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Proposed Halfgewonnen Solar PV Facility on Portions 7, 8, 9 and 16 of the Farm Halfgewonnen 190IS, Mpumalanga Province

Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) Report

Reference Number: 14/12/16/3/3/2/2068

ISSUED FOR PUBLIC COMMENT

September 2021

Prepared for:		Completed by independent EAP	
Company	Dreamworks Haven Investments Pty Ltd	Company	Cabanga Concepts cc t/a Cabanga Environmental
Site	Halfgewonnen Solar PV Facilities	Author	Lelani Claassen
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DOCUMENT CONTROL

Role	Name	Signature	Document Version	Date
Author:	Lelani Claassen Pr. Sci. Nat. 121645 Registered EAP 2018/153		Internal Review Applicant Review Public Review Authority submission	17 August 2021 25 August 2021 6 September 2021
Reviewed:	Michelle Venter Cert. Sci. Nat. 114447 Registered EAP 2019/456		Internal review	25 August 2021
Approved:	Ken van Rooyen Pr. Sci. Nat 400121/93		Internal Approval	25 August 2021

Executive Summary

The Applicant (Dreamworks Haven Investments Pty Ltd) proposes to develop the Halfgewonnen Solar Photovoltaic (PV) Facilities on Portions of Portion 7, 8, 9 and 16 of the Farm Halfgewonnen 190IS, in the Govan Mbeki Local Municipality of the Gert Sibande District Municipality, Mpumalanga.

The total proposed Solar PV Facility will generate approximately 80 MW of power. Three alternative powerline routes are being considered to connect the proposed solar plant to the National Grid – via one of the three existing 88kv Eskom substations (i.e., Halfgewonnen South, Forzando or Ysterkop).

The Project is being developed as part of the Department of Mineral Resources and Energy (DMRE) Renewable Energy Independent Power Producer Procurement Programme (REIPPP), and will also be able to directly address the electricity needs of immediately surrounding consumers.

The project requires a number of authorisations / permissions to be obtained prior to construction, including (but not limited to) an Environmental Authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

An application for Environmental Authorisation was consequently submitted to the Department of Forestry, Fisheries and the Environment (DFFE) on 18 May 2021. The Draft Scoping Report was made available for a public comment period from 12 May 2021 to 18 June 2021 (36 days). The Draft Scoping Report was updated with comments received during the public comment period and submitted to the DFFE on 30 June 2021. The DFFE accepted the scoping report and approved the Plan of Study for Environmental Impact Assessment (EIA) on 20 July 2021. Subsequently, this Draft EIA Report was prepared in accordance with the approved plan of study for EIA and comments received from the DFFE.

This Draft EIA Report is being made available for a public comment period of 30 days whereafter the report will be updated with all comments received and submitted to the DFFE for consideration.

This EIA Report contains detailed descriptions of the proposed project (section 2) including an evaluation of the need for the project (section 4) and alternatives to the project (section 5), an overview of the policy and legislative context pertaining to the proposed development (section 3), a description of the receiving environment (section 7), and a comprehensive impact assessment with management measures to address the identified impacts (section 9 and 10 respectively). The public participation process that has been followed thus far and will be followed is summarised in section 6 and details provided in Appendix B.

If all of the management and mitigation measures contained in this report are implemented successfully, it is anticipated that potential impacts arising from the project can be avoided entirely, or managed to acceptable significance levels. The transition from coal-based electricity generation in South Africa, to renewables, is to some extent inevitable and the proposed project has the potential to contribute positively to the National Grid and secure reliable and sustainable electricity supply to consumers in the immediate vicinity of the project.

Table of Contents

List of Tables

List of Figures

List of Plans

List of Appendices

ACRONYMS AND ABBREVIATIONS

ACRONYM:	DESCRIPTION:
AC	Alternating Current
AEL	Atmospheric Emissions License
AGIS	Agricultural Geo-referenced Information Service
AQMP	Air Quality Management Plan
BGIS	Biodiversity Geographic Information Systems
CARA	Conservation of Agricultural Resources Act, 1983 (Act No 43 of 1983)
CBA	Critical Biodiversity Area
CRR	Comment and response report
c-Si	Polycrystalline
DC	Direct Current
DEA	Department of Environmental Affairs
DEFF DFFE	Department of Environment Forestry and Fisheries Department of Forestry Fisheries & Environment
DMRE	Department of Mineral Resources and Energy
DWS	Department of Water and Sanitation (previously Department of Water Affairs and Forestry, DWAF
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioner's Association of South Africa
EIA	Environmental Impact Assessment
EIS	Environmental Importance and Sensitivity
EMP	Environmental Management Plan
ERA	Electricity Regulation Act, 2006 (Act No. 4 of 2006) (as amended)
GHG	Greenhouse Gas
GMLM	Govan Mbeki Local Municipality
GN R	Government Notice Regulation
GPS	Global Positioning System
GVA	Gross Value Added
Ha	Hectares
HDSAs	historically disadvantaged South Africans

ACRONYM:	DESCRIPTION:
HGM	Hydrogeomorphic
HPA	Highveld Priority Area
I&APs	Interested and Affected Parties
IDP	Integrated Development Plans
IPP	Independent Power Producer
IPPPP	Independent Power Producers Procurement Programme
IRP	Integrated Resource Plan
kv	Kilovolt
LED	Local Economic Development
MBSP	Mpumalanga Biodiversity Sector Plan
MHSA	Mine Health and Safety Act, 1996
MPHRA	Mpumalanga Provincial Heritage Resources Authority
MPRDA	Mineral and Petroleum Resources Development Act, Act 28 of 2002
MRA	Mining Right Area
MTPA	Mpumalanga Tourism and Parks Agency
MW	Mega Watts
NAAQS	National Ambient Air Quality Standards
NBA	National Biodiversity Assessment (NBA (2018)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMAQA	National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NEMPAA	National Environmental Management: Protected Areas Act, 2003 (Act No 57 of 2003)
NEMWA	National Environmental Management Waste Act, 2008 (Act No. 59 of 2008)
NERSA	National Energy Regulator of South Africa
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
O&M	Operation and Maintenance
PES	Present Ecological State
PPP	Public Participation Process

ACRONYM:	DESCRIPTION:
PV	Photovoltaic
RBS	Revised Balance Scenario
RDL	Red Data Listed
RE	Renewable Energy
REIPPP	Renewable energy independent power producer procurement programme
RMIPPPP	Risk Mitigation Independent Power Producer Procurement Programme
SAAELIP	South African Atmospheric Emissions Licensing and Inventory Portal
SACNASP	South African Council for natural scientific professions
SAGERS	South African Greenhouse Gas Emissions Reporting System
SAHRA	South African Heritage Resources Agency
SAPAD	South African Protected Areas Database
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SPLUMA	Spatial Land Use and Management Act, 2013 (Act No. 16 of 2013)
TF	Thin Film
VIA	Visual Impact Assessment
WUL(A)	Water Use License (Application)

Key Information relevant to the Proposed Project

Aspect	Description
The applicant	Dreamworks Haven Investments (Pty) Ltd)
Activity description	The applicant proposes to develop the Halfgewonnen Solar Photovoltaic (PV) Facility, that will generate approximately 80 Mega Watt (MW) of electricity for distribution to immediately surrounding consumers and the National Grid.
Capacity of facility	Up to 80 MW Solar PV Facility Up to 20MW Battery Storage
Project location	Portions 7, 8, 9 and 16 of the Farm Halfgewonnen 190IS, in the in the Govan Mbeki Local Municipality of the Gert Sibande District Municipality, Mpumalanga
Size of the site and proposed development	The mentioned Farm Portions comprise in total approximately 724 Hectares (Ha). A study area of approximately 340 Ha was identified for further study and the evaluation of layout alternatives. The proposed project footprint comprises approximately 160 Ha.
Project Components	• Solar PV Panels • Mounting Structures • Inverters and Transformers • Powerlines • Battery Storage (up to 20 MW) • Supporting Infrastructure: main sub-station, operation and maintenance office, weather station, internal roads, parking, offices, staff ablutions.
Environmental Assessment Practitioner (EAP) where comments can be submitted and more information obtained	Cabanga Concepts CC (trading as Cabanga Environmental) Lelani Claassen Pr. Sci. Nat. (Environmental Science) (121645) Registered EAP with the Environmental Assessment Practitioner's Association of South Africa (EAPASA) (2018/153) Tel: 011 794 7534 Fax: 011 764 6946 e-mail: lelani@cabangaenvironmental.co.za

1 Introduction

The Applicant (Dreamworks Haven Investments Pty Ltd) proposes to develop the Halfgewonnen Solar Photovoltaic (PV) Facilities on Portions of Portion 7, 8, 9 and 16 of the Farm Halfgewonnen 190IS, in the Govan Mbeki Local Municipality of the Gert Sibande District Municipality, Mpumalanga (Plan 1).

The total proposed Halfgewonnen Solar PV Facility will generate approximately 80 MW of power. The Project comprises of two components:

- Solar PV 1 will generate approximately 20 Mega Watts (MW). Construction is expected to take approximately 10 months. The total development footprint will not exceed 30 Ha. The development will initially aim to address the electricity requirements for the immediately surrounding and adjacent consumers, including (but not limited to) the surrounding coal mines. Once the mines reach the end of their operational lives, and if no other consumers can be identified in the immediate surroundings, Solar PV1 will be connected to the National Grid.
- Solar PV 2 will generate approximately 60 MW. Construction is expected to take approximately 12 months. The total development footprint is expected to comprise about 60 Ha. Solar PV 2 will be connected to the National Grid and is being developed as part of the Department of Mineral Resources and Energy (DMRE) Renewable Energy Independent Power Producer Procurement Programme (REIPPP).

Three alternative powerline routes are considered to connect the proposed solar plant to the National Grid – via one of the three existing 88kv Eskom substations (i.e., Halfgewonnen South, Forzando and Ysterkop). The preferred option is via the Ysterkop substation and Eskom has confirmed that the grid connection at Ysterkop substation is feasible. A Grid Connection Cost Estimate Letter (CEL) was received by the Applicant from Eskom on the 30th July 2021.

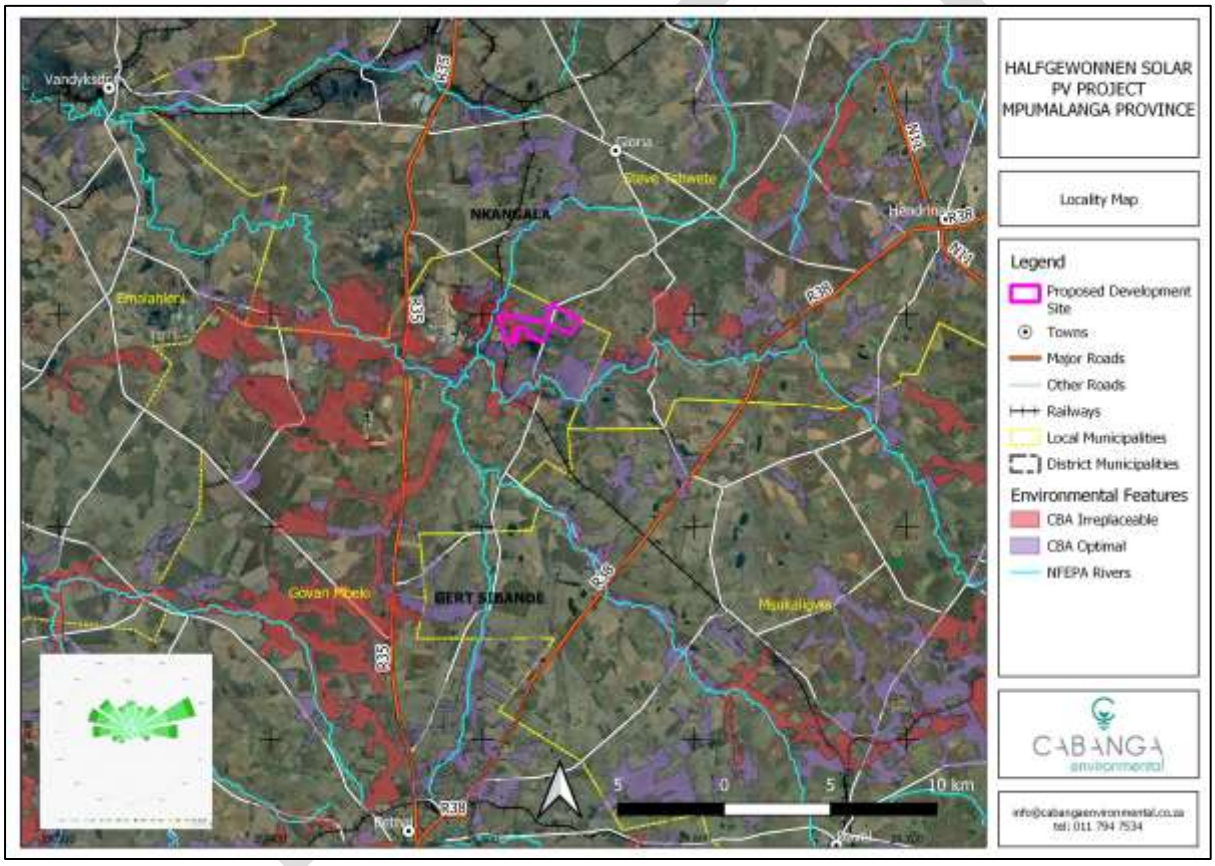
The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) is the principal legislation dealing with the management of environmental impacts potentially arising from development proposals in South Africa. Section 24 (1)(a) and (b) of NEMA state that the potential impact on the environment and socio-economic conditions of activities that require authorisation or permission by law and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity.

The Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) set out the procedures for applying for Environmental Authorisation in terms of NEMA, and contains lists of activities that specifically require environmental authorisation. The proposed Halfgewonnen Solar PV Facility will involve the undertaking of Listed Activities and therefore Environmental Authorisation must be obtained prior to commencement of the proposed development.

Dreamworks Haven Investments (Pty) Ltd) (hereafter "Dreamworks"), the Applicant, has appointed Cabanga Concepts CC (trading as Cabanga Environmental, "Cabanga" hereafter) as the independent Environmental Assessment Practitioner (EAP) to undertake the Scoping and EIA Process required for the application.

The Scoping and EIA Process being followed is in accordance with the EIA Regulations, 2014 (as amended). The Application was submitted to the Department of Forestry, Fisheries and Environment (DFFE) on 18 May 2021. The Scoping Report was made available for public comment from 12 May 2021 to 18 June 2021 and submitted to the DFFE for consideration on 30 June 2021 after being updated with the comments received during the public participation process. The Scoping Report (including the plan of study for EIA) was approved by the DFFE on 20 July 2021. Please see Appendix A.

This report constitutes the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) Report compiled in terms of the abovementioned application, and is submitted to Interested and Affected Parties (I&APs) for a comment period of 30 days, following which the Report will be updated with the comments received and submitted to DFFE for consideration.



Plan 1: Regional Location of the Proposed Project

1.1 Structure of this report

The required content of an EIA Report is prescribed in Appendix 3 of the EIA Regulations, 2014 (As amended). Table 1 presents these requirements and provides cross-references to the various sections of this report where the requirements are addressed.

The required content of an Environmental Management Plan is provided in Appendix 4 of the EIA Regulations, 2014 (as amended), and shown in Table 2 with cross-references to the relevant section(s) of this report.

Table 1: Structure of the EIA Report

Requirement, as per EIA Regulations 2014 (as amended)		Section of this report
(1) An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include—		
(a) details of—	(i) the EAP who prepared the report; and	Section 1.2
	(iii) the expertise of the EAP, including a curriculum vitae;	Section 1.3 and Appendix C
(b) the location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report, including:	(i) the 21-digit Surveyor General code of each cadastral land parcel;	Project Location is described in Section 2.1. Details of the affected properties are provided in Table 6.
	(ii) where available, the physical address and farm name;	
	(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	
(c) a plan which locates the proposed activities applied for and the associated structures and infrastructure at an appropriate scale,		Refer to Plan 3 and Plan 4
(d) a description of the scope of the proposed activity, including—	(i) all listed and specified activities triggered and being applied for;	Section 2.5
	(ii) a description of the associated structures and infrastructure related to the development;	Section 2.3
(e) a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;		Section 3
(f) a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred development footprint within the approved site as contemplated in the accepted scoping report;		Section 4
(g) a motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report;		Section 2.1.1
(h) a full description of the process followed to	(i) details of the development footprint alternatives considered;	Section 5.3

Requirement, as per EIA Regulations 2014 (as amended)		Section of this report
reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including:	(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 6 and Appendix B
	(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	
	(iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 7
	(v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts— (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	Section 9.2
	(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;	Section 9.1
	(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 9.2
	(viii) the possible mitigation measures that could be applied and level of residual risk;	Table 24 and Section 10

Requirement, as per EIA Regulations 2014 (as amended)		Section of this report
	(ix) if no alternative development footprints for the activity were investigated, the motivation for not considering such;	N/A – alternatives were investigated, see Section 5
	(x) a concluding statement indicating the location of the preferred alternative development footprint within the approved site as contemplated in the accepted scoping report;	Section 5.10
a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including—	(i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and	Section 9.1 & 9.2
	(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;	Section 9.2
(j) an assessment of each identified potentially significant impact and risk, including—	(i) cumulative impacts;	Section 9.2 and 9.3
	(ii) the nature, significance and consequences of the impact and risk;	
	(iii) the extent and duration of the impact and risk;	
	(iv) the probability of the impact and risk occurring;	
	(v) the degree to which the impact and risk can be reversed;	
	(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and	
	(vii) the degree to which the impact and risk can be mitigated;	
(k) where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix		Specialist reports are referred to

Requirement, as per EIA Regulations 2014 (as amended)		Section of this report
6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;		throughout this EIA Report and appended hereto.
(l) an environmental impact statement which contains—	(i) a summary of the key findings of the environmental impact assessment:	Section 11
	(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and	
	(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	
(m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMP as well as for inclusion as conditions of authorisation;		Section 10.3
(n) the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;		Section 5
(o) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;		Section 11
(p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;		Section 13
(q) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;		Section 11
(r) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;		Section 2.4

Requirement, as per EIA Regulations 2014 (as amended)		Section of this report
(s) an undertaking under oath or affirmation by the EAP in relation to—	(i) the correctness of the information provided in the reports;	Appendix C
	(ii) the inclusion of comments and inputs from stakeholders and I&APs;	
	(iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and	
	(iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	
(t) where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;		Section 12
(u) an indication of any deviation from the approved scoping report, including the plan of study, including—	(i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and	N/A there is no deviation from the approved Plan of Study
	(ii) a motivation for the deviation;	
(v) any specific information that may be required by the competent authority;		Section 11.2
(w) any other matters required in terms of section 24(4)(a) and (b) of the Act.		

Table 2: Structure of the EMP Report

No	Requirement	Section of this report
1	An EMP must comply with section 24N of the Act and include—	
(a)	details of– (i) the EAP who prepared the EMP; and (ii) the expertise of that EAP to prepare an EMP, including a curriculum vitae;	Section 1.2, Section 1.3 and Appendix C
(b)	a detailed description of the aspects of the activity that are covered by the EMP as identified by the project description;	Section 9.3
(c)	a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure	Plan 15

No	Requirement	Section of this report
	on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	
(d)	a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including — (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities;	Section 10.3
(e)	- (repealed)	
(f)	a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to — (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;	Section 10 and Appendix E
(g)	the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 10.4
(h)	the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 10.4
(i)	an indication of the persons who will be responsible for the implementation of the impact management actions;	Section 10.4
(j)	the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 10.3
(k)	the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 10.4
(l)	a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 10.4

No	Requirement	Section of this report
(m)	an environmental awareness plan describing the manner in which— (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Section 10.5
(n)	any specific information that may be required by the competent authority.	Section11.2

1.2 Details of the Report Authors

The details of the persons who prepared this report are provided in Table 3.

Table 3: Details of the Authors

Author and EAP	**Lelani Claassen**
Highest qualification	BSc Honours Environmental Management
Years' experience	10+ years
Professional registration	Registered Environmental Assessment Practitioner (EAP) with the Environmental Assessment Practitioner's Association of South Africa (EAPASA). Registration Number 2018/153. Registered Scientist (Environmental Science) with the South African Council for Natural Scientific Professions (SACNASP) as required in terms of the Natural Scientific Professions Act of 2003: Pr. Sci. Nat (Reg. 121645)
Public Participation & Review	**Michelle Venter**
Highest qualification	BSc Honours Geography
Years' experience	10+ years
Professional registration	Registered EAP with EAPASA. Registration Number 2019/456. Cert. Sci. Nat. (Reg: 114447)
Approval	**Ken van Rooyen**
Highest qualification	MSc Geography
Years' experience	30+ years
Professional registration	Pr. Sci. Nat (Reg. 400121/93)

1.3 Expertise of the EAP

Lelani Claassen started her career as an environmental consultant in 2008. She holds an Honours degree in Environmental Management from UNISA and a BSc Degree in Landscape Architecture from the University of Pretoria. She has also successfully completed the SABS Short-course: Environmental Legal Requirements for ISO 14001 compliance. Her project experience is extensive in scope and covers various aspects of development including residential developments, filling stations and depots, infrastructure and mining projects.

Lelani's experience includes environmental authorization processes: Basic Assessments, Environmental Impact Assessments, Environmental Management Plans and Programmes, Mining Right Applications, Water Use Licensing, Concept (Fatal Flaw), Pre-Feasibility and Feasibility Studies. She also has experience as an Environmental Control Officer and has completed numerous environmental compliance audits and environmental-legal compliance assessments.

Lelani is a Registered EAP (Registration Number 2018/153) with the Environmental Assessment Practitioner's Association of South Africa (EAPASA), the only Registration Authority for EAPs in South Africa in terms of Section 24H of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

Lelani is also a Registered Scientist with the South African Council for Natural Scientific Professions (SACNASP) (Environmental Science) (Pr. Sci. Nat 121645), the legislated regulatory body for natural science practitioners in South Africa in terms of the Natural Scientific Professions Act of 2003.

Lelani's CV and declaration of independence are included in Appendix C

2 Details of the proposed Project

The purpose of this section is to provide the public with sufficiently detailed information regarding the proposed project to facilitate meaningful public participation; and to provide the relevant decision-making authorities with sufficiently detailed information about the proposed project to enable informed consideration of the application, and decision-making.

Details of the Project Applicant are provided in Table 4.

Table 4: Details of the Project Applicant

Project applicant:	Dreamworks Haven Investments (Pty) Ltd		
Registration No:	2016/173562/07		
Contact person	Keobakile Sedupane		
Head-Office Address:	Unit 5287, Thornton Place, Blue Valley Estate, Kosmosdal, Centurion		
Postal Address:	P.O. Box 32836, Kyalami, 1685		
Telephone:	083 254 5210	Cell:	083 254 5210
E-mail:	keo@k-energy.co.za	Fax:	086 276 8475

2.1 Project Location

The proposed Solar PV Development will be located on portions of Portion 7, 8, 9 and 16 of the Farm Halfgewonnen 190IS (Plan 2), in the Govan Mbeki Local Municipality of the Gert Sibande District Municipality. Hendrina lies approximately 20km north-east of the proposed site. Bethal lies approximately 30km south of the proposed site (Plan 1).

The site is located within the Mining Right Area (MRA) of the Halfgewonnen Colliery. The Rights at Halfgewonnen Colliery were previously held by Sudor Coal, but since June 2020 are held by Overlooked Colliery Alpha (Pty) following a transfer of the rights in terms of Section 11 of the Mineral and Petroleum Resources Development Act, Act 28 of 2002 (MPRDA). The details of the Holder of the surface and mining rights are provided in Table 5.

Table 5: Details of the land owner and holder of the Mineral Rights

Name of the landowner:	Overlooked Colliery Alpha (Pty) Ltd		
Name of contact person for landowner:	Ontiretse Mathews Senosi		
Postal address:	22A Samora Machel, Middelburg		
Postal code:	1050	Cell:	082 444 6194
Telephone:	082 444 6194	Fax:	013 246 1725
E-mail:	msenosi@overlooked.co.za		

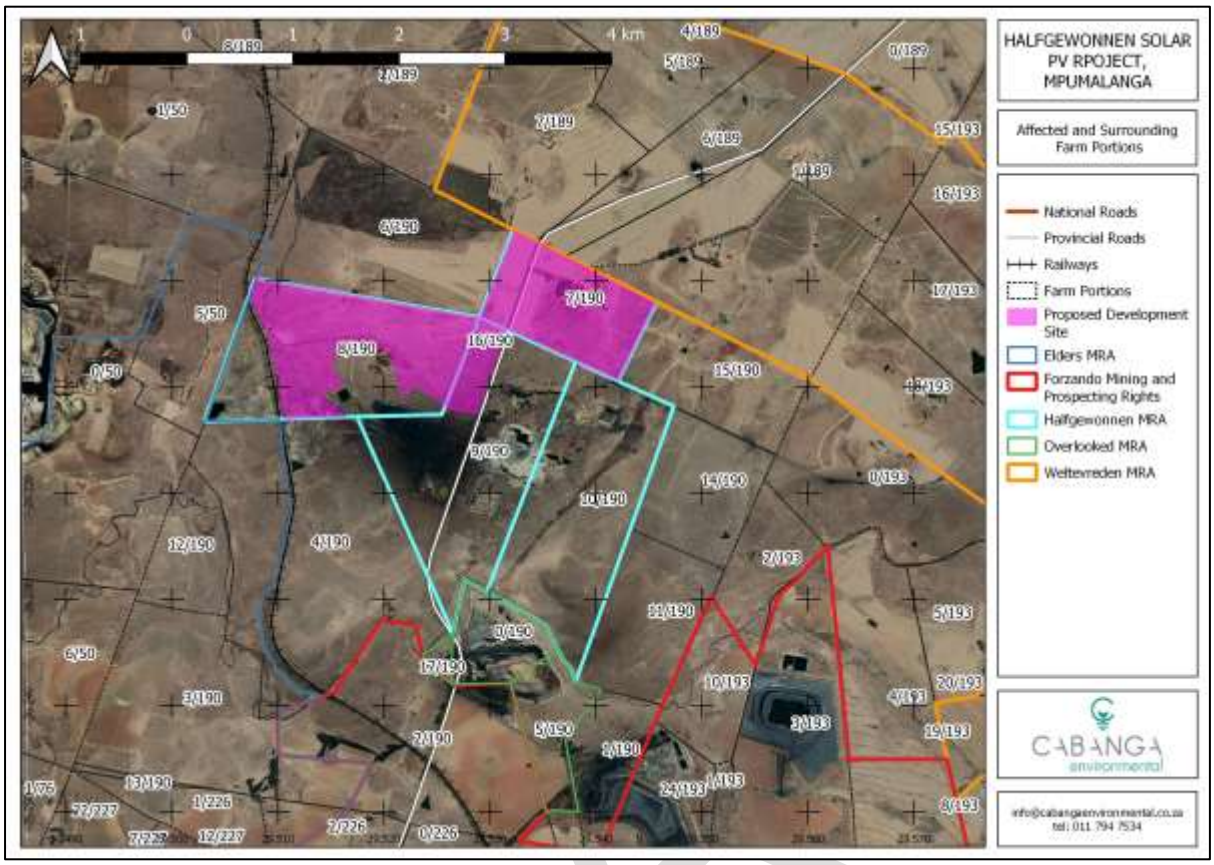
Numerous other mining rights are located in the immediate vicinity of the proposed project site, as shown in Plan 2, providing further motivation for the development of Solar PV1 to address the needs of consumers in the immediate surroundings. The project will be able to sell electricity to these consumers until it is connected to the National Grid.

The 21-digit Surveyor General code of each cadastral land parcel are as follows:

Table 6: 21-Digit Surveyor General Codes of affected properties

T	0	I	S	0	0	0	0	0	0	0	0	0	1	9	0	0	0	0	0	7
T	0	I	S	0	0	0	0	0	0	0	0	0	1	9	0	0	0	0	0	8
T	0	I	S	0	0	0	0	0	0	0	0	0	1	9	0	0	0	0	0	9
T	0	I	S	0	0	0	0	0	0	0	0	0	1	9	0	0	0	0	1	6
1	**2**			**3**				**4**								**5**				

Central Coordinate of the Project Site	26°12'20.24"S; 29°31'46.22"E



Plan 2: Proposed development site in the context of surrounding Mining Rights

The direction and distance from the proposed development site to the nearest towns are provided in Table 7.

Table 7: Direction and distance to surrounding towns

Town Name	Direction from site	Linear Distance from site
Komati	North-North-West	14 km
Hendrina	East-North-East	19.5 km
Pullens Hope	North-North-East	21 km
Kriel	West-South-West	27 km
Bethal	South-South-West	28 km
Emalahleni	North-West	45 km
Ogies	West-North-West	51 km

2.1.1 Motivation for Development Footprint within the Site

A site selection process was undertaken by Cabanga Environmental at the request of the Applicant, in consultation with the Land Owner. The details of the alternatives considered are discussed in Section 5. The site selection report is included as Appendix G.

In summary, a proposed development site comprising a total of approximately 340 Hectares (Ha) was identified on Portions of Portion 7, 8, 9, 10 and 16 of the Farm Halfgewonnen 190 IS. This site was identified as potentially suitable for the development of the proposed Solar PV Project, due to the following considerations:

- Surface Rights Ownership;
- Land availability (not affected by or earmarked for Mining Development);
- Developable size;
- Access (existing road network);
- Access (existing electricity distribution network);
- Geotechnical stability;
- Slope;
- Presence of known wetlands, sensitive biodiversity areas or heritage sites;
- Location in relation to existing mining and associated activities, specifically in terms of potential dust impacts on the Solar PV Project from existing Mines.

A preliminary design was put forward by the Engineering Team, as presented in the original, Draft Scoping Report. Specialist studies were initiated on the proposed development site as part of the application for Environmental Authorisation. The Wetland Specialist informed the EAP and Applicant that there are wetlands present on the site that are conservation-worthy and as such, the Applicant, through his Engineering Team, adjusted the site layout to avoid these wetland areas.

In summary, initial areas comprising some 750 Hectares (Ha) were identified as potential development sites for the Halfgewonnen PV Project, based on land ownership and availability. This area was refined to an investigation area of approximately 340 Ha based on desktop environmental sensitivities identified on the original area. Within this refined possible development site, the preferred layout was designed in response to environmental sensitivities identified by specialists.

2.2 Project Scope

This Application relates to the Application for Environmental Authorisation in terms of the NEMA for the Halfgewonnen Solar PV facility.

It is anticipated that authorisation will also have to be obtained from the Department of Water and Sanitation (DWS) in terms of the National Water Act, 19989 (Act No 36 of 1998). However, it is understood that the DWS is not processing applications for Water Use Licenses associated with the DMRE REIPPP until a preferred bidder(s) is identified.

There are new Listed Activities associated with the proposed Project. These Activities are identified in terms of Listing Notice 1, 2 and 3 of the EIA Regulations 2014 (as amended).

A Scoping and Environmental Impact Assessment (EIA) Process is therefore relevant to the application.

2.3 Project Description

The proposed Halfgewonnen Solar PV Facility will generate approximately 80 Mega Watts (MW) of power for distribution into the National Grid (PV2) and specifically for the benefit of mining and farming communities located closer the proposed development (PV1). Three

alternative powerline routes are being considered to connect the proposed solar plant to the National Grid – via one of the three existing 88kv Eskom substations (i.e., Halfgewonnen South, Forzando and Ysterkop). Eskom has confirmed that the grid connection at Ysterkop substation is feasible

The proposed PV facility will most likely use Crystalline Silicon PV technology; however, this may change depending on whether or not the Applicant will use single axis tracking or fixed mounting solutions for the facility. Technology alternatives are discussed in Section 5 of this Report.

Detailed design of the facility is still being undertaken by the Engineering Team. The latest version of the Project Design Drawings is included in Appendix D.

2.3.1 Project Components

"Photovoltaic" or "PV" relates to cells made from semi-conductor materials that are able to release electrons when exposed to solar radiation (sunlight) by using the photo-electric effect (DEA, 2015). In Layman's terms; Solar PV technology converts energy from the sun into electricity. The proposed Projects thus comprise of the following components:

- **Solar PV Panels**: The two most common types of PV Panel technology are Polycrystalline (c-Si) technology and Thin Film (TF) technology and these can also be used in conjunction. Both technologies comprise of PV cells, that make up PV modules, that in turn make up solar panels. The collection of solar panels makes up the solar array (a group of panels connected together).
- **Mounting Structures**: The solar PV panels will be fixed to tilted mounting structures likely consisting of steel posts used as structural support for the solar array. Tilt brackets will be at an angle of about 16° (to be confirmed by technical studies that are underway) (Figure 1).
- **Inverters and Transformers:** All PV cells produce Direct Current (DC) electricity. The solar array is connected via cables to the inverters, to convert the DC electricity to Alternating Current (AC) electricity, at grid frequency. Transformers then increase the voltage so the electricity may be connected to the Project's main sub-station.

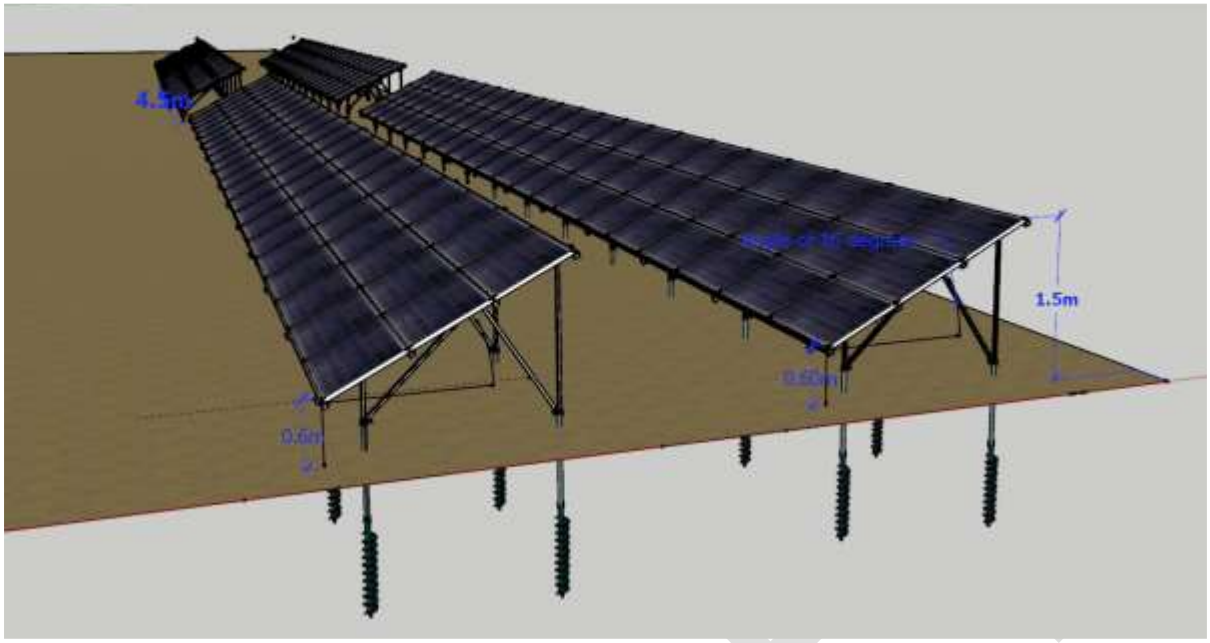


Figure 1: Typical Solar Array[1]

- **Powerlines:** Powerline alternatives are discussed in Section 5. The preferred alternative involves that, from the project's main sub-station, the project will be connected to the Ysterkop sub-station (existing) via proposed 88kV overhead powerlines. The connection distance is approximately 7km. The proposed powerline route runs mostly along the existing powerline routes, along the provincial road, past the Overlooked Colliery (South of Halfgewonnen Colliery), and then east, past the Forzando North Colliery to the Ysterkop substation.
- **Battery Storage:** Up to 20 MW battery storage facility is proposed. Various energy storage technologies are currently being assessed as part of the feasibility studies. The Applicant is considering lithium-ion batteries as well as vanadium redox flow batteries. The chosen technology will largely depend on the appointed Engineering, Procurement and Construction (EPC) Contractor. Batteries will be pre-assembled by the supplier and transported to site in container(s) for installation.
- **Supporting Infrastructure:** Supporting infrastructure will include the mentioned main sub-station, an operation and maintenance (O&M) office and a weather station (climate detector). Additionally, internal roads (to facilitate access required for maintenance), parking, offices, and ablutions for staff will be included.

The proposed project Layout is illustrated in Plan 3.

A typical system design overview is presented in Figure 2. Table 8 presents further detail of each component.

[1] Image provided through Applicant, from Green Energy Holdings Group of EPC Consortium

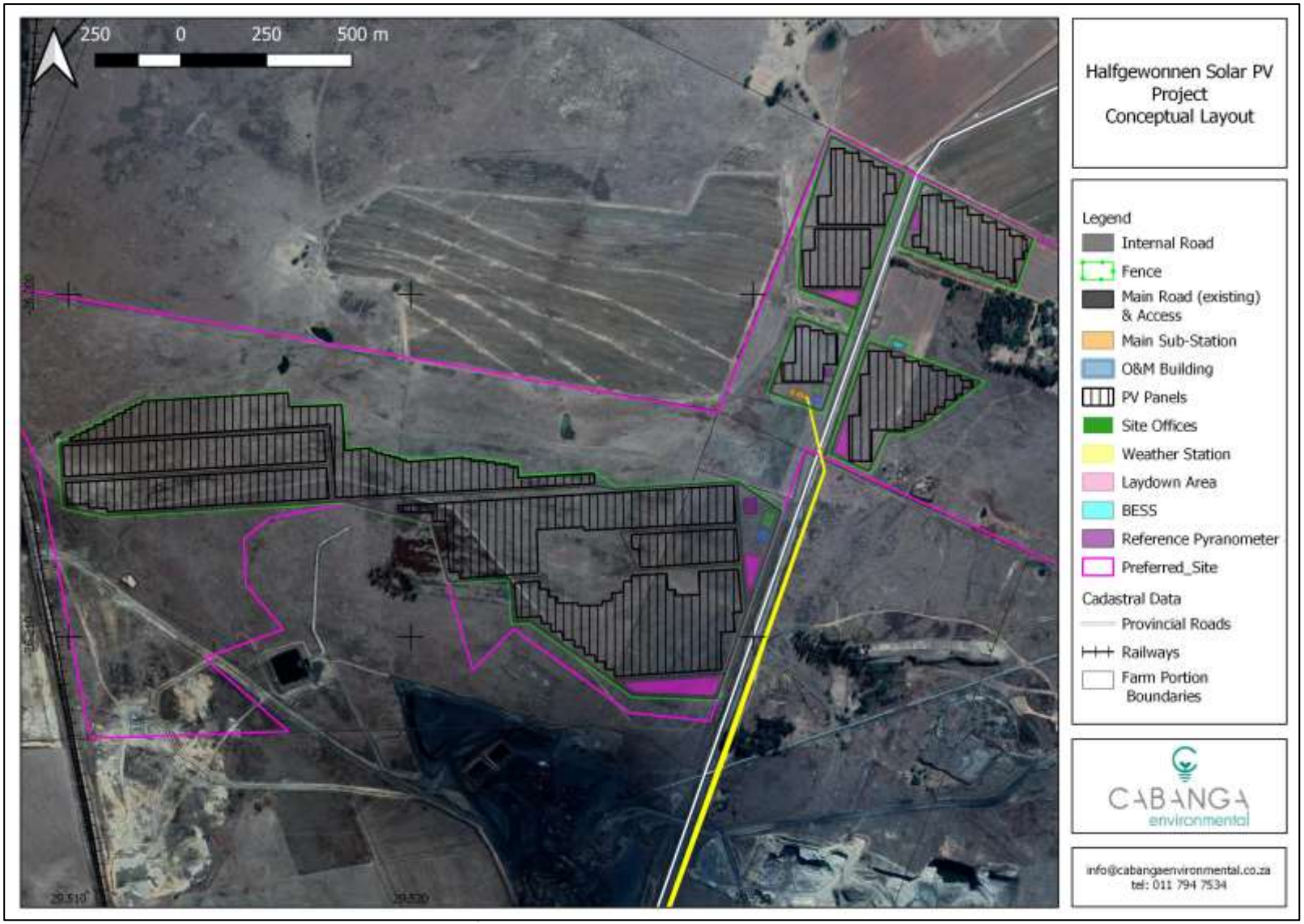
Figure 2: System Design Overview[2]

Table 8: Detail of Project Components

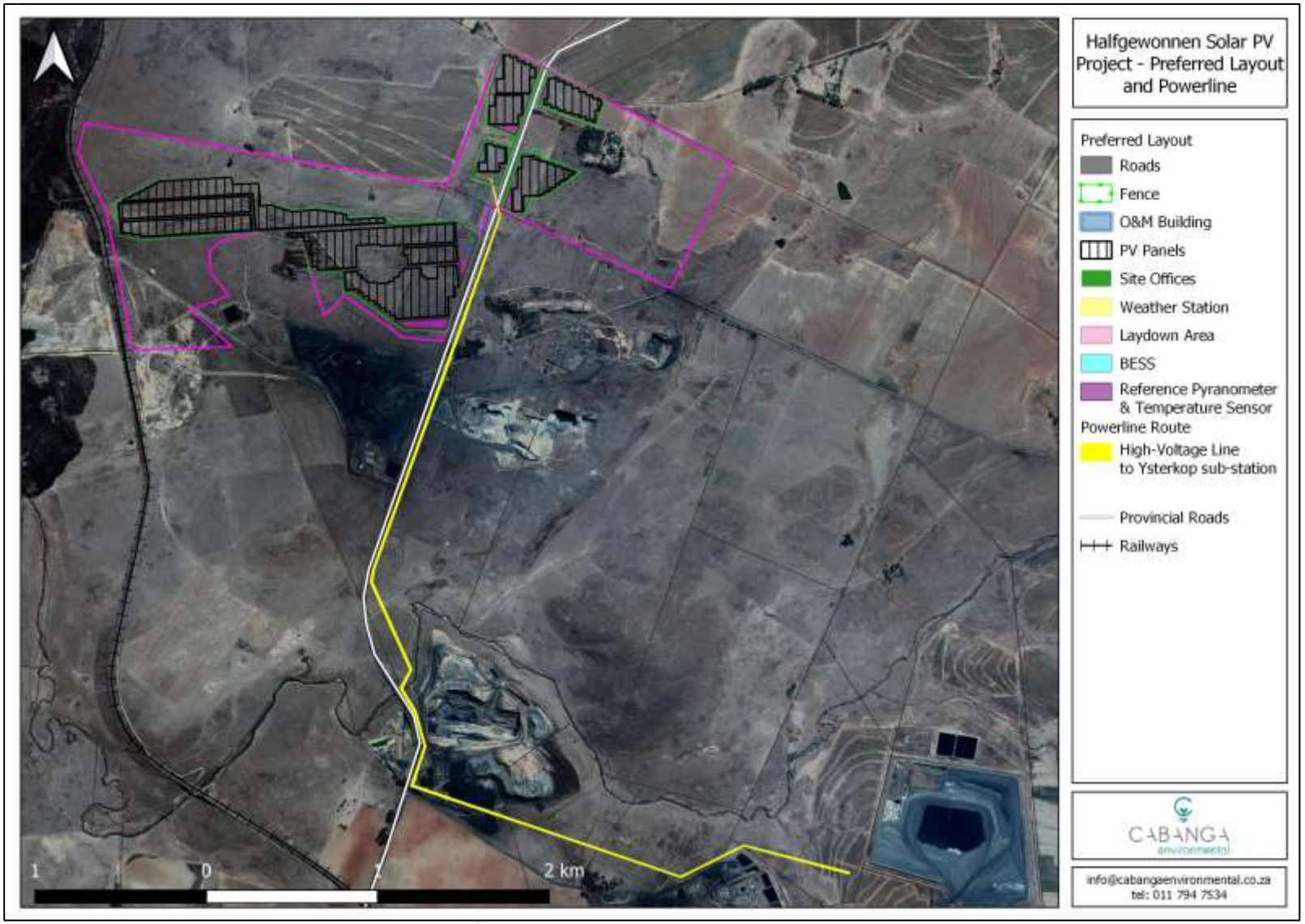
Component	Description / dimensions
Height of PV panels	Approximately 5m
Area of PV array	PV 1(20MW): Module area: ~11.6 Ha Cell area: ~10.7 Ha PV2 (60MW): Module area: ~36.8 Ha Cell area: ~34 Ha
Number of inverters required	PV1 (20MW): 6 units PV2 (60MW): 19 units
Area occupied by inverter / transformer stations / substations	~3 Ha Inverter dimensions: Area = 7.74 per sqm Dimensions (W*H*D): 2991*2591*2438 mm
Capacity of on-site substation	22/132kV
Capacity of the powerline	Export capacity onto the Ysterkop line is Chickadee, limited to around 95MVA at 50 degrees, while the nearby Kudu-Aberdeen line is Bear, limited to around 120MVA at 50 degrees. Those are the two interconnection options available
Length of the powerline corridor	Approximately 7km

[2] Image provided through Applicant, from Green Energy Holdings Group of EPC Consortium

Component	Description / dimensions
Width of the powerline corridor	Approximately 31m (15.5m on either side of the centre line)
Area occupied by BESS	Approximately 700m² (up to 1 Ha) A 20MW Battery Energy Storage System (BESS) will generate 80MWh for 4 - 6 hours during peak energy demands by the mines. Both Vanadium Redox Flow technology and Lithium-Ion technology are currently being considered for the project, depending on which is most feasible technically and financially at the time of implementation.
Area occupied by both permanent and construction laydown areas	Up to 5 Ha. The occupied area will include a laydown area, makeshift temporary offices, a construction yard and a concrete batching facility.
Area occupied by buildings	• Laydown Area (North) for PV1 array (20MW): 1050 m² • Laydown Area (West) for PV1 array (20MW): 2200 m² • Laydown Area (South) for PV2 array (60MW): 10 350 m² • Site Offices for PV1 array (20MW): 625 m² • Site Offices for PV2 array (60MW): 1200 m² • O&M Building for PV1 array (20MW): 625 m² • O&M Building for PV2 array (60MW): 1200 m²
Length of internal roads	Will be confirmed as the detailed design and site layout are finalized, estimate: 10km to 20km
Width of internal roads	Internal roads are 4m wide. Perimeter roads are 6m wide. Widenings may be required on bends.
Proximity to grid connection	The main project sub-station is approximately 5km linear distance and 6.2km from the Ysterkop sub-station.
Height of fencing	2.4m
Type of fencing	Wired mesh/ chain link fence not electrified
Length and Width of access road	Different areas of the site can be accessed directly from the Halfgewonnen Road. PV 1 access roads will be 10m wide and 20m long. PV2 access roads will be 10m wide and 45m long. Please refer to the detailed plans in Appendix D.



Plan 3: Conceptual Layout: Proposed PV Facility



Plan 4: Conceptual Layout including powerline route

2.3.2 Site Access and Security

The proposed development site borders on the D622 provincial road (also called the Halfgewonnen Road). New access points to the site from the D622 will have to be established (permission from the Provincial Roads Agency required), to gain access to the project areas located east and west of the provincial road.

The proposed development will be fenced for security purposes and access control implemented.

2.3.3 Provision of Services

During both construction and operational phases, a number of supporting services will be required at the site as described below:

2.3.3.1 Power supply

Diesel generators will be used for electrical power supply during the construction phase.

For the operational phase, the electrical reticulation and connection to the grid has taken the 80 MW PV array into account and will be sufficient to export power back to into the grid. The overhead line will supply power to the site from the grid where there is insufficient power available from the Halfgewonnen Solar PV Facility and feed power back into the grid when there is excess renewable energy available from the solar facility.

2.3.3.2 Water

During construction, 25,000–40,000 m^3 of water will be required over a period of 6 - 12-months. Water will also be needed to control dust during grading operations and to control dust on the construction roads.

During operation of the proposed facility, approximately 400 m^3 of water per year will be needed for panel maintenance. The following is therefore assumed:

- Two (2) washes per year; and
- 0.001m^3 of water necessary per square meter of panel.

Water will be required for construction and will also be required for module washing. Washing of modules is a site-specific decision, taking into account the availability of water and the economic benefit for the site.

Overlooked Colliery, south of the proposed development site, has indicated they would be able to provide the project with water.

2.3.3.3 Sewage

During construction, workers will not be housed/ based on site and will be transported to and from the site every day. It is expected that more than 300 workers will be employed to oversee the construction of the solar facility. It is stipulated that the amount of effluent water generated is 25 litres per person per day for toilet use. 20 litres per person per day will be added for all permanent staff. This accumulates to an overall figure of 7 500 litres (7.5m^3) per day during the construction phase and 1 100 litres (1.1m^3) per day during the operational phase.

Conservancy tanks will be installed to contain human effluent during the construction and operational phases of the project. The tanks will be emptied and disposed of at the Kwazamokhule Waste Water Treatment Plant located near Hendrina. The level in the conservancy tank will be monitored by permanent staff to prevent overloading and overflowing.

As per SANS 10252-2, waste generated during the construction and operational phases will accumulate to 7.5m^3 and 1.1m^3 respectively per day. 8 X 6 m^3 (48 m^3 in total) tanks will be installed during construction and 2 X 6 m^3 (12 m^3 in total) tanks will be installed during operational phase. A vacuum tanker (honeysucker) will empty the effluent on a weekly basis or as necessary based on monitoring.

2.3.3.4 Waste Management

Construction waste generated is expected to include solar panel packaging, cable drums and contaminated soil. Packaging includes plastic wrapping, cardboard boxes and wooden pallets. It is estimated that at least 5000 boxes and wooden pallets will be generated by the proposed Halfgewonnen Solar PV Facility project. This will equal 50 tonnes of boxes and 150 tonnes of wooden pallets. Soil contamination due to diesel spillage is also a possibility that will be considered. In order to contain any contamination of soil, it is proposed that a diesel tank bund area will be constructed for the housing of the diesel tank. The appointed Engineering, Procurement and Construction (EPC) Contractor will be responsible for the management and removal of all solid waste.

Waste generated during the operations will be limited to general office waste and will be collected for recycling as far as possible, or be disposed of at the Municipal Landfill.

2.3.3.5 Stormwater Management

Temporary drains will be established during the construction phase to capture any silted runoff. Silt will be used in construction or rehabilitation and only clean water will be allowed to leave the construction site.

Stormwater management measures based on the specialist stormwater management plan (specialist study and engineering designs) will be constructed to manage surface water runoff during the operational phase.

Solar panels themselves do not have a significant effect on the peak flows and runoff volumes. However, if the ground cover under the panels is gravel or bare ground, owing to design decisions or lack of maintenance, the peak discharge may increase significantly with storm-water management control measures needed (Letsolo, 2021).

Permanent structures associated with the Halfgewonnen Solar PV Facility, apart from the solar panels themselves, will include the control room, Operation and Maintenance (O&M) and office buildings. It is proposed that a gutter system be installed to capture all stormwater falling on the structure's roof and redirecting it into a 2m^3 stormwater attenuation tank.

A simple practice that can be implemented would be a buffer strip at the downgradient end of the solar farm. The buffer strip length must be sufficient to return the runoff characteristics with the panels to those of runoff experienced before the panels and associated infrastructure were installed. Alternatively, a detention basin can be installed (Letsolo, 2021).

2.3.3.6 *Employment and operating hours*

Approximately 250 – 300 jobs will be created during the construction, operations and maintenance of the project. This will contribute towards uplifting the local community. It is anticipated that 60% of the jobs created from the project will be for the previously disadvantaged and the local community. The locals will be given first preference based on the availability of the required skill(s). During the construction period, the project will require a temporary workforce which will be approximately 9 to 12 months. Approximately 25 - 30 permanent jobs will be created during operations and maintenance of the Halfgewonnen Solar PV Facility over its lifespan of 25 years. Actual job quantum will be quantified once the EPC contract is in place.

2.4 Time-frames for implementation of the Activity

The project is being developed as part of the Department of Mineral Resources and Energy (DMRE) Renewable Energy Independent Power Producer Procurement Programme (REIPPP). The REIPPP is aimed at increasing the country's electricity production capacity by adding private sector renewables to the National Grid.

The time-frames associated with the REIPPP are uncertain at this stage.

Construction of the proposed project can only commence once all of the necessary approvals in terms of the NEMA (this application) and NWA have been obtained. It is also anticipated that approvals in terms of land use zoning, agreements with the roads authorities and possible other permissions may have to be obtained. Such permissions are beyond Cabanga's scope or expertise.

Due consideration will be given to the existing agricultural activities taking place on portions of the site. The Applicant, land owner and current land user have to reach agreement to ensure that harvesting is complete before construction commences.

The development of renewable energy facilities often takes a considerable time to complete, given the scope of such developments. It may therefore be that the facilities are constructed in piecemeal due to potential constraints such as:

- environmental (seasonal) considerations,
- financial considerations may cause some parts of the project to be constructed in piecemeal as funding becomes available;
- social constraints, such as land access agreements (specifically with regard to servitudes and Eskom preferences pertaining to connections) that can be associated with long time-frames; or
- restrictions on gatherings and the normal undertaking of business and construction activities due to lockdown or illness associated with the Covid-19 pandemic.

Construction and operation (and eventual decommissioning) of the project over an un-defined time-frame due to the unforeseen elements may affect construction time-frames.

Construction of Solar PV 1 is expected to take approximately 10 months. Construction of Solar PV 2 is expected to take approximately 12 months.

The facility life-span is anticipated to be approximately 25 years.

2.5 Listed Activities being applied for

The Listed Activities in terms of the NEMA EIA Regulations 2014 (as amended) pertaining to the proposed project are provided in Table 9. No Listed Waste Management Activities are proposed as part of the Project.

Table 9: Listed Activities applied for

Activity No(s):	**The Basic Assessment Activity(ies) as set out in Listing Notice 1 of the EIA Regulations, 2014 as amended**	**The portion of the proposed project to which the applicable listed activity relates.**
11	The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more;	While the proposed development site is within the Halfgewonnen Coal Mine Mining Right Area, the entire site including the route of the high-voltage powerline to connect the Halfgewonnen PV Project to the Ysterkop Substation (or alternative) is not considered an industrial complex. The 88KV powerline will thus trigger this activity.
12	The development of— (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; —	The proposed infrastructure will have a physical footprint exceeding 100m². Parts of the proposed PV development infrastructure fall within 32m of delineated wetlands on site. A portion of PV1 overlaps a Seep Wetland 2 (largely modified, low ecological importance and sensitivity).
Activity No(s):	**The relevant Scoping and EIA Activity(ies) as set out in Listing Notice 2 of the EIA Regulations, 2014 as amended**	**The portion of the proposed project to which the applicable listed activity relates.**
1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more,	The proposed project will result in the generation of approximately 80 MW of electricity once complete, and the proposed development site is not located in an urban area.

	excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs — (a) within an urban area; or (b) on existing infrastructure.	
15	The clearance of an area of 20 hectares or more of indigenous vegetation	PV2 infrastructure (about 60 Ha) is located on "indigenous vegetation" as per the definition provided in the EIA Regulations[3]. PV1 affects approximately 3 Ha of indigenous vegetation.
Activity No(s):	**The relevant Basic Assessment Activity(ies) as set out in Listing Notice 3 of the EIA Regulations, 2014 as amended**	**The portion of the proposed project to which the applicable listed activity relates.**
12	The clearance of an area of 300 square metres or more of indigenous vegetation, (f) in Mpumalanga, (ii) Within critical biodiversity areas identified in bioregional plans	Approximately 35 Ha of the proposed development footprint overlaps with a Critical Biodiversity Area (CBA) identified in terms of the Mpumalanga Biodiversity Sector Plan. The full 35Ha will not require vegetation clearance but vegetation clearance in this portion of the development footprint will likely exceed 300m².
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; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; (f) in Mpumalanga, (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	The proposed development footprint will exceed 10m² and portions of the proposed development site overlap with a CBA identified in terms of the Mpumalanga Biodiversity Sector Plan as mentioned above. More than 10m² of the PV1 facility affects the Seep Wetland 2 (largely modified, low ecological importance and sensitivity). Portions of PV2 (within the CBA) are within 32m of the delineated channelled valley bottom wetland that forms the northern border of the proposed development site.

[3] "Indigenous Vegetation" refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.

3 Policy and Legislative Context

Section 24 of the Constitution of the Republic of South Africa states that:

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

To give effect to Section 24 of the Constitution, several laws have been promulgated towards realisation of these rights. The National, Provincial and Local legislation most relevant to the proposed development are discussed herein.

3.1 National Environmental Management Legislation

The most prominent legislation dealing with environmental management and impact assessment are discussed below.

3.1.1 The NEMA and EIA Regulations

The National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA), as amended was set in place in accordance with Section 24 of the Constitution of the Republic of South Africa. Certain environmental principles under NEMA have to be adhered to, to inform decision making for issues affecting the environment. Section 24 (1)(a) and (b) of NEMA state that the potential impact on the environment and socio-economic conditions of activities that require authorisation or permission by law and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity.

The EIA Regulations, Government Notice (GN) Regulation 982 were published on 04 December 2014 and promulgated on 08 December 2014. Together with the EIA Regulations, the Minister also published GN R 983 (Listing Notice No. 1), GN 984 (Listing Notice No. 2) and GN R 985 (Listing Notice No. 3). The NEMA EIA Regulations, 2014 and Listing Notices have been amended numerous times. The undertaking of Listed Activities in terms of the EIA Regulations requires Environmental Authorisation to be obtained prior to commencement.

There are new Listed Activities associated with the proposed Halfgewonnen Solar PV Development, as described in Section 2.5 of this Report. Activities are identified in terms of Listing Notice 1, 2 and 3 of the EIA Regulations 2014 (as amended). The EIA Regulations further set out the requirements for reporting, timeframes, public participation and specialist reports.

A comprehensive Scoping and EIA Process is therefore relevant to the application. The Scoping and EIA Process that is being undertaken in terms of the proposed Project is undertaken in accordance with the Regulations, and the EIA Guideline for Renewable Energy Projects (DEA, 2015).

3.1.2 NEMA Regulations pertaining to renewable energy development zones

The Minister of Forestry, Fisheries and Environment identified three additional geographical areas of strategic importance for the development of large-scale wind and solar PV energy facilities (in addition to those published in Government Notice 114 of 2018) on 26 February 2021 (Government Notice 144). The proposed Project is located approximately 20km south of Renewable Energy Development Zone 9 (Emalahleni).

The Minister further identified specific procedures to be followed when applying for environmental authorisation in terms of NEMA, for electricity transmission and distribution projects when occurring in Renewable Energy Development Zones (Government Notice 145 of 26 February 2021). Government Notice 145 does therefore not specifically apply to the proposed project, as it is not located within any of the Renewable Energy Development Zones. The Department published Guidelines for EIAs pertaining to renewable energy projects (DEA, 2015) which were consulted during the compilation of this report and throughout the application process.

3.1.3 National Environmental Management: Waste Act

The National Environmental Management Waste Act, 2008 (Act No. 59 of 2008) (NEMWA) provides for national norms and standards for regulating the management of waste, and the licensing and control of waste management activities.

Regulations to the NEMWA identifies a number of activities which require a Waste Management License (WML) prior to being undertaken.

No Listed Waste Management Activities are relevant to the proposed Halfgewonnen Solar PV Development and no WML in terms of NEMWA is required.

The National Norms and Standards for the storage of waste (GN 926 of 29 November 2013) will still be relevant to waste storage at the proposed Solar PV Project, even though the facility is expected to generate only limited quantities of general domestic (office-type) waste. Specifications for areas/ facilities for the temporary storage and eventual disposal of waste generated at the Project site will be provided in the Environmental Management Plan (EMP).

3.1.4 National Water Act, 1998 (Act No. 36 of 1998) (NWA)

The NWA provides for the sustainable and equitable use and protection of water resources. It is founded on the principle that the National Government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use of water in the public interest, and that a person is only entitled to use water, without a license, if the use is permissible in terms of Section 22 of the NWA.

The competent authority in respect of water use licenses is the Department of Water and Sanitation (DWS, previously Department of Water Affairs and Forestry, DWAF).

"Water Use" is defined in Section 21 of the NWA. Each defined water use, and its possible relevance, to the proposed Halfgewonnen Solar PV Project is described in Table 10. Application for a Water Use License (WUL) will be required.

Table 10: Legislated water uses

S 21	Description	Relevance to the proposed project
a	taking water from a water resource.	This is relevant to abstraction of water from surface resources or groundwater (boreholes) and will probably not be required for the proposed project as water will be obtained from existing licensed sources.
b	storing water.	This is applicable to the bulk storage of clean water and probably not relevant to the proposed project, unless wash water is to be stored on site.
c & i	impeding or diverting the flow of water in a watercourse; altering the bed, banks, course or characteristic of a watercourse.	These water uses apply to development planned in close proximity to water resources including rivers and wetlands. There are wetland areas on the proposed development site and the proposed powerline route will have to cross over the Olifants River and at least one tributary. Water Use Authorisation will have to be obtained prior to the development being undertaken.
d	engaging in a stream flow reduction activity contemplated in section 36.	Such activities relate to afforestation and similar undertakings and are not relevant to the proposed project.
e	engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1).	No controlled activities have been identified that may be associated with the proposed project and this activity is not considered relevant to the proposed project.
f	discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit.	Waste or wastewater will not be discharged from the proposed project – it is recommended that affected water be contained on site and re-used, and may also be re-used in the adjacent ongoing mining operations as process water (to address any deficits in make-up water that may exist and assist the mines in reducing their abstraction of clean water).
g	disposing of waste in a manner which may detrimentally impact on a water resource.	Waste will not be disposed of on site and this activity is not relevant to the proposed project.
h	disposing in any manner of water which contains waste from, or which has been	The proposed project will not involve heating of water or the disposal of water heated through an industrial or power generation process.

S 21	Description	Relevance to the proposed project
	heated in, any industrial or power generation process.	
j	removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people.	This water use is typically associated with dewatering of mine workings and will not be relevant to the proposed project.
k	using water for recreational purposes.	Not relevant to the proposed project.

3.1.5 National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)

According to the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEMAQA) the Department of Environmental Affairs (DEA), the provincial environmental departments and local authorities (district and local municipalities) are separately and jointly responsible for the implementation and enforcement of various aspects of NEMAQA. A fundamental aspect of the approach to the air quality regulation, as reflected in the NEMAQA is the establishment of National Ambient Air Quality Standards (NAAQS) (GN R 1210 of 2009). These standards provide the goals for air quality management plans and also provide the benchmark by which the effectiveness of these management plans are measured.

Activities that are identified in GN 983 require an Atmospheric Emissions License (AEL) to be issued in terms of NEMAQA. No such activities are associated with the proposed project and an AEL will not be required.

GN1123 declared the Highveld Priority Area (HPA) in terms of the NEMAQA. The HPA Air Quality Management Plan (AQMP) was published in GN144. The proposed project site falls within the HPA and thus must comply with the AQMP. Specific measures are included in the EMP, along with specific requirements for prevention and management of dust and emissions potentially arising from the proposed development, and monitoring and reporting requirements.

3.2 Legislation pertaining to mining

The Mineral and Petroleum Resources Development Act, 2002 (MPRDA) (Act No. 28 of 2002) and its Regulations (GNR527, 23 April 2004 as amended by: GNR R1288 dated 29 October 2004; GNR1203 dated 30 November 2006; and GNR349 dated 18 April 2011) is the predominant legislation dealing with the acquisition of rights to search for, extract and process mineral resources in South Africa.

A person may not mine without the necessary authorisations in terms of the MPRDA (among others).

A Mining Right for coal is held over the subject property by Overlooked Colliery Alpha (Pty) Ltd, who is also the land owner of the proposed development site. The Land Owner and Mineral Rights Holder has agreed to the proposed development on their property.

While the proposed Solar PV development is located on an area where Mineral Rights exist, and where mining and mineral processing occurs, the proposed development footprint does not overlap with any of the areas directly affected by mining and the two land-uses are expected to be able to co-exist on the properties, without interfering with each other.

As mentioned, the Halfgewonnen Solar PV1 component of the project will initially be able to supply electricity directly to surrounding consumers/land users in the immediate vicinity, including the surrounding coal mines. Once the mines reach the end of their operational life and are decommissioned, and if no other local consumers are interested in the purchase of electricity directly from the proposed facility, Solar PV 1 will also be connected to the National Grid, while Solar PV 2 will be directly connected to the National Grid from the start.

Section 53 of the MPRDA provides that persons who intend to use the surface rights of any land in any way which may result in sterilisation of a mineral resource or impede any objects of the MPRDA, has to obtain consent from the Minister of Mineral Resources prior to undertaking such activity or land use. While Mineral Rights for coal are held over the proposed development site, the Mine Owners have indicated that they do not intend to mine via open-pit methods the specific portions of land over which the Halfgewonnen Solar PV Project is proposed, or the land affected by the preferred powerline route. The proposed development will therefore not sterilise the mineral resources on the land nor impede the objects of the MPRDA.

Regulation 17(8) of the Mine Health and Safety Act, 1996, (MHSA) Regulations state that "no person may erect, establish or construct any buildings, roads, railways, dams, waste dumps, reserve land, excavations or any other structures whatsoever within a horizontal distance of 100 (one hundred) metres from workings, unless a lesser distance has been determined safe by a professional geotechnical specialist and all restrictions and conditions determined by him or her or by the Chief Inspector of Mines are complied with."

A near-surface geotechnical investigation has been completed over the proposed development site (Appendix F 7). The investigation concluded that the site is suitable for the development of the proposed Solar PV Facility and makes recommendations on foundations for the proposed structures. Further, the proposed development layout has been designed such that the facility is further than 100m from the activities directly associated with the mining and mineral processing activities.

3.3 Legislation pertaining to conservation

The following sections provide an overview of the most pertinent legislation relating to conservation of natural and historic resources in South Africa at present.

The National Environmental Management: **Protected Areas Act**, 2003 (Act No 57 of 2003) (NEMPAA) (as amended) provides for the protection and conservation of ecologically viable areas of South Africa's biological diversity, natural landscapes and seascapes. It further provides for the establishment of a register of protected areas (SAPAD). There are no formally protected areas in the immediate vicinity of the proposed development site, the closest being the Heyns Private Nature Reserve 25km to the north-west and the Rietvlei Private Nature Reserve 45km to the south-east.

The National Environmental Management: **Biodiversity Act**, 2004 (Act No. 10 of 2004) (NEMBA) provides for the management and conservation of South Africa's biodiversity within the

framework of the NEMA. The Act relates to the protection of species and ecosystems that warrant national protection, among others. Certain Fauna and Flora Species of Conservation Concern (SCC) occur on the site, and a number of biodiversity specialist studies have been commissioned as part of the EIA Process.

Some protected plant species will be directly affected by the proposed project that cannot be avoided. The necessary permits for translocation of these species will have to be obtained prior to their disturbance.

The Conservation of **Agricultural Resources Act**, 1983 (Act No 43 of 1983) (CARA) provides for control over the utilization of the natural agricultural resources of the Republic to promote the conservation of soil, water sources and vegetation and the combating of weeds and invader plants. The soil, land use and land capability assessment confirmed that areas of the site contain high-potential agricultural soils. Due to past disturbance of the site (from adjacent mining and agricultural activities), alien invasive species are present as identified in the terrestrial ecology study (Appendix F 3). Such species are a threat to the biological diversity of surrounding areas. The Project must be associated with an alien invasive species management plan.

The National **Heritage Resources Act**, 1999 (Act No. 25 of 1999) (NHRA) aims to promote good management and preservation of the country's Heritage Resources. A Heritage / Archaeological impact assessment was completed as part of the EIA. The NHRA requires (Section 38) that a person who intends to undertake certain types of activities (including developments that will change the character of a site), must notify the responsible Heritage Authority of such development proposal and furnish such information that the Authority may require. The South African Heritage Resources Agency (SAHRA) and Mpumalanga Provincial Heritage Resources Authority (MPHRA) were consulted as part of the public participation process and provided with a copy of the Phase 1 Archaeological Impact Assessment Report (Appendix F 1). SAHRA requested that a Palaeontology Study also be completed. This study is included in Appendix F 1 as well.

3.4 Legislation relevant to Electricity Generation

The **Electricity Regulation Act**, 2006 (Act No. 4 of 2006) (as amended) (ERA) establishes a national regulatory framework for the electricity supply industry and makes the National Energy Regulator of South Africa (NERSA) (established by Section 3 of the National Energy Regulator Act) the custodian and enforcer thereof. The Act further provides for licences and registration as the manner in which generation, transmission, distribution, reticulation and trading of electricity are regulated (among others).

The Applicant will have to follow the necessary procedures and obtain the necessary approvals from NERSA. Cabanga Environmental is not involved in these application processes and the Applicant is managing the application(s) internally.

Electricity regulations on new generation capacity (GN R 399 of 4 May 2011) apply to the procurement of new generation capacity, by organs of state active in the energy sector (excluding nuclear power technology) and specifically aims to facilitate planning for the establishment of new generation capacity and the regulation of entry by a buyer and a seller into a power purchase agreement and the minimum standards for such agreements. The

Applicant must reach suitable agreement to connect the proposed project to the National Grid, though concluding of such agreements are beyond Cabanga's expertise and scope.

The Minister of Energy in consultation with NERSA, acting under Section 34(1) of the ERA and the Electricity Regulations on new generation capacity determined that renewable energy generation capacity is needed to contribute towards energy security and to facilitate achievement of the renewable energy targets of the Republic of South Africa.

The current version of the **Integrated Resource Plan (IRP)** has confirmed that the installation of renewables (including Solar PV) has been brought forward to accelerate local industry. The plan includes 17.8GW of renewables. Following various policy recommendations, modelling and public participation processes, the Revised Balance Scenario (RBS) was changed, resulting in the Policy-Adjusted IRP that includes solar PV as a "separate technology option with an assumed roll-out of 300 MW per year from 2012 (since solar PV can be rolled out early if procurement processes are initiated immediately)" (**Electricity Regulations on the Integrated Resource Plan 2010 - 2030**, GN 400 of 6 May 2011).

3.5 Provincial and Local Legislation and guidelines

The **Mpumalanga Tourism and Parks Agency Act** (Act 5 of 2005) provides for the establishment and management of the Mpumalanga Tourism and Parks Agency (MTPA) and the sustainable development and improvement of the tourism industry in Mpumalanga. Section 2 of the MTPA Act establishes the MTPA as a juristic person. The MTPA came into existence on 1 April 2006 following the merger of the Mpumalanga Parks Board and Mpumalanga Tourism Authority.

The powers and functions of the MTPA in respect of conservation management of the natural resources of the province include administration of the **Mpumalanga Nature Conservation Act** (Act No. 10 of 1998). The Schedules to the Act list "specially protected game", "protected game", "ordinary game" and "protected wild animals", and makes specific provisions regarding hunting, catching, purchase, donation and sale of such game, including the removal, receipt, handling and conveyance of dead game, and the importing and exporting of wild animals from the province. Chapter 4 of the Mpumalanga Nature Conservation Act deals with problem animals, including black-backed jackal (*Canis mesomels*), Caracal / Red Lynx (*Felis caracal*) and Bush Pig (*Potamochoerus porcus*). The Act also places specific restrictions on the picking, donation, sale, export, removal, purchase and receipt of protected and indigenous plants, and invader weeds and plants (Chapter 6).

The specific species present on the site that may be affected by the proposed development are discussed in more detail in Section 7 and the relevant specialist studies (Appendix F).

The **Mpumalanga Spatial Development Framework** (SDF) (MPSDF, 2018) mentions mining as the predominant Regional Spatial Development Initiative in the area where the site is located (Figure 3). Mining and energy-related development is identified as one of nine key drivers of the Mpumalanga Vision 2030, and states the following: "Infrastructure investment aimed at enhancing the mining and electricity industry should be consolidated in the western Highveld of Mpumalanga where the vast majority of coal mines and power stations are located (MPSDF, 2018).

The proposed project site is located in Ward 15 of the Govan Mbeki Local Municipality (GMLM). The GMLM Spatial Development Framework (2014-2034) (GMLM, 2017) identifies Ward 15 as

one of the "rural areas" of the Municipality. The vast majority of the projects identified in the SDF are focussed around the urban centres of Leandra, Evander, Embalenhle, Secunda and Bethal.

The SDF identifies agriculture and mining as the most prevalent land uses in the rural areas of the GMLM. Halfgewonnen Colliery (the Mining Right Area where the project is proposed) is acknowledged as an operational coal mine, however the contiguous Overlooked Colliery, Weltevreden Colliery and Forzando North and South Coal Mines are not mentioned, indicating that there are far more operational coal mines in the GMLM than defined in the SDF.

The SDF acknowledges that Eskom is the primary bulk electricity provider in both urban and rural area in the Municipality. Reliability of supply is of paramount importance to households and businesses countrywide. The proposed Solar PV development will relieve some pressure off Eskom by supplementing generation and direct distribution to consumers, as well as by feeding additional electricity supply to the National Grid for distribution.

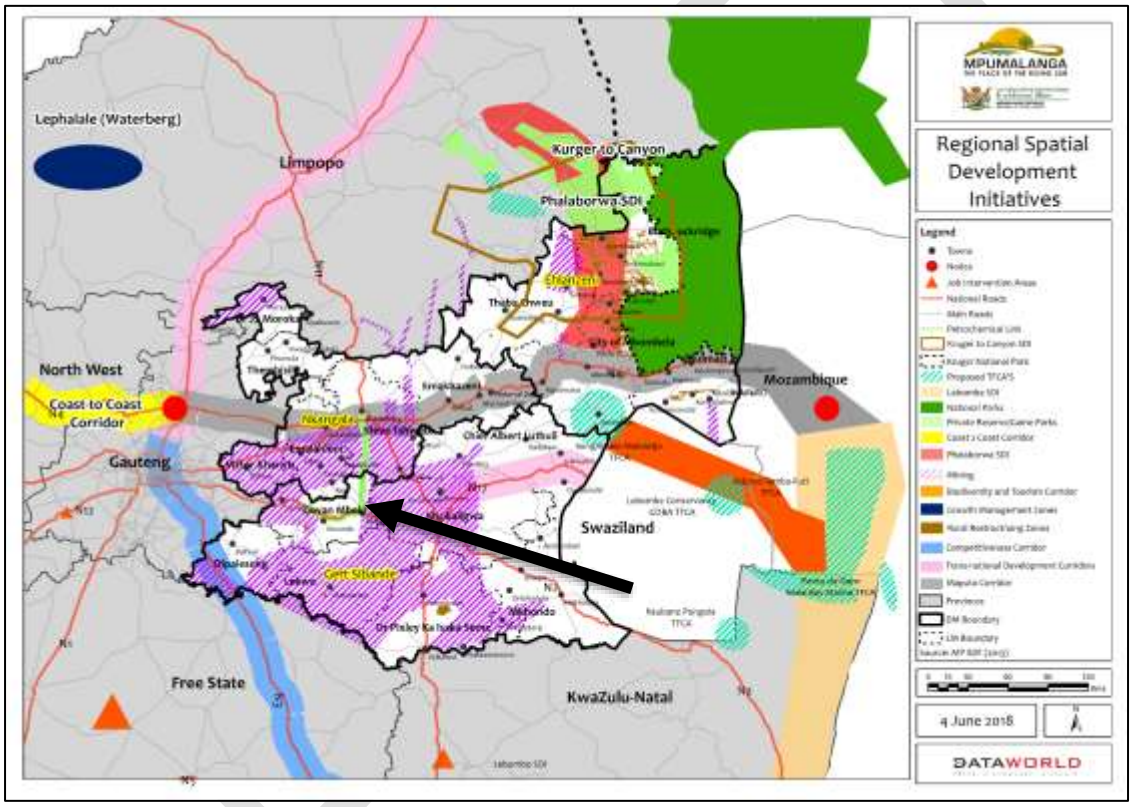


Figure 3: Mpumalanga SDF extract (Black arrow shows approximate position of proposed development site, purple hatch indicates mining areas)

3.6 Other relevant Legislation

In addition to the Laws and Guidelines discussed above, Table 11 summarises some of the other key legislation and guidelines relevant to this application:

Table 11: Other Relevant legislation and guidelines

Applicable legislation and guidelines used to compile the report	How this development complies with the legislation and guidelines
NEMA: Public Participation Guidelines (GNR807). Department of Environmental Affairs (2017), Public Participation guideline in terms of NEMA EIA Regulations, Department of Environmental Affairs, Pretoria, South Africa.	Guidelines have been and will be followed during the Public Participation Process (PPP).
DEA (2017), Guideline on Need and Desirability, Department of Environmental Affairs (DEA), Pretoria, South Africa	The Guideline was and will continue to be considered in assessing the need and desirability of the Project aspects.
Spatial Land Use and Management Act, 2013 (Act No. 16 of 2013) (SPLUMA)	SPLUMA aims to develop a framework to govern planning permissions and the lawful use of land. In terms of SPLUMA the developer should ensure that the surface rights areas where the project is undertaken, is approved as such.
Restitution of Land Rights Act, 1994, the Land Reform (Labour Tenants) Act, 1996 and the Extension of Security of Tenure Act, 1997.	Consultation with the Land Claims Commissioner has been initiated. Despite several engagements with the Department of Rural Development and Land Reform, no confirmation has been obtained whether there are land claims on the affected property or not. (See Appendix B for proof of consultation).
Local Government Municipal Systems Act, 2000 (Act No. 32 of 2000) as amended	The Act requires local government to compile a Spatial Development Framework (SDF) which must include the provision of basic guidelines for a land use management system for the Municipality. The objectives of an SDF are to promote sustainable functional and integrated human settlements, maximise resource efficiency, and enhance regional identity and unique character of a place. In addition, Municipalities are required to develop Integrated Development Plans (IDPs) which is a government co-ordinated approach to planning that seeks to ensure the economic and social enhancement of all within their jurisdiction. It provides a land use framework, considers infrastructure development, and the protection of

Applicable legislation and guidelines used to compile the report	How this development complies with the legislation and guidelines
	the environment. The proposed project in relation to the relevant SDF is discussed in section 3.5.
Development Facilitation Act, 1995 (Act No. 67 of 1995) (DFA)	The Act promotes the integration of the social, economic, institutional and physical aspects of land development and also promotes integrated land development in rural and urban areas in support of each other. The Act encourages the availability of residential & employment opportunities in close proximity to or integrated with each other, while optimising the use of existing resources including such resources relating to agriculture, land, minerals, bulk infrastructure, roads, transportation and social facilities. The symbiotic relationship between the proposed project and the Mines in the immediate area is evident in the integrated manner in which the Mine and proposed PV Projects can share resources (land, employment, roads, water), and how a part of the proposed PV Project will directly supply the mines with electricity needed for their ongoing operations (and associated ongoing employment).
NEMA Regulations pertaining to the financial provision for prospecting, exploration, mining or production activities (GNR1147 –20 November 2015) (as amended).	The proposed project is not required (in terms of the Financial Provisioning Regulations) to make provision for rehabilitation of the site, however, given the project location within a Mining Right Area, the EIA includes a decommissioning and rehabilitation plan for the site and a cost-estimation of the eventual decommissioning activities. See Section 12
National Road Traffic Act, Act No. 93 of 1996 (NRTA) and National Land Transport Act, Act No. 5 of 2008 (NLTA)	These Acts relate specifically to the planning and development of transport systems and the safe use of roads. The project will potentially affect the Provincial Road as certain components are proposed on either side of it and consultation with the relevant roads' authorities will be undertaken by the project proponent directly (in addition to the public participation process associated with this application for environmental authorisation).
Hazardous Substances Act, 1973 (Act No 15 of 1973)	The Hazardous Substances Act provides for the control of hazardous substances (sub-divided into

Applicable legislation and guidelines used to compile the report	How this development complies with the legislation and guidelines
	four groups) defined as any substance that by their nature are toxic, corrosive, irritant, flammable, sensitising or pressure generating, which may cause ill-health, injury or death in humans. Minimum requirements for hazardous substances associated with the construction phase have been incorporated into the EMP and must be fully implemented on site.
Subdivision of Agricultural Land Act (SALA) (Act no 70 of 1970) as amended	SALA regulates the subdivision of all agricultural land in South Africa, to prevent the creation of un-economic farming units, and the degradation of prime agricultural land. The land to which the proposed project relates is in an approved Mining Right Area, and a portion is leased for agricultural use. The agricultural study (Appendix F 2) further comments on the value of the agricultural soils that may be affected by the proposed project.
Civil Aviation Act (No.13 of 2009)	The Act effectively established the Civil Aviation Authority (CAA), an agency of the Department of Transport, and mandates the controlling, promoting, regulating, supporting, developing, enforcing and continuous improvement of the levels of safety throughout the civil aviation industry. The CAA is an important stakeholder in the development of Solar PV Projects (and has been included in the public consultation database for the project) as Solar PV developments could potentially affect civil aviation in the form of glare. Please see Appendix B for details of consultation with the CAA.

4 Need and Desirability

Department of Environmental Affairs (DEA) published an updated Integrated Environmental Management Guideline on Need and Desirability in 2017.

According to these guidelines, the consideration of "need and desirability" in EIA decision-making requires the consideration of the strategic context of the proposed Project along with the broader public interest and societal needs. Furthermore, the development must not exceed ecological limits and the proposed actions must be measured against the short-term and long-term public interest to promote justifiable social and economic development.

The latest guideline document on the assessment of Need and Desirability (DEA, 2017) includes a number of questions, the answers to which should be considered in the EIA Process. These questions (as per the Guideline) have been summarised and grouped and answers to each are presented in Table 12.

Table 12: Need and Desirability Motivation

Theme	Specific Questions	Answer related to this Application
" Securing ecological sustainable development and use of natural resources"	How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?	A detailed Impact Assessment is presented in Section 9 of this report. In summary, the development footprint has been adjusted to avoid specific environmentally sensitive features like wetlands within the Project site to minimise the potential impact of the Project on the ecological integrity of the area. Some impact is unavoidable and management measures to reduce impact significance have been proposed in the EMP (Section 9.3.8).
	How were the following ecological integrity considerations considered? • Threatened and sensitive ecosystems • Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) • Conservation targets	The Mpumalanga Biodiversity Sector Plan (MBSP) (MTPA, 2014) identifies an irreplaceable Critical Biodiversity Area (CBA) and an Optimal CBA in the western portions of the proposed development site. Approximately 35 Hectares of the preferred development footprint intersects with the irreplaceable CBA (that measures 168 hectares in total). Large portions of this CBA have already been adversely affected by the mining and associated activities at the Halfgewonnen Colliery. It is noted for example that a portion of the CBA intersects with land that has been earmarked for the further (already approved) development of the discard dump associated with Halfgewonnen Colliery. This footprint was already approved for development in 2012 (before the CBA was designated as such). The proposed powerline route traverse areas that have been mapped as CBAs but largely follows existing powerline routes and areas disturbed by mining and associated activities. Mucina & Rutherford (2006) identified the area as falling within the Eastern Highveld Grassland (Gm12), which has a conservation status of Endangered.
	How does the proposed development respond to the relevant framework documents? • Environmental Management Framework,	Alignment with the Mpumalanga SDP is discussed in Section 3.5 of this report.

Theme	Specific Questions	Answer related to this Application
	• Spatial Development Framework • Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.).	The proposed development site is over 250km from the nearest international border (Mozambique) and as such is unlikely to affect international obligations directly, however the following is emphasized: - The Project's proximity to the water resources associated with the Olifants River that eventually discharges to Mozambique and the Indian Ocean, is considered and impacts to the Olifants River and associated aquatic systems should be avoided. - The Project's direct association with the proposed generation of Solar PV energy (renewable energy) contributes to South Africa's international clean-energy commitments. - The site is not located in close proximity to any RAMSAR sites, the closest being the Blesbokspruit (120km west of the site); Seekoeivlei Nature Reserve (165km south of the site) and Verloren Valei Nature Reserve (115km north-east of the site).
	How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity, or pollute or degrade the biophysical environment? What measures were explored to avoid negative impacts, or minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	A detailed Impact Assessment is presented in Section 9 of this report. Impacts to ecosystems and biodiversity are included and management measures to reduce impact significance have been proposed in the EMP (Section 9.3.8). The proposed layout has been adjusted to avoid sensitive wetland features. Positive impacts are also included in the impact assessment.
	What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, to minimise, reuse	Waste will be generated during the construction and operational phases and will comprise of hazardous waste, (minimal such as used hydrocarbons and oily rags), and inert waste like building rubble, spoils and vegetation removal. Used Personal Protective Equipment (PPE) will also be generated. Minimal office

Theme	Specific Questions	Answer related to this Application
	and/or recycle or to safely treat and/or dispose of unavoidable waste?	waste may also be generated. This waste will likely be collected by contractor and disposed of at a registered facility. Anticipated quantities of waste will be minimal. Details are specified in the EMP.
	How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to avoid these impacts or minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	A heritage impact assessment was undertaken as part of the EIA Process. Heritage resources that have been identified can and will be completely avoided by the proposed development footprints. Management measures to ensure in-situ preservation of heritage resources are included in the EMP.
	How will this development use and/or impact on natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of resources been considered? What measures were explored to avoid these impacts or minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Manufacturing of the Solar PV panels and auxiliary control facilities, inverters, cables, stands etc. is associated with the use of various natural resources. Silicon is the most common semiconductor material used in Solar PV cells. Silicon is not found free in nature but rather occurs in sand, quartz, rock crystals etc. and must thus be mined and extracted for the manufacture of Solar PV technology. The electricity generation technology prevalent in South Africa is associated with coal-fired power plants that are far more resource-use-intensive than Solar PV technology. During the operational phase, some water will be required for maintenance (washing) of the arrays – it is expected that water can be sourced from the adjacent mining operations or Usuthu Pipeline but this will be confirmed during the detailed design of the facility.
	Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency? Do the	The project reduces resource dependency to a degree as Solar PV is a less resource-intensive technology to generate electricity than coal. Further, the project's proximity to existing Eskom infrastructure to facilitate connection to

Theme	Specific Questions	Answer related to this Application
	proposed location, type and scale of development promote a reduced dependency on resources?	the National Grid and its proximity to consumers of electricity directly contribute to the project's ability to reduce resource dependency.
	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?	The power generation sector in South Africa presently and historically is largely focused on coal, and the Halfgewonnen Coal Mine (where the proposed development site is located with the approved Mining Right Area) and various other mining operations in the immediate vicinity continues to supply coal to Eskom for electricity generation. It is fairly well understood that a continued reliance on coal is not sustainable indefinitely, and the proposed project aims to reduce the surrounding Mines' reliance on coal-generated electricity supplied by Eskom, and to supplement the electricity supply grid with renewable energy. It is believed that the proposed use of resources is appropriate and justifiable.
	How were a risk-averse and cautious approach applied in identifying and assessing impacts?	The impact assessment methodology is described in Section 9.1. Where information is lacking the precautionary approach is implemented.
	What are the limits of current knowledge and the risks associated therewith?	Knowledge gaps and assumptions are further discussed in section 13 of this report.
	How will the ecological impacts of this development impact on people's environmental rights?	The project will not infringe on people's environmental rights as measures will be put in place to ensure people's right to an environment that is not harmful to their health and safety.
	Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified resulted in the selection of the "best practicable environmental option"	Alternatives are discussed in Section 5.

Theme	Specific Questions	Answer related to this Application
" Promoting justifiable economic and social development"	What is the socio-economic context of the area in terms of: • The IDP and any other strategic plans, frameworks of policies applicable to the area, • Spatial priorities and desired spatial patterns; • Existing land uses, planned land uses, cultural landscapes etc. • Municipal Economic Development Strategy ("LED Strategy")	The Socio-Economic context of the area is discussed in Section 7.11 (Baseline and present conditions). As mentioned previously, the GMLM SDF identified that the area where the development is proposed is one of the rural areas in the municipality. The GMLM Final Amended IDP (2020/2021) identified the following needs from the community consultation process: • Cleaning of toilets and building new toilets; • Provision of water services (borehole and windmill maintenance); • Allocation of low-cost housing; • Improved road infrastructure and road maintenance; • Electrification of houses; • Establishment of a Drug Rehabilitation Centre; • Employment opportunities; and • LED Projects.
	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 impact be socially and economically sustainable in the short- and long-term?	The proposed Solar PV Project will provide at least some employment opportunities, which will benefit local populations wherever the required skills are available locally. Furthermore, it is expected that the Economic Development (ED) Plan associated with the proposed Solar PV Project will be aligned to the Social and Labour Plan of the Halfgewonnen Colliery and assist the surrounding Mines to meet their Local Economic Development commitments.
	In terms of location, describe how the placement of the proposed development will:	The proposed project site is not in close proximity to large-scale residential areas; however, it is anticipated that employees already travelling to the immediately surrounding mines reside in the same areas where employment

Theme	Specific Questions	Answer related to this Application
	• result in the creation of residential and employment opportunities in close proximity to or integrated with each other, • reduce the need for transport of people and goods • result in access to public transport or enable non-motorised and pedestrian transport • compliment other uses in the area • be in line with the planning for the area • optimise the use of existing resources and infrastructure • 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, • encourage environmentally sustainable land development practices and processes Will the investment in the settlement or area in question generate the highest socio-economic returns? What is the 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? In terms of the nature, scale and location of the development, will it promote or act as a	for the proposed Solar PV Project will be sourced and that transport opportunities will be integrated to existing transportation networks. The proposed Solar PV Development compliments other land uses in the area in that it will partially address a National electricity crisis by contributing to sustainable electricity generation to the National Grid, and directly provide reliable power supply to consumers in the immediate vicinity of the proposed project. As discussed, the proposed project is not in contradiction with Provincial or Municipal planning for the area. The optimal use of resources is also discussed previously. Existing infrastructure will be used as far as possible (including the use of existing roads and electricity distribution infrastructure, in consultation with Eskom). Potential impacts on the sense of history, sense of place and heritage are assessed in Section 9.3.7.

Theme	Specific Questions	Answer related to this Application
	catalyst to create a more integrated settlement?	
	What measures were taken to pursue environmental justice and equitable access to environmental resources, benefits and services so that adverse environmental impacts shall not be distributed so as to unfairly discriminate against any person, (who are the beneficiaries and is the development located appropriately)? What measures were taken 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?	Adverse environmental impacts are bound to arise from the implementation of the proposed project; however, it is acknowledged that the proposed development site has to a large degree already been disturbed by past activities. The intended beneficiaries of this proposed development comprise two distinct consumer types: the nation at large will benefit from the implementation of the IPP in that more reliable and renewable energy supply technology will form part of the country's energy mix, and secondly, direct consumers will be the immediately surrounding mines and farming community. Continued operation of the surrounding Mines (reliant on electricity supply) in turn benefits the mine employees directly as well.
	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?	All of the relevant construction health and safety and operational health and safety measures relevant to this type of development will be implemented, these are beyond the scope of the EIA process and beyond the expertise of the EAP.
	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,	A comprehensive public participation process (PPP) has been and will be associated with all phases of the EIA Process. The PPP is guided by the EIA Regulations, 2014 (as amended). Extensive consultation with interested and affected parties (I&APs) is planned and will continue to be undertaken with authorities, local land owners, land users, communities and interest groups.

Theme	Specific Questions	Answer related to this Application
	• ensure participation by vulnerable and disadvantaged persons 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	Public Participation will continue to be undertaken to ensure the opportunity for all potential I&APs to participate in meetings (if possible) and the EIA process. PPP documentation was made available in English and isiZulu. The reports themselves are compiled in English. Public meetings (open days / discussion forums) if allowed to be held in light of the Covid-19 Pandemic will be presented in English and will also involve a translator to isiZulu. Documents for public review are made available electronically (via email, on the Cabanga Environmental website and/or via Dropbox/WeTransfer) and in hard copy, where the current Regulations in terms of the Covid-19 Pandemic allow for hard-copy distribution. I&APs will be kept informed of the process and any developments / meetings / reports via e-mail and SMS communication. I&AP comments will be incorporated in to the reports, and into the comment and response report (CRR) along with the EAP's response to each comment or question. This process ensures that all I&AP comments are addressed in the Scoping and EIA Reports and incorporated into the studies.
	Considering the interests, needs and values of all the I&APs, 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)?	The proposed development will to some extent benefit all electricity consumers in the country (by contributing to the National Grid) and will benefit the Mines and Mine employees of the immediately surrounding coal mining operations.
	What measures have been taken to ensure that workers will be informed of work that might be harmful to human health or the environment or dangerous, and what measures have been	An environmental awareness training program is included in Section 10.5.

Theme	Specific Questions	Answer related to this Application
	taken to ensure that the right of workers to refuse such work will be respected and protected?	
	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); • 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.).	Approximately 250 – 300 jobs will be created during the construction, operations and maintenance of the project. The temporary workforce during construction will only be for approximately 9 to 12 months, and likely be associated with an EPC contract. Approximately 25 - 30 permanent jobs will be created during operations and maintenance of the Halfgewonnen Solar PV Facility over its lifespan of 25 years. Permanent employment during the operational phase is limited in number and restricted in terms of the required skills and education, however other opportunities exist in the operation and maintenance of the facility that do not require specialized skills and these will be earmarked for local persons. Of the total proposed development footprint, approximately 35 Ha is rented to a local farmer for agricultural activities. It is expected that the farmer's business will be able to continue given the areas of land available in the area. The site falls within the Mining Right Area of Halfgewonnen Colliery but does not directly affect the activities of Halfgewonnen Colliery in any way and will not result in any job-losses at Halfgewonnen Colliery.
	What measures were taken to ensure: • that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and	Section 3 contains a comprehensive discussion of the relevant legislative framework, looking at national, provincial and local legislation. Various government departments at different levels were informed of the proposed project and requested to participate in the PPP. While the proposed project is within an approved Mining Right Area, it will not affect mineral extraction or processing operations and no conflict of interest is anticipated.

Theme	Specific Questions	Answer related to this Application
	• that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	
	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?	The EIA process, and development of the Environmental Management Plan (EMP) aims to achieve environmental protection (where relevant) and restoration of the environment. Rehabilitation and decommissioning are discussed in Section 12.
	Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	Mitigation measures are included in Section 9.3.8, proportionate to the significance of the impacts that are anticipated. Mitigation measures are specific (to minimise the likelihood or severity of the anticipated impact), practical (implementable) and auditable. Long-term environmental legacy and management options are discussed as part of the rehabilitation and closure plan. It is anticipated that the proposed Solar PV Development will long out-live the surrounding mining activities and be able to continue feeding into the National Power Grid.
	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?	This matter is addressed in the rehabilitation and closure plan (Section 12). The EMP (Section 9.3.8) aims to identify measures to avoid pollution and environmental degradation wherever possible. Where it is not possible to avoid environmental degradation measures are stipulated to manage potential impacts arising from the proposed project, and measures to remedy the effects of unavoidable degradation and pollution.

5 Evaluation of Alternatives

The concept of alternatives can be defined as a possible course of action, in place of another, that would meet the same purpose and need (DEAT, 2004).

5.1 Defining the purpose and need of the proposed project

The Integrated Resource Plan (IRP) is an electricity capacity plan indicating the country's electricity demand, how the demand will be met and what it will cost to meet the demand. The intention was originally that the Department of Energy would revise the IRP every two years since its initial publication in 2010. As this was not done, the resultant energy mix failed to address the ever-changing supply and demand scenarios in the country and failed to reflect global trends and technologies in the efficient and responsible (sustainable) generation of electricity (Govender, 2019).

On 27 August 2018, the IRP 2019 was promulgated to update the energy forecast until 2030.

The promulgation of the IRP 2019 and associated ministerial determinations guide the roll out of the Independent Power Producers Procurement Programme (IPPPP). The IRP 2019 indicates that there is a short-term electricity supply gap of approximately 2 000 MW between 2019 and 2022 (https://www.ipp-rm.co.za/). The Department of Mineral Resources and Energy (DMRE) launched a Risk Mitigation Independent Power Producer Procurement Programme (RMIPPPP) on 23 August 2020, with the objective 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. The Determination for the RMIPPPP was gazetted on the 7th of July 2020.

The proposed Halfgewonnen Solar PV project was initiated as part of the DMRE IPPPP.

To date, four bidding rounds have been completed for renewable energy projects under the government-led Renewable Energy (RE) Independent Power Producers (IPP) Procurement Programme. Round Five is expected to be announced imminently.

The need and purpose of the proposed Halfgewonnen Solar PV Project are therefore:

- To address the requirements of the DMRE IPP Programme; and
- To develop a Solar PV Facility to supplement electricity supply to the National Grid, and provide renewable energy to consumers directly.

5.2 Process to assess alternatives

Consideration of alternatives is one of the most critical elements of the environmental assessment process (DEAT, 2004). Key criteria that must be considered when identifying alternatives are that they should be "practicable, feasible, relevant, reasonable and viable".

DEA (2018) identifies six potential categories of alternatives and emphasises that "the number of alternatives that are selected for an assessment should be determined by the range of potential alternatives that could be reasonable and feasible" (DEA, 2018). The alternatives that have been considered are discussed in these terms and grouped according to the categories defined by DEA.

5.3 Property or Location

Overlooked Colliery Alpha (Pty) Ltd (Alpha) holds Mining Rights for coal over various farms between Bethal and Hendrina in Mpumalanga and also owns some property in the area. The Applicant approached Alpha with the initial project proposal, to use some of the land owned by Alpha for electricity projects that would be able to supply power to the immediately surrounding mines, and other consumers/land users, while addressing the requirements of the DMRE IPP Programme.

The Applicant initially proposed the development of three components:

- Solar PV with an installed capacity of <20MW and land requirement of 30Ha;
- Solar PV with an installed capacity of 40MW and land requirement of 60Ha; and
- A coal power plant with an installed capacity of 300MW and land requirement of 210Ha.

In the interest of sustainable and environmentally responsive development, the Applicant requested Cabanga Environmental to identify (on a desktop level) suitable sites for the proposed developments that:

- Avoid known environmental sensitivities on the properties; and
- Can sustainably co-exist with the coal mining activities and other infrastructure associated with the properties.

Various properties were evaluated for suitability of the proposed energy projects – please see the site selection report in Appendix G.

The site selection process concluded that:

- None of the potential development sites are suitable for the development of a coal plant, due to size, access and environmental constraints;
- Solar PV development can be accommodated on land east of the railway, north of previously mined areas, north of the processing plant and approved footprint of the Halfgewonnen discard dump, and in the area surrounding the farm house in the far north of the Halfgewonnen Colliery Mining Right Area (The proposed project site).

5.4 The type of activity

As mentioned, the initial investigations included consideration of a coal power plant. The site selection process concluded that the coal plant would not be feasible on the potential development properties due to size, access and environmental considerations and was thus excluded from further assessment or applications for authorisation. A suitable site may be identified in future, and the Applicant may pursue this development under separate applications for authorisation in due time.

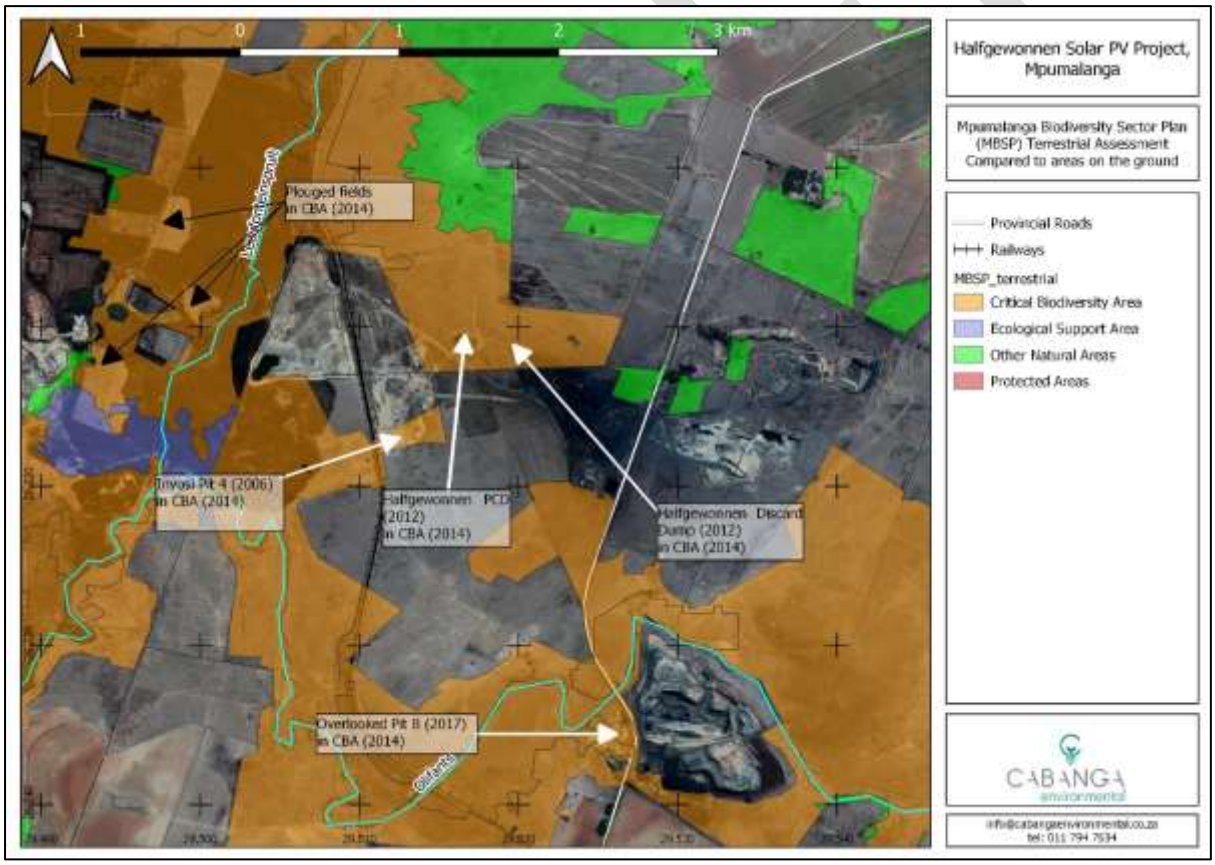
Other land uses that may be considered on the proposed development site include mining-related infrastructure, but the infrastructure at Halfgewonnen Colliery is well-established and approved in terms of the relevant legislation and thus no further land is required for mining.

Portions of the affected surface are being rented to local farmers for agricultural purposes and this is a viable alternative land use for portions of the proposed development site. Approximately 35 Ha that is currently used for agricultural purposes will be directly affected by

the proposed PV development (preferred layout). The powerline route(s) will not directly affect existing agricultural activity. It is believed that sufficient alternative land exists in the immediate vicinity that the loss of this agricultural land to the proposed solar development would not adversely affect the feasibility of continued agricultural activities in the surrounding area.

It is noted that parts of the development site are delineated as Critical Biodiversity Areas (CBAs) in terms of the MBSP (MTPA, 2014). Motivation for the delineation is unclear, as the CBA overlaps the approved Mining Right Area and areas of already developed and approved mining activity and related infrastructure. These CBAs were presumably delineated in 2014, after much of the Mining infrastructure and activity already existed on the site (see Plan 5).

Conservation is not a viable land use on the portion of the subject property that overlaps the CBA: If the proposed PV Project is not approved it is considered likely that alternative productive and profitable land use will be pursued, such as agricultural or mining activity. The specialist soil study (ZRC, July 2021) found that the agricultural potential of this portion is relatively low.



Plan 5: Existing Mining and farming in relation to CBAs

5.5 Design and/or Layout

The aforementioned site selection process also informed, to some degree, the layout of the Solar PV Facility, by eliminating those sites that are not feasible to host the proposed infrastructure, and those areas less suitable for development due to environmental sensitivities, geotechnical concerns or other practical considerations.

The site selection process identified an area of approximately 342 Ha that could host the proposed development which only comprises approximately 135 Ha.

Prior to any environmental specialist studies being initiated on site, the layout alternative shown in Plan 6 and included in the Draft Scoping Report was presented by the design engineers. As mentioned, specialist studies identified environmental sensitive features on the proposed development site. Primarily these relate to wetlands. Consequently, the design of the Project was adjusted in an effort to exclude identified wetlands from the development footprint as far as possible.

The amended layout (preferred layout) is shown in Plan 7 overleaf.

Comparison of the layout alternatives in Plan 6 and Plan 7 clearly shows how the layout has been adjusted in response to identified environmental sensitivities of the site.

Potential alternative routes for the powerline to connect the proposed Solar PV Facility to existing electricity distribution infrastructure is also considered. Presently it is thought that the proposed Halfgewonnen Solar PV Project should be connected to the Ysterkop Sub-Station, and as far as possible align with existing powerlines in the vicinity so as to avoid additional unnecessary disturbance. Connection to the Halfgewonnen South (Aberdeen) sub-station and the Forzando sub-station were also considered.

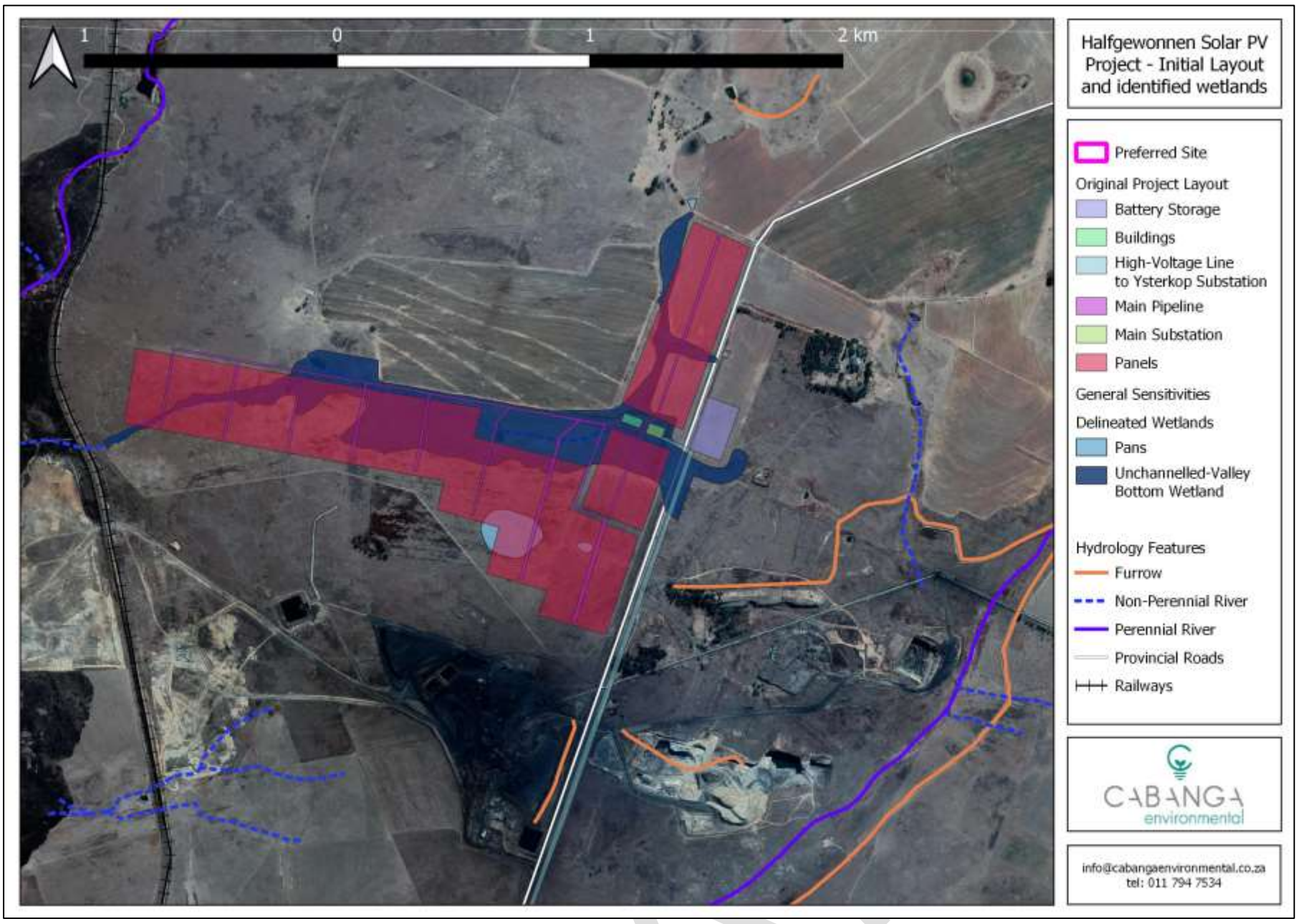
The capacity of existing sub-stations is a key consideration in identifying the preferred alternative, along with the distance from the proposed project site to the existing sub-stations. Connection to the sub-station will largely depend on Eskom's preferences (being negotiated by the Applicant).

5.6 Technology

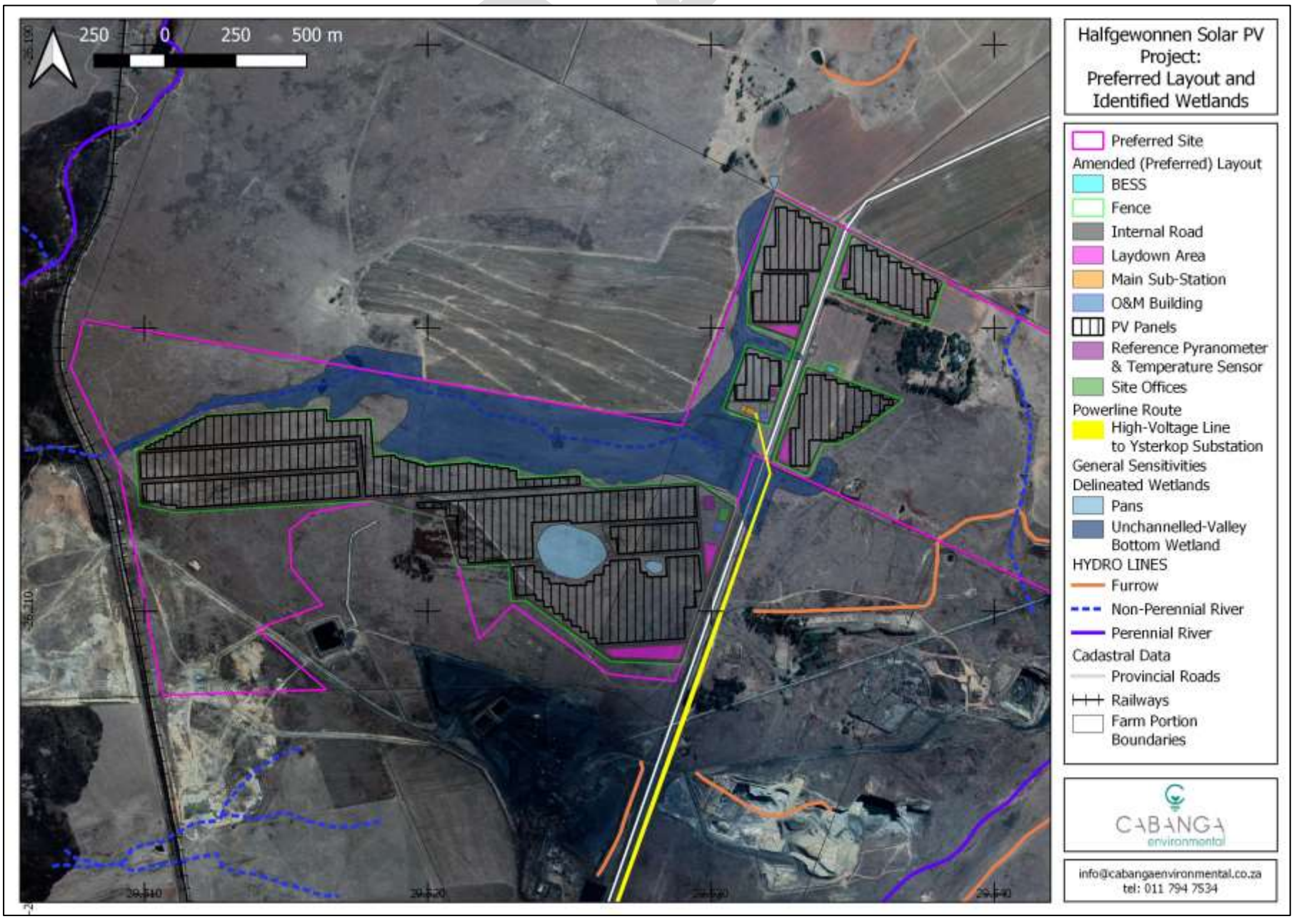
The main aim of the proposed Halfgewonnen Solar PV Project is to contribute electricity generation capacity to the National Grid. The use of coal-fired power generation technology was also considered, as previously mentioned. However, the available potential development sites did not present suitable opportunity for coal technology. It is further posited that the development of a facility, as part of the IPP Programme, generates electricity from renewable resources, which would be preferable to non-renewable technologies such as coal.

In terms of the PV Technology chosen, various technologies exist and will be considered by the applicant and engineering design team, to ensure the technology alternative presents the optimal solution. These technologies differ greatly in detail but should not alter the potential environmental impacts of the Solar PV facility.

Different battery technologies are also considered, presently it is thought that Lithium-ion batteries or vanadium redox flow batteries will be used.



Plan 6: Original layout and identified wetlands



Plan 7: Adjusted (preferred) layout and identified wetlands

5.7 Operational Aspects

These types of alternatives are dependent on the type of operation but may include:

- Operating hours and designating set times for specific activities.
- Setting specific traffic control mechanisms.
- Dust control methods such as the use of chemical dust suppressant on roads.
- Management of water requirements.

It is proposed to limit construction activities to daylight hours to minimise the impacts of noise resulting from construction activities. There are no particularly noise-sensitive receptors in the immediate vicinity considering the existing noise-generating activities at the Halfgewonnen Colliery.

It must be ensured that the proposed development and existing and ongoing activities at Halfgewonnen Colliery do not negatively impact on one another. Scheduling of certain activities will therefore be important, for example, operational management should schedule the delivery of construction equipment to fall outside of the peak truck-traffic times at the Mine. Presently, mining activities at Halfgewonnen Colliery have been suspended and operations are limited to those associated with the processing/beneficiation of coal. There are numerous other operational coal mines in the direct vicinity that undertake blasting as part of the mining process. The effects of blasting on the proposed solar facility are not known and must be considered by the engineering team during detailed design of the facility.

It is anticipated that the Mine will continue to implement dust suppression via water cart at the Halfgewonnen operations, and may extend this practice to affected roads at the proposed Solar PV Facility (in consultation with the applicant). The Mine monitors dust fallout monthly and activities associated with the Solar PV Project will also thus be monitored – if the existing monitoring programme identifies excessive dust generation, additional dust management such as the use of chemical suppressants should be investigated.

During the operational phase, the solar panels will periodically have to be cleaned. The combined use of compressed air and clean water is optimal, and reduces the water requirements. Water could potentially be sourced from the Halfgewonnen Colliery, where water is pumped from the old underground workings and treated prior to being used at the Mine. Abstraction volumes will have to be authorised in the Mine's water use license, and the engineering team will have to confirm if the water quality is adequate to use for washing the solar panels. Alternatively, clean (possibly distilled) water will have to be brought to site from an alternative source. One possible alternative source that could be investigated by the engineering team is water from the Usuthu Pipeline which runs along the Halfgewonnen Road past the site.

5.8 No-Development Option

Should the proposed Halfgewonnen Solar PV Project not receive the necessary approvals, it is likely that the site will remain in its current state, or alternatively be used for agricultural activities. The limited agricultural activities in the north of the Mining Right Area will also be able to continue unhindered, at the discretion of the land owner who may or may not decide to extend the lease of his land to the surrounding farmers.

Any ecological impacts potentially associated with the proposed Solar PV Development will not be realized.

However, any positive benefits of the project will also not be realized, thus resulting in:

- No contribution from this project to the DMRE IPP Programme;
- No contribution from this project towards electricity generation from renewable energy technologies, to contribute to the National Grid and direct consumers in the area;
- No increased job opportunities (however limited) associated with this project; and
- Continued uncertainty of electricity supply to the surrounding Mines and other consumers/landowners in this area.

Continued power supply disruptions and "load-shedding" implemented by Eskom has far-reaching effects to all consumers of electricity, including to the coal mining industry who supply coal to Eskom for power generation purposes (among other clients) but also require electricity from Eskom to meet their coal supply agreements (CSAs) with Eskom. If power supply to the mines is disrupted due to loadshedding (or other power supply constraints), the increased cost of mining using diesel-generated power affects the economic viability of the operations. It is therefore beneficial for the immediately surrounding coal mines (and potentially other consumers such as farmers) to have a reliable source of electricity generated from renewable resources to tap into.

Similarly, the contribution that the proposed Halfgewonnen Solar PV Facility proposes to make to the National Power Grid is expected to alleviate at least some of the pressure presently experienced by the power utility.

Not developing the proposed Solar PV Project on the identified site, does not guarantee conservation of the site or its associated environmental sensitivities – the land falls within the Mining Right Area of Halfgewonnen Colliery and the surface rights are owned by the holder of the Mining Right as well (Overlooked Colliery Alpha) and is not being used for conservation purposes or managed as such. If not used for the proposed Solar PV Project, it is possible the land may be affected by additional agriculture, human settlement or mining infrastructure, potentially resulting in similar environmental impacts as the development proposal but without implementation of necessary management measures as stipulated in the EMP for this Project and without realising the same benefits as the development proposal.

5.9 Alternatives Impact and Risk Assessment

The following alternatives are considered technically feasible, and will therefore be subject to further assessment in this section:

- The original proposed layout as presented in the Draft Scoping Report;
- The preferred alternative layout (Plan 3).

Impact and Risk assessment criteria for this purpose are based on the nature, consequence, extent, duration and probability of potential impacts occurring and the degree to which impacts can be reversed, whether the impacts cause irreplaceable loss of resources and whether impacts can be avoided, managed or mitigated.

Table 13: Impact evaluation of layout alternatives

Discussion	Original Layout (Plan 6)	Preferred Layout (Plan 3, Plan 7)
Nature and Consequence of Impacts	Will lead to direct loss of wetlands, associated impacts to flora and fauna and local hydrology.	Wetlands are avoided as far as possible.
Extent:	Direct wetland loss >45 Ha.	No direct loss of sensitive wetlands, edge effects still a possibility.
Duration:	Likely permanent.	Edge-effects will remain possible for the life of the facility.
Probability:	Definite, considering layout footprint.	Highly likely that edge effects to wetlands would still occur.
Reversibility:	Can possibly be reversed if wetlands are rehabilitated after decommissioning of facility, but this is unlikely.	Impact can be effectively reversed with wetland rehabilitation.
Irreplaceable loss of resources	Yes – wetland habitat will be lost.	None (assuming wetlands are protected) Additional agricultural land will be lost through this layout option.
Avoidance, management, mitigation options	Can be avoided if layout is changed Management and mitigation without layout changes are not possible.	Impact of edge effects can be avoided by ensuring adequate stormwater control, site delineation. Management and mitigation reliant on rehabilitation of edge effects occur.

5.10 Confirmation of the preferred alternative

The proposed layout alternative presented in Plan 3, Plan 4 and the detailed drawings in Appendix D presents the preferred alternative.

6 Public Participation

The latest Public Participation Guideline in terms of the NEMA was published by the Department of Environmental Affairs in 2017 (DEA, 2017). The NEMA requires the participation of all Interested and Affected Parties (I&APs) in environmental governance (Section (2)(4)) and holds that the beneficial use of environmental resources must serve the public interest. Decisions that may affect the environment, have to include sufficient opportunity for public participation.

The public participation process (PPP) aims to involve the authorities and I&APs in the project process; and determine their needs, expectations and perceptions. An open and transparent process will be followed at all times and is based on the reciprocal dissemination of information.

The PPP is designed to provide sufficient and accessible information to all I&APs in an objective manner to assist them to:

- Raise issues of concern and suggestions for enhanced benefits;
- Contribute local knowledge and experience; and
- Verify that their issues have been and will be captured.

A comprehensive public participation report is included in

Appendix B to this report and will not be duplicated in this section. In summary, the following steps comprise the PPP (as per the Public Participation Plan submitted to comply with the Guidelines issued due to the Covid-19 Pandemic, and approved by the DEAT on 05 March 2021, refer to Appendix E of the public participation report in Appendix B.

- Identification of stakeholders
- Notification of stakeholders:
    - Direct notification via e-mail, post and fax;
    - Direct notification through on-site consultations;
    - Publication of newspaper adverts in local publications;
    - Display of posters at the proposed development site and other prominent locations in the vicinity of the site.

The abovementioned notification documents presented details of the application and EIA process, described the nature and location of the proposed project, described the PPP associated with the application and gives details of the EAP where further information can be obtained.

- Public Review of Draft Reports

The Draft Scoping Report was made available in digital and hard copy to I&APs for review and comment from 12 May 2021 until 18 June 2021. The report was also distributed via e-mail to I&APs who requested it. The Report was available on Cabanga's website, at the public library in Bethal and at the Mine Offices (with the Environmental Officer).

The Draft Scoping Report was approved by the DFFE on 20 July 2021. See Appendix A.

This Draft EIA/EMP Report is similarly made available to I&APs for review and comment, and will be updated with all comments received before being submitted to the DFFE for consideration.

If the Regulations and restrictions on gatherings imposed by Regulations in response to the Covid-19 Pandemic allows, a public meeting will be arranged during the EIA/EMP review period. Details will be communicated to I&APs in due course.

Once the DFFE reaches a decision on the EIA and EMP, and communicates their decision to the Applicant, registered I&APs will be notified of the decision, reasons for the decision, and the appeal process that I&APs may follow if they do not agree with the decision or a part thereof.

7 Existing Site Attributes

Just as a project is associated with certain impacts on the environment where it is undertaken, the existing environment can also influence a proposed development in terms of design, location, technology and layout. It is therefore important to define the environmental baseline conditions (*status quo*) or context of a proposed development site.

This section describes the environmental attributes associated with the affected site focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects. Information is presented on different scales as relevant to the information that is available:

- Regional Scale – the areas, land uses and communities surrounding the proposed project site, including in some cases the larger municipal area;
- The land immediately adjacent to the proposed development site; and
- Site-specific: the proposed development footprint.

A number of specialist assessments have been commissioned to form part of the EIA Process, and are referenced accordingly and appended to this Report.

The sub-sections to follow describe the existing attributes of the sites affected by the proposed project in terms of geographical, physical, biological, social, economic, heritage and cultural aspects. This section is not a simple duplicate of the baseline environments described in the specialist reports but serve as a summary of those findings only.

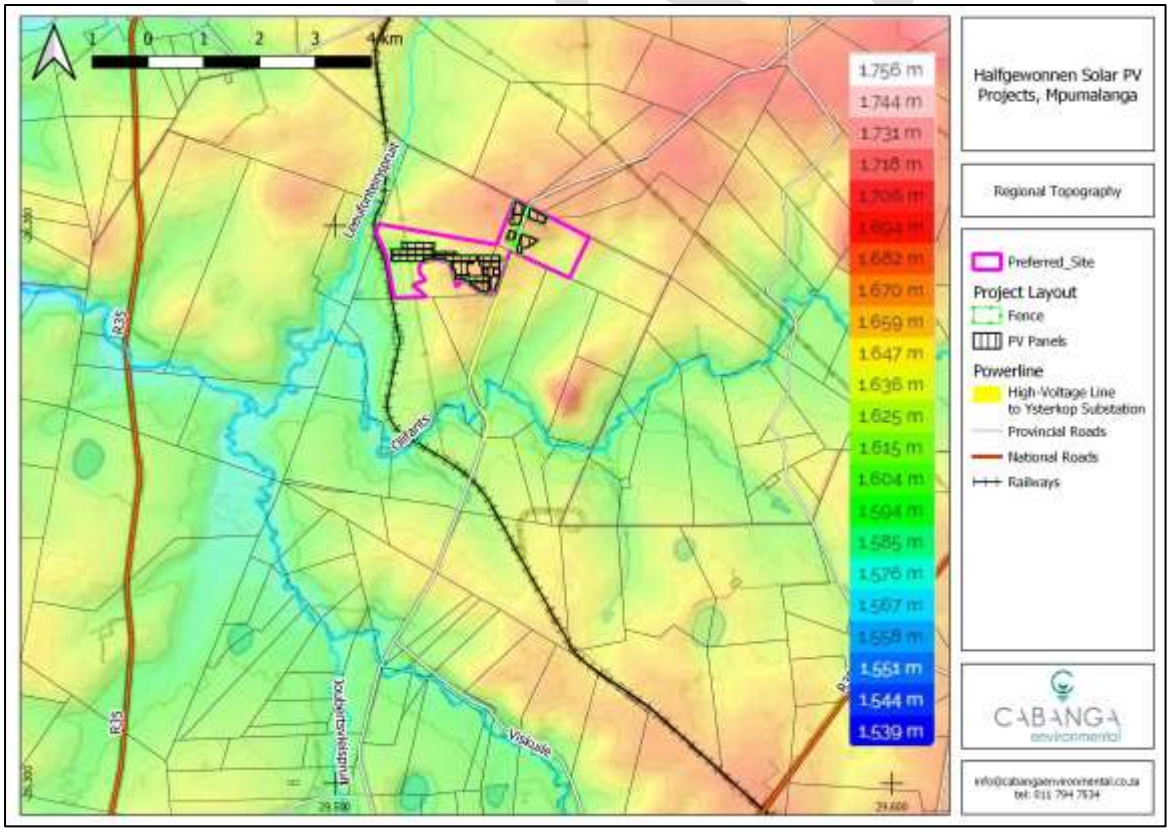
7.1 Geology, physiography and topography

The regional geology of the area is shown in Figure 4. The site area spans across a geological boundary: the western portion of the site is underlain by porphyritic rhyolite with interbedded mudstone and sandstone of the Selons River Formation, Rooiberg Group of the Vaalian Era. The eastern portion of the site is underlain by sandstone, shale and coal beds of the Vryheid Formation, Ecca Group of the Permian Era (Geotheta, February 2021).

A topographical spur is present along the north eastern boundary of the Halfgewonnen farm, less than 3km south-east of the proposed development site – the topographical high is known colloquially as "Ysterkop". The measured height in that area is 1676m above mean seal level (mamsl). The land then slopes downward in a westerly direction towards the Leeuwfontein Spruit, just below 1600 mamsl, and in a southerly direction towards the Olifants River. The topographic ground level of the site is approximately 1655masl and slopes, in a northeast direction to about 1647mamsl. The area has a gradient of 1:63 (1.6%) to the west.

Plan 8 illustrates the regional topography.

Figure 4: Regional Geology (Geotheta, February 2021)



Plan 8: Regional topography

7.2 Climate and meteorology

The regional climate at the site is characterised by strong seasonal summer rainfall, with dry winters. The mean annual rainfall for the study area is 747 mm and the mean annual evaporation for the area is 1774mm (Geovicon, 2018).

Meteoblue has modelled climate data for the Project Area illustrated in Figure 5 (https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/wildebeesfontein_south-africa_940094). The average maximum temperatures in summer time reach 26°C while the minimum temperatures in winter drops to 2°C.

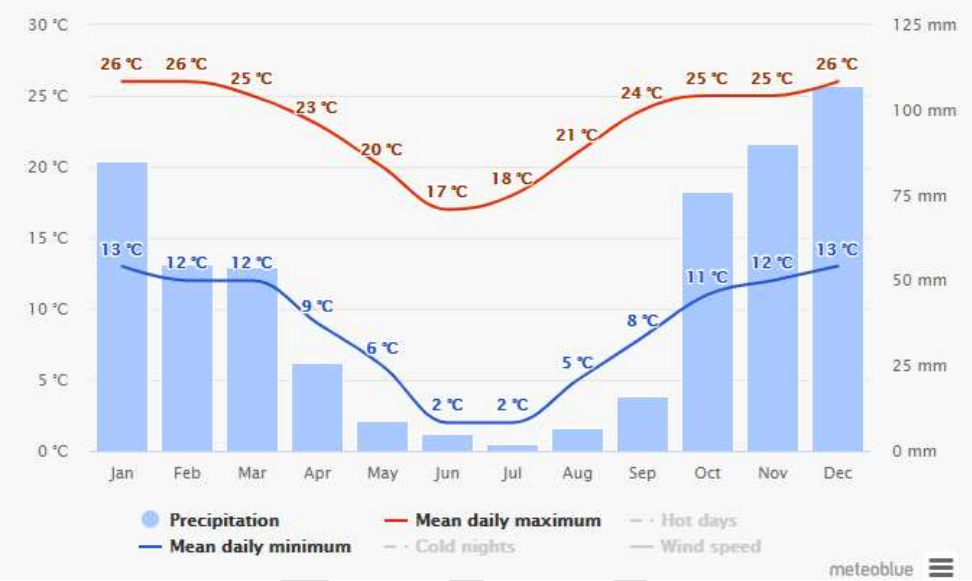


Figure 5: Modelled Climate data for the project area

The graph in Figure 6 shows the monthly number of sunny, partly cloudy, overcast and precipitation days at the proposed development site. Days with less than 20% cloud cover are regarded as sunny, while more than 80% cloud cover is considered an overcast day. (https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/wildebeesfontein_south-africa_940094). It is clear that the site enjoys majority sunny and partly cloudy days.

The wind rose presented in Figure 7 shows that average wind speeds in the area rarely exceeds 28km/h and is predominantly from the east-north-east, though stronger winds are sometimes experienced from the north-west (https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/wildebeesfontein_south-africa_940094).

The closest known meteorological station to the site is B1E004: Rietfontein located at 26°21'27.90"S; 29°12'59.00"E, approximately 35km south-west of the site. According to the rainfall data available the average annual rainfall is 718.1mm. Gross annual evaporation 'A' pan evaporation for the study area is 1934.7mm/a (Letsolo, 2021).

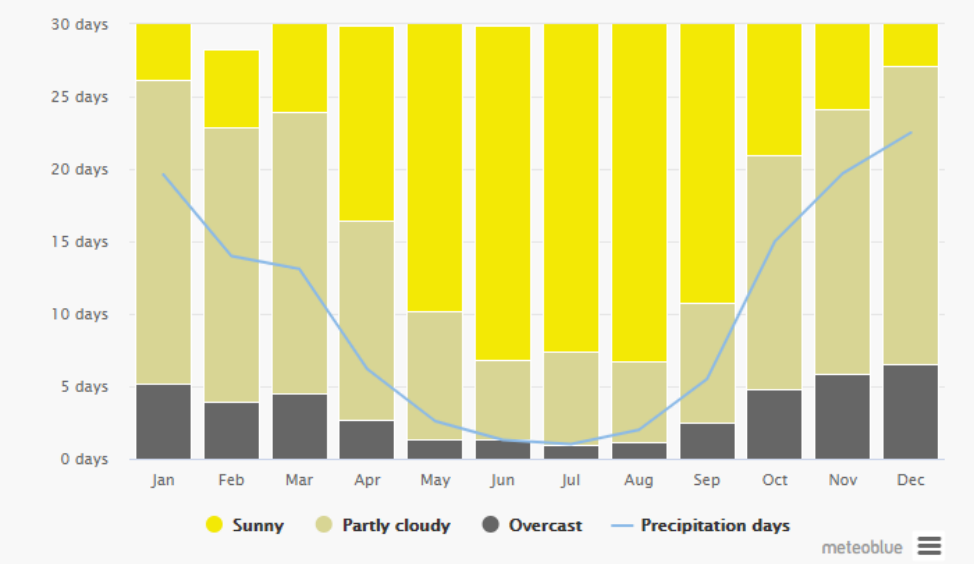


Figure 6: Sunny, cloudy and precipitation days

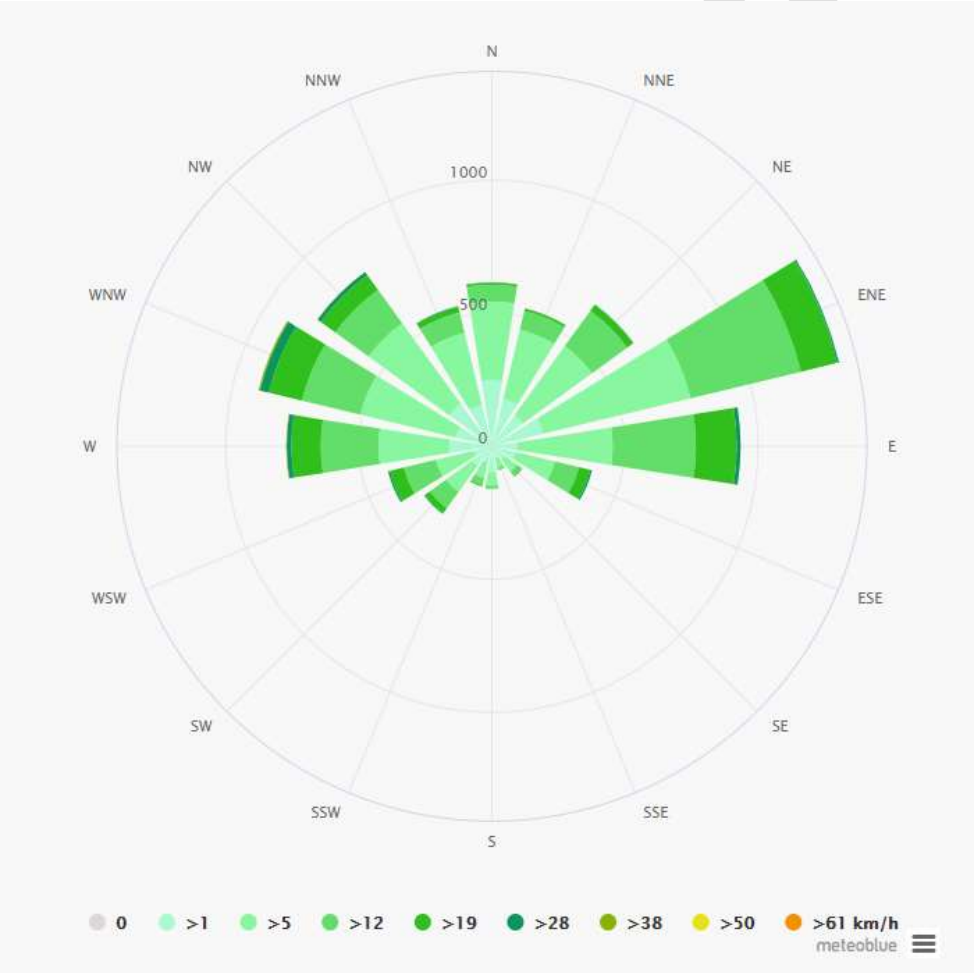


Figure 7: Wind Rose

7.3 Soils, land use and land capability

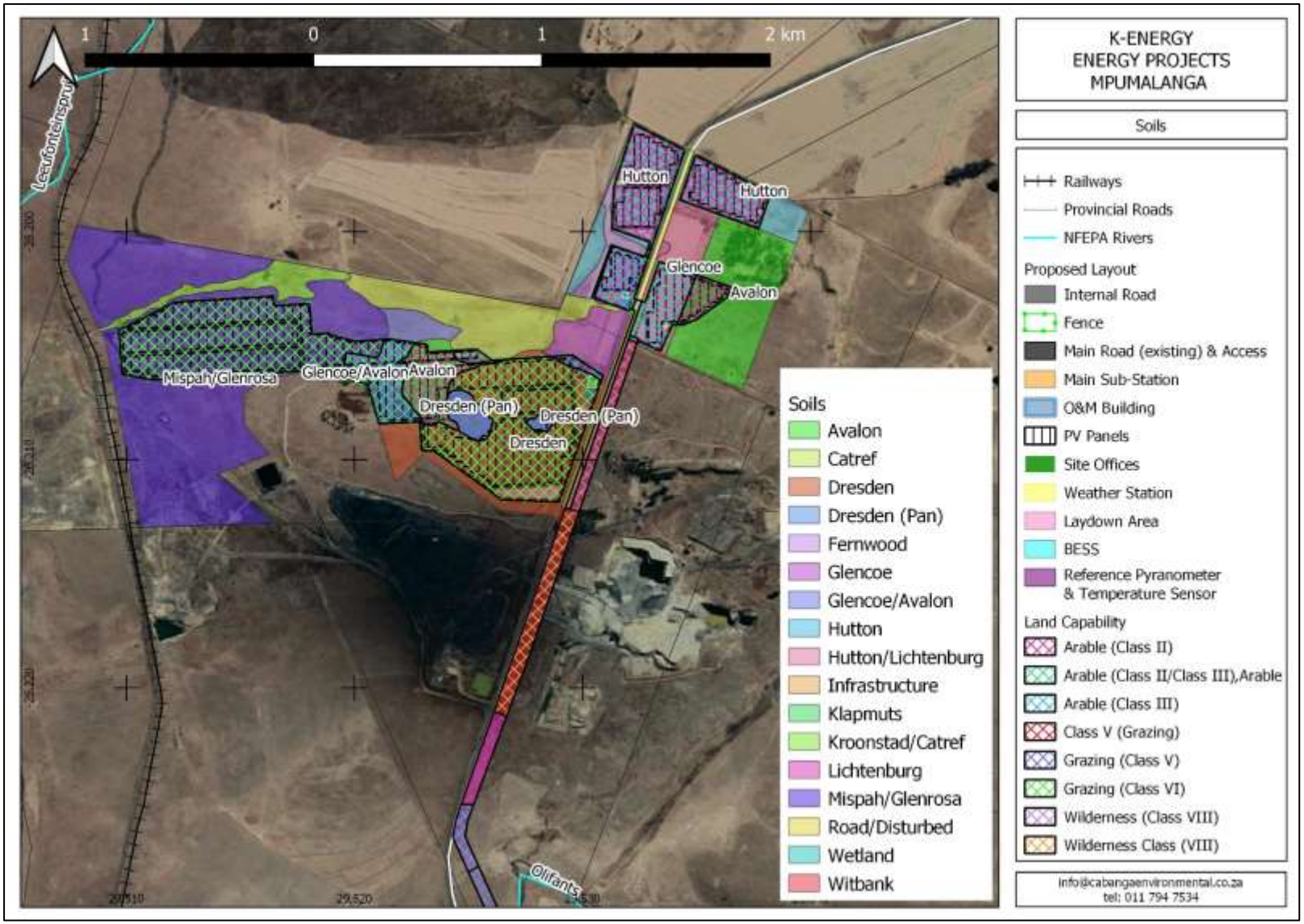
The dominant land use within the study area is grazing, cultivation, mining and related activities (ZRC, July 2021).

The dominant soil identified within the study area are Dresden, Glencoe, Mispah/Glenrosa, Cartref, Hutton and Witbank forms. The sub-dominant soils include Kroonstad/Cartref, Avalon, Lichtenburg, Fernwood and Klapmuts forms (ZRC, July 2021). Table 14 lists the identified soil forms and their associated land capability as these relate to the total area and percentage of the proposed development site.

The soils forms and land capability as they relate to the proposed development footprint are shown in Plan 9.

Table 14: Soil Forms and Land Capability (ZRC, July 2021)

Soil Form	Area (Ha)	Percentage (%)	Land Capability	Area (Ha)	Percentage (%)
Avalon	10.5	7%	Arable (Class II, slight limitations)	42.98	30%
Lichtenburg	3.1	2%			
Hutton	21.32	15%			
Hutton/Lichtenburg	8.06	6%			
Glencoe/Avalon	7.6	5%	Arable (Class II/Class III, slight to moderate limitations)	7.6	5%
Dresden	34.35	24%	Arable (Class III, moderate limitations)	39.72	27%
Glencoe	5.37	4%			
Klapmuts	0.8	1%	Grazing (Class V)	6.06	4%
Cartref	0.88	1%			
Wetland	0.19	0%			
Dresden (Pan)	3.9	3%			
Fernwood	0.29	0%			
Mispah/Glenrosa	32.69	22%	Grazing (Class VI)	32.69	22%
Witbank	16.29	11%	Grazing (Class VII)	16.29	11%
TOTAL AREA	**145.34**	**100%**		**145.34**	**100%**



Plan 9: Soil and Land Capability (delineated by ZRC, July 2021)

7.4 Hydrogeology (Groundwater)

The two main aquifers that occur in the area are the weathered material aquifer and the underlying fractured rock material aquifer. The alluvial material associated with the stream courses can have a relatively high transmissivity and storage capacity. However, due to the localised nature of the deposits it is considered that this material will not have a significant impact on the regional groundwater occurrence and patterns, (Cabanga Concepts, 2012).

The depth to groundwater level in general ranges between 0 and around 16.9 m below surface (Cabanga Concepts, 2012).

A hydrocensus investigation undertaken in 2013 included the analysis of ten groundwater samples, including a spring, a windmill-equipped borehole, and underground seepage samples. Some elevated nitrates were observed, but the majority of samples did not indicate that surrounding mining operations have impacted groundwater quality significantly (Geovicon, 2018).

The most recent hydrocensus (Shangoni Aquiscience, February 2021) identified 19 boreholes on the Halfgewonnen Farm and immediate surrounding properties. Water depth measured in the field is illustrated in Figure 8.

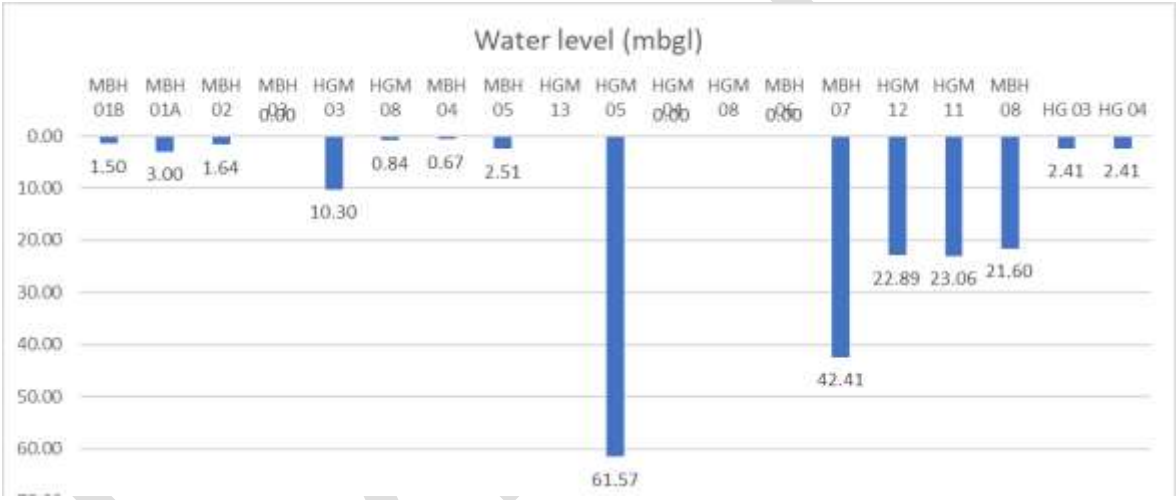


Figure 8: Groundwater levels

7.5 Hydrology (Surface water)

The proposed development site is situated in the quaternary catchment B11A within the Upper Olifants Water Management Area.

The Olifants Catchment Management Agency (CMA) was officially established by Regulation 168 of 2015 following the evaluation of the CMA business case published by the Department of Water Affairs (DWA, October 2013). At the time of writing this report, no governing board for the Olifants CMA has been appointed and no Catchment Management Strategy (CMS) for the Olifants WMA has been published. A regional steering committee (Upper Olifants Catchment Technical Working Group) is operational.

The Olifants WMA is located in the north-eastern part of South Africa and includes portions of the Gauteng, Mpumalanga and Limpopo Provinces. The Olifants River, forming the main River in the catchment and flowing from east to west about 2km south of the proposed development site, originates in the far-southern Mpumalanga Highveld Region on the Farm Nooitgedacht 237IS. The Olifants initially flows roughly north-west, before veering in an easterly direction, eventually flowing through the Kruger National Park and into Mozambique and the Massingir Dam.

Surface water runoff from the proposed development site will drain in a generally western direction towards the Leeuwfontein Spruit, which flows in a southernly direction to its confluence with the Olifants River.

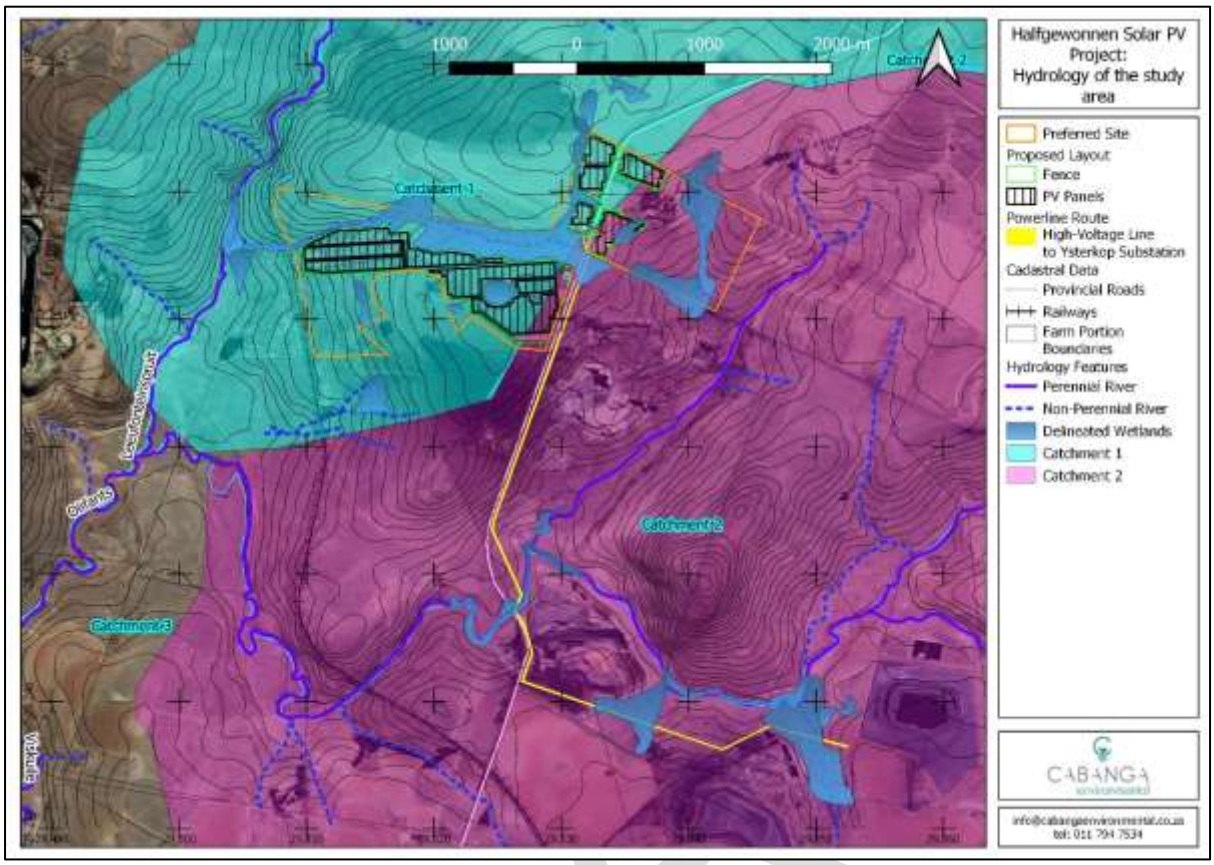
In the Leeuwfontein Spruit west of the project area and to which the proposed development site's runoff will drain, surface water monitoring has indicated that mining activities have contributed to sulphate concentrations in this watercourse.

A hydrological assessment was undertaken by Letsolo Water and Environmental Services for the proposed PV Project. Field work was undertaken in February 2021. The full report is included as Appendix F 6.

The study delineated two site-specific catchments of the proposed development site. The bulk of the Project infrastructure falls within Catchment 1 with a small portion in the east of the site and the powerline to Ysterkop Substation falling in Catchment 2 (Plan 10). Key hydrological characteristics of the catchments are summarised in Table 15 (Letsolo, 2021).

Table 15: Key hydrological characteristics of the site-specific catchments

Catchment characteristics	**Catchment 1**	**Catchment 2**
Area of catchment	80.4 km²	453 km²
Length of longest watercourse	18.71 km	55.381 km
Change in height	118 m	170 m
Average slope	0.0084 m/m	0.0041 m/m
Drainage basin characteristics		
Mean annual daily maximum rain	58mm	58 mm
Days on which thunder was heard	20 days	20 days
Basin mean annual precipitation	630 mm	630 mm
Basin mean annual evaporation	1600 mm	1600 mm
Basin evaporation index MAE/MAP	2.54	2.54
Peak Flow		
1 in 50 years	256.89m³/s	549.26 m³/s
1 in 100 years	327.48m³/s	700.19 m³/s



Plan 10: Site-Specific catchments and hydrology features

7.6 Freshwater Ecology

A Freshwater Ecosystem Assessment was undertaken by Scientific Aquatic Services (SAS) on 1 – 3 February 2021 (see Appendix F 4); eight wetlands were identified during the assessment which may be affected by the proposed development (Plan 11):

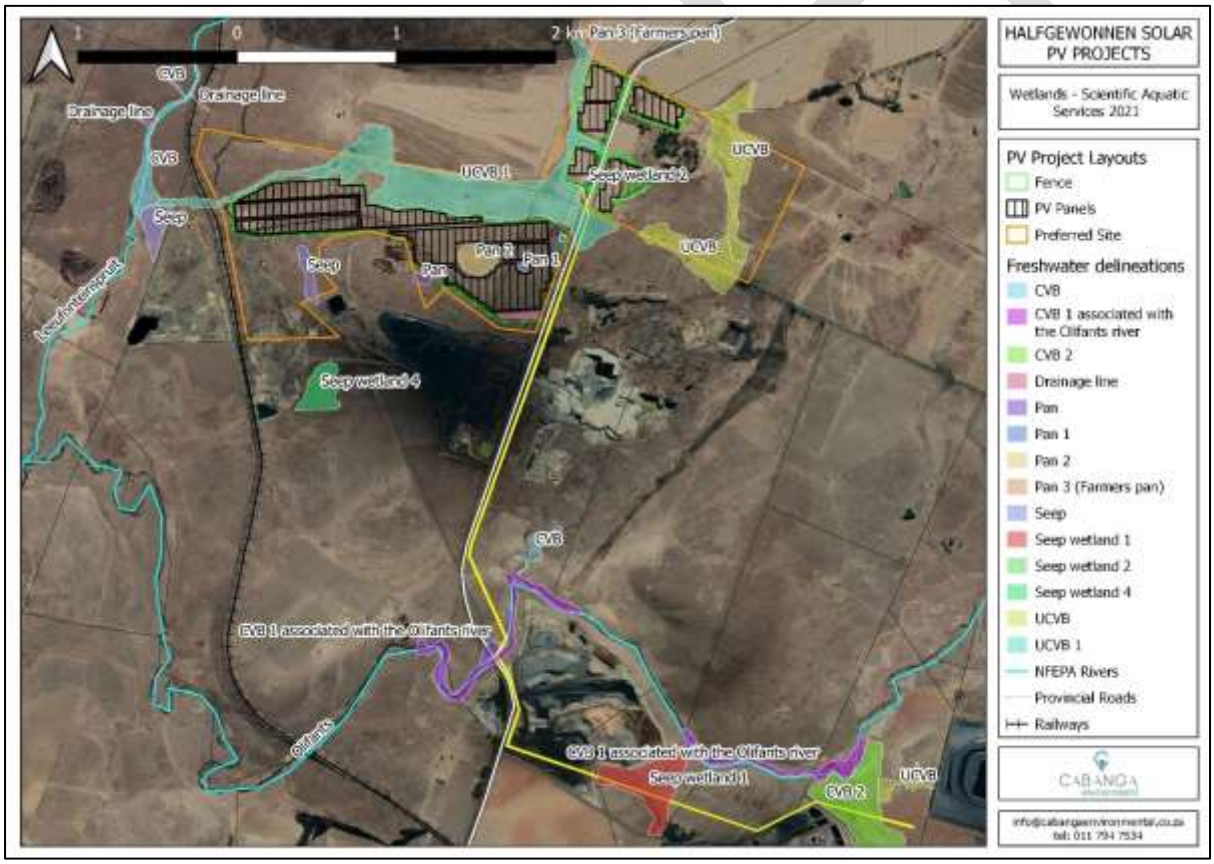
- one un-channelled valley bottom wetland (UCVB wetland 1);
- three pan wetlands (pans 1, 2 and 3);
- two channelled valley bottom wetlands (CVB wetlands 1 and 2); and
- two seep wetlands (seep wetlands 1 and 2).

In the initial stages of the project, the proposed Halfgewonnen Solar Photovoltaic (PV) Project was planned with a large portion of the footprint of the PV array in the wetland systems. Once this became evident, the project layout was revisited to reduce the risk to the receiving environment – based on recommendations from Scientific Terrestrial Services CC (STS) and Scientific Aquatic Services CC (SAS) (SAS, July 2021).

Key characteristics of each of the identified wetlands are summarized in Table 16, in terms of their Present Ecological State (PES), Ecological Importance and Sensitivity (EIS), Ecoservice provision and Recommended Ecological Category (REC).

Table 16: Key characteristics of potentially affected wetlands

	PES	EIS	Ecoservice Provision	REC
Pan 1	Largely natural	Moderate	Intermediate	B
Pan 2	Moderately Modified	Moderate	Intermediate	C
Pan 3	Moderately Modified	Moderate	Moderately Low	C
UCVB Wetland 1	Moderately Modified	High	Intermediate	C
CVB Wetland 1	Largely Modified	High	Moderately High	D
CVB Wetland 2	Moderately Modified	High	Intermediate	C
Seep 1	Moderately Modified	Low	Moderately Low	C
Seep 2	Largely Modified	Low	Moderately Low	D



Plan 11: Wetland Delineation (SAS, July 2021)

7.7 Terrestrial Ecology

The proposed development site is situated in the Mesic Highveld Grassland Bioregion of the Grassland Biome, and falls within the Eastern Highveld Grassland (Gm12) delineated by Mucina & Rutherford (Mucina & Rutherford, 2006) who describe the landscape as moderately to slightly undulating plains including some low hills and pan depressions. The vegetation comprises short, dense grassland dominated by common highveld grasses such as *Aristida, Digitaria, Eragrosits, Themeda* and *Tristacya* species.

The threat status of the Eastern Highveld Grassland is "Vulnerable" according to the updated 2018 Final Vegetation Map of South Africa, Lesotho and Swaziland, and the ecosystem is currently poorly protected. Ecosystem types are categorised as "not protected", "poorly protected", "moderately protected" and "well protected" based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act, 2003 (Act No. 57 of 2003), and compared with the biodiversity target for that ecosystem type (STS, July 2021).

On a desktop level, the ecosystem is classified as endemic with an Area of Occupancy (AOO) of 174 ha and an Extent of Occurrence (EOO) 22980.816 ha. It has an estimated percentage of decline of 0.5% per year (based on data from 1990 – 2014) (STS, July 2021).

The western portions and small section of the southern portion of the Solar PV Panel 2 and its associated internal roads and fence occurs within an Irreplaceable Critical Biodiversity Area (CBA). Much of the study area occurs within Heavily Modified areas, including several portions of the proposed Solar PV 1 and Solar PV 2 panels (with associated internal roads and fences), most of the proposed laydown areas, the main sub-station, O&M buildings, reference pyranometer and temperature sensor, site offices, several of the weather stations, as well as a large stretch of the high-voltage line. These are areas currently modified to such an extent that any valuable biodiversity and ecological functions have been lost (STS, July 2021).

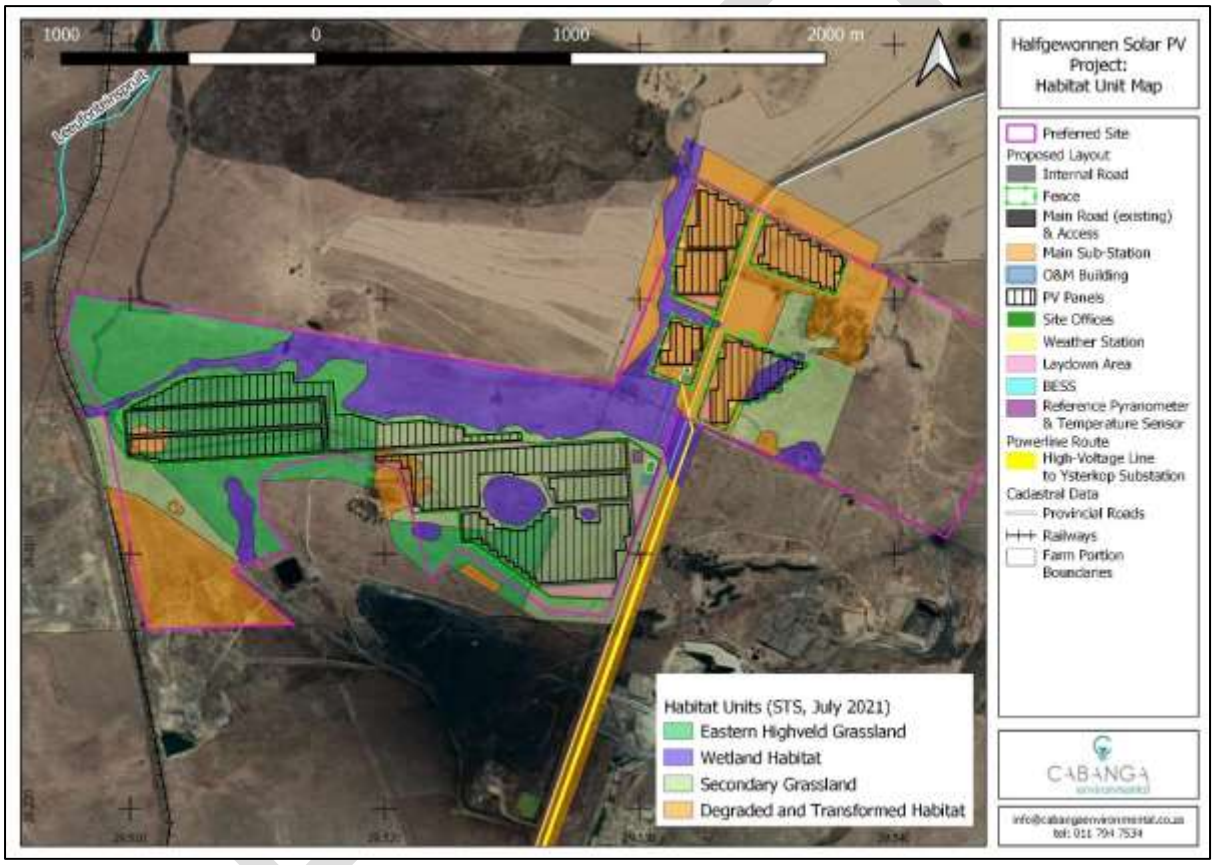
Site specific flora and fauna specialist studies were undertaken on the proposed development site, field work was undertaken in February 2021. Please refer to Appendix F 3 for the specialist study report.

Based on the results of the field investigation of February 2021, and the ad hoc observations from the Avifaunal winter assessment, four broad habitat units were distinguished for the study area, illustrated in Plan 12:

- **Degraded and Transformed** Habitat Unit: habitat that is currently either mined or cultivated, or which has experienced historic mining without rehabilitation to the reference state;
- **Eastern Highveld Grassland** Habitat Unit: largely intact grasslands with minimal alien vegetation and disturbances – meets the definition of primary grassland[4];

[4] **"Primary grasslands** are those that have not been significantly modified from their original state; even though they may no longer have their full complement of naturally occurring species, they have not undergone significant or irreversible modification and still retain their essential ecological characteristics (SANBI, 2013)

- **Secondary Grassland**[5] Habitat Unit stretches of grassland where floral communities display evidence of significant historic disturbance – in this case, historic cultivation. Also includes grasslands that despite not being historically transformed, no longer represent the reference state due to prolonged edge effect impacts and alteration of key ecological processes and drivers (e.g., fire and herbivory exclusion); and
- **Wetland** Habitat Unit: includes sections where vegetation is still largely intact, comprising mainly indigenous graminoids and forb species. Also includes several sections where vegetation is degraded, i.e., where there is a clear dominance of alien forb species, encroaching *Seriphium plumosum,* and a general lack of expected wetland graminoids.



Plan 12: Habitat Units delineated by the terrestrial biodiversity study

Provincially protected species *Aloe bergeriana* and *Gladiolus crassifolius* were recorded in the Eastern Highveld Grassland habitat unit. *Eucomis autumnalis, a Crinum sp.* and *Gladiolus eliotii* were recorded in the wetland habitat unit. These species are protected in terms of Section 11 of the Mpumalanga Nature Conservation Act and permits from the MTPA must be obtained prior to their removal or disturbance. No other protected flora or flora species of conservation

[5] "**Secondary grasslands** are those that have undergone extensive modification and a fundamental shift from their original state (e.g., to cultivated areas), but have then been allowed to return to a 'grassland' state (e.g., when old cultivated lands are re-colonised by a few grass species). Although secondary grasslands may superficially look like primary grasslands, they differ markedly with respect to species composition, vegetation structure, ecological functioning and the ecosystem services they deliver." (SANBI, 2013)

concern (SCC) were recorded during the field assessments, however, suitable habitat for certain SCC was identified and it is recommended that a survey be undertaken on the development footprint before vegetation clearance commences to ensure that protected species are not inadvertently affected by the project (STS, July 2021).

Figure 9: *Aloe bergeriana* (left) and *Gladiolus elliotii* (right), two of the SCC identified on the site (STS, July 2021)

As the wetland habitat unit was largely excluded from the proposed development footprint, it is unlikely that SCC in this habitat unit will be directly affected as long as edge-effects are managed and the development site and no-go areas are properly demarcated.

The Eastern Highveld Grassland Habitat Unit had the least Alien Invasive Plant (AIPs) species, with the Degraded and Transformed Habitat Units comprising the most. Of the AIPs recorded during the field assessment, nine species are listed under NEMBA Category 1b. The remaining 20 species are not listed under NEMBA but species such as *Bidens pilosa, Cosmos bipinnatus, Erigeron* sp., and *Tagetes minuta* are considered problem plants having a negative impact on indigenous floral communities within the study area (STS, July 2021).

Suitable habitat for *Ourebia ourebi* (Oribi, Vulnerable) was identified in the Eastern Highveld Grassland habitat unit. Habitat for *Leptailurus serval* (Serval, Near-Threatened) was noted in the Secondary Grassland, Wetland and Eastern Highveld Grassland Habitat and this species may potentially breed within the study area. Even though this species is listed as near threatened, it seems able to dwell amongst disturbed surroundings, frequently having been recorded near coal mines within the surrounding vicinity to this study area. The overall mammal species diversity and sensitivity for the proposed development sites is deemed to be intermediate (STS, July 2021).

No amphibian or reptile SCC were observed during the assessment and it is unlikely that reptilian SCC will occur in the vicinity of the proposed project site due to limited habitat availability. Herpetofauna diversity and abundances appeared moderately low during the field investigation, yet intermediate diversities are anticipated as a result of the Wetland Habitat and the portion of Eastern Highveld Grassland Habitat where more opportunities exist for breeding, basking and foraging. Overall, herpetofauna sensitivity was deemed intermediate (STS, July 2021).

During the field assessment no invertebrate SCC were observed. *Metisella meninx* (Marsh Sylph, Vulnerable) has been previously recorded in the area, and its larval foodplant (*Leersia hexandra*) was observed in high densities within the Wetland Habitat. As it was with the mammal diversity, insect diversity was species poor, and abundances were low (STS, July 2021).

No Fauna SCC were noted during the field investigation though Serval, Giant Bullfrog and March Sylph butterfly have a high probability of occurrence (STS, July 2021).

7.8 Avifauna

During the site assessment undertaken by Scientific Terrestrial Services (STS, July 2021) four avifauna habitat units were delineated, corresponding to the habitat units delineated by the terrestrial biodiversity study.

The study included a summer (February 2021) and winter (June 2021) site assessment. Key findings are discussed herein, with the full report included in Appendix F 5.

Avifaunal diversity associated with the study area ranged from low to moderately high. Because habitat structure is generally a primary determinant of bird assemblages, the largely homogenous grassland structure of the study area is mirrored by a relatively low bird assemblage (STS, July 2021).

The study area is considered to have suitable breeding habitat for *Tyto capensis* (African Grass Owl) and *Eupodotis caerulescens* (Blue Korhaan). Other SCC may also use the study area for foraging, and include *Circus maurus* (Black Harrier), *Falco vespertinus* (Red-footed Falcon), *Circus ranivorus* (African Marsh-Harrier), *Glareola nordmanni* (Black-winged Pratincole), *Circus macrourus* (Pallid Harrier), *Geronticus calvus* (Southern Bald Ibis), *Ciconia abdimii* (Abdim's Stork), *Mycteria ibis* (Yellow-billed Stork), *Sagittarius serpentarius* (Secretarybird) and *Falco biarmicus* (Lanner Falcon). Possible habitat for *Heteromirafra ruddi* (Rudd's Lark) was observed within the study area but this species prefers higher altitude locations (STS, July 2021). No legally protected Avifauna were observed during the field investigations, although suitable habitat for avifauna SCC was identified primarily in the Eastern Highveld Grassland and Wetland Habitat Units.

A single species considered regionally of Special Interest, the Amur Falcon (*Falco amurensis*) was observed during the field work foraging within the Eastern Highveld Grassland, utilizing existing powerline infrastructure to perch on.

Most Avifauna SCC which may inhabit the study area have wide ranges and often respond to favourable environmental conditions (grazing, fire, rainfall, or invertebrate outbreaks) and as such may find suitable habitat within the study area intermittently (STS, July 2021).

7.9 Air Quality and Noise

Permanent ambient air quality monitoring stations and dust-fall networks operated near the project site are often used to evaluate the existing air quality situation, however, there was no air quality monitoring data from the South African Air Quality Information System (SAAQIS) (that could be determined) to present background concentrations for SO_2, NO_2, CO, PM_{10} and $PM_{2.5}$ concentrations at the project site. There is also no ambient air quality monitoring undertaken at the site.

Background dust-fallout monitoring data from surrounding mining operations is available, and generally indicates compliance with the dust fallout standards for non-residential areas. It is anticipated that background particulate matter (PM) concentrations in the area could be high due to existing mining activity taking place.

Existing noise sources in the vicinity include the activities associated with the Halfgewonnen Coal Washing Plant, the conveyor between Halfgewonnen and Weltevreden Collieries, ongoing mining (including blasting) activities and truck operations on the Halfgewonnen (D622) Road. Those areas of the proposed development site closer to the Halfgewonnen Road and Coal Wash Plant are associated with a significantly higher noise profile than areas in the central portion of the development site. West of the development site, the Transnet Railway Line is also associated with increased noise levels, though sporadic in nature.

7.10 Visual Resources

The landscape character of the study area is described in rural, interspersed with mining and agricultural activities and limited farmhouses distributed across the landscape. The terrain is moderately undulating. Cattle grazing and crop cultivation are practiced, along with active mining activities and evidence of past mining activities occurring in the landscape (SAS, July 2021).

Visual absorption capacity (VAC) of the area is considered moderate: due to the nature of the project, its location adjacent to existing mining activities, the relatively low height of the structures and existing powerlines, the proposed PV structures are likely to be absorbed in the landscape, resulting in a moderately low visual intrusion. The undulating terrain is the main contributing factor to the medium VAC, as the undulating terrain limits the observer from seeing across vast distances, as such confining the line of sight toward the study area to few vantage points in the surrounding environment (SAS, July 2021).

The presence of the Olifants River and Ysterkop (local topographic high) in the wider region increases the cultural sensitivity of the area as confirmed by the DEA Screening Tool. However, the cultural aspects of the area are unlikely to be affected by the proposed project as the undulating terrain prevents direct views of the proposed facility from many vantage points (SAS, July 2021).

7.11 Socio-Cultural Environment

The proposed project site is located in the Govan Mbeki Local Municipality, which falls under the jurisdiction of the Gert Sibande District Municipality. The estimated population density for the local municipality is 74.9 people per km². The population density in the local area where the site is located is limited to farmers and their workers. Persons employed at the surrounding mines generally reside in surrounding towns. The farm Halfgewonnen is not an area that has been targeted for extensive development; therefore, it is unlikely that the current population will expand significantly (Geovicon, 2018).

Govan Mbeki Local Municipality contributes 63% of the Gross Value Added (GVA) product to the district municipality, which in turn contributes 19.8% GVA to the Mpumalanga economy. The Govan Mbeki Local Municipality contributes 95.8% GVA to the manufacturing and 68.2% GVA to the Mining Sector in the District (GMLM, 2017).

Govan Mbeki experienced a growth rate of 3.3% per annum (p.a.) which is equal to the national growth rate, and higher than the provincial growth of 2.8% p.a. and the district growth rate of 2.7%.

Agriculture is the smallest contributing sector in Govan Mbeki Local Municipality contributing only 0.7% to the municipal economy. Mining is the second largest sector within Govan Mbeki Local Municipality (contributing 28.4% to the local economy), and the largest sector within Mpumalanga making up 26.4% of the provincial economy (GMLM, 2017).

The highest levels of employment within the Govan Mbeki Local Municipality are experienced in trade (22%), mining (20%) and manufacturing (20.4%). The Govan Mbeki unemployment rate (25.2%) is higher than the provincial unemployment rate (24.5%) and lower than the district unemployment rate (30.0%) (GMLM, 2017).

7.12 Sites of archaeological and cultural interest

"Heritage resource" as defined in the NHRA means any place or object of cultural significance. "Cultural significance" means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

A Phase 1 Archaeological Impact Assessment has been commissioned as part of the EIA phase of the application. The study (Appendix F 1) identified a number of heritage resources in the vicinity of the proposed project, including historical buildings and graves. None of the identified sites are in the same footprint as the proposed development, and should therefore be preserved *in-situ* and completely avoided by the development activities. The identified heritage and archaeological sites are illustrated in Plan 13 and summarized in Table 17.

Table 17: Summary of Archaeological and Heritage Sites

Site Name	Coordinate	Description	Potential Impact
Site 1: Graves	26°14'30.60"S 29°32'6.78"E	Fenced graveyard about 30 m x 24 m in an open field. The fence was damaged. Six of the graves are orientated east to west and the rest was orientated north to south. The graveyard is overgrown with tall grass. The headstones are made of granite, natural stone and cement and the grave dressings are made of natural stone, granite, and cement. There are at least 25 graves visible. No graves are 60 years and older, 2 graves are younger than 60 years and 23 unmarked graves were found. The oldest grave belongs to Maria Nolanga Mahlangu	The graveyard lies 55 m southwest of the proposed power line and might be affected by the development if precautionary measures are not taken – the site fence must be maintained and impacts avoided.

		05/04/1983 and the youngest grave is that of Ben July Mahlangu 24/12/1985.	
Site 2: Graves	26°12'01.65"S 29°32'13.98"E	Graveyard of about 10 m long and about 4 m wide in a densely wooded area to the west of the farmhouse, with no fence surrounding the graves. The graves have been damaged due to falling trees. The graves are orientated east to west. The graveyard is overgrown with pioneer vegetation and trees and the presence of a beehive made documentation problematic. The headstones are made of granite and cut stone and the grave dressings are made of granite and cast iron. There are approximately 5 graves. One grave is 60 years and older, no graves are younger than 60 years and 4 unmarked graves were found. The oldest grave belongs to Pieter B. Janse van Rensburg. No other information could be found.	The graveyard lies 387 m east of the proposed development area and is unlikely to be affected by the development. It is recommended that the site be fenced and clearly marked to prevent inadvertent damage.
Site 3: Farmhouse	26°12'03.43"S 29°32'20.37"E	The farmyard is approximately 200 m long and 123 m wide and contains several structures and outbuildings associated with farming activities. The farmhouse is about 30 m long and 26 m wide. The farmhouse and other structures are currently being used by the Halfgewonnen Mine as offices and storage. The core of this farmhouse could be older than 60 years, but modern alterations have been done to the farmhouse and little remained of that core.	The farmyard is of low significance and it may be granted destruction at the discretion of the relevant heritage authority without a formal permit application. However, the farmhouse will not be directly affected by the proposed Solar PV Facility and thus may be left as it is.

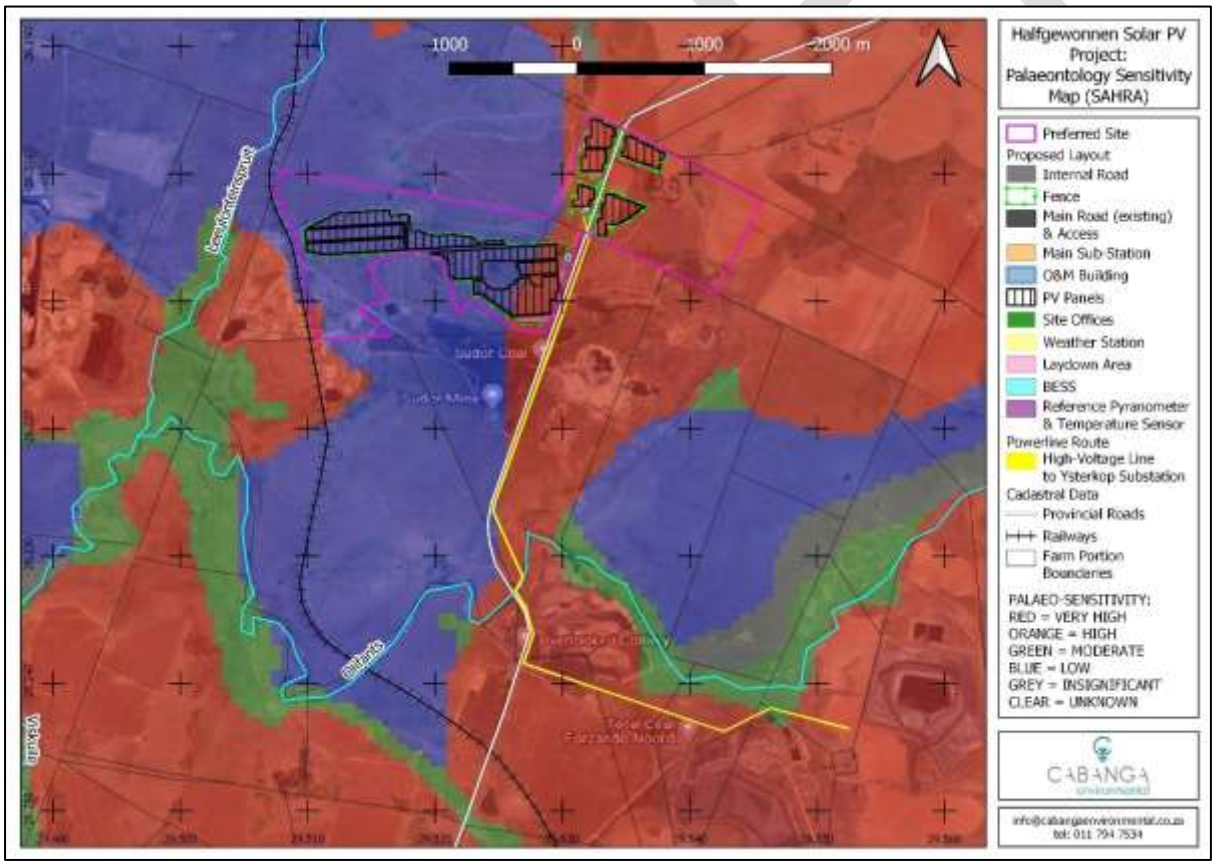
Site 4: Historical Post Office	26°14'15.90"S 29°31'37.62"E	This site was recorded previously: this was a farmyard of approximately 136 m long and 85m wide with four buildings that are older than 60 years of age. Through a mitigation process undertaken by Overlooked Colliery (Pty) Ltd three of the buildings were demolished and the post office building was kept and should be preserved.	The building falls outside the development footprint, though the powerline passes in close proximity – environmental awareness to be presented to staff, impacts to be avoided.

Plan 13: Heritage Sites in the vicinity of the Project

The Palaeo-sensitivity Map of the South African Heritage Resources Agency (SAHRA) (https://sahris.sahra.org.za/map/palaeo) shows that the proposed development footprint overlaps with areas of very high and low palaeontological sensitivity (Plan 14).

A site visit was undertaken by Mr. F Tolchard (MSc. Palaeontology) under the supervision of Professor Marion Bamford (PhD. Palaeontology) on 27 July 2021. The study concluded the following (Appendix F 1):

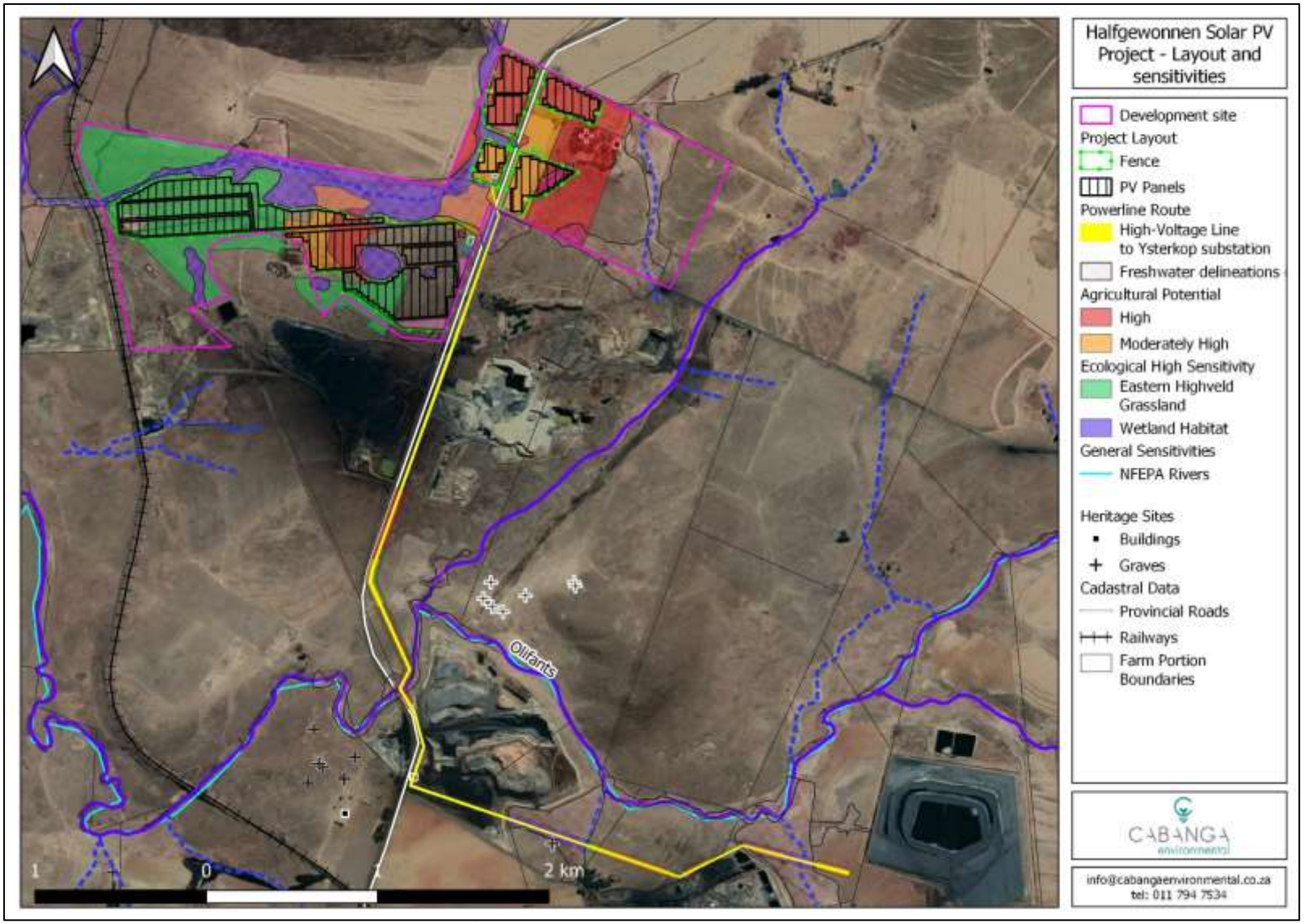
"*Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the alluvium, sands and soils of the Quaternary. There is a very small chance that fossil plants of the Glossopteris flora may occur in the adjacent and underground shales of the Vryheid Formation. The site visit showed that there are NO FOSSILS visible on the surface. Nonetheless, a Fossil Chance Find Protocol should be added to the EMP. If fossils are found once excavations for foundations and infrastructure have commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. As far as the palaeontology is concerned, the project may proceed*." (Bamford, July 2021).



Plan 14: Project in relation to Palaeontological Sensitivity

8 Sensitivity Map

Plan 15 presents the proposed project infrastructure in relation to the identified environmental sensitivities:



Plan 15: Proposed layout and site sensitivities

9 Identification of potential impacts

The purpose of the impact assessment is to determine the significance of potential impacts, so that those activities that are expected to result in high impacts can be altered, or management measures imposed to lessen the impact significance.

The identification of potential impacts arising from the proposed activities is assisted by a number of inputs including:

- Expertise of the EAP and knowledge of typical impacts associated with the type(s) of development activities proposed;
- Discussions with the applicant and engineering team;
- Consultations with I&APs, including authorities; and
- Inputs from various specialist studies.

9.1 Impact Assessment Methodology

Impact Significance is calculated by the following formula:

Impact Significance = Consequence x Likelihood

Likelihood refers to the probability that an impact will occur at some time during the project.

The Matrix which is proposed to determine Likelihood is as follows:

Table 18: Matrix used to determine likelihood

Likelihood	Unlikely: Impact could occur in extreme events. Less than 15% chance of the impact ever occurring.	1
	Possible: possibility of impact occurring is very low. 16% - 30% chance of the impact occurring.	2
	Probable: There is a distinct possibility of the impact occurring. 31% to 60% chance.	3
	Highly Probable: The impact is expected to occur. Between 61% and 85 % chance.	4
	Definite: There are sound scientific reasons to expect that the impact will occur	5

Consequence is calculated by considering the **duration**, spatial **scale** and **intensity** of an impact.

Duration relates to the time-frame that an aspect will be impacted upon. For example, any impact to a heritage resource is considered permanent, while the impact of increased traffic related to a construction activity will only last as long as the construction phase. Duration is rated according to the following criteria:

Table 19: Matrix used to rate duration

Duration	Short term: Less than 1 year and is reversible.	1
	Short to medium term: 2 - 3 years	2
	Medium term - 3 to 10 years	3
	Long term: 11-20 years	4
	Permanent: in excess of 20 years	5

Spatial **Scale** relates to the physical extent of the zone of influence of an impact. Where groundwater or air quality impacts, for example, can extend far beyond the footprint of the activity, it is not expected that the impact of vegetation removal should extend beyond the footprint of the activity. Scale is rated according to Table 20:

Table 20: Matrix used to rate scale

Scale / Extent	Isolated: Limited footprint within the site will be affected (less than 50% of the site)	1
	Site Specific: The entire site will be affected	2
	Local: Will affect the site and surrounding areas	3
	Regional: Will affect the entire region / catchment / province	4
	National: Will affect the country, and possibly beyond the borders of the country	5

The **Intensity** of an impact is calculated by considering the **severity of the impact** (how it will change the aspect, will it be destroyed completely, or altered slightly?) and the **sensitivity of the aspect** (is the aspect sensitive to change, and is the aspect important to ecosystem processes or social dynamics?). For example, if the impact is anticipated to completely destroy a local plant population, but the plant population is commonly found and protected in nearby surroundings, the over-all intensity is lowered. If, however, the plant population in question is unique or protected, the intensity increases proportionately.

The Matrix which is proposed to determine Intensity is as follows:

Table 21: Matrix used to rate Intensity

Severity	Slight: Little effect, negligible disturbance / benefit	1
	Slight to Moderate: Effects are observable but natural process continue	2
	Moderate: ecosystem processes / social dynamics are permanently altered, but functioning.	3
	Moderate - High: natural / social processes are altered to the point where function is limited	4
	High: The aspect is affected so that its functioning is compromised and this effect is irreversible	5
Sen	The aspect is not sensitive to change (No irreplaceable loss of resource)	1

	The aspect is not of significant value but is sensitive to change	2
	The affected aspect is of moderate value and is slightly resilient to change	3
	The affected aspect is of significant value and only slightly resilient to change	4
	The affected aspect is valued, irreplaceable and sensitive to change. Irreplaceable loss of significant resource	5

Therefore, considering the formula:

Significance = Consequence x Likelihood

Where ***Consequence = Duration + Scale + Severity of the Impact + Sensitivity of the Aspect***

The over-all Significance rating can be calculated as a value between 4 and 100. The score is then categorised as follows:

- 4 to 19 = Insignificant Impact, no mitigation is required beyond standard best practice;
- From 20 to 39 = Low Impact, specific mitigation should be included in the EMP and monitoring should be undertaken;
- From 40 to 59 = Moderate Impact, specific mitigation with strict monitoring is required;
- From 60 to 79 = High Impact, mitigation should consider alteration of the design or process to reduce the impact significance. Alternatively, it must be shown that positive effects of the projects outweigh the potential impact to the environmental aspect;
- >Higher than 80 (100 max) = The Impact is so Significant that the project design must be reconsidered to avoid the impact.

Impacts will be rated as per the abovementioned methodology without consideration of mitigation measures first, however there may be some mitigation already inherent in the design of the Project (i.e. by avoiding identified wetland areas in the layout of the project, by using existing roads instead of constructing a new access road, etc.).

Those impacts that are rated as having a moderate impact or above will be investigated further and management measures identified to attempt to reduce the consequence or likelihood of the impact. These impacts will then be rated again, while considering the mitigation measures that have been imposed.

9.2 Impact Identification

The EIA Guideline for Renewable Energy Projects (DEA, 2015) confirms that the potential environmental impacts associated with solar power vary greatly and could include:

- Impacts to land use;
- Impacts associated with water use;
- Impacts associated with hazardous materials; and
- Other impacts such as noise, visual impacts, electromagnetics and aircraft interference.

To identify the potential impacts that will be associated with the proposed Solar PV Project, an in-depth understanding of activities and facilities associated with each phase of project development must be attained first.

Table 22 identifies the activities that will be associated with each phase of the project, and potential impacts associated with each activity.

Table 22: Impacts potentially associated with project activities

Phase	Activities	Potential Impacts
Construction	Vegetation Clearance	Loss of sensitive plant species
		Loss of viable ecosystems
		Fragmentation of ecosystems
		Increased erosion potential
	Topsoil stripping	Loss of topsoil
		Loss of land with agricultural potential
		Increased erosion potential
	Excavating foundations	Altered surface water runoff patterns
		Safety impacts to humans and animals (open excavations)
	Construction of stormwater management controls	Reduced / altered surface water runoff to remaining catchments
		Siltation of downstream environments from erosion
	Construction, including the use of cement and concrete on site	Potential soils, surface- and groundwater pollution from use of cement and chemicals on site
	Construction activities	Employment opportunities during construction phase (short-term)
	Presence of construction workers	Increased littering, potential poaching, potential trespassing and associated safety concerns, establishment of informal settlements, fires etc.
		Increased noise and dust from activities on site

Phase	Activities	Potential Impacts
	Construction activities, vehicle movement and machinery operation	Traffic impacts: deteriorating road conditions, road safety impacts
	Construction activities	Alteration of visual resource
	Completion of construction	Loss of short-term employment that was associated with construction
	Establishment of the battery storage facility	Potential impacts associated with the storage of hazardous substances
	Re-establishment of vegetation between the project infrastructure	Potential for establishment of alien invasive species on disturbed areas
Operation	Presence of the Solar PV Facility and supporting infrastructure	Visual impact of the Solar PV Facilities and powerline
		Potential impacts to avifauna
		Safety Impacts to employees and visitors to the site.
	Maintenance of the Solar PV Facility and supporting infrastructure	Water use; potentially polluted stormwater runoff to downstream environments, erosion and siltation of downstream environments
Decommissioning and rehabilitation	Dismantling of the facility and associated infrastructure	Safety risks, visual impacts, increased dust and noise, pollution potential from affected runoff
	Removal of materials from site and disposal thereof	Potential for illegal disposal causing pollution
	Re-vegetation of the site	Potential for establishment of alien invasive species

9.2.1 Pre-Construction and Planning Phase

Before any activities are physically undertaken on the project site, action can already be taken to pro-actively put management measures in place. Failure to do so could result in more significant impacts manifesting (though the impacts will only physically manifest once activities on site commence). Thus, while the pre-construction and planning phase are not associated with physical impacts on-site, failure to implement the prescribed management measures would cause impacts to occur in subsequent project phases.

In summary, the following management plans are required prior to project implementation:

Table 23: Management plans required prior to commencement

Management Plan/permit required	Consequence if not in place
Rehabilitation Plan	Long-term or permanent degradation and modification of the receiving environment, loss of SCC and habitat.
Anti-collision measures	Long-term collision and electrocution risks to SCC species leading to a reduction in SCC diversity.
Permit(s) for removal / relocation of protected species, and relocation plan	Avoidable loss of floral SCC within the development footprint areas.
Site / activity delineation	Avoidable impact(s) beyond the activity footprint.
Alien invasive species management plan	Potential proliferation of alien invasive species.
Environmental Awareness Plan	Potential avoidable edge effects, fires, littering, pollution due to spills etc.
Lighting design	Potential inadequate design of lighting within the PV facility could lead to invertebrates being attracted to lights and the resulting attracting of insect predators, increasing the potential for fauna, particularly bats, to collide with or be electrocuted by associated facilities or start fires.

9.2.2 Construction, operation and rehabilitation phase

Table 24 lists the activities that are planned to be undertaken at the project sites and summarises the environmental aspect that each activity poses a risk to or will impact upon, along with consideration of impact significance in terms of the nature, duration, scale and likelihood of the impact occurring.

Full Impact Assessment Tables are included in Appendix E. Each impact is further discussed in Section 9.3

Table 24: Impact Assessment

Activity	Description of potential impacts	Discussion of impact, and Mitigation		Significance	
Vegetation Clearance	Impacts on flora Species of Conservation Concern	Flora SCC were confirmed on the proposed development site, prior to any vegetation clearance, a thorough rescue and relocation process must be undertaken, with the necessary permits in place, to relocate SCC to adjacent suitable habitat, or demarcate SCC that are not directly in the proposed development footprint, to ensure they are not inadvertently damaged. Relocation of most of the SCC on site will likely be successful, however, population genetics will be impacted (STS, July 2021).	Before Mitigation	42	Moderate
			After Mitigation	22	Low
	Impacts to floral species habitat and diversity	Vegetation clearance in the Eastern Highveld Grassland vegetation unit, will result in unavoidable loss of floral habitat and diversity. Clear demarcation of the activity areas and management of alien invasive species, as well as post-construction rehabilitation will reduce the extent and severity of the impact.	Before Mitigation	52	Moderate
			After Mitigation	36	Low
	Impact on avifauna diversity and habitat	Clearance of vegetation will alter the existing avifauna habitat, which is considered moderately sensitive in the eastern highveld grassland vegetation unit. The site must be demarcated adequately to avoid potential loss outside the planned footprint area, reducing impact extent. Rehabilitation of areas between the directly affected footprints will also reduce impact duration.	Before Mitigation	52	Moderate
			After Mitigation	36	Low

Activity	Description of potential impacts	Discussion of impact, and Mitigation		Significance	
	Impact on avifauna species of conservation concern	Avifauna SCC may occur in the project area, either permanently for breeding or temporarily while foraging. Vegetation clearance in the Eastern Highveld Grassland will lead to loss of breeding and foraging habitat for these species within the footprint. These species are then expected to migrate to surrounding habitat, increasing competition for resources in adjacent habitats, and reduced species richness. The extent of impacts must be controlled.	Before Mitigation	52	Moderate
			After Mitigation	40	Moderate
	Impact on faunal habitat and diversity	Loss of faunal habitat, especially sensitive in Eastern Highveld Grassland (primary grassland). Decrease in available forage in the study area. Mitigation should aim to limit edge effects and manage alien invasive species. Minimise habitat loss and vegetation clearance beneath PV panels.	Before Mitigation	56	Moderate
			After Mitigation	36	Low
	Impact on faunal SCC	No faunal SCC were observed during the specialist site visit, however suitable habitat for faunal SCC exists in the wetland and grassland habitats. Disturbance on the site is expected to result in reduced SCC diversity on the site. Mitigation involves strict management of the impact footprint and environmental awareness training.	Before Mitigation	52	Moderate
			After Mitigation	22	Low
	Fragmentation of ecosystems	Considering the project footprint to be closely associated with existing mining and agricultural activities in the area and the already fragmented nature of ecosystems, the development is unlikely to exacerbate fragmentation of habitats and	Before Mitigation	12	Insignificant
			After Mitigation	11	Insignificant

Activity	Description of potential impacts	Discussion of impact, and Mitigation		Significance	
		ecosystems. The development footprint must not be allowed to expand beyond approved areas.			
	Loss of wetland habitat	Seep wetland 2 will be directly affected by the proposed development footprint. Other wetlands may be impacted by edge effects, if not managed. Boundaries of vegetation clearance must be clearly demarcated and not exceeded. Runoff from the development footprint must be controlled. Implement alien invasive species management plan. Implement rehabilitation plan after construction.	Before Mitigation	52	Moderate
			After Mitigation	28	Low
	Increased erosion potential	If not mitigated, erosion is highly likely to occur as a result of construction activities, which would in turn lead to loss of soil resources and siltation of downstream water resources including wetlands, the Leeuwfontein Spruit and Olifants River. Erosion prevention measures are relatively easy to implement and must be planned for to reduce the likelihood of the impact occurring. The developer must implement a maintenance schedule for vegetation recovery and implement erosion control measures at steep areas.	Before Mitigation	48	Moderate
			After Mitigation	12	Insignificant
Topsoil stripping	Loss of topsoil	Topsoil loss on the affected footprint is inevitable but this topsoil could be used in other applications such as rehabilitation of the Mines. If topsoil is lost this will be considered significant. Mitigation should aim to reduce the likelihood of topsoil loss by ensuring topsoil is stripped from affected footprints and either stockpiled (while being protected from erosion) for use in	Before Mitigation	56	Moderate
			After Mitigation	24	Low

Activity	Description of potential impacts	Discussion of impact, and Mitigation		Significance	
		rehabilitation or used directly in rehabilitation of surrounding areas affected by mining. No unnecessary topsoil must be stripped, the footprint of areas to be stripped must be demarcated clearly.			
	Loss of land with agricultural potential	About 30 Ha of the total development footprint of approximately 150 ha is currently under cultivation (thus, 20%). The loss, though limited, is unavoidable if the proposed project is to be implemented. The Mine (land owner) may consider making other areas available to local farmers but this is beyond the control of the Applicant.	Before Mitigation	50	Moderate
			After Mitigation	30	Low
Excavating foundations	Altered surface water runoff patterns	Surface water ponding is expected in the excavations unless managed. The proposed development is not associated with major earthworks and proper construction scheduling and the implementation of stormwater management measures as stipulated in the specialist report and EMP are assumed.	Before Mitigation	32	Low
			After Mitigation	32	Low
	Palaeontology - loss of or damage to fossils potentially occurring on the site.	The specialist assessment confirmed that it is unlikely that fossils will be encountered on the site. A Fossil chance-find protocol should be in place (include in awareness training) and if fossils are encountered, a palaeontologist must be contacted immediately to advise.	Before Mitigation	15	Insignificant
			After Mitigation	13	Insignificant
	Safety impacts to humans and animals (open excavations)	Open excavations present safety risks to humans and animals that may gain access to the site. The	Before Mitigation	26	Low

Activity	Description of potential impacts	Discussion of impact, and Mitigation		Significance	
		construction site must be fenced off and access to unauthorised persons prevented. Construction staff and all persons gaining access to the site must have appropriate PPE. Additionally, excavations should be demarcated separately with danger tape or similar visible warnings. As few as possible excavations should be open at any given time.	After Mitigation	22	Low
Construction of stormwater management controls	Reduced / altered surface water runoff to remaining catchments	Excavations and retention of potentially polluted stormwater on the development site will lead to reduced surface water reporting to downstream environments, this is expected to be minimal and is preferable to allowing polluted stormwater to discharge into downstream systems.	Before Mitigation	48	Moderate
			After Mitigation	28	Low
	Siltation of downstream environments from erosion	Stormwater that is affected by the construction activities will contain increased silt and potentially also contain other pollutants, and should be retained on site and used for construction, reticulated to the Mine for use in their "dirty water area" or treated and tested before being allowed to run off to surrounding environments (if water quality is acceptable).	Before Mitigation	56	Moderate
			After Mitigation	22	Low
Construction, including the use of cement and concrete on site	Potential soils, surface- and groundwater pollution from use of cement and chemicals on site	The use of potentially polluting materials on site including cement, chemicals, paint, etc. must be strictly controlled. Spill kits must be available on site and construction workers must be trained on how to use them, and what procedures to follow in the event of accidental spills of various types of potential pollutants.	Before Mitigation	36	Low
			After Mitigation	16	Insignificant

Activity	Description of potential impacts	Discussion of impact, and Mitigation		Significance	
Construction Activities	Employment opportunities during construction phase (short-term)	This is a positive impact on the livelihoods of construction phase employees, likely to be appointed by a contractor. Preference must be given to local applicants where the skills are available from within the closest towns (Hendrina and Bethal, even though Hendrina is in a different Municipal area, it is the closest town to the site and benefits of the project should accrue to persons in and around Hendrina as well.	Before Mitigation	36	Low
			After Mitigation	36	Low
Presence of construction workers	Increased littering, potential poaching, potential trespassing and associated safety concerns, establishment of informal settlements	Recruitment should be done according to accepted procedures, from a central recruitment office in town and not at the construction site or mine. Preference will be given to employ local persons where possible. Employees will undergo environmental awareness training which must include a prohibition on littering, uncontained fires, poaching and trespassing. Access to the construction site will be strictly controlled. If informal settlement is noted, the developer and land owner must liaise with the police to prevent the establishment of informal settlements.	Before Mitigation	48	Moderate
			After Mitigation	22	Low
Construction Activities, vehicle movement and machinery operation	Increased noise and dust from activities on site	Operation of construction vehicles and machinery will be associated with noise and dust. Machinery, vehicles and equipment must be serviced as per manufacturer's specification to prevent noise and emissions resulting from machines being in disrepair. The appointed construction contractor should commit to this stipulation. Dust monitoring at the Mine will continue and detect if increased unacceptable dust is generated by construction activities. Dust suppression	Before Mitigation	30	Low
			After Mitigation	18	Insignificant

Activity	Description of potential impacts	Discussion of impact, and Mitigation		Significance	
		via watering truck (preferably using the Mine's water source) must be implemented as necessary. Construction activities must be restricted to day-time.			
	Traffic impacts: deteriorating road conditions, road safety impacts	Delivery of construction materials to site, increase staff travelling to site (construction and operational phases) will be associated with increased road traffic. The Halfgewonnen Road is already experiencing more significant truck volumes due to the Mines in the immediate vicinity, and occasional temporary closures to enable blasting activity by the Mines, causing nuisance impacts to the surrounding farmers. Scheduling of deliveries and provision of transport services to staff can alleviate the impact of increased traffic volumes. All road safety rules must be adhered to. Additional safety signs are recommended to prevent road traffic accidents.	Before Mitigation	56	Moderate
			After Mitigation	20	Low
Construction Activities	Damage to or destruction of heritage resources	Graves and heritage buildings were identified in the proximity of the site, these should be preserved in-situ. It is recommended that the sites be clearly demarcated and that their presence and importance be included in the awareness training to prevent inadvertent damage.	Before Mitigation	64	High
			After Mitigation	14	Insignificant
Construction Activities	Alteration of visual resource	Visual impacts are inevitable but not expected to be significant given the existing mining activities in the region and short duration of construction-phase impacts.	Before Mitigation	28	Low
			After Mitigation	24	Low

Activity	Description of potential impacts	Discussion of impact, and Mitigation		Significance	
Completion of construction	Loss of short-term employment that was associated with construction	It is expected that construction-phase employees will mostly be appointed by the contractor and thus possibly could be re-deployed to continue employment on another construction project. Expectations of employees must be managed professionally.	Before Mitigation	36	Low
			After Mitigation	36	Low
Establishment of the battery storage facility	Potential impacts associated with the storage of hazardous substances	Battery storage facility will be pre-assembled and installed on site and it must be guaranteed by the supplier / installer that the necessary safety precautions and pollution (leak) prevention measures are implemented. Temporary storage and use of potentially hazardous substances like diesel, cement, chemicals etc. must be controlled and only authorised, trained personnel allowed to access such materials. Spill kits must be available on site and personnel trained in their use.	Before Mitigation	42	Moderate
			After Mitigation	12	Insignificant
Re-establishment of vegetation between the project infrastructure	Potential for establishment of alien invasive species on disturbed areas	Areas that are not physically affected by infrastructure should be re-vegetated by seeding with indigenous seed mix (or not disturbed at all, where possible). The establishment of viable and self-sustaining vegetation communities on site will prevent to a large degree the establishment of alien invasive species. A qualified person with knowledge of the area should inspect the site post-construction, and periodically during the operational phase, and identify alien species that may have established, and advise the developer and land owner of appropriate measures to eradicate such species. This should be included in an alien invasive	Before Mitigation	56	Moderate
			After Mitigation	20	Low

Activity	Description of potential impacts	Discussion of impact, and Mitigation		Significance	
		species control plan to be maintained by the Developer's ECO.			
Presence of the Solar PV Facility and supporting infrastructure	Visual Impact on landscape character and sense of place	With the study area being situated within a rural area with limited receptors present within 2 km, and the relatively low height of the proposed PV structures in comparison to the existing mining structures, the proposed PV facilities are expected to have a moderately low visual impact on the landscape character within the region.	Before Mitigation	44	Moderate
			After Mitigation	36	Low
	Visual intrusion of the Project infrastructure and visual absorption capacity (VAC) impacts	The VAC of the study area and surrounds is determined to be medium, which illustrates the ability of the surrounding area to absorb or conceal some visual impacts. Due to the relatively low height of the proposed structures, the undulating terrain and the limited sensitive receptors in the area, the proposed PV facilities are not expected to lead to a significant level of visual intrusion on the surrounding landscape.	Before Mitigation	48	Moderate
			After Mitigation	30	Low
	Potential impacts to avifauna habitat and avifauna SCC	The layout has been adjusted to avoid the wetland habitat in line with preliminary specialist recommendation. However, portions of Eastern Highveld Grassland will still be affected, reducing breeding and foraging habitat for Avifauna SCC, who are expected to migrate to adjacent habitat and increasing competition for resources in adjacent habitats. Potential electrocutions and collisions are also likely if not mitigated.	Before Mitigation	68	High
			After Mitigation	45	Moderate

Activity	Description of potential impacts	Discussion of impact, and Mitigation		Significance	
Maintenance of the Solar PV Facility and supporting infrastructure	Water use; potentially polluted water runoff to downstream environments, erosion and siltation of downstream environments	Minimal water and compressed air will be used to clean the solar panels. The source of water must be confirmed by the developer, it is assumed that water from the Mines or Usuthu-pipeline can be used. If additional abstraction is required, this must first be licensed in terms of the NWA. Affected (potentially polluted) water will be retained by the stormwater management facilities on site, and either re-used, or treated to acceptable standards prior to controlled release (to prevent erosion) to the surrounding environment.	Before Mitigation	56	Moderate
			After Mitigation	20	Low
Dismantling of the facility and associated infrastructure.	Safety risks, visual impacts, increased dust and noise, pollution potential from affected runoff	All of the management measures associated with the construction phase will also apply to decommissioning of the facility at the end of its operational life. The visual impact of the facility will be removed in the long term. Dust suppression, maintenance and safety measures must remain in place until the site is entirely rehabilitated.	Before Mitigation	48	Moderate
			After Mitigation	16	Insignificant
Removal of materials from site and disposal thereof	Potential for illegal disposal causing pollution	The contractor(s) appointed for the decommissioning and rehabilitation activities must commit to the disposal of materials at registered sites and provide proof thereof to the developer. Salvageable materials may be sold to interested parties where these are not hazardous.	Before Mitigation	36	Low
			After Mitigation	8	Insignificant
	Potential for establishment of alien invasive species	Post-demolition, the site must be rehabilitated (compacted areas ripped, topsoil re-instated and the	Before Mitigation	56	Moderate

Activity	Description of potential impacts	Discussion of impact, and Mitigation		Significance	
Re-vegetation of the site		area vegetated with indigenous seed mix) to prevent alien species from colonising the area. Post-rehabilitation monitoring will also be required. A detailed rehabilitation strategy is included in this EIA Report.	After Mitigation	30	Low

9.3 Impact Assessment

The nature, significance, consequence, extent, duration and probability of each impact is discussed in Section 9.2.2. Detailed Impact Assessment Tables are provided in Appendix E.

Each of the key impacts resulting from the proposed project activities are discussed below.

9.3.1 Impacts to terrestrial ecology (flora and fauna)

The specialist impact assessment (STS, July 2021) was undertaken on all aspects of floral ecology deemed likely to be affected by the proposed Solar PV activities. Much of the proposed development will be within already transformed habitat; however, sections of the proposed surface infrastructure overlap wetland and grassland habitat. Several aspects of the proposed project will thus impact on sensitive floral communities and protected species (with possible, but restricted, potential for impacts on Red Data List (RDL) species).

Impacts on species habitat and diversity will be higher during the construction phase where vegetation clearance will take place, especially impacts stemming from the PV 2 panels that will be impacting on Irreplaceable CBAs (53 ha), threatened ecosystems (50 ha), and may have edge effect impacts on the Wetland Habitat Unit if not mitigated for. Impacts on protected floral species (as well as potentially occurring RDL species) will be higher during the planning phase where SCC will be relocated and/or destroyed – this needs to take place prior to the construction phase, especially with obtaining permit applications that can delay the relocation process. Relocation of most of the SCC on site will likely be successful, however, population genetics will be impacted. Impacts during the operation and maintenance phase can be reduced to lower impact significance on all aspects of floral ecology. Impact on floral SCC varies significantly between the habitat units (STS, July 2021).

The perceived impact significance of the proposed infrastructure development (prior to mitigation) on faunal habitat, diversity and SCC ranges from very low to high. These impact scores were influenced by the varying degrees of impact that possible activities within each stage of development of certain infrastructure would have on the faunal assemblage identified. Should the relevant mitigation be undertaken impacts can be reduced to medium-low, low and very low levels. The development of PV 2 panels will result in the highest impact score due to the overlap with the presently intact sensitive Eastern Highveld Grassland Habitat (STS, July 2021).

The study area is surrounded by agricultural and mining activities which reduce the suitability for supporting a diverse and abundant faunal assemblage and especially for larger faunal species. Yet habitat connectivity is still maintained for the most part, especially to the north-west and as such movement routes for faunal species should be maintained by preventing impacts on wetland habitat. As part of the rehabilitation actions, disturbed areas not within the development footprint must be rehabilitated appropriately and AIP establishment controlled within such areas (STS, July 2021).

9.3.2 Impacts to Aquatic Ecology

There are four key ecological impacts on the wetlands that are anticipated to occur, namely (SAS, July 2021),

- Loss of wetland habitat and ecological structure;

- Changes to the sociocultural and service provision;
- Impacts on the hydrology and sediment balance of the wetlands; and
- Impacts on water quality.

Whilst the surface infrastructure component of the proposed development was moved outside of the delineated wetlands (with the exception of seep wetland 2) to avoid impacts to the freshwater ecosystems, some indirect impacts to wetlands are still possible.

Site clearing, excavation, laydown of concrete and construction of infrastructure may encroach on the delineated wetlands if not managed. The specialist recommendation of a 10 m construction and operational phase buffer zone must be implemented and activity beyond the approved footprint areas may not be allowed.

Additionally, activities may result in decreased ecological service provisioning, potential for degradation in wetland health and ingress of hydrocarbons, toxicants and sediment runoff into the wetlands. This may have a cumulative impact on the health, functionality and water quality of the freshwater ecosystems (SAS, July 2021).

Provided that the mitigation hierarchy is followed, some impacts can be avoided or adequately minimised where avoidance is not feasible.

9.3.3 Impacts to Avifauna

The western portions of the study area are still relatively intact and may host a modest assemblage of avifauna, with a reduced abundance of large raptors. Avifaunal diversity within the study area ranges from moderately high to low (STS, July 2021).

Very little clearing of vegetation is anticipated for the construction of the powerline and thus little alteration in the local habitat or impacts on SCC habitat are anticipated. However, these proposed infrastructures increase the potential for avifauna (particularly larger birds) to collide with the transmission cables and earth wires or be electrocuted on them while perching which may reduce their abundances (STS, July 2021).

Avifauna may also collide with PV panels which they confuse for a waterbody. The potential for impacts is greater in the western portions of the site where the habitat is less disturbed (thus more sensitive).

Edge effects may also result in impacts to surrounding habitats if not properly managed and should rehabilitation of the site not be completed. Edge effects may alter the local environment to an extent where it is no longer representative of the reference type, rendering it unsuitable for many SCC (STS, July 2021).

An increase in vehicle movement in the area during maintenance phases will increase the likelihood of collisions with avifauna, yet the vehicles are unlikely to be moving fast enough to be a significant risk to avifauna should a strict speed limit be kept. The impact significance of the loss of avifaunal species diversity and habitat based on the proposed layout plans for the construction and operational and maintenance phases is expected to vary between medium high to very low should mitigation be implemented thoroughly (STS, July 2021).

9.3.4 Surface Water Impacts

It is important to determine the environmental and hydrologic effects of the proposed Solar PV Facility. Various sensitivity analyses were conducted including changing the storm duration and volume, soil type, ground slope, panel angle, and ground cover to determine the effect that each of these factors would have on the volumes and peak discharge rates of the runoff (Letsolo, 2021).

The addition of solar panels over a grassy field does not have much of an effect on the volume of runoff, the peak discharge, nor the time to peak. With each analysis, the runoff volume increased slightly but not enough to require storm-water management facilities. However, when the land-cover type was changed under the panels, the hydrologic response changed significantly. When gravel or pavement was placed under the panels, with the spacer section left as patchy grass or bare ground, the volume of the runoff increased significantly and the peak discharge increased (Letsolo, 2021).

The potential for erosion of the soil at the base of the solar panels was also studied. It was determined that the kinetic energy of the water draining from the solar panel could be as much as ten times greater than that of rainfall. Thus, because the energy of the water draining from the panels is much higher, it is very possible that soil below the base of the solar panel could erode owing to the concentrated flow of water off the panel, especially if there is bare ground in the spacer section of the cell. If necessary, erosion control methods should be used (Letsolo, 2021).

Vegetation protects the surface by restricting the movement of sediments. As vegetation is removed, soil is loosened and this results in a higher potential for sediment transport during storm events. The necessary flood attenuation and erosion control structures have to be put in place.

Considering the above, it is important that appropriate land cover be restored under the panels, to prevent the runoff volumes expected if the areas under the panels are paved or gravel. Establishment of vegetation is also preferable from a biodiversity perspective. Additionally, erosion control measures must be implemented at the base of the panels especially (Letsolo, 2021).

9.3.5 Impacts to soils, land use and land capability

In the initial stages of the project, the proposed Halfgewonnen Solar Photovoltaic (PV) Project was planned with a large portion of the footprint of the PV array in the wetland system. Once this became evident, the project layout was revisited to reduce the risk to the receiving environment; based on recommendations from STS and Scientific Aquatic Services CC (SAS).

Areas outside and adjacent to the study area that were highlighted as "Medium Sensitivity" for the Agricultural Sensitivity Theme by the National Web Based Environmental Screening Tool were investigated as alternatives but were deemed unsuitable due to the following technical reasons:

- Property where land-use and access agreements have not been reached between the developer and landowner;
- Areas already approved for expansion at the Halfgewonnen Mine;

- Current Halfgewonnen coal processing plant - incompatible with Solar PV development due to dust and land availability; and
- Previously mined areas deemed not suitable to develop the PV array.

The final layout prepared was thus put forward as the only alternative, noting that some impacts on agriculturally sensitive soils cannot be avoided any further.

The soils are anticipated to be exposed to erosion, dust emission, and potential soil contamination impacts during the construction phase of the proposed development; and these impacts may persist for the duration of the operational phase if not mitigated adequately. The following primary impacts are anticipated (ZRC, July 2021):

- **Soil erosion**: The proposed development footprint is located on a moderately sloping terrain, which increases the erosion hazard. While the identified soils display a moderate susceptibility to erosion under current conditions, their susceptibility to erosion is likely to increase once the land is cleared for construction activities, and the soils will inevitably be exposed to wind and stormwater. Erosion is easy to identify and relatively easy to rectify. Specific erosion prevention measures are included in the EMP (Section 10).
- **Soil compaction**: Heavy equipment traffic during construction and activities is anticipated to cause soil compaction that could lead to increased bulk density and soil strength, reduced aeration and lower infiltration rates causing lower crop performance. Compaction also alters soil structure impacting on crop yields. Reduced microbial biomass caused by reduced soil aeration influences the distribution of macro-fauna such as earthworms that are vital to soils structure (ZRC, July 2021);
- **Soil contamination** from spills or leaks during construction or operation can be relatively easily prevented by ensuring adequate vehicle and equipment maintenance and restricted access to the use of potentially hazardous chemicals on site. In the event of accidental spills, staff must be adequately trained in clean-up procedures; and
- **Loss of agricultural land capability**: The majority of the area is most suitable for grazing, pasture or woodland. Thus, the loss of land capability is anticipated to be Medium Low because stripping of topsoil and site clearing will potentially result in loss of fertile topsoil and soil erosion. The Low impact with mitigation measures takes in to account the recommendation that the possibility for any agricultural activity concurrently with solar generation was investigated.

9.3.6 Atmospheric Pollution (Dust)

Clearance of vegetation from site in preparation for construction activities expose bare soils potentially giving rise to erosion and wind-dispersed dust from the site. This is exacerbated when soils are loosened through topsoil stripping and digging of excavations and other necessary earthworks (though relatively minor in this case). Vehicle and machinery movement on un-paved road surfaces also mobilize particles from the surface contributing to wind-blown dust. Increased dust in the area is regarded as a cumulative impact when considering the existing dust impacts from agricultural activities and mining in the area.

If not mitigated, the increased dust fallout can be a long-term impact, but with successful re-vegetation and stabilisation (paving, application of chemical dust suppressants or compaction) of exposed areas after construction, the potential for wind-dispersed dust is reduced significantly. Even during construction, the significance of the impact can be

reduced by implementing dust-suppression measures such as spraying exposed surfaces with water.

There are no residential activities in the immediate vicinity of the proposed construction activities, the closest being the farm house approximately 400m north of the site. It is recommended that a complaints register be maintained by security personnel at the entrance to the construction site, so that surrounding I&APs have the opportunity to lodge complaints if dust levels become excessive. The Developer's ECO (see section 10.1) is to inspect the register weekly and address complaints as soon as possible by ensuring that dust suppression is intensified and re-vegetation prioritised.

With the implementation of these mitigation measures it is anticipated that the impact will be of short duration, slight to moderate severity and limited to the immediate vicinity of activities.

9.3.7 Potential damage to or destruction of heritage resources

Heritage resources were identified in the proximity of the project site. These include buildings that are older than 60 years and graves. The identified heritage sites are not in the direct activity footprint areas and should be preserved in-situ.

Inadvertent impacts to these resources are possible if not specifically managed through environmental awareness training (to be provided to all employees and visitors to the site) and demarcation of the heritage sites when activities will occur in close proximity to the sites.

If management measures are implemented, the likelihood of the heritage resources being impacted upon by the proposed development is extremely low.

It was determined through the specialist palaeontology study that the likelihood of fossils occurring on site is also very low. Additionally, the proposed infrastructure will not be associated with excessively deep excavations and thus the potential impacts on fossils is regarded as negligible.

9.3.8 Visual Impacts

The proposed project may impact on the existing landscape and visual character of the region and sense of place associated with the study area and its immediate surroundings.

The landscape in the region is characterised by undulating terrain with low hills and existing overburden dumps, grassland interspersed with watercourses such as the Olifants River, cultivated fields, isolated tree clumps mostly associated with farm houses, and mining activities.

With the study area being situated within a rural area with limited receptors present within two km, and the relatively low height of the proposed PV structures in comparison to the existing mining structures, the proposed PV facilities are expected to have a moderately low visual impact on the landscape character within the region.

The expected level of visual intrusion as a result of the proposed project is considered Medium Low. The VAC of the study area and surrounds is determined to be medium, which illustrates the ability of the surrounding area to absorb or conceal some visual impacts. The perceived significance ratings may be lowered further through the implementation of mitigation

measures such as progressive revegetation of impacted areas and limiting the extent of vegetation clearance.

Overall, the impact significance of potential night-time lighting is expected to be low, and will be limited to a local area. This impact can also be easily mitigated by installing security lighting no higher than five meters above the ground and through appropriate planning of illumination direction (SAS, July 2021).

9.3.9 Socio-Economic Impacts: Employment

Approximately 250 – 300 jobs will be created during the construction, operations and maintenance of the project. This will contribute towards uplifting the local community. It is anticipated that 60% of the jobs created from the project will be for the previously disadvantaged and the local community. The locals will be given first preference based on the availability of the required skill(s). During the construction period, the project will require a temporary workforce which will be approximately 9 to 12 months. Approximately 25 - 30 permanent jobs will be created during operations and maintenance of the Halfgewonnen Solar PV Facility over its lifespan of 25 years. Actual job quantum will be quantified once the EPC contract is in place.

It is not anticipated that the proposed Project will negatively impact on any existing commercial activity or current employment – activities at Halfgewonnen Colliery will be able to continue unhindered. Given the relatively small area of agricultural land that will be lost due to the proposed development, it is anticipated that the proposed development will not have a significant effect on the continuation of farming activities in the wider region and on adjacent sites and no loss of employment for existing farm workers is expected.

9.3.10 Potential influx of job-seekers

New development is oftentimes associated with opportunistic job-seekers flocking to an area in the hopes of finding employment. This phenomenon can be associated with persons establishing illegal housing in an area (squatters) that in turn is associated with significant environmental risks (sewage, litter, fires) and social impacts including security risks to existing surrounding land owners.

If squatters are identified during any phase of the proposed development, the land owner and developer must engage with law enforcement to address the issue.

Employees at the proposed development site will undergo environmental awareness training and it is thus expected that the use of provided sanitary facilities, prevention of uncontained fires and littering, prohibitions on poaching and accessing property outside of the development footprint etc. will be well understood by employees.

9.3.11 Road safety and traffic impacts

The impact on the local road network from the proposed project will be most pronounced during the construction phase where materials and personnel will be transported to and from site via the Halfgewonnen Road. This road is already heavily used by Mine personnel and coal trucks transporting coal product from the local mines to market. The road is also affected by periodic temporary closures due to blasting activities undertaken by the surrounding mines.

Particular attention will be required at the access points to the proposed development site to ensure sufficient line-of-sight and thus ensure safe traffic conditions where vehicles enter and exit the development site. With the high number of coal trucks already using the Halfgewonnen Road, additional signage is anticipated to be required, along with driver safety training to prevent road accidents.

The scheduling of deliveries of materials to the construction site will also have to be considered by the Developer / EPC Contractor so as not to coincide with peak traffic times of the coal trucks collecting coal product from the Mines.

The construction phase of the proposed development is relatively short-lived. It is not expected that the operational phase of the proposed development will be associated with significant traffic volumes, though the necessary road safety measures must be maintained throughout all phases of the proposed development.

10 Impact Management

The significance of impacts associated with the project is discussed in Sections 9.2 and 9.3 in terms of the probability of the impact occurring, the intensity, the duration and the spatial scale of the impact.

Impact management should be proportionate to the significance of an impact prior to the implementation of mitigation measures and will aim to reduce either the probability of an impact occurring, or the consequence of an impact (in terms of its duration, scale and intensity).

10.1 Roles and Responsibilities

The effective implementation of management and mitigation measures depends largely on the realistic and appropriate assignment of responsibilities for the implementation, and for the monitoring of the implementation of the stipulated measures.

The specific roles and responsibilities that are relevant to the proposed Solar PV development are discussed below.

10.1.1 The Applicant (holder) / developer

Despite any other appointment or delegation of responsibilities, the Applicant and eventual Holder of the EA (if approved) will ultimately be responsible for ensuring compliance to the EMP and conditions of the EA. It is understood that the Applicant intends to appoint an EPC (Engineering, Procurement and Construction) contractor who will be responsible for the final engineering detail design, procurement and actual construction of the facility. The developer (eventual holder of the EA if approved) will be responsible for ensuring that the conditions of the EMP and EA are clearly communicated to the EPC contractor and that the EPC contractor commits to meeting the commitments in the EMP and conditions of the EA. A contractual commitment / obligation to this effect must be included in any contract entered into between the developer and EPC contractor.

The Holder of the EA must report to the DFFE, as the competent authority.

10.1.2 The EPC Contractor

The EPC contractor appointed by the Holder must be fully conversant with the EMP and conditions of EA.

The EPC contractor must also appoint an Environmental Control Officer (ECO) to objectively monitor the implementation of the EMP according to relevant environmental legislation, and the conditions of the environmental authorisation (EA).

The EPC Contractor is further responsible for providing and giving mandate to enable their ECO to perform responsibilities, and must ensure that the ECO is integrated as part of the project team while remaining objective (DEA, 2019). The EPC contractor must ensure that sufficient financial and human resources are at the disposal of the ECO to facilitate the completion of his/her duties. Further, the EPC contractor must ensure that sufficient human and financial resources are accounted for in the agreement with the Holder, to enable full compliance to the EMP and conditions of the EA.

The EPC Contractor will report directly to the Holder of the EA.

10.1.3 The Contractor's ECO

The Contractor's ECO will be responsible for maintaining the Site's environmental file (See section 10.2) and continuously monitoring compliance of the on-site activities against the commitments in the EMP and conditions of EA.

Prior to construction commencing, the Holder must obtain the necessary permits for the relocation of protected flora species from the site. It will be the responsibility of the ECO to oversee the process of relocation and monitor the success of relocation. Monthly reports should be prepared by the ECO and submitted to the Mpumalanga Tourism and Parks Agency (MTPA) until such time as the relocated species are established.

During construction, the ECO will undertake weekly environmental inspections of the project site and compile a checklist / report on key compliance matters. A preliminary checklist is presented in Table 25.

The ECO will further be responsible for implementation of the environmental awareness plan and retain environmental training records, and keeping records of waste disposal.

The Contractor's ECO will report directly to the EPC Contractor.

10.1.4 External ECO

It is recommended that the Holder must appoint an independent, external ECO to audit compliance against the conditions of the EA and EMP on a quarterly basis for the duration of the construction phase. Quarterly audit reports from the external ECO must be prepared in accordance with Regulation 34 of the EIA Regulations, 2014 (or the legislation pertaining to environmental auditing relevant at the time). Audit reports are to be submitted to the DFFE quarterly.

Table 25: Preliminary environmental compliance checklist

Date of inspection:		**Inspection carried out by:**	
Weather conditions:			

Compliance condition	**Status (compliant / non-compliant)**	**Recommendation to rectify non-compliance**	**Responsible party and target date**
Housekeeping is adequate at construction camp(s).			
Sufficient bins are placed strategically around the site and enables the separation of hazardous and non-hazardous waste.			
The site is free of litter.			
Potentially hazardous chemicals and construction material are stored in designated areas that are access-controlled and able to contain accidental spills.			
No spills of chemicals, diesel, cement etc. observed on bare ground.			
Sufficient spill kits are available and accessible in appropriate locations around the site.			
Records of waste disposal, including safe disposal certificates for hazardous waste, are included in the environmental file.			
Construction vehicles and equipment appear in a sound state, are not generating excessive fumes or smoke, are not excessively noisy and are not being serviced outside designated areas with spill containment measures in place.			

Compliance condition	Status (compliant / non-compliant)	Recommendation to rectify non-compliance	Responsible party and target date
The construction site is demarcated clearly, with adequate buffer zones (10m to wetlands) indicated on site. Access to no-go areas is prohibited and prevented.			
No activity has occurred beyond the approved footprint (including no runoff from the site beyond the demarcated activity boundary).			
Access to the site is controlled, and records maintained.			
Measures are in place to prevent inadvertent damage to heritage buildings and graves.			
Excavations are clearly demarcated and safe.			
No excavations remain open longer than absolutely necessary.			
Stormwater management measures and erosion control measures are in place and effective.			
Measures are implemented to control alien invasive species – no proliferation of alien invasive species or weeds noted on site.			
Complaint register is available at the site, no unresolved complaints.			
Incident log is being maintained.			
Sufficient number of toilet facilities are provided within appropriate distances from where construction activities are being undertaken.			
Toilet facilities are private, clean, with sufficient toilet paper and hand-washing facilities. Separate facilities must be provided for men and			

Compliance condition	Status (compliant / non-compliant)	Recommendation to rectify non-compliance	Responsible party and target date
ladies. Bins for the disposal of sanitary pads must be provided in Ladies toilets.			
Records of regular sewage disposal are maintained.			
Drinking water is supplied to employees from a legal and reliable source.			
No employees are housed on site.			
No evidence of squatting or illegal establishment observed around the site.			
Rehabilitation of areas is occurring concurrently with construction activities, as construction is completed in an area, topsoil is re-instated and re-vegetation campaigns commence.			

10.2 Document control and record-keeping

At the outset of the project the following documents shall be placed in the environmental file (to be maintained by the contractor's ECO) and be accessible at all times:

- Full copy of the signed EA from the Competent Authority (CA) in terms of NEMA, granting approval for the development;
- Copy of the final approved EIA/EMP report;
- Copy of the contract of the EPC Contractor, specifically with regards to the commitment of the EPC Contractor to implement the EMP and EA Conditions;
- Environmental checklists as completed by the appointed internal ECO;
- Minutes and attendance register of environmental site meetings;
- An up-to-date environmental incident log;
- A copy of all instructions or directives issued;
- A copy of all corrective actions signed off. The corrective actions must be filed in such a way that a clear reference is made to the non-compliance record;
- Records of all monitoring and auditing undertaken at the site;
- Complaints register.

10.3 Impact Management Outcomes and Actions

For each activity associated with the proposed project, a set of impact management outcomes and associated management actions have been identified and are described in this section – these are based on the Generic EMP published for the development and expansion of substation infrastructure for the transmission and distribution of electricity (DEA, 2019), and supplemented with additional measures as relevant specifically to the proposed Solar PV facility.

Monitoring and reporting requirements are further detailed in Section 10.4.

Table 26: Impact Management outcomes and Actions

No	Aspect	Impact Management Outcome	Impact Management Actions	Implementation			Monitoring		
				Responsible Person	Method of Implementation	Timeframe for implementation	Responsible Person	Frequency	Evidence of compliance
1	Environmental Awareness Training	All onsite staff are aware and understand the individual responsibilities in terms of this EMP.	All staff must receive environmental awareness training prior to commencement of the activities	Contractor's ECO	See section 10.5	Prior to site establishment	External ECO	Quarterly	Training records
			The Contractor must allow for sufficient sessions to train all personnel with no more than 20 personnel attending each course						
			Refresher environmental awareness training is available as and when required	Contractor's ECO	Training needs analysis	As needed	External ECO	Quarterly	Training records
			All staff are aware of the conditions and controls linked to the EA and within the EMP and made aware of their individual roles and responsibilities in achieving compliance with the EA and EMP	Contractor's ECO	Environmental Awareness training (Section 10.5)	Prior to site establishment, and refreshed as needed	External ECO	Quarterly	Training records
			The Contractor must erect and maintain information posters at key locations on site, and the posters must include the following information as a minimum: a) Safety notifications; and b) No littering	Contractor's safety officer	Safety and no littering signs observable on site	Prior to site establishment, updated and maintained throughout construction phase as needed	Contractor's ECO	Weekly	Photographic records in weekly inspection reports during construction phase
							External ECO	Quarterly	Audit report with photographic evidence
			Environmental awareness training must include as a minimum the following: a) Description of significant environmental impacts, actual or potential, related to their work activities; b) Mitigation measures to be implemented when carrying out specific activities; c) Emergency preparedness and response procedures; d) Emergency procedures; e) Procedures to be followed when working near or within sensitive areas; f) Wastewater management procedures; g) Water usage and conservation; h) Solid waste management procedures; i) Sanitation procedures; j) Fire prevention; and k) Disease prevention	Contractor's ECO	Environmental Awareness training (Section 10.5)	Prior to site establishment, updated and maintained throughout construction phase as needed	External ECO	Quarterly	Training material and records
			A record of all environmental awareness training courses undertaken as part of the EMP must be available	Contractor's ECO	Training records to be kept in File	As training is undertaken	External ECO	Quarterly	Audit Reports
			Educate workers on the dangers of open and/or unattended fires	Contractor's ECO	Environmental Awareness training (Section 10.5)	When environmental awareness training is presented	External ECO	Quarterly	Audit Reports to include observation of fires, interviews with staff
			A staff attendance register of all staff to have received environmental awareness training must be available	Contractor's ECO	Training records to be kept in File	As training is undertaken	External ECO	Quarterly	Audit Reports

No	Aspect	Impact Management Outcome	Impact Management Actions	Implementation			Monitoring		
				Responsible Person	Method of Implementation	Timeframe for implementation	Responsible Person	Frequency	Evidence of compliance
			Course material must be available and presented in appropriate languages that all staff can understand	Contractor's ECO	Training records to be kept in File	As training is undertaken	External ECO	Quarterly	Training material and records
2	Site Establishment development	Impacts on the environment are minimised during site establishment and the development footprint are kept to demarcated development area.	A method statement must be provided by the contractor prior to any onsite activity that includes the layout of the construction camp in the form of a plan showing the location of key infrastructure and services where applicable), including but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and lay down areas, hazardous materials storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas and the placement of ablution facilities, waste and wastewater management	EPC Contractor (with assistance from Contractor's ECO)	Method statements to be kept in Environmental File	Prior to site establishment	External ECO	Quarterly	Audit Reports
			Location of camps must be within approved area to ensure that the site does not impact on sensitive areas identified in the environmental assessment or site walk through; - Sites must be located where possible on previously disturbed areas; - The camp must be fenced in accordance with No 5: fencing and gate installation; - The use of existing accommodation for contractor staff, where possible, is encouraged[6]	Contractor's ECO	Visual inspections and weekly site reports	Prior to site establishment, maintained throughout construction phase	External ECO	Quarterly	Audit Reports
3	Access restricted areas	Access to restricted areas prevented	Identification of access restricted areas is to be informed by the environmental assessment, site walk through and any additional areas identified during development	Contractor's ECO and Specialist	Areas to be demarcated by specialist, demarcation to be maintained by ECO	Prior to site establishment, maintained throughout construction phase	External ECO	Quarterly	Audit Reports, including photographic evidence of demarcations
			Erect, demarcate and maintain a temporary barrier with clear signage around the perimeter of any access restricted area, colour coding could be used if appropriate						
			Unauthorised access and development related activity inside access restricted areas is prohibited						
4	Access roads	Minimise impact to the environment through the planned and restricted movement of vehicles on site.	Access to the servitude and tower positions must be negotiated with the relevant landowner and must fall within the assessed and authorised area	Developer, land owner and contractor	Access agreement to be included in Environmental File	Prior to site establishment	Contractor's ECO	Once-off	Confirmation of agreement in environmental file
			An access agreement must be formalised and signed by the developer, contractor and landowner before commencing with the activities						
			The access roads to tower positions must be signposted after access has been negotiated and before the commencement of the activities	Contractor	Signage	After access agreement before commencement	Contractor's ECO	Weekly	Inspection of signage
			All private roads used for access to the site (and servitude) must be maintained and upon completion of the works, be left in at least the original condition	Contractor	Road maintenance	Throughout and at the end of construction phase	Contractor's ECO	Weekly	Photographic records in weekly inspection reports during

[6] No staff accommodation on site will be allowed, staff to be housed in surrounding towns such as Hendrina or Bethal.

No	Aspect	Impact Management Outcome	Impact Management Actions	Implementation			Monitoring		
				Responsible Person	Method of Implementation	Timeframe for implementation	Responsible Person	Frequency	Evidence of compliance
									construction phase
			All contractors must be made aware of all these access routes	Contractor's ECO	Environmental Awareness training (Section 10.5)	Prior to commencement of construction	External ECO	Quarterly	Training material and records
			Any access route deviation from that in the written agreement must be closed and re-vegetated immediately, at the contractor's expense	Contractor	Complaints register, visual inspections	As (if) required	Contractor's ECO	Weekly	Review of complaints register, visual inspection of access roads used.
			Maximum use of both existing servitudes and existing roads must be made to minimize further disturbance through the development of new roads	Contractor	Driver / operator training and instruction. Method statements.	Throughout construction phase	Contractor's ECO	Weekly	Visual inspection and photographic record of access roads used
			In circumstances where private roads must be used, the condition of the said roads must be recorded photographically; prior to use and the condition thereof agreed by the landowner, the Developer, and the contractor	Landowner, Developer, and Contractor	Photographic record of roads	Prior to commencement of construction	Contractor's ECO	As needed	Photographic record comparison of roads before and after use
			Access roads in flattish areas must follow fence lines and tree belts to avoid fragmentation of vegetated areas or croplands	Contractor	Driver / operator training and instruction. Method statements.	Throughout construction phase	Contractor's ECO	Weekly	Visual inspection and photographic record of access roads used
			Access roads must only be developed on a pre-planned and approved road						
5	Fencing and Gate installation	Minimise impact to the environment and ensure safe and controlled access to the site through the erection of fencing and gates where required.	Use existing gates provided to gain access to all parts of the area authorised for development, where possible	Contractor	Driver / operator training and instruction. Method statements.	Throughout construction phase	Contractor's ECO	Weekly	Visual inspection and photographic record of gates used
			Existing and new gates to be recorded and documented in accordance with section 4.9: photographic record	Contractor's ECO	Photographic record of all gates	Prior to construction and as new gates are installed	External ECO	Quarterly	Photographic record in quarterly reports
			All gates must be fitted with locks and be kept locked at all times during the development phase, unless otherwise agreed with the landowner						
			At points where the line crosses a fence in which there is no suitable gate within the extent of the line servitude, on the instruction of the EPC Contractor a gate must be installed at the approval of the landowner	EPC Contractor and land owner	Gates installed where necessary	As required	Contractor's ECO	Photographic record of all gates	As new gates are installed
			Care must be taken that the gates must be so erected that there is a gap of no more than 100 mm between the bottom of the gate and the ground						
			Where gates are installed in jackal proof fencing, a suitable reinforced concrete sill must be provided beneath the gate						
			Original tension must be maintained in the fence wires						

No	Aspect	Impact Management Outcome	Impact Management Actions	Implementation			Monitoring		
				Responsible Person	Method of Implementation	Timeframe for implementation	Responsible Person	Frequency	Evidence of compliance
			All gates installed in electrified fencing must be re-electrified						
			All demarcation fencing and barriers must be maintained in good working order for the duration of the Construction phase	Contractor	Maintenance	As required	Contractor's ECO	Photographic record of gates and fences	Weekly inspection reports
			Fencing must be erected around the camp, batching plants, hazardous storage areas, and all designated access restricted areas, where appropriate and would not cause harm to the sensitive flora	Contractor	Establishment of fences	Upon site establishment			
			Any temporary fencing to restrict the movement of life-stock must only be erected with the permission of the land owner	Contractor	Written agreement with land owner	Prior to establishment of temporary fencing			
			All fencing must be developed of high-quality material bearing the SABS mark	Contractor	Inspection of materials prior to use	As materials arrive on site			
			The use of razor wire as fencing must be avoided						
			Fenced areas with gate access must remain locked after hours, during weekends and on holidays if staff are away from site. Site security will be required at all times	Contractor's safety officer	Daily inspection of site security (inspection log)	Daily	Contractor's ECO	Weekly	Include security inspection log in weekly report
			On completion of the development phase all temporary fences are to be removed	Contractor	Removal of temporary fences	Once construction is complete	Contractor's ECO	Once-off	Visual inspection & photographic record.
			The contractor must ensure that all fence uprights are appropriately removed, ensuring that no uprights are cut at ground level but rather removed completely						
6	Water Supply Management	Undertake responsible water usage	All abstraction points or bore holes must be registered with the DWS and suitable water meters installed to ensure that the abstracted volumes are measured on a daily basis	Not applicable - water required for construction will be sourced from one of the existing and licensed mining operations, or the Usuthu Pipeline. The External ECO must verify the water used in the quarterly reports.					
			The Contractor must ensure the following: a. The vehicle abstracting water from a river does not enter or cross it and does not operate from within the river; b. No damage occurs to the river bed or banks and that the abstraction of water does not entail stream diversion activities; and c. All reasonable measures to limit pollution or sedimentation of the downstream watercourse are implemented	Not applicable - no water will be allowed to be abstracted directly from any river. The external ECO will verify in the quarterly inspections that no abstraction from Rivers took place.					
			Ensure water conservation is being practiced by: a. Minimising water use during cleaning of equipment; b. Undertaking regular audits of water systems; and c. Including a discussion on water usage and conservation during environmental awareness training. d. The use of grey water is encouraged.	Contractor's ECO	Environmental Awareness training (Section 10.5)	Prior to commencement and throughout construction phase	Contractor's ECO	Weekly	Review of training material and water use (wastage) on site reported in weekly reports.
7	Storm and wast	Impacts to the environment caused by storm water and	Runoff from the cement/ concrete batching areas must be strictly controlled, and contaminated water must be collected, stored	Contractor	Sump (or similar) at batching areas	Throughout construction phase	Contractor's ECO	Weekly	Weekly inspection of sumps and final

No	Aspect	Impact Management Outcome	Impact Management Actions	Implementation			Monitoring		
				Responsible Person	Method of Implementation	Timeframe for implementation	Responsible Person	Frequency	Evidence of compliance
		wastewater discharges during construction are avoided.	and either treated or disposed of off-site, at a location approved by the project manager						discharge / disposal records
			All spillage of oil onto concrete surfaces must be controlled by the use of an approved absorbent material and the used absorbent material disposed of at an appropriate waste disposal facility	Contractor	Spill kits available, all employees trained to use them	Throughout construction phase	Contractor's ECO	Weekly	Inspect site for spills, spill kits and waste disposal records in file.
			Natural storm water runoff not contaminated during the development and clean water can be discharged directly to watercourses and water bodies, subject to the Project Manager's approval and support by the ECO	Noted, contaminated runoff from the adjacent mine must be confined to the Mine and report to the Mine's PCDs. Affected runoff from the construction site will be contained and released under controlled circumstances (if not contaminated), treated prior to discharge or re-used at the adjacent mine. Unaffected runoff is diverted around the site.					
			Water that has been contaminated with suspended solids, such as soils and silt, may be released into watercourses or water bodies only once all suspended solids have been removed from the water by settling out these solids in settlement ponds. The release of settled water back into the environment must be subject to the Project Manager's approval and support by the ECO	Noted. Affected runoff will report to on-site sump or contoured buffer strips to ensure sediment is retained and clean water is allowed to report to the downstream environment. External ECO will inspect these facilities quarterly.					
8	Solid and hazardous waste management	Wastes are appropriately stored, handled and safely disposed of at a recognised waste facility	All measures regarding waste management must be undertaken using an integrated waste management approach	Contractor	Waste Management Plan (method statement)	Plan compiled prior to construction, implemented throughout construction	Contractor's ECO	Weekly	Inspect site for general waste management practices
			Sufficient, covered waste collection bins (scavenger and weatherproof) must be provided	Contractor	Provide bins	Prior to and throughout construction	Contractor's ECO	Weekly	Visually inspect bins and retain records of waste removal from bins
			A suitably positioned and clearly demarcated waste collection site must be identified and provided	Contractor	Establishment of waste site	Prior to construction (maintenance throughout)	Contractor's ECO	Weekly	Visual inspections, photographic record and compliance report
			The waste collection site must be maintained in a clean and orderly manner						
			Waste must be segregated into separate bins and clearly marked for each waste type for recycling and safe disposal	Contractor	Provide bins	Prior to and throughout construction	Contractor's ECO	Weekly	Visual inspections, photographic record and compliance report
			Staff must be trained in waste segregation	Contractor's ECO	Environmental Awareness training (Section 10.5)	Prior to commencement	External ECO	Quarterly	Review training material
			Bins must be emptied regularly	Contractor	Empty bins	As needed	Contractor's ECO	Weekly	Visual inspection of bins
			General waste produced onsite must be disposed of at registered waste disposal sites/ recycling company	Contractor	Appoint registered waste management company	As needed	Contractor's ECO	Weekly	Records of waste disposal
			Hazardous waste must be disposed of at a registered waste disposal site						

No	Aspect	Impact Management Outcome	Impact Management Actions	Implementation			Monitoring		
				Responsible Person	Method of Implementation	Timeframe for implementation	Responsible Person	Frequency	Evidence of compliance
			Certificates of safe disposal for general, hazardous and recycled waste must be maintained	Contractor's ECO	Safe disposal certificates	As needed	External ECO	Quarterly	Safe disposal certificates
9	Protection of watercourses and estuaries	Pollution and contamination of the watercourse environment and or estuary erosion are prevented	All watercourses must be protected from direct or indirect spills of pollutants such as solid waste, sewage, cement, oils, fuels, chemicals, aggregate tailings, wash and contaminated water or organic material resulting from the Contractor's activities	Contractor	Stormwater management plan implementation (containment of dirty water on site)	Plan approval prior to commencement, implementation and maintenance throughout	Contractor's ECO	Weekly	Weekly inspection & photographic record of discharge points - no evidence of pollution from site.
			In the event of a spill, prompt action must be taken to clear the polluted or affected areas	Contractor	Spill kits available, all employees trained to use them	Throughout construction phase	Contractor's ECO	Weekly	Inspect site for spills, spill kits and waste disposal records in file.
			Where possible, no development equipment must traverse any seasonal or permanent wetland	Contractor's ECO and Specialist	Demarcate allowed development footprint	Prior to site establishment	Contractor's ECO	Weekly	Inspection and photographic record of demarcations
			No return flow into the estuaries must be allowed and no disturbance of the estuarine functional zone should occur	Noted - no estuaries in proximity to the proposed development. Powerline will cross the Olifants River and Wetlands, on the same route as existing powerlines. Permitted development footprint must be demarcated clearly.					
			Development of permanent watercourse or estuary crossing must only be undertaken where no alternative access to tower position is available	Noted - no deviation from the approved powerline route will be considered.					
			There must not be any impact on the long-term morphological dynamics of watercourses or estuaries	Noted - no long-term impact expected as powerline crossings generally align with existing powerline crossing corridors.					
			Existing crossing points must be favoured over the creation of new crossings (including temporary access)	Noted - points where existing powerlines cross the watercourses were favoured in the design of this project.					
			When working in or near any watercourse or estuary, the following environmental controls and consideration must be taken: a) Water levels during the period of construction; No altering of the bed, banks, course or characteristics of a watercourse b) During the execution of the works, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g. including ensuring that construction equipment is well maintained; c) Where earthwork is being undertaken in close proximity to any watercourse, slopes must be stabilised using suitable materials, i.e. sandbags or geotextile fabric, to prevent sand and rock from entering the channel; and d) Appropriate rehabilitation and re-vegetation measures for the watercourse banks must be implemented timeously. In this regard, the banks should be appropriately and incrementally stabilised as soon as development allows	Contractor	Supervision where construction occurs within 100m of watercourse crossings to specifically include mentioned measures	Whenever construction is planned within 100m of any of the watercourses	Contractor's ECO	Weekly	Weekly inspection reports (and photographic record)
10	Vegetation	Vegetation clearing is restricted to the	Indigenous vegetation which does not interfere with the development must be left undisturbed	Contractor	Site demarcation	Prior to site establishment	Contractor's ECO	Weekly	Inspection of activity limits

No	Aspect	Impact Management Outcome	Impact Management Actions	Implementation			Monitoring		
				Responsible Person	Method of Implementation	Timeframe for implementation	Responsible Person	Frequency	Evidence of compliance
		authorised development footprint of the proposed infrastructure	Protected or endangered species may occur on or near the development site. Special care should be taken not to damage such species	Contractor's ECO and Specialist	Rescue and relocation plan, approved permits and relocation	Prior to site establishment	External ECO	Quarterly	Quarterly inspection of relocated species (or as per permit conditions)
			Search, rescue and replanting of all protected and endangered species likely to be damaged during project development must be identified by the relevant specialist and completed prior to any development or clearing						
			Permits for removal must be obtained from the relevant CA prior to the cutting or clearing of the affected species, and they must be filed						
			The Environmental Audit Report must confirm that all identified species have been rescued and replanted and that the location of replanting is compliant with conditions of approvals	External ECO	Audit Report	Quarterly (or as per specialist recommendation)	External ECO	Audit Report	Quarterly (or as per specialist recommendation)
			Trees felled due to construction must be documented and form part of the Environmental Audit Report	Noted: no trees located on development site, no tree felling anticipated. If it emerges that a tree must be cut down, the Contractor's ECO will record this in the weekly report.					
			Rivers and watercourses must be kept clear of felled trees, vegetation cuttings and debris	Contractor	Site demarcation	Prior to site establishment	Contractor's ECO	Weekly	Inspection of activity limits
			Only a registered pest control operator may apply herbicides on a commercial basis and commercial application must be carried out under the supervision of a registered pest control operator, supervision of a registered pest control operator or is appropriately trained	Contractor	Appointment of registered pest control operator or similar	As required (on ECO recommendation)	Contractor's ECO	As required (based on findings of site inspections)	Details of pest control operator on file
			A daily register must be kept of all relevant details of herbicide usage	Appointed herbicide user	Daily register	Daily as and when necessary	Contractor's ECO	Weekly	Filed records obtained from registered pest control operator (when relevant)
			No herbicides may be used in estuaries	Noted, no estuaries in proximity to the site.					
			All protected species and sensitive vegetation not removed must be clearly marked and such areas fenced off	Contractor	Site demarcation	Prior to site establishment	Contractor's ECO	Weekly	Inspection of activity limits
			Vegetation that does not grow high enough to cause interference with overhead transmission and distribution infrastructures, or cause a fire hazard to any plantation, must not be cut or trimmed unless it is growing in the road access area, and then only at the discretion of the Project Manager	Contractor	Site demarcation	Prior to vegetation removal / trimming	Contractor's ECO	Weekly	Inspect / record vegetation removed
			Where clearing for access purposes is essential, the maximum width to be cleared within the servitude must be in accordance to distance as agreed between the land owner and the EA holder	Contractor	Site demarcation	Prior to vegetation removal / trimming	Contractor's ECO	Weekly	Inspect / record vegetation removed, and compare to land owner agreements
			Alien invasive vegetation must be removed according to a plan (in line with relevant municipal and provincial procedures, guidelines and recommendations) and disposed of at a recognised waste disposal facility	Contractor	Removal of alien vegetation and weeds, and disposal records	As vegetation is removed	Contractor's ECO	Weekly	Review of records of disposal and visual inspection of alien invasive

No	Aspect	Impact Management Outcome	Impact Management Actions	Implementation			Monitoring		
				Responsible Person	Method of Implementation	Timeframe for implementation	Responsible Person	Frequency	Evidence of compliance
									plants and weeds on the site
			Vegetation must be trimmed where it is likely to intrude on the minimum vegetation clearance distance (MVCD) or will intrude on this distance before the next scheduled clearance. MVCD is determined from SANS 10280	Contractor	Record of trimming and vegetation removal	As vegetation is removed	Contractor's ECO	Monthly	Inspect the MVCD
			Debris resulting from clearing and pruning must be disposed of at a recognised waste disposal facility, unless the landowners wish to retain the cut vegetation	Contractor	Record of disposal, or landowner agreement	As vegetation is removed	Contractor's ECO	Monthly	Record of disposal, or landowner agreement
			In the case of the development of new overhead transmission and distribution infrastructures, a one metre "trace-line" must be cut through the vegetation for stringing purposes only and no vehicle access must be cleared along the "trace-line". Alternative methods of stringing which limit impact to the environment must always be considered	Contractor	Trace Line (or environmentally acceptable alternative)	When stringing is set to commence	Contractor's ECO	When stringing is set to commence	Visual inspection / photographic evidence
11	Protection of fauna	Minimise disturbance to fauna	No interference with livestock must occur without the landowner's written consent and with the landowner or a person representing the landowner being present	Contractor	Supervision of activities, avoidance of livestock, communication	Throughout construction phase	Contractor's ECO	If/when required	Complaint Register free of complaints
			The breeding sites of raptors and other wild bird species must be taken into consideration during the planning of the development programme	Noted: no raptor breeding sites were identified during the specialist study					
			Breeding sites must be kept intact and disturbance to breeding birds must be avoided. Special care must be taken where nestlings or fledglings are present	Contractor's ECO	Environmental Awareness training (Section 10.5)	Prior to commencement	External ECO	Quarterly	Review training material
			Nesting sites on existing parallel lines must documented	Contractor's ECO	Document nesting sites on existing lines	Prior to commencement	External ECO	Quarterly	Review document
			Special recommendations of the avian specialist must be adhered to at all times to prevent unnecessary disturbance of birds	Noted: the specialists' recommendations have been incorporated into this EIA/EMP Report					
			Bird guards and diverters must be installed on the new line as per the recommendations of the specialist	Noted: the specialists' recommendations have been incorporated into this EIA/EMP Report					
			No poaching must be tolerated under any circumstances. All animal dens in close proximity to the works areas must be marked as access restricted areas	Contractor's ECO	Environmental Awareness training (Section 10.5)	Prior to commencement	External ECO	Quarterly	Review training material
			No deliberate or intentional killing of fauna is allowed						
			In areas where snakes are abundant, snake deterrents to be deployed on the pylons to prevent snakes climbing up, being electrocuted and causing power outages	Contractor	Deployment of snake deterrents Safety Boots (not just shoes) to be worn in the areas	As needed	Contractor's ECO	As needed	Photographic record of snake deterrents and snake encounters record.
			No Threatened or Protected species (ToPs) and/or protected fauna as listed according NEMBA (Act	Contractor's ECO	Environmental Awareness	Prior to commencement	External ECO	Quarterly	Review training material and

No	Aspect	Impact Management Outcome	Impact Management Actions	Implementation			Monitoring		
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			No. 10 of 2004) and relevant provincial ordinances may be removed and/or relocated without appropriate authorisations/permits		training (Section 10.5)				permits (if relevant)
12	Protection of heritage resources	Minimise impact to heritage resources	Identify, demarcate and prevent impact to all known sensitive heritage features on site	Contractor	Site demarcation	Prior to commencement	Contractor's ECO	Weekly	Inspections and photographic records of heritage sites and demarcations
			Carry out general monitoring of excavations for potential fossils, artefacts and material of heritage importance	Contractor's ECO	Inspect excavations	Throughout construction phase	Contractor's ECO	Weekly	Photographic records of excavations. Records of communication with palaeontologist (if relevant)
			All work must cease immediately, if any human remains and/or other archaeological, palaeontological and historical material are uncovered. Such material, if exposed, must be reported to the nearest museum, archaeologist/ palaeontologist (or the South African Police Services), so that a systematic and professional investigation can be undertaken. Sufficient time must be allowed to remove/collect such material before development recommences	Contractor	Work stop order and photographic evidence, record of communication	If required (if fossils or heritage resources are encountered)	External ECO	If/when required	Records of correspondence
13	Safety of the public	All precautions are taken to minimise the risk of injury, harm or complaints.	Identify fire hazards, demarcate and restrict public access to these areas as well as notify the local authority of any potential threats e.g. large brush stockpiles, fuels etc.	Contractor's ECO	Fire risk signs, demarcation and records of communication	As necessary / when and where relevant	External ECO	Quarterly	Photographic evidence of signage, demarcations, included in quarterly reports.
			All unattended open excavations must be adequately fenced or demarcated	Contractor	Demarcations	As necessary	Contractor's ECO	Weekly	Photographic evidence in ECO reports
			Adequate protective measures must be implemented to prevent unauthorised access to and climbing of partly constructed towers and protective scaffolding	Contractor	Demarcations, signage	As necessary	Contractor's ECO	Weekly	Photographic evidence in ECO reports
			Ensure structures vulnerable to high winds are secured	Contractor	Secure structures	As necessary	Safety Manager	As necessary	Report from safety officer
			Maintain an incidents and complaints register in which all incidents or complaints involving the public are logged	Contractor's ECO	Complaint Register	Throughout construction phase	External ECO	Quarterly	Include in quarterly reports
14	Sanitation	Clean and well-maintained toilet facilities are available to all staff in an effort to minimise the risk of disease and impact to the environment.	Mobile chemical toilets are installed onsite if no other ablution facilities are available	Contractor	Contract with supplier, physical presence of toilets	Throughout construction phase	Contractor's ECO	Weekly	Include in weekly inspection reports
			The use of ablution facilities and or mobile toilets must be used at all times and no indiscriminate use of the veld for the purposes of ablutions must be permitted under any circumstances	All employees and visitors	Provision of toilets, and training	Throughout construction phase	Contractor's ECO	Weekly	Training records, inspect toilets in weekly reports

No	Aspect	Impact Management Outcome	Impact Management Actions	Implementation			Monitoring		
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			Where mobile chemical toilets are required, the following must be ensured: a) Toilets are located no closer than 100 m to any watercourse or water body; b) Toilets are secured to the ground to prevent them from toppling due to wind or any other cause; c) No spillage occurs when the toilets are cleaned or emptied and the contents are managed in accordance with the EMP; d) Toilets have an external closing mechanism and are closed and secured from the outside when not in use to prevent toilet paper from being blown out; e) Toilets are emptied before long weekends and workers holidays, and must be locked after working hours; f) Toilets are serviced regularly and the ECO must inspect toilets to ensure compliance to health standards	Contractor and Contractor's ECO	Contract with supplier, physical presence of toilets	Throughout construction phase	Contractor's ECO and External ECO	Weekly Quarterly	Include in weekly inspection reports and Quarterly reports
			A copy of the waste disposal certificates must be maintained	Contractor's ECO	Safe disposal certificates	Throughout construction phase	External ECO	Quarterly	Inspect certificates during quarterly audits
15	Prevention of disease	All necessary precautions linked to the spread of disease are taken.	Undertake environmentally-friendly pest control in the camp area	Contractor's ECO	Visual inspection of camp area (ensure adequate hygiene)	Inspect weekly, intervene as/ if required	External ECO	Quarterly	Include camp area in quarterly audits
			Ensure that the workforce is sensitised to the effects of sexually transmitted diseases, especially HIV and AIDS	Contractor's ECO	Environmental Awareness training (Section 10.5)	Prior to commencement, refresher training as needed	External ECO	Quarterly	Training material and records
			The Contractor must ensure that information posters on AIDS are displayed in the Contractor Camp area	Contractor's Health & safety officer	Presence of posters	Prior to commencement	Contractor's ECO	Weekly	Inspect posters as part of weekly reports
			Information and education relating to sexually transmitted diseases to be made available to both construction workers and local community, where applicable		Information brochures / training material	As necessary throughout construction phase	Contractor's ECO	As necessary	Periodically inspect the posters and training / information material and distribution records
			Free condoms must be made available to all staff on site at central points It is also recommended that free sanitary pads be provided for female employees		Free condoms are made available	Throughout construction phase	Contractor's ECO	Weekly	Inspect the central points for availability of condoms
			Medical support must be made available		Availability of medical support	Throughout construction phase	Contractor's ECO	Quarterly	Verify the availability of medical support
			Provide access to voluntary HIV testing and counselling services		Access to services	Throughout construction phase	Contractor's ECO	Quarterly	Verify the availability to testing and

No	Aspect	Impact Management Outcome	Impact Management Actions	Implementation			Monitoring		
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									counselling services
16	Emergency procedures	Emergency procedures are in place to enable a rapid and effective response to all types of environmental emergencies.	Compile an Emergency Response Action Plan (ERAP) prior to the commencement of the proposed project	Contractor's ECO	ERAP (in file)	Prior to commencement	External ECO	Quarterly	Verify ERAP in file
			The Emergency Plan must deal with accidents, potential spillages and fires in line with relevant legislation				External ECO	Quarterly	Verify contents of ERAP
			All staff must be made aware of emergency procedures as part of environmental awareness training	Contractor's ECO	Environmental Awareness training (Section 10.5)	Prior to commencement	External ECO	Quarterly	Training material and records
			The relevant local authority must be made aware of a fire as soon as it starts	Contractor's ECO	Fire alert included in ERAP	Prior to commencement	External ECO	Quarterly	Verify contents of ERAP
			In the event of emergency necessary mitigation measures to contain the spill or leak must be implemented (see Hazardous Substances No 17 below)	Contractor's ECO	Incident reports	As necessary	External ECO	Quarterly	Inspect incident reports as part of quarterly report
17	Hazardous substances	Safe storage, handling, use and disposal of hazardous substances.	The use and storage of hazardous substances to be minimised and non-hazardous and non-toxic alternatives substituted where possible	Contractor	Hazardous substances register	Throughout construction phase	Contractor's ECO	Quarterly	Reconcile substances on site with the register
			All hazardous substances must be stored in suitable containers as defined in the Method Statement	Contractor	Containers present on site	Throughout construction phase	Contractor's ECO	Weekly	Photographs of suitable containers in weekly reports
			Containers must be clearly marked to indicate contents, quantities and safety requirements						
			All storage areas must be bunded. The bunded area must be of sufficient capacity to contain a spill / leak from the stored containers						
			Bunded areas to be suitably lined with a SABS approved liner				Contractor	Once-off	Proof of bund
			An Alphabetical Hazardous Chemical Substance (HCS) control sheet must be drawn up and kept up to date on a continuous basis				Contractor's Safety Officer	Monthly	HCS control sheet
			All hazardous chemicals that will be used on site must have Material Safety Data Sheets (MSDS)	Contractor's Safety Officer	MSDSs kept on file	Throughout construction phase	Contractor's ECO	Quarterly	Reconcile substances on site with the register and MSDS
			All employees working with HCS must be trained in the safe use of the substance and according to the safety data sheet	Contractor's ECO	Environmental Awareness training (Section 10.5)	Prior to commencement, refresher training as needed	External ECO	Quarterly	Review training material and records
			Employees handling hazardous substances / materials must be aware of the potential impacts and follow appropriate safety measures						
			Appropriate personal protective equipment must be made available	Contractor	Provide PPE	Prior to and throughout construction	Contractor's ECO	Weekly	Check that all the necessary PPE is being used.
			The Contractor must ensure that diesel and other liquid fuel, oil and hydraulic fluid is stored in appropriate storage tanks or in bowsers	Contractor	Appropriate storage containers/ bowsers	Throughout construction phase	Contractor's ECO	Weekly	Inspect storage areas / facilities
			The tanks/ bowsers must be situated on a smooth impermeable surface (concrete) with a permanent bund. The impermeable lining must						

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			extend to the crest of the bund and the volume inside the bund must be 130% of the total capacity of all the storage tanks/ bowsers (110% statutory requirement plus an allowance for rainfall)						
			The floor of the bund must be sloped, draining to an oil separator						
			Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained	Contractor	Appropriate refuelling area and drip trays	Throughout construction phase	Contractor's ECO	Weekly	Inspect area, photographic record in weekly report
			All empty externally dirty drums must be stored on a drip tray or within a bunded area	All employees	All drums in drip tray or bund	Throughout construction phase	Contractor's ECO	Weekly	Inspect area, photographic record in weekly report
			No unauthorised access into the hazardous substances storage areas must be permitted	Contractor	Access control	Prior to commencement and throughout construction phase	Contractor's ECO	Weekly	Inspect access control measures
			No smoking must be allowed within the vicinity of the hazardous storage areas	Contractor (All employees and visitors)	No smoking signs	Throughout construction phase	Contractor's ECO	Weekly	Check signage and cigarette butt disposal
			Adequate fire-fighting equipment must be made available at all hazardous storage areas	Contractor	Firefighting equipment	Throughout construction phase	Contractor's ECO	Weekly	Confirm firefighting equipment is present
			Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used	Contractor	Provision of drip trays	Throughout construction phase	Contractor's ECO	Weekly	Inspect site for spills, spill kits and waste disposal records in file.
			An appropriately sized spill kit kept onsite relevant to the scale of the activity/s involving the use of hazardous substance must be available at all times	Contractor	Provision of spill kit(s)	Throughout construction phase	Contractor's ECO	Weekly	Inspect site for spills, spill kits and waste disposal records in file.
			The responsible operator must have the required training to make use of the spill kit in emergency situations	Contractor's ECO	Environmental Awareness training (Section 10.5)	Prior to commencement	External ECO	Quarterly	Review training material and records
			An appropriate number of spill kits must be available and must be located in all areas where activities are being undertaken	Contractor	Provision of spill kit(s)	Throughout construction phase	Contractor's ECO	Weekly	Inspect site for spills, spill kits and waste disposal records in file.
			In the event of a spill, contaminated soil must be collected in containers and stored in a central location and disposed of according to the National Environmental Management: Waste Act 59 of 2008. Refer to No 7 of this EMP Table for procedures concerning storm and waste water management and No 8 for solid and hazardous waste management	Contractor	Spill response procedure to be followed	Throughout construction phase	Contractor's ECO	Whenever a spill has occurred	Review disposal records

No	Aspect	Impact Management Outcome	Impact Management Actions	Implementation			Monitoring		
				Responsible Person	Method of Implementation	Timeframe for implementation	Responsible Person	Frequency	Evidence of compliance
18	Workshop, equipment maintenance and storage	Soil, surface water and groundwater contamination are minimised.	Where possible and practical all maintenance of vehicles and equipment must take place in the workshop area	Contractor	Maintenance to be done in workshops only, if possible	Throughout construction phase	Contractor's ECO	Weekly	Inspect workshop as part of weekly inspection reports
			During servicing of vehicles or equipment, especially where emergency repairs are affected outside the workshop area, a suitable drip tray must be used to prevent spills onto the soil	Contractor	Use of drip trays.	When necessary	Contractor's ECO	Monthly	Inspect servicing / maintenance records
			The relevant local authority must be made aware of a fire as soon as it starts	Contractor	Communication records	When necessary	Contractor's ECO	Monthly	Inspect incident reporting records
			Leaking equipment must be repaired immediately or be removed from site to facilitate repair	Contractor	Maintenance of equipment	Throughout construction phase	Contractor's ECO	Weekly	Check for leaking equipment on site
			Workshop areas must be monitored for oil and fuel spills	Contractor's ECO	Weekly inspection	Throughout construction phase	Contractor's ECO	Weekly	Inspect area for evidence of spills
			Appropriately sized spill kit kept onsite relevant to the scale of the activity taking place must be available	Contractor	Spill kits available, all employees trained to use them	Throughout construction phase	Contractor's ECO	Weekly	Inspect site for spills, spill kits and waste disposal records in file.
			The workshop area must have a bunded concrete slab that is sloped to facilitate runoff into a collection sump or suitable oil / water separator where maintenance work on vehicles and equipment can be performed	Contractor	Appropriate workshop area and sump (or similar)	Prior to vehicle maintenance being required	Contractor's ECO	Weekly	Inspect workshop, and downstream area as part of weekly inspection reports
			Water drainage from the workshop must be contained and managed in accordance No 7 of this Table: Storm and waste water management	Contractor					
19	Batching plants	Minimise spillages and contamination of soil, surface water and groundwater.	Concrete mixing must be carried out on an impermeable surface	Contractor	Impermeable mixing surface	Before any concrete mixing takes place	Contractor's ECO	Weekly	Inspect area for evidence of concrete mixing outside designated impermeable area
			Batching plants areas must be fitted with a containment facility for the collection of cement laden water		Containment facility				Inspect area for runoff of cement laden water
			Dirty water from the batching plant must be contained to prevent soil and groundwater contamination						
			Bagged cement must be stored in an appropriate facility and at least 10 m away from any water courses, gullies and drains		Bagged cement storage facility	Before any cement is brought to site			Inspect storage areas / facilities
			A washout facility must be provided for washing of concrete associated equipment. Water used for washing must be restricted		Washout facility	Before any concrete mixing takes place			Inspect washing facility
			Hardened concrete from the washout facility or concrete mixer can either be reused or disposed of at an appropriate licenced disposal facility		Re-use or legal disposal of concrete waste	As relevant			Verify concrete waste disposal / re-use

No	Aspect	Impact Management Outcome	Impact Management Actions	Implementation			Monitoring		
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			Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site		Storage facility for empty cement bags	Before any cement is brought to site			Inspect facility - no cement bags outside designated area
			Any excess sand, stone and cement must be removed or reused from site on completion of construction period and disposed at a registered disposal facility		Legal disposal or re-use of excess material	On completion of construction			Verify disposal / re-use
			Temporary fencing must be erected around batching plants in accordance with Section 5.5: Fencing and gate installation		Temporary fencing in place	On establishment of batching plant area			Visual inspection (photographs)
20	Dust emissions	Dust prevention measures are applied to minimise the generation of dust.	Take all reasonable measures to minimise the generation of dust as a result of project development activities to the satisfaction of the ECO	Contractor	Control dust-generating activities, implement dust suppression	Throughout construction phase	Contractor's ECO	Throughout construction phase	Dust suppression is practiced, sources of dust is controlled
			Removal of vegetation must be avoided until such time as soil stripping is required and similarly exposed surfaces must be revegetated or stabilised as soon as is practically possible	Contractor	Appropriate scheduling of vegetation clearance and re-vegetation	Throughout construction phase	Contractor's ECO	Throughout construction phase	Lack of unnecessarily bare areas on the site (photographic evidence)
			Excavation, handling and transport of erodible materials must be avoided under high wind conditions or when a visible dust plume is present	Contractor	Stop certain work under high wind conditions	Throughout construction phase	Contractor's ECO	Throughout construction phase	Inspect the site for signs of excessive dust
			During high wind conditions, the ECO must evaluate the situation and make recommendations as to whether dust damping measures are adequate, or whether working will cease altogether until the wind speed drops to an acceptable level	Contractor's ECO	Written recommendation to contractor	As necessary	External ECO	Quarterly	Review records of ECO recommendations to contractor
			Where possible, soil stockpiles must be located in sheltered areas where they are not exposed to the erosive effects of the wind	Noted: The Contractor's ECO should advise on the most suitable location for stockpiles.					
			Where erosion of stockpiles becomes a problem, erosion control measures must be implemented at the discretion of the ECO	Contractor	Monitor stockpiles for erosion, and remedy	As erosion manifests	Contractor's ECO	Weekly	Inspect stockpiles for signs of erosion, advise contractor on means to remedy
			Vehicle speeds must not exceed 40 km/h along dust roads or 20 km/h when traversing unconsolidated and non-vegetated areas	All persons driving on site	Speed limit signs to be installed on site. Driver training.	Throughout construction phase	Contractor	Continuous	No speeding vehicles on site
			Straw stabilisation must be applied at a rate of one bale/10 m² and harrowed into the top 100 mm of top material, for all completed earthworks	Contractor	Application of straw stabilisation	As earthworks is completed on an area	Contractor's ECO	As earthworks are completed on an area	Visual inspection of completed earthworks
			For significant areas of excavation or exposed ground, dust suppression measures must be used to minimise the spread of dust	Contractor	Dust suppression via watering cart or similar	As required (on ECO recommendation)	Contractor's ECO	As required (based on site-specific conditions)	Dust suppression is practiced, sources of dust are controlled
21	Blasting	Impact to the environment is	Any blasting activity must be conducted by a suitably licensed blasting contractor	Contractor	Appointment of licensed blasting contractor	If blasting is required	Contractor's ECO	If blasting is required	Appointment contract in environmental file

No	Aspect	Impact Management Outcome	Impact Management Actions	Implementation			Monitoring		
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		minimised through a safe blasting practice.	Notification of surrounding landowners, emergency services site personnel of blasting activity 24 hours prior to such activity taking place on Site	Contractor	Communication to stakeholders	If blasting is required	Contractor's ECO	If blasting is required	Records of notification on file
22	Noise	Unnecessary noise is prevented by ensuring that noise from construction activities is mitigated	The Contractor must keep noise level within acceptable limits, restrict the use of sound amplification equipment for communication and emergency only	Contractor	Code of conduct	Throughout construction phase	Contractor's ECO	Weekly	Assess site for excessive noise during weekly inspections
			All vehicles and machinery must be fitted with appropriate silencing technology and must be properly maintained	Contractor	Maintenance schedule				
			Any complaints received by the Contractor regarding noise must be recorded and communicated	Contractor's ECO	Complaints register		External ECO	Quarterly	Review complaints register (and resolution of complaints)
			Where possible or applicable, provide transport to and from the site on a daily basis for construction workers	Contractor	Personnel transport		N/A – no monitoring required		
			Develop a Code of Conduct for the construction phase in terms of behaviour of construction staff. Operating hours as determined by the environmental authorisation are adhered to during the development phase. Where not defined, it must be ensured that development activities must still meet the impact management outcome related to noise management	Contractor	Code of conduct. Limitation of operating hours		External ECO	Quarterly	Review code of conduct and operating hours.
23	Fire Prevention	Prevention of uncontrollable fires.	Designate smoking areas where the fire hazard could be regarded as insignificant	Contractor	Appropriate designated smoking areas	On commencement	Contractor's ECO	Weekly	Inspect smoking areas (also for cleanliness)
			Firefighting equipment must be available on all vehicles located on site		Availability of firefighting equipment	Throughout construction phase	Contractor's ECO	Weekly	Spot-check firefighting equipment on site vehicles
			The local Fire Protection Agency (FPA) must be informed of construction activities	Contractor's ECO	Record of notification	Prior to commencement	External ECO	Quarterly	Check communication records and signage on site
			Contact numbers for the FPA and emergency services must be communicated in environmental awareness training and displayed at a central location on site		Display of contact details	Throughout construction phase			
			Two-way swop of contact details between ECO and FPA		Record of notification	Prior to commencement			
24	Stockpiling and stockpile areas	Erosion and sedimentation as a result of stockpiling are reduced	All material that is excavated during the project development phase (either during piling (if required) or earthworks) must be stored appropriately on site in order to minimise impacts to watercourses and water bodies	Contractor	Appropriate stockpile locations	As material is excavated	Contractor's ECO	As material is excavated	Ensure stockpile locations are appropriate
			All stockpiled material must be maintained and kept clear of weeds and alien vegetation growth by undertaking regular weeding and control methods	Contractor's ECO	Implement alien invasive management plan	As per approved alien invasive management plan	External ECO	Quarterly	Evaluate site for alien invasive species and weeds
			Topsoil stockpiles must not exceed 2 m in height	Contractor	Establishment of topsoil stockpiles		Contractor's ECO	Quarterly	Photographic evidence of

No	Aspect	Impact Management Outcome	Impact Management Actions	Implementation			Monitoring		
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			During periods of strong winds and heavy rain, the stockpiles must be covered with appropriate material (e.g. cloth, tarpaulin etc.)	Contractor	Stockpile covering	As topsoil is stripped and stockpiled			stockpile height, and condition
			Where possible, sandbags (or similar) must be placed at the bases of the stockpiled material in order to prevent erosion of the material	Contractor	Erosion prevention measures at stockpiles				
25	Finalising tower positions	No environmental degradation occurs as a result of the survey and pegging operations	No vegetation clearing must occur during survey and pegging operations	Surveyor	Do not clear vegetation	When site surveying and pegging is undertaken	Contractor's ECO	Weekly	Verify survey and pegging activities (no vegetation clearance or new roads made by survey team)
			No new access roads must be developed to facilitate access for survey and pegging purposes		Use existing roads (no driving outside of existing roads)				
			Project manager, botanical specialist and contractor to agree on final tower positions based on survey within assessed and approved areas	Project manager, botanical specialist	Plan showing final tower positions, signed by relevant parties		Contractor's ECO	Once-off	File approved plan in environmental file and verify positions on site
			The surveyor is to demarcate (peg) access roads/tracks in consultation with ECO. No deviations will be allowed without the prior written consent from the ECO	Surveyor	Communication records between surveyor and ECO		Contractor's ECO	When site surveying and pegging is undertaken	Ensure survey team do not make inappropriate access tracks
26	Excavation and Installation of foundations	No environmental degradation occurs as a result of excavation or installation of foundations	All excess spoil generated during foundation excavation must be disposed of in an appropriate manner and at a recognised disposal site, if not used for backfilling purposes	Noted: It is expected that excavated material can be used on site as backfill and this is preferred. If spoil material must be disposed, records must be kept by the contractor's ECO. The external ECO must verify that no spoils remain on site for longer than necessary.					
			Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes	Contractor	Use soil in rehabilitation landscaping	Rehabilitation concurrent to construction, and at conclusion	Contractor's ECO	Weekly	Document the progress of rehabilitation
			Management of equipment for excavation purposes must be undertaken in accordance with No 18: Workshop equipment maintenance and storage	Noted - please see specific measures in No 18: Workshop equipment maintenance and storage					
			Hazardous substances spills from equipment must be managed in accordance with No 17: Hazardous substances	Noted - please see specific measures in No 17: Hazardous substances					
			Batching of cement to be undertaken in accordance with No 19: Batching plants	Noted - please see specific measures in No 19: Batching plants					
			Residual cement must be disposed of in accordance with No 8: Solid and hazardous waste management	Noted - please see specific measures in No 8: Solid and hazardous waste management					
27	Assembly and erecting towers	No environmental degradation occurs as a result of assembly and erecting of towers	Prior to erection, assembled towers and tower sections must be stored on elevated surface (suggest wooden blocks) to minimise damage to the underlying vegetation	Contractor	Designated storage areas with wooden blocks (or similar)	Before tower sections are delivered to site	Contractor's ECO	As tower sections are delivered to site	Photographic evidence of appropriate storage of tower sections
			In sensitive areas, tower assembly must take place off-site or away from sensitive positions	Contractor	Ensure no tower assembly to take place in the delineated	Whenever tower assembly takes place	Contractor's ECO	Whenever tower assembly takes place	No tower assembly to take place in the delineated

No	Aspect	Impact Management Outcome	Impact Management Actions	Implementation			Monitoring		
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					wetland areas or buffer zones				wetland areas or buffer zones
			The crane used for tower assembly must be operated in a manner which minimises impact to the environment	Crane operator & contractor	Train crane operator in EMP and environmental sensitivities	Prior to crane operations commencing	Contractor's ECO	Weekly	Comment on crane operations in weekly report
			The number of crane trips to each site must be minimised	Noted, moving the crane has financial implications, so it is reasonable to think the contractor will move it as seldom as possible.					
			Wheeled cranes must be utilised in preference to tracked cranes	The preference is noted, but will depend on the appointed EPC contractor					
			Consideration must be given to erecting towers by helicopter or by hand where it is warranted to limit the extent of environmental impact	The exact method employed will depend on the appointed EPC contractor. Due consideration must be given by the contractor to alternative assembly methods. No assembly to take place within delineated wetlands or their buffers.					
			Access to tower positions to be undertaken in accordance with access requirements in specified in No 4: Access Roads	Noted - please see specific measures in No 4: Access Roads					
			Vegetation clearance to be undertaken in accordance with general vegetation clearance requirements specified in No 10: Vegetation clearing	Noted - please see specific measures in No 10: Vegetation clearing					
			No levelling at tower sites must be permitted unless approved by the Development Project Manager or Developer Site Supervisor	Contractor	No levelling at tower sites (without approval)	Prior to tower establishment	Contractor's ECO	Prior to tower establishment	Check that no unauthorised levelling is undertaken
			Topsoil must be removed separately from subsoil material and stored for later use during rehabilitation of such tower sites	Contractor	Separate topsoil and subsoil stockpiles	When stripping soil for tower establishment	Contractor's ECO	When stripping soil for tower establishment	Photographic evidence - stockpiles and rehabilitation progress
			Topsoil must be stored in heaps not higher than 1m to prevent destruction of the seed bank within the topsoil	Contractor	Topsoil stockpiles lower than 1m in height	When stripping topsoil	Contractor's ECO	Throughout construction phase	
			Excavated slopes must be no greater that 1:3, but where this is unavoidable, appropriate measures must be undertaken to stabilise the slopes	Contractor	Stable excavated slopes	During excavations	Contractor's ECO	Throughout construction phase	Photographic evidence of stable slopes
			Fly rock from blasting activity must be minimised and any pieces greater than 150 mm falling beyond the working area, must be collected and removed	Blasting contractor	Clean-up after blasting	After blasting has taken place	Contractor	After blasting	Inspect area for fly rock
			Only existing disturbed areas are utilised as spoil areas	Contractor	Only use approved spoil areas	Throughout construction phase	Contractor's ECO	Throughout construction phase	Inspect site for spoils outside designated areas
			Drainage is provided to control groundwater exit gradient with the spill areas such that migration of fines is kept to a minimum	Contractor	Control drainage on the construction site	Throughout construction phase	Contractor's ECO	Throughout construction phase	Evaluate drainage on site and advise contractor
			Surface water runoff is appropriately channelled through or around spoil areas						
			During backfilling operations, care must be taken not to dump the topsoil at the bottom of the foundation and then put spoil on top of that	Contractor	Backfill in the same sequence that soil was excavated (topsoil to be placed last)	When backfilling excavations	Contractor's ECO	When backfilling excavations	Supervise and ensure backfilling occurs in correct sequence

No	Aspect	Impact Management Outcome	Impact Management Actions	Implementation			Monitoring		
				Responsible Person	Method of Implementation	Timeframe for implementation	Responsible Person	Frequency	Evidence of compliance
			The surface of the spoil is appropriately rehabilitated in accordance with the requirements specified in Section 5.29: Landscaping and rehabilitation	Contractor	Implement rehabilitation measures	During rehabilitation	Contractor's ECO	During rehabilitation	Photographic records of rehabilitation progress
			The retained topsoil must be spread evenly over areas to be rehabilitated and suitably compacted to effect revegetation of such areas to prevent erosion as soon as construction activities on the site are complete. Spreading of topsoil must not be undertaken at the beginning of the dry season						
28	Stringing	No environmental degradation occurs as a result of stringing.	Where possible, previously disturbed areas must be used for the siting of winch and tensioner stations. In all other instances the siting of the winch and tensioner must avoid access restricted areas and other sensitive areas	Contractor	Method statement including layout plan / map showing locations of winch and tensioner stations	Before establishment of winch and tensioner stations	Contractor's ECO	Once-off approval of sites and continuous monitoring until sites are rehabilitated	Approved plan and photographic evidence of station locations
			The winch and tensioner station must be equipped with drip trays in order to contain any fuel, hydraulic fuel or oil spills and leaks		Supply of drip trays			Weekly	Verify drip trays on site
			Refuelling of the winch and tensioner stations must be undertaken in accordance with No 17: Hazardous substances	Noted - please see specific measures in No 17: Hazardous substances					
			In the case of the development of overhead transmission and distribution infrastructure, a one metre "trace-line" may be cut through the vegetation for stringing purposes only and no vehicle access must be cleared along "trace-lines". Vegetation clearing must be undertaken by hand, using chainsaws and hand-held implements, with vegetation being cut off at ground level. No tracked or wheeled mechanised equipment must be used	Contractor	Method statement for vegetation clearance at trace lines	Before vegetation clearance for stringing commences	Contractor's ECO	Once-off approval of method statement, continuous verification	Document vegetation removal
			Alternative methods of stringing which limit impact to the environment must always be considered e.g. by hand or by using a helicopter						Assess alternative methods
			Where the stringing operation crosses a public or private road or railway line, the necessary scaffolding/ protection measures must be installed to facilitate access. If, for any reason, such access has to be closed for any period(s) during development, the persons affected must be given reasonable notice, in writing	Contractor	Installation of scaffolding / protection measures. Communication records	When relevant	Contractor's ECO	When relevant	Communication records
							Contractor's Safety Officer	When relevant	Inspection of protection measures to facilitate access
			No services (electrical distribution lines, telephone lines, roads, railways lines, pipelines fences etc.) must be damaged because of stringing operations. Where disruption to services is unavoidable, persons affected must be given reasonable notice, in writing	Contractor	No damage to existing infrastructure. Giving written notice of planned disruptions	When (if) relevant	Contractor's ECO	When relevant	Evidence of written notices to affected parties

No	Aspect	Impact Management Outcome	Impact Management Actions	Implementation			Monitoring		
				Responsible Person	Method of Implementation	Timeframe for implementation	Responsible Person	Frequency	Evidence of compliance
			Where stringing operations cross cultivated land, damage to crops is restricted to the minimum required to conduct stringing operations, and reasonable notice (10 work days minimum), in writing, must be provided to the landowner	Contractor	Written communication with landowner	10 days before stringing operations to Ysterkop substation	Contractor's ECO	10 days before stringing operations to Ysterkop substation	Evidence of written notice to land owner
			Necessary scaffolding protection measures must be installed to prevent damage to the structures supporting certain high value agricultural areas such as vineyards, orchards, nurseries	Contractor	As relevant, there are no nurseries, orchard or vineyards associated with this proposed project site, the only agricultural area affected by the powerline is right by the Ysterkop substation. Agricultural areas affected by the PV infrastructure is on land owned by Overlooked Colliery Alpha - agreements are in place.				
29	Socio-economic	Socio-economic development is enhanced	Develop and implement communication strategies to facilitate public participation	Developer (or his/her appointed representative)	Develop and implement stakeholder engagement plan. No employees to be housed on site. Training to all employees, including acceptable behaviour (no littering, fires, poaching, accessing adjacent areas etc.)	Develop plan prior to site establishment, implement throughout construction phase	Contractor's ECO	Quarterly	Review stakeholder development plan and records of training and communication
			Develop and implement a collaborative and constructive approach to conflict resolution as part of the external stakeholder engagement process						
			Develop and implement a collaborative and constructive approach to conflict resolution as part of the external stakeholder engagement process						
			Sustain continuous communication and liaison with neighbouring owners and residents						
			Create work and training opportunities for local stakeholders						
			Where feasible, no workers, with the exception of security personnel, must be permitted to stay over-night on the site. This would reduce the risk to local farmers						
30	Temporary closure of site	Minimise the risk of environmental impact during periods of site closure greater than five days	Bunds must be emptied (where applicable) and need to be undertaken in accordance with the impact management actions included in sections 5.17: management of hazardous substances and 5.18 workshop, equipment maintenance and storage	Contractor	Please see the relevant sections for specific measures	When temporarily closing the site for whatever reason	Contractor's ECO	Once-off, if temporary closure of the site is required	Please see the relevant sections for specific measures
			Hazardous storage areas must be well ventilated		Ventilated storage area				Photographic evidence
			Fire extinguishers must be serviced and accessible. Service records to be filed and audited at last service		Fire extinguishers present and accessible				Service records on file
			Emergency and contact details displayed must be displayed		Displayed emergency contact details				Photographic evidence
			Security personnel must be briefed and have the facilities to contact or be contacted by relevant management and emergency personnel		Communication equipment provided to security personnel				Training records
			Night hazards such as reflectors, lighting, traffic signage etc. must have been checked		Check all night hazards				Photographic evidence
			Fire hazards identified and the local authority must have been notified of any potential threats e.g. large brush stockpiles, fuels etc		Identify and signpost fire hazards				Photographic evidence
			Structures vulnerable to high winds must be secured		Secure structures				Photographic evidence and

No	Aspect	Impact Management Outcome	Impact Management Actions	Implementation			Monitoring		
				Responsible Person	Method of Implementation	Timeframe for implementation	Responsible Person	Frequency	Evidence of compliance
			Wind and dust mitigation must be implemented		Appoint person to implement dust suppression measures				written records of communication to local authority
			Cement and materials stores must have been secured		Secured stores				
			Toilets must have been emptied and secured		Empty and secured toilets, refuse bins and drip trays				
			Refuse bins must have been emptied and secured						
			Drip trays must have been emptied and secured.						
31	Landscaping and rehabilitation	Areas disturbed during the development phase are returned to a state that approximates the original condition	All areas disturbed by construction activities must be subject to landscaping and rehabilitation	Contractor	Rehabilitate affected areas	During and after construction	Contractor's ECO	Once-off, with follow up as needed	Photographic evidence
			All spoil and waste must be disposed to a registered waste site and certificates of disposal provided		Appoint registered waste management contractor	Whenever waste is disposed of		Whenever waste is disposed of	Waste disposal certificates in File
			All slopes must be assessed for contouring, and to contour only when the need is identified in accordance with the Conservation of Agricultural Resources Act, No 43 of 1983	Contractor, on instruction of ECO	Appropriate contouring, if needed	During and after construction		When contouring is required	Photographic evidence
			All slopes must be assessed for terracing, and to terrace only when the need is identified in accordance with the Conservation of Agricultural Resources Act, No 43 of 1983		Appropriate terracing, only if needed			When terracing is required	Photographic evidence
			Berms that have been created must have a slope of 1:4 and be replanted with indigenous species and grasses that approximates the original condition	Contractor	Sloping and revegetating berms			When berms are created	Photographic evidence
			Where new access roads have crossed cultivated farmlands, that lands must be rehabilitated by ripping which must be agreed to by the holder of the EA and the landowners	Contractor, holder & land owner	Ripping of agreed access roads created		External ECO	Once-off, when roads are being rehabilitated	Photographic evidence & Report
			Rehabilitation of tower sites and access roads outside of farmland	Contractor	Rehabilitate affected areas	Rehabilitation concurrent to construction, and at conclusion	Contractor's ECO	Rehabilitation monitoring to be undertaken concurrently to construction (as an area is completed, rehabilitation must take place), after conclusion of construction phase, and upon decommissioning (during which time detailed plans must be compiled)	Rehabilitation efforts must be documented by written and photographic evidence and specialist input where relevant
			Indigenous species must be used for with species and/grasses to where it compliments or approximates the original condition		Use approved vegetation in rehabilitation				
			Stockpiled topsoil must be used for rehabilitation (refer to Section 5.24: Stockpiling and stockpiled areas)		Use stockpiled topsoil in rehabilitation				
			Stockpiled topsoil must be evenly spread so as to facilitate seeding and minimise loss of soil due to erosion		Spread topsoil evenly				
			Before placing topsoil, all visible weeds from the placement area and from the topsoil must be removed		Remove weeds before topsoil placement				
			Subsoil must be ripped before topsoil is placed		Rip subsoil before topsoil placement				
			The rehabilitation must be timed so that rehabilitation can take place at the optimal time for vegetation establishment		Rehabilitate concurrent to construction,				

No	Aspect	Impact Management Outcome	Impact Management Actions	Implementation			Monitoring		
				Responsible Person	Method of Implementation	Timeframe for implementation	Responsible Person	Frequency	Evidence of compliance
					after construction and after decommissioning				
			Where impacted through construction related activity, all sloped areas must be stabilised to ensure proper rehabilitation is affected and erosion is controlled		Stabilize areas with steep slopes				
			Sloped areas stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly		Follow method statement to stabilize areas with steep slopes				
			Spoil can be used for backfilling or landscaping as long as it is covered by a minimum of 150 mm of topsoil		After backfilling, cover with 150mm topsoil				
			Where required, re-vegetation including hydro-seeding can be enhanced using a vegetation seed mixture as described below. A mixture of seed can be used provided the mixture is carefully selected to ensure the following: a) Annual and perennial plants are chosen; b) Pioneer species are included; c) Species chosen must be indigenous to the area with the seeds used coming from the area; d) Root systems must have a binding effect on the soil; e) The final product must not cause an ecological imbalance in the area		Re-vegetate affected areas according to approved seed mix and application (Method statement)				

10.4 Monitoring and Reporting Requirements

This section of the report contains the monitoring, auditing and reporting requirements relevant to the Halfgewonnen Solar PV Project. Table 27 contains a summary of the monitoring plans that must be implemented at the Project and identifies the person responsible for undertaking the audit / monitoring and the frequency of each monitoring / auditing and reporting exercise.

Table 27: Monitoring, Auditing and Reporting summary

Impact that requires monitoring	Monitoring description	Person responsible for monitoring	Frequency of monitoring	Reporting requirements
General compliance – all EMP commitments	Weekly Checklists	Contractor's ECO	Weekly	Internal
	Quarterly ECO Reports	External ECO	Quarterly (during construction)	Report to DFFE and MTPA
	External Regulation 34 Audits	Independent External Auditor	Annually	Report to DFFE and MTPA
Physical destruction and general disturbance of biodiversity	Monitoring of relocation of floral SCC	Independent Specialist	As per approved floral SCC relocation plan	Report to MTPA as per approved floral SCC relocation Plan
	Rehabilitation Monitoring	Contractor's ECO	Weekly	Internal
		External ECO	Quarterly (during construction)	Report to DFFE and MTPA
	Monitoring the establishment and spread of AIPs	Contractor's ECO	Weekly	Internal
		External ECO	Quarterly (during construction)	Report to DFFE and MTPA
Impacts to Avifauna	Avifaunal monitoring (at PV Facilities and Powerline): record birds and collect any birds which have collided with or been electrocuted by the infrastructure.	Contractor's ECO	Every second month for the first year	Report to MTPA

Impact that requires monitoring	Monitoring description	Person responsible for monitoring	Frequency of monitoring	Reporting requirements
Inadvertent impacts to soils (erosion)	Inspect the affected areas and downstream areas for erosion	Contractor's ECO	Weekly during rainy season (during construction), monthly in dry season.	Report to Contractor, for actioning (repair)
		Developer	Annually in rainy season for operational phase	None – developer to appoint contractor to remedy
Surface water contamination	Surface water quality monitoring	Sampling: internal Analysis: SANAS accredited laboratory Reporting: external specialist	Sampling & Analysis: monthly Reporting: Quarterly	Monthly summary reports to developer (internal). Quarterly reports to DWS (see Appendix F 6, section 11)
Heritage Resources	Visual inspection of demarcations. Any damage or unauthorized access to be reported immediately.	Contractor's ECO	Weekly during construction	Internal, but any damage or unauthorized access to be reported immediately to Heritage Authority

10.5 Environmental Awareness Plan

The EIA Regulations, 2014 (as amended) requires that the EMP contains an environmental awareness plan describing the manner in which—

i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and
ii) risks must be dealt with in order to avoid pollution or the degradation of the environment.

Environmental awareness training is critical for two primary reasons:

a) the workforce must understand how they can play a role in achieving the objectives specified in the EMP, and
b) the workforce must understand their obligations in terms of the implementation of the EMP and adherence to environmental-legislative requirements.

Different people with different roles will be involved in the pre-construction, construction, operation and maintenance and the eventual closure and rehabilitation of the Project. As such, different levels of environmental awareness and specialized environmental skills are required.

Table 28 identifies specific categories of role-players and their environmental roles and responsibilities, along with the required knowledge to perform their duties. This enables the identification of appropriate training material and frequency.

This Table will enable the completion of a training needs analysis including all role-players once the EPC contractor is appointed, before the commencement of activities on site.

The EPC Contractor will be required to appoint a dedicated Environmental Control Officer (ECO) to complete the training needs analysis, schedule the requisite training and keep records of training provided to employees, contractors and visitors to the site during the construction phase.

It will remain the responsibility of the Holder of the EA to ensure the conditions of the EMP are adhered to throughout all phases, despite delegation of responsibilities to the EPC contractor during the construction phase.

The training sessions must incorporate methods to test the training attendee's understanding of the subject matter presented. The Contractor's ECO must, on the basis of evidence, determine that the employees are competent in the training material and learning outcomes before they will be allowed to access the site.

The environmental training and awareness programme detailed in this EIA/EMP report additionally details the following:

- Identification of SCC (Flora and Fauna) potentially associated with the project site and immediate surroundings (as per Appendix F 3);
- The location and status of identified heritage resources, and heritage resources that may be uncovered during the course of activities (including fossils), and what actions should be taken if these are identified (Appendix F 1);
- Demarcation of sensitive areas surrounding the project sites (such as wetlands), to ensure that all employees are aware of the approved footprint areas and the no-go areas;
- Training related to acceptable and unacceptable behaviour, with specific reference to work-limits, prohibition of excessive noise, fires, littering, poaching, harvesting, accessing adjacent areas etc.

The abovementioned training is required for all employees, subcontractors and visitors to the site.

Table 28: Environmental Awareness Training Requirements

Occupation Category	Environmental Management Responsibility / Role	Required Knowledge and Skills	Training Required	Interval
Senior Management, including the Applicant	Over-all responsibility for implementation of the EMP and management of environmental impacts, pollution prevention, incident reporting etc.	Knowledge of the significant impacts as described in the EIA/EMP. Knowledge of the commitments and management measures in the EMP and emergency preparedness and response plan.	General in-house, management training on the EIA and EMP.	Once off
			Training on the applicable environmental legislation	Annually
All staff	Implement specific management measures, prevent pollution incidents.	Knowledge of the EMP, emergency response plan, complaints register, avoidance of sensitive / no-go areas, water and waste management procedures, sanitation procedures, fire prevention, disease prevention.	General environmental awareness training	Prior to commencement, refresher training as required (based on ECO recommendation)
All staff	Health of employees.	Ensure that the workforce is sensitised to the effects of sexually transmitted diseases, especially HIV and AIDS.	Health awareness training	Prior to commencement, refresher training as required (based on ECO recommendation)
All staff and visitors	Avoid wasting of water (conserve water).	Minimise water use during cleaning of equipment. Report water wastage incidents.	Water management awareness	Prior to commencement, refresher training as required (based on ECO recommendation)
All staff and visitors	Waste management.	Separation of waste, importance of not littering.	Waste management training	

Occupation Category	Environmental Management Responsibility / Role	Required Knowledge and Skills	Training Required	Interval
All staff and visitors	No poaching, no disturbing of animals (including birds) on site. No harvesting of any animals or plants from site.		General environmental awareness training	
Staff involved in site demarcation	Prevention of edge effects and accidental damage.	Specific knowledge of sensitive areas (wetlands, heritage resources).	Specific training in demarcation procedure (as per contractor's approved method statement)	Prior to commencement, refresher training as required (based on ECO recommendation)
All drivers	Only use designated roads, no speeding, safe road use.	Routes and speed limits that are allowed.	Driver awareness training	Once-off prior to commencement

11 Environmental Impact Statement

The impact assessment that was undertaken (Section 9) identified and rated a number of potential impacts that could arise from the proposed development of the PV Project and associated infrastructure.

Potential High impacts could arise if heritage resources in the area are damaged – impacts to heritage resources are viewed as permanent loss of irreplaceable resources. Such impacts are, however, fairly easy to mitigate by avoidance. Heritage resources must be demarcated and avoided entirely as none of the identified heritage resources are directly affected by the planned project footprint. Environmental awareness training to all employees must include the importance and location of these heritage resources, to ensure that employees do not cause inadvertent damage due to lack of understanding. A chance-find procedure is also included in the Specialist assessment, which must be followed in the event of uncovering additional resources.

Potential impacts to avifauna habitat and avifauna SCC were also regarded as high, before the consideration of mitigation measures. The layout has been adjusted to avoid the wetland habitat in line with preliminary specialist recommendation. However, portions of Eastern Highveld Grassland will still be affected, reducing breeding and foraging habitat for avifauna SCC, who are expected to migrate to adjacent habitat resulting in increasing competition for resources in adjacent habitats. Potential electrocutions and collisions are also likely if not mitigated.

After the implementation of mitigation measures as discussed in this report, only potential impacts to Avifauna SCC are still regarded as being of moderate significance. Avifauna SCC may occur in the project area, either permanently for breeding or temporarily while foraging. Vegetation clearance in the Eastern Highveld Grassland will lead to loss of breeding and foraging habitat for these species within the footprint. These species are then expected to migrate to surrounding habitat, increasing competition for resources in adjacent habitats, and reduced species richness. The extent of impacts must be controlled.

Please refer to Plan 15 for a map which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report. All areas outside of the indicated development footprint must be avoided.

A 10m buffer will be demarcated from the wetlands that must be preserved and flora SCC will be marked for relocation under permits from the MTPA, after the site walkthrough which must be undertaken prior to any pegging or other site establishment taking place.

The assessment has found that the potential impacts associated with the proposed project can in most instances be completely avoided, or mitigated to acceptable significance levels. Strict control of potential edge-effects and implementation of the EMP is required to ensure impacts remain at an acceptable significance level.

11.1 Specific aspects to be included as conditions of authorization

It is the reasoned opinion of the EAP that the proposed project should be authorized due to the following key considerations:

- Construction of the Halfgewonnen Solar PV Project is associated with manageable environmental impacts while contributing positively to existing industry in the area, on a site that has already been impacted by mining and agricultural development.
- The proposed project can potentially contribute to electricity generation in South Africa, using renewable resources. The shift from coal-fired electricity generation to renewables in South Africa is to some extent inevitable.
- The proposed project will be associated with additional job creation (albeit limited) and turn the proposed development site into a fully productive land – presently there is no guarantee that the ecological integrity of the property will not be destroyed by mining, agriculture or squatting in the future and its contribution to conservation targets is questioned.

The following specific mitigation should be made conditional to authorization:

- Compilation of a rescue and relocation plan for floral SCC affected by the project. The rescue and relocation plan should be compiled and implemented in consultation with the MTPA;
- Concurrent rehabilitation should be implemented with areas affected by construction being shaped and vegetated as construction in a specific area is completed – the developer cannot only commence with rehabilitation programmes once construction is concluded.
- The proposed EPC Contractor will be required to adhere to the commitments of the EMP and any conditions of environmental authorisation.

11.2 Specific Information required

The EIA report must also address the matters referred to in section 24(4)(a) and (b) of the NEMA. The provisions of this section, and how these are addressed in this report are shown in Table 29:

Table 29: How the provisions of NEMA Section 24(4)(a) and (b) are addressed in this report

Provision of NEMA	Relevance to this application and report
(4) Procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment – *(a) must ensure, with respect to every application for an environmental authorisation—*	
(i) coordination and cooperation between organs of state in the consideration of assessments where an activity falls under the jurisdiction of more than one organ of state;	The DFFE has been identified as the competent authority in terms of the application under the NEMA. The IWULA will be applied for in due course as a separate process. The DWS is the competent authority in respect of applications in terms of the NWA and is still included in the I&AP database for the

Provision of NEMA	Relevance to this application and report
	Scoping and EIA and an integrated PPP is being followed. The relevant conservation authorities are also included in the consultation process. The full I&AP database indicating all the organs of state who were informed of this proposed project is contained in Appendix B.
(ii) that the findings and recommendations flowing from an investigation, the general objectives of integrated environmental management laid down in this Act and the principles of environmental management set out in section 2 are taken into account in any decision made by an organ of state in relation to any proposed policy, programme, process, plan or project;	It is assumed that the decision-making authorities will take the provisions of section 2 of the NEMA into account when evaluating the Project, based on the information presented in this EIA/EMP report.
(iii) that a description of the environment likely to be significantly affected by the proposed activity is contained in such application;	Please see the baseline description in Section 7 of this report and the Specialist studies in Appendix F.
(iv) investigation of the potential consequences for or impacts on the environment of the activity and assessment of the significance of those potential consequences or impacts; and	Impact identification and assessment is presented in section 8 of this report.
(v) public information and participation procedures which provide all interested and affected parties, including all organs of state in all spheres of government that may have jurisdiction over any aspect of the activity, with a reasonable opportunity to participate in those information and participation procedures; and	The PPP is discussed in Section 6 of this report and detailed in Appendix B.
(b) must include, with respect to every application for an environmental authorisation and where applicable—	
(i) investigation of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those	Alternatives, including the no-development option, are discussed in Section 5 of this report.

Provision of NEMA	Relevance to this application and report
potential consequences or impacts, including the option of not implementing the activity; *(ii) investigation of mitigation measures to keep adverse consequences or impacts to a minimum;*	Impacts of the proposed project were identified and assessed in Section 8. Management and Mitigation is discussed in Section 9.3.8.
(iii) investigation, assessment and evaluation of the impact of any proposed listed or specified activity on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999), excluding the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act;	Listed Activities relevant to the proposed project are identified in this report. The impact(s) of these activities on palaeontological and heritage resources has been assessed (Section 9.3.6, Appendix F 2 and Appendix F 3).
(iv) reporting on gaps in knowledge, the adequacy of predictive methods and underlying assumptions, and uncertainties encountered in compiling the required information;	Current assumptions, limitations and gaps are highlighted in this report (section 13).
(v) Investigation and formulation of arrangements for the monitoring and management of consequences for or impacts on the environment, and the assessment of the effectiveness of such arrangements after their implementation;	Impact Management is discussed in Section 9.3.8 while Monitoring requirements are summarized in Section 10.4.
(vi) consideration of environmental attributes identified in the compilation of information and maps contemplated in subsection (3); and	The baseline environment is described in this report (Section 7) and relevant maps (Plans) are provided throughout this report.
(vii) provision for the adherence to requirements that are prescribed in a specific environmental management Act relevant to the listed or specified activity in question.	Provisions of the Waste Act, Heritage Resources Act, Water Act and other relevant legislation are included in this report (Section 3).

12 Closure and Rehabilitation

The proposed Halfgewonnen Solar PV Facility has an estimated lifespan of approximately 25 years. PV 1 will initially provide electricity to consumers in the immediate vicinity of the project

while PV 2 will be connected to the National Grid. If at any time consumers cannot be identified in the immediate vicinity, PV 1 will also be connected to the National Grid.

It is impossible to accurately predict the exact nature of the surrounding environment in 25 years' time or whether the area would have developed to the point where the PV Facility will be upgraded to continue providing electricity, or decommissioned. Decommissioning of facilities that require environmental authorisation (such as the PV Facility) is also a Listed Activity in terms of NEMA and will thus require the decommissioning and closure to be approved by the relevant authorities at the time, based on the current legislative framework. However, it is also not possible to predict the legal framework in 25 years' time.

For the purposes of this EIA Report, it is assumed that the facility will eventually be decommissioned, and the site rehabilitated.

Decommissioning would firstly involve the disassembly of the Project components. Many of these could be re-used or recycled and it is recommended that the proponent investigate options for the sale of the Solar PV components in preparation for decommissioning. Functional components may also be donated and installed at other facilities like local schools or clinics in consultation with these facilities and local Government. No re-sale value has been offset against the calculated costs for decommissioning at this stage.

The following actions will be associated with the decommissioning phase:

- Confirm the site fences are secure to restrict access to the decommissioning site;
- Evaluate decommissioning office and support facilities like toilets and establish these on site if necessary (it is assumed that facilities used during the operational phase would still be present on site upon decommissioning and that no new facilities to serve the decommissioning workforce will be required);
- Establish containers on site to receive scrap metal (for recycling) and other waste materials;
- Lock out the array from producing any more energy, make sure it is no longer feeding into the grid.
- It is assumed that scrap will be hauled away daily (due to theft) considering the value of the metals (copper and stainless steel among others).
- Remove all cabling and wiring;
- Remove solar panels from mountings (stack for removal from site, either to pre-arranged donation site(s), buyers or disposal site);
- Dismantle and remove mountings and mounting foundations;
- Clean-up of site: ripping of compacted areas, replacement of topsoil, re-vegetating affected areas;
- Monitoring will involve the periodic evaluation of the success of rehabilitation, and management (removal) of alien invasive species until indigenous vegetation has established to such an extent that the area becomes self-sufficient.

The Massachusetts Board of Planning in the United States of America (USA) has developed a Solar Decommissioning Template presenting a list of labour and equipment rates that can be used to calculate the cost of decommissioning and enable developers to make sufficient financial provision for decommissioning (https://www.athol-ma.gov/sites/g/files/vyhlif2741/f/file/file/solar_decommissioning_bpcd_rules_and_reg_adoption_2-8-2018.pdf). The average

costs in the USA for decommissioning of Solar Facilities amounts to approximately 3.5 cents per watt, or roughly R518,000.00 per Mega-Watt based on currency conversion of R14.80/US Dollar.

Based on this calculation, the total costs for decommissioning of the facility (PV1 = 20MW + PV2 = 60MW, combined 80MW x R518,000) amounts to R41,440,000. It is however acknowledged that labour costs in South Africa are far lower than that in the US and that this amount makes no allowance for the re-sale value of materials.

13 Assumptions, limitations and gaps in knowledge

Assumptions, limitations and gaps in knowledge are discussed in the specialist reports contained in Appendix F. The following points presents the key assumptions, limitations and knowledge gaps only.

- Sampling by definition means that not all areas are assessed, and therefore some aspects may have been overlooked in this assessment. It is the opinion of the EAP that the specialist assessments that involved sampling covered adequate number and distribution of samples to give a representative view and support the conclusions reached in this report.
- Although all data sources used (with specific emphasis on desktop information) provide useful and often verifiable, high-quality data, the various databases used do not always provide an entirely accurate indication of the actual site characteristics associated with the proposed development. The information is however, considered to be useful as background information to the assessments.
- The majority of specialist field work was undertaken in the beginning of February 2021. During and immediately preceding this, significant rainfall was experienced within many parts of the country due to residual effects of cyclone Eloise. Extremely wet conditions may influence the findings of certain specialist investigations, as qualified in each individual specialist report.
- Global Positioning System (GPS) technology is inherently inaccurate and some inaccuracies due to the use of handheld GPS instrumentation may occur. However, the maps and coordinates presented in this report are sufficient for the purposes of the EIA. Prior to activities commencing on site, a site walk-over will have to be undertaken to mark the exact locations of Flora SCC (to be relocated under permits from MTPA) and to delineate the exact construction footprint (and exclude the delineated wetlands and their buffers).
- Impact assessment is a predictive tool to identify aspects of a development that need to be prevented, altered or controlled in a manner to reduce the impact to the receiving environment, or determine where remediation activities will need to be incorporated into the overall development plan. This does not mean that the impact will occur at the predicted significance, but provides guidance on the formulation of the management and monitoring requirements which need to be incorporated into the EMP.
- The level of project detail presented in this report is sufficient to ensure a realistic identification of potential impacts associated with the proposed project. In assessing the potential significance of those impacts, the precautionary principle was implemented and a worst-case scenario assessed in each instance.

14 Conclusion

Dreamworks Haven Investments Pty Ltd (the Applicant) proposes to develop the Halfgewonnen Solar Photovoltaic (PV) Facilities on Portions of Portion 7, 8, 9 and 16 of the Farm Halfgewonnen 190IS, in the Govan Mbeki Local Municipality of the Gert Sibande District Municipality, Mpumalanga.

The proposed development site is located within the Mining Right Area (MRA) of the Halfgewonnen Colliery. Agreements pertaining to land access have been reached with the Mine and land owner and the proposed PV facility will not impede the ongoing activities at the Mine. There are areas on the proposed development footprint currently leased from the land owner by local farmers and used for agricultural purposes. These areas are comparatively small and potential exists for other agricultural areas to be identified within the MRA and in the surroundings. It is unlikely that the proposed development will have a marked impact on ongoing employment at surrounding farming operations.

The total proposed Halfgewonnen Solar PV Facility will generate approximately 80 MW of power in total, through two components: Solar PV 1 will generate approximately 20 Mega Watts (MW) and will initially address the electricity requirements of consumers in the immediate vicinity of the Project. Solar PV 2 will generate approximately 60 MW and will be connected to the National Grid. The Project is being developed as part of the Department of Mineral Resources and Energy (DMRE) Renewable Energy Independent Power Producer Procurement Programme (REIPPP).

The Scoping and EIA Process being followed is in accordance with the EIA Regulations, 2014 (as amended). This is the Draft EIA Report and is made available for a public review and comment period of 30 days, whereafter the report will be updated with all comments received and submitted to the Department of Forestry, Fisheries and Environment (DFFE) for consideration.

This EIA Report contains detailed descriptions of the proposed project (Section 2) including an evaluation of the need for the project (Section 4) and alternatives to the project (Section 5), an overview of the policy and legislative context pertaining to the proposed development (Section 3), a description of the receiving environment (Section 7), and a comprehensive impact assessment with management measures to address the identified impacts (Section 9 and 10 respectively). The public participation process that has been followed thus far and will be followed is summarised in Section 6 and details provided in

Appendix B.

The potential impacts arising from the proposed project were rated in terms of significance (which is a function of the duration, scale and intensity of an anticipated impact, the sensitivity or uniqueness of the environmental aspect potentially impact upon, and the likelihood that an impact would occur). Impacts were rated first without the consideration of management and mitigation measures. Mitigation measures were then proposed in accordance with the mitigation hierarchy, and where impacts could be avoided by implementing mitigation, these measures were incorporated into the Environmental Management Plan (EMP, Section 10). Where impacts cannot be avoided entirely, mitigation to reduce the impact intensity, duration or spatial scale were incorporated into the EMP.

After the implementation of mitigation measures, only potential impacts to avifauna Species of Conservation Concern (SCC) that may forage or breed in the area are still regarded as being of moderate significance. Vegetation clearance in the Eastern Highveld Grassland occurring in the western portions of the site will lead to loss of breeding and foraging habitat for these species within the footprint. These species are then expected to migrate to surrounding habitat, increasing competition for resources in adjacent habitats, and reduced species richness. The extent of impacts must be controlled and limited to the site. Edge effects on adjacent habitats must be strictly controlled and avoided.

The assessment has found that the potential impacts associated with the proposed project can in most instances be completely avoided, or mitigated to acceptable significance levels. Strict control of potential edge-effects and implementation of the EMP is required to ensure impacts remain at an acceptable significance level.

15 References

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Appendix A: Approval of Scoping Report

Appendix B: Public Participation Report

Appendix C: CV and Undertaking by the EAP

I, Lelani Claassen, herewith confirm:

- That the information provided in this report are to the best of my knowledge true and correct;
- That comments and inputs from stakeholders and interested and affected parties that have been communicated to Cabanga Environmental to date, have been included in this report;
- That comments and inputs from stakeholders and interested and affected parties received at any time during the EIA process that is being undertaken for this project, will be included in subsequent reports or communicated to the relevant authorities;
- That the inputs and recommendations from specialist reports pertaining to the proposed project have been included in this report and its appendices.

I further declare that –

- I act as the independent environmental practitioner in this application;
- I have performed and will continue to perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant. I have no, and will not engage in, conflicting interests in the undertaking of the activity. I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations;
- there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting EIAs, including knowledge of the relevant Acts, Regulations and any guidelines that have relevance to the proposed activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority;
- I will continue to ensure that participation by I&APs is facilitated so that all I&APs will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced for the application .I will keep a register of I&APs and ensure that the comments of all I&APs are recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by I&APs in respect of a final report may be attached to the report without further amendment to the report; and
- I realise that a false declaration is an offence and is punishable by law.

_____ 11 August 2021

Signature of the EAP: Date:

Name of company: Cabanga Concepts CC (t/a Cabanga Environmental)

CURRICULUM VITAE: LELANI CLAASSEN

PROFESSIONAL PROFILE

Lelani started her career as an environmental consultant in 2008. She holds an Honours degree in Environmental Management from UNISA, which she completed whilst working as an environmental consultant following the successful completion of a BSc Degree in Landscape Architecture from the University of Pretoria. She has also successfully completed the SABS Short-course: Environmental Legal Requirements for ISO 14001 compliance. Her project experience is extensive in scope and covers various aspects of development including residential developments, filling stations and depots, infrastructure and mining projects.

Lelani's experience includes environmental authorization processes: Basic Assessments, Environmental Impact Assessments, Environmental Management Plans and Programmes, Mining Right Applications, Water Use Licensing, Concept (Fatal Flaw), Pre-Feasibility and Feasibility Studies. She also has experience as an Environmental Control Officer on construction projects. Lelani has also completed numerous environmental compliance audits and environmental-legal compliance assessments.

In addition to projects throughout South Africa, Lelani completed an EIA which was approved in Zambia. She has travelled for work to the Democratic Republic of Congo (DRC) and Uganda. Lelani is familiar with the EIA process in Botswana and has assisted with Projects there as well.

Lelani is proficient on GIS software packages (ArcGIS, QGIS), the full MS Office suite, CorelDraw and AutoCAD.

Lelani is a Registered EAP with EAPASA (2018/153) and a Professional Natural Scientist (Environmental Science) in terms of the Natural Scientific Professions Act (Reg 121645).

QUALIFICATIONS

2011-2013: BSc. Hons. Environmental Management (UNISA)

July 2010: Short Course: South African Environmental Legal Requirements for ISO14000 (SABS)

2004-2007: BSc. Landscape Architecture (University of Pretoria)

YEARS EXPERIENCE

10 + years

EMPLOYEMENT HISTORY

Cabanga Environmental: March 2018 – current

Position Held: Environmental Assessment Practitioner.

Digby Wells and Associates (South Africa) (Pty) Ltd January 2016 – March 2018. Position held: Environmental Consultant and Project Manager.

Mills and Otten Environmental Consultants CC. April – December 2015: Position Held Environmental Scientist .

Exigo Sustainability (formerly Africa Geo-Environmental Services, AGES) 2010 – March 2015: Position Held: Environmental Consultant.

Eco Consult / E-Scape Landscapes: 2008 – 2009: Position Held: Environmental Consultant and Landscape Technologist.

Appendix D: A3 Maps and Plans

Appendix E: Detailed Impact Assessment Tables

Appendix F: Specialist Studies

Appendix F 1: Archaeological Impact Assessment

Appendix F 2: Agricultural / Soil study

Appendix F 3: Terrestrial Ecology Impact Assessment

Appendix F 4: Aquatic Ecology Impact Assessment

Appendix F 5: Avian Impact Assessment

Appendix F 6: Surface Water Impact Assessment

Appendix F 7: Geotechnical Assessment

Appendix F 8: Visual Impact Assessment

Appendix G: Site Selection Report