28°38'49.52"S	25°45'50.90"E
Medium Voltage Substation 12	31.1	28°38'49.54"S	25°45'51.98"E
Medium Voltage Substation 13	31.1	28°38'58.96"S	25°45'50.75"E
Medium Voltage Substation 14	31.1	28°38'58.98"S	25°45'51.87"E
Medium Voltage Substation 15	31.1	28°39'14.18"S	25°45'50.56"E
Medium Voltage Substation 16	31.1	28°39'14.19"S	25°45'51.67"E
Medium Voltage Substation 17	31.1	28°39'8.60"S	25°46'5.01"E
Medium Voltage Substation 18	31.1	28°38'59.13"S	25°46'6.23"E
Medium Voltage Substation 19	31.1	28°38'59.11"S	25°46'5.12"E
Medium Voltage Substation 20	31.1	28°38'49.68"S	25°46'5.24"E
Medium Voltage Substation 21	31.1	28°38'49.64"S	25°46'6.33"E

Table 1-7. Coordinates of associated infrastructure for Good Hope 2.

Point	Area (m²)	Latitude	Longitude
Battery Energy Storage Facility	100,264 (10 ha)	28°38'40.30"S	25°46'38.47"E
Good Hope 2 132kV switching station	11,002 (1.1 ha)	28°38'36.98"S	25°46'25.83"E
132kV/400kV Switching Station	22,560 (2.26 ha)	28°38'24.94"S	25°45'24.35"E
Warehouse A	313	28°38'38.42"S	25°46'28.80"E
Warehouse B	313	28°38'39.56"S	25°46'28.04"E

Point	Area (m²)	Latitude	Longitude
Warehouse C	313	28°38'39.62"S	25°46'28.85"E
Medium Voltage Substation 1	31.1	28°38'29.36"S	25°46'45.38"E
Medium Voltage Substation 2	31.1	28°38'27.50"S	25°46'47.06"E
Medium Voltage Substation 3	31.1	28°38'19.89"S	25°46'45.48"E
Medium Voltage Substation 4	31.1	28°38'17.99"S	25°46'47.15"E
Medium Voltage Substation 5	31.1	28°38'12.26"S	25°46'45.58"E
Medium Voltage Substation 6	31.1	28°38'8.52"S	25°46'47.25"E
Medium Voltage Substation 7	31.1	28°38'4.68"S	25°46'45.64"E
Medium Voltage Substation 8	31.1	28°37'55.45"S	25°47'6.75"E
Medium Voltage Substation 9	31.1	28°37'59.24"S	25°47'5.59"E
Medium Voltage Substation 10	31.1	28°38'3.05"S	25°47'6.67"E
Medium Voltage Substation 11	31.1	28°38'8.68"S	25°47'5.51"E
Medium Voltage Substation 12	31.1	28°38'10.55"S	25°47'6.58"E
Medium Voltage Substation 13	31.1	28°38'18.20"S	25°47'5.41"E
Medium Voltage Substation 14	31.1	28°38'25.76"S	25°47'6.41"E
Medium Voltage Substation 15	31.1	28°38'27.65"S	25°47'5.27"E
Medium Voltage Substation 16	31.1	28°38'33.32"S	25°47'6.31"E
Medium Voltage Substation 17	31.1	28°38'37.08"S	25°47'5.15"E
Medium Voltage Substation 18	31.1	28°38'40.88"S	25°47'6.25"E
Medium Voltage Substation 19	31.1	28°38'51.77"S	25°47'2.20"E
Medium Voltage Substation 20	31.1	28°38'46.36"S	25°46'46.81"E
Medium Voltage Substation 21	31.1	28°38'36.91"S	25°46'46.97"E

Table 1-8. Coordinates of the 400kV connection line with Eskom Perseus 400kV/275kV Main Transmission Substation (MTS)

Point	Latitude	Longitude
Start coordinates (132/400 kV switching station)	28°38'23.74"S	25°45'21.68"E
Mid-point coordinate	28°37'56.57"S	25°45'4.42"E
End point coordinates (Eskom Perseus substation)	28°38'3.41"S	25°44'31.10"E

Table 1-9. Coordinates of the 132kV connection line with Good Hope 1 switching station to the 132kV/400kV switching station.

Point	Latitude	Longitude
Start coordinates (Good Hope 1 132 kV switching station)	28°38'21.69"S	25°45'14.79"E
Mid-point coordinate	28°38'21.02"S	25°45'14.07"E
End point coordinates (Good Hope 1 132/400 kV switching station)	28°38'20.48"S	25°45'13.41"E

Table 1-10. Coordinates of 132 kV connection line with Good Hope 2 internal substation.

Point	Latitude	Longitude
Start coordinates (Good Hope 2 132kV switching station)	28°38'38.45"S	25°46'24.96"E
Mid-point coordinate	28°38'33.08"S	25°45'51.23"E
End point coordinates (132kV/400kV switching station)	28°38'19.93"S	25°45'13.66"E

Table 1-11. The area (per section) of the proposed Good Hope 1 and 2 solar farm development.

Solar farm development	Area (ha)
Western portion (Good Hope 1)	104 ha
Eastern portion (Good Hope 1)	97 ha
TOTAL GH1	**201 ha**
Good Hope 2	206 ha
TOTAL GH2	**206 ha**
400kV connection corridor	17.2 ha
Total development footprint	**424.2 ha**

The proposed development will be located on:

- Farm Epsom Downs 1216, Boshof RD (Good Hope 1 Solar Park);
- Farm Goede Hoop 1028, Boshof RD (Good Hope 1 Solar Park);
- Farm Gedenksrus-1029, Boshof RD (Good Hope 2 Solar Park);
- Farm De Werf 1013, Boshof RD (Good Hope 2 Solar Park);
- The remainder of the Farm Kentani 953, Boshof RD (Good Hope 1&2 400kV powerline); and
- Portion 3 of the Farm Kentani 953, Boshof RD (Good Hope 1&2 400kV powerline).

The 21-digit surveyor general (SG) code for the properties are contained in Table 1-12.

Table 1-12. 21-digit Surveyor General code for the properties affected by the proposed Good Hope 1 development.

F	0	0	4	0	0	0	0	0	0	0	0	1	2	1	6	0	0	0	0	0
F	0	0	4	0	0	0	0	0	0	0	0	1	0	2	8	0	0	0	0	0

Table 1-13. 21-digit Surveyor General code for the properties affected by the proposed Good Hope 2 development.

F	0	0	4	0	0	0	0	0	0	0	0	1	0	2	9	0	0	0	0	0
F	0	0	4	0	0	0	0	0	0	0	0	1	0	1	3	0	0	0	0	0

Table 1-14. 21-digit Surveyor General code for the properties affected by the proposed 400kV Powerline (shared infrastructure).

F	0	0	4	0	0	0	0	0	0	0	0	0	9	5	3	0	0	0	0	0
F	0	0	4	0	0	0	0	0	0	0	0	0	9	5	3	0	0	0	0	3

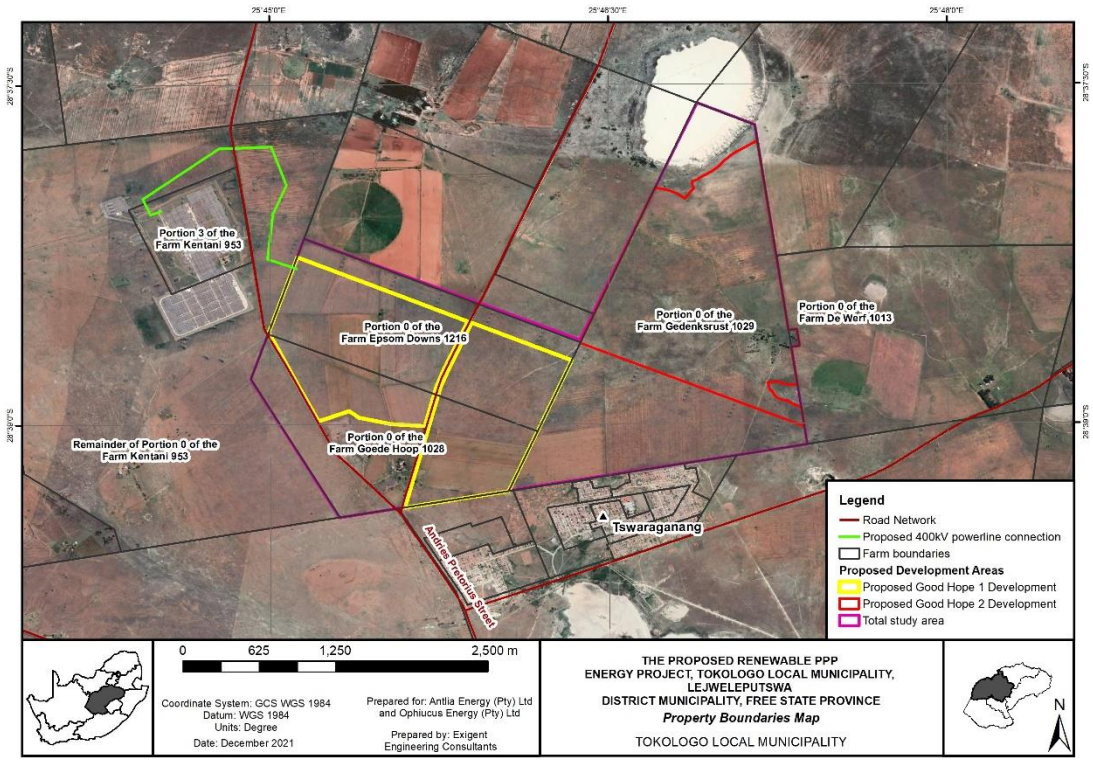


Figure 1-3. Properties where the proposed development will be located on

1.4. Land owners

The proposed development sites are owned by the following landowners:

Table 1-15. The landowners of the affected properties.

Landowner	Farm Name	Property information
GOOD HOPE 1		
Neville Gabriel & Hendrika Fredrika Collett	Epsom Downs 1216	Farm Epsom Downs 1216
	Goede Hoop 1028	Farm Goede Hoop 1028
ESKOM POWERLINE CONNECTION CORRIDOR		
Daniel David Albertus Van Der Watt	Kentani 953	Remainder of the Farm Kentani 953
Eskom Holdings Ltd	Portion 3, Kentani 953	Portion 3 of the Farm Kentani 953
GOOD HOPE 2		
Neville Gabriel & Hendrika Fredrika Collett	Gedenksrust 1029	Farm Gedenksrust 1029
	De Werf 1013	Farm De Werf 1013

1.5. Surrounding Land Uses

The land uses surrounding the proposed developments include farming activities as well as multiple proposed and future solar panel farm developments (As discussed in Section 1.6), due to the site being located within the REDZ. The proposed development is located approximately 2 km north of Dealesville on the outskirts of Tswaraganang, and within close proximity to Eskom's Perseus Main Transmission Substation (MTS). The south-western reaches of the project will be located along Andries Pretorius Street.

Figure 1-4 provides an indication of the surrounding land uses as well as the existing infrastructure on site. Additional site photographs have been included as part of Appendix D of this report.

(a)

(b)

c)

Figure 1-4. A photographic representation of a) The proposed development area of Good Hope 1; b) The proposed development area of Good Hope 2; and c) Eskom's Perseus Main Transmission Substation (MTS).

1.6. Similar projects within close proximity to the proposed development

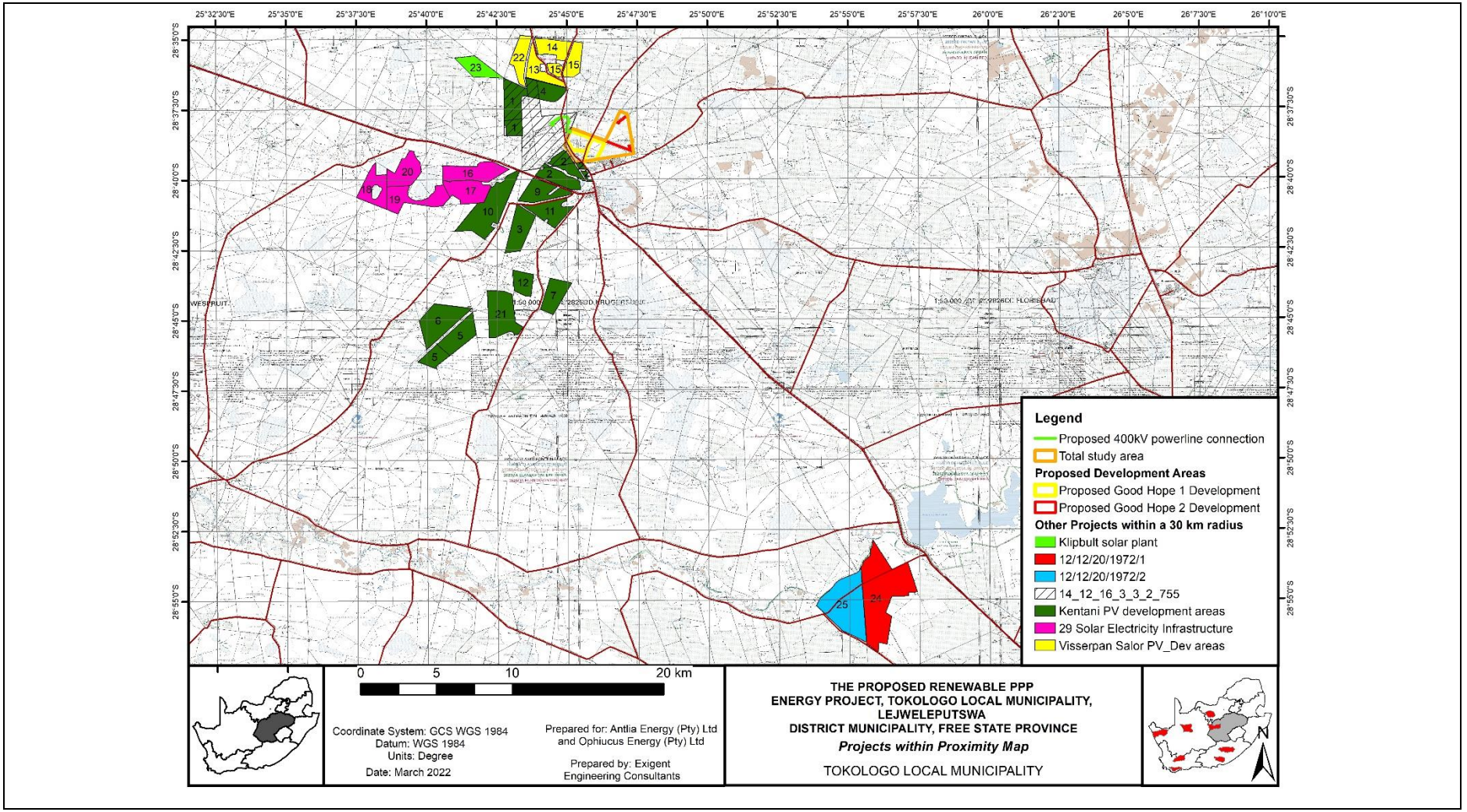
As per the site Screening report extracted from the DFFE website, it was indicated that numerous projects were previously approved within close proximity to the proposed development area. Table 1-16 lists the previous Solar PV applications within proximity to the proposed development that has been approved. Figure 1-5 indicates the location of the approved Solar PV farms in relation to the proposed development.

Upon receipt of the comments from the CA during the public review phase of the Draft BAR, Table 1-16 and Figure 1-5 below has been amended to include all previously approved PVPP developments within a 30 km radius of the proposed developments. Items 23-25 have subsequently been added to the database in order to incorporate all the before mentioned projects. Figure 1-5 only indicates the approved developments within the 30 km proximity periphery, where the developments further away have not included in the mapping process.

Table 1-16. Previous applications within proximity to the proposed development.

Map reference nr	EIA reference nr	Application Title	Distance from proposed development area
Approved as indicated in the Screening Tool document			
1	14/12/16/3/3/2/724	Kentani Solar PV	2.6 km
2	14/12/16/3/3/2/722	Klipfontein Solar PV	0.1 km
3	14/12/16/3/3/2/717	Eksteen Solar PV	4.8 km
4	14/12/16/3/3/2/723	Sonoblomo Solar PV	2.1 km
5	14/12/16/3/3/2/718	Irene Solar PV	11.8 km
6	14/12/16/3/3/2/719	Meeding Solar PV	11.6 km
7	14/12/16/3/3/2/720	Boschrand 2 Solar PV	7.9 km
8	14/12/16/3/3/2/755	*Project name unknown*	0 km
9	14/12/16/3/3/2/721	Klipfontein 1 Solar PV	2.1 km
10	14/12/16/3/3/2/728	Leliehoek Solar PV	3.3 km

Map reference nr	EIA reference nr	Application Title	Distance from proposed development area
11	14/12/16/3/3/2/726	Klipfontein 2 Solar PV	2.6 km
12	14/12/16/3/3/2/727	Boschrand 1 Solar PV	7.9 km
13	14/12/16/3/3/1/2154	Visserspan Solar PV Facility - Project 2	2.8 km
14	14/12/16/3/3/1/2155	Visserspan Solar PV Facility - Project 3	4.5 km
15	14/12/16/3/3/1/2156	Visserspan Solar PV Facility - Project 4	3.5 km
16	14/12/16/3/3/2/851	Edison PV	3.8 km
17	14/12/16/3/3/2/854	Watt PV	5.3 km
18	14/12/16/3/3/2/855	Faraday PV	10.7 km
19	14/12/16/3/3/2/853	Marconi PV	7.8 km
20	14/12/16/3/3/2/852	Maxwell PV	8.6 km
Applications within proximity to the proposed development not listed in the Screening Tool document			
21	14/12/16/3/3/2/725	Braklaagte-Braambosch Solar PV	9.6 km
22	14/12/16/3/3/1/2153	Visserspan Solar PV Facility - Project 1	3.8 km
23	14/12/16/3/3/2/432	Klipbult solar plant	5.21 km
24	12/12/20/1972/1	Letsatsi solar power farm	29.3 km
25	12/12/20/1972/2	Jedwater Solar Power Facility	30.9 km


Legend
Proposed 400kV powerline connection
Total study area
Proposed Development Areas
Proposed Good Hope 1 Development
Proposed Good Hope 2 Development
Other Projects within a 30 km radius
Klipbult solar plant
12/12/20/1972/1
12/12/20/1972/2
14_12_16_3_3_2_755
Kentani PV development areas
29 Solar Electricity Infrastructure
Visserpan Salor PV_Dev areas
0 5 10 20 km
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree
Date: March 2022
Prepared for: Antlia Energy (Pty) Ltd and Ophiucus Energy (Pty) Ltd
Prepared by: Exigent Engineering Consultants
THE PROPOSED RENEWABLE PPP ENERGY PROJECT, TOKOLOGO LOCAL MUNICIPALITY, LEJWELEPUTSWA DISTRICT MUNICIPALITY, FREE STATE PROVINCE
Projects within Proximity Map
TOKOLOGO LOCAL MUNICIPALITY
N

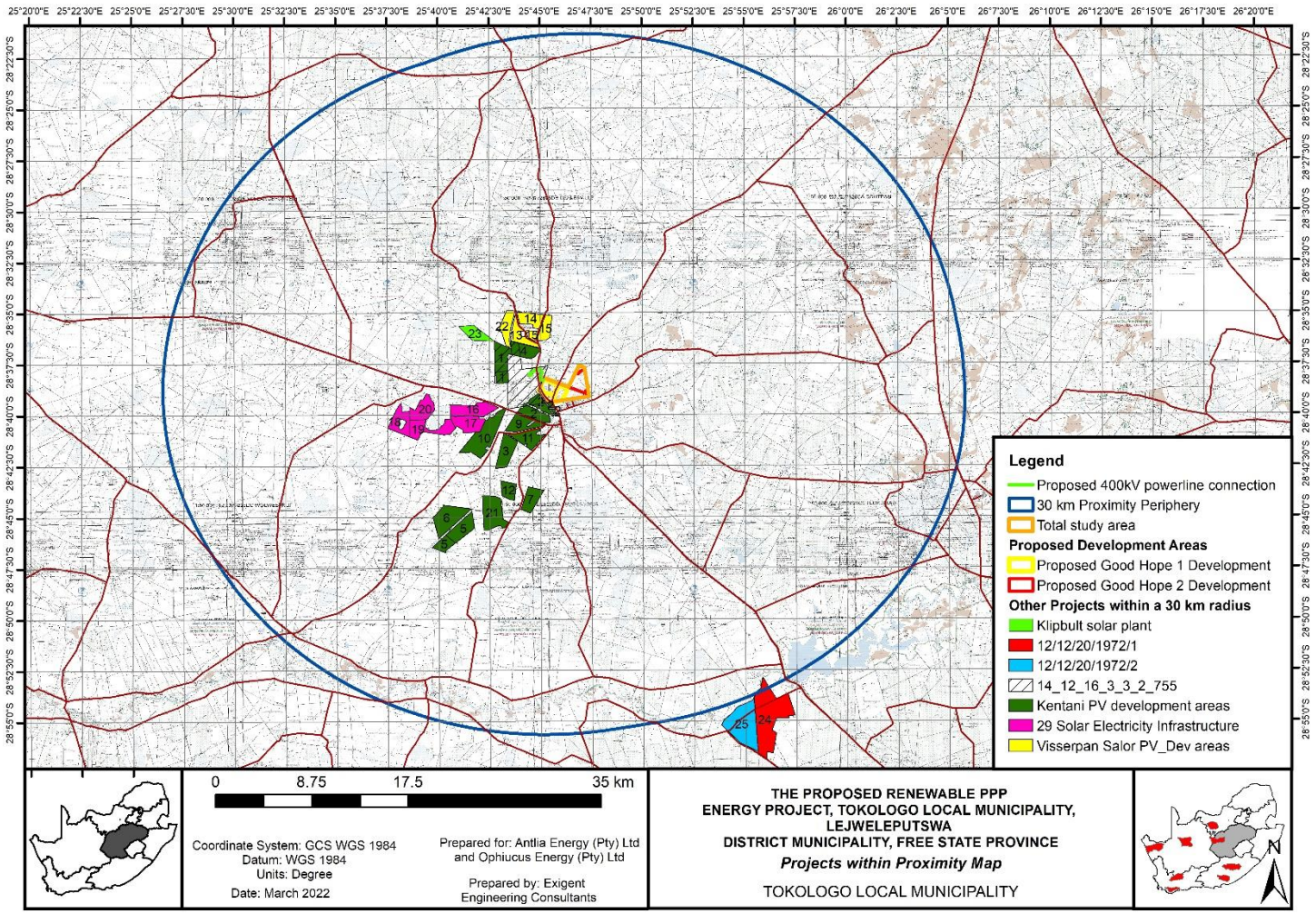


Figure 1-5. Approved Solar PV farms within a 30 km radius of the proposed Good Hope 1 and 2 developments.

1.7. Project Description

Table 1-17 below contains the description of the proposed developments:

Table 1-17. Project details

Component	Descriptions/dimensions	
	Good Hope 1 development	**Good Hope 2 development**
Output capacity of the PVPP	100 MW	100 MW
Height of PV panels	4.5 m	4.5 m
Area of the PV Array	Western portion: 87.4 ha; Eastern portion: 86.3 ha Total area of the PV Array: 173.7 ha	Total area of the PV Array: 160.8 ha
Number of inverters required	Each Medium voltage station will be equipped with DC/AC inverters that converts Direct Current (DC) into Alternate Currents (AC) at a low voltage of 270V. There will be 21 medium voltage stations throughout the proposed development. PV technology is in constant and rapid evolution, this means that the final choice of the type (e.g. central inverters or string inverters) and model of inverter can be taken at the time of the commission date, on the basis of the availability of inverters of the worldwide market and of the cost-efficiency curve. In any case, the total installed capacity of the inverters (AC side) will be up to 125 MWac.	Each Medium voltage station will be equipped with DC/AC inverters that converts Direct Current (DC) into Alternate Currents (AC) at a low voltage of 270V. There will be 21 medium voltage stations throughout the proposed development. PV technology is in constant and rapid evolution, this means that the final choice of the type (e.g. central inverters or string inverters) and model of inverter can be taken at the time of the commission date, on the basis of the availability of inverters of the worldwide market and of the cost-efficiency curve. In any case, the total installed capacity of the inverters (AC side) will be up to 125 MWac.
Area occupied by inverter/transformer stations/substations	There will be 21 medium voltage stations throughout the proposed development. Each will have an area of approximately 31.3 m^2. Therefore, the combined area of the medium voltage stations will be 657.3 m^2.	There will be 20 medium voltage stations throughout the proposed development. Each will have an area of approximately 31.3 m^2. Therefore, the combined area of the medium voltage stations will be 626 m^2.
Control rooms	Each substation (the 132kV/400 kV and the 132kV switching stations respectively) will be equipped with 1 or more control room. The control rooms will have a length of 26.66 m and a width of 10.82 m. Therefore, each of the control rooms will have an area of 288,46 m^2.	The 132kV substation located within the proposed Good Hope 2 PVPP development area and the 132kV/400kV switching station development will be equipped with a control room. The control rooms will have a length of 26.66 m and a width of 10.82 m. Therefore, each of the control rooms will have an area of 288,46 m^2.

Component	Descriptions/dimensions	
	Good Hope 1 development	Good Hope 2 development
Workshops/Warehouses	Three warehouses / workshops will be constructed within close proximity to the On-site 132kV switching station. The warehouses will have an area of 939 m^2.	Three warehouses / workshops will be constructed within close proximity to the On-site 132kV switching station. The warehouses will have an area of 939 m^2.
Capacity of on-site substations	• One on-site 33kV/132kV step-up substation with high-voltage power transformers, stepping up the voltage from 33kV (or 22k) to 132kV. Total capacity: up to 150 MVA. • One on-site 132kV/400kV step-up substation with high-voltage power transformers, stepping up the voltage to 400kV. Total capacity: up to 300 MVA (shared infrastructure with Good Hope 2 Solar Park).	• One on-site 33kV/132kV step-up substation with high-voltage power transformers, stepping up the voltage from 33kV (or 22k) to 132kV. Total capacity: up to 150 MVA. • One on-site 132kV/400kV step-up substation with high-voltage power transformers, stepping up the voltage to 400kV. Total capacity: up to 300 MVA (shared infrastructure with Good Hope 1 Solar Park).
Area occupied by both permanent and construction laydown areas	Project footprint / fenced area is up to 201 ha. Surface area (within the project footprint) covered by PV modules, internal roads, MV stations, HV substation and BESS is up to 114 ha (cover ratio up to 0.5) The construction camp (temporary) will be up to 10 ha in extent, at the location of the BESS	Project footprint / fenced area is up to 206 ha. Surface area (within the project footprint) covered by PV modules, internal roads, MV stations, HV substation and BESS is up to 102 ha (cover ratio up to 0.5) The construction camp (temporary) will be up to 10 ha in extent, at the location of the BESS
Areas occupied by buildings	Medium-voltage stations occupy a footprint up to 930 m^2. On-site 33kV/132kV substation and 132kV switching station occupy a footprint of approx. 11,000 m^2. This area includes the control buildings, of approx. 300 m^2. Workshop & Warehouse occupy a footprint of approx. 300 m^2 each. In total, 3 warehouses are foreseen. Therefore, the total area occupied by buildings (MV stations, HV substation, Workshop & Warehouse) amounts to approx. 12,830 m^2 (1.3 ha).	Medium-voltage stations occupy a footprint up to 930 m2. On-site 33kV/132kV substation and 132kV switching station occupy a footprint of approx. 11,000 m^2. This area includes the control buildings, of approx. 300 m2. On-site 132kV/400kV substation and 400kV switching station occupy a footprint of approx. 22,500 m2. This area includes the control buildings, of approx. 300 m2. Workshop & Warehouse occupy a footprint of approx. 300 m2 each. In total, 3 warehouses are foreseen. Therefore, the total area occupied by buildings (MV stations, HV substation, Workshop & Warehouse) amounts to approx. 35,330 m2 (3.5 ha).
Length of internal roads	Approximately 11 774 m	Approximately 10 638 m
Width of internal roads	8 m	8 m
Access roads	The project footprint / development area will have direct access from the secondary road from Dealesville which crosses the property along the North to South direction.	The project footprint / development area will have direct access from the secondary road from Dealesville which crosses the property along the North to South direction.
Proximity to the grid	2.892 km (via the proposed infrastructure route). One 400 kV overhead	4.681 (via the proposed infrastructure route). One 400 kV overhead power

Component	Descriptions/dimensions	
	Good Hope 1 development	Good Hope 2 development
connections	power line, connecting the on-site 400kV switching station to the 400 kV busbar of the Eskom Perseus 400kV/275kV Main Transmission Substation (MTS) – an extension of the 400kV busbar of the Eskom substation may be required. The powerline servitude will be of 55m in width.	line, connecting the on-site 400kV switching station to the 400 kV busbar of the Eskom Perseus 400kV/275kV Main Transmission Substation (MTS) – an extension of the 400kV busbar of the Eskom substation may be required. The powerline servitude will be of 55m in width.
Height of fencing	3.0 m	3.0 m
Type of fencing	Wire mesh fencing with video-surveillance system.	Wire mesh fencing with video-surveillance system.
Height of overhead powerlines	132kV: up to 25 m above the ground level 400kV: up to 40 m above the ground level	132kV: up to 25 m above the ground level 400kV: up to 40 m above the ground level
Length and width of servitude of 132kV powerline	The servitude will be 32 m in width and the 132kV corridor from the 132 kV substation to the 132/400 kV switching station will be 52 m long	The servitude will be 32 m in width and the 132kV corridor from the 132 kV substation to the 132/400 kV switching station will be 1.79 km long
Width of servitude of 400kV servitude	55 m	55 m
132kV Substation dimensions	11 001 m^2	11 002 m^2
132/400kV switching station dimensions	22 560 m^2; 132kV/1400kV step-up substation with high-voltage power transformers, stepping up the voltage to 400kV, and one 400kV busbar with metering and protection devices (switching station);	22 560 m^2; 132kV/1400kV step-up substation with high-voltage power transformers, stepping up the voltage to 400kV, and one 400kV busbar with metering and protection devices (switching station);
Battery Energy Storage Facility	With a Maximum Export Capacity up to 100 MW and a 6-hour storage capacity up to 600 MWh, with a footprint up to 10 ha within the proposed PV plant footprint / fenced area.	With a Maximum Export Capacity up to 100 MW and a 6-hour storage capacity up to 600 MWh, with a footprint up to 10 ha within the proposed PV plant footprint / fenced area.

Additional information regarding the technical descriptions of the proposed PVPP facilities can be found included as part of Appendix L of the FBAR.

1.7.1. Period of the construction phase of the projects

The construction phase of the proposed Good Hope 1 and Good Hope 2 PVPP developments will last approximately 15 months, respectively.

1.7.2. Primary Components of the proposed developments

The proposed developments (the PVPP and their connection infrastructure) consist of the installation of the following equipment:

- PV modules (mono-crystalline, poly-crystalline or bi-facial modules as described below);
- Mounting systems for the PV arrays (single-axis horizontal trackers or fixed structures) and related foundations;
- Internal cabling and string boxes;
- Medium voltage stations, hosting LV/MV power transformers;
- Medium voltage receiving stations;
- Workshops and warehouses;
- Electrical system and Uninterruptible Power Supply (UPS) devices;
- Lighting system;
- Grounding system;
- Internal roads;
- Fencing of the site and alarm and video-surveillance system;
- Water access point, water supply pipelines, water treatment facilities;
- Sewage system;
- Interventions on the Eskom Perseus Main Transmission Substation (MTS).

During the construction phase, the sites may be provided with additional:

- Water access point, water supply pipelines, water treatment facilities;
- Prefabricated buildings; and
- Workshops and warehouses; which will all be removed at the end of construction.

The connection may also entail interventions on the Eskom grid, according to Eskom's connection requirements/solution.

1.7.3. Energy generation and avoided production of CO_2.

Each project envisages the establishment of a solar power plant with a maximum generation capacity at the delivery point (Maximum Export Capacity) of up to 100 MW (200 MW in total).

The preferred technical solutions envisage:

- **mono/polycrystalline PV modules, mono or bi-facial.**

- **fixed mounting systems** or **horizontal 1-axis trackers.**

The estimated annual energy production is calculated in approximately:

- **2,100 kWh/kWp/year** (load factor = 0.240), in the case of bi-facial PV modules mounted on fixed mounting systems; or
- **2,450 kWh/kWp/year** (load factor = 0.280) in the case of bi-facial PV modules mounted on trackers.

Therefore, each of the two projects will generate:

- **328.1 GWh per year** in the case of PV modules mounted on fixed mounting systems; or
- **382.8 GWh per year** in the case of PV modules mounted on trackers.

The Global Horizontal Irradiation (GHI) of the site is 2,136 kWh/m^2/year (source: https://solargis.info/imaps/).

The energy generated by the Good Hope 1 and 2 Solar Parks will reduce the quantity of pollutants and greenhouse gases emitted into the atmosphere. The reduced amount of CO_2 will be the emissions that would have been generated by a thermal power plant using fossil fuels for producing the same quantity of energy that it is produced by the Good Hope 1 Solar Park.

The quantity of the avoided CO_2 is calculated as follows: the energy produced by the Good Hope 1 and 2 Solar Parks (up to 328.1 GWh/y or 382.8 GWh/y, per project) is multiplied by the Eskom's average emission factor which is 1.015 t CO^2/MWh (source: Energy Research Centre, University of Cape Town. (2009 Carbon accounting for South Africa).

This means that, in the case of Good Hope 1 and 2 Solar Parks, the avoided CO_2 emissions are approximately 323,276 tons of CO_2 per year per project in the case of PV modules mounted on fixed mounting systems, or 377,155 tons of CO_2 per year per project in the case of PV modules mounted on trackers.

Considering that 1 kg of coal generates approximately 3.7 kWh (supposing a caloric value of 8000 kcal/kg and a coal plant efficiency of 40%), the coal saved by the Good Hope 1 and 2 Solar Parks will be approximately 88,682 tons of coal / year / project in the case of PV modules mounted on fixed mounting systems, or 103,463 tons of coal / year / project in the case of PV modules mounted on trackers.

The detailed description of the characteristic and functioning of the PV plants and their connection is given in the following paragraphs.

1.7.4. Detailed descriptions of the project components

1.7.4.1. PV technology (Project functioning

Solar energy facilities using PV technology convert sun energy to generate electricity through a process known as the Photovoltaic Effect, which consists of the generation of electrons by photons of sunlight in order to create electrical energy.

The preferred technical solutions are:

- Mono / bi-facial mono / polycrystalline modules, mounted on:
- fixed mounting systems or mounted on horizontal 1-axis trackers, which at present represent the best performing options in terms of reliability and costs/efficiency.

PV technology is in constant and rapid evolution, this means that the final choice of the type of solar modules (mono-crystalline or polycrystalline, mono or bi-facial) and mounting system (fixed or tracker) can be taken at the time of the commission date, on the basis of the availability of PV modules and mounting systems, of the worldwide market and of the cost-efficiency curve.

The required footprint - corresponding on the fenced area - will not exceed 201 ha for GH1 and 206 ha for GH2; furthermore, the maximum height of the structures (PV modules and support frames) will be approximately 4.5 m above the ground level. Therefore. the impacts and mitigation measures will not change.

PV modules will be assembled on zinced steel or aluminium frames, to form PV arrays. The metal frames that sustain PV arrays are set to the ground by fixed support poles.

A. In the case of PV modules mounted on fixed mounting systems:

Each mounting frame will host several PV modules along two or more parallel rows consisting of PV modules placed side by side, with the position of the PV arrays northwards and at an optimized tilt. The rows are mounted one on top of the other, with an overall mounting structure height up to 4.5 meters above ground level.

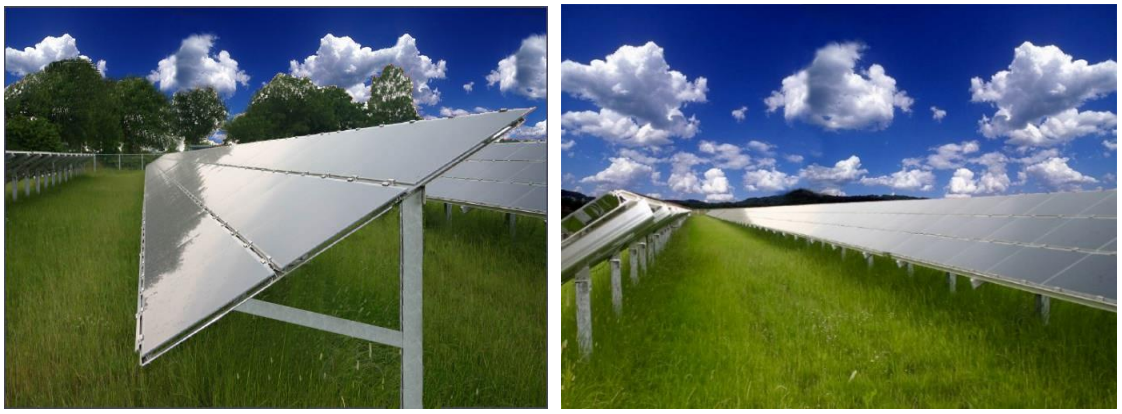


Figure 1-6. Lateral views of PV arrays mounted on fixed mounting systems.

Figure 1-7. Frontal views of PV arrays mounted on fixed mounting systems.

For further details, please refer to the figures above and to the drawing included in the annexures:

- GH12_03_r0 Mounting System – Alternative option 1: fixed mounting systems

B. <u>In the case of PV modules mounted on trackers</u>

Each PV array is composed of several PV modules disposed along one or more parallel rows consisting of PV modules placed side by side. Each tracker is composed by several PV arrays North-South oriented and linked by an horizontal axis, driven by a motor. The horizontal axis allows the rotation of the PV arrays toward the West and East direction, in order to follow the daily sun path.

The maximum mounting structure height will be up to 4.5 meters above ground level.

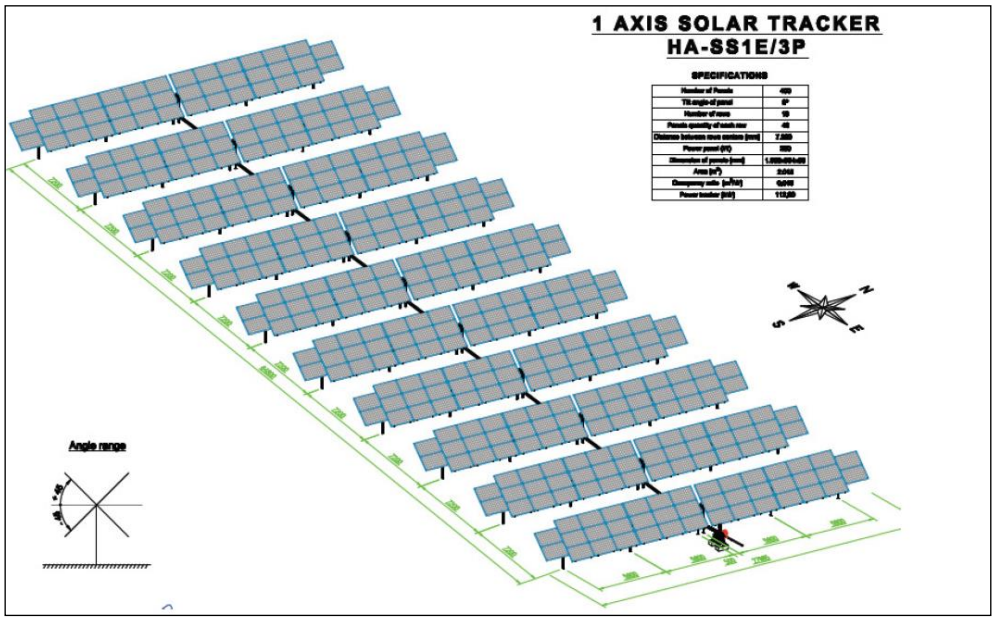


Figure 1-8. Frontal views of PV arrays mounted on fixed mounting systems.

Figure 1-9. Frontal views of PV arrays mounted on fixed mounting systems.

For further details, see also the drawing of the Appendix E:

- GH12SP_04_r0 *Mounting System – Alternative option 2: horizontal single-axis trackers*

C. <u>In both cases (where both alternatives are used</u>

PV modules are series-connected outlining PV strings made of several modules, so that the PV string voltage fits into the voltage range of the inverters. PV strings are set up in order to be connected to DC-connection boxes. Each String Box allows the parallel connection of several PV strings (also called "PV sub-field").

String Boxes monitor the currents in photovoltaic modules and can promptly diagnose faults. String boxes are also designed with a circuit breaker in order to disconnect the photovoltaic sub-fields from the inverters.

1.7.4.2. <u>Medium Voltage Stations</u>

The energy delivered from the medium voltage stations will be collected into one (or more) medium voltage receiving station(s), parallel connecting all the PV fields of the PV generator.

From the medium voltage receiving station, the energy will be delivered to one step-up transformer of 125 MVA (plus one as spare), which will step up the electric energy from the medium voltage level (22 kV or 33 kV) to 132 kV. The power transformers will be connected to an on-site 132 kV busbar (the so called "switching station"), to be equipped with protection and metering devices.

1.7.4.3. <u>On-site 132kV busbar (switching station)</u>

The new on-site 33kV/132kV substation and 132kV switching station will need to be equipped with circuit breakers upstream and downstream, in order to disconnect the PV power plant and/or the power line in case of failure or grid problems.

The layout of the on-site high-voltage substations and switching stations including the control building can be found in Appendix E:

- GH12SP_07_r0 On-site 33kV/132kV substation and 132kV switching station

1.7.4.4. 400 kV Substation and powerline

From the on-site 132kV switching station, a new 132kV power line, 0.05 km long for GH1 and 2.22 km long for GH2, will deliver the energy to a new step-up transformer of 125 MVA (plus one as spare) (one per project), located in a new on-site 400kV substation, which will step up the electric energy from 132kV to 400kV. The power transformers will be connected to a 400kV busbar (the so called "switching station"), to be equipped with protection and metering devices.

The layout of the on-site high-voltage substations and switching stations including the control building can be found in Appendix E:

- GH12SP_08_r0 On-site 132kV/400kV substation and 400kV switching station

1.7.4.5. Shared infrastructure

Both the Good Hope 1 and 2 Solar Parks will be connected to the 400 kV busbar of the Eskom Perseus 400 kV / 275 kV Main Transmission Substation (MTS) via a new 400 kV power line approximately 2.46 km long.

The connection may entail the extension of the 400V busbar of the Eskom Perseus MTS and the establishment of a new 400kV bus-bay.

The power generation capacity at the delivery point (Maximum Export Capacity) will be up to 100 MW per project (200 MW in total).

1.7.4.6. Battery Energy Storage Systems (BESS)

A Battery Energy Storage System (BEES) with an output capacity up to 100 MWac and a storage capacity up to 600 MWh (6-hour storage) will be installed next to the on-site step-up substation and switching station, within the footprint and fenced area of the Good Hope 1 Solar Park and Good Hope 2 Solar Park.

Lithium-ion batteries will store energy at times of low energy demand and release the energy to the grid at times of pick demand. The battery energy storage system can also provide other grid services (if required by Eskom) aimed to improve grid stability and power quality, by turning on and off in fractions of a second, such as "Fast Frequency Response" (FFR).

Each Battery Storage Facility (one per project) will have a footprint of **up to 10 hectares** and will comprise of the following equipment:

- Up to 120 containers (each up to 40 m^2), each with a storage capacity of up to 5 MWh and on a concrete platform. These will house the batteries, management system and auxiliaries.
- Up to 50 transformer stations (up to 35 m^2 each).
- Up to an additional 10 m^2 per container for cooling units.
- Internal access roads up to 8.0 m wide between rows of containers.
- BESS will be connected:
  - to the PV plant by means of DC/DC inverters, and

- to the 33kV bus-bay of the on-site step-up substation by means of kiosk transformers, medium-voltage overhead lines and/or underground cables;
- Temporary infrastructure including a site camp and a laydown area.

The batteries to be installed in the containers will be of the Lithium ion type and the battery cells will be pre-assembled at the supplier factory prior to delivery to the site. NO electrolytes will be transported to and handled on site.

The Battery System shall be able to store electrical energy and charge and discharge electrical energy when connected to a Power Conversion Unit (PCU), which performs the current conversion from LV DC to MV AC (and vice versa). The battery is commonly connected at AC MV level to the Renewable Power Plant for HV conversion and grid interconnection.

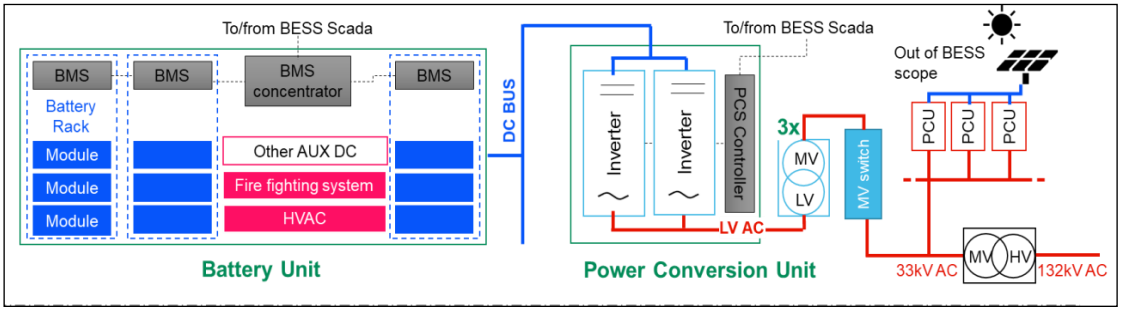


Figure 1-10. Battery Energy Storage Systems (BESS)

Battery Storage in combination to solar power plants is capable to provide multiple services to the plant and to the power transmission network adding flexibility to the system. Possible applications include amongst others: renewable generation time shifting, unbalancing reduction, curtailment avoidance, frequency regulation, voltage support, spinning reserve.

1.7.4.7. Access road and internal roads

Access to the Good Hope 1 and 2 Solar Parks will be from a secondary road from Dealesville which crosses the property along the North to South direction. During construction and operation, access and internal roads will be up to 8 m wide with a road reserve up to 13.5 m.

Internal roads will consist of gravel roads designed in accordance with engineering standards. The roads will have a width up to 8.0 meters allowing for the slow-moving heavy vehicles. Once the solar farm is in operation, the internal roads will mainly be used for maintenance and inspections. The vertical alignment of the roads will not present significant challenges due to the flatness of the terrain. The entire development will be contained inside a fenced area and the roads are not intended for public use.

1.7.4.8. Lighting system

The lighting system will consist of the following equipment (per project):

- Floodlight-towers: maximum 10 meters high, with directional lamps (LED type) of 120 W, installed around the HV loop-in loop-out substation. Normal lighting: 15 lux; up to 40 lux in case of emergency.
- Street lighting along internal roads, for the stretch from the access point up to the HV substation inside the property: 1 streetlamp, maximum 5.5 meters high, every 20 meters, having a LED lamp of 120 W.
- 2x120 W spotlights (LED type) mounted on the top of medium-voltage stations.

The lighting of the MV stations and of the on-site HV substation will be on only in case of intrusion/emergency or necessity to reach the MV stations / HV substation during the night.

During the night, the video-surveillance system will use infra-red (or micro-wave) video-cameras, which do not need a lighting system (which could reduce the functioning).

1.7.4.9. Stormwater collection system

Given the low rainfall, flat topography and low flow speed of run-off, no formal storm water structures are required as the proposed gravel roads will be developed at ground level so as not to disturb the natural flow of storm water. This means that run-off will not be concentrated, and the existing drainage patterns will be left undisturbed.

1.7.4.10. Water requirements

This section describes the water requirements of the during the **construction phase** (per project). The overall and average water consumption during construction is detailed in Table 1-18.

Table 1-18. Water consumption during the construction phase of the proposed developments.

WATER REQUIREMENT DURING THE CONSTRUCTION PHASE OF THE PROJECTS			
DESCRIPTION	**UNIT**	**TOTAL: Good Hope 1**	**TOTAL: Good Hope 1**
Timeframe of the construction activities	*months*	15	15
Timeframe of the construction activities - calendar days	*days*	450	450
Overall water consumption for internal roads	m^3	6,850	6,850
Overall water consumption for sanitary use	m^3	1,650	1,650
Overall water consumption for concrete production	m^3	3,000	3,000
OVERALL WATER CONSUMPTION	***m^3***	**11,500**	**11,500**
Daily water consumption (average over 450 calendar days)	***m^3/day***	**25.5**	**25.5**

Storage tanks will be sized in order to provide a reserve of water approximately **200 cubic meters for each project respectively**.

A. Construction of internal gravel roads

- Water is necessary for the construction of internal gravel roads, in order to get the gravel compacted to optimum moisture content (OMC).
- The surface of internal gravel roads will be approximately 137,000 m^2.
- 50 liters of water / m^2 of internal of roads will be required for each project respectively.

B. Workers

- Approximately 100 people are expected to be employed during the construction period, although this number can increase to 150 for short spaces of time during peak periods. This number can be higher in the case the Project Company - once being selected as Preferred Bidder by the Department of Energy and having finalized the Connection Agreement with Eskom, where in particular it is agreed the envisaged connection timeline - evaluates to build the respective Solar Parks in a timeframe shorter than 15 months (i.e. 330 working days). For example, in the case the construction works are planned to last only 6 months (i.e. 132 working days), the average number of workers required on site during construction is 250.
- Each worker needs 50 liters / 8 working hours for sanitary use.
- Water consumption will be:
  - 100 people x 50 l/person x 330 working days = 1650 m3 over 15 months, or:
  - 250 people x 50 l/person x 132 working days = 1650 m3 over 6 months.

C. Concrete production

- Concrete is necessary for the basements of the medium-voltage stations, the high-voltage loop-in loop-out substation, the control building and the warehouse and for the foundations of the mounting systems. The overall amount of concrete to be produced will be approximately 15,000 m^3 for each project respectively.
- 200 litres of water are needed for 1 cubic meter of concrete.

D. Vehicle cleaning

As mitigation measure, the cleaning of vehicles like excavators, mechanical diggers and pile rammers will be done once or twice per month and not during working days, also in order to limit the water requirement during the construction activities. In order not to waste a large amount of water, high pressure cleaners will be used. Overall, the water requirement for cleaning activity is very low.

This section describes the water requirements of the during the construction phase (per project):

This section describes the water requirements of the during the **operational phase** (per project). During operation, water is only required for the operational team on site (sanitary use), as well as for the cleaning of the solar panels. Further water consumption may be only for routine washing of vehicles and other similar uses. The overall and average water consumption during construction is detailed in Table 1-19.

Table 1-19. Water consumption during the operational phase of the proposed developments.

WATER REQUIREMENT DURING THE OPERATIONAL PHASE			
DESCRIPTION	**UNIT**	**TOTAL: Good Hope 1**	**TOTAL: Good Hope 1**
Average daily water consumption for sanitary use	*l/day*	3,000	3,000
Average daily water consumption during cleaning activity (over 12 working days, twice per year)	*l/day*	74,000	74,000
Average monthly water consumption for sanitary use (over 30 days)	*l/month*	90,000	90,000
Annual water consumption for sanitary use	***m^3/year***	**1,095**	**1,095**
Annual water consumption for PV modules cleaning activities (twice/year)	***m^3/year***	**1,700**	**1,700**
ANNUAL WATER CONSUMPTION DURING OPERATION	***m^3/year***	**2,795**	**2,795**
DAILY WATER CONSUMPTION DURING OPERATION (average over 365 day)	***m^3/day***	**7.66**	**7.66**

A. Water for sanitary use

B. Water consumption to clean the PV modules

The cleaning activities of the solar panels will take place twice per year. It is assumed that up to 1.0 liters per m^2 of PV panel surface will be needed. Therefore, the amount of water for cleaning is up to 850 m^3 per cleaning cycle and 1,700 m^3 per year.

PV modules cleaning activity can last less than 1 month. If the cleaning activity lasts approximately 2 weeks (12 working days), the daily water consumption will be approximately 71,000 liters/day, over 12 days, for the respective projects.

C. Conclusion

The daily water requirement will be approximately 3,000 liters/day over 12 months for sanitary use (i.e. 90,000 l/month and 1,095 m^3/year) for each project, respective.

The water consumption will increase up to 74,000 liters/day during the cleaning of the solar modules (71,000 liters/day for cleaning activity and 3,000 for sanitary use), which will last less than a month and will occur twice per year during the dry period. Indeed PV modules are conceived as self-cleaning with the rain.

It is further proposed that 90,000 litres of water will be stored in storage tanks (on the respective proposed developments) for fire, emergency and washing of panels twice a year.

Water needs for the construction phase (11,500 m^3 over approximately 15 months, for each project, respectively) and the operational phase (2795 m^3/year) can be obtained from the Tokologo Local Municipality and/or from on-site boreholes. The Tokologo Local Municipality will be consulted in this respect.

1.7.4.11. Sewerage

Considering that the proposed development will not include formal residential properties there is no need to connect the municipal sewer reticulation system. Sewer reticulation will be handled by a suitable patented and commercially available wastewater treatment system.

The sewer system will consist of an installation to serve the offices of the control building. The system will be installed in line with the requirements of the manufacturer. Typical systems consist of a conservancy tank (built underground on site), and a patented digester. Most systems require electricity to power the pumps and fans used in aeration process, although some systems use wind power (whirlybird). The system could require chlorine tablets available commercially. The effluent from the wastewater treatment system will be suitable for irrigation of lawns, or re-use in the dwellings as water for the flushing of toilets, or for fire-fighting purposes. This could reduce the overall water requirement of the development substantially.

1.7.4.12. Refuse removal

During the construction phase, solid waste will mainly consist of vegetation material as a result of the clearance of vegetation. Other type of solid waste will include, amongst others, wood from packaging, boxboards, expanded polystyrene and household waste. Vegetation material from clearing activity can be recycled to be re-used as organic fertilizer. Other solid wastes will be recycled as much as possible. Non-recyclable waste will be delivered to the closest legal landfill site.

During the operational phase (approx. 30 years), solid waste will mainly consist of household waste from the operational team. Other type of solid waste will come from the maintenance activity in case of failure of some components.

At the end of the project lifetime, the PV plant will be decommissioned. Silicon of the PV modules and cables (copper and/or aluminium conductor) will be recycled, as well as the aluminium (or zinced steel) frames and piles of the mounting systems.

The project company will enter into an agreement with the Local Municipality for the PV plant's refuse at the nearby municipal refuse site. No refuse will be buried or incinerated on site. Measures to manage waste has been included in the EMPr.

1.7.4.13. Temporary Construction Camps

The construction camp (approximately 10 ha) will be located within the planned development area, close to the new on-site substation, at the planned location of the Battery Energy Storage System (BESS). Consequently, the construction site area will be gradually reduced at the completion of the BESS. The optimal location of the construction site is important during the planning phase in order to minimize impacts on the surrounding environment. The site's location has been dictated by the nature of the works to be undertaken, specialist studies, site restrictions, town planning intended uses and access.

The area identified for the construction site had to meet the following requirements:

- sufficient size;
- proximity to existing roads;

- availability of water and energy;
- low environmental and landscape value;
- sufficient distance from residential areas; and
- proximity to the worksite.

In addition, to ensure environmental compatibility, the following factors have been considered:

- restrictions on land use (landscape, archaeological, natural, hydrological, etc.);
- terrain morphology;
- presence of high environmental value areas (e.g. wetlands); and
- sand & stone supply.

1.8. Project phases

1.8.1. Pre-construction phase

The pre-construction phase of the proposed project includes the planning of the project, by considering the best strategic approach for layout and component design, construction and operation of the proposed development. This is done in order to minimize the risks during the construction phase on the environment.

Based on the environmental impacts, e.g. natural vegetation, potential graves and natural water resources, as well as engineering design considerations and existing servitudes, various alternative layout options were considered.

1.8.2. Construction phase

The project will be located within close proximity to Dealesville and Tswaraganang, with the grid connection powerline leading from the proposed PVPP to the existing Eskom Perseus substation located towards the west of the proposed PVPP project.

The construction phase for the proposed developments will be separated into two phases, namely the 1) site preparation phase, and the 2) construction and installation phase.

The construction phase of the proposed developments is expected to take 15 months respectively. It is estimated that between 100 and 150 laborers will be employed each proposed PVPP.

A detailed description of the infrastructure to be installed has been included as part of Appendix L of this report.

1.8.2.1. Site preparation phase:

The proposed development sites are accessible via the extension of Andries Pretorius Street leading from Dealesville and an unnamed road branching through the proposed development sites. The following preparations will take place:

- PV modules and all steel structures will be transported to the proposed development site.
- The main transformers, graders, drill rigs, 10 m^3 tipper truck, tractors, trailers, water tanker truck, track-loader backhoes (TLBs) and trenching machines will be delivered to site.
- Vegetation clearance will take place.

- The area will be graded and levelled according to the required specifications, using the 20-ton roller.
- Throughout the entirety of the construction phase, water spray (using the water tanker truck) will be used to control excessive dust blow off.
- Internal access roads, as indicated on the layout plans, will be established on site. These access roads will allow for easy vehicular access to each panel system within the proposed developments. All roads will be gravel roads with a width of up to 8 m. (Once the proposed PVPPs are operational, the roads will mainly be used for maintenance and inspections.)
- For the purpose of the construction phase of the proposed development, water access point, water supply pipelines, water treatment facilities, pre-fabricated building, workshops and warehouses will be installed during the site preparation phase.

1.8.2.2. Construction and installation phase

- As part of the construction and installation phase, concrete transformer pads for each row of solar panels and a switch panel for connection to the power grid and control sheds will be constructed on site.
- Electrical systems development will take place in conjunction with the installation of the rest of structures on site (such as the sewer wastewater treatment works (WWTW) and all supporting infrastructure). The electrical systems installations will include electrical cabling and trenching (field trenching in and around the site where the units will be installed). These structures connect the solar units, collects the energy from them and then routes the energy to a point within the utility infrastructure system.
- A sewer reticulation system will also be installed on site. This will be done to service the offices of the control building and will be done in accordance with the specifications of the SABS. The systems will consist of an underground conservancy tank and a patented digester. These systems require electricity to power the pumps and fans used as part of the aeration process.
- During the construction phase, solid waste will mainly consist of vegetation material from the clearance of vegetation which will be recycled to be re-used as organic fertilizer. Other type of solid waste will include, amongst others, wood from packaging, boxboards, expanded polystyrene and household waste, which will be recycled as much as possible. Non-recyclable waste will be delivered to the closest permitted landfill site.
- Water needs for the construction and operational phases will be obtained from the local municipality. The TLM will be consulted in this respect.

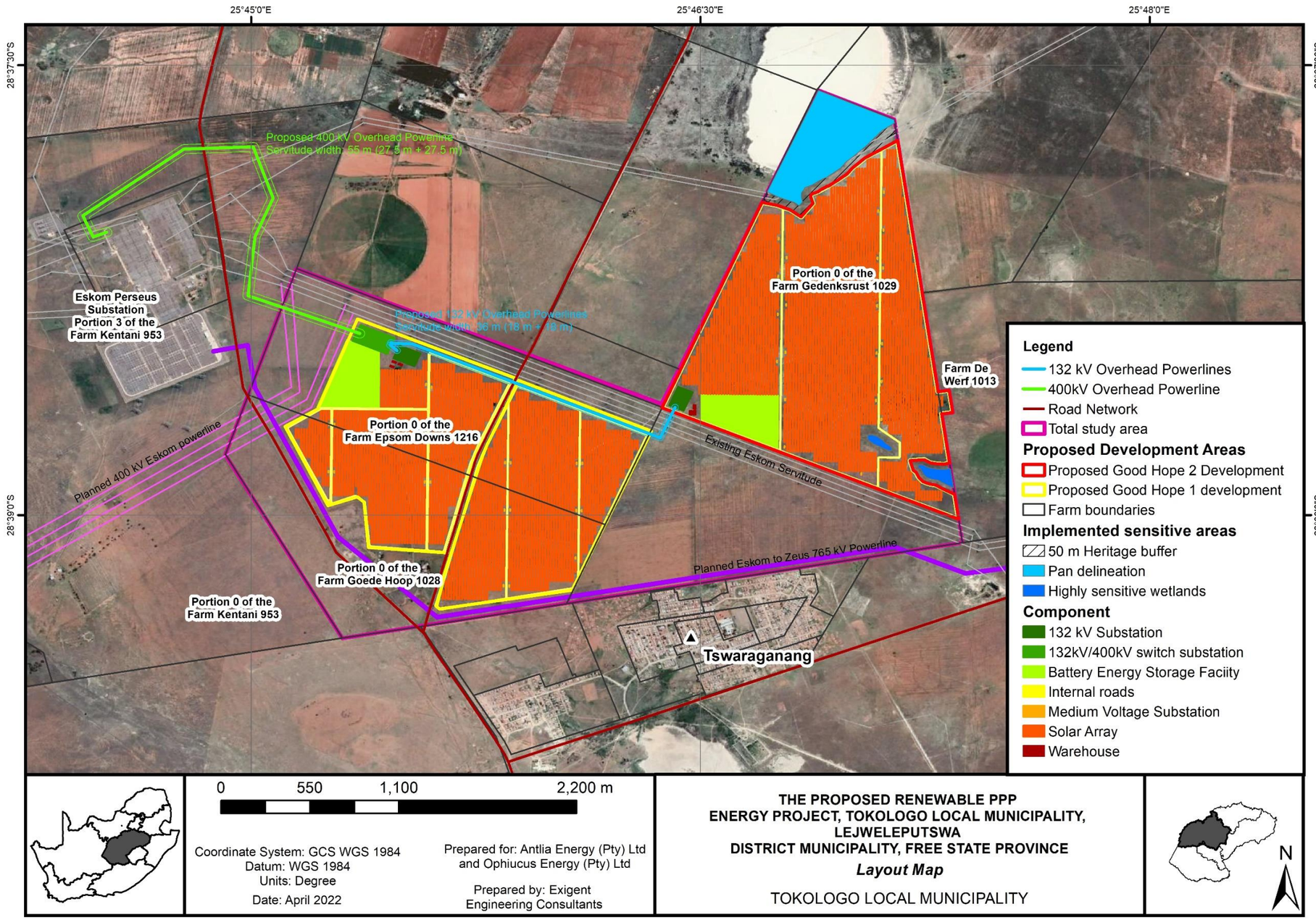


Figure 1-11. Proposed developments layout (A3 size attached as Appendix B).

1.8.3. Project phases: Operational

The proposed PVPPs aim to supplement the national energy supply through providing Eskom with 100MW additional energy supply. The proposed development aims to provide a sustainable, self-sustaining plant with all resources managed and maintained through internal processes.

2. Legal Framework

2.1. National Environmental Management Act, Act 107 of 1998

The NEMA (Act 107 of 1998) is an all-encompassing act regulating various aspects of natural resource use, integrated environmental management and pollution control. The Act provides for:

- The right to an environment that is not harmful to the health and well-being of the South African people;
- Sustainable development, environmental protection, equitable distribution of natural resources; and
- The formulation of environmental management frameworks.

2.1.1. NEMA listing notices

Environmental regulations were promulgated in terms of NEMA in 2014 to guide environmental management, these regulations were amended in April 2017.

These regulations include:

- GNR. 982 (as amended, 2017, GNR 326). The Minister of Environmental Affairs, hereby make the regulations pertaining to environmental impact assessments, under 24(5) and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998)
- GNR. 983 (as amended, 2017, GNR 327). The purpose of this notice is to identify activities that would require environmental authorisations prior to commencement of that activity and to identify CAs in terms of Section 24(2) and 24(D) of the Act.
- GNR. 984 (as amended, 2017, GNR 325). The purpose of this notice is to identify activities that would require an environmental authorisation prior to the commencement of that activity and to identify CAs in terms of sections 24(2) and 24(D) of this Act.
- GNR 985 (as amended, 2017, GNR 324). The purpose of this notice is to list activities and identify CAs under section 24(2) and 24(D) of the Act, where environmental authorization is required prior to commencement of that activity in specific identified geographical areas only.

Listed activities from these Regulations which will be triggered by the proposed project are provided in the Table 2-1.

Table 2-1. GNR 327 and GNR 324 activities applicable to the proposed development sites.

RELEVANT GOVERNMENT NOTICE	ACTIVITY	LISTED ACTIVITY	Good Hope 1 development and shared infrastructure (Antlia Energy)	Good Hope 2 development and shared infrastructure (Ophiucus Energy)
Listing Notice 1				
Listing Notice 1: GNR 983 as amended 2017, GNR 327	11	*The development and related operation of 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 Good Hope Solar Parks project will entail the construction and operation of: • **Shared infrastructure:** An on-site 33kV/132kV step-up substation, equipped with high-voltage power transformers, stepping up the voltage from 33kV (or 22k) to 132kV, and one 132kV busbar with metering and protection devices (switching station). One 132 kV power line, approximately 0.05 km long, connecting the on-site 132kV switching station of the GH1 project to the 132kV busbar of the on-site 132kV/400kV step-up substation established at the GH1 footprint	The Good Hope Solar Park 1 project will entail the construction and operation of: • **Shared infrastructure:** An on-site 33kV/132kV step-up substation, equipped with high-voltage power transformers, stepping up the voltage from 33kV (or 22k) to 132kV, and one 132kV busbar with metering and protection devices (switching station). One 132kV power line, approximately 2.22 km long, connecting the on-site 132kV switching station of the GH2 to the 132kV busbar of the on-site 132kV/400kV step-up substation established at the GH 1 footprint located outside urban areas or industrial complexes.
Listing Notice 1: GNR983 as amended 2017, GNR 327	12	*The development of-* *(xii) infrastructure or structures with a physical footprint of 100m² or more; where such development occurs-* *(a) within a watercourse;* *(b) in front of a development setback; or* *(c) if no development setback exists, within 32m of a watercourse, measured from the edge of a watercourse;*	The proposed development plan will intercept wetlands that have been identified as per the National Freshwater Priority Areas (NFEPA) database and as per specialist study. The interception of these watercourses will exceed an area of 100 m².	The proposed development plan will intercept wetlands that have been identified as per the National Freshwater Priority Areas (NFEPA) database and as per specialist study. The interception of these watercourses will exceed an area of 100 m².

RELEVANT GOVERNMENT NOTICE	ACTIVITY	LISTED ACTIVITY	Good Hope 1 development and shared infrastructure (Antlia Energy)	Good Hope 2 development and shared infrastructure (Ophiucus Energy)
Listing Notice 1: GNR983 as amended 2017, GNR 327	19	*The infilling or depositing of any material of more than 5m^3 into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 m^3 from-(i) a watercourse;*	The proposed development will intercept wetlands that have been identified as per the delineation of the appointed wetland specialist. The interception of these watercourses will exceed a volume of 10 m^3.	The proposed development will intercept wetlands that have been identified as per the delineation of the appointed wetland specialist. The interception of these watercourses will exceed a volume of 10 m^3.
Listing Notice 1: GNR983 as amended 2017, GNR 327	24	*The development of a road –* *(ii) with a reserve wider than 13,5 m or where no reserve exists where the road is wider than 8 m.*	Multiple internal roads will be constructed for the purpose of servicing the solar panel farms. Widths of the proposed internal roads are approximately 8 m. During construction phase, access points and some of the internal roads will have a reserve wider than 13.5 m to allow the transportation of abnormal goods (e.g. power transformers, etc.). The access roads to be used during construction will be of temporary nature within the areas to be cleared for development.	Multiple internal roads will be constructed for the purpose of servicing the solar panel farms. Widths of the proposed internal roads are approximately 8 m. During construction phase, access points and some of the internal roads will have a reserve wider than 13.5 m to allow the transportation of abnormal goods (e.g. power transformers, etc.). The access roads to be used during construction will be of temporary nature within the areas to be cleared for development.
Listing Notice 1: GNR983 as amended 2017, GNR 327	28	*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; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.*	The proposed development is to occur on land that was previously used as agricultural land, however which has since been allowed to return to its natural state. The construction of the proposed GH1 will have an extent of approximately 201 ha.	The proposed development is to occur on land that was previously used as agricultural land, however which has since been allowed to return to its natural state. The construction of the proposed GH2 solar panel farm will have an extent of approximately 206 ha.

RELEVANT GOVERNMENT NOTICE	ACTIVITY	LISTED ACTIVITY	Good Hope 1 development and shared infrastructure (Antlia Energy)	Good Hope 2 development and shared infrastructure (Ophiucus Energy)
Listing Notice 2				
Listing Notice 2: GNR984 as amended 2017, GNR 325	1	*The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20MW or more.*	The output capacity of the proposed development will be 100 MW (Therefore, 200 MW combined for the GH1 and GH2 collectively).	The output capacity of the proposed development will be 100 MW (Therefore, 200 MW combined for the GH1 and GH2 collectively).
Listing Notice 2: GNR984 as amended 2017, GNR 325	9	*Development of facilities or infrastructure for transmission and distribution of electricity with a capacity of 275kV or more, outside urban areas or industrial complex. excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is —* *(c) within an existing transmission line servitude*	The Solar Parks will entail the construction and operation of shared infrastructure: • One on-site 132kV/400kV step-up substation and switching station, equipped with two high-voltage power transformers (one per project), stepping up the voltage from 132kV to 400kV, one 132kV busbar and one 400kV busbar with metering and protection devices (switching station) • One 400 kV power line, approximately 1.76 km long, connecting the on-site 400kV switching station to the 400 kV busbar of the Eskom Perseus 400 kV / 275 kV Main Transmission Substation (MTS) – an extension of the 400kV busbar of the Eskom substation may be required located outside urban areas or industrial complexes.	The Solar Parks will entail the construction and operation of shared infrastructure: • One on-site 132kV/400kV step-up substation and switching station, equipped with two high-voltage power transformers (one per project), stepping up the voltage from 132kV to 400kV, one 132kV busbar and one 400kV busbar with metering and protection devices (switching station) • One 400 kV power line, approximately 1.76 km long, connecting the on-site 400kV switching station to the 400 kV busbar of the Eskom Perseus 400 kV / 275 kV Main Transmission Substation (MTS) – an extension of the 400kV busbar of the Eskom substation may be required located outside urban areas or industrial complexes.
Listing Notice 2: No. GN R984 as amended 2017, GNR 325	15	*The clearance of an area of 20 hectares or more of indigenous vegetation.*	The proposed development (including the GH1 solar park and powerline connection) will see to the clearance of approximately 218.2 ha of indigenous vegetation.	The proposed development (including the GH1 solar park and powerline connection) will see to the clearance of approximately 223.2 ha of indigenous vegetation.

RELEVANT GOVERNMENT NOTICE	ACTIVITY	LISTED ACTIVITY	Good Hope 1 development and shared infrastructure (Antlia Energy)	Good Hope 2 development and shared infrastructure (Ophiucus Energy)
Listing Notice 3				
Listing Notice 2: No. GN R985 as amended 2017, GNR 324	4	*The development of a road wider than 4 metres with a reserve less than 13,5 metres.* *b. Free State* *i. Outside urban areas:* *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas*	In order to provide access to the various sections of the proposed development, the construction of numerous access roads will be required. It is expected that these roads will have a width of 4 m. The proposed project is partially located within a CBA 1 area as per the Free State Biodiversity Plan. Furthermore, the proposed development is located approximately 9.5 km due South from a protected area (the Blenheim Hunting Farm).	In order to provide access to the various sections of the proposed development, the construction of numerous access roads will be required. It is expected that these roads will have a width of 4 m. The proposed project is partially located within a CBA 1 area as per the Free State Biodiversity Plan. Furthermore, the proposed development is located approximately 9.5 km due South from a protected area (the Blenheim Hunting Farm).
Listing Notice 2: No. GN R985 as amended 2017, GNR 324	12	*The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of Indigenous vegetation is required for maintenance Purposes undertaken in accordance with a Maintenance management plan.* *b. Free State* *i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;* *ii. Within critical biodiversity areas identified in bioregional plans;*	The proposed development will see to the clearance of approximately 201 ha of vegetation, for the purpose of constructing the Solar Panel farm and its associated infrastructure, e.g. roads and powerline corridor. The proposed project is partially located within a CBA 1 area as per the Free State Biodiversity Plan. Furthermore, the proposed development is located approximately 9.5 km due South from a protected area (the Blenheim Hunting Farm).	**GH1**: The proposed development will see to the clearance of approximately 201 ha of vegetation, for the purpose of constructing the Solar Panel farm and its associated infrastructure, e.g. roads and powerline corridor. The proposed project is partially located within a CBA 1 and ESA 2 areas as per the Free State Biodiversity Plan. Furthermore, the proposed development is located approximately 9.5 km due South from a protected area (the Blenheim Hunting Farm).

RELEVANT GOVERNMENT NOTICE	ACTIVITY	LISTED ACTIVITY	Good Hope 1 development and shared infrastructure (Antlia Energy)	Good Hope 2 development and shared infrastructure (Ophiucus Energy)
		iv. Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland.		
Listing Notice 2: No. GN R985 as amended 2017, GNR 324	14	*The development of— (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs—* *(a) within a watercourse;* *b. Free State* *i. Outside urban areas:* *(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *(hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve*	The proposed development will intercept wetlands that have been identified as per the National Freshwater Priority Areas (NFEPA) database as well as numerous watercourses identified by the wetland specialist. The interception of these watercourses will exceed an area of 10 m^2. The proposed project is partially located within a CBA 1 area as per the Free State Biodiversity Plan. Furthermore, the proposed development is located approximately 9.5 km due South from a protected area (the Blenheim Hunting Farm).	The proposed development will intercept wetlands that have been identified as per the National Freshwater Priority Areas (NFEPA) database as well as numerous watercourses identified by the wetland specialist. The interception of these watercourses will exceed an area of 10 m^2. The proposed project is partially located within a CBA 1 and ESA 2 areas as per the Free State Biodiversity Plan. Furthermore, the proposed development is located approximately 9.5 km due South from a protected area (the Blenheim Hunting Farm).

2.2. National Water Act, Act 36 of 1998

The National Water Act (NWA) (Act 36 of 1998) identifies 11 consumptive and non-consumptive water uses which must be authorized under a tiered authorization system. Section 27 of the NWA specifies that the following factors regarding water use authorization must be taken into consideration:

- The efficient and beneficial use of water in the public interest;
- The socio-economic impact of the decision whether to issue a licence;
- Alignment with the catchment management strategy;
- The impact of the water use, resource directed measures; and
- Investments made by the applicant in respect of the water use in question.

A Water Use License (WUL) in terms of Section 21 of the National Water Act (NWA), (Act 36 of 1998) will be required for the proposed development, which will be lodged with the Department of Water and Sanitation (DWS). All water resources were delineated as part of the wetland impact assessment report as undertaken by EMG, October 2021 (Appendix F3).

2.3. National Heritage Resources Act, Act 25 of 1999

In terms of Section 38 (1) of the National Heritage Resources Act (NHRA) (Act 25 of 1999), a Heritage Impact Assessment (HIA) must be undertaken for the following developments:

a) The construction of a road, wall, powerline, pipeline, canal, or other similar form of linear development or barrier exceeding 300 m in length;

c) Any development or other activity which will change the character of a site (i) exceeding 5 000 m^2 in extent; or

d) the re-zoning of a site exceeding 10 000 m^2 in extent.

The proposed solar farms will have a combined area of 433 ha. A HIA was undertaken by EMG, October 2021 (Appendix F2).

2.4. National Environmental Management: Waste Act, Act 59 of 2008

The National Environmental Management: Waste Act (NEMWA) (Act 59 of 2008) was implemented on 1 July 2009 and Section 20 of the Environmental Conservation Act 73 of 1989, under which waste management was previously governed, was repealed.

The objectives of the NEMWA involve the protection of health, well-being and the environment by providing reasonable measures for the minimization of natural resource consumption, avoiding and minimizing the generation of waste, reducing, recycling and recovering waste, and treating and safely disposing of waste as a last resort.

In general, the Act seeks to ensure that people are aware of the impact of waste on their health, well-being and the environment, and in the process giving effect to Section 24 of the Constitution, in ensuring an environment that is not harmful to the health and well-being of the individuals.

The NEMWA has no sections of relevance to the proposed development of the PVPP, Good Hope 1 and 2.

2.5. National Environmental Management: Air Quality Act, Act 39 of 2004

The National Environmental Management Air Quality Act (NEM:AQA) (Act 39 of 2004) was a landmark act which focused on the ambient air quality and the receptor as opposed to the previous Act which defined air quality by regulating the emissions which impact air quality. As a result of the NEM:AQA, standards for ambient air quality have been developed which are managed through the local municipalities or provincial municipalities.

The NEM:AQA enabled the publication of the Listed Activities and Minimum Emission Requirements, which require emitters to apply for and obtain an Atmospheric Emissions License (AEL) related to installations such as combustion installations in various industries.

The NEM:AQA has no sections of of relevance to the proposed project scope.

2.6. Conservation of Agricultural Resources Act, Act 43 of 1982

The Conservation of Agricultural Resources Act (CARA) (Act 43 of 1983) provides for the:

- Protection of wetlands; and
- Requires the removal of listed alien invasive species.

The National Department of Agriculture (NDA) is the responsible authority enforcing the CARA. This Act also requires that any declared invader species on the proposed site must be controlled according to their declared invader status.

The Environmental Management Programme (EMPr), which has been attached as Appendix I, includes the compulsory removal of alien and invader species from the study area. The rehabilitation phase of the construction area must make use of indigenous plants of the area.

2.7. National Environmental Management: Biodiversity Act, Act 10 of 2004

The National Environmental Management: Biodiversity Act (NEMBA) (Act 10 of 2004) provides for the management and conservation of South Africa's biodiversity within the framework of the NEMA, 1998; and provides for and includes:

- The protection of species and ecosystems that warrant national protection;
- The sustainable use of indigenous biological resources;
- The fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources;
- The establishment and functions of a South African National Biodiversity Institute; and for matters connected therewith;
- Biodiversity planning and monitoring;
- Protection of threatened or protected ecosystems;
- Protection of threatened or protected species; and
- The control of alien species, invasive species and genetically modified organisms.

Species that are classified as threatened and/or protected are listed in Government Gazette (GG) 151 of February 2007 and the regulations are included in GG 152 of February 2007, with the most recent amendment in GN 576 of July 2011.

Threatened ecosystems in need of protection are listed GN 1002 of December 2011.

The National Environmental Management: Biodiversity Act (10/2004): Alien and Invasive Species Lists, 2016 (No 864) was published on 29 July 2016 in GN 40166. In conjunction with these Regulations, the following Notices and Lists were also promulgated in terms of Sections 66(1), 67(1), 70(1)(a), 71(3) and 71A:

- Notice 1: Notice in respect of Categories 1a, 1b, 2 and 3, Listed Invasive Species, in terms of which certain Restricted Activities are prohibited in terms of section 71A(1); Exempted in terms of section 71(3); require a Permit in terms of section 71(1);
- Notice 2: Exempted Alien Species in terms of Section 66(1);
- Notice 3: National Lists of Invasive Species in terms section 70(1); and
- Notice 4: Prohibited Alien Species in terms of section 67(1).

The study area is located within the Western Free State Clay Grassland (LC) as well as the Vaal-Vet Sandy Grassland Ecosystem type, the latter has been listed as an Endangered (EN) Ecosystem type in terms of the NEMBA (Act 10 of 2004). The proposed development is also located within a CBA 1. Mitigation measures to safeguard the natural biodiversity of the study area have been discussed in the EMPr, as attached in Appendix I.

2.8. National Forest Act, Act 84 of 1998

The National Forest Act (NFA) (Act 84 of 1998), aims to reform the laws on forest protection and relating matters. The Act provides guidelines for sustainable forestry management, special measures used to protect forests and trees within natural forests and protected areas. The Act also provides uses for forests. Failure to comply with the Act may result in prosecution under the NFA.

Based on an assessment of the list of protected tree species, as identified in Regulations 716 of the NFA, a permit will be required prior to the removal / destruction of any of these species from the DFFE. However, none of these species were identified on site during the site inspection held by the specialist.

2.9. Free State Nature Conservation Ordinance, No 8 of 1969

The Free State Nature Conservation Ordinance (No. 8 of 1969) relates to nature conservation and concerns in the province. The ordinance lists the protected and specially protected plants in the province and prohibits the picking, sale, export or removal of protected plants. The ordinance also lists invader weeds which must be controlled within the study area and may not be sold or donated.

The Ordinance contains a list of the protected indigenous species which requires a permit for their removal, destruction or prior to being exported or imported into the Province.

2.10. Other applicable environmental legislation and guidelines

The following additional guidelines and South African legislation was considered during the impact assessment phase.

2.10.1. Other Legislation

- Constitution of the Republic of South Africa Act, 1996 (Act 108 of 1996)

2.10.2. Guidelines

- DEAT, 2002. *Integrated Environmental Management, Information Series 3: Stakeholder Engagement*;
- DEAT, 2002. *Integrated Environmental Management, Information Series 4: Specialist Studies*;
- DEAT, 2002. *Integrated Environmental Management, Information Series 12: Environmental Management Plans*;
- DEAT, 2004. *Integrated Environmental Management Information Series*, Department of Environmental Affairs and Tourism (DEAT), Pretoria.
- DWAF, 2008. *Updated manual for the identification and delineation of wetlands and riparian areas.* Department of Water Affairs and Forestry. Pretoria. South Africa;
- DEA, 2017. *Public Participation Guideline in term of the National Environmental Management Act, 1998 Environmental Impact Assessment Regulations*;
- DEAT, 2012. *NEMA Implementation Guideline – Companion Document on the Environmental Impact Assessments Regulations*.

3. Description of Receiving Environment

According to Mucina and Rutherford (2006) the proposed development is located within the Vaal-Vet Sandy Grassland vegetation type and Western Free State Clay Grassland. The following sections provide a description of the characteristics of the project area that may be affected by the proposed development.

3.1. Climate

The climate of the project area can be described as a warm-temperate, summer rainfall climate. According to Mucina & Rutherford (2006), the project area experiences fairly low precipitation reaching mean annual precipitation (MAP) values of approximately 530 mm with high summer temperatures. The area is considered a severe frost area, with approximately 37 frost days per year on average.

The study area is located 2 km north of Dealesville, Free State. According to World Weather Online (http://www.worldweatheronline.com; accessed 23 November 2021), the area experiences strong seasonality patterns with a majority of the precipitation occurring in the summer months. The average minimum temperatures in July were recorded as 4˚C, whereas the maximum temperature readings in summer (January) averages 30˚C.

3.2. Geology, topography and soils

The geology and soils of the Vaal-Vet Sandy Grassland are aeolian and colluvial sand underlain by the sandstone, mudstone and shales of the Karoo Supergroup (Specifically the Ecca Group) as well as the older Ventersdorp Supergroup andesite and basement gneiss. The soil forms are mostly Avalon, Westleigh and Clovelly with the dominant land type being Bd, Bc, Ae and Ba (Mucina & Rutherford, 2006).

According to the specialist study that was undertaken (EMG, 2021), the Eastern part of the site's underlying geology is dominated by limestone. According to the HIA (Palaeo Field Services, 2021), the site geology of the site (from oldest to youngest) is made up of Permian Ecca shales (Tierberg Formation., Pt), Jurassic dolerite intrusions (Jd, Karoo Dolerite Suite), Quaternary calcretes, surface limestones, calcified pandunes (Qc) and aeolian sands (Qs) (Kalahari Group) (Bosch, 1993). The wind-blown sands

represent the latest geological phase and are made up of the characteristically red-brown Kalahari sands (Hutton sands). The geological map indicates that, except for dolerite intrusions, the affected area is mainly covered by Quaternary-age surface deposits made up of surface limestones (Qc) and a thick mantle of aeolian sand (Qs). Unconsolidated sediments like sheet wash, alluvium, spring accumulations and aeolian sand generally occur as thin to well-developed deposits in the region, while consolidated regolith largely preserve as pedocretes.

3.3. Hydrology

3.3.1. Surface Water

The study area is located within the Orange (Upper) Water Management Area (WMA) (As gazette in September 2016). This WMA includes major rivers such as the Modder, Riet, Caledon, Kraai, Ongers, Hartbees and Orange Rivers. The proposed development is situated within the quaternary catchments C52H which forms part of the Upper Orange catchment. The major water resources of the Upper Orange Catchment are the Armenia Dam, Egmont Dam and several irrigation dams and impoundments, lakes and pans.

The National Freshwater Ecosystem Priority Areas (NFEPA) database includes various water resources data layers, including wetland delineation and vegetation data, catchment data, area of high groundwater recharge and water management areas. As per the NFEPA database, the majority of the proposed development is located within the Dry Highveld Grassland Group 3. Figure 3-1 depicts the NFEPAs for the study area. The vegetation and wetland delineation and functionality assessment specialist study (As included in Appendix F3) has indicated the wetland and watercourse characteristics throughout the area. A summary of the wetlands within the project footprint and those within close proximity to the proposed development is described in Section 7.8.

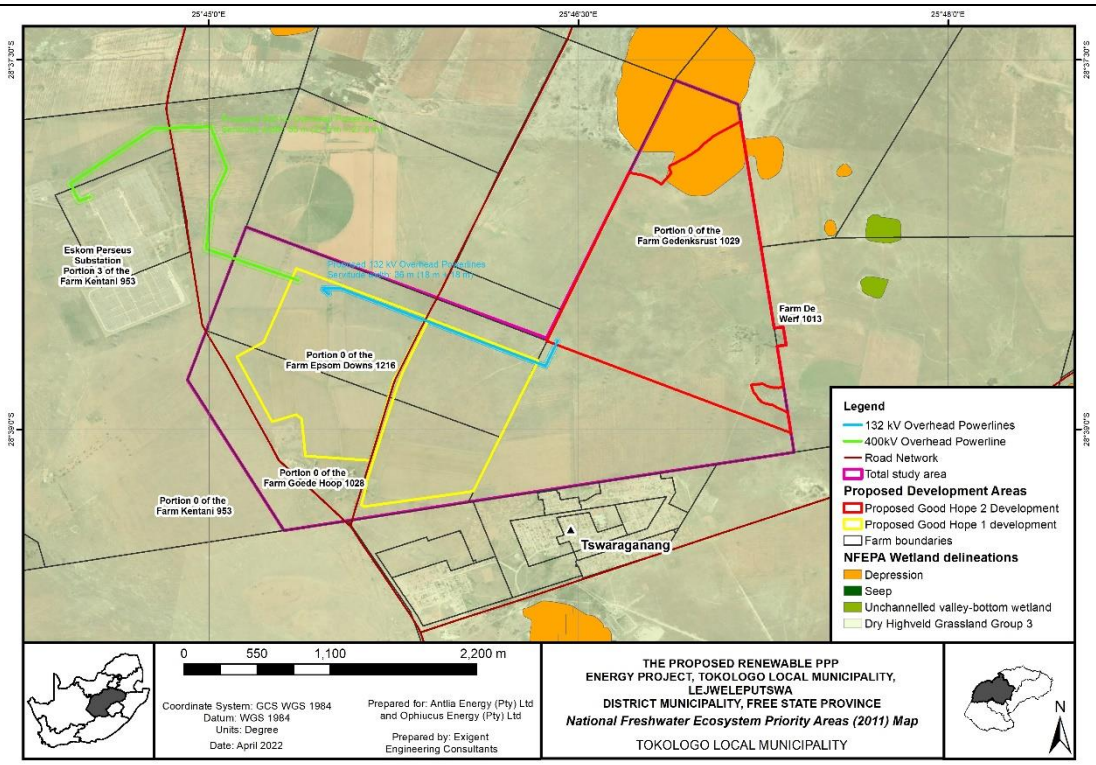


Figure 3-1. The NFEPA defined areas within the study area.

3.3.2. Ground Water

The groundwater recharge of South Africa has been mapped and distributed as part of the NFEPA in 2011. This data aimed to provide the sub-quaternary catchments where the groundwater recharge was three-times higher than the average recharge ratio. Areas of high groundwater recharge are not necessarily classified as FEPAs, however they can be perceived as the 'recharge hotspots' of a region. It is critical to maintain the natural habitat in these areas of high groundwater recharge as to protect the functioning of the groundwater dependent ecosystems. Areas of groundwater recharge values higher than 300 indicate high groundwater recharge areas. The study area has a groundwater recharge ratio of 56, therefor the proposed development is not located within a 'recharge hotspot'.

The aquifer classification map of South Africa (2012) has indicated that the study area has been identified as a minor aquifer system. The water source in this area is groundwater. According to the groundwater quality map of South Africa (2012) the electrical conductivity of the groundwater in the area ranges between 150 to 370 mS/m.

3.4. Vegetation

According to Mucina & Rutherford (2006), as amended, the total study area is located within the Vaal-Vet Sandy Grassland vegetation type, the Western Free State Clay Grassland and the Highveld Salt Pans vegetation types (all three located within the Dry Highveld Grassland Biome) (Figure 3-2).

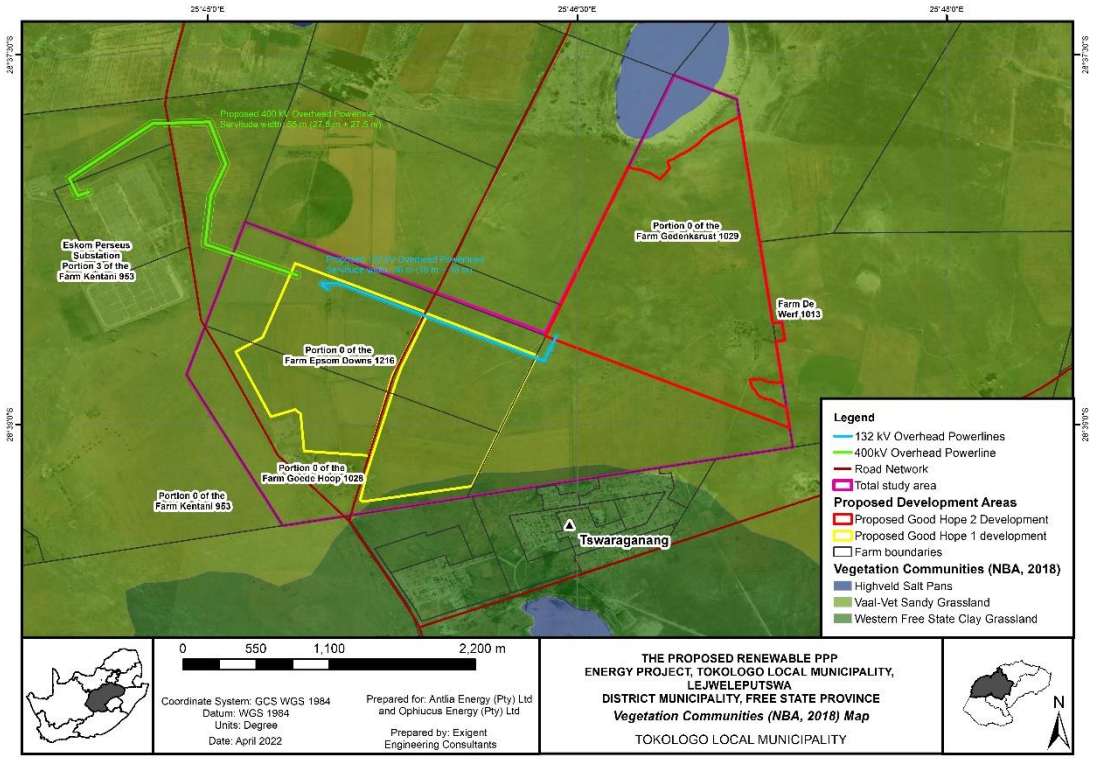


Figure 3-2. Mucina & Rutherford (2006, as amended) vegetation types within the study area.

The Vaal Vet Sandy Grassland is characterized by plains with scattered, slightly undulating plains and hills. Mainly low-tussock grasslands with an abundant karroid element. The dominance of *Themeda triandra* is a key feature of this vegetation unit. In local areas, there may be a low cover of *Themeda triandra* and the associate increase in *Elionurus muticus, Cymbopogon pospishilii* and *Aristida congesta*, which is usually attributed to heavy grazing and/or erratic rainfall. Dominant species include *Anthephora pubescens, Aristida congesta, Chloris virgata, Cymbopogon caesius, cynodont dactylon, Digitaria argyrograpta, Elionurus muticus, Eragrostis chloromelas, Eragrostis lehmanniana, Eragrostis plana, Eragrostis trichophora, Heteropogon contortus, Panicum gilvum, Setaria sphacelate, Themeda triandra, Tragus berteronianus* and *Felicia muricata* (Mucina and Rutherford, 2006).

The Western Free State Clay Grassland is confined to a small section of the southern portion of the study area. This vegetation type is restricted to the flat bottom lands which support dry, species-poor grasslands with a high number of salt pans (playas) embedded. Dwarf karoo shrublands surround the playas in disturbed habitats. Dominant species of this vegetation unit includes *Aristida adscensionis, Aristida bipartite, Cynodon dactylon, Eragrostis chloromelas, Eragrostis lehmanniana, Panicum coloratum, Themeda triandra, Lycium cinereum* and *Pentzia globosa* (Mucina and Rutherford, 2006).

The largest concentrations of the Highveld Salt Pans are found around Dealesville, Bultfontein, Wesselsbron, Delareyville and Petrusburg. The salt pans are defined as depressions in a plateau landscape containing temporary (and less frequently also permanent) water bodies. Central parts of the pans are often seasonally inundated and sometimes contains floating macrophyte vegetation or vegetation cover develops on drained bottoms of the pans and forms typical concentric zonation patterns.

On the edges of the pans, an open to sparse dwarf shrubland may develop, especially when the pan is under heavy grazing pressure. The vegetation surrounding these pans are usually dominated by *Salsola glabrescens, Chloris virgata, Cynodon dactylon, Cynodon trasvaalensis, Cyperys laevigatus, Cyperus marginatus, Diplachne fusca, Eragrostis bicolor, Eragrostis chloromelas, Eragrostis plana, Hemarthria altissima, Juncus rigidus, Panicum coloratum, Panicum laevifolium, Panicum schinzii and Setaria incrassate* (Mucina and Rutherford, 2006).

Figure 3-3 below indicates the ecosystem threat status of the vegetation types as per the National Biodiversity Assessment (2011). The conservation statuses per dataset for each vegetation type has been indicated in Table 3-1 below and only takes into consideration the project footprint.

Table 3-1. Conservation status per vegetation type as per the available databases.

Vegetation Type	NSBA (2004): Conservation Status and NBA (2011): Ecosystem Threat Status
Western Free State Clay Grassland	Least Concern
Vaal-Vet Sandy Grassland	Endangered
Highveld Salt Pans	Least Threatened

Based on the Free State Biodiversity Management Plan, the proposed development is located within a CBA 1 (Figure 3-4).

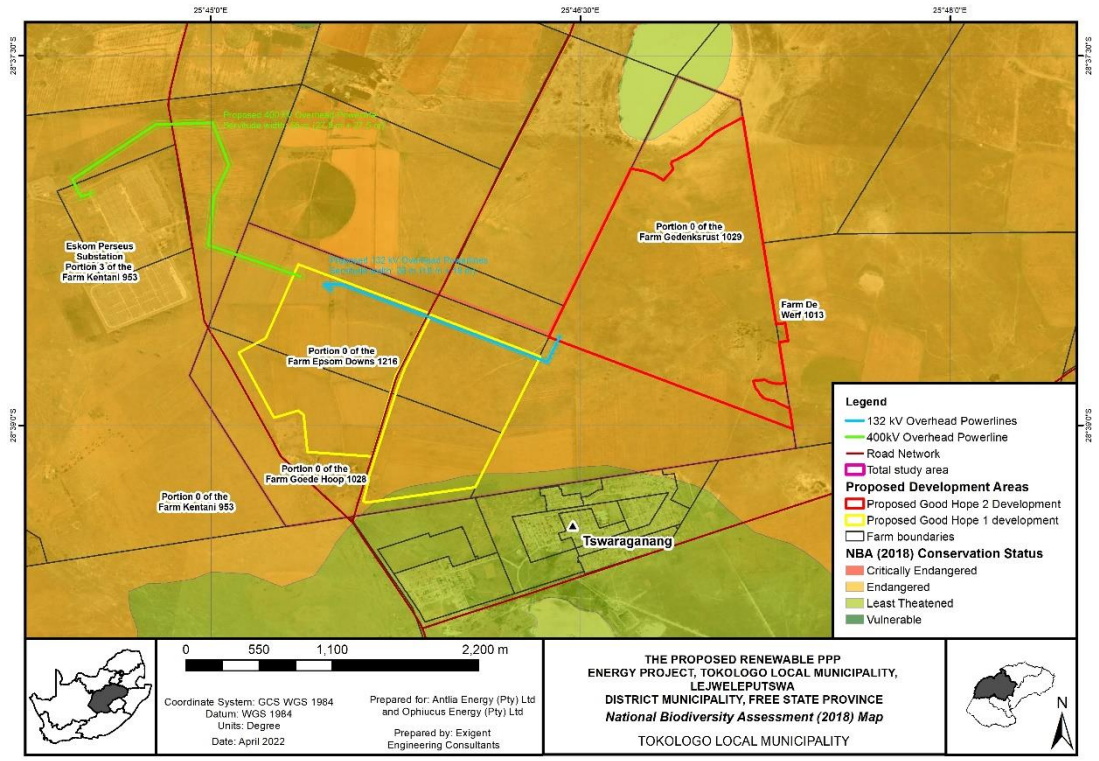


Figure 3-3. National Biodiversity Assessment conservation status for the proposed development.

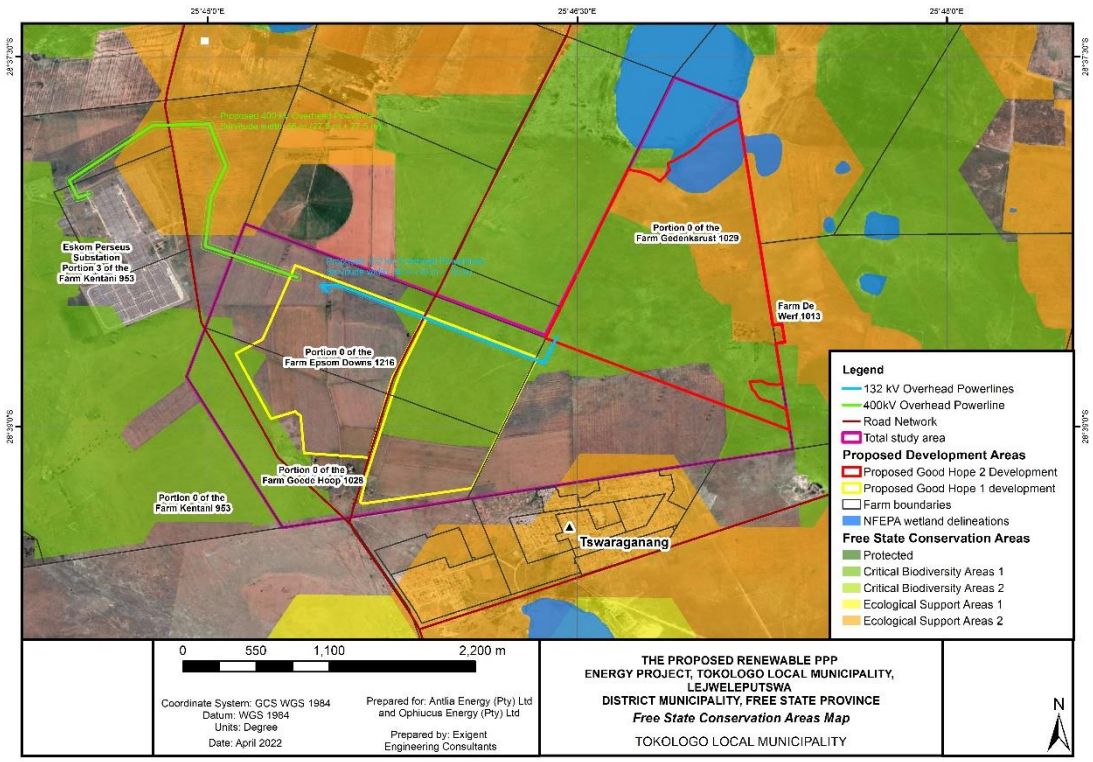


Figure 3-4. Free State CBAs map indicating the extent of the Transformed and Optimal CBAs in relation to the Biodiversity Areas.

3.5. Social and socio-economic environment

The study area falls within the TLM in the Lejweleputswa District Municipality. According to Statistics SA, the population for the area consists of 28,986 people of which 27.5% of people are unemployed and 35.8% of the youth are unemployed (www.statssa.gov.za, accessed on 14/12/2021). According to Statistics SA (www.statssa.gov.za, accessed on 14/12/2021) 20.8% of the population above the age of 20, have no schooling. Out of the 28, 986 people in the area only 27.3% have completed secondary school and a small number of only 5.1% of people have higher education (www.statssa.gov.za, accessed on 14/12/2021).

Based on the 2011 Census, the employment rates are usually associated with education levels; therefore, employment and incomes are based on education levels. 31.2% of the population compromises of children that are younger than 15 years old. 9122 people are employed, 2504 people are unemployed, and 974 are discouraged work seekers and 8141 not economically active (www.statssa.gov.za, accessed on 14/12/2021).

3.5.1. Tokologo Local Municipality Integrated Development Plan

According to the Municipality's Integrated Development Plan (IDP) as updated for the 2020/21 period, the Municipality covers an area of 9 326.24 km^2 and comprises of Dealesville, Boshof and Hertzigville, within the Lejweleputswa District Municipality. According to the IDP (IDP, 2020/21), the TLM houses 9831 households people which is an estimated 12% increase between 2011 and 2016. The population growth

rate within the Municipality is approximately 1.6% increase per annum. Based on this projected growth rate, the population size was estimated to be approximately 29 600 people in 2021 (IDP, 2020/21). Should the projected population growth rate be higher there would be a significant increased pressure for improved municipal services.

According to the age breakdown defined by the Municipal IDP most of the Municipality consists out of the generation group between the ages of 15 and 34. This generation group contributed 35% of the Municipality's population (IDP, 2020/21). The 2011 population pyramid for the Municipality suggests that the municipality has an expanding or increasing population.

3.5.2. Lejweleputswa District Municipality IDP

According to the Lejweleputswa District Municipality IDP for 2017-2022 (Lejweleputswa IDP, 2017/22) the Tokologo Local Municipality's main economic contribution in 2014 was the agriculture sector. According to the IDP, the main economic contributors which exist within the district are mining and agriculture (with Tokologo and Tswelopele Local Municipalities being the main contributors to the later sector). Other notable sectors in the district include the trade sector, the finance sector and community services.

As unemployment is quite high in the Lejweleputswa District (32.8%), Small, Medium and Micro Enterprises (SMMEs) play a vital role. Adequate attention should therefore be given to entrepreneurs in the development of new and sustainable SMMEs. As per the IDP, the mining sector, although the largest economically contributor, has recently seen a decline due to the high cost of producing and the requirement for deeper mining has risen.

The vision of the Lejweleputswa District Municipality is to become a leader in sustainable development and to provide service delivery to all. They strive to do this through sound financial management, providing excellent public participation and high-quality municipal support programmes and enhancing staff morale, productivity and motivation. The core values of the district are those of integrity, high work ethics, openness and transparency, honesty, consultation, and professionalism.

The Lejweleputswa District Municipality extends over 31 930 km^2 and houses a population of 627 626 people. The district has a total of 219 014 households. According to the IDP, the GDP-R per capita for the district saw a 17.5 % decrease between 2005 and 2014, indicating a decline in the standard living conditions of the Municipality (Lejweleputswa IDP, 2017/22).

Key challenges which the district faces include:

- Good Governance and Public Participation
- Local Economic Development;
- Municipal Transportation and Organizational Development;
- Basic Infrastructure and Service Delivery;
- Municipal Financial Viability and Management; and
- Spatial Planning and Spatial Development Frameworks.

4. Alternatives

An alternative in relation to the proposed activity means different means of meeting the general purpose and requirements of the activity. This can be through identifying an alternative location upon which the activity can take place, the type of activity to be undertaken, a change in design or layout of the activity, the technology used in the activity or the operational aspects of the activity. It also includes the option of not implementing the activity, called the no-go alternative.

4.1. Alternative sites for developments

4.1.1. Location alternatives

There are no site alternatives taken into consideration for the proposed developments. The proposed development is located ideally within the Kimberley REDZ, within close proximity to the existing Eskom Perseus Substation to which the proposed development will be connected to the power grid.

4.2. Layout alternatives

As part of the planning process of the proposed developments, numerous factors were taken into consideration in order to determine the optimum layout for the proposed developments, so as to ensure that the maximum output capacity is obtained as well as catering to the biophysical sensitivity of the proposed development sites. The determining factors of the proposed development site included, but was not limited to:

- Consultation with the specialist assessments.
- Comments as received from the Competent Authority; and
- Consultations with the stakeholders and I&APs.

As a result, three (3) alternative layouts were identified for each of the proposed developments. These Alternatives will each be discussed in this section.

4.2.1. Preferred Alternative: Proposed Good Hope 1 Solar Development

The preferred layout of the proposed Good Hope 1 development as presented considers the requirements of the various specialist assessments, including the sensitive areas as presented by both the wetland specialist and avifaunal specialist studies. The recommendations and mitigations of the sensitive areas of the of respective specialists, including review of the sensitivities and buffers, were considered during review of the preferred layout design.

The preferred layout alternative for the proposed GH 1 development was amended following consultation with Eskom following the PPP of the DBAR. Subsequent to the discussions, the planned Perseus substation to Zues substation 765kV overhead Powerline and the planned 400 kV powerlines that intercepted the proposed development area were taken into consideration. The amended layout (preferred alternative), indicating all proposed infrastructure has been indicated on Figure 4-1 below.

Figure 4-1. Preferred Alternative: Proposed Good Hope 1 Development.

4.2.2. Preferred Alternative: Proposed Good Hope 2 Solar Development

The extent of the preferred alternative for the proposed Good Hope 2 Solar Development saw very little to no changes between the DBAR and FBAR. With minor changes made to the internal infrastructure layouts. As part of the layout extents, the following was taken into consideration as part of the determination of the layouts:

- **The wetland delineations**: As indicated by the wetland specialist, (1) a 20 m buffer was to be placed around the pan area (identified as having a Very High sensitivity); and (2) the wetlands located on the south-eastern corner of the proposed development (identified as having a High Sensitivity) was to be excluded from the development area.
    - As part of the precautionary principle, a 30 m buffer was placed around the wetlands located on the south-eastern corner.
- **The heritage assessment**: As per the heritage assessment, a 50 m buffer was to be placed around the pan system located towards the North of the proposed development area.

Sensitivities that were presented following the conclusion of the DBAR included:

- The **Avifaunal specialist assessment**: As part of the avifaunal assessment presented in the DBAR, it was indicated that a detailed assessment would be required for the proposed developments. The findings of the original statement presented by the specialist indicated that the pan system was highly sensitive, the primary grasslands were moderately sensitive, and the secondary wetlands held a low sensitivity status. It should be noted that no buffer areas were identified as part of the original statement presented by the specialist. However, as part of the detailed specialist assessment presented as part of the FBAR for the proposed development, a

200 m buffer was suggested around the pan system and a 100 m buffer was suggested around all of the seasonal wetlands identified within the study area.

As an EAP we understand the sensitivities of the avifaunal habitat, but also has to consider the requirements of the socio-economic aspects of the project. Therefore, the proposed avifaunal buffer of 200m around the pan has been reduced by the EAP to 50m, due to the site being located within the REDZ, which allows for optimal use for renewable energy projects and the current high demand in South Africa. The avifaunal wetland buffers have been reduced from 100m to 30m, as per the same motivation in terms of the site being located in the REDZ and the high need for renewable energy in South Africa.

Therefore, in light of the sustainable development principles, we have proposed amended buffers in order to provide a balance between nature and development. The preferred alternative, indicating all proposed infrastructure has been indicated on Figure 4-2 below.

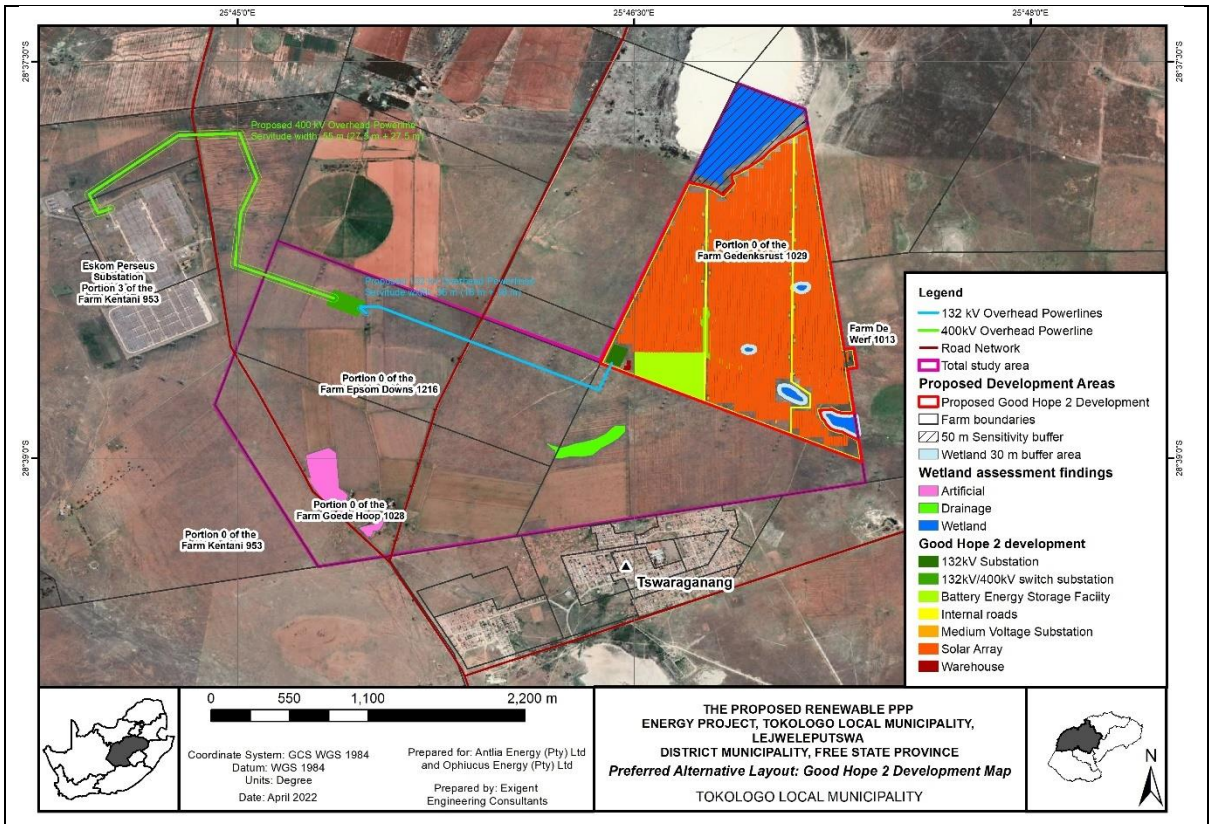


Figure 4-2. Preferred Alternative: Proposed Good Hope 2 Development.

4.2.3. Alternative Option 1: Proposed Good Hope 1 Solar Development

Following consultations with Eskom, the layout as presented in the DBAR was amended in order to accommodate the planned Eskom infrastructure as indicated on the Layout maps compiled for this FBAR. Alternative Option 1 includes the original proposed preferred option for the proposed GH 1 development and shared infrastructure. Due to the conflict in the planning region, approximately 25 ha of the originally proposed development area was considered an area of conflict. Figure 4-3 below indicates the extent of

Alternative Option 1. It is important to note that no areas of biophysical importance (High or Very Highly sensitive areas) were impacted upon by this Layout Option.

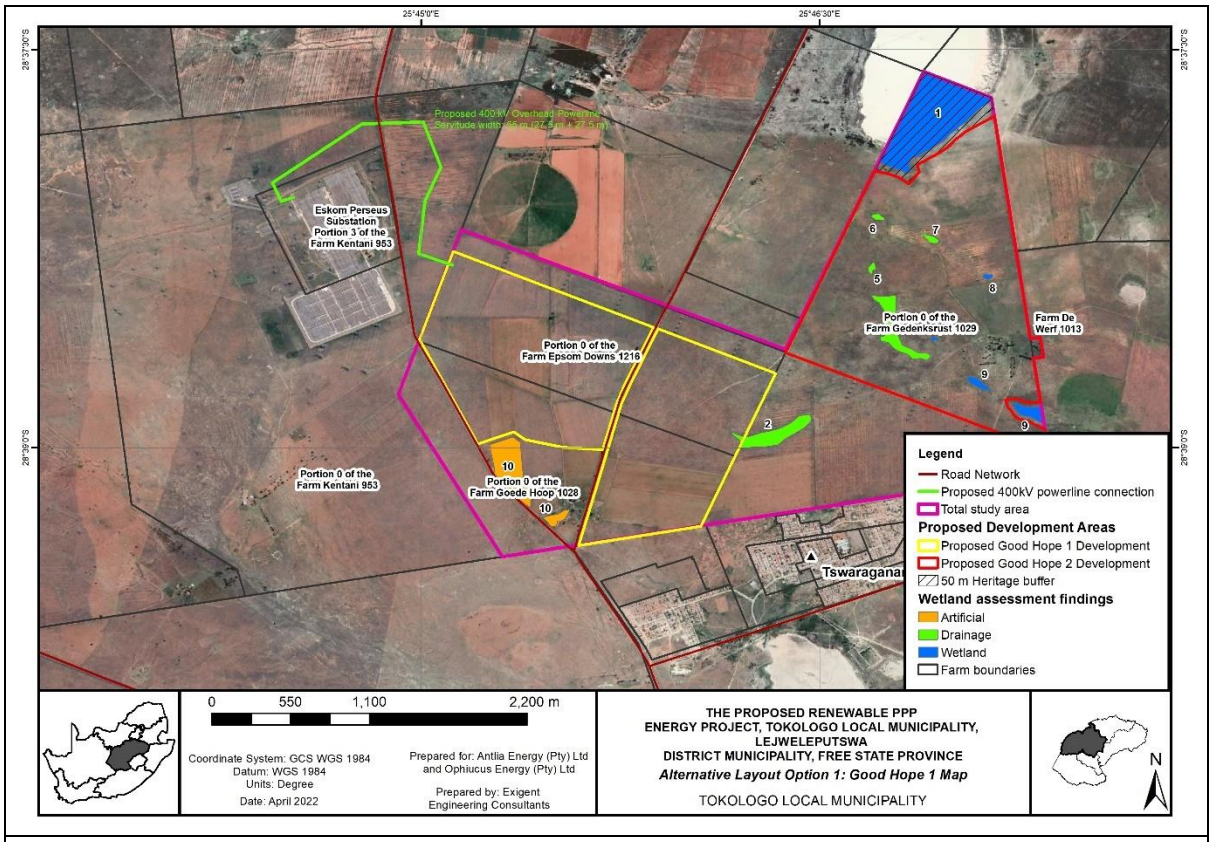


Figure 4-3. Alternative Option 1: Proposed Good Hope 1 Development.

4.2.4. Alternative Option 1: Proposed Good Hope 2 Solar Development

The Alternative Option 1 for the proposed GH 2 Solar Development incorporates the following sensitivities as identified by the specialists:

- The **wetland delineations**: As indicated by the wetland specialist, (1) a 20 m buffer was to be placed around the pan area (identified as having a Very High sensitivity); and (2) the wetlands located on the south-eastern corner of the proposed development (identified as having a High Sensitivity) was to be excluded from the development area.
    - As part of the precautionary principle, a 30 m buffer was placed around the wetlands located on the south-eastern corner.
- The **heritage assessment**: As per the heritage assessment, a 50 m buffer was to be placed around the pan system located towards the North of the proposed development area.
- The **Avifaunal specialist assessment**: As part of the avifaunal assessment presented in the DBAR, it was indicated that a detailed assessment would be required for the proposed developments. The findings of the original statement presented by the specialist indicated that the pan system was highly sensitive, the primary grasslands were moderately sensitive and the secondary wetlands held a low sensitivity status. It should be noted that no buffer areas were identified as part of the original statement presented by the specialist. However, as part of the

detailed specialist assessment presented as part of the FBAR for the proposed development, a 200 m buffer was suggested around the pan system and a 100 m buffer was suggested around all of the seasonal wetlands identified within the study area. The additional area lost due to the inclusion of the various avifaunal for the purpose of the alternative option 1 for the proposed Good Hope 2 development equates to approximately 30 ha.

The extent of the alternative option 1 of the proposed Good Hope 2 development, has been included in Figure 4-4 below.

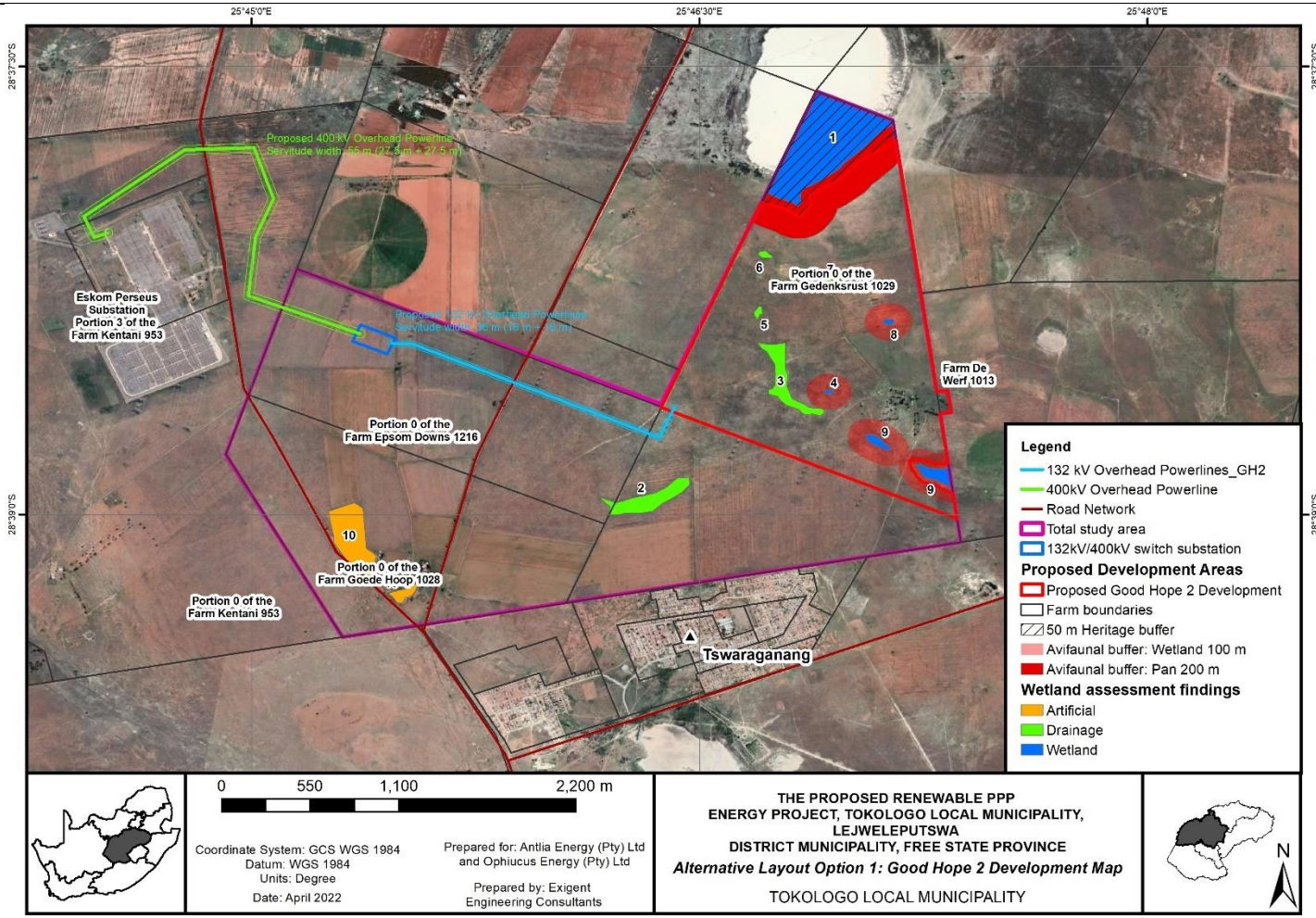


Figure 4-4. Alternative Option 1: Proposed Good Hope 2 Solar Development.

4.2.5. Alternative Option 2: Proposed Good Hope 1 and 2 Solar Developments

Layout option 1 proposed a layout of the total study area (Figure 4-5). However, after review and initial consultation with the specialists prior to the submission of the DBAR, an alternative layout (preferred layout) was proposed for both sites, GH1 and GH2.

The alternative layout for the proposed developments, sees a smaller footprint for the proposed GH1 development after site investigations undertaken by the various specialists. The proposed layout was amended to consider an optimum development area. The alternative layout also does not take cognizance of the sensitive areas as described by the various specialists.

The image below indicates the alternative layout design which has not taken any of the findings of the specialist reports into consideration (Figure 4-5).

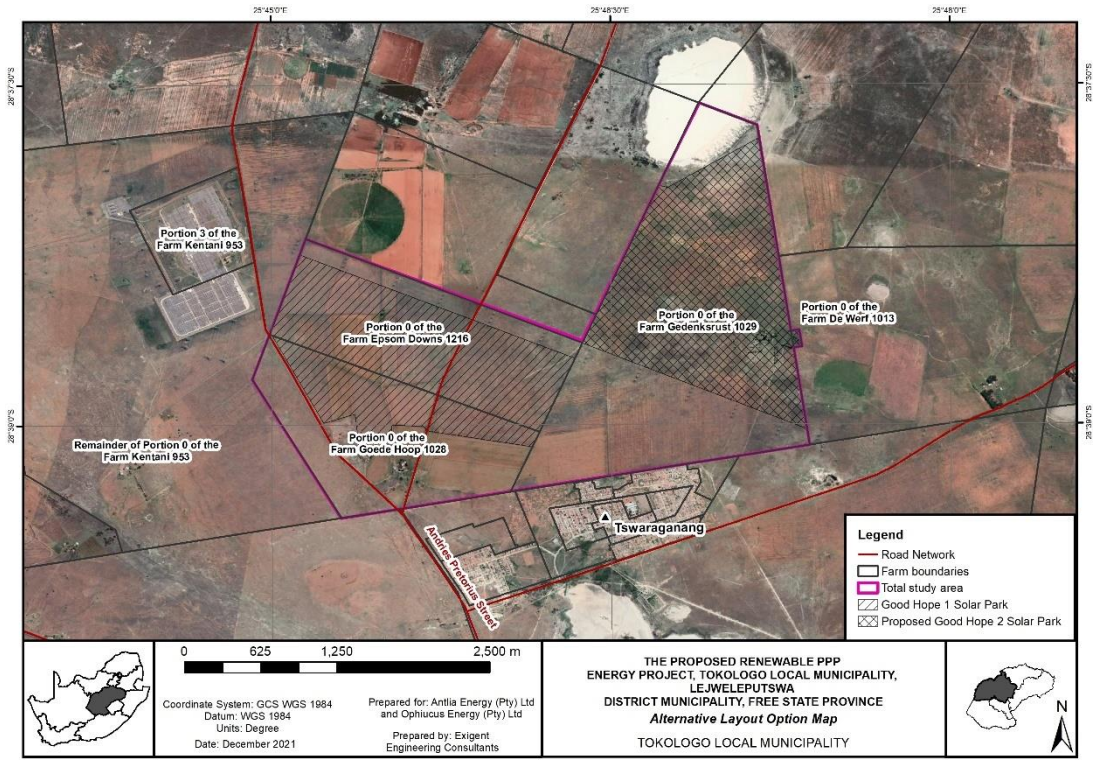


Figure 4-5. Alternative layout for the proposed development.

4.3. Alternative activity

There are no activity alternatives applicable to this project, as there is an electricity supply shortage in South Africa. The project aims to feed an additional 100 MW energy into the existing Eskom Grid via the Perseus Substation connection.

4.4. Alternative technology

The technology alternatives that were considered as part of the proposed developments have been captured in Table 4-1 below. It should be noted that the information contained in the table was provided as part of Appendix L of the Draft BAR and is therefore not considered to be new information to the report.

Table 4-1. Technology alternatives for the proposed developments.

Technology component	Description of the alternatives
PV Plant	The alternative to PV for producing energy from the sun is the thermal solution. There are different forms of this technology: linear Fresnel, parabolic trough or tower. These technologies can also be with or without thermal storage and they can use diathermic oils or, the more sophisticated ones can use water and/or molten salts. The final choice made was the PV option because these kinds of projects results: • Lower construction costs; • Lower operating and maintenance costs; • It is simpler, quicker and more experienced technology; and Lower environmental impact, considering that, amongst other factores, the PV Solution requires a minor quantity of water.
Wind Power	Another alternative to PV for producing energy from the sun is electrical energy form wind. A wind energy facility has a significant visual impact especially where it is located in a relative flat topographical area. Most important, the project site is not windy enough to be considered suitable for a wind farm. The PV option is thus still a better choice than wind energy based on the same reasons given above.
Alternatives for the Mounting System of the PV Modules	Preferred technical solutions for the proposed solar park entail PV modules mounted on fixed mounting systems (alternative option 1) or horizontal single-axis trackers (alternative option 2). The tracking solution is the best performing in terms of efficiency, because its energy production is approximately 20% more if compared with fixed systems. This type of technology is characterized by higher technical complexity and hgher installing and maintenance costs, if compared with the fixed mounting solution. The selected tracking system is the horizontal single-axis tracker (SAT), which doesn't differ from the fixed system, except for the presence of the tracking devices and the orientation of the rows of the PV arrays (north - south instead of west – east direction). The technology of mounting systems is under continuous evolution. Consequently, the final decision about the mounting system technology will be taken only at the commissioning date. The selection of fixed mounting system or horizontal single-axis trackers will not affect the layout of the PV power plant or imply any additional visual or environmental impacts that will necessitate specific or different mitigation measures. The development will not exceed the currently planned footprint (240 ha) and the height of the structures (PV modules and support frames) will be maximum 4.5 m above the ground level. Both fixed and horizontal single-axis tracking solutions grant the reversibility of the development in respect of the terrain's morphology, geology and hydrogeology. This means that at the end of the PV plant's lifetime, the site can easily be returned to its status prior to the establishment of the PV plant.
BESS Technology Alternatives	Batteries store electrical energy in chemical form. The range of electrochemical technologies include: a) batteries with solid electrolyte, as Lithium-ion battery; b) batteries with liquid electrolyte, as Na–S battery, Lead–Acid (PbA) battery, nickel - cadmium (Ni–Cd) battery or other types of liquid metal battery The preferred technology for the Battery Energy Storage System ("BESS") is Lithium-ion battery cells, which will be pre-assembled at the supplier factory and installed in the containers prior to delivery to the site. Lithium-ion cells technology offers the highest energy density (compared to the other cell technologies), does not suffer from memory effect and is low maintenance.

	Typical lithium-ion cells used for BESS hold a solid rechargeable electrolyte (the energy accumulator), therefore they don't hold any liquid or gas. The main benefit of solid ceramic electrolytes is that there is no risk of leaks, which is a serious safety issue for batteries with liquid electrolytes. A BESS does not emit any gas to the atmosphere during construction and/or normal operation. The containers of the batteries are equipped with a firefighting system conceived to effectively detect smoke and high temperatures and automatically activate the extinguishers to prevent fire. Furthermore, the external metallic surface of the cells is conceived to resist to fire. The preferred technology is therefore Lithium-ion battery cells with solid rechargeable electrolyte. Batteries with liquid electrolytes are not preferred for the risk of leakage and consequent potential impacts on environment.

4.5. No-go alternative

The no-go alternative means that the there is no additional feed of energy into the existing Eskom Power Grid. Therefore, the project will not contribute to elevating the current electricity shortage problems in South Africa. Leading to further economic disruptions due to the continued loadshedding due to limited electricity supply. Further, the short-term socio-economic benefits of the project, by means of job creation in the area immediately surrounding the proposed developments, will not be fulfilled.

5. Need and Desirability

The EIA Regulations require that the Need and Desirability of a proposed project be outlined as part of the Impact Phase (GNR 891 of 2014). The Guideline on Need and Desirability (DEA, 2017) of the proposed development will be addressed by answering the questions on the specific impacts.

5.1. Key drivers and principles of need and desirability assessment

In the GNR 891 of 2014 it is stated that environmental authorities must support increased economic growth and promote social inclusion, whilst ensuring that such growth is ecologically sustainable. This is consistent with national priorities. Furthermore, the New Growth Path (2010) highlights that in essence the aim is to target our limited capital and capacity at activities that maximise the creation of decent work opportunities. To that end, we must use both macro and micro economic policies to create a favourable overall environment and to support more labour-absorbing activities. The main indicators of success will be jobs (the number and quality of jobs created), growth (the rat, labour intensity and composition of economic growth), equity (lower income inequity and poverty) and environmental outcomes.

The National Development Plan 2030 (NDP) (2012) stresses that the threat to the "environment and the challenge of poverty alleviation are closely intertwined" and as such environmental policies should not be framed as a choice between the environment or economic growth.

Sustainable development is the process that is followed to achieve the goal of sustainability. Sustainable development implies the selection and implementation of a development option, which allows for appropriate and justifiable social and economic goals to be achieved, based on the meeting of basic needs and equity, without compromising the natural systems on which it is based (National Strategy for Sustainable Development and Action Plan 2011 – 2014 (NSSD 1) (2011)).

Consistent with the aim and purpose of EIAs, the concept of need and desirability relates to, amongst others, the nature, scale and location of development being proposed, as well as the wise use of land. While essentially, the concept of need and desirability can be explained in terms of the general meaning of its two components in which need primarily refers to time and desirability to place. Need and desirability are interrelated, and the two components can be considered in an integrated and holistic manner (GN 891 of 2014).

5.2. Motivation for the proposed project

The motivation behind the proposed project is driven by the current electricity crisis in South Africa. In the last few years, the demand for electricity in South Africa has been growing at a rate approximately 3% per annum. South Africa currently relies principally on fossil fuels (coal and oil) for the generation of electricity, whereas the current number of renewable energy power plants is still limited. At present,

Eskom generates approximately 90% of the electricity used in South Africa. South Africa has a largely unexploited potential in renewable energy resources such as solar, wind, biomass and hydro to produce electricity as opposed to other energy types (liquid fuel or coal).

These factors, if coupled with the rapid advancement in community development, have determined the growing consciousness of the significance of environmental impacts, climate change and the need for sustainable development. The use of renewable energy technologies is a sustainable way in which to meet future energy requirements.

The development of clean, green and renewable energy has been qualified as a priority by the Government of South Africa with a target for 2013 of 10,000 GWh, as planned in the Integrated Resource Plan 1 (IRP1) and with the Kyoto Protocol. Subsequently the South African Department of Energy (DoE) decided to undertake a detailed process to determine South Africa's 20-year electricity plan, called Integrated Resources Plan 2010-2030 (IRP 2010). The IRP1 (2009) and the IRP 2010 (2011, updated in March 2014 and in October 2019) outline the Government's vision, policy and strategy in matter of the use of energy resources and the current status of energy policies in South Africa.

In order to achieve this goal, the DoE announced a Renewable Energy Independent Power Producers Procurement Programme (REIPPPP). The REIPPPP issued on 3rd of August 2011, envisaged the commissioning of 3725 MW of renewable projects (1450 MW with solar photovoltaic technology) capable of beginning commercial operation before the end of 2017. This goal has not been fully fulfilled.

On 2014, the DoE announced the intention to procure additional renewable energy projects with a combined output of a total of 3,600 MW by 2020 (DOE Media Statement of 12 December 2014).

The IRP 2019, published in October 2019, indicated that there is a short-term electricity supply gap of approximately 2,000 MW between 2019 and 2022. In response to the Determination under section 34 (1) of the Electricity Regulation Act, 2006 (Act No 4 of 2006), the Department of Mineral Resources and Energy (DMRE) launched a Risk Mitigation Independent Power Producer Procurement Programme (RMIPPPP) on the 23rd of August 2020. The objective of the RMIPPPP is "to fill the current short-term supply gap, alleviate the current electricity supply constraints and reduce the extensive utilisation of diesel-based peaking electrical generators".

5.3. Benefits of the proposed project

The benefits of the proposed development will be seen in the supply of additional electricity contributors to the national electricity grid. This will align with the requirements as set forth by the Government in terms of energy planning and infrastructural requirements, Additionally, there will be medium-term socio-economic benefits in the form of job creation during the construction phase of the proposed development.

5.4. Need

In providing for the need for a project, the applicant must explain how a development would benefit the local/regional/national community. By emphasizing how communities would benefit from the development, the need for the project is emphasized. It will be dealt with by answering the questions as set out in GN 891 of 201, Guideline on need and desirability in terms of the EIA Regulations of 2017.

Table 5-1 summarizes the key questions and through process which has been followed during the environmental assessment process to ensure the needs motivation has been adequately assessed.

Table 5-1. Needs motivation and assessment guideline.

Question			BAR conclusion
1.	How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?		
	1.1.	How were the following ecological integrity considerations taken into account? • Threatened Ecosystems; • Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure; • Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs"); • Conservation targets; • Ecological drivers of the ecosystem; • Environmental Management Framework; • Spatial Development Framework; and • Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.)	• **GH1 and GH2:** As per the NBA (2018), the study area of the proposed solar farms are located within the Vaal-Vet Sandy Grassland (EN), the Highveld Salt Pans (LT) and the Western Free State Clay Grasslands (LC). The proposed development is partially located in areas which have been identified as Optimal CBA 1 by the Free State Biodiversity Management-plan. • **GH1 and GH2:** A wetland and avifaunal specialist assessment was undertaken in order to determine the impact on the water resources and avifaunal habitat within the study area. Ten (10) wetlands or watercourses were identified within the study area of the proposed development. • **GH2:** The significant water resources include the pan system located toward the north-eastern boundary of the proposed GH2 and the drainage areas located towards the south-eastern boundary of the same development. As per the wetland assessment report, a 20 m buffer was proposed around the pan system. • The pan system located toward the north-eastern boundary of the proposed GH2 site was also identified by the NFEPA (2011) as a wetland system.
	1.2	• How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? • What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? • What measures were explored to enhance positive impacts?	• **GH1 and GH2:** A wetland and watercourse assessment and avifaunal study was undertaken in order to determine the impact on the water resources within the study area and an assessment of the avifaunal habitat. Ten (10) wetlands or watercourses were identified within the study area of the proposed development. • **GH2:** The significant water resources include the pan system located toward the north-eastern boundary of the proposed Good Hope 2 site and the drainage areas located towards the south-eastern boundary of the same development. As per the wetland assessment report, a 20 m buffer was proposed around the pan system. • **GH1 and GH2:** The HIA confirmed no historical buildings, national monuments, cemeteries, or battlefields occurring on the proposed development areas. • **GH2:** From a heritage perspective, a 50 m buffer was placed around the pan system located towards the north-eastern boundary of the GH2 site.
	1.3	• How will this development pollute and/or degrade the biophysical environment?	• **GH2:** o When constructing in the wetland and watercourse areas, wetland/watercourse specific management measures must be implemented.

Question			BAR conclusion
		• What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? • What measures were explored to enhance positive impacts?	○ From a heritage perspective, a 50 m buffer was placed around the pan system located towards the north-eastern boundary of the GH2 site. ○ Following consultation with the specialists, the layout of the proposed development was adapted in order to accommodate the sensitive areas and also to optimise the areas of the properties ○ The relevant watercourse buffers must be implemented as indicated in this report. It is acknowledged that construction activities will take place within the watercourse and buffer zones, but implementation thereof will indicate the areas to be considered sensitive during construction activities; and ○ Specific wetland management measures should be implemented, as stipulated in Section 12.1.2 of the specialist report (as presented by the wetland specialist). • **GH1 and GH2:** ○ Throughout the lifetime of the proposed construction activities, nobody may capture, trap, hunt or kill any wild animal on study area; ○ Permits should be obtained for all required species to be removed (if applicable)
	1.4	• What waste will be generated by this development? • What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? • What measures have been explored to safely treat and/or dispose of unavoidable waste?	• **GH1 and GH2:** ○ The proposed development will only generate general construction waste; and ○ No dumping of the construction waste will be allowed on site. Waste must be placed in large skips at each work front, should the construction of the proposed pipeline infrastructure occur in various areas simultaneously. The skips must be emptied as required and are not allowed to overflow.
	1.5	• How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? • What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? • What measures were explored to enhance positive impacts?	• **GH1 and GH2:** The HIA confirmed no historical buildings, national monuments, cemeteries, or battlefields occurring on the proposed development areas. • **GH2:** From a heritage perspective, a 50 m buffer was placed around the pan system located towards the north-eastern boundary of the GH2 site.

Question			BAR conclusion
	1.6	• How will this development use and/or impact on non-renewable natural resources? • What measures were explored to ensure responsible and equitable use of the resources? • How have the consequences of the depletion of the non-renewable natural resources been considered? • What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? • What measures were explored to enhance positive impacts?	• **GH1 and GH2:** o As per the NBA (2018). the study area of the proposed development is located within the Vaal-Vet Sandy Grassland (EN), the Highveld Salt Pans (LT) and the Western Free State Clay Grasslands (LC). The proposed development is partially located in areas which have been identified as Optimal CBA 1 by the Free State Biodiversity Management-plan. o A wetland and watercourse assessment were undertaken in order to determine the impact on the water resources within the study area. Ten (10) wetlands or watercourses were identified within the study area of the proposed development. o The EMPr and specialist recommendations will manage the impacts within these sensitive natural resources; o The impact on all water resources and avifaunal habitats have been assessed in the BAR and specialist studies; • **GH2:** The significant water resources includes the pan system located toward the north-eastern boundary of the proposed GH2 site and the drainage areas located towards the south-eastern boundary of the same development. As per the wetland assessment report, a 20 m buffer was proposed around the pan system.
	1.7	• How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? • Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? • What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? • What measures were taken to ensure responsible and equitable use of the resources? • What measures were explored to enhance positive impacts? • Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life).	• **GH1 and GH2:** o As per the NBA (2018). the study area of the proposed development is located within the Vaal-Vet Sandy Grassland (EN), the Highveld Salt Pans (LT) and the Western Free State Clay Grasslands (LC). The proposed development is partially located in areas which have been identified as Optimal CBA 1 by the Free State Biodiversity Management-plan. o A wetland and watercourse assessment was undertaken in order to determine the impact on the water resources within the study area. Ten (10) wetlands or watercourses were identified within the study area of the proposed development. • **GH2:** The significant water resources include the pan system located toward the north-eastern boundary of the proposed GN2 site and the drainage areas located towards the south-eastern boundary of the same development. As per the wetland assessment report, a 20 m buffer was proposed around the pan system.

Question			BAR conclusion
		• Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?) • Do the proposed location, type and scale of development promote a reduced dependency on resources?	
	1.8	• How were a risk-averse and cautious approach applied in terms of ecological impacts? • What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)? • What is the level of risk associated with the limits of current knowledge? • Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	• **GH1 and GH2:** o The wetlands and drainage areas were delineated upfront and included in the alternative assessment review, to ensure all ecological aspects are considered in the proposed development layout. o The wetland boundaries mapped in this specialist report represent the approximate boundary on a gradient between saturated and terrestrial soil as determined by a specialist experienced in the delineation technique. o In order to obtain a comprehensive understanding of the dynamics of the study area, as well as the status of endemic, rare or threatened species in any area, assessments should always consider investigations at different time scales (across seasons/years) and replication. However, due to time constraints, such long-term studies are not always feasible. o All limitation, gaps in knowledge and uncertainties have been discussed in Section 13 of this BAR.
	1.9	• How will the ecological impacts resulting from this development impact on people's environmental right in terms of the following: • Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts? • Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?	• **GH1 and GH2:** o A wetland and avifaunal assessment was undertaken in order to determine the impact on the water resources and avifaunal habitat within the study area. Ten (10) wetlands or watercourses were identified within the study area of the proposed development. o The EMPr and specialist recommendations will manage the impacts within these sensitive natural resources; o The impact on all water resources have been assessed in the BAR and specialist studies • **GH2:** o The significant water resources include the pan system located toward the north-eastern boundary of the proposed GH2 and the drainage areas located

Question			BAR conclusion
			towards the south-eastern boundary of the same development. A 50 m buffer was proposed around the pan system. • **GH1 and GH2:** o The HIA confirmed no historical buildings, national monuments, cemeteries, or battlefields occurring on the proposed development areas. • **GH2:** o From a heritage perspective, a 50 m buffer was placed around the pan system located towards the north-eastern boundary of the GH2 site. • **GH2:** o As per the findings of the ecological impact assessment as well as the avifaunal assessment, the Pan system located toward the north-eastern boundary of the proposed GH2 development is the most sensitive area. Of the 14 avifaunal species that has a potential of occurring on site, 9 of the species would find the Pan system as a preferable habitat.
	1.10	Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?	• **GH1 and GH2:** o The HIA confirmed no historical buildings, national monuments, cemeteries, or battlefields occurring on the proposed development areas. • **GH2:** o From a heritage perspective, a 50 m buffer was placed around the pan system located towards the north-eastern boundary of the GH2 site.
	1.11	Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives / targets / considerations of the area?	• **GH1 and GH2:** o The proposed PVPP developments will be located with the Vaal-Vet Sandy Grassland (EN) vegetation type, the Western Free State Clay Grassland (LC) and the Highveld Salt Pans (LT) vegetation types according to the NBA (2018). The proposed developments are partially located in areas which have been identified as CBA 1 and Ecological Support Areas 2 by the Free State Biodiversity Management-plan and the remainder of the site is located within areas identified as Biodiversity Areas. These areas are not necessarily of high conservation value, however special care needs to be attained then activities occur therein.

Question			BAR conclusion
	1.12	Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?	• **GH1 and GH2:** o Numerous wetlands were identified as part of the wetland specialist report. The report identified several wetlands which had to be avoided as part of the development and operational phases. This included the pan located towards the north-eastern boundary of the site, which (including its buffer) has also been identified as a highly sensitive area by the heritage impact assessment. • **GH1 and GH2:** o Following consultation with the specialists, the layout of the proposed development was adapted in order to accommodate the sensitive areas and also to optimise the developable areas of the properties.
	1.13	Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?	• **GH1 and GH2:** o The proposed development lies within the Kimberley Renewable Energy Development Zone 5 (also known as "Kimberley REDZ"), published under GNR114 in GG 41445, 16 February 2018.The REDZs have been identified in terms of section 24(3) of the NEMA, 1998. The applicability of Kimberley REDZ for purposes of the Notice, is that large scale solar PV energy facilities located within this REDZ are subject to a BA Process in terms of the EIA Regulations of 2014, as amended, as published under the NEMA (Act 107 of 1998). o As discussed in Section 1.6, numerous similar solar PV developments have been authorised ito NEMA within close proximity to the site. These development layouts took the biophysical and the socio-economic status of the developments into consideration.

5.5. Desirability

Desirability relates to the placement of an activity. The motivation must indicate why the location of a development in this particular area would be more desirable that establishing it in another area. It will be dealt with by answering the questions as set out in the DEA Guideline on need and desirability in terms of the EIA Regulations of 2017.

Table 5-2 summarises the key questions and through process to be followed during the BA process to ensure that the desirability of the project has been thoroughly assessed.

Table 5-2. Benefit motivation and assessment guideline.

Question			BAR conclusion
2.	What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?		
	2.1	• The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area; • Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.); • Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.); and • Municipal Economic Development Strategy ("LED Strategy").	• **GH1 and GH2:** o The proposed development aligns with the District IDP with regard to basic service delivery and labour provisions in the district. o The proposed development will provide additional short- and long-term work opportunities for skilled and unskilled labourers. The skills acquired as part of the various phases of the proposed development, will be transferable to future employment opportunities. o The historical land use was agriculture, however, the land has since been allowed to return to it's natural state, with secondary grasslands now covering the majority of the sites. • **GH1:** o A portion of the proposed development site already accommodates existing Eskom powerlines. The proposed PVPP will connected to the Eskom Perseus infrastructure by means of a 400 kV overhead powerline, which will tie into the infrastructure located within the Eskom Perseus substation.
	2.2	• Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area? • Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?	• **GH1 and GH2:** o The proposed developments will provide additional short- and long-term work opportunities for skilled and unskilled labourers. The skills acquired as part of the various phases of the proposed development, will be transferable to future employment opportunities.
	2.3	• How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	• **GH1 and GH2:** o The motivation behind the proposed project is driven by the current need for additional sources of electricity feeding into the National Electricity Grid. As per the target of the REIPPPP for energy provision in South Africa, the proposed development aims to supply an additional 100 MW to the National Electricity Grid. The Objective of the REIPPPP is to relieve the pressures of the current electricity supply constraints, reduce the extensive use of diesel-operated electrical generators and to fill the current short term electricity supply gap in South Africa.

Question			BAR conclusion
	2.4	• Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? • Will the impact be socially and economically sustainable in the short- and long-term?	• **GH1 and GH2:** o The proposed development will provide additional short- and long-term work opportunities for skilled and unskilled labourers. The skills acquired as part of the various phases of the proposed development, will be transferable to future employment opportunities. o The aim of the proposed development is to provide an additional source of energy to the existing electricity grid. Through the use of PVPP, the proposed development will see to the use of renewable energy sources (solar energy) in order to generate the electricity to be transferred into the National Electricity Grid System.
	2.5	• In terms of location, describe how the placement of the proposed development will: o result in the creation of residential and employment opportunities in close proximity to or integrated with each other; o reduce the need for transport of people and goods; o result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport); o compliment other uses in the area; o be in line with the planning for the area; o for urban related development, make use of underutilised land available with the urban edge; o optimise the use of existing resources and infrastructure; o opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement); o discourage "urban sprawl" and contribute to compaction/densification; o contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs; o encourage environmentally sustainable land development practices and processes;	• **GH1 and GH2:** o The proposed development will provide numerous temporary employment opportunities for both skilled and unskilled individuals during the construction and operational phases of the project. o The aim of the proposed development is to provide an additional source of energy to the existing electricity grid. Through the use of PVPP, the proposed development will see to the use of renewable energy sources (solar energy) in order to generate the electricity to be transferred into the National Electricity Grid System. o The motivation behind the proposed project is driven by the current need for additional sources of electricity feeding into the National Electricity Grid. As per the target of the REIPPPP for energy provision in South Africa, the proposed development aims to supply an additional 100 MW to the National Electricity Grid. The Objective of the REIPPPP is to relieve the pressures of the current electricity supply constraints, reduce the extensive use of diesel-operated electrical generators and to fill the current short term electricity supply gap in South Africa.

Question			BAR conclusion
		○ take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.); ○ the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential); ○ impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area; and ○ in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?	
	2.6	• How were a risk-averse and cautious approach applied in terms of socio-economic impacts? ○ What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)? ○ What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities' critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge? ○ Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	• **GH1 and GH2:** ○ The proposed development will occur on privately owned land • **ESKOM connection corridor** ○ The connection corridor will be on portions 0 and 3 of the farm Kentani 953, owned and managed by Daniel David Albertus Van Der Watt and Eskom Holdings Ltd. respectively.
	2.7	• How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following: ○ Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts? ○ Positive impacts. What measures were taken to enhance positive impacts?	• **GH1 and GH2:** ○ The motivation behind the proposed project is driven by the current need for additional sources of electricity feeding into the National Electricity Grid. As per the target of the REIPPPP for energy provision in South Africa, the proposed development aims to supply an additional 100 MW to the National Electricity Grid. The Objective of the REIPPPP is to relieve the pressures of the current electricity supply constraints, reduce the extensive use of diesel-operated electrical generators and to fill the current short term electricity supply gap in South Africa. ○ The impact assessment includes the risks associate to the construction and operational phases of the proposed development. Through this, mitigation measures were also identified.
	2.8	• Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the	• **GH1 and GH2:** ○ The proposed development aligns with the Municipal IDP's in terms of service delivery and infrastructure development.

Question			BAR conclusion
		area in question and how the development's socio-economic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?	○ The proposed development will be located within various watercourses as described by the wetland specialist. • **GH2:** ○ Watercourse systems (such as the salt pan towards the north-eastern boundary and the wetlands identified as highly sensitive systems throughout the study area) will be avoided as part of the integrated design as per the preferred layout alternative.
	2.9	• What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	• **GH1 and GH2:** ○ During the employment / tendering phase of proposed development, where possible, local labourers will be used, and additional skills will be acquired by these labourers which will be transferable into other employment opportunities.
	2.10	• What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)? • Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?	• **GH1 and GH2:** ○ No site or technology alternatives were considered for the proposed development; however alignment alternatives were considered. Following consultation with the specialists, the layout of the proposed development was adapted in order to accommodate the sensitive areas and also to optimise the areas of the properties ○ During the employment / tendering phase of proposed development, where possible, local labourers will be utilised, and additional skills will be acquired by these labourers which will be transferable into other employment opportunities.
	2.11	• What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?	• **GH1 and GH2:** ○ The initial Public Participation Process (PPP) for the proposed development was conducted as per the NEMA, as stipulated in the EIA Regulations of 2017, as amended. ○ Where possible, preference must be given to the local affected parties when recruiting labourers. These parties must be trained in such a way as to assist with furthering their skills, where required.
	2.12	• What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?	○ These impacts have been assessed and addressed in the EMPr provided for this report (attached as Appendix I).
	2.13	• What measures were taken to: ○ ensure the participation of all interested and affected parties; ○ provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation;	• **GH1 and GH2:** ○ The PPP was conducted as per the NEMA, as stipulated in the EIA Regulations of 2017, as amended.

Question			BAR conclusion
		○ ensure participation by vulnerable and disadvantaged persons; ○ promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means; ○ ensure openness and transparency, and access to information in terms of the process; ○ ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge; and ○ ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were promoted?	
	2.14	Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?	• **GH1 and GH2:** ○ The motivation behind the proposed project is driven by the current need for additional sources of electricity feeding into the National Electricity Grid. As per the target of the REIPPPP for energy provision in South Africa, the proposed development aims to supply an additional 100 MW to the National Electricity Grid. The Objective of the REIPPPP is to relieve the pressures of the current electricity supply constraints, reduce the extensive use of diesel-operated electrical generators and to fill the current short term electricity supply gap in South Africa. ○ The impact assessment includes the risks associate to the construction and operational phases of the proposed development. Through this, mitigation measures were also identified.
	2.15	What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	• **GH1 and GH2:** ○ These impacts have been addressed in the EMPr (Appendix I).
	2.16	• Describe how the development will impact on job creation in terms of, amongst other aspects: ○ the number of temporary versus permanent jobs that will be created; ○ whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area);	• **GH1 and GH2:** ○ The construction phase of the proposed developments will create employment opportunities during the construction and operational phases. ○ Where possible, preference must be given to the local affected parties (such as the residents from Dealesville and Tswaraganang) when recruiting labourers.

Question			BAR conclusion
		○ the distance from where labourers will have to travel; ○ the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits); and ○ the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).	These parties must be trained in such a way as to assist with furthering their skills, where required.
	2.17	• What measures were taken to ensure: ○ that there were inter-governmental coordination and harmonisation of policies, legislation and actions relating to the environment; and ○ that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	• **GH1 and GH2:** ○ All departments dealing with legislation applicable to this project were invited to provide comments and be involved in this project.
	2.18	What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?	• **GH1 and GH2:** ○ The BA process was followed as per the applicable laws and related regulations of South Africa. ○ The proposed development lies within the Kimberley Renewable Energy Development Zone 5 (also known as "Kimberley REDZ"), published under GNR114 in GG 41445, 16 February 2018.The REDZs have been identified in terms of section 24(3) of the NEMA, 1998. The applicability of Kimberley REDZ for purposes of the Notice, is that large scale solar PV energy facilities located within this REDZ are subject to a BA Process in terms of the EIA Regulations of 2014, as amended, as published under the NEMA (Act 107 of 1998). ○ As discussed in Section 1.6, numerous similar solar PV developments have been authorised ito NEMA within close proximity to the site. These development layouts took the biophysical and the socio-economic status of the developments into consideration. ○ Mitigation measures presented in this document as well as the final EMPr provided for the project aims to limit the impact of the proposed development on the watercourses and heritage resources. These mitigation measures have been included in the specialist studies and the BAR.
	2.19	Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	• **GH1 and GH2:** ○ Mitigation measures presented in this document as well as the final EMPr provided for the project aims to limit the impact of the proposed development on the watercourses and heritage resources. These mitigation measures have been included in the specialist studies and the BAR.

Question			BAR conclusion
	2.20	What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?	• **GH1 and GH2:** ○ Mitigation measures presented in this document as well as the final EMPr provided for the project aims to limit the impact of the proposed development on the watercourses and heritage resources. These mitigation measures have been included in the specialist studies and the BAR.
	2.21	Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?	• **GH1 and GH2:** ○ No site or technology alternatives were considered for the proposed development, however alignment alternatives were considered. Following consultation with the specialists, the layout of the proposed development was adapted in order to accommodate the sensitive areas and also to optimise the areas of the properties
	2.22	Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?	• **GH1 and GH2:** ○ The motivation behind the proposed project is driven by the current need for additional sources of electricity feeding into the National Electricity Grid. As per the target of the REIPPPP for energy provision in South Africa, the proposed development aims to supply an additional 100 MW to the National Electricity Grid. The Objective of the REIPPPP is to relieve the pressures of the current electricity supply constraints, reduce the extensive use of diesel-operated electrical generators and to fill the current short term electricity supply gap in South Africa. ○ The aim of the proposed development is to provide an additional source of energy to the existing electricity grid. Through the use of PVPP the proposed development will see to the use of renewable energy sources (solar energy) in order to generate the electricity to be transferred into the National Electricity Grid System. ○ The proposed development lies within the Kimberley Renewable Energy Development Zone 5 (also known as "Kimberley REDZ"), published under GNR114 in GG 41445, 16 February 2018.The REDZs have been identified in terms of section 24(3) of the NEMA, 1998. The applicability of Kimberley REDZ for purposes of the Notice, is that large scale solar PV energy facilities located within this REDZ are subject to a BA Process in terms of the EIA Regulations of 2014, as amended, as published under the NEMA (Act 107 of 1998). ○ As discussed in Section 1.6, numerous similar developments have been previously approved within close proximity to the proposed developments. These development layouts took the biophysical and the socio-economic status of the developments into consideration.

6. Public Participation Process

6.1. Objectives

The primary objective of the PPP includes:

- Meaningful and timeous participation of I&APs;
- Identification of issues and concerns of key stakeholders and I&AP with regard to the proposed development, i.e., focus on important issues;
- Promotion of transparency and an understanding of the proposed project and its potential environmental (social and biophysical) impacts;
- Accountability for information used for decision-making;
- To serve as a structure for liaison and communication with I&APs; and
- Identifying potential environmental (social and biophysical) impacts associated with the proposed project.

6.2. Approach

6.2.1. Identification of and consultation with Key Stakeholders and Landowners

The first step in the PPP entails the identification of key I&APs and Stakeholders, including:

- Local and provincial government;
- Affected and neighbouring landowners; and
- Environmental Organisations.

Identification of I&APs takes place through the use of existing databases, door to door interaction, responses to newspaper advertisements, networking and a proactive process to identify key I&APs within the study area. All I&AP information (including contact details), together with dates and details of consultation and a record of all issues raised will be recorded within a comprehensive database of affected landowners (and occupiers where relevant). This database is updated on an on-going basis throughout the project process and acts as a record of the communication/involvement process. This database was prepared by Exigent and will be utilised to record I&APs and stakeholder responses. The database was continually updated throughout the. Landowners and key stakeholders were given opportunity to comment during the public registration period. The capturing and distribution of information as part of the initial PPP as well as the review process of this document will take place in alignment with the Protection of Personal Information Act (Act 4 of 2013) (POPIA). Exigent's Privacy Policy as followed during all processes has been included as part of Appendix G of this report.

6.2.2. Advertising

In accordance with the EIA Regulations, the commencement of the EIA Process for the project was advertised in the local newspaper. An English advertisement was placed in the Bloem News on 30 September 2021 for the announcement of the proposed projects. In order to ensure that the widest group of I&APs were informed during the initial public participation phase, the public participation information was distributed within close proximity to the proposed development areas. Numerous site notices were erected throughout the development area and the information was sent via and emails to the pre-identified I&APs and key stakeholders such as government departments.

Copies of the newspaper advertisements and site notices placed along the route has been attached as part of Appendix G.

6.2.3. Background Information Document

A background Information Document (BID) was compiled and distributed to I&APs and relevant stakeholders for the proposed project. The aim of the BID was to provide a brief outline of the proposed project, provide I&APs and stakeholders with a map of the study area, provide preliminary details regarding the BA, and to explain how I&APs can become involved in the project.

6.2.4. Public and Authority review of the draft Basic Assessment Report

The draft BAR has been available for review for 30 days via download from public.exigent.co.za and selected stakeholders received hard copies/USBs. The option for receipt of an electronic copy was available, however no I&AP requested it.

A 30-calendar day period was allowed for the review process. All I&APs and Stakeholders registered on the project database were notified of the availability of this report by letter or e-mail. A hard copy of the draft report was submitted to the DFFE and Free State DESTEA. The DFFE requests all state departments that administer a law relating to a listed activity to comment on the draft BAR within 30 calendar days from date of submission.

6.2.5. Issues Trail (Comments and Response Report)

Issues and concerns raised during the PPP will be incorporated into a CRR (Appendix G4), where responses will be provided by Exigent and the project team. From this CRR, an action list will be compiled detailing the actions which the development team are required to undertake in order to address specific issues raised.

6.3. Key issues from I&APs and Stakeholders

The comments and responses received from the following publication of the adverts, placing of the site notices and circulation of the BID have been captured and incorporated into this report. All comments have been incorporated into the CRR (Appendix G4) and Table 6-1.

Communications between Exigent and I&APs and Stakeholders during the PPP have been included in Appendix G3.

Table 6-1. Comments received as part of public participation and the EAP's responses to the comments.

Institution	Comments	Response
Comments received on BID		
Eskom connection		
ESKOM	The commenter requested a KMZ file of the affected properties as well as the proposed grid connection point. The Eskom general requirements for works at or near Eskom infrastructure and servitudes and the Setback Guidelines have were also attached for consideration during the planning phase of the proposed developments.	A KMZ file of the proposed development was forwarded to the commenter. However, at the time of the initial PPP, the Eskom grid connection point was not available. This connection point has since been confirmed and has been included as part of this report. The shapefiles and KML files for the proposed development as also be made available with the report. This documentation was forwarded to the design team upon receipt of the documents. The design team was made aware of the requirements and took the documents into consideration during the planning process.
Agricultural impact of the proposed development		
Department of Agriculture and Rural Development	The commenter indicated that the proposed development lies under the ambient of Act no 70 of 1970, which requires that developers apply for change in land use if a development is to be carried out on agricultural land that is something else other than agriculture. An application should be lodged for every respective property. The area of the respective properties was requested. It was indicated that the Department allows development on agricultural land of not more than 10 percent (10%) of the total size of the property for activities other than agriculture. No development is allowed on cultivated lands.	A land use change application will be lodged with the applicable entities once a conclusion on the environmental procedures have been reached. The full property descriptions were provided as part of Section 1 of this report. The Windeed Title extracts have also been included as part of Appendix A, Annexure 3. The proposed Good Hope 1 PVPP development will be located upon Farm Epsom Downs 1216 (171 ha), Farm Goede Hoop 1028 (172 ha) and the proposed Good Hope 2 PVPP development will be located on the Farm Gedenksrus-1029 (367 ha), Farm De Werf 1013 (0.84 ha). The proposed Eskom grid connection powerline will be located on portion 0 of the Farm Kentani 953 (679 ha), and portion 3 of the Farm Kentani 953 (56.5 ha). An agricultural specialist assessment was undertaken as part of the impact assessment phase of the proposed development. The recommendation received was that the change of land-use for this area be approved as it would be strategically or more value to produce renewable energy than for traditional agricultural production. The specialist also identified livestock theft (due to the proximity of the proposed development to the township) as a risk, therefor deeming only cattle production viable. Furthermore, due to the lack of suitable water source for irrigation purposes, the soil potential for irrigation

Institution	Comments	Response
		will not be utilised. Due to climatic conditions, the area is only suitable for a marginal to below dry land crop production area.
Aerial obstacles		
CAA	The commenter indicated that should the project have reference to a windfarm application, the procedure as provided should be followed. Furthermore, it was indicated that the Air Traffic and Navigation Services (ATNS) has been appointed as the new Obstacle application Service Provider for Windfarms and in due time Solar Plants.	The proposed project is solely aimed toward the construction of the proposed Good Hope 1 and 2 PVPP developments. The ATNS has since been added to the I&AP and Stakeholder database as part of this project.
Draft Basic Assessment Report		
Project Description		
DFFE	It is noted that the submitted BAR is for combined application as per Regulation 11(4) of the EIA Regulations as amended, you are therefore requested to separate project descriptions in the BAR and in the EMPr for Good Hope 1 PV and Good Hope 2 PV.	The project descriptions for the respective projects have been separated as requested.
	The BAR must provide the technical details for the proposed facility in a table format as well as their description and dimensions. A sample of the minimum information required is listed in Annexure 1 as provided. This must be done for each proposed project.	The project descriptions for the respective projects have been separated and all technical information has been incorporated as requested.
Project location		
DFFE	You are requested to provide coordinates of the proposed project site including associated infrastructures (such as substations, Battery Storage Facility, powerlines (132 kV and 400 kV), access roads etc) in degrees, minutes and seconds. Start, middle and end point coordinates must be provided for each project.	The coordinates of the various infrastructures required for the respective projects have been included in the FBAR.
	The project farm portions and 21 Surveyor General digit code provided in the BAR and EMPr must be separated and shown for each project (Good Hope 1 and Good Hope 2).	The project descriptions for the respective projects have been separated as requested.
Listed activities		
DFFE	It is imperative that the relevant authorities are continuously involved throughout the BA process as the development property possibly falls within geographically designated areas in terms of numerous GNR 985 Activities. Written comments must be obtained from the relevant authorities and submitted to this Department. In addition a graphical representation of the proposed development within the respective geographical areas must be provided.	All stakeholders and interested and affected parties were provided with the opportunity to lay comments down on the proposed developments. All stakeholders and I&APs were reminded prior to end of the commenting period of the DBAR to provide comments on the proposed developments.

Institution	Comments	Response
Public Participation Process		
DFFE	The following must be submitted with the final BAR: 1) A list of registered interested and affected parties as per Regulation 42 of the NEMA EIA Regulations, 2014, as amended. 2) Copies of all comments received during the Draft BAR comment period; and 3) A comments and responses report which contains all comments received and responses provided to comments and issues raised during the public participation process for the Draft BAR. Please note that comments received from the DFFE must also form part of the comments and responses report.	The list of I&APs and stakeholders, all comments received during the various PPP ran for the proposed development as well as the comments and responses report has been included as Appendix G of the Final Basic Assessment Report.
	Please ensure that all issues raised and comments received during the circulation of the DRAFT BAR from registered I&APs and organs of state which have jurisdiction (including this Department's Biodiversity Section) in respect of the proposed activity are adequately addressed in the final BAR.	All comments raised during the public review phase of the DBAR of the proposed developments have been incorporated into the Final BAR as submitted to the DFFE.
	Proof of correspondence with the various stakeholders must be included in the final BAR. Should you be unable to obtain comments, proof should be submitted to the Department of the attempts that were made to obtain comments. The Public Participation Process must be conducted in terms of Regulation 39, 40, 41, 42, 43 & 44 of the EIA Regulations 2014, as amended.	Proof of all correspondence with various stakeholders and I&APs have been included as part of Appendix G of the Final BAR.
Cumulative Assessments		
DFFE	Should there be any other similar projects within a 30km radius of the proposed development site, the cumulative impact assessment for all identified and assessed impacts must be refined to indicate the following: 1) Identified cumulative impacts must be clearly defined, and where possible the size of the identified impact must be quantified and indicated, i.e. hectares of cumulatively transformed land. 2) Detailed process flow and proof must be provided, to indicate how the specialist's recommendations, mitigation measures and conclusions from the various similar developments in the area were taken into consideration in the assessment of cumulative impacts and when the conclusion and mitigation measures were drafted for this project. 3) The cumulative impacts significance rating must also inform the need and desirability of the proposed development. 4) A cumulative impact environmental statement on whether the proposed development must proceed	The cumulative impacts of the projects identified within a 30 km radius were evaluated based on the criteria provided by both the EIA Regulations as well as the criteria indicated in the received comments. In addition to the assessment of the impacts, the need and desirability assessment was also updated.
Layout and sensitivity maps		

Institution	Comments	Response
DFFE	The BAR layout map should indicate the following: 1) The proposed Good Hope 1 PV and Good Hope 2 PV with associated infrastructure for each development; 2) The proposed grid infrastructure for each of the above PV facilities, overlain by the sensitivity map; 3) All supporting onsite infrastructure such as laydown area, guard house and control room etc. 4) All necessary details regarding all possible locations and sizes of the proposed satellite substation and the main substation. 5) The location of sensitive environmental features on site e.g. CBAs, heritage sites, wetlands, drainage lines etc. that will be affected; 6) Buffer areas; and 7) All "no-go" areas.	The layout map captured in the BAR final document as well as in Appendix C of the document has been updated in order to reflect the required information as prescribed by the DFFE. These maps have been compiled for the two respective PVPP projects as well as a combined project
	A copy of the final preferred route layout map. All available biodiversity information must be used in the finalisation of the layout map. Existing infrastructure must be used as far as possible e.g. roads. The layout map must indicate the following: 1) Permanent laydown area footprint 2) Internal roads indicating width (construction period width and operation period width) and with numbered sections between the other site elements which they serve (to make commenting on sections possible); 3) Wetlands, drainage lines, rivers, stream and water crossing of roads and cables indicating the type of bridging structures that will be used; 4) The location of sensitive environmental features on site e.g. CBAs, heritage sites, wetlands, drainage lines etc. that will be affected by the facility and its associated infrastructure; 5) Substation(s) and/or transformer(s) sites including their entire footprint; 6) Location of access and service roads; 7) Connection routes (including pylon positions) to the distribution/transmission network; 8) All existing infrastructure on the site, especially railway lines and roads; 9) Buffer areas; 10) Buildings, including accommodation; and 11) All "no-go" areas	The layout map for the preferred external route, the layout map for the preferred route has been provided. This map includes all information as requested

Institution	Comments	Response
	An environmental sensitivity map indicating environmental sensitive areas and features identified during the assessment process.	The sensitivity maps of the proposed has been updated to indicate all highly sensitive areas within the proposed developments and along the corridor. The maps have been compiled for the two projects respectively and for the proposed array as a whole.
	A map combining the final layout map superimposed (overlain) on the environmental sensitivity map	The sensitivity maps of the proposed has been updated to indicate all highly sensitive areas within the proposed developments and along the corridor. The maps have been compiled for the two projects respectively and for the proposed array as a whole.
Environmental Management Programme		
DFFE	It is drawn to your attention that for substation infrastructure and overhead electricity transmission and distribution infrastructure, when such facilities trigger activity 11 or 47 of the Environmental Impact Assessment Regulations Listing Notice 1 of 2014, as amended, and any other listed and specified activities necessary for the realisation of such facilities, the generic Environmental Management Programme (EMPr), contemplated in Regulations 19(4) must be used and submitted with the final report over and above the EMPr for the PV facility. Please ensure that any specific mitigation measures identified in the BAR and specialist reports for the on-site substations are incorporated into the generic EMPr.	The EMPr has been updated to reflect the necessary changes. Above that, the generic EMPr was used and amended in order to incorporate the site-specific information for the proposed overhead powerlines to service both the Good Hope 1 and Good Hope 2 PVPP developments. All specific mitigation measures as identified in the BAR and all specialist assessments have been incorporated into both EMPrs
	Please ensure that the mitigation measures specified in the BAR and specialist reports for the PV facilities are also incorporated into the EMPr for the PV facilities. In addition, ensure that the EMPr complies with the content of the EMPr in terms of Appendix 4 of the Environmental Impact Assessment Regulations, 2014, as amended.	All specific mitigation measures as identified in the BAR and all specialist assessments have been incorporated into both EMPrs. The template of the EMPRs were based on Appendix 4 of the EIA Regulations, 2014, as amended.
Validity period and auditing frequency		
DFFE	Please ensure that the final BAR includes the period for which the EA is required, the date on which the activity will be concluded and the pot construction monitoring requirements finalised, as per Appendix 1(3)(1)(q) of the NEMA EIA Regulations, 2014, as amended	The required validity period has been included as part of the EAP recommendations of the Final BAR. The validity period requested for the proposed development is 15 years
Specialist Assessments		
DFFE	Please ensure that specialist studies conducted provide a detailed description of their methodology, as well as all other associated infrastructures that they have assessed and are recommending for the authorisation.	Where applicable, the specialists were requested to update their specialist assessments in order to include a more detailed description of the methodology followed to conduct their study.
	The specialist studies must also provide a detailed description of all limitations to their studies.	The specialist assessments have incorporated the limitations to their studies as required. The limitations as provided by the specialist assessments have been incorporated into the Section 13 of the BAR.

Institution	Comments	Response
	If the specialists specify contradicting recommendations, the EAP must clearly indicate the most reasonable recommendation and substantiate this with defendable reasons; and were necessary, include further expertise advice.	On the northern boundary of this proposed development site, is a highly sensitive pan, which provides biodiversity functions. The combination of the proposed buffer zones and exclusion areas have been incorporated into the overall sensitivity plan. The EAP has recommended that this pan and a 50m buffer be excluded from the proposed development footprint. The proposed avifaunal buffer of 200m around the pan has thus been reduced by the EAP to 50m, due to the site being located within the REDZ, which allows for optimal use for renewable energy projects and the current high demand in South Africa. The EAP has recommended reduced avifaunal wetland buffers from 100m to 30m, as per the same motivation in terms of the site being located in the REDZ and the high need for renewable energy in South Africa. As an EAP we understand the sensitivities of the avifaunal habitat, but also must consider the requirements of the socio-economic aspects of the project. Strict implementation of the proposed recommendations from the avifaunal specialist in terms of compiling and implementing the Habitat Monitoring Plan (HMP) and related monitoring, is critical in order to confirm the adequacy of the proposed buffers and mitigation measures. The implementation of the HMP and proposed adaptive measures, aims to ensure the survival of the pan ecosystem and its associated avifaunal presence. Therefore, based on sustainable development principles, we proposed the preferred layout with strict adherence to early implementation of the HMP, in order to allow for a balance between nature and development. Based on the proposed designs and the sensitivities presented in the BAR, the preferred layout of the proposed GH1 and GH2 and related mitigation measures to be implemented, the potential impacts on the receiving environment have been mitigated.
	Please ensure that Specialist Declaration of Interest forms for all specialist conducted as well as for the Specialist statements obtained is attached to the final BAR.	All specialists included a specialist declaration in their reports, stating that they have no personal interest in the proposed developments.
	It is brought to your attention that Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998,	Where the required protocols have been promulgated e.i. terrestrial plant and animal species, the protocols were considered as part of the reporting process.

Institution	Comments	Response
	when applying for Environmental Authorisation, which were promulgated in Government Notice No. 320 of 20 March 2020 (i.e. "the Protocols"), and in Government Notice No. 1150 of 30 October 2020 (i.e. protocols for terrestrial plant and animal species), have come into effect. Please ensure that the specialist assessments conducted comply with these protocols.	Where the protocols were not available, Appendix 6 of the EIA Regulations, 2014, as amended, were consulted to govern the contents of the report.
General Comments provided		
DFFE	You are further reminded to comply with Regulation 19(1)(a) of the NEMA EIA Regulations, 2014, as amended, which states that: *"Where basic assessment must be applied to an application, the applicant must, within 90 days of receipt of the application by the competent authority, submit to the competent authority – (a) a basic assessment report, inclusive of any specialist reports, an EMPr, a closure plan in the case of a closure activity and where the application is a mining application, the plans, report and calculations contemplated in the Financial Provisioning Regulations, which have been subjected to a public participation process of at least 30 days and which reflects the incorporation of comments received, including any comments of the competent authority".*	The Basic Assessment report has been compiled in accordance to the EIA Regulations, 2014, as amended. The Report has been subjected to 30 days public participation and all public participation has been undertaken in accordance to the requirements of the EIA regulations, 2014, as amended.
	Should there be significant changes or new information that has been added to the BAR or EMPr which changes or information was not contained in the reports or plans consulted on during the initial public participation process, you are required to comply with Regulation 19(1)(b) of the NEMA EIA Regulations, 2014, as amended, which states: *"the applicant must, within 90 days of receipt of the application by the competent authority, submit to the competent authority – (b) a notification in writing that the documents contemplated in subregulation 1(a) will be submitted within 140 days of receipt of the application by the competent authority, as significant changes have been made or significant new information has been added to the documents which changes or information was not contained in the original documents consulted on during the initial public participation process contemplated in subregulation (1)(a) and that the revised documents will be subjected to another public participation process of at least 30 days."*	The Basic Assessment report has been compiled in accordance to the EIA Regulations, 2014, as amended. The Report has been subjected to 30 days public participation and all public participation has been undertaken in accordance to the requirements of the EIA regulations, 2014, as amended. It is the opinion of the EAP that no significant changes have been made to warrant the need for additional commenting from the I&APs and stakeholders. A summary of the changes made to the BAR has been captured in the beginning of the FBAR.
	Should you fail to meet any of the timeframes stipulated in Regulation 19 of the NEMA EIA Regulations, 2014, as amended, your application will lapse.	All prescribed timeframes have been met in accordance with the EIA Regulations, 2014, as amended and GNR 114 of February 2018.
	You are hereby reminded of Section 24F of the National Environmental Management Act, Act No. 107 of 1998, as amended, that no activity may commence prior to an Environmental Authorisation being granted by the Department.	The Applicants for both projects are aware of this requirement of the NEMA and construction works will only commence once all approvals have been obtained.

Institution	Comments	Response
Eskom connection application		
ESKOM	As per the guideline document provided by the commenter, it was requested whether formal engagement was made with the Eskom GAU in terms of the setback guidelines. The proposed plant is extremely close to Perseus substation and will hamper future 765kV development at the site which will be required for evacuation of RE power being generated south of Perseus substation and in the area of Perseus substation. As per the guidelines, a written agreement with Eskom is recommended during the planning phase of concentrated solar plants, photovoltaic structures, BESS and other renewable generation plants that are within a 2 km radius of the closest point of a transmission or distribution substation (66kV to 765kV) to ensure Eskom's future planning is not impeded.	Eskom has been consulted regarding future planned infrastructure to be located within close proximity to the proposed development area. Based on the correspondence between the project team and the representatives of Eskom, the layout of the Good Hope 1 development has been amended to accommodate the future infrastructure. The amended drawings have been attached as Appendix E of the FBAR.

7. Summary and Findings of the Specialist Studies

As per the findings of the DEA screening tool report, as extracted, a number of studies have been proposed to be undertaken for the proposed developments. These included the following specialist studies:

Table 7-1. Analysis of the specialist assessments proposed by the screening tool and the EAPs comments on the applicability thereof.

Proposed Assessment	Sensitivity in the screening tool*			EAP's comments on findings of the screening tool	Section of this report
	GH1	GH2	EC		
Agricultural Impact Assessment	H	H	H	The findings of the Agricultural Specialist Assessment provide an indication towards the sensitivity of the area based on the type of development and the surrounding land uses.	Section 7.1 and Appendix x
Landscape/Visual Impact Assessment	VH	VH	N/A	The findings of the Visual Impact Assessment provide an indication towards the sensitivity of the area based on the type of development and the surrounding land uses.	Section 7.4 and Appendix x
Archaeological and Cultural Heritage Impact Assessment	L	L	L	The findings of the Heritage Impact Assessment provide an indication towards the sensitivity of the area based on the type of development and the surrounding land uses.	Section 7.3 and Appendix x
Palaeontology Impact Assessment	H	H	N/A	The findings of the Palaeontological Assessment as included in the HIA provides an indication towards the sensitivity of the area based on the type of development and the surrounding land uses.	Section 7.3 and Appendix x
Terrestrial Biodiversity Impact Assessment	VH	VH	N/A	The findings of the Terrestrial (in the form of an Ecological assessment) Specialist Assessment provide an indication towards the sensitivity of the area based on the type of development and the surrounding land uses.	Section 7.5 and Appendix x
Aquatic Biodiversity Impact Assessment	L	VH	L	The findings of the Aquatic (In the form of a wetland assessment) Specialist Assessment provide an indication towards the sensitivity of the area based on the type of development and the surrounding land uses.	Section 7.8 and Appendix x
Avian Impact Assessment	M	H	NE	The findings of the Avian Specialist Assessment provide an indication towards the sensitivity of the area based on the type of development and the surrounding land uses.	Section 7.6 and Appendix x
Bats Theme	L	L	N/A	As per the Screening reports generated, the bats theme sensitivity for the proposed development areas were low.	N/A
Civil Aviation Assessment	L	L	L	According to the Screening reports generated, there are no major or other types of civil aviation aerodromes.	N/A
RFI Assessment	M	M	NE	According to the Screening reports generated, the Southern boundary of GH1 and GH2 is within 1 km of a telecommunication facility, however the remainder of the sites are of Low sensitivity.	N/A

Proposed Assessment	Sensitivity in the screening tool*			EAP's comments on findings of the screening tool	Section of this report
	GH1	GH2	EC		
				The small section within 1km of a telecommunication facility triggers the risk to a Medium significance rating.	
Geotechnical Assessment	NE	NE	NE	As per the Screening reports generated, a Geotechnical Report is required. This report will be compiled prior to the commencement of the construction phase in order to inform the exact construction procedures for the proposed developments.	N/A
Plant Species Assessment	L	L	L	The findings of the Plant Species Assessment (as included in the Ecological Impact Assessment Report) provides an indication towards the sensitivity of the area based on the type of development and the surrounding land uses.	Section 7.5
Animal Species Assessment	M	M	M	The Medium sensitivity animal species trigger is the bird species, *Neotis ludwigii* (Ludwig's bustard). The avifaunal sensitivity is addressed in the Avifaunal Assessment. The findings of the Faunal Species Assessment (as included in the Ecological Impact Assessment Report) provides an indication towards the sensitivity of the area based on the type of development and the surrounding land uses.	Section 7.5

7.1. Geotechnical Screening

7.1.1. Methodology

Various geotechnical studies have been conducted within the project area. SMEC (Preliminary Geotechnical Investigation Report: Kentani C1801, Revision No. 1, October 2010) conducted a geotechnical study for various farm portions surrounding the study area. These farm portions are indicated in Figure 1-5, as Kentani PV, with specific reference to number 2, Klipfontein. A detailed geotechnical report will be conducted during detail design phase, prior to finalisation of the designs.

7.1.2. Results

Based on the stratigraphy and lithology of the area (map ref), the site is located within quaternary deposits with red and grey aeolian dune sand. The residual soils originating from the underling geology may display compressible or potentially expansive attributes, with potential collapsible soil structures.

The area is generally recognised by a thin layer of topsoil and transported sand overlying the shale and dolerite rock mass.

As has been confirmed during the agricultural assessment for the study area, the limestone geology dominating the eastern region of the site is evident by the shallow limestone outcrops observed on site (Figure 7-1).

Figure 7-1. Limestone geology evident on site

7.1.3. Conclusions

The detailed geotechnical design report should be conducted prior to finalisation of detail designs, to verify the actual site conditions for all infrastructure to be constructed.

It is recommended that a Competent Person be on site during all excavations and to inspect the excavations.

7.2. Agricultural Potential Assessment

The agricultural potential study aims to determine the current agricultural potential of the proposed site and the impact of the development on the soils, land use, land capability, and agricultural potential.

7.2.1. Methodology

The assessment of the agricultural potential rests primarily on identifying soils that are well suited for crop production and the description of the natural veld, as well as characteristics of the climate. As most of the crops produced on this site will be rain-fed, the rainfall characteristics will be essential. This includes the total potential rainfall as well as rainfall distribution over the study area. Other critical climatic factors are the earliest entry and latest exit date of frost and temperatures, including the minimum and maximum temperatures. Areas that are unsuitable for crop cultivation are generally utilised as grazing fields for livestock. The site's natural grazing characteristics linked with the mentioned climatic factors ultimately determine the veld's carrying capacity. The official carrying capacity of this farm is calculated at 6ha/LSU. However, it should be emphasised that most of the study area was previously cultivated, and the reclaimed grassland areas can no longer support the same grazing capacity as compared to healthy functioning fields.

The agricultural potential study was conducted in four phases in which various environmental factors were assessed, namely:

1. obtaining the land type data from the Institute for Soil Climate and Water (ISCW),
2. identifying the land uses on site from the interpretation of Google Earth Images,
3. obtaining data from the Natural Agricultural Resources Atlas of South Africa (NARASA) concerning the site's general soil characteristics and climate data;
4. Site visit (conducted on 11 October 2021) for ground-truthing and data collection purposes.

7.2.2. Results

The site is included in the Ae 46 land type with a dominance of red sandy soil, typically from the Hutton series (76% of the site area). The majority of the site (53.1%) exhibits deeper soils that are more than 1200 mm deep, whilst 22.9% are shallower. Areas that present significantly shallow soils (less than 300 mm) consists of soil forms like rock (2,2%), Glenrosa(0,5%), Mispah(4%), Sterkspruit(2,9%), Katspruit(2,5%) and Valsrivier(2,0%). The remainder of the site with deeper soil will likely consist of Shortlands (3,4%) and Oakleaf(2%).

About 59% of the area is expected to be deeper than 1200mm and 23% between 600 and 1200 mm. Therefore, around 82% of the study area's soil is considered to be suitable for crop production.

Aerial imagery indicates that around 40% (Southern and Western section) of the site was previously cultivated Furthermore, it is estimated that around 60% of the site's surrounding environment has been cultivated.

There are currently no irrigated croplands on the three farms; however, pivot irrigated crops are visible on an adjacent farm to the north.

The presence of irrigated crops on the adjacent farm and the large pan situated in the northern corner of the study area may indicate a strong underground water source.

Valuable information has been obtained from the NARASA, as summarised below:

- **Land and soil capability:** Approximately 209 ha (29%) of the study area is described as low to low/moderate land and soil capability. This coincides with the information obtained from the land type data and is mainly attributed to soil depth. The remainder of the 503 ha (71%) is described as moderate to moderate/high land and soil capability.
- **Climate capability:** The area's climate capability is described as low to moderate, as reflected in the land capability.
- **Terrain capability:** There are no extremes slopes located within the study area, and the terrain capability is described as high.
- **Irrigation suitability:** The total area of 503 ha is indicated as moderate to moderate/high, and its irrigation capability is described as excellent.
- **High Potential Agricultural Area (HPAA):** The total area forms part of a high potential agricultural area according to the Natural Agricultural Resources Atlas.

The majority of the site can therefore be regarded as having relatively deep soils (more than 1200 mm) and are considered to possess moderate to moderate/high land and soil capability. Areas with deeper soils are generally classified with excellent irrigation suitability. Few areas are identified to have shallow soils (less than 600 mm) and, consequently, low land and soil capability.

During the field survey, a total of 49 soil profile holes were dug and the following were noted:

- The site's general topography is flat, with a gradual rise in elevation from east to west (30m over 4 km) and again with a slight elevation rise from south to north (24m over 2.5 km).
- A notable decrease in elevation is noted from the pan's ridge (grassland vegetation) down to the pan itself (20 m elevation loss over 100 m).
- Soil types as described on site coincide with those typically found in Land Type Ae46.
    - The eastern part of the site's underlying geology is dominated by limestone, and in some parts of the site, limestone is also observed protruding through the soil.
    - The central and western region of the study area is characterised by underlying gravel which are clearly visible near the quarry.
- Currently, no crop cultivation is present on the site, and the surrounding areas have been withdrawn from cultivation except for the pivot irrigated crops located north of the study area and in small patches on the neighbouring farm. A small patch of about 13 ha have been cultivated but not yet planted.

The potential to grow crops successfully is Low on about 29% of the land. The remainder is medium to medium/high potential soil, depending on the crop choice. The master plan for the Department of Agriculture and Rural Development (DARD) indicates that the crops listed in Table 7-2can be produced and have an optimal to high potential. Note that several other crops may suit the climatic conditions with a marginal to sub-optimal potential in addition to the mentioned crops. For the purposes of this study, the scope was defined to crops with a marginal and high potential.

Table 7-2. Potential crops that can be produced.

CROP	SUITABILITY CLASS	YIELD (TONS/HA)
Vegetables	High	Depend on crop
Borseltjie grass	High	1,5-3

CROP	SUITABILITY CLASS	YIELD (TONS/HA)
Buffelsgrass	High	2-6
Wheat	Optimal	2
Maize	Marginal	0,5 – 1,5
Sweet potato (Irrigation)	Optimal	20-30

The official carrying capacity in the site is 8 ha per Large Stock Unit (LSU), however due to the locality of the area next to a rural residential area, the risk for stock theft will be high, and cattle will be used to utilise the veld. The site's grassland is primarily utilised as grazing grounds for cattle and a small herd of sheep. If the total area is utilised and in optimal condition, about 470 Bonsmara cows can be kept on the veld. The approximate net margin per cow is R3 129, and the total net margin for cattle can be R1 470 630-00.

As indicated, approximately 311 ha of the previously cultivated land have been withdrawn from cultivation and left to return to the natural veld. Although there are no signs of the overutilisation of the land and the natural veld is actually in optimal condition, it will still take time for the mentioned 311 ha areas to return to their full potential. Therefore, it is estimated that the natural grassland is about at 70% of the optimal condition, and this will decrease the potential carrying capacity by 27 LSU.

It is clear from the above information, aligned with the frost data, that crop production is not a function of the soils' limits but rather limitations imposed by the regional climate. Climatic limitations are most probably the reason for the absence of dry cultivation agricultural practices. The dry crop cultivated lands have decreased from around 32 ha (previously cultivated) to around 13 ha, which is currently cultivated. The site's natural grassland has since reclaimed these previously cultivated lands.

7.2.3. Conclusions

The Agricultural potential study concludes by stating that even though 70% of the study area's land/soil capability is considered medium-high potential according to NARASA, climatic limitations greatly influence the site's dry crop cultivation potential. The NARASA indicate that 70% of the study area's soil is excellent irrigation soils, and the total area is included as HPAA, and should thus be reserved for agricultural purposes. Climatic conditions greatly limit dry crop cultivation; however, irrigated crop cultivation potential will be very high if a suitable water source is identified. The probability of identifying a water source suitable for optimal irrigated crop production within the study area's is considered low.

The locality of the land, adjacent to a rural residential area, that increase the stock theft risk for livestock production to such an extent that it will only be viable for cattle production and not any small stock. On the other hand, the chances to identify a water source suitable for irrigation purposes is extremely slim and the soil potential for irrigation will thus not be able to be utilised. As indicated the low rainfall and other extreme climatic conditions results in this area only a marginal to below dry land crop production area.

7.3. Heritage Impact Assessment

The extent of the proposed development is larger than 5000 m^2, and therefore falls within the requirements for a HIA, as required by Section 38 of the South African National Heritage Resources Act (SAHRA) (Act No. 25 of 1999). As a prerequisite for new development, the study was also triggered by the possible need for extensive ground moving activities and excavations into potentially vulnerable fossiliferous sediments of Quaternary and Paleozoic age. The task involved an assessment of possible

impact by the proposed development on potential fossil heritage, an assessment of their significance and recommendations for mitigation where relevant.

The Terms of Reference of the study included the:

- Identification and mapping of possible heritage sites and occurrences using published and database resources;
- Determining and assessing the potential impacts of the proposed development on potential heritage resources;
- Recommending mitigation measures to minimize potential impacts associated with the proposed development.

7.3.1. Methodology

The heritage significance of the affected area was evaluated using existing field data, database information and published literature, and was followed up by a field assessment on 15 October 2021, using a Garmin Etrex Vista GPS hand model (set to the WGS 84 map datum) and a digital camera for recording and mapping purposes. Geological maps, aerial photographs and site records were integrated with data acquired during the on-site inspection. The study area is graded according to field rating categories as prescribed by SAHRA.

7.3.2. Results

The GH1 mainly covers "degraded" land (in the sense that it has either been disturbed by ploughing or pasture use or both in the past, thereby destroying a potential Stone Age archaeological footprint) and is underlain by palaeontologically insignificant dolerite intrusions, covered by a well-developed and calcrete-rich aeolian sand overburden. There is no aboveground evidence of historically significant building structures older than 60 years, intact Stone Age archaeological remains, graves or material of cultural significance within the confines of the development footprint.

The GH2 mainly covers "degraded" land (in the sense that it has either been disturbed by ploughing or pasture use or both in the past, thereby destroying a potential Stone Age archaeological footprint). It is also partially underlain by Permian shales and siltstones of the Tierberg Formation (Ecca Group), that are covered by a well-developed and calcrete-rich aeolian sand overburden. There is no aboveground evidence of historically significant building structures older than 60 years, intact Stone Age archaeological remains, graves or material of cultural significance within the confines of the development footprint. A cluster of dilapidated farm structures covering about 1.6 ha, and recorded near the south eastern boundary of the footprint is not considered to be historically significant.

7.3.3. Conclusions

Proposed development at GH1 will primarily affect superficial Quaternary sediments and intrusive dolerite bedrock, which has no palaeontological potential. The likelihood of negative impact on palaeontological heritage in superficial Quaternary sediments (aeolian sand & residual soils) is considered negligible.

Proposed development at GH2 will primarily affect superficial Quaternary sediments and potentially fossil-bearing rock units of the Tierberg Formation. In addition, Quaternary pan dune (lunette) deposits, as found in the northern boundary of the site, are potentially highly sensitive in terms of palaeontological as well as archaeological finds. It is advised that development at Good Hope 2 may proceed, provided that extensive excavations into intact Ecca sediments should be avoided where possible; or alternatively it is recommended that palaeontological monitoring is allowed at the start of and for duration of (1) linear

excavations exceeding 3 m in length and > 60cm in depth into Ecca bedrock or (2) the mechanical exposure of unweathered Ecca bedrock surfaces exceeding 4 m^2 in size, while fresh, potentially fossiliferous strata is still exposed for study and recording. It is also recommended that the pan dune deposits bordering the northern boundary of the site are avoided by a ≥ 50 m no-go zone.

It is further also recommended that the development may proceed, provided that all construction activities are restricted to within the boundaries of each demarcated footprint.

7.4. Landscape/Visual Impact Assessment

The Landscape and Visual Impact Assessment (VIA) for the proposed developments was conducted by EScience Associates (Pty) Ltd. (2022).

7.4.1. Methodology

As part of the specialist assessment, the *Guideline for involving Visual and Aesthetic Specialists in EIA Processes* (Oberholzer, 2005) was consulted. This guideline identifies various principles and concepts for providing the visual analysis of a project. A solar PV is not specifically categorized in the abovementioned guideline. According to the height of the development, a category 3 or 4 development has been selected. The receiving environment land use varies between Agricultural, Urban, and Grassland and has been deemed "Areas or routes of low scenic, cultural, historical significance". According to the Guideline, the intensity of this type of development has been identified as minimum to moderate visual impact. Therefore, a Level 3 Visual Assessment should be undertaken.

Four viewpoints were identified within proximity to the proposed developments. These included a viewpoint: a) located on the northern side of the proposed Good Hope 1 development, b) from Dealesville - R64, c) from Dealesville Townshop, and d) from Dealesville Substation. These viewpoints have been indicated on Table 7-2 below.

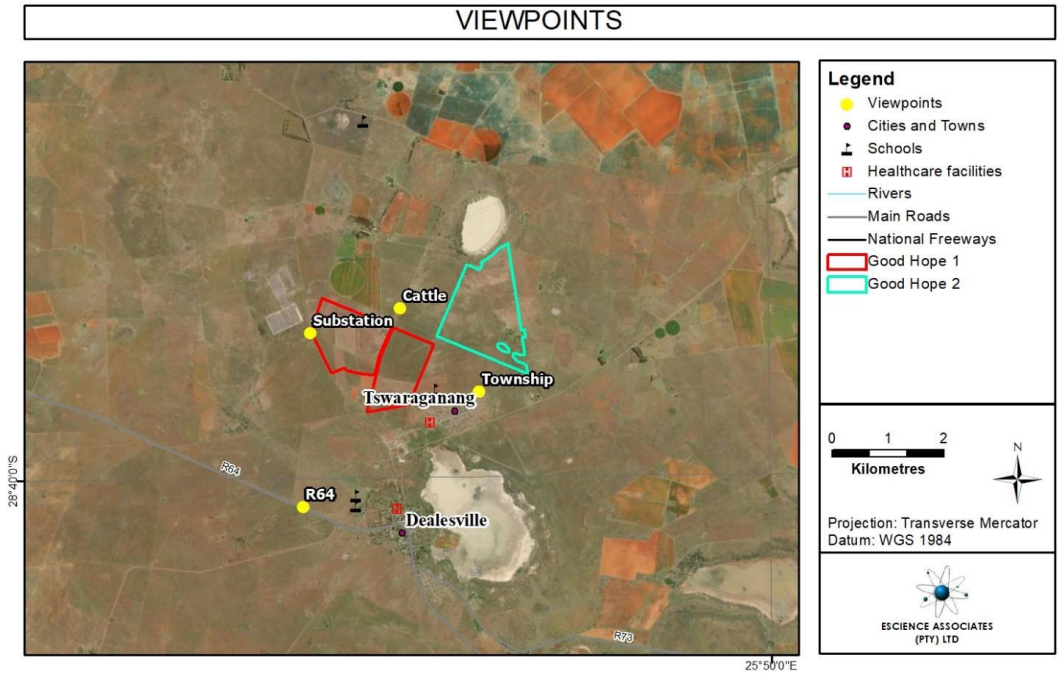


Figure 7-2. The location of the viewpoints in relation to the proposed developments.

The landscape sensitivity was determined by numerous assessments, including the site sensitivity according to the REDZ strategic environmental assessment (SEA) and the sensitivity as per the DFFE online screening tool. The REDZ SEA determined that the proposed developments are located in the Kimberly REDZ. The REDZ have been pre-screened for their suitably for PV developments through the conducting of a SEA. The proposed solar parks are located within areas identified between low to high sensitivity due to their proximity to Dealesville (Figure X).

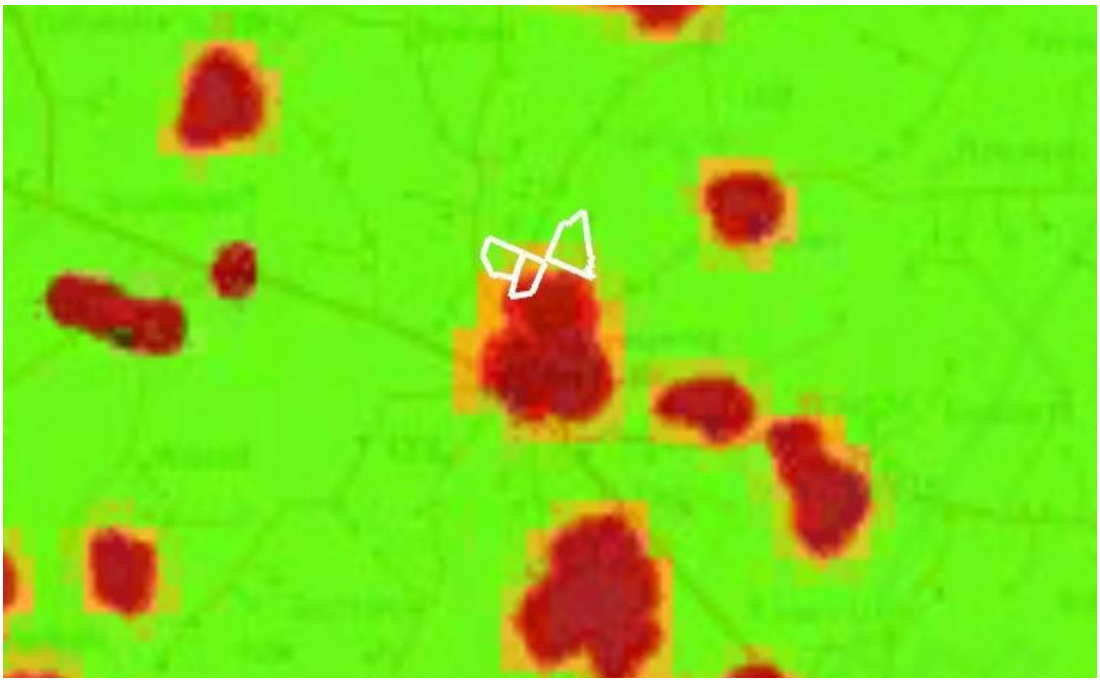


Figure 7-3. A zoomed in depiction of the Kimberley REDZ PV development sensitivity.

The DFFE screening tool identified the proposed Good Hope 1 development as High to Very high, whereas the proposed Good Hope 2 development has a Medium to High Sensitivity according to the Landscape Solar Sensitivity (Figure 7-4). This is due to the town of Dealesville having a concentration of receptors. In addition to this, the very high sensitivity associated with mountain tops and high ridges. The topography of the surrounding area indicates slight elevations in the landscape which corresponds to this very highly sensitive areas.

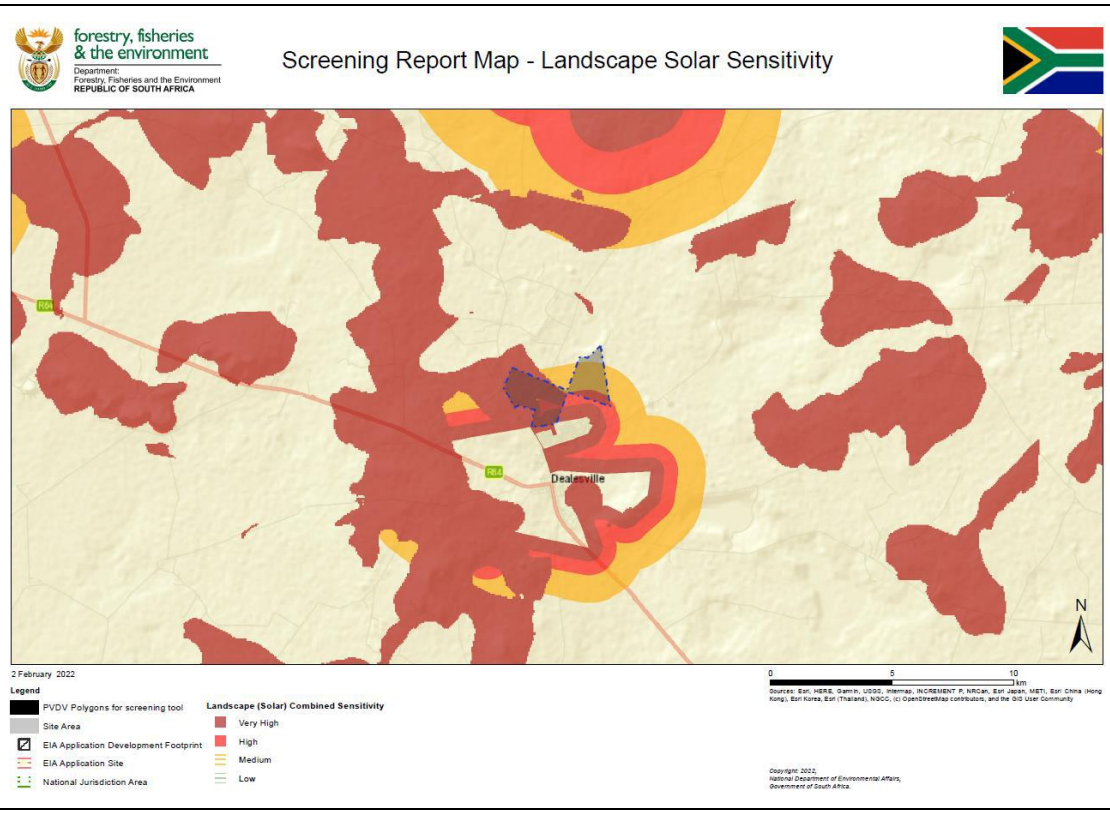
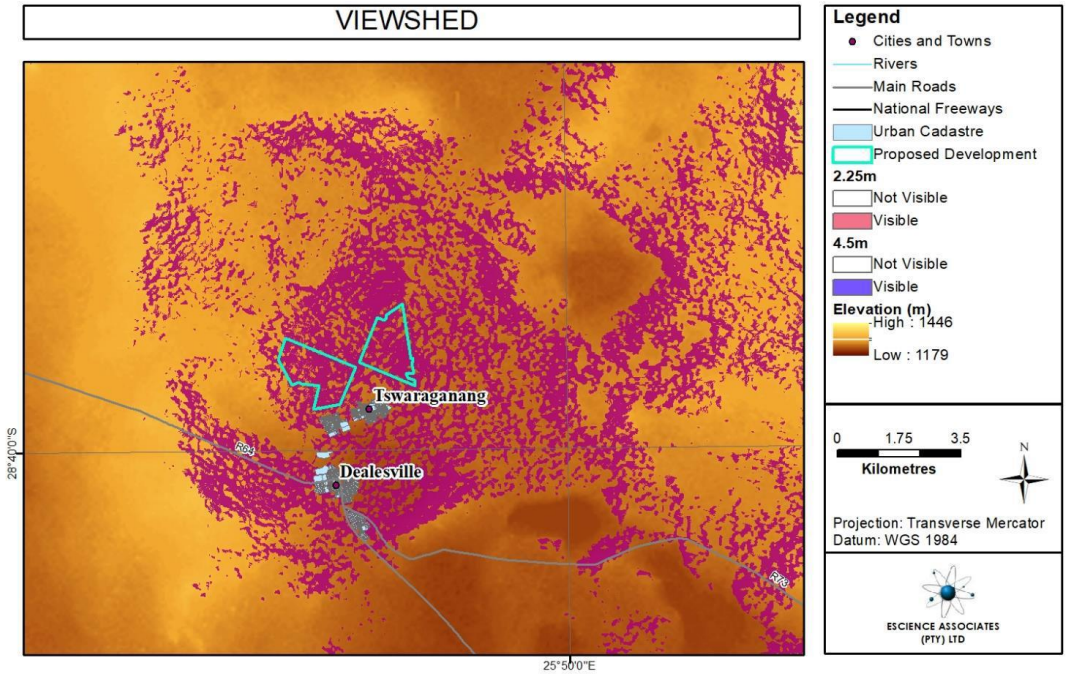
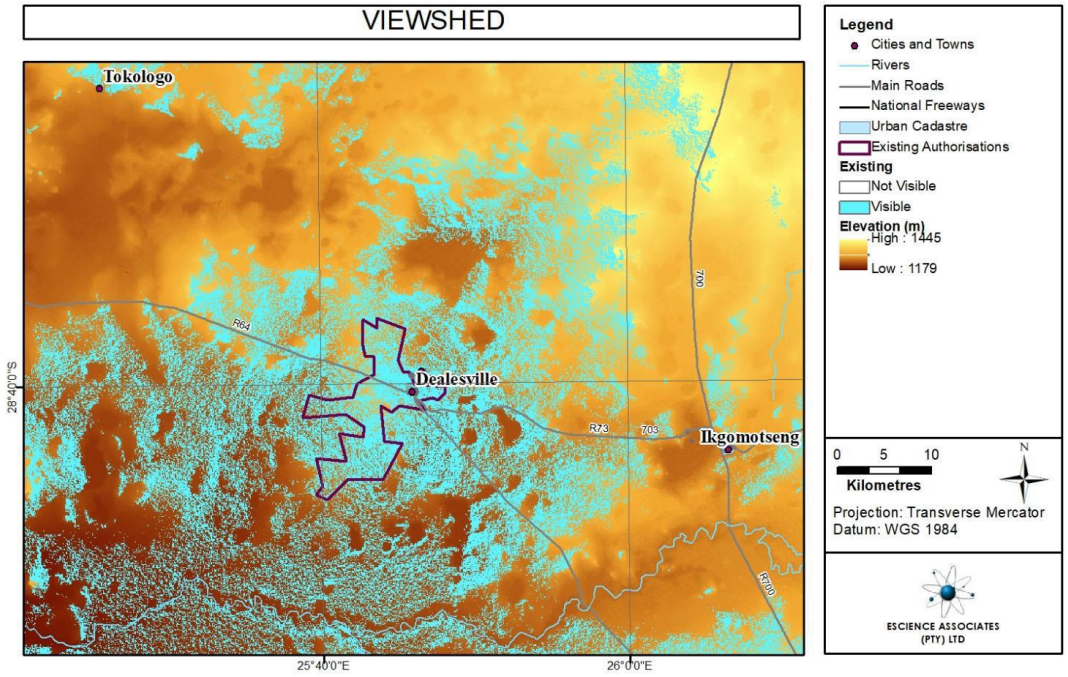


Figure 7-4. A zoomed in depiction of the Landscape Solar Sensitivity.

7.4.2. Visual receptors and viewer sensitivity

The visual receptors (Figure 7-6 to Figure 7-9) identified for the solar parks will be Dealesville (Urban areas in close proximity to the developments), point receptions including home and farmsteads areas that are scattered throughout the area and the linear receptors which includes the R64 (provincial road that connects Kimberley and Bloemfontein) and the R73 (provincial road that connects to the N1 to Welkom). The significance of the visual impact will change from one receptor to another and will depend largely on the receptors land use/activity. Permanent residents could depend on a view for the enjoyment of the area and to maintain property values.


VIEWSHED
Legend
Cities and Towns
Rivers
Main Roads
National Freeways
Urban Cadastre
Proposed Development
2.25m
Not Visible
Visible
4.5m
Not Visible
Visible
Elevation (m)
High : 1446
Low : 1179
Tswaraganang
Dealesville
R64
R73
28°4'0"S
25°50'0"E
0 1.75 3.5
Kilometres
N
Projection: Transverse Mercator
Datum: WGS 1984
ESCIENCE ASSOCIATES (PTY) LTD


VIEWSHED
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Cities and Towns
Rivers
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Urban Cadastre
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Elevation (m)
High : 1445
Low : 1179
Tokologo
Dealesville
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R64
R73
703
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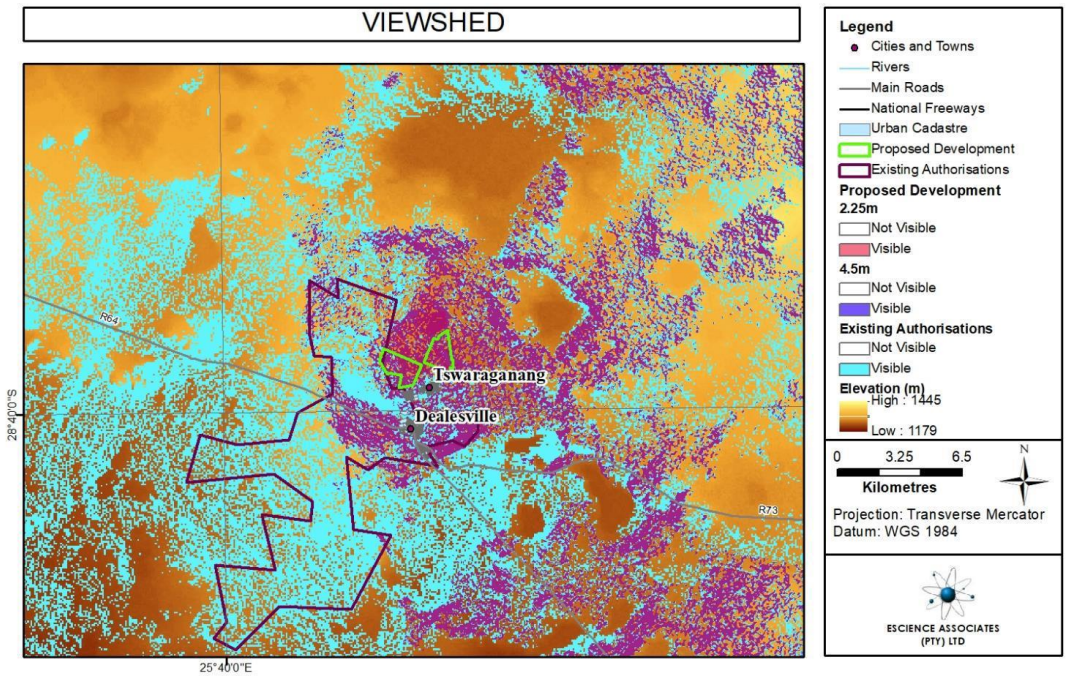

Figure 7-5. Viewshed of the proposed solar PV facilities.

7.4.3. Results following fieldwork

The proposed development area is mainly mixed agriculture and grassland as well as the small town of Dealesville. Authorised solar PV facilities are to the south and west of the developments. Therefore, it must be noted that the addition of the solar farms is not anticipated to stand in contrast with the receiving environment and is thus not expected to significantly alter the sense of place.

In terms of the landscape sensitivity, may be regarded as a measure of resilience or robustness of a landscape to withstand specified change arising from development types or land management practices, without significant or undue negative effects on the landscape visual baseline and their value – such as changes to valued attributes of baseline landscape character and the visual resource. The sensitivity of the landscape to the solar farms is deemed to be low, considering the fact that the area has already approved solar farms, and the height of the infrastructure is not exceedingly high.

7.4.4. Sensitive Receptors and zone of visual influence

The development is not very tall, with the structures reaching heights no more than 4.5m (however the powerlines will have a maximum height of 40m) but is located in mostly grassland and mixed agriculture which has low visual absorption. Thus, the development is anticipated to be visible from distances of 25 km.

The types of viewers potentially exposed to the development will be varied and include commuters and residents, as well as the occasional tourist. The proposed development area is mainly mixed agriculture and grassland as well as the small town of Dealesville. Authorised solar PV facilities are to the south and west of the developments. Therefore, it must be noted that the addition of the solar farms is not anticipated

to stand in contrast with the receiving environment and is thus not expected to significantly alter the receiving environment.

7.4.5. Visual simulations

View simulations showing views from three vantage points have been developed, in order to illustrate how the proposed solar PV facilities will be visible from these locations: The locations of the viewpoints have been indicated in figures above.

1. Dealesville Cattle
2. Dealesville R64
3. Dealesville Township
4. Dealesville Substation

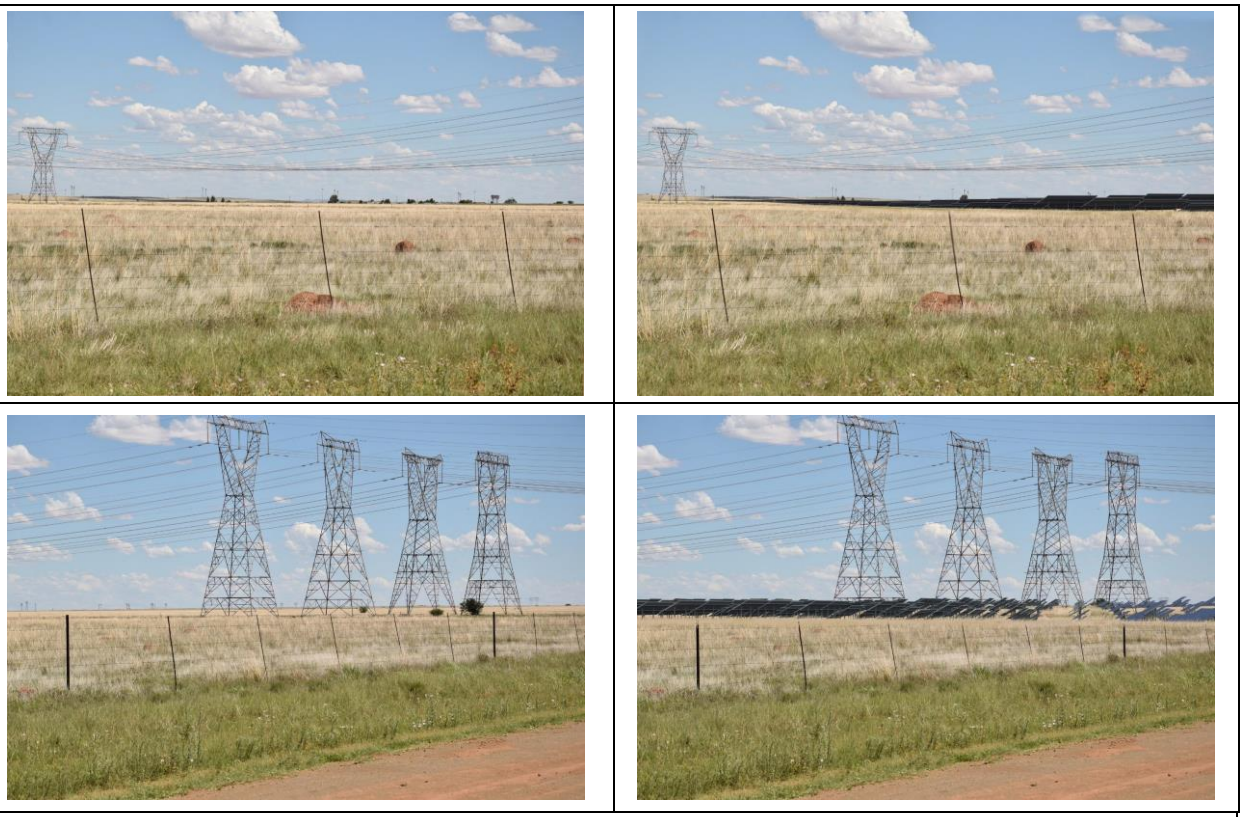

Figure 7-6. View simulation showing the view from Dealesville Cattle prior to (left) and post-development (right) of the same view.

Figure 7-7. View simulation showing the view from Dealesville R64 prior to (left) and post-development (right) of the same view.

Figure 7-8. View from the Dealesville Township prior to (left) and post-development (right) of the same view.

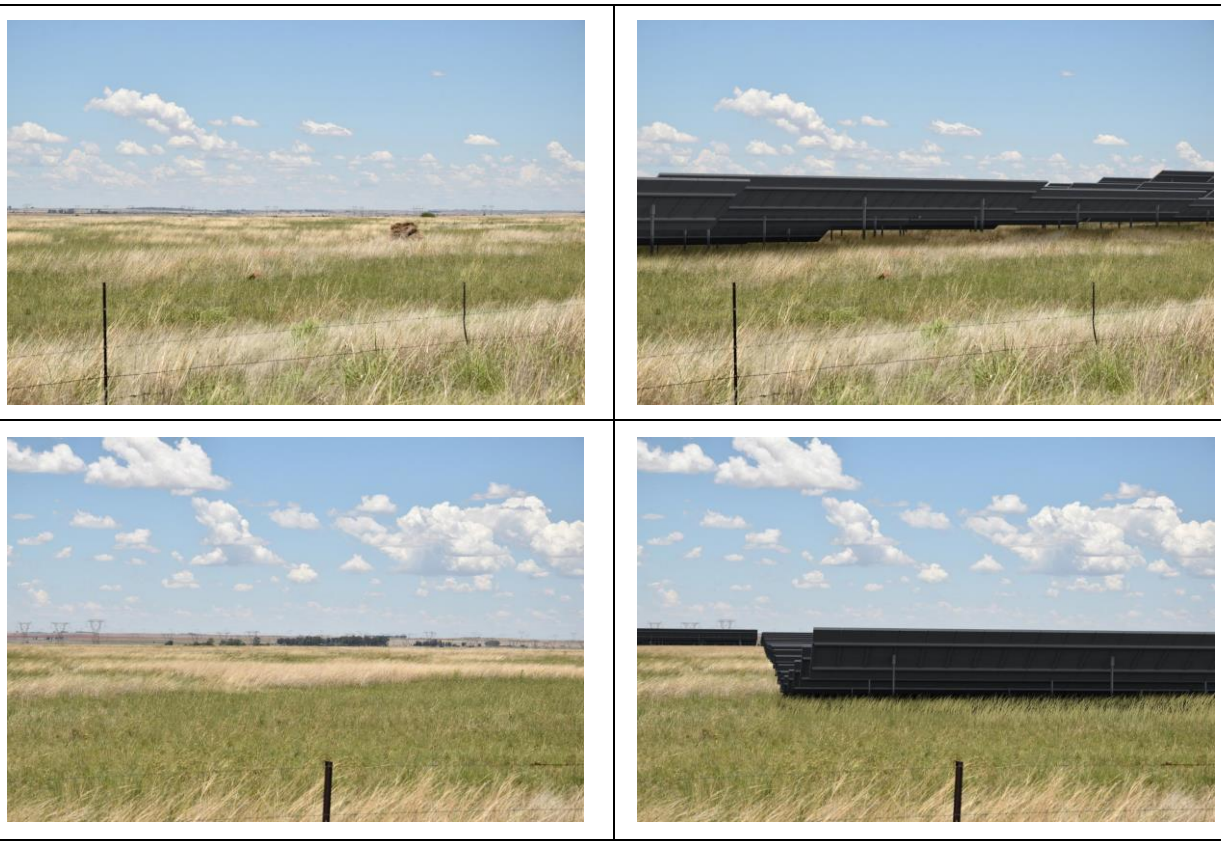

Figure 7-9. View from the Dealesville substation prior to (left) and post-development (right) of the same view.

7.4.6. Conclusion

- Due to the development's size, it is anticipated to be **highly** visible.
- Due to its proximity to vantage points it is anticipated to be **highly** visible.
- It is anticipated to be **highly** visible in the field of view for some vantage points.
- The level of contrast the development will have in relation to its environment scores 9/12, constituting a contrast value of 75%. This indicates a high contrast ratio, with anticipated **low compatibility** with surrounding scenery.
- The proposed development poses an anticipated visual change rating of 19/30, thus constituting a **moderate visual change rating**.
- The proposed development poses an anticipated visual impact rating of 15/25, thus constituting a **high visual impact rating.**

The securing of renewable energy sources, like solar PV, has become high priority for the Government, considering that the current energy production is not able to meet the increased energy demand of the Country. This leads to frequent electricity shortage and fluctuations in supply ("load shedding"), detrimental to the economic development of South Africa. Therefore, the development of the proposed solar farms will represent a key feature in the fulfilment of the proposed goals of sustainable fuel for new generation capacities for energy security.

7.5. Ecological Impact Assessment

Ecological infrastructure refers to the natural functioning ecosystems which provide essential services to people. An ecosystem functions as a collective of components, living and non-living, interacting with one another (Wohlitz, 2016). An ecological specialist assessment was undertaken in order to determine the ecological components of the proposed development site.

7.5.1. Methodology

Methodologies followed in order to determine the ecological sensitivity of the development site included:

7.5.1.1. Literature review

The vegetation descriptions were formulated using sources such as the Red Data list, Mucina and Rutherford (2006), SANBI's database and field guides used of specific species. Whereas the terrestrial faunal assessment was done through field guides for species identification.

7.5.1.2. Survey

Prior to conducting the field work, a desktop assessment was undertaken in order to determine the vegetation type, climatic conditions, probable rare, endemic and protected species, relatively homogenous vegetation units in which surveying will commence, probable environmental impacts, and the species identified by the general public (through iNaturalist).

The field survey was done by traversing the site on foot, whilst an unmanned arial vehicle was used to aid the delineation of relatively homogenous vegetation units. Plant species observed were recorded with particular emphasis on rare-, endemic-, protected- and dominant species. Attention was given to the current state of the environment regarding grazing impacts, anthropogenic disturbances, erosion and the presence of alien or invasive species.

Observed animal species and evidence of their existence (dung, habitat requirements, excavations, animal tracks, burrows, and nests) were recorded.

7.5.2. Results

7.5.2.1. Vegetation units

Excluding all areas associated with previous cultivation (disturbed grassland), most of the site can be described as an almost uninterrupted grassland with a few randomly distributed patches where karroid elements increase. The floral survey resulted in the identification of 69 plant species, which constitutes 20 graminoids, four dwarf shrubs, 13 medium to tall shrubs, three tall shrubs, four trees, four succulents, two geophytes, and 19 forbs.

Three relatively homogenous VUs were recorded within natural vegetation (areas which have experienced very little environmental disturbance) located within the study area (approximately 35.5 % of the proposed development areas) (Figure 7-10).

Previously cultivated areas (disturbed grassland) make up more than half of the site's total surface area (52.5%). These areas displayed an overall poor floral species richness and are mainly occupied by pioneering grass species. Ground cover by the herbaceous component within disturbed grassland areas was low and consequently resulted in low Normalised Difference Vegetation Index (NDVI) scores as captured by the Sentinel 2 L2A satellite early in January 2021. It is possible that, given sufficient time, these disturbed grasslands can return to a near climax state. *Olea eurpaeae* subsp. *africana* is the only protected species recorded during the survey.

The site's overall conservation value, in terms of the naturally occurring vegetation, considering the Vet-Vaal Sandy Grassland's threat status, the extend off and floral composition of the naturally occurring vegetation units, connectivity, extend of disturbed grassland, habitat transformation and species richness, is considered **low to medium**.

This unit has been separated into three main units across the study area.

VU-A

This vegetation unit is characterised by an absence of tall trees/shrubs and the overall dominance of *Themeda triandra*. Other graminoids such as *Aristida congesta, Aristida bipartita, Eragrostis curvula, E. lehmanniana, E. obtusa, E. superba* and *Heteropogon contortus* were more frequently recorded in clearings where the dominance of *Themeda triandra* subsided. The presence of woody elements such as *Chrysocoma ciliata, Pentzia globose* and *Lycium crinium* coincided with the mentioned clearings. Ground cover by the herbaceous component can be considered moderate to high. The ground cover becomes less pronounced in areas between VU-A and VU-B, where an increase in woody species seems to displace the herbaceous component. Evidence of low-intensity extensive grazing was noticed; however, its influence on the grass component is insignificant. VU-A did not present a high number of exotic plant species; however, the occurrence of exotics increased in proximity to disturbed habitats.

A **medium** sensitivity rating is assigned to this unit due to its overall good groundcover, reasonably high species richness, the scattered distribution of playas, and overall good representation of the Vet-Vaal Sandy Grassland.

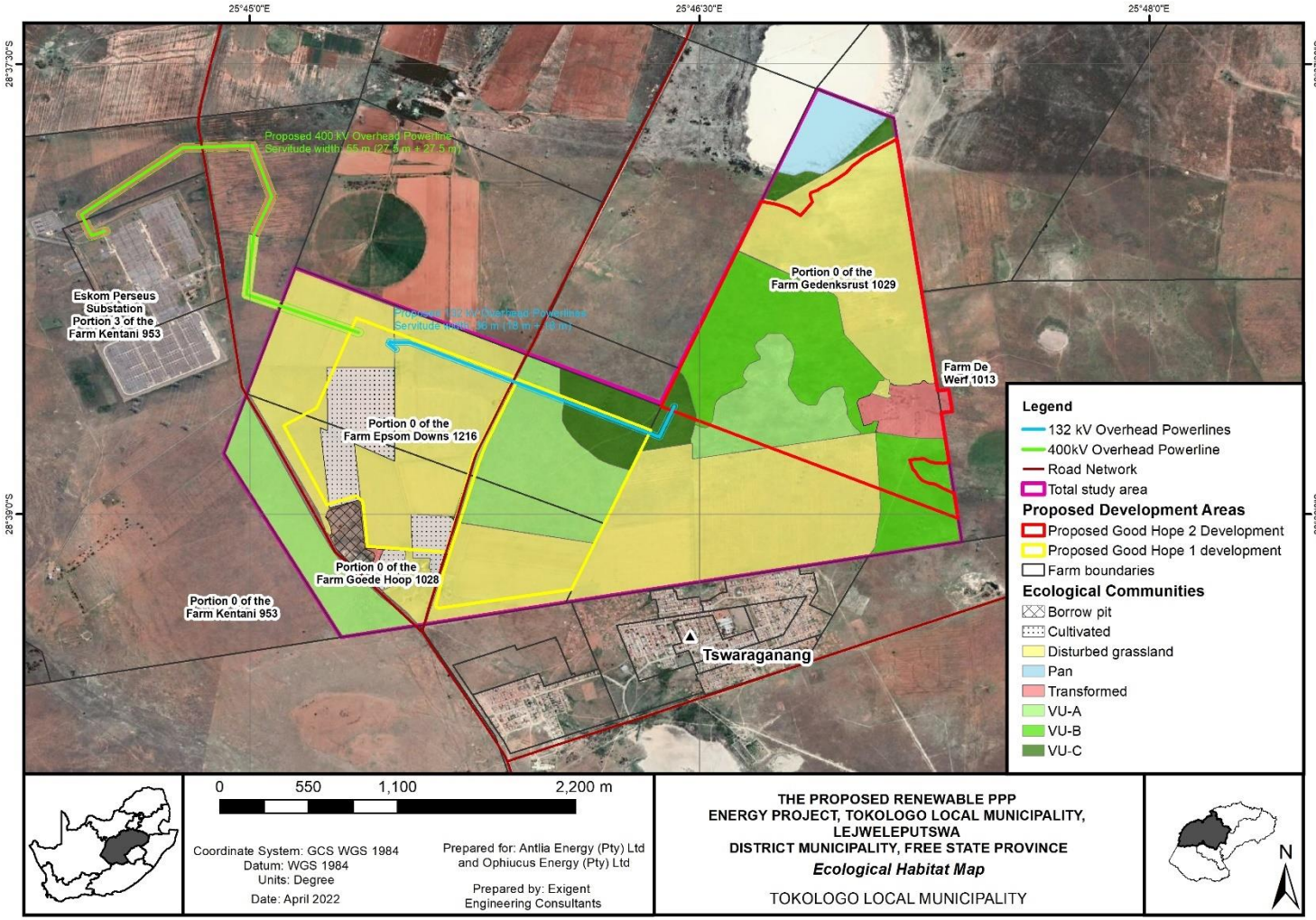

Figure 7-10. Ecological habitat boundaries delineated within the study area.

VU-B

VU-B covers a reasonably large portion of the eastern half of the study area and can be described as an overall low tussock grassland dominated unit. Graminoids recorded included *Aristida congesta* subsp. *barbicollis, Themeda triandra, Eragrostis lehmanniana, E. chloromelas, Aristida bipartita* and *Eragrostis curvula*. Ground cover by the herbaceous component is considered reasonably high; however, a mosaic of barren patches are distributed throughout this unit. These barren patches display an overall low graminoid species richness and are primarily occupied by pioneering grasses and karroid shrubs (*Chrysocoma ciliata* and *Pentzia globosa*)

No species of particular conservation concern were recorded within this unit. A slightly lower sensitivity rating is assigned to VU-B due to the graminoid component largely being represented by pioneer and sub-climax grasses.

VU-C

A small portion of this vegetation unit is located along the calcrete rich soils around the periphery of the pan system, whilst the largest part of the vegetation unit is located roughly in the middle of the study area. The floral composition of the vegetation unit was described as grassy shrubland with high occurrences of karroid shrubs. The dominant shrub components includes *Chrysocoma ciliata, Pentzia globosa* and *Lycium crinium*. However, small clusters of *Themeda triandra*, and *Cymbopogon pospischilii* are distributed sporadically. Other graminoids with a high occurrence include *Eragrostis chloromelas, Eragrostis curvula* and *Aristida congesta* subsp. *barbicollis*. This unit does not have a well-developed herbaceous layer and consequently poor ground cover. The middle section of the vegetation unit did not have any tall trees/shrubs; however, some trees were recorded along the periphery of the pan. Trees and other shrubs recorded within the study area near the pan include *Searsia lancea, Vachellia karroo, Prosopis glandulosa, Olea europaea* subsp. *africana, Ehretia rigida* and, *Asparagus suaveolens*. *Olea europaea* subsp. *africana* is a provincially protected species within the Free State Province (FSNCO, 1969).

It is important to emphasise that the calcrete rich soils which surround the large pan (northern section of the site) creates a unique arid habitat which might host species of particular conservation concern. These species might have been missed due to exhibiting a cryptic nature or simply due to the season in which the survey was conducted. Therefore, the northern section of this vegetation unit is considered slightly more sensitive than the middle section. A **medium** sensitivity rating is assigned to the northern section whilst the middle section is regarded as a **low-medium** sensitivity habitat

7.5.2.2. Faunal review

The majority of the site's vegetation and consequently habitat for fauna is described as an almost uninterrupted grassland with large areas of reclaimed grassland following previous cultivation. Numerous termitaria are spread across the study area, with large rounded excavations within the sides of the termitaria likely indicating the presence of myrmecophagous mammals, most likely *Orycteropus afer* (Aardvark).

During the survey, two colonies of *Xerus inauris* (Cape ground squirrels) were recorded (one in the northern reaches of VU-B and another in the mid-section of VU-A. *Xerus inauris* create extensive burrow systems, often shared with other small mammals such as Suricate and Yellow mongoose. Other

mammals observed during the field survey include *Cynictis penicillate* (Yellow mongoose) and *Lepus saxitalis* (Scrub hare). Furthermore, the presence of Springhare (*Pedetes capensis*) is confirmed by their typical whitish, stone shaped scat and burrows within open grassland habitats. Two members of the Bovidae family were recorded on site. These are *Damaliscus pygargus* subsp. *phillipsi* (Blesbok) and *Antidorcas marsupiallis* (Springbok). Both these antelope are commonly distributed in game reserves and farms. Given the opportunity, these antelope will migrate to other open spaces.

A preliminary search for the possible occurrence of mammals using the virtual museum portal (search for QDS 2825DA and QDS2825BD) and observations logged in the INaturalist website was assessed for the possible occurrence of other mammal species. The preliminary mammal search for the mentioned QDS identified 31 species, of which five were recorded. Furthermore, three mammals of particular conservation concern were identified in the preliminary mammal search. These species included *Hippotragus niger niger* (Sable antelope) (VU), *Kobus leche Lechwe* (Red lechwe) (NT), and *Atelerix frontalis* (South African Hedgehog) (NT).

The two antelope species of conservation concern were not recorded during the site survey. Most often, these antelope species are located within private game reserves or natural parks. A higher probability of occurrence score is given to *Atelerix frontalis* due to its widespread distribution and availability of food resources found on the site.

7.5.2.3. Biodiversity sensitivity rating (BSR)

Previous cultivated areas within the study area comprised of approximately 52.5 % of the study area and 35.5% of the study area could be associated with natural vegetation. These previously cultivated areas displayed an overall low species richness. The BSR took into consideration numerous environmental characteristics (such as habitat diversity. rare and endangered species, ecological function, conservation value, percentage ground cover, vegetation structure, infestation of exotic and invasive plants, impact of grazing, erosion, percentage of healthy functioning ecosystem and connectivity) and concluded that the site is acceptable for development. It should be emphasized that mitigation measures will have to be implemented to prevent any unnecessary environmental stress.

7.5.3. Conclusion

The overall description of the vegetation on site coincides with the description brought forth by Mucina and Rutherford's (2006) description of the Vaal-Vet Sandy Grassland (Gh10) (EN). Previous cultivated areas within the study area comprised of approximately 52.5 % of the study area and 35.5% of the study area could be associated with natural vegetation. The study area is located within CBA1 zones as per the Free State Biodiversity Management Plan. These zones are vital for meeting conservation targets of endangered ecosystem types. Considering all the mentioned factors, a moderate conservation rating was assigned to the healthy grassland units.

A BSR was conducted to evaluate the current ecological condition and the site's sensitivity to development. The BSR took into consideration numerous environmental characteristics and concluded that the site is acceptable for development. It should be emphasized that mitigation measures will have to be implemented to prevent any unnecessary environmental stress.

The overall anticipated environmental impact evaluation indicated that the development would have an overall low impact. Any drastic changes to the development proposal and encroachment into sensitive

habitats will significantly influence this score. It remains crucial for the developer to be mindful of low impact development practices.

7.6. Avian Impact Assessment (Initial Assessment – Avifaunal Statement)

As part of the impacts proposed developments, it is expected that the proposed developments will have an impact on the avifaunal community in terms of suitable nesting habitat and migration corridors. An avian specialist was appointed in order to provide a comprehensive shortlist of bird species occurring within the study area, to identify discrete avifaunal habitats with the study area, to compare the species composition occurring within the study area with the regional composition that has been recorded in recent history. To identify ecologically sensitive areas in terms of species occurrence and/or habitat. To provide an inventory of the bird species currently occurring with the study area as well as identifying species that could occur on site based on habitat preferences, nomadism and historical records, and to provide a list of species with conservation importance.

The site will then be characterised in terms of the bird habitats present, the species occurring within these habitats, the priority species, the seasonality and movements of the key species, and the identification of highly sensitive, no-go areas to be avoided during all phases of the proposed developments.

7.6.1. Methodology

7.6.1.1. Desktop assessment

A desktop study of the local avifauna was conducted, using relevant, pre-existing information (Hockey et al. 2005) and datasets, for example the Southern African Bird Atlas data (SABAP 1 - (Harrison et al. 1997), and SABAP 2, http://sabap2.adu.org.za), Coordinated Waterbird Counts (CWAC, http://cwac.adu.org.za, Taylor et al. 1999), provincial conservation plans and provincial species databases (where available), and data from the Endangered Wildlife Trust's programs (www.ewt.org.za) and associated specialist research studies.

By consulting the SABAP2 data basis, all threatened (referring to IUCN categories Critically endangered, endangered and vulnerable) and/or near threatened bird species historically recorded within the 2835_2545 and 2835_2540 pentads and the directly surrounding pentads were added to the initial reference list of expected species. All threatened/near threatened species occurring in or around the study area were reviewed (Roberts VII, Hockey et al. 2005; Taylor et al., 2015) before conducting the field survey.

7.6.1.2. Field survey

Two field surveys to the area were conducted with the main aim to search for key species and resources, and to develop an on-site understanding of where (and possibly when) priority species are likely to occur and move around the site. A list of expected species was compiled as part of the desktop study and used as a reference during the field surveys to ensure that bird species that should theoretically occur were not overlooked. The initial shortlist compiled for the species occurring in and around the study area can however not be used as an accurate list in terms of the species actually occurring within the study area since it covers a larger area as well as a wider variety of habitats.

In order to compile an accurate species list for the study area, all the species previously recorded in and around the 2825DB and 2825DA QDS's were considered and added or eliminated on account of the habitat

present on the study area, as well as the habitat preferences of each of the species previously recorded within the larger area.

All distinct avifaunal habitats were identified on site, after which these habitats were assessed to record the associated avifaunal species present. Species were identified by actual sightings, calls as well as signs of presence in the form of eggshells, nests, droppings and feathers (Chris & Tilde Stuart., 2000). Where necessary, species were verified using Sasol Birds of Southern Africa (Sinclair et al., 2011).

7.6.2. Results

7.6.2.1. Avifaunal Habitat Identification

During the site visits conducted, four distinct areas were identified. These included the Primary grassland, secondary grassland, transformed areas and a Pan system (Figure 7-11).

Primary grassland

A large section of the proposed development area can be described as the uninterrupted primary grassland habitat, with a few randomly distributed patches where karroid elements increase. The Primary Grassland habitat contains mostly grass and forb vegetation (*Aristida congesta* subsp. *barbicollis, Themeda triandra, Eragrostis lehmanniana, E. chloromelas, Aristida bipartita* and *Eragrostis curvula*).

Grassland habitats normally have low to medium avifaunal species richness as a result of the highly specialized environment. The habitat does provide the optimal foraging habitat for Secretary birds (*Sagittarius serpentarius*), as well as providing the preferred habitat for other threatened and near threatened avifauna species such as Ludwig Bustard (*Neotis ludwigii*). As a result of the unique environment a number of habitat specific species such as Anteating Chat (*Myrmecocichla formicivora*), Zitting Cisticola (*Cisticola juncidis*), Cape Longclaw (*Macronyx capensis*) and African Quailfinch (*Ortygospiza atricollis*) as well as endemic species such as Cloud Cisticola (*Cisticola textrix*) and South African Cliff-swallow (*Hirundo spilodera*) are present. Connectivity of the habitat unit with surrounding homogenous habitats is relatively good.

Due to the aforementioned connectivity function, optimal habitat for threatened bird species, natural state of the habitat and unique species composition the largest part of this habitat was deemed to be moderately sensitive from an avifaunal perspective.

Secondary grassland and the Transformed areas

The Secondary Grassland habitat has an overall low floral species richness, poor ground cover, high occurrence of exotic plant species, occurrences of soil erosion and a floral composition dominated by pioneering and sub-climax grasses (such as *Aristida congesta subsp. barbicollis, Eragrostis lehmanniana, E. chloromellas, Pentzia globosa, Argemone urochloa, Tribulus terrestris, Acrotome inflata* and *Anthephora pubescens).* Secondary Grassland habitats generally have a low to medium avifaunal species richness as a result of the highly specialised environment and associated disturbances. A number of widespread bird species such as Bishops, Sparrows, Doves, Lapwings, Swallows, Cisticolas and Widowbirds were present within the grassland habitat.

The transformed areas included disturbances such as ploughing for dry crop cultivation, an on-site burrow-pit mining operation, bailing, and extensive grazing practices.

Due to the ongoing disturbances within the secondary grassland habitat unit, the sustainability of the continual well-being and persistence of this grassland habitat is unlikely. Furthermore, it does not provide optimal habitat for threatened or near threatened species and has been identified with a low avifaunal sensitivity rating.

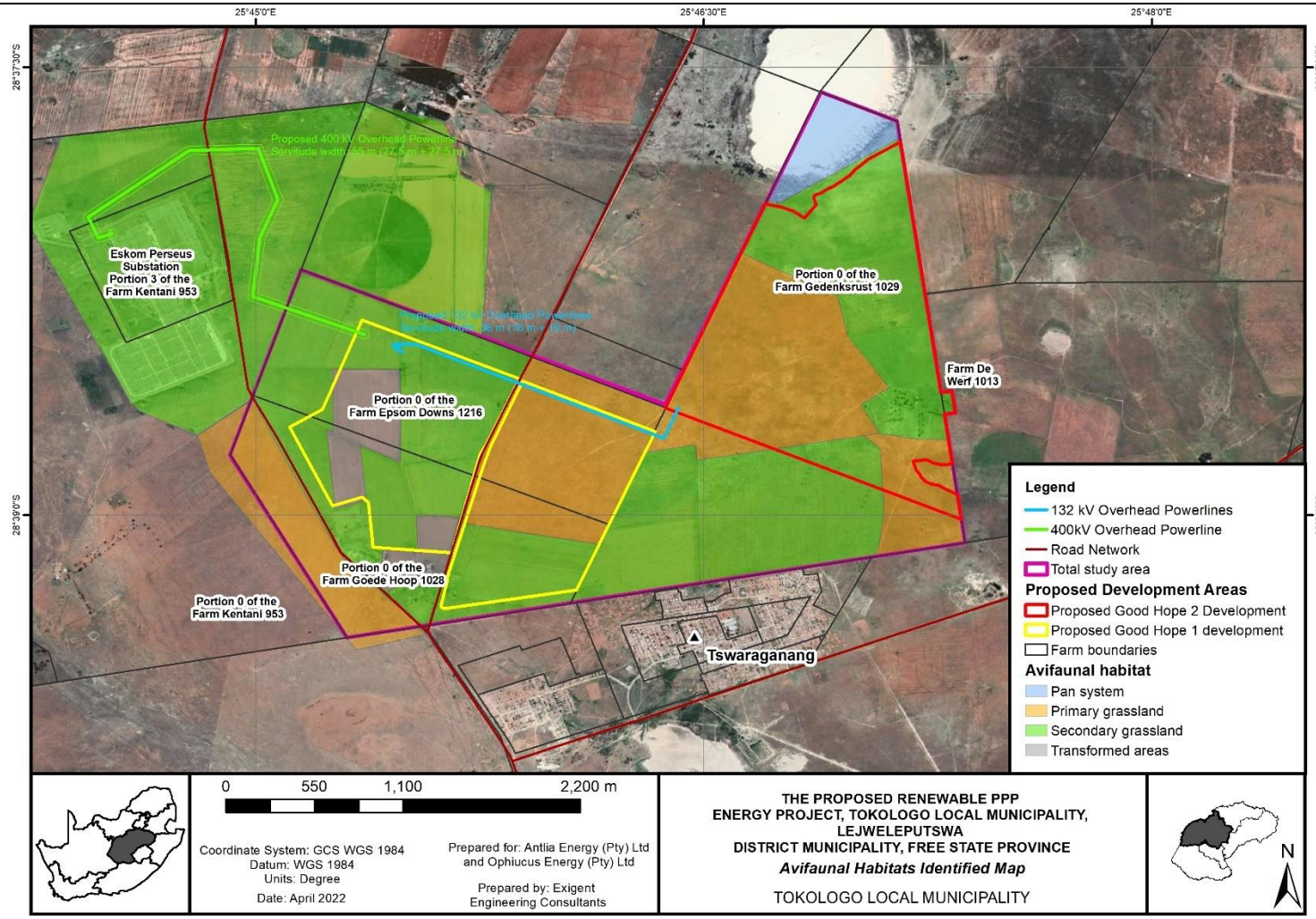

Figure 7-11. Avifaunal habitats identified within the study area.

Pan system

The pan and the immediately surrounding vegetation are defined as a distinct Pan system habitat unit. The Pan System habitat unit is situated along the margin of a large pan bordering the most northern section of the proposed Good Hope 2 PVPP development. The floral composition of the margins of the pan system habitat unit is described as a grassy shrubland with high occurrences of karroid shrubs. *Chrysocoma ciliata*, *Pentzia globosa* and *Lycium crinium* represent the dominant shrub component, whilst small clusters of Themeda triandra, and *Cymbopogon pospischilii* are irregularly distributed. Other graminoids with a high occurrence include *Eragrostis chloromelas, Eragrostis curvula* and *Aristida congesta* subsp. *barbicollis*. This unit does not have a well-developed herbaceous layer and consequently poor ground cover. Widespread bird species such as Spike-healed Lark and Double-banded Courser are expected to frequent this area since these species are often associated with flat open plains with a low vegetation density. The majority of this habitat unit did not have any tall trees/shrubs; however, some trees were recorded along the periphery of the pan. Trees and other shrubs recorded near the pan include *Searsia lancea, Vachellia karroo, Prosopis glandulosa, Olea europaea* subsp. *africana, Ehretia rigida* and, *Asparagus suaveolens*. *Olea europaea* subsp. *Africana*. A number of common central Free State bird species were encountered in this section of the habitat unit, including Acacia Pied Barbet (*Tricholaema leucomelas*), Pririt Battis (*Batis pririt*), Chestnut-vented Warbler (*Sylvia subcaerulea*) as well as a breeding pair of Spotted Eagle-owls (*Buteo africanius*) nesting along the calcrete cliffs.

Soils on the shore indicate a high silt content but absence of wetland conditions. During high rainfall events the basin of the pan will rapidly fill with water owing to the fact that it is almost completely flat. This creates an ideal foraging habitat for a large number of waterfowl and waders. When filled with water, the pan becomes the optimal foraging habitat for species such as Lesser Flamingo (*Phoenicopterus minor*), Greater Flamingo (*Phoenicopterus roseus*) and Black-winged Pratincole (*Glareola nordmanni*), listed as near threatened, and the optimal breading and foraging habitat for Chestnut-banded Plover (Charadrius pallidus) and Greater Painted-snipe (*Rostratula benghalensis*), both also listed as near threatened. A number of other threatened and near threatened bird species such as Yellow-billed Stork (*Mycteria ibis*), Black Stork (*Ciconia nigra*) and Caspian Tern (*Hydroprogne caspia*), can be expected to frequent the pan during wet conditions.

As a result of the site inspections being done prior to the rainy season, these species were not found on site, however, due to the vegetation composition, this habitat is considered as optimal breeding and foraging habitat and can therefore be considered highly sensitive.

7.6.2.2. <u>The potential occurrence of species and Red data status of threatened and near threatened bird species</u>

Fourteen (14) threatened and/or near threatened bird species could potentially occur within the study area based on habitat and breeding preferences as well as on historical records. On account of the habitat availability on the study area as well as specific habitat preferences, at least eleven of these species have a high to medium probability of occurrence on the study area. These species included Ludwig's Bustard (*Neotis ludwigii*) (EN), Burchell's Courser (*Cursorius rufus*) (VU), Lanner falcon (*Falco biarmicus*) (VU), Greater flamingo (*Phoenicopterus roseus*) (NT), Lesser flamingo (*Phoeniconaias minor*) (NT), Greater painted snipe (*Rostratula benghalensis*) (NT), Chestnut-banded plover (*Charadrius paliidus*) (NT), Black-winged pratincole (*Glareola nordmanni*) (NT), Secretary bird (*Sagittarus serpentarius*) (VU), Abdim's

stork (*Ciconia abdimii*) (NT), Black stork (*Ciconia nigra*) (VU), Yellow-billed stork (*Mycteria Ibis*) (EN), Caspian tern (*Hydroprogne caspia*) (VU) and the White-backed vulture (*Gups africanus*) (CR).

A total of 14 threatened and/or near threatened bird species are thought to occur and/or have been recorded within and around the study area (Table 3). Nine of these are directly linked to the pan system habitat, however, the presence of these birds within or near the study area is reliant on there being water within the pan system. Since the field survey was conducted before the rainy season, none of these species were present.

7.6.3. Conclusion

Four distinct habitat units were identified during the site investigations. The sensitivity of the habitats were identified as Low (secondary grasslands and transformed areas), Moderately (primary grasslands) and Highly sensitive (pan system) depending on the habitat characteristics and likelihood of occurrence of threatened and near-threatened avifaunal species.

At least 14 threatened and/or near threatened bird species could sporadically visit and/or reside within the study area, of which eleven are judged to have a medium to high probability of breading and/or frequently visiting the study area. These species are highly specialized and restricted to their associated habitats as stipulated in this report. Therefore, care should be taken to accurately assess the study area before making any final conclusions on the occurrence or absence of the mentioned threatened and near threatened species.

Since the field survey was conducted before the rainy season, none of these species were present. As such it is recommended that further monitoring take place to record the prevalence of these species once the pan holds some water. It must also be noted that limited data on the occurrence of these species within and surrounding the study area has been collected. The fact that the data is so limited may have a major affect on the actual numbers of these species in the area, witch further constitutes additional monitoring of the study area. In addition, clear flight patterns to and from the surrounding pans must be assessed to determine potential red zones in terms of overhead powerlines and potential collisions.

7.7. Avifaunal Assessment (Detailed Assessment)

EMG was appointed as the Avifaunal Impact Assessment (AIA) specialists for the proposed development. It should be noted that a scoping avifaunal report was compiled by EMG as part of the DBAR phase of the proposed development. Subsequently, the Regime 2 AIA was undertaken in order to further illuminate on the avifaunal sensitivity of the proposed development areas. The findings of the original scoping report has been retained in this FBAR and the Regime 2 study undertaken will act as a supplementary component to the original study. The Regime 2 study aims to provide a more detailed approach to the identification of the specific species which would be affected by a solar farm development as well as associated infrastructure.

7.7.1. Methodology

The survey methodology took into consideration the best practice guidelines for avifaunal impact studies for solar developments as compiled by BirdLife South Africa (BLSA) (Jenkins et al, 2017), as adapted.

The site visits of the AIA were conducted for 7 days in total (27 September 2021, 11 October 2021, 18 January 2022 and 9-17 March 2022) by creating 10 transects across the study area, ensuring that all major habitats are traversed. Each transect was counted twice a day during the 7 day time period. During each transect, all species on both sides of the observer was recorded.

The variables recorded per species were the species, number of birds, date, start and end time, the weather, temperature and the behaviour of the animals.

All sightings of priority species in and around the study area was also recorded.

The 5 focal points identified included 3 natural pans and 2 natural grassland areas (moderately sensitive) as identified in the ecological assessment were monitored once in the 7 day duration.

7.7.2. Avifaunal habitat identified

Similarly to the initial assessment undertaken, four (4) avifaunal habitats (See Figure 7-11 above) were identified which includes: Primary Grassland, Secondary grassland, transformed areas and the pan system. The center of the focal study area can be is described as uninterrupted primary grassland habitat which excludes the previously cultivated areas such as the secondary grassland and the transformed area. The pan is located at the border of the study area in the north and described as the pan system habitat.

7.7.2.1. Primary Grassland

This habitat is located in the middle of the study area and contains grasses such as *Aristida congesta* subsp. *Barbicollis, Themeda triandra, Eragrostis lehmanniana, Echloromelas, Aristida bipartite* and *Eragrostis curvula*. The habitat is considered a low to medium avifaunal species richness because of the highly specialized environment. Species such as the Secretary Bird which is known to occur in the area and the threatened and near threatened Ludwig Bustard and the Lanner Falcon which have the potential to occur in this preferred habitat. Within this unique system several priority species were observed which include the Common Buzzard, Western Cattle Egret, Amur Falcon, Egyptian Goose, Pale Chanting Goshawk, Helmeted Guineafowl, Black headed Heron, Lesser Kestrel, black winged Kite, Northern black Korhaan, Melodious Lark and the Secretary Bird (Red data) were observed in the habitat.

Due to the good connectivity and unique species composition of this habitat it was classified as moderately sensitive.

7.7.2.2. Secondary Grassland

This habitat consists predominantly of grass and forb vegetation and is dominated by *Cynodon dactylon, Eragrostis paspaloides, Panicum coloratum, Setaria sphacelate* and *Themeda triandra*. The forb layer is dominated by *Cleome maculate, Commelina Africana, Commelina benghalensis, Helichrysum rugulosum, Hilliardiella hirsute, Ledebouria inquinate* and *Ledebouria revoluta*. The habitat is considered a low to medium avifaunal species richness because of the various anthropogenic disturbances. Various widespread birds are in this habitat which includes Bishops, Sparrows, Doves, Lapwings, Swallows, Cisticolas and Widowbirds. Even though several priority birds are expected to utilize this habitat none solely reply on it for their survival. The priority birds observed within this habitat includes Western Cattle Egret, Amur Falcon, Helmeted Guineafowl, Lesser Kestrel, Black winged kite and Northern korhaan. The connectivity of this habitat is very low due to the surrounding areas which are transformed by means of residential housing and agriculture. This habitat also indicated disturbances such as over grazing, grass harvesting, unpaved roads and tracks, trampling and alien vegetation encroachment were observed. Due to the afore mentioned disturbances this habitat was classified as a sub-optimal habitat for the threatened and near threatened bird species identified and a low sensitivity.

7.7.2.3. Pan system

This habitat is located along the margin of a large pan which borders the northern section of the focal study area. This habitat consists of grassy shrubs and karroid shrubs which includes *Chrysocoma ciliate*, *Pentzia globose* and *Lycium crinium* which is a characteristic of the shrubs whereas *Themeda triandra* and *Cymbopogon p*ospischilii are distributed irregularly. The occurrence of other gramoids such as *Eragrostis chloromelas*, *Eragrostis curvula* and *Aristida congesta subsp. barbicollis*. This habitat was observed to have a poor herbaceous layer and poor ground cover. Tall trees were scares in this habitat and only located in the periphery. Various Free State bird species were observed in the area of the pan with the tall trees.

The pan is described to be deep and obvious in the landscape. When wet the pan provides a habitat for a large number of waterfowl and waders. The pan functions an ideal foraging habitat for large species such as Lesser Flamingo, Greater Flamingo and the Black-winged Pratincole which are all listed as near threatened. The habitat provides an optimal foraging area for the Chestnut banded Plover and Greater Pinted snipe which are listed as near threatened. There are other threatened and near threatened species that are also expected at the pan during wet conditions such as the Yellow billed stork, Black Strok, Caspian Tern, Black Harrier and African Marsh Harrier. Many priority birds are also expected in this area such as the Pied Avocet, African Darter, White faced Whistling Duck, Lesser Flamingo, Greater Flamingo, Fairy Flycatcher, Egyptian Goose, Spur winged Goose, Grey Heron, African Sacred Ibis, Glossy Ibis, Hadada Ibis, Lesser Spotted Eagle Owl, Three banded Plover, Marsh Sandpiper, Red billed Teal, Whiskered Tern, Kittlit's Plover and Little Stint. This habitat was described as an optimal avian breeding and foraging habitat which was considered irreplaceable as a number of priority species were observed. This habitat is also considered highly sensitive.

7.7.3. Surface water

A portion on the eastern section of the study area contains several poorly defined drainage areas and small depressions. This area is not a delineated watercourse or wetland however performs a drainage function. This area is completely transformed by crop cultivation and areas which are natural do not possess any wetland bird species nor ecological functions. These areas possess no water and are not expected to either in high rainfall seasons hence birds will not utilize this area for drinking or bathing.

On the contrary a small section to the south eastern portion of the site small wetland areas are present which contain general drainage from west to east (Figure 7-12). As a result it possesses better wetland conditions but temporary wetness. This area could be used extensively by birds such as large raptors to drink and bath. This seasonal small wetland is considered preferred habitats for a number of rallids and waterfowl for breeding. Hence a 100m buffer is proposed around small wetlands to ensure safe take off and landing and enough space for raptors to hunt birds and other prey in fast ariel pursuit.

Largest surface water feature in the study area is the pan which is also listed as an NFEPA wetland. The pan including the calcrete cliffs provide a preferred habitat for a number of priority birds particularly when it holds water. A number of birds visit the pan for both breeding and foraging purposes during high rainfall seasons. The influx of eater birds to the pans during high rainfall events will also increase a number of priority predatory species. This habitat is considered highly sensitive and possesses a high ecological sensitivity. Hence a 200 m buffer is proposed to ensure the ecological function and high sensitivity is not negatively impacted on.

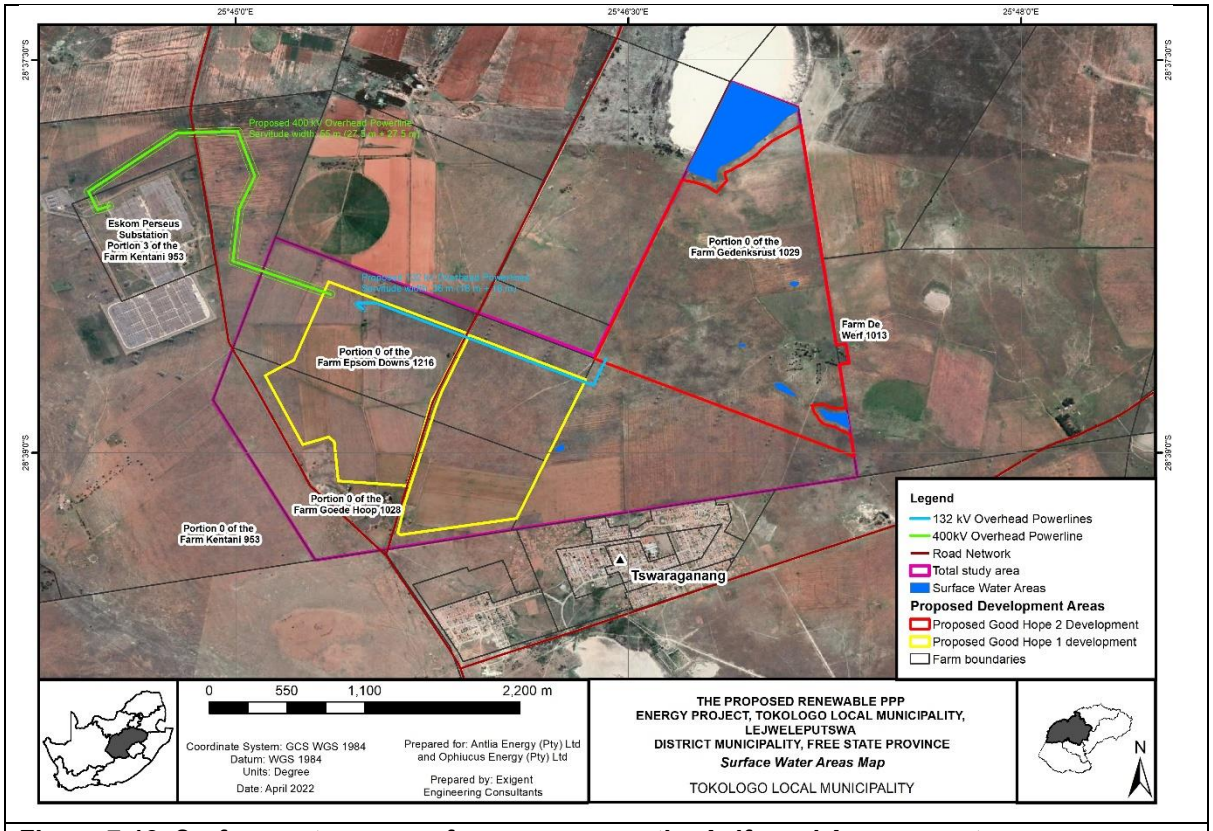

Figure 7-12. Surface water areas of concern as per the Avifaunal Assessment.

7.7.4. Southern African Bird Atlas 2

The SABA2 data identified 183 bird species which could occur in the broader area.

On site a total of 378 individual birds were counted at the 5 focal point in the course of the surveys and 731 during the walked transects.

7.7.5. Identification of the Environmental Sensitivities

7.7.5.1. High sensitivities

These areas include areas within the 100m seasonal wetlands and within 200 m of the ephemeral pan. These areas are considered highly sensitive because surface water in a semi-arid area is considered highly important particularly for avifauna such as the red data Lanner Falcon, Secretary Bird and Ludwigs Bustard. The small wetlands could be important for large raptors to drink and bath and require a 100 m buffer.

7.7.5.2. Moderate Sensitivity

Primary Grass habitat is classified as moderately sensitive as it is largely untransformed and supports 26 priority species of which six are Red Listed.

7.7.5.3. Low Sensitivity

The Secondary Grass habitat can be classified as low sensitivity because of the transformed areas. This habitat also holds a low to medium species richness because of anthropogenic disturbances, overgrazing, and cultivation. The Secondary grassland supports several priority species however these are adaptable and are not dependent on this habitat.

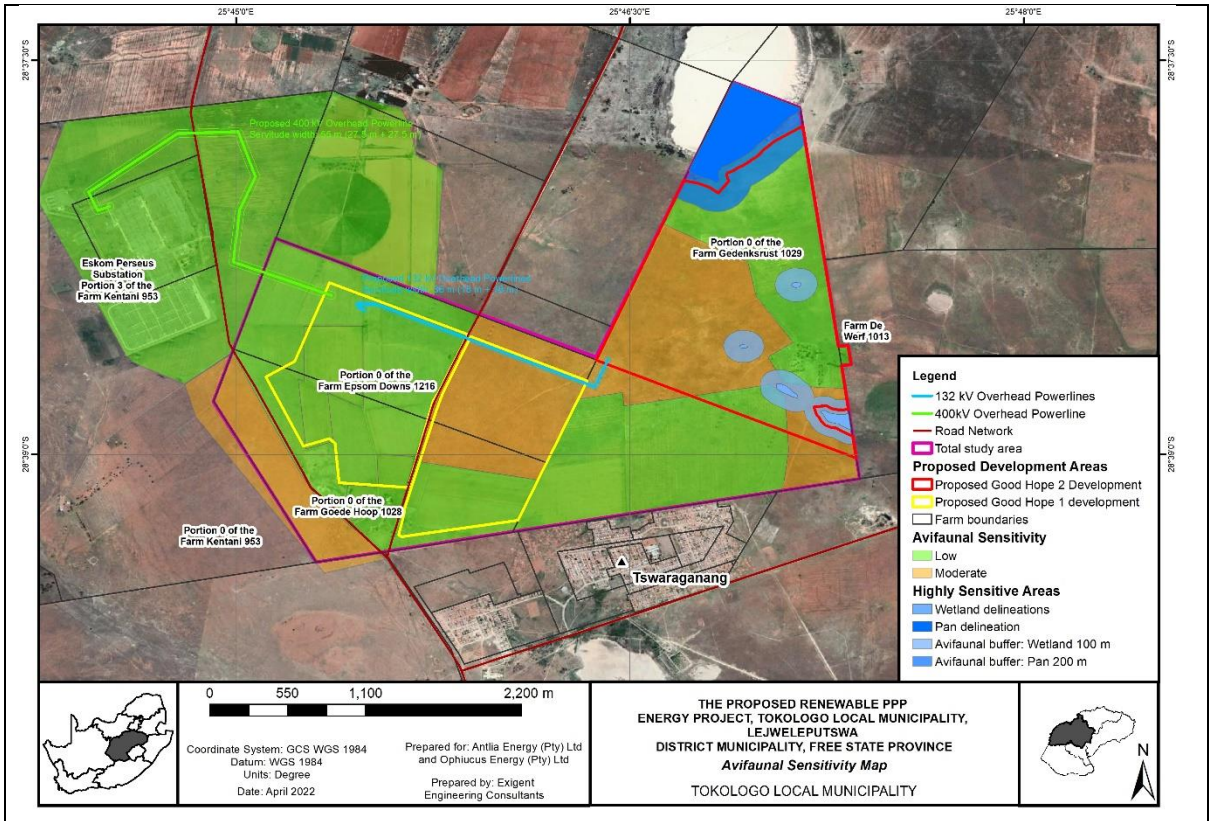

Figure 7-13. Avifaunal Sensitivities identified

7.8. Wetland delineation and functionality assessment

DPR Ecologists & Environmental Services were appointed in order to conduct the wetland delineation and functionality assessment (Appendix F5). This study determines the presence of water sources and any associated wetland conditions in the study area and the likelihood that the development may impact on them.

7.8.1. Methodology

7.8.1.1. Literature reviews

In order to classify the general ecology of the study area, the Red Data List, Mucina & Rutherford (2006), the NBA (2018): South African Inventory of Inland Aquatic Ecosystems, the NBA (2018): Technical Report on the Inland Aquatic (Freshwater) Realm, NFEPA (2011), SWSA (2018), the SANBI (2011) List of threatened ecosystems, and the NEM:BA: List of threatened ecosystems and Threatened or Protected Species were consulted. In order to classify the vegetation located within the study area, the Red Data List, Mucina and Rutherford (2006) and various field guilds for vegetation and riparian species

identification were used. In order to obtain a methodology for the wetland delineation and identification, various handbooks and guides were consulted.

7.8.1.2. Survey

The site was assessed by means of transects and sample plots. During the survey rare and dominant species were noted, broad vegetation types present within the development site were determined, and the state of the environment and habitat was determined. The assessment of the watercourses were done through the following procedures:

- Desktop overview of the study area was done in order to determine possible watercourses and flow patterns. Thereafter determining transects and sample points.
- Possible sites identified during desktop review are surveyed on-site.
- Where a lateral transect is taken of a watercourse this is done from the water's edge, across the marginal, lower and upper zones and extended across the floodplain until the edge of the riparian zone is reached. Soil samples are taken at 10 meter intervals along the survey transect, or where a distinct transition into a different zone is observed.
- A survey of the plant species within each distinct riparian or wetland zone is undertaken and includes the identification of obligate wetland species, riparian species, terrestrial species, exotic species and the general species composition and vegetation structure which allows for an accurate description of the watercourse or wetland.
- Visual survey of the general topography which substantiates the presence of riparian zones and wetland forms are done and other general observations such as impacts on the system are made.
- This data is then used to determine the condition and the status of the watercourses and wetlands identified on site.
- The criteria used to assess the sites included the evaluation of the vegetation characteristics and condition and faunal characteristics.

7.8.2. Results

The study area contains the main, large pan system, drainage areas with interspersed depressions and a few artificial excavations and wetlands. Ten (10) watercourses (Figure 7-14) were identified within the boundaries of the study area and have been described in Table 7-3.

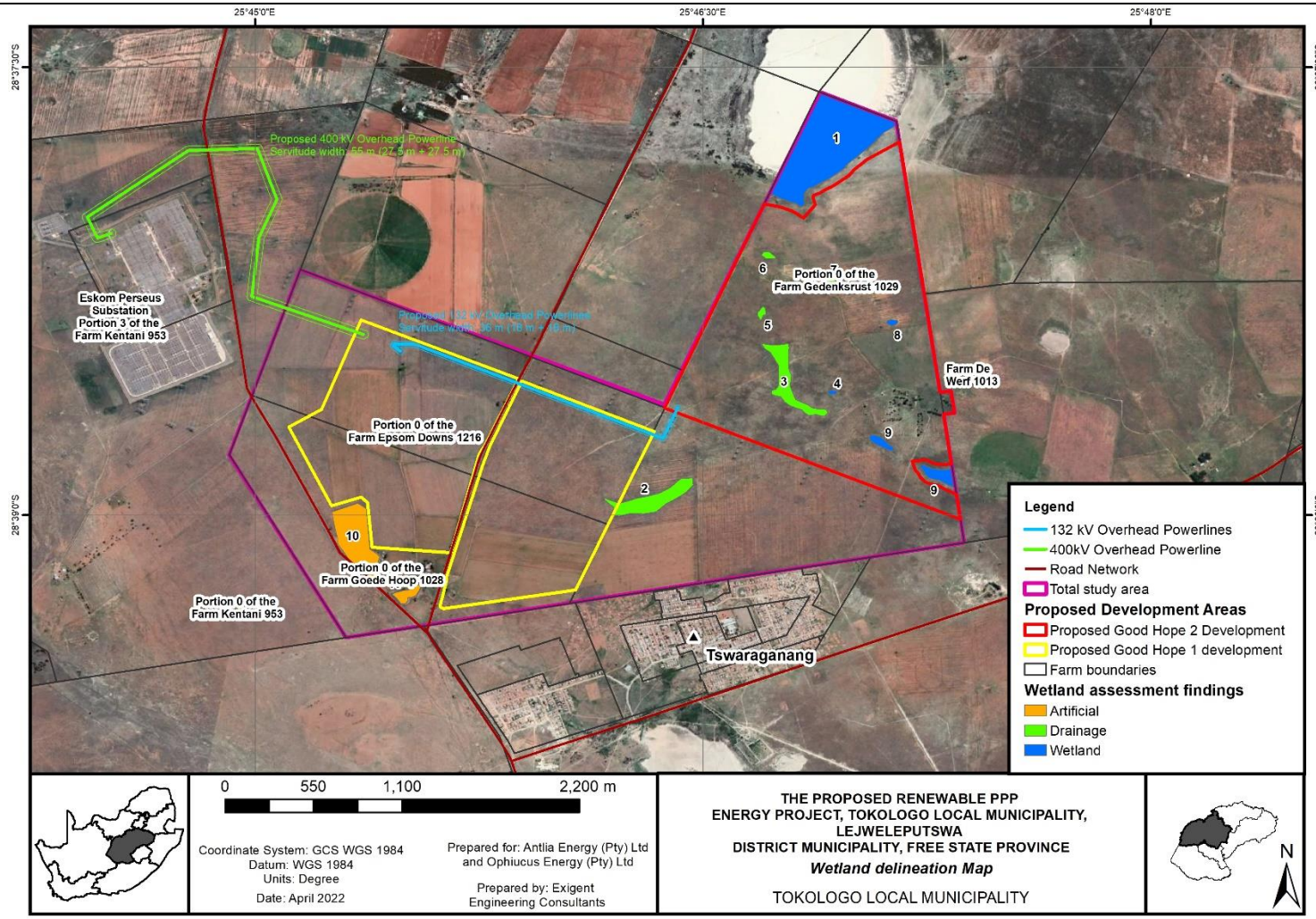

Figure 7-14. Wetlands delineated within the study area.

Table 7-3. Wetlands and watercourses identified within the study area.

Watercourse name	Coordinates of sampling	Flow regime	Description of watercourse	Biodiversity Sensitivity Rating (BSR)	Photograph
GOOD HOPE 1					
#1 Seasonal Pan – Main pan system in north-eastern corner of the site	S 28.628549°, E 25.783276° S 28.630764°, E 25.780208°	Seasonal	The largest and most significant surface water feature in the study area. This pan system has an approximate diameter of 1.2 km and is the most important wetland feature in the area. The pan is an endorheic system (no in- or outflows) and is fed by diffuse surface flow and groundwater inflow, largely from a catchment to the north of the pan. Large portions of the surrounding catchment have however been transformed by dryland crop cultivation and this will have a significant impact on it. This will include increased surface runoff rates due to the absence of vegetation and high concentrations of fertilizer runoff as well as some herbicide and pesticide contamination. These are however the only major impacts on the pan and the system seems to still be largely natural and unmodified. The pan forms a quite deep basin and is prominent in the landscape. The central basin is almost completely flat and without any vegetation and is a well-developed, hypersaline environment. The shores of the pan contain a variety of riparian grasses. From the calcrete cliff along the shore of the pan, a calcrete pebble habitat and outcrops occur which is considered as forming part of the riparian zone. The calcrete cliff, pebble habitat and outcrops form quite unique habitats and contain many rare and protected plant species with a variety of yet unidentified plants noted. It is quite possible that several unique species will occur in these habitats and consequently they are considered to have a high conservation value.	**BSR:** Very High **PES:** B; **EIS:** HIgh	

Watercourse name	Coordinates of sampling	Flow regime	Description of watercourse	Biodiversity Sensitivity Rating (BSR)	Photograph
			A few of the specialised, rare and protected plant species noted around the pan include the following: *Hertia ciliata* a relatively widespread species but is a habitat specialist, an unidentified species of the Apocynaceae family which could not be identified due to the time of year but is highly likely to be of conservation significance, *Titanopsis calcarea* a dwarf and highly specialised succulent which, although widespread is uncommon and this site and may also represent a substantial range extension and possibly the most eastern observation for it and a few other protected species such as *Orbea lutea* subsp. *lutea* and *Olea europaea* subsp. *africana*.		
#2 Drainage area – Central drainage area transformed by previous ploughing	S 28.649753°, E 25.770584°	Temporary	This is a poorly defined drainage area located within the central portion of the study area. The drainage area is situated in one of the old, cultivated fields and consequently the vegetation and soil profile has been transformed. It is however visible as a low point in the area and a higher moisture regime is clearly present here during the rainy season. It contains a very small central depression that contains faint wetland soil characteristics and a few wetland plants. The drainage area has no defined channel or border and is not visibly connected to any downstream areas though it is likely that groundwater flow will take place. The drainage area clearly drains from west to east and toward the eastern border of the site. Since this drainage area has been transformed from the natural condition, it is dominated by pioneer grasses which do not resemble the natural condition. The pioneer grasses, *Cynodon dactylon* and *Chloris virgata* dominate here. However, the riparian grass, *Eragrostis bicolor*, was also abundant, indicating that an increased moisture regime is	**BSR:** Moderate	

Watercourse name	Coordinates of sampling	Flow regime	Description of watercourse	Biodiversity Sensitivity Rating (BSR)	Photograph
			indeed present here. The small depression area also contains the sedge, *Shoenoplectus* sp., which is a wetland species. A soil sample taken within this depression also confirm feint mottling and confirms the presence of temporary wetland conditions.		
#3 Drainage area – Eastern drainage area in natural condition	S 28.642446°, E 25.779459°	None	This is a poorly defined drainage area located within the eastern portion of the study area. The drainage area and immediate surroundings still consists of primary, unmodified grassland and should also provide a good indication of the natural condition and functioning of these drainage areas. The drainage area is not clearly defined but is visible as an indistinct linear area where the grass composition is clearly different from the surroundings. Bare patches where silt deposition occurs, and surface water must be present for short periods are also visible. The drainage area also does not meet the requirements do be regarded as a watercourse or wetland but still clearly functions as part of the surface water drainage patterns on the site. Despite being largely natural the drainage area is still dominated by a variety of pioneer and riparian grasses. The pioneer grasses, *Aristida congesta* and *Chloris virgata* are abundant here while the riparian grass, *Eragrostis bicolor* dominates. Therefore, although the drainage area cannot be considered a watercourse or wetland, the presence of riparian grasses clearly indicates an increased moisture regime is indeed present here. Soil samples also indicated the absence of wetland conditions although a silt content does indicate the accumulation of surface water.	**BSR:** Moderate	

Watercourse name	Coordinates of sampling	Flow regime	Description of watercourse	Biodiversity Sensitivity Rating (BSR)	Photograph
#4 Depression – Associated with the eastern drainage area	S 28.643218°, E 25.782176°	Temporary	This is a poorly defined circular depression which is situated in close proximity to the central drainage area and associated with it. The depression and immediate surroundings still consist of primary, unmodified grassland. It has a very small size of approximately 40 meters diameter and is not well defined though a differing grass composition does cause it to be visibly different from the surroundings. Despite being poorly defined and not being large the small depression does fit within the characteristics of a depression wetland. Despite being largely natural the depression is still dominated by a pioneer grass, *Chloris virgata* and riparian grass, *Eragrostis bicolor*. A low vegetation diversity consisting of only two grass species is notable. The riparian grass, *Eragrostis bicolor*, was also abundant, indicating that an increased moisture regime is indeed present here. A soil sample taken within this depression also confirm feint mottling and confirms the presence of temporary wetland conditions.	**BSR:** Moderate	
#5 Depression – Series of three depressions in close proximity	S 28.638596°, E 25.778330°	None	This is a poorly defined circular depression which forms part of a series of three similar depressions situated in close proximity to each other. They are all situated in the north-eastern portion of the site. This depression of the only one of the three situated in primary, unmodified grassland and should therefore provide an indication of the natural condition and functioning. It has a very small size of approximately 70 meters diameter and is not well defined though a differing grass composition does cause it to be visibly different from the surroundings.	**BSR:** Moderate	

Watercourse name	Coordinates of sampling	Flow regime	Description of watercourse	Biodiversity Sensitivity Rating (BSR)	Photograph
			Despite being largely natural the depression is still dominated by the pioneer grasses *Eragrostis lehmanniana* and *Cynodon dactylon*. A low vegetation diversity consisting of only two grass species is notable. Of these two, *C. dactylon* is often associated with riparian areas but is also a pioneer species of disturbed areas and cannot in itself be regarded as an indicator of riparian conditions. It may however still indicate a slightly higher moisture regime than surrounding areas. A soil sample taken within this depression also indicate a high loam content without any indications of either riparian or wetland conditions.		
#6 Depression – Series of three depressions in close proximity	S 28.635519°, E 25.778548°	None	This is a poorly defined circular depression which forms part of a series of three similar depressions situated in close proximity to each other. This depression is one of the depressions situated in previously ploughed grassland and is therefore completely transformed from the natural conditions. It has a very small size of approximately 60 meters in diameter and is also not readily distinguishable from the surroundings. The grass composition is also not differing in any significant degree from the surroundings, most probably a result of the transformation caused by ploughing. The depression also does not contain vegetation or soil indicators identifying it as being a depression wetland Probably as a result of the transformed condition of the depression, it is dominated by a single pioneer grass, *Aristida congesta*. A soil sample taken within this depression also indicate a high loam content without any indications of either riparian or wetland conditions.	**BSR:** Moderate	

Watercourse name	Coordinates of sampling	Flow regime	Description of watercourse	Biodiversity Sensitivity Rating (BSR)	Photograph
#7 Depression – Series of three depressions in close proximity	S 28.636914°, E 25.782062°	None	This is a poorly defined circular depression which forms part of a series of three similar depressions situated in close proximity to each other. This depression is one of the depressions situated in previously ploughed grassland and is therefore completely transformed from the natural conditions. It has a somewhat larger extent (approximately 80 meters) but is still small and is also not readily distinguishable from the surroundings. The grass composition is also not differing in any significant degree from the surroundings, most probably a result of the transformation caused by ploughing. Furthermore, the depression also does not contain vegetation or soil indicators identifying it as being a depression wetland. Probably as a result of the transformed condition of the depression, it is dominated by a single pioneer grass, *Eragrostis lehmanniana*. A soil sample taken within this depression also indicate a high loam content without any indications of either riparian or wetland conditions	**BSR:** Moderate	
#8 Depression – Clearly defined but transformed depression	S 28.639301°, E 25.785518°	Temporary	The depression has previously been ploughed and forms part of transformed grassland and is therefore completely transformed from the natural conditions. It has a very small size of approximately 40 meters diameter but is quite clearly defined and visibly different from the surroundings. Despite being transformed it still fits within the characteristics of a depression wetland. Being transformed, the depression contains many pioneer species such as the grass, *Chloris virgata*, while scattered specimens of the invasive tree, *Prosopis glandulosa* also indicates significant levels of disturbance. The depression also contains several wetland plants such as the grass,	**BSR:** High	

Watercourse name	Coordinates of sampling	Flow regime	Description of watercourse	Biodiversity Sensitivity Rating (BSR)	Photograph
			Panicum schinzii, the sedge, *Schoenoplectus* sp. and the herb, *Platycarphella parvifolia*. These also confirm clear wetland conditions. A soil sample taken within this depression also confirm clearly oxidised rootzones and mottling and confirms the presence of temporary wetland condition		
#9 Drainage area – South-eastern drainage area in natural condition	S 28.646226°, E 25.785257°	Temporary	This is a poorly defined drainage area located in the southeastern corner of the study area. The drainage area and immediate surroundings still consists of primary, unmodified grassland and should also provide a good indication of the natural condition and functioning of these drainage areas. The area drains from west to east and this drainage area therefore forms the downslope portion or where the surface runoff from the western portion of the site accumulates. As a result, it also contains better defined wetland conditions, albeit also only of temporary wetness. Despite these wetland conditions, the drainage area still does not contain sufficient characteristics for it to be regarded as either a depression wetland or watercourse. It clearly functions as part of the surface drainage pattern of the site and since it forms the "main" drainage area, it is also considered to have a somewhat higher level of importance. Despite being largely natural the drainage area is still dominated by a variety of pioneer and riparian grasses. The pioneer grass, *Chloris virgata* is abundant here while the riparian grass, *Eragrostis bicolor* dominates. In addition, wetland plants are scattered within the drainage area and include the sedge, *Schoenoplectus* sp. and the herb, *Platycarphella parvifolia*. These also confirm the presence of wetland conditions although only of temporary wetness.	**BSR:** High	

Watercourse name	Coordinates of sampling	Flow regime	Description of watercourse	Biodiversity Sensitivity Rating (BSR)	Photograph
			A soil sample taken within the drainage area also indicated feint mottling which indicates a temporary zone of wetness. It should therefore be considered that this drainage area be excluded from the development. Where this is not possible, will require a higher level of mitigation to be implemented.		
#10 Artificial wetlands	S 28.654837°, E 25.758272° S 28.651411°, E 25.754884° S 28.642990°, E 25.760168°	Artificial	These three wetlands have been formed as a result of artificial, human induced modifications in the landscape and are therefore not considered natural watercourses or wetlands. Due to modifications, they may contain surface water for some periods which may form artificial wetland conditions though they are not considered to play any role in the surface drainage pattern of the site and are therefore not considered to be of consequence to the development.	**BSR:** Low	

7.8.3. Conclusion

Large portions of the site have been transformed by crop cultivation therefore the portions of remaining grassland must be regarded as being of high conservation value and the pan system which is listed as a National Freshwater Ecosystem Priority Area (NFEPA) contributes significantly toward the conservation value of the area.

The proposed development of the GH1 and GH2 will require clearance of the vegetation and surface disturbance of a large area. The anticipated impacts would therefore be high, especially where watercourses and wetlands occur, and the development will have to take this into consideration. The study area still contains large portions of natural and unmodified grassland but with equally large portions having been transformed by ploughing but now being fallow. Consequently, wetlands in the area also range from natural to completely transformed.

The site itself also contains a large pan system in the northeast on HG2, while the southern portions contain several small pans and drainage areas. These drainage areas are not well defined and together with previous transformation, does complicate the delineation of wetland areas. These areas do however still form part of the surface drainage patterns and will be included within the assessment. Interspersed within this surface drainage patterns, small depressions have formed with a few also containing seasonal wetlands conditions. Two larger depression wetlands also occur in the south-eastern corner of the site and though they are not distinct systems, they must be regarded as wetland areas.

The large pan system has clearly been identified as the main wetland system on the site and is considered highly sensitive and being of high conservation value. The pan should therefore be completely excluded by the development and in order to ensure no impacts on it occur, a 20 m buffer zone should also be maintained around the riparian zone of the pan. The pan and buffer zone should also be regarded as no-go areas and no construction or operational activities including stockpiling, clearing, laydown areas, vehicle movement or any other associated activities should occur in or near this pan system. As long as this is implemented successfully, the anticipated risk on the pan should remain low. Furthermore, the catchment of the pan lies outside the development footprint and any impact that the development will have on surface runoff, infiltration and erosion should not have an effect on the pan.

The eastern portion of the site contains several poorly defined drainage areas and associated small depressions (Figure 7-14). The majority of these areas have been completely transformed by previous for crop fields and that those that are still natural also do not contain a significant diversity of species or perform important ecological functions. Inclusion of these drainage areas within the development footprint should therefore not result in significantly high impacts and should therefore be confined to a low risk. However, this is subject to the development implementing a comprehensive storm water management system which should ensure that the surface runoff patterns are retained as is, especially pertaining to drainage areas, and that the development does not contribute toward increased surface flow, erosion and any impacts on downslope areas.

The exception to the above is the drainage area occurring in the south-eastern corner of the site (Figure 7-14). The site has a general surface drainage from west to east and this results in the culmination of surface runoff in the south-eastern portion of the site. As a result, it also contains better defined wetland conditions, albeit also only of temporary wetness. It clearly functions as part of the surface drainage

pattern of the site and since it forms the "main" drainage area, it is also considered to have a somewhat higher level of importance. The development should therefore consider excluding this drainage area from development but where this is not possible, will require a higher level of mitigation to be implemented. Should the development manage to exclude this area the risk will also be retained as low. However, should the development not be able to exclude this drainage area, it will result in a higher level of impact which can be regarded as a moderate risk. In this instance the development will also have to implement the necessary storm water structures and erosion measures to ensure that runoff generated by the development does not lead to impacts in the downslope areas.

8. Impact Assessment

8.1. Methodology in assessing potential impacts

The impacts of the proposed development and each alternative were assessed according to the criteria in Table 8-1 and will include the degree to which these impacts can be reversed, may cause irreplaceable loss of resources and can be avoided, managed or mitigated.

Table 8-1. Criteria by which impacts were assessed.

ASPECT	IMPACT RATING
Status of the impact: A statement of whether the impact is positive (a benefit), negative (a cost), or neutral.	
Direct impacts	Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.
Indirect impacts	Impacts of an activity are indirect or induced changes that may occur as a result of the activity. These types of impacts include all the potential impacts that do not **manifest** immediately when the activity is undertaken or which occur at a different place as a result of the activity.
Cumulative impacts	Cumulative impacts are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.
Nature of the impact: The evaluation of the nature is impact specific. Most negative impacts will remain negative, however, after mitigation, significance should reduce: • Positive. • Negative.	

ASPECT	IMPACT RATING

Extent:

A description of whether the impact would occur on a scale limited to within the study area (local), limited to within 5 km of the study area (area); on a regional scale i.e. Tokologo Local Municipality & Free State (region); or would occur at a national or international scale.

Local	1
Area	2
Region	3
National	4
International	5

Duration:

A prediction of whether the duration of the impact would be Immediate and once-off (less than one month), more than once, but short term (less than one year), regular, medium term (1 to 5 years), Long term (6 to 15 years), Project life/permanent (> 15 years, with the impact ceasing after the operational life of the development, or should be considered as permanent).

Immediate	1
Short term	2
Medium term	3
Long term	4
Project life/permanent	5

Severity (extent +duration + intensity)

Intensity: This provides an order of magnitude of whether or not the intensity (magnitude/size/frequency) of the impact would be negligible, low, medium, high or very high. This is based on the following aspects:

- an assessment of the reversibility of the impact (permanent loss of resources, or impact is reversible after project life);
- whether or not the aspect is controversial;
- an assessment of the irreplaceability of the resource loss caused by the activity (whether the project will destroy the resources which are easily replaceable, or the project will destroy resources which are irreplaceable and cannot be replaced);
- the level of alteration to the natural systems, processes or systems.

Negligible	The impact does not affect physical, biophysical or socio-economic functions and processes.	1
Low/potential harmful	The impact has limited impacts on physical, biophysical or socio-economic functions and processes.	2
Medium/slightly harmful	The impact has an effect on physical, biophysical and socio-economic functions and processes, but in such a way that these processes can still continue to function albeit in a modified fashion.	3
High/Harmful	Where the physical, bio-physical and socio-economic functions and processes are impacted on in such a way as to cause them to temporarily or permanently cease.	4
Very high/Disastrous	Where the physical, bio-physical and socio-economic functions and processes are highly impacted on in such a way as to cause them to permanently cease.	5

Incidence (frequency + probability)

Frequency: This provides a description of any repetitive, continuous or time-linked characteristics of the impact: Once Off (occurring any time during construction or operation); Intermittent (occurring from time to time, without specific periodicity); Periodic (occurring at more or less regular intervals); Continuous (without interruption).

Once Off	Once	1
Rare	1/5 to 1/10 years	2
Frequent	Once a year	3
Very frequent	Once a month	4
Continuous	≥ Once a day/ per shift	5

Probability of occurrence: A description of the chance that consequences of that selected level of severity could occur during the exposure.

Highly unlikely	The probability of the impact occurring is highly unlikely due to its design or historic experience.	1
Improbable	The probability of the impact occurring is low due to its design or historic experience.	2
Probable	There is a distinct probability of the impact occurring	3
Almost certain	It is most likely that the impact will occur	4
Definite	The impact will occur regardless of any prevention measures	5

Risk rating	The risk rating is calculated based on input from the above assessments. The incidence of occurrence is calculated by adding the Extent of the impact to the duration of the impact. The Severity of the impact is calculated based on input from the extent of the impact, the duration and the intensity. **Risk** = Severity (extent +duration + intensity) x Incidence (frequency + probability) **Significance**: The significance of the risk based on the identified impacts has been expressed qualitatively as follows: ○ **low** – the impact is of little importance/insignificant, but may/may not require minimal management ○ **medium** - the impact is important, management is required to reduce negative impacts to acceptable levels. ○ **high** - the impact is of great importance, negative impacts could render development options or the entire project unacceptable if they cannot be reduced to acceptable levels and/or if they are not balanced by significant positive impacts, management of negative impacts is essential.

Low risk	0 – 50
Medium risk	51 – 100
High risk	101 - 150
Low positive	0 – 50
Medium positive	51 – 100
High positive	101 - 150

8.2. Assessment of Impacts and risks

In terms of the identification of issues and associated impacts for the proposed project, the following should be noted:

- The issues have been identified by the EAP team, the proponent, landowners and Interested and Affected Parties;
- A broad definition of the "environment" is considered, which includes the natural (biotic and abiotic), social, cultural, economic and built environments;
- Certain issues and associated impacts have been identified as potentially occurring, but their occurrence is not definite. However, they need to be identified to inform decision-making and to enable the relevant parties to proactively address them should they occur, or prevent them from occurring;

- Both negative and positive impacts[1] are identified and described.

The following specialist studies were commissioned:

- Wetland delineation and functionality assessment;
- Ecological impact assessment;
- Avifaunal impact assessment;
- Heritage Impact Assessment report;
- Agricultural impact assessment and
- Visual impact assessment.

The Specialist Studies required to assess potentially significant impacts identified during the BAR are included as Appendix F. These studies were undertaken by independent professionals regarded as specialists in their specific disciplines. The requirements for specialist reports stipulated in Appendix 6 of the GNR326 of 2017, as amended, of NEMA have been complied with.

8.3. Mitigation and management actions for the proposed development

An EMPr (Appendix I of this final BAR) has been prepared in accordance with Appendix 4 of the R326 of 2017, as amended, of NEMA and includes the following:

- Details and expertise of the person who prepared the EMPr.
- Information on any proposed management or mitigation measures that was taken to address the environmental impacts that have been identified in the BAR, including environmental impacts or objectives in respect of planning and design, pre-construction and construction activities, operation or undertaking of the activity, rehabilitation of the environment, and closure (where relevant).
- A detailed description of the aspects of the activity that are covered by the EMPr.
- An identification of the persons who will be responsible for the implementation of the measures.
- Where appropriate, time periods within which the measures contemplated in the EMPr must be implemented.
- Proposed mechanisms for monitoring compliance with the EMPr and reporting thereon.

[1] An environmental impact, whether adverse or beneficial, is defined as a change to the environment.

9. Key Impacts and Assessment thereof

Due to this application submitted as a combined application as per Regulation 11(4) with the issuing of multiple environmental authorisations of Regulation 25(1) and (2) of the EIA Regulations, 2014, as amended, the impact assessment makes specific reference to each project separately. In some instances, the impacts will be the same and it will therefore be indicated as such.

9.1. Construction phase

Table 9-1. Impacts associated with the construction phase of the proposed development.

PREFERRED ALTERNATIVE

IMPACT	**Ecological Assessment (excluding avifaunal): Habitat loss**

Habitat loss and fragmentation is the leading cause of the global biodiversity crisis. The removal of crucial environmental units will lead to the destabilization of the entire ecosystem and eventually ecological breakdown. The proposed development will see the transformation of a relatively large portion of both disturbed and pristine Vaal-Vet Sandy Grassland (EN) vegetation. The mentioned pristine grassland areas are indicated as CBA 1 zones, which are vital to meet conservation targets for endangered ecosystems (Collins, 2015).

GH1 AND GH2									
Impact	**Type**	**Severity**			**Incidence**		**Risk class**		
		Extent	**Duration**	**Intensity**	**Frequency**	**Probability**	**Before mitigation**		**After mitigation**
Negative	Direct	1	3	3	4	5	63	**MEDIUM**	**LOW**
Cumulative impact								**MEDIUM**	**LOW**

COMMENT/MITIGATION:

- Development may only occur within the demarcated areas.
- Areas of high sensitivity must be avoided.
- Ideally, the development should take place in the disturbed grassland areas if possible.
- Post-development open areas should be revegetated and kept free of exotic plant species.
- Vehicle movement should strictly stay on designated dirt roads.
- Pre-construction walk should be done to verify any species of conservation concern prior to the commencement of vegetation clearing.

IMPACT	**Ecological Assessment (excluding avifaunal): Loss of indigenous faunal and floral diversity**

Indigenous vegetation has a far greater conservation value than that of exotic species. Indigenous species have adapted to the surrounding environment and have established many stable networks of energy transfer. The removal of indigenous species disrupts this balance which has formed over many years. The proposed developments will result in an overall loss of indigenous species.

GH1 AND GH2									
Impact	**Type**	**Severity**			**Incidence**		**Risk class**		
		Extent	**Duration**	**Intensity**	**Frequency**	**Probability**	**Before mitigation**		**After mitigation**
Negative	Direct	1	3	3	4	5	63	**MEDIUM**	**LOW**
Cumulative impact								**MEDIUM**	**LOW**

COMMENT/MITIGATION:

- Removal of indigenous flora must be kept to a minimum.
- Disturbance related activities may only occur in the demarcated area.
- Vehicle movement must be kept on designated dirt roads.
- Hunting/trapping of fauna is strictly prohibited.
- Post-development open areas should be revegetated and kept free of exotic plant species.
- Vehicles may only move within the demarcated space of the development area.

PREFERRED ALTERNATIVE

- Pre-construction walk should be done to verify any species of conservation concern prior to the commencement of vegetation clearing.
- **GH2:** Disturbance activities may not encroach near the large pan or the delineated buffer area.

IMPACT | **Ecological Assessment (excluding avifaunal): Loss of protected floral and faunal species**

Protected species have been assigned protected status either nationally or provincially. These species are of unique conservation concern for many purposes. These include socioeconomic importance, scarcity, limited distribution and ecological significance. Removing these species should be avoided at all costs. If removal is unavoidable, the necessary permits should be acquired for their removal and translocation if possible.

GH1 AND GH2

Impact	Type	Severity			Incidence		Risk class		
		Extent	Duration	Intensity	Frequency	Probability	Before mitigation		After mitigation
Negative	Direct	1	3	4	3	4	56	MEDIUM	LOW
Cumulative impacts								MEDIUM	LOW

COMMENT/MITIGATION:

- The removal of protected species should be avoided if possible.
- Protected plant species should be demarcated prior to construction activities.
- All construction staff should be informed on species of particular conservation concern.
- **GH2:** Disturbance activities may not encroach near the large pan or the delineated buffer area.

IMPACT | **Ecological Assessment (excluding avifaunal): Invasive plant species**

The disturbance of the natural vegetation by the proposed activities may increase the spread of exotic species. Alien and invasive species are already a problem in the project area and utmost care should be taken not to disperse and increase the colonisation of these species.

GH1 AND GH2

Impact	Type	Severity			Incidence		Risk class		
		Extent	Duration	Intensity	Frequency	Probability	Before mitigation		After mitigation
Negative	Direct	1	3	4	3	4	56	MEDIUM	LOW
Cumulative impacts								MEDIUM	LOW

COMMENT/MITIGATION:

- A monitoring program should be compiled to remove exotic vegetation and maintain open space areas free from exotic invasions during construction; and
- Successful re-vegetation is crucial to stabilize soils and limit infestation by invasive alien plant species. Rehabilitation should be undertaken on a progressive basis in these areas.
- Natural open spaces outside the development footprint should be left in their undeveloped state and any existing or new exotic vegetation within the development footprint should be eradicated.
- **GH2:** Within proximity to pan system, successful re-vegetation is crucial to stabilize soils and limit infestation by invasive alien plant species.

IMPACT | **Ecological Assessment (excluding avifaunal): Land transformation/Veld fire**

It is expected that the proposed development will cause considerable habitat transformation and therefor a reduction of local species diversity. The proposed development will see to the transformation of an Endangered Ecosystem, Vaal-Vet Sandy Grassland. The pristine grassland areas are indicated as CBA1 zones, which are vital to meet conservation targets for endangered ecosystems. Due to the vegetation of the surrounding area being grasslands (both primary and secondary), the area is prone to veld fires.

GH1 AND GH2

Impact	Type	Severity			Incidence		Risk class		
		Extent	Duration	Intensity	Frequency	Probability	Before mitigation		After mitigation
Negative	Direct	3	2	5	2	3	50	LOW	LOW

PREFERRED ALTERNATIVE		
Cumulative impacts	**LOW**	**LOW**

COMMENT/MITIGATION:

- Development may only occur within the demarcated area.
- Areas of high sensitivity must be avoided.
- Ideally, the development should take place in the disturbed grassland areas if possible.
- Post-development open areas should be revegetated and kept free of exotic plant species.
- Vehicle movement should strictly stay on designated dirt roads.
- **GH2:** Disturbance activities may not encroach near the large pan or the delineated buffer area.

IMPACT	**Ecological Assessment (excluding avifaunal): Loss of sensitive ecosystems**

It is expected that the proposed development will cause considerable habitat transformation and therefor a reduction of local species diversity. The proposed development will see to the transformation of an Endangered Ecosystem, Vaal-Vet Sandy Grassland (Gh10). Three (3) vegetation units within the primary grasslands (natural, undisturbed state of Gh10) were identified as part of the ecological impact assessment conducted for the proposed developments.

GH1 AND GH2:

Impact	**Type**	**Severity**			**Incidence**		**Risk class**		
		Extent	**Duration**	**Intensity**	**Frequency**	**Probability**	**Before mitigation**		**After mitigation**
Negative	Direct	1	3	5	2	4	54	**MEDIUM**	**MEDIUM**
Cumulative impacts								**MEDIUM**	**MEDIUM**

COMMENT/MITIGATION:

- Development may only occur within the demarcated area.
- Areas of high sensitivity must be avoided.
- Ideally, the development should take place in the disturbed grassland areas if possible.
- Post-development open areas should be revegetated and kept free of exotic plant species.
- Vehicle movement should strictly stay on designated dirt roads.
- **GH2:** Disturbance activities may not encroach near the large pan or the delineated buffer area.

IMPACT	**Ecological Assessment (excluding avifaunal): Hydrological impacts**

This refers to any alterations in the quantity, timing and distribution of water inputs and through flows within the drainage line. Construction activities associated with bulk earthworks (such as excavations, stockpiling, reshaping, back-filling and compaction) in the catchment area feeding the river can alter natural patterns of surface runoff reaching water resources downslope/downstream. Changes in flow patterns reaching aquatic ecosystems does not only affect hydrological functionality and thus ecosystem integrity but may lead to erosion and sedimentation through increased runoff velocities linked to concentrated flow paths created during construction.

GH1 AND GH2

Impact	**Type**	**Severity**			**Incidence**		**Risk class**		
		Extent	**Duration**	**Intensity**	**Frequency**	**Probability**	**Before mitigation**		**After mitigation**
Negative	Direct	1	3	5	3	4	63	**MEDIUM**	**LOW**
Cumulative impacts								**MEDIUM**	**LOW**

COMMENT/MITIGATION:

- Bare areas where vegetation has been removed pose a risk of becoming a sediment load into river during heavy rainfall or windy conditions. Bare areas should therefore be covered during such events.
- Any potential large sediment loads (i.e. stockpiles) must be contained by covering them.

PREFERRED ALTERNATIVE

- Where required, temporary stormwater management structures must be used during construction.
- **GH2:** Disturbance activities may not encroach near the large pan or the delineated buffer area.

IMPACT	**Agricultural Assessment: Loss of high agricultural potential ground**

The Agricultural potential study concludes by stating that even though 70% of the study area's land/soil capability is considered medium-high potential according to NARASA, climatic limitations greatly influence the site's dry crop cultivation potential. The NARASA indicate that 70% of the study area's soil is excellent irrigation soils, and the total area is included as HPAA, and should thus be reserved for agricultural purposes. Climatic conditions greatly limit dry crop cultivation; however, irrigated crop cultivation potential will be very high if a suitable water source is identified. The probability of identifying a water source suitable for optimal irrigated crop production within the study area's is considered low.

GH1 AND GH2

Impact	**Type**	**Severity**			**Incidence**		**Risk class**		
		Extent	**Duration**	**Intensity**	**Frequency**	**Probability**	**Before mitigation**		**After mitigation**
Positive	Direct	1	5	4	2	5	70	**MEDIUM**	**MEDIUM**
Cumulative impacts								**MEDIUM**	**MEDIUM**

COMMENT/MITIGATION:

- There are no additional mitigation measures required, over and above what has already been included in the Generic EMPr for overhead electricity transmission and distribution infrastructure as per Government Notice 435, which was published in Government Gazette 42323 on 22 March 2019.

IMPACT	**Avifaunal Assessment: Displacement due to disturbance associated with the construction of the solar PV plants and associated infrastructure**

The Noise movement associated with the construction activities at the PV footprint will be a source of disturbance which would lead to the displacement of avifauna from the area.

GH2

Impact	**Type**	**Severity**			**Incidence**		**Risk class**		
		Extent	**Duration**	**Intensity**	**Frequency**	**Probability**	**Before mitigation**		**After mitigation**
Negative	Direct	2	5	3	3	5	80	**MEDIUM**	**LOW**
Cumulative impacts								**LOW**	**LOW**

COMMENT/MITIGATION:

- Implementation of a Construction EMPr must be undertaken, and the activities are to be overseen to ensure that the EMPr is implemented and enforced via site audits and inspection reports and record of any non-conpliances.
- Ensure that construction personnel are made aware of the impacts relating to offroad driving.
- Construction access roads must be demarcated clearly. Inspections are to be done to verify.
- A Habitat Restoration Plan is to be developed by an appointed rehabilitation specialist.
- Site inspections are to be done in order to monitor progress of the Habitat Restoration Plan.
- Adaptive management is required to ensure that the Habitat Restoration Plan's goals are met.
- Activities should as far as possible be restricted to the footprint of the infrastructure.
- Measures to control noise and dust should be applied according to current best practice in the industry.

PREFERRED ALTERNATIVE

- Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum as far as practical.
- Access to the rest of the property should be restricted.
- The recommendations of the ecological and wetland specialist studies must be strictly implemented, especially as far as limitation of the construction footprint is concerned.
- Buffer zones around surface water areas must be implemented. (Please see the recommendations of the EAP regarding this mitigation measure)

IMPACT | **Heritage Assessment: Potential disturbance of fossil carrying strata**

Possible impact on moderate to highly sensitive sedimentary strata usually requires monitoring by a professional palaeontologist, since most detrimental impacts on palaeontological heritage usually occur during the construction phase when fossils may be disturbed or destroyed during excavations and subsequent construction activities.

GH1 AND GH2

Impact	Type	Severity			Incidence		Risk class		
		Extent	Duration	Intensity	Frequency	Probability	Before mitigation		After mitigation
Positive	Direct	1	5	5	1	2	33	LOW	LOW
Cumulative impacts								LOW	LOW

COMMENT/MITIGATION:

- Extensive excavations into intact Ecca sediments should be avoided where possible.
- It is recommended that palaeontological monitoring is allowed at the start and end for a duration of (1) linear excavations exceeding 3 m in length and >60cm in depth into Ecca bedrock, or (2) the mechanical exposure of unweathered Ecca bedrock surfaces exceeding 4m^3 in size, while fresh, potentially fossiliferous strata is still exposed for study and recording.
- The pan dune deposits bordering the northern boundary of the site should be strictly avoided by a >50 m no-go zone.

IMPACT | **Heritage Assessment: Potential disturbance of cultural significant structures/items**

According to the HIA, there has not been any sites of archaeological artifacts found within the footprint of the proposed development. No national monuments, battlefields, or historical cemeteries are known to occur in the study area.

GH1 AND GH2

Impact	Type	Severity			Incidence		Risk class		
		Extent	Duration	Intensity	Frequency	Probability	Before mitigation		After mitigation
Positive	Direct	1	5	5	1	2	33	LOW	LOW
Cumulative impacts								LOW	LOW

COMMENT/MITIGATION:

- No mitigation measures proposed.

IMPACT | **General: Pollution of surface and groundwater due to chemical, oil and spillages**

Contaminants such as hydrocarbons, solids and pathogens will be generated from several potential sources (examples include petrol/diesel, oil/grease and other hazardous substances). These contaminants have the capacity to negatively affect ecosystems including sensitive or intolerant species of flora and fauna.

GH1 AND GH2

Impact	Type	Severity			Incidence		Risk class		
		Extent	Duration	Intensity	Frequency	Probability	Before mitigation		After mitigation
Negative	Direct	1	2	3	3	3	36	LOW	LOW
Cumulative impacts								LOW	LOW

PREFERRED ALTERNATIVE

COMMENT/MITIGATION:

- Extra care must be given to prevent any potentially hazardous substances from entering the wetlands and drainage areas during rainfall events.
- The use of all chemicals and potentially hazardous substances must take place on a tray or an impermeable surface;
- In the event of a spill of chemicals and potentially hazardous substances, this must be addressed immediately and reported to the ECO for the necessary actions and/or reporting.

IMPACT | **General: Pollution due to sewer: On-site sewer treatment system**

A sewer reticulation system will also be installed on site. This will be done so as to service the offices of the control building and will be done in accordance with the specifications of the SABS. The systems will consist of an underground conservancy tank and a patented digester. These systems require electricity to power the pumps and fans used as part of the aeration process.

GH1 AND GH2									
Impact	**Type**	**Severity**			**Incidence**		**Risk class**		
		Extent	**Duration**	**Intensity**	**Frequency**	**Probability**	**Before mitigation**		**After mitigation**
Negative	Direct	1	2	5	2	2	32	**LOW**	**LOW**
Cumulative impacts								**LOW**	**LOW**

COMMENT/MITIGATION:

- Preventive measure must be undertaken during the construction of the infrastructures, securing all joints for minimum spillage occurrences.
- Should a spillage occur, it must be reported to the relevant departments immediately.
- Where contamination occurs, soil must be immediately removed to prevent further contamination.
- Records must be kept of sewage spillages during all phases of the proposed development.
- An emergency preparedness plan must be in place for instances where spills occur that can be harmful to people or the receiving environment

IMPACT | **Wetland Assessment: Impacts on wetland resources**

Numerous wetland systems were identified as part of the wetland assessment. The development footprint will occur over numerous drainage areas and wetlands within the study area. The construction of the proposed developments will not encroach into the pan or riparian zone, as a 20 m buffer has been proposed by the wetland specialist (and a 50 m buffer has been proposed by the HIA specialist). However, an impact will be seen on the catchment area of the pan which will have an indirect impact on it.

GH1									
Impact	**Type**	**Severity**			**Incidence**		**Risk class**		
		Extent	**Duration**	**Intensity**	**Frequency**	**Probability**	**Before mitigation**		**After mitigation**
Negative	Direct	2	5	4	3	4	77	**MEDIUM**	**LOW**
GH2									
Negative	Direct	3	5	4	4	5	108	**HIGH**	**LOW**
Cumulative impacts								**HIGH**	**LOW**

COMMENT/MITIGATION:

- **GH1:** The pan system as well as the 20 m buffer zone is to be excluded from the development and is treated as no-go areas.
- **GH2:** The south-eastern drainage areas has been excluded from the proposed development areas.

PREFERRED ALTERNATIVE

- A stormwater management system will should be implemented to manage the runoff from the construction areas.
- No littering must be allowed, and all littering must be removed from the development footprint.
- All recommendations as brought forth by the wetland impact assessment as well as captured in Section 11 below must be adhered to on site.
- Adequate weed and alien invasive species monitoring, and management must be maintained within the development footprint.

IMPACT | **General: Dust, noise and waste generated during construction (general nuisance)**

Areas of unconsolidated soil will be present during construction, in the construction footprint and areas in close proximity. These soils will be prone to wind erosion with associated generation of dust and windblown sand during high wind velocities.

GH1 AND GH2

Impact	Type	Severity			Incidence		Risk class		
		Extent	Duration	Intensity	Frequency	Probability	Before mitigation		After mitigation
Negative	Direct	2	3	2	3	5	56	MEDIUM	LOW
Cumulative impacts								MEDIUM	LOW

COMMENT/MITIGATION:

- Disturbed areas must be stabilised immediately after final grading has been done in order to limit dust pollution.
- Structurally sound surface for the development must be maintained, by providing adequate drainage so that erosion, excessive dust and undue surface damage are avoided.
- Excessive liberation of dust must be controlled by the use of water-spraying or other dust-allaying agents, as required.

IMPACT | **General: Visual Impact**

During the construction phase of the proposed developments it is expected that the surrounding areas will be visually impacted by the general construction works, including stockpiling, clearance and the erecting of the various components of the proposed solar panel farms. These impacts will be visible from all determined viewpoints.

GH1 AND GH2

Impact	Type	Severity			Incidence		Risk class		
		Extent	Duration	Intensity	Frequency	Probability	Before mitigation		After mitigation
Negative	Direct	3	5	3	5	5	110	HIGH	MEDIUM
Cumulative impacts								HIGH	MEDIUM

COMMENT/MITIGATION:

- All material stockpile heights are not to exceed a height of 2 m.
- A clean site policy must be adopted throughout the construction phase of the developments.
- Waste bins must be strategically placed in order to prevent visual pollution.

IMPACT | **General: Socio-economic impacts: creation of job opportunities**

Several temporary employment and skills development opportunities will be created during construction. These opportunities will be of short-term duration and will be limited to the construction requirements of the Contractor, however skills can be transferred which may be used during further opportunities. Future employment opportunities may arise from the resident of this development employing domestic workers.

GH1 AND GH2

Impact	Type	Severity			Incidence		Risk class		
		Extent	Duration	Intensity	Frequency	Probability	Before mitigation		After mitigation
Positive	Direct	3	3	4	5	5	110	HIGH	No mitigation required

PREFERRED ALTERNATIVE		
Cumulative impacts	HIGH	No mitigation required

COMMENT/MITIGATION:

- The contractor should, if possible, use local labour to ensure the economic growth of the surrounding area.

IMPACT | **General: Traffic Control Impacts**

The construction of the proposed infrastructure will be primarily located on a property owned by the person with whom the developer has an agreement with, however, the proposed Eskom grid connection powerline will not be located in these properties. Furthermore, due to the type of machinery to be used (especially in the early stages of the construction phase), traffic calming measures should be implemented which ensures safety to the public, both the pedestrians and motorised traffic. The traffic control and safety aspects must be monitored by the safety consultant during the construction phase of the proposed development.

GH1 AND GH2

Impact	Type	Severity			Incidence		Risk class	
		Extent	Duration	Intensity	Frequency	Probability	Before mitigation	After mitigation
Negative	Direct	2	2	3	2	5	49 LOW	LOW
Cumulative impacts							LOW	LOW

COMMENT/MITIGATION:

- The speed of vehicles must be strictly controlled to avoid dangerous situations to the local community, and excessive dust and deterioration of the roads within the construction areas.
- Proper signage must be strategically placed within proximity to the construction areas.
- Where applicable, all construction vehicles must remain on designated roads with no indiscriminate driving through the construction areas.
- Records must be kept of accidents.
- This aspect must be managed by the appointed Safety Officer for the proposed project during the construction and operational phases.

NO-GO ALTERNATIVE				
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation:**	**Significance rating of impacts after mitigation:**	**Risk of the impact and mitigation not being implemented**
Sedimentation and erosion	**LOW**	The site will be left as is. No additional mitigation measures will be implemented.	No mitigation measures will be implemented	The site will be left as is. No additional mitigation measures will be implemented.
Infestation and spread of alien invasive species	**MEDIUM-LOW**	The site will be left as is. No additional mitigation measures will be implemented.	No mitigation measures will be implemented	The site will be left as is. No additional mitigation measures will be implemented.

9.2. Operational phase

Table 9-2. Impact assessment conducted for the operational phase of the proposed development.

PREFERRED ALTERNATIVE

IMPACT | **Ecological Assessment: Invasive plant species**

The disturbance of the natural vegetation by the proposed activities may increase the spread of exotic species. Alien and invasive species are already a problem in the project area and utmost care should be taken not to disperse and increase the colonisation of these species.

GH1 AND GH2

Impact	Type	Severity			Incidence		Risk class		
		Extent	Duration	Intensity	Frequency	Probability	Before mitigation		After mitigation
Negative	Direct	2	5	4	3	4	77	MEDIUM	LOW
Cumulative impacts								MEDIUM	LOW

COMMENT/MITIGATION:

- A monitoring program should be compiled to remove exotic vegetation and maintain open space areas free from exotic invasions during the operational phase.
- Successful re-vegetation is crucial to stabilize soils and limit infestation by invasive alien plant species. Rehabilitation should be undertaken on a progressive basis in these areas.
- Natural open spaces outside the development footprint should be left in their undeveloped state and any existing or new exotic vegetation within the development footprint should be eradicated.
- Within proximity to pan system, successful re-vegetation is crucial to stabilize soils and limit infestation by invasive alien plant species.

IMPACT | **Ecological Assessment: Hydrological impacts**

This refers to any alterations in the quantity, timing and distribution of water inputs and through flows within the drainage line. Construction activities associated with bulk earthworks (such as excavations, stockpiling, reshaping, back-filling and compaction) in the catchment area feeding the river can alter natural patterns of surface runoff reaching water resources downslope/downstream. Changes in flow patterns reaching aquatic ecosystems does not only affect hydrological functionality and thus ecosystem integrity but may lead to erosion and sedimentation through increased runoff velocities linked to concentrated flow paths created during construction.

GH1 AND GH2

Impact	Type	Severity			Incidence		Risk class		
		Extent	Duration	Intensity	Frequency	Probability	Before mitigation		After mitigation
Negative	Direct	2	5	5	2	3	60	MEDIUM	LOW
Cumulative impacts								MEDIUM	LOW

COMMENT/MITIGATION:

- Bare areas where vegetation has been removed pose a risk of becoming a sediment load into river during heavy rainfall or windy conditions. Bare areas should therefore be covered during such events.
- Any potential large sediment loads (i.e. stockpiles) must be contained by covering them.
- Where required, temporary stormwater management structures must be used during construction.

IMPACT | **General: Pollution of surface and groundwater due to chemical, oil and spillages**

Contaminants such as hydrocarbons, solids and pathogens will be generated from several potential sources (examples include petrol/diesel, oil/grease and other hazardous substances). These contaminants have the capacity to negatively affect ecosystems including sensitive or intolerant species of flora and fauna.

PREFERRED ALTERNATIVE

GH1 AND GH2

Impact	Type	Severity			Incidence		Risk class		
		Extent	Duration	Intensity	Frequency	Probability	Before mitigation		After mitigation
Negative	Direct	1	2	3	3	3	36	LOW	LOW
Cumulative impacts								LOW	LOW

COMMENT/MITIGATION:

- Extra care must be given to prevent any potentially hazardous substances from entering the wetland and drainage areas during rainfall events.
- The use of all chemicals and potentially hazardous substances must take place on a tray or an impermeable surface;
- In the event of a spill of chemicals and potentially hazardous substances, this must be addressed immediately and reported to the relevant Department immediately

IMPACT | **General: Pollution due to sewer: On-site sewer treatment system**

A sewer reticulation system will also be installed on site. This will be done so as to service the offices of the control building and will be done in accordance with the specifications of the SABS. The systems will consist of an underground conservancy tank and a patented digester. These systems require electricity to power the pumps and fans used as part of the aeration process.

GH1 AND GH2

Impact	Type	Severity			Incidence		Risk class		
		Extent	Duration	Intensity	Frequency	Probability	Before mitigation		After mitigation
Negative	Direct	1	2	5	2	2	32	LOW	LOW
Cumulative impacts								LOW	LOW

COMMENT/MITIGATION:

- Preventive measure must be undertaken during the operational phase of the infrastructures, securing all joints for minimum spillage occurrences.
- Should a spillage occur, it must be reported to the relevant departments immediately.
- Where contamination occurs, soil must be immediately removed to prevent further contamination.
- Records must be kept of sewage spillages during all phases of the proposed development.
- An emergency preparedness plan must be in place for instances where spills occur that can be harmful to people or the receiving environment

IMPACT | **Wetland Assessment: Impacts on wetland resources**

Numerous wetland systems were identified as part of the wetland assessment. The development footprint will occur over numerous drainage areas and wetlands within the study area. The construction of the proposed developments will not encroach into the pan or riparian zone, as a 20 m buffer has been proposed by the wetland specialist (and a 50 m buffer has been proposed by the HIA specialist). However, an impact will be seen on the catchment area of the pan which will have an indirect impact on it.

GH1 AND GH2

Impact	Type	Severity			Incidence		Risk class	
		Extent	Duration	Intensity	Frequency	Probability	Before mitigation	After mitigation

PREFERRED ALTERNATIVE									
Negative	Direct	1	3	4	3	5	64	MEDIUM	LOW
Cumulative impacts								MEDIUM	LOW

COMMENT/MITIGATION:

- **GH1:** The pan system as well as the 20 m buffer zone is to be excluded from the development and is treated as no-go areas.
- The south-eastern drainage areas should be excluded from the proposed development areas.
- A stormwater management system will should be implanted in order to manage the runoff from the development.
- No littering must be allowed and all littering must be removed from the development footprint.
- All recommendations as brought forth by the wetland impact assessment as well as captured in Section 11 below must be adhered to on site.
- Adequate weed and alien invasive species monitoring and management must be maintained within the development footprint.

IMPACT | **General: Visual Impact**

During the operational phase of the proposed developments, the structures within the development boundaries will have a high not exceeding 4.5 m (with the exception of the overhead powerlines with a height not exceeding 40 m). The proposed developments will be surrounded by grasslands which provide to be a good visual buffer from these structures, however the developments will be highly visible from all viewpoints. The proposed developments have an anticipated low compatibility with the surrounding scenery and a moderate visual change rating.

The proposed developments will have a high visual exposure as they cover a large area. The developments compatibility with the surrounding area has been described as low (9/12), based on the height of the development as well as the colours, shape and texture thereof. The absence of forest or large hills among the predominantly low, grasslands and agricultural areas of the receiving environment, lacks the ability to visually absorb the development and obscure it from view in many instances. In other instances, where there is some variation in the topography, the landscape does successfully visually

Criteria	Rating
I the project result in a noticeable change in the physical characteristics of the existing environment?	High level of change
Will the project complement or contrast with the visual character desired by the community?	Somewhat incompatible
What types of project features and construction impacts are proposed? Are bridge structures, large excavations, sound barriers, or median planting removal proposed?	Low concern
Will the project changes likely be mitigated by normal means such as landscaping and architectural enhancement, or will avoidance measures be necessary to minimize adverse change?	Project alternative may be needed
Will this project, when seen collectively with other projects, result in an aggregate adverse change in overall visual quality or character?	Impacts likely in 0-5 years
What is the potential that the project proposal may be controversial within the community, or opposed by any organized group?	Low potential
How sensitive are potential viewer-groups likely to be regarding visible changes proposed by the project?	Low Sensitivity
To which degree does the project appear to be consistent with applicable laws, ordinances, regulations, policies or standards?	Largely compatible
Are any permits going to be required by outside regulatory agencies (national, provincial or municipal) to allow development to proceed?	**Yes**
Will the Project Development Team or public benefit from a more detailed visual analysis in order to help reach consensus on a course of action?	No

PREFERRED ALTERNATIVE									
GH1 AND GH2									
Impact	**Type**	**Severity**			**Incidence**		**Risk class**		
		Extent	**Duration**	**Intensity**	**Frequency**	**Probability**	**Before mitigation**		**After mitigation**
Negative	Direct	3	5	3	5	5	110	**HIGH**	**HIGH**
Cumulative impacts								**HIGH**	**HIGH**

COMMENT/MITIGATION:

- There are no additional mitigation measures required.

IMPACT	**Avifaunal Assessment: The vegetation clearance and presence of the solar arrays and associated infrastructure**

Total or partial displacement of avifaunal communities due to habitat transformation associated with the presence of the proposed solar PV plants and associated infrastructure specifically relating to the areas within close proximity to the highly sensitive areas as identified by the specialist.

GH 2									
Impact	**Type**	**Severity**			**Incidence**		**Risk class**		
		Extent	**Duration**	**Intensity**	**Frequency**	**Probability**	**Before mitigation**		**After mitigation**
Negative	Direct	2	5	5	4	5	108	**HIGH**	**MEDIUM**
Cumulative impacts								**HIGH**	**MEDIUM**

COMMENT/MITIGATION:

- The recommendations of the ecological and wetland specialist studies must be strictly implemented, especially as far as limitation of the construction footprint is concerned.
- Buffer zones around surface water areas must be implemented. (Please see the recommendations of the EAP regarding this mitigation measure)

IMPACT	**Avifaunal Assessment: Impact of collisions with solar PV panels**

The presence of the PV solar arrays will lead to collisions with the reflective solar panels in the PV footprint. The birds will get killed or injured through the collisions with the panels.

GH 2									
Impact	**Type**	**Severity**			**Incidence**		**Risk class**		
		Extent	**Duration**	**Intensity**	**Frequency**	**Probability**	**Before mitigation**		**After mitigation**
Negative	Direct	1	1	3	2	2	20	**LOW**	**LOW**
Cumulative impacts								**LOW**	**LOW**

COMMENT/MITIGATION:

- There are no additional mitigation measures required.

IMPACT	**Avifaunal Assessment: Entrapment in fencing**

The presence of a perimeter fence could lead to the entrapment of terrestrial birds, leading to mortality.

GH 2									
Impact	**Type**	**Severity**			**Incidence**		**Risk class**		
		Extent	**Duration**	**Intensity**	**Frequency**	**Probability**	**Before mitigation**		**After mitigation**
Negative	Direct	1	5	4	2	2	40	**LOW**	**LOW**
Cumulative impacts								**LOW**	**LOW**

COMMENT/MITIGATION:

- A single perimeter fence should be used.
- Wire fence lines must always remain stiffly torqued.
- Topmost wire strands must not contain any barbs.

IMPACT	**Avifaunal Assessment: Impact of electrocutions**

On-site substation could be a source of electrocutions of priority species including

GH2				
Impact	**Type**	**Severity**	**Incidence**	**Risk class**

PREFERRED ALTERNATIVE									
		Extent	**Duration**	**Intensity**	**Frequency**	**Probability**	**Before mitigation**		**After mitigation**
Negative	Direct	1	2	5	3	2	40	**LOW**	**LOW**
Cumulative impacts								**LOW**	**LOW**

COMMENT/MITIGATION:

- With regards to the infrastructure within the substation yards and inverter stations, the hardware is too complex to warrant any mitigation for electrocution at this stage. It is rather recommended that if any impacts are recorded once operational, site-specific mitigation be applied reactively.

IMPACT | **General: Socio-economic impacts - creation of job opportunities**

A number of temporary employment and skills development opportunities will be created during the operational phase of the proposed development.

GH1 AND GH2									
Impact	**Type**	**Severity**			**Incidence**		**Risk class**		
		Extent	**Duration**	**Intensity**	**Frequency**	**Probability**	**Before mitigation**		**After mitigation**
Positive	Direct	2	5	1	5	5	80	**MEDIUM**	**No mitigation required**
Cumulative impacts								**MEDIUM**	**No mitigation required**

COMMENT/MITIGATION:

- The developer should, if possible, use local labour to ensure the economic growth of the surrounding area.

IMPACT | **General: Socio-economic impacts – Increase in electricity supply**

The motivation behind the proposed project is driven by the current need for additional sources of electricity feeding into the National Electricity Grid. As per the target of the REIPPPP for energy provision in South Africa, the proposed development aims to supply an additional 100 MW to the National Electricity Grid. The Objective of the REIPPPP is to relieve the pressures of the current electricity supply constraints, reduce the extensive use of diesel-operated electrical generators and to fill the current short term electricity supply gap in South Africa.

The aim of the proposed development is to provide an additional source of energy to the existing electricity grid. Through the use of PVPP the proposed development will see to the use of renewable energy sources (solar energy) in order to generate the electricity to be transferred into the National Electricity Grid System.

The proposed development lies within the Renewable Energy Development Zone 5 (also known as "Kimberley REDZ"), published under Government Notice No. 114 in Government Gazette No. 41445 of 16 February 2018.The Renewable Energy Development Zones (REDZs) have been identified in terms of section 24(3) of the National Environmental Management Act, 1998. The applicability of Kimberley REDZ for purposes of the Notice, is that large scale solar photovoltaic energy facilities located within this REDZ are subject to a Basic Assessment Process in terms of the Environmental Impact Assessment (EIA) Regulations of 2014, as amended, as published under the National Environmental Management Act (Act 107 of 1998).

GH1 AND GH2									
Impact	**Type**	**Severity**			**Incidence**		**Risk class**		
		Extent	**Duration**	**Intensity**	**Frequency**	**Probability**	**Before mitigation**		**After mitigation**
Positive	Direct	3	5	4	5	5	120	**HIGH**	**No mitigation required**
Cumulative impacts								**HIGH**	**No mitigation required**

PREFERRED ALTERNATIVE
COMMENT/MITIGATION: • The developer should, if possible, use local labour to ensure the economic growth of the surrounding area.

Table 9-3. Summary of the potential impacts during the construction phase.

IMPACT	SITE	STATUS	EXTENT	DURATION	SEVERITY	FREQUENCY	PROBABILITY OF OCCURRENCE	SIGNIFICANCE WITHOUT MITIGATION		SIGNIFICANCE WITH MITIGATION	CUMULATIVE IMPACT AFTER MITIGATION
Ecological Assessment (excluding avifaunal): Habitat loss	GH1 and GH2	Negative	1	3	3	4	5	63	MEDIUM	LOW	LOW
Ecological Assessment (excluding avifaunal): Loss of indigenous floral and faunal diversity	GH1 and GH2	Negative	1	3	3	4	5	63	MEDIUM	LOW	LOW
Ecological Assessment (excluding avifaunal): Loss of protected floral and faunal species	GH1 and GH2	Negative	1	3	4	3	4	56	MEDIUM	LOW	LOW
Ecological Assessment (excluding avifaunal): Invasive plant species	GH1 and GH2	Negative	1	3	4	3	4	56	MEDIUM	LOW	LOW
Ecological Assessment (excluding avifaunal): Land transformation/Veld fire	GH1 and GH2	Negative	3	2	5	2	3	50	LOW	LOW	LOW
Ecological Assessment (excluding avifaunal): Disturbance of sensitive ecosystems	GH1 and GH2	Negative	1	3	5	2	4	54	MEDIUM	MEDIUM	MEDIUM
Ecological Assessment (excluding avifaunal): Hydrological impacts	GH1 and GH2	Negative	1	3	5	3	4	63	MEDIUM	LOW	LOW
Agricultural Assessment: Loss of high agricultural potential ground	GH1 and GH2	Negative	1	5	4	2	5	70	MEDIUM	MEDIUM	MEDIUM
Heritage Assessment: Potential disturbance of fossil carrying strata	GH1 and GH2	Negative	1	5	5	1	2	33	LOW	LOW	LOW
Heritage Assessment: Potential disturbance of cultural significant structures/items	GH1 and GH2	Negative	1	5	5	1	2	33	LOW	LOW	LOW
Wetland Assessment: Impact on wetland resources	GH1	Negative	2	5	4	3	4	77	MEDIUM	LOW	LOW
	GH2	Negative	3	5	4	4	5	108	HIGH	MEDIUM	LOW
Avifaunal Assessment: Displacement due to construction of infrastructure	GH 2	Negative	2	5	3	3	5	80	MEDIUM	LOW	LOW
General: Visual Impacts	GH1 and GH2	Negative	3	5	3	5	5	110	HIGH	MEDIUM	MEDIUM
General: Pollution due to sewer: On-site sewer treatment system	GH1 and GH2	Negative	1	2	5	2	2	32	LOW	LOW	LOW

IMPACT	SITE	STATUS	EXTENT	DURATION	SEVERITY	FREQUENCY	PROBABILITY OF OCCURRENCE	SIGNIFICANCE WITHOUT MITIGATION		SIGNIFICANCE WITH MITIGATION	CUMULATIVE IMPACT AFTER MITIGATION
General: Pollution of surface and groundwater due to chemical, oil and fuel spills	GH1 and GH2	Negative	1	2	3	3	3	36	LOW	LOW	LOW
General: Traffic Control Impacts	GH1 and GH2	Negative	2	2	3	2	5	49	LOW	LOW	LOW
General: Dust, noise and waste generated during construction	GH1 and GH2	Negative	2	3	3	3	5	56	MEDIUM	LOW	LOW
General: Socio-economic benefits - Creation of job opportunities	GH1 and GH2	Positive	2	5	4	5	5	110	HIGH	N/A	HIGH

Table 9-4. Summary of the potential impacts during the operational phase.

IMPACT	SITE	STATUS	EXTENT	DURATION	SEVERITY	FREQUENCY	PROBABILITY OF OCCURRENCE	SIGNIFICANCE WITHOUT MITIGATION		SIGNIFICANCE WITH MITIGATION	CUMULATIVE IMPACTS
Ecological Assessment (excluding avifaunal): Invasive plant species	GH1 and GH2	Negative	2	5	4	3	4	77	MEDIUM	LOW	LOW
Ecological Assessment (excluding avifaunal): Land transformation/Veld fire	GH1 and GH2	Negative	3	2	5	2	3	50	LOW	LOW	LOW
Ecological Assessment (excluding avifaunal): Hydrological impacts	GH1 and GH2	Negative	2	5	5	2	3	60	MEDIUM	LOW	LOW
Wetland Assessment: Impact on wetland resources	GH1 and GH2	Negative	1	3	4	3	5	64	MEDIUM	LOW	LOW
Avifaunal Assessment: Displacement due to habitat transformation	GH 2	Negative	2	5	5	4	5	108	HIGH	MEDIUM	MEDIUM
Avifaunal Assessment: Collisions with solar panels	GH 2	Negative	1	1	3	2	2	20	LOW	LOW	LOW
Avifaunal Assessment: Entrapment in perimeter fences	GH 2	Negative	1	5	4	2	2	40	LOW	LOW	LOW
Avifaunal Assessment: Electrocutions in onsite infrastructure	GH 2	Negative	1	2	5	3	2	40	LOW	LOW	LOW
Avifaunal Assessment: Displacement due to decommissioning	GH 2	Negative	2	3	2	3	5	56	MEDIUM	LOW	LOW
General: Visual Impacts	GH1 and GH2	Negative	3	5	3	5	5	110	HIGH	HIGH	HIGH
General: Pollution due to sewer: On-site sewer treatment system	GH1 and GH2	Negative	1	2	5	2	2	32	LOW	LOW	LOW
General: Socio-economic benefits Creation of job opportunities	GH1 and GH2	Positive	2	5	1	5	5	80	MEDIUM	N/A	MEDIUM
General: Socio-economic benefits - Increase in electricity supply	GH1 and GH2	Positive	3	5	4	5	5	120	HIGH	N/A	HIGH

10. Cumulative Assessment

Cumulative impact is defined in the NEMA EIA Reg GN R982 of 2014 as "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 be significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities".

This assessment therefore considers the cumulative impact of the proposed developments, as well as the other developments in the area, also refer to Figure 1-5 and Table 1-16. The cumulative impact has the potential to result in positive socio-economic opportunities for the region.

The overall positive impact of the proposed project as well as other approved projects in the area, on electricity constraints within both the local municipal as well as the larger district area will be highly beneficial to all as a reliable source of electricity. This improvement in a reliable electricity source, is in alignment with the strategic objectives of the TLM and LDM.

Following the comments received from the Department, the specialists were requested to provide insight into the cumulative impacts of the proposed developments in relation to the previously approved developments within a 30 km radius. The findings of the Avifaunal Specialist Assessment indicates that the total footprint to be taken up by current and proposed solar energy projects is approximately 7300 ha. This project comprises 425 ha of this footprint. The total area of the 30 km radius around the proposed projects equates to approximately 284 000 ha of similar habitat. Therefore, the combined footprints of the proposed approved developments will be approximately 2.58% of the available habitat found within the 30 km radius. The cumulative impacts as a result of the approval of the proposed developments will be low.

11. Environmental Impact Statement

The environmental aspects associated with the proposed GH1 and GH2 developments have been assessed in Section 8. These issues have been guided by the findings of the various specialists as summarized in Section 7.

The impacts of the proposed infrastructure development under consideration for this application have been evaluated. It has been determined that the main negative impacts on the biodiversity during the construction phase of the proposed developments would be the loss of terrestrial habitat, the loss of indigenous floral and faunal diversity, the loss protected floral and faunal species, infestation of alien invasive species, disturbance of sensitive ecosystems, the hydrological impacts, loss of high agricultural potential ground, and the impact on water resources in and within proximity to the proposed development footprints. The proposed development layout has been amended in order to accommodate all buffers and sensitive area as determined by the various specialists.

During the operational phase of the proposed development it is expected that the development will have a medium impact in terms the loss of terrestrial habitat, the loss of indigenous floral and faunal diversity, the loss protected floral and faunal species, infestation of alien invasive species, disturbance of sensitive ecosystems, the hydrological impacts, loss of high agricultural potential ground, and the impact on water resources in and within proximity to the proposed development footprints. However, should the impact be mitigated through the appropriate measures, these impacts will be regarded as low.

While the overall impacts of the project on the receiving environment range between insignificant, very low negative to medium negative after implementation of mitigation measures such as the buffer zones around wetlands and the amendment of the layout to the preferred layout, the cumulative positive effect of the proposed development and other developments in the area has the potential to result in positive socio-economic opportunities for the region.

No fata flaws have been identified and thus the proposed development should proceed.

12. Specialist Recommendation for Inclusion into the EMPr and Authorisation Conditions

12.1. Heritage resources management and mitigation

It is advised that the development may proceed, given the following recommendations:

- Extensive excavations into intact Ecca sediments should be avoided where possible.
- Alternatively, it is recommended that palaeontological monitoring is allowed at the start of and for duration of (1) linear excavations exceeding 3 m in length and > 60cm in depth into Ecca bedrock or (2) the mechanical exposure of unweathered Ecca bedrock surfaces exceeding 4 m^2 in size, while fresh, potentially fossiliferous strata is still exposed for study and recording.
- The pan dune deposits bordering the northern boundary of the site should be strictly avoided by a ≥ 50 m no-go zone.

12.2. Ecological Impact Assessment Report

The following should be implemented:

- No disturbance related activity may encroach near the large pan situated towards the northern boundary of the proposed development area (Good Hope 2 PVPP);
- Hunting, capturing and trapping of fauna must be prohibited;
- Ideally development should be located within the disturbed grasslands;
- Care should be given to not unnecessarily clear or destroy indigenous vegetation;
- Drip trays should be placed under stationary construction vehicles;
- Vehicle movement should be restricted to designated dirt roads and may not occur near sensitive habitats;
- Excavated topsoil should be kept clean of exotic vegetation;
- Fauna that are trapped in trenches, should be relocated on site and located as far as possible within the sensitive habitats;
- Waste should be removed from site on a regular basis and not allowed to pile up as to start polluting the environment;
- All construction-related waste/material should be appropriately disposed of after the construction has ceased;
- A comprehensive fire management plan should be implemented so as to prevent any fire outbreaks;
- Notice boards should be erected informing construction workers on floral and faunal species of particular conservation concern. A relevant specialist should be notified when any of these species are observed during the construction phase; and

- No protected fauna or flora may be harmed without the necessary permits.

12.3. Avifaunal Impact Assessment

- The northern section of the study area can be seen as highly sensitive from an avian perspective. Since the pan system didn't contain any water during the survey, it is highly recommended that at least 3 one day follow-up surveys be conducted to determine the prevalence of expected threatened and near threatened species.
- Owing to the overall sensitivity of the study area and the number of species of conservation concern possibly occurring within and surrounding the study area, at least a regime 2 avifaunal assessment is proposed before final conclusions regarding potential impacts and mitigations can be properly evaluated.
- Flight paths of migratory birds and waterbirds must be determined and assessed during regime 2 monitoring.
- Should any of the mentioned threatened or near threatened species be abundant within the study area, further in dept assessments might be required to determine the impact the proposed development will have on these species.
- A single perimeter fence should be used. Wire fence lines must always remain stiffly torqued and the topmost wire strands must not contain any barbs.
- The Construction EMPr must include the following:
    - No off-road driving.
    - Maximum use of existing roads.
    - Measures to control noise and dust according to latest best practices
    - Restricted access to the rest of the property.
    - Strict application of all recommendations in the ecological and wetland specialists report pertaining to the limitation of the footprint.
- A Habitat Restoration Plan (HRP) to be developed and approved.
- Rehabilitation to the monitored via site audits and site inspections to ensure compliance. Record and report any non-compliances.
- Implementation of mitigation measures such as insulation of live parts to prevent further electrocutions.

12.4. Wetland Impact Assessment

- The following recommendations and mitigation measures should be implemented in order to manage impacts on the pan system and drainage areas:
    - The large pan system in the north eastern corner of the site should be completed excluded by the development and in order to ensure no impacts on it occur, a 20 meter buffer zone should also be maintained around the riparian zone of the pan.
    - The pan and buffer zone should also be regarded as no-go areas and no construction or operational activities including stockpiling, clearing, laydown areas, vehicle movement or any other associated activities should occur in or near this pan system.
    - Drainage areas and interspersed small depressions occurring in the eastern portion of the site may be included within the development footprint without resulting in large impacts.

- However, this is subject to the development implementing a comprehensive storm water management system which should ensure that the surface runoff patterns are retained as is, especially pertaining to drainage areas, and that the development does not contribute toward increase surface flow, erosion and any impacts on downslope areas.
- The storm water management system should include design of erosion prevention structures such as soakaways, attenuation areas and dissipation structures.
- All structures and mitigation measures should be maintained throughout the lifetime of the development.
- The drainage area occurring in the south-eastern corner of the site contains better defined wetland conditions and provides a higher level of ecological function. The development should therefore consider excluding this drainage area from development.
- Where the development is unable to exclude this drainage area in the south-eastern corner of the site, it will also have to implement the necessary storm water structures and erosion measures to ensure that runoff generated by the development does not lead to impacts in the downslope areas.
- It will be important to implement a monitoring programme so that any changes to the pan system on the site can be identified quickly before it leads to irreversible changes. This monitoring programme should include at least during the construction phase, a bi-annual biomonitoring of the pan system. This should be conducted by a suitable qualified wetland specialist.
- The necessary authorisations should be obtained from the DWS.

- Adequate monitoring of weed establishment and their continued eradication must be maintained. Where category 1 and 2 weeds occur, they require removal by the property owner according to the CARA and the NEMBA.
- No littering must be allowed and all litter must be removed from the site.
- Construction should be confined to the site footprint and should not encroach into adjacent areas.
- After construction has ceased, all construction waste should be removed from the area.
- Monitoring of construction including weed establishment and erosion should take place.

13. Assumptions, Uncertainties and Gaps in Knowledge

13.1. Geotechnical Assessment

- A detailed geotechnical report will be conducted during detail design phase, prior to finalisation of the designs.
- The detailed geotechnical design report should be conducted prior to finalisation of detail designs, to verify the actual site conditions for all infrastructure to be constructed.
- It is recommended that a Competent Person be on site during all excavations and to inspect the excavations.

13.2. Ecological Impact Assessment

- Not all plants have the same flowering period. Therefore, it is likely that the survey could have occurred outside of the flowering period of a specific species. As the field survey was conducted in early spring some plant species might not have been in full bloom, thus making them inconspicuous.

- Some geophytic and succulent plants may have been overlooked due to their cryptic nature.
- Some animal species exhibit nocturnal and shy habits and would therefore most likely not be observed during the daytime.
- The study area occupies a large spatial extent, making a highly detailed survey difficult. However, the use of unmanned arial vehicles (drones) and satellite imagery (including satellite multispectral vegetation analysis) supplemented the findings of this report.

13.3. Avifaunal Impact Assessment (2022)

- A total of 38 SABAP 2 full protocol lists had been completed for the broader area where the proposed project is located (i.e. bird listing surveys lasting a minimum of two hours each). In addition, 21 ad hoc protocol lists (i.e. bird listing surveys testing less than two hours but still giving useful data), and it was further supplemented by data collected during the on-site surveus.
- The Focus of the study is primarily on the potential impacts on solar priority species.
- Solar priority species are defined as follows:
    - South African Red Data species;
    - South African endemic and near-endemics of conservation concern;
    - Raptors; and
    - Waterbirds
- The impact of solar installations on avifauna is a new field of study. Strong reliance was therefore placed on expert opinion and data from existing monitoring programmes at solar facilities in the United States of America, where monitoring has been ongoing since 2013. The pre-cautionary principle was applied throughout as the full extent of impacts on avifauna at solar facilities are not presently known.
- The assessment of impacts is based on the baseline environment as it exists at the focal study area when the surveys were conducted.
- Cumulative impacts include all proposed and existing renewable energy projects within a 30 km radius around the study areas.
- Conclusions in this study are based on experience of these and similar species in different parts of South Africa. Bird behavior can never be entirely reduced to formulas that will be valid under all circumstances.

13.4. Wetland Assessment

- Some geophytic or succulent species may have been overlooked due to a specific flowering time or cryptic nature.
- Although a comprehensive survey of the site was done, it is still likely that several species were overlooked.
- Due to time constraints, only limited soil sampling could be done.
- The wetlands and watercourses in the study area are seasonal in nature and do not contain an aquatic component (including invertebrates and fish species).
- Smaller drainage lines may have been overlooked where a distinct channel or riparian vegetation is absent.
- Due to the large extent of the study area, only spot surveys of wetlands were undertaken.

13.5. Visual Impact Assessment

- The assessment is undertaken based on the infrastructure specifications, dimensions and layout provided by the applicant.
- The anticipated viewshed of the facility was modelled based on all PV panels being a maximum height of 4.5 m above ground level, whereas this will in fact vary between 1m and 4.5m.
- It was assumed that the Battery Energy Storage System will be made up of shipping containers.
- Cumulative view simulations of the GH 1 and GH 2 PV facilities combined with other approved PV facilities in the area were not conducted, the capacity for the landscape to absorb further large scale PV was thus not assessed. The likelihood that other PV facilities are constructed within the next 5 years was however accounted for in the impact assessment.

14. EAP Opinion on Authorisation and Motivation

The EAP is of the opinion that due process has been followed during the undertaking of this BAR and the associated PPP as per the regulatory requirements. The results presented in this report has been based on the input from the registered I&APs, specialist studies and related recommendations and the EAP opinion. The sensitivity layout and impact assessment of the proposed development, considers the identified sensitivities in terms of the ecological, heritage, avifaunal, and wetland specialist studies.

Good Hope 1:

The following environmental conditions currently prevail on the site:

- **Ecological Impact Assessment:**
  - The disturbed grasslands with a ***low*** sensitivity rating.
  - VU-A (which forms part of the Vaal-Vet Sandy Grasslands) vegetation unit has a ***medium*** sensitivity rating.
  - VU-C (which forms part of the Vaal-Vet Sandy Grasslands) vegetation unit has a ***low-medium to high*** sensitivity rating (specifically within close proximity to the pan system located towards the north-eastern boundary of the proposed Good Hope 2 PVPP development.
  - Cultivated areas.

- **Avifaunal Impact Assessment**
  - The primary grassland habitat has a ***moderate*** sensitivity rating.
  - The secondary grassland habitat and transformed areas located has a ***low*** sensitivity rating.

- **Wetland Impact assessment**
  - The drainage areas located towards along the eastern boundary of the GH1 development have a ***moderate*** sensitivity rating. The overlap of GH1 with Wetland 2 is 0.21 ha, of the total extent of 4.1 ha of the wetland.

- **Heritage Impact Assessment**
  - No buffers or sensitive areas has been identified.

Recommendations: No sensitives occur on this site and there are no buffers or exclusion areas applicable to the proposed layout.

Good Hope 2

The following environmental conditions currently prevail on the site:

- **Ecological Impact Assessment:**
  - The transformed areas, which includes the cultivated areas and the burrow-pit, have a ***very low*** sensitivity rating.
  - The disturbed grasslands have a ***low*** sensitivity rating.
  - VU-A (which forms part of the Vaal-Vet Sandy Grasslands) vegetation unit has a ***medium*** sensitivity rating.
  - VU-B (which forms part of the Vaal-Vet Sandy Grasslands) vegetation unit has a ***low-medium*** sensitivity rating.
  - VU-C (which forms part of the Vaal-Vet Sandy Grasslands) vegetation unit has a ***low-medium to high*** sensitivity rating (specifically within close proximity to the pan system located towards the north-eastern boundary of the proposed Good Hope 2 PVPP development.
- **Avifaunal Impact Assessment**
  - The primary grassland habitat has a ***moderate*** sensitivity rating.
  - The secondary grassland habitat has a ***low*** sensitivity rating.
  - The Pan system has been allocated a sensitivity rating of ***high***. The specialist proposed a buffer of 200m, however the EAP has proposed a buffer of 50m.
  - A high rating has also been allocated to the 100 m buffer to be implemented around the seasonal wetlands 4, 8 and 9. Again, the EAP proposed a buffer of 30m at wetland 9.
- **Wetland Impact assessment**
  - The Pan system is considered to have a ***very high*** sensitivity and a 50m buffer has been implemented around it.
  - The wetland areas located towards the south-eastern boundary (Wetlands 3, 4 and 9) is considered to have a ***high*** sensitivity rating.
  - The drainage areas located towards the western section (Wetlands 3, 5, 6 and 7) have a ***moderate*** sensitivity rating.
- **Heritage Impact Assessment**
  - A 50 m no-go buffer has been proposed around the pan system located in the north-eastern section of the proposed study area. This area is to be considered ***very high*** sensitivity.

Recommendations: On the northern boundary of this proposed development site, is a highly sensitive pan, which provides biodiversity functions. The combination of the proposed buffer zones and exclusion areas have been incorporated into the overall sensitivity plan. The EAP has recommended that this pan and a 50m buffer be excluded from the proposed development footprint. The proposed avifaunal buffer of 200m around the pan has thus been reduced by the EAP to 50m, due to the site being located within

the REDZ, which allows for optimal use for renewable energy projects and the current high demand in South Africa.

The EAP has recommended reduced avifaunal wetland buffers from 100m to 30m, as per the same motivation in terms of the site being located in the REDZ and the high need for renewable energy in South Africa. As an EAP we understand the sensitivities of the avifaunal habitat, but also must consider the requirements of the socio-economic aspects of the project.

Strict implementation of the proposed recommendations from the avifaunal specialist in terms of compiling and implementing the Habitat Monitoring Plan (HMP) and related monitoring, is critical in order to confirm the adequacy of the proposed buffers and mitigation measures. The implementation of the HMP and proposed adaptive measures, aims to ensure the survival of the pan ecosystem and its associated avifaunal presence.

Therefore, based on sustainable development principles, we proposed the preferred layout with strict adherence to early implementation of the HMP, in order to allow for a balance between nature and development.

Based on the proposed designs and the sensitivities presented in the BAR, the preferred layout of the proposed GH1 and GH2 and related mitigation measures to be implemented, the potential impacts on the receiving environment have been mitigated.

Based on the above, the EAP recommends that the proposed GH 1 and GH 2 PVPP developments be authorised by the CA with a validity period of 15 years.

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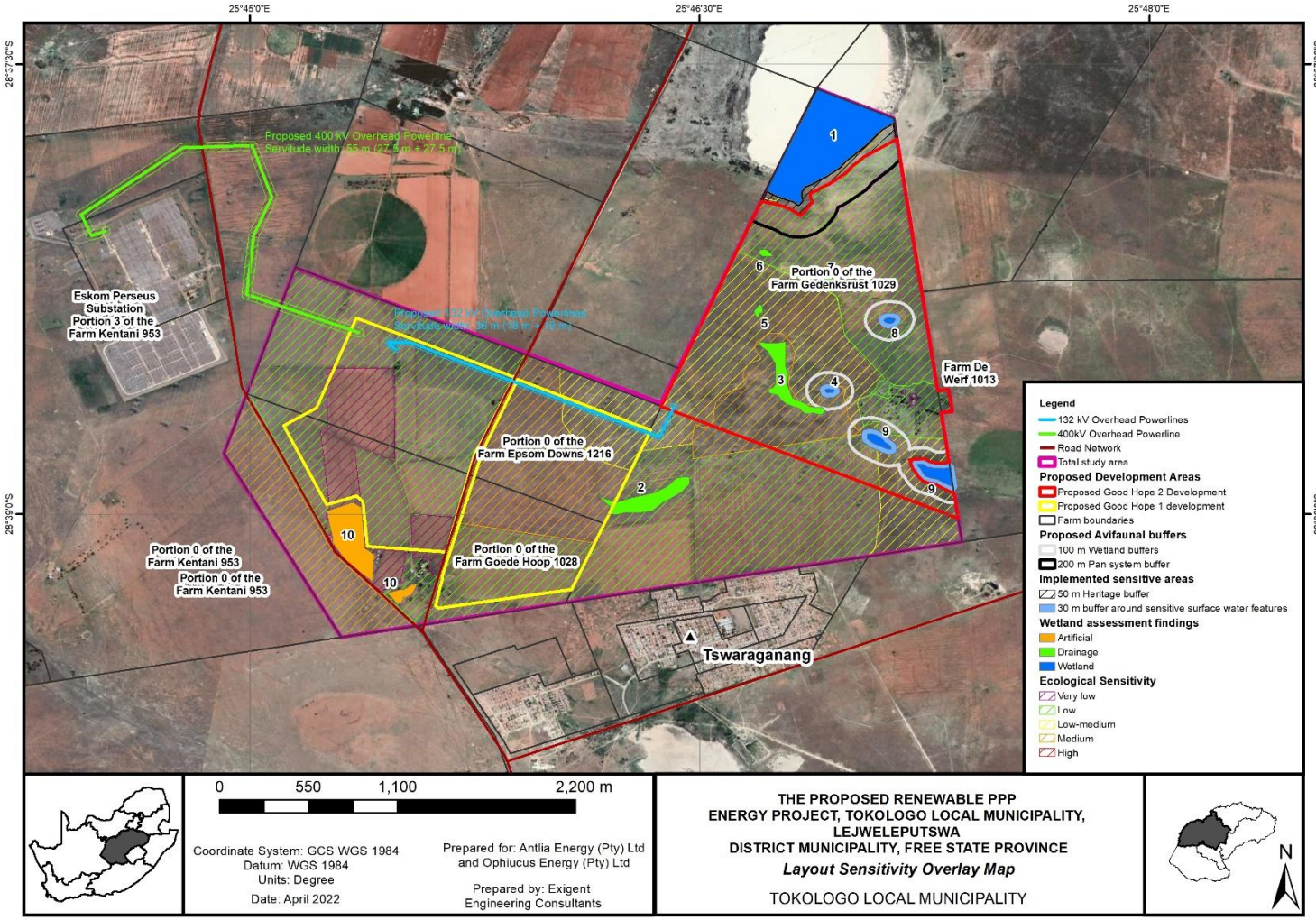

Figure 14-1. The overall environmental sensitivity of the proposed PVPP developments.

15. Conclusion

The need and desirability of the proposed GH1 and GH2 PVPP developments is rooted in the basic needs for additional renewable energy sources in South Africa. The proposed PVPP developments are located within the Kimberley REDZ 5, an area specifically identified for solar projects. The proposed construction works under consideration for this BAR includes the construction of the GH1 and GH2 developments including the Eskom grid connection and associated infrastructure.

This BAR has been compiled in accordance with the EIA Regulations, as amended, for the activities triggered in the various listing notices (In terms of listed activities 11, 12, 19, 24, and 28 of Listing Notice 1 – GNR 983, as amended in 2017, listed activities 1, 9, and 15 in terms of Listing Notice 2 – GNR.984, as amended in 2017, as well as listed activities 4, 12 and 14 of Listing Notice 3 – GNR 985, as amended in 2017. The BA calls for complete stakeholder engagement as it has been initiated from the outset of the project to ensure all stakeholders have been adequately and effectively consulted. During the initial consultation period several comments pertaining to the proposed development were received. These comments have been accordingly addressed. The draft BAR will be made available for public and stakeholder review for a period of 30 days. All comments received, and the issues raised has been documented and addressed in the CRR, which has been included in Appendix G4.

The DEA Screening tool was consulted as part of the planning phase of the proposed development. During this consultation, numerous specialist studies were identified. The findings of theses specialist studies determined the sensitive areas for the proposed development. The main impacts of the proposed development would be the loss of terrestrial habitat, the loss of indigenous floral and faunal diversity, the loss protected floral and faunal species, infestation of alien invasive species, disturbance of sensitive ecosystems, the hydrological impacts, loss of high agricultural potential ground, and the impact on water resources in and within proximity to the proposed development footprints.

The positive impacts of the proposed development relate to the provision of short to medium term employment opportunities of the construction and operational phases of the proposed developments. Approximately 100 employment opportunities will be created during the construction phase of the proposed development. Based on the demand, up to 150 employment opportunities can be created during this phase at any one time. Furthermore, the positive impacts are seen in the additional energy supply to the existing Eskom electricity grid. Therefore, aiming to contribute towards the Departmental mandate of supplying an additional 2000 MW to the energy grid. The proposed developments aim to contribute 100 MW towards this 2000 MW goal.

Due to the sensitivity of the proposed development, the existing impacts on the biophysical and social environments and the sensitivity of these environments, it is recommended that the mitigation measures as presented in this BAR, the EMPr, and the various specialist assessments must comply with throughout all phases of the proposed development.