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

Scoping Report

Issued for Public Comment

Reference Number: 2021-01-0010

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DOCUMENT CONTROL

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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 and 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). This report is the Scoping Report, prepared in terms of Regulation 21 and Appendix 2 of the Environmental Impact Assessment (EIA) Regulations, and is made available for a public comment period of 30 days, as part of the application process for Environmental Authorisation.

Following the comment period, this report will be updated with all comments received and submitted to the Department of Environment, Forestry and Fisheries (DEFF) for consideration. Once the DEFF approves the Scoping Report and associated plan of study for EIA (Section 9 of this report), the EIA phase will commence and further studies and public consultation undertaken.

At this early stage of project evaluation, the following key potential impacts have been identified:

- Impacts to biodiversity: potential loss of sensitive species or ecosystems, fragmentation of ecosystems, impacts to avifauna, establishment of alien invasive species due to disturbance of natural ecosystems
- Impacts to soils: loss of viable topsoil and high-potential agricultural soils, increased erosion potential leading to downstream sedimentation and soil loss;
- Impacts to surface water flow patterns and surface water quality;
- Safety and pollution risks associated with construction;
- Positive impact of short- and long-term employment opportunities, and negative impact of the loss of short-term employment once construction is complete;
- Negative impacts associated with increased number of people on the site: potential for littering, unauthorised access to surrounding property, potential poaching, establishment of informal settlements etc.
- Increased noise and dust from activities on the site;
- Alteration of the visual resource; and

- Deterioration of water resources in quality and quantity due to potential pollution and use in the maintenance of the proposed facilities.

A preliminary assessment of impact significance, and identification of measures that could reduce the likelihood or significance of the identified impacts, are included in Section 8 of this report.

As part of the EIA phase, a detailed Environmental Management Plan (EMP) will be compiled, to guide the applicant through the construction, operation and decommissioning phases in the management of activities that could lead to environmental impacts, should the project receive the necessary approvals. The compilation of the EMP will be guided by the specialist studies to be undertaken during the EIA phase.

This is the Draft Scoping Report and was prepared according to the provisions of the NEMA and EIA Regulations. This Scoping Report aims to:

- identify the relevant policies and legislation relevant to the proposed project (Section 3);
- motivate the need and desirability of the proposed project and the proposed project Site (Section 4);
- assess alternatives to the proposed project and proposed project site (Section 5);
- identify and confirm the preferred site, through a detailed site selection process, which includes an identification of impacts and risks inclusive of identification of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment (Appendix C);
- identify the key issues to be addressed in the EIA phase (Section 8.2);
- agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity (Section 9);
- identify possible measures to avoid, manage or mitigate identified impacts and determine the extent of the residual risks that need to be managed and monitored (Section 8.2).

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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	Department of Environment Forestry and Fisheries
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

ACRONYM:	DESCRIPTION:
PPP	Public Participation Process
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 the immediately surrounding mines and the National Grid.
Capacity of facility	80 MW Solar PV Facility 5MW 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 5 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: info@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 proposed Halfgewonnen Solar PV 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 from the onset and is being developed as part of the Department of Mineral Resources and Energy (DMRE) Renewable Energy Independent Power Producer Procurement Programme (REIPPP).

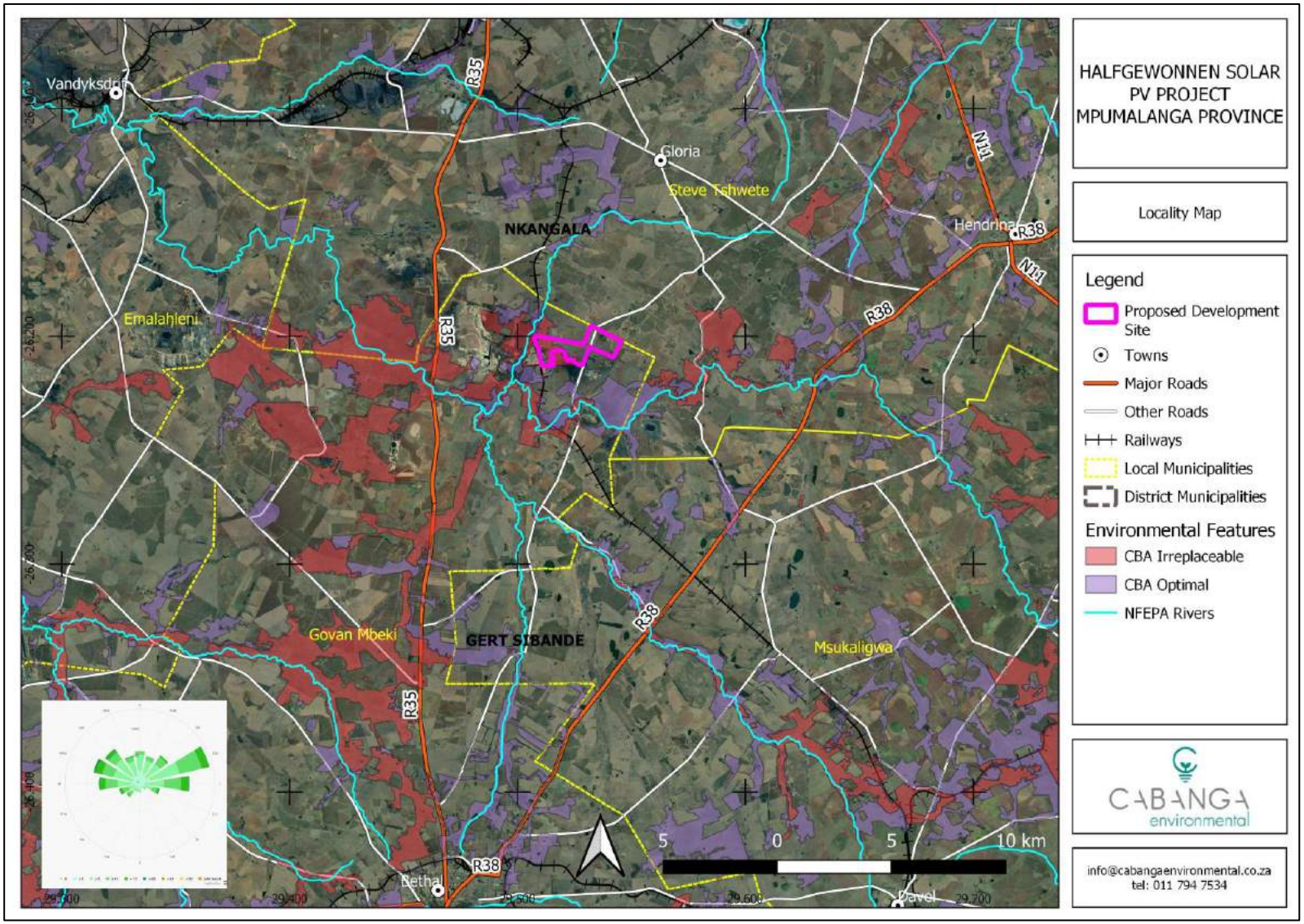
The total proposed Halfgewonnen Solar PV Facility will thus generate approximately 80 MW of power. Three alternative powerline routes are being considered to connect the proposed solar plant to the National Grid – via one of the three existing 88kv Eskom substations (i.e., Halfgewonnen South, Forzando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

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 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.

This report constitutes the Scoping 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.



Plan 1: Regional Location of the proposed project

1.1 Structure of the Report

The required content of a Scoping Report is prescribed in Appendix 2 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.

Table 1: Structure of the Scoping Report

No	Requirement	Section of report
1	A scoping report must contain the information that is necessary for a proper understanding of the process, informing all preferred alternatives, including location alternatives, the scope of the assessment, and the consultation process to be undertaken through the environmental impact assessment process, and must include:	
(a)	details of— (i) the Environmental Assessment Practitioner (EAP) who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae;	Section 1.2
(b)	the location of the activity, including— (i) the 21-digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Section 2.1
(c)	a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is— (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Plan 3 and Plan 4
(d)	a description of the scope of the proposed activity, including— (i) all listed and specified activities triggered; (ii) a description of the activities to be undertaken, including associated structures and infrastructure;	Section 2.2 and 2.3
(e)	a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;	Section 3

No	Requirement	Section of report
(f)	motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Section 4
(g)	a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including— (i) details of all the alternatives considered;	Section 5
(g)	(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; (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;	Section 6 and Appendix A.
(g)	(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 7
(g)	(v) the impacts and risks which have informed the identification of each alternative, including the nature, significance, consequence, extent, duration and probability of such identified impacts, including the degree to which these impacts— (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	Section 8.2
(g)	(vi) the methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Section 8.1
(g)	(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 8.2
(g)	(viii) the possible mitigation measures that could be applied and level of residual risk;	Section 8.2
(g)	(ix) the outcome of the site selection matrix;	Section 5 and Appendix C
(g)	(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	N/A, See Section 5
(g)	(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	Section 11

No	Requirement	Section of report
(h)	A plan of study for undertaking the environmental impact assessment process to be undertaken,	Section 9
(i)	An undertaking under oath or affirmation by the EAP in relation to— (i) the correctness of the information provided in the report; (ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and (iii) 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;	Section 1.2.2
(j)	an undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment;	Section 1.2.2
(k)	where applicable, any specific information required by the competent authority	None requested at this time
(l)	any other matter required in terms of section 24(4)(a) and (b) of the Act.	Section 11.1

1.2 Details of the EAP

The details of the persons who prepared this report are provided in Table 2.

Table 2: Details of the Author

Author and EAP	**Lelani Claassen**
Highest qualification	BSc Hons 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. SACNASP: Pr. Sci. Nat (Reg. 121645)
Review	**Michelle Venter**
Highest qualification	BSc Hons Geography; BSc Environmental Management & Zoology
Years' experience	10+ years
Professional registration	Registered EAP: 2019/456 (EAPASA) SACNASP: Cert Sci Nat 114447

Review	Jane Barrett
Highest qualification	BSc Environmental Management & Botany
Years' experience	10+ years
Approval	**Ken van Rooyen**
Highest qualification	MSc Geography
Years' experience	30+ years
Professional registration	SACNASP: Pr. Sci. Nat (Reg. 400121/93)

1.2.1 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, 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.

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.

1.2.2 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, have been included in this report;

This report is being made available for a public comment period of 30 days. After receipt of comments from the Public, I will be in a position to comment on the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment.

I further declare that –

- I act as the independent environmental practitioner in this application;
- I will 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 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.

_____ _____

Signature of the EAP: Date:

2 Details of the proposed Project

The purpose of this section of the report is to provide details of the location and nature of the proposed project. Details of the Project Applicant are provided in Table 3.

Table 3: 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 4.

Table 4: 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.

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

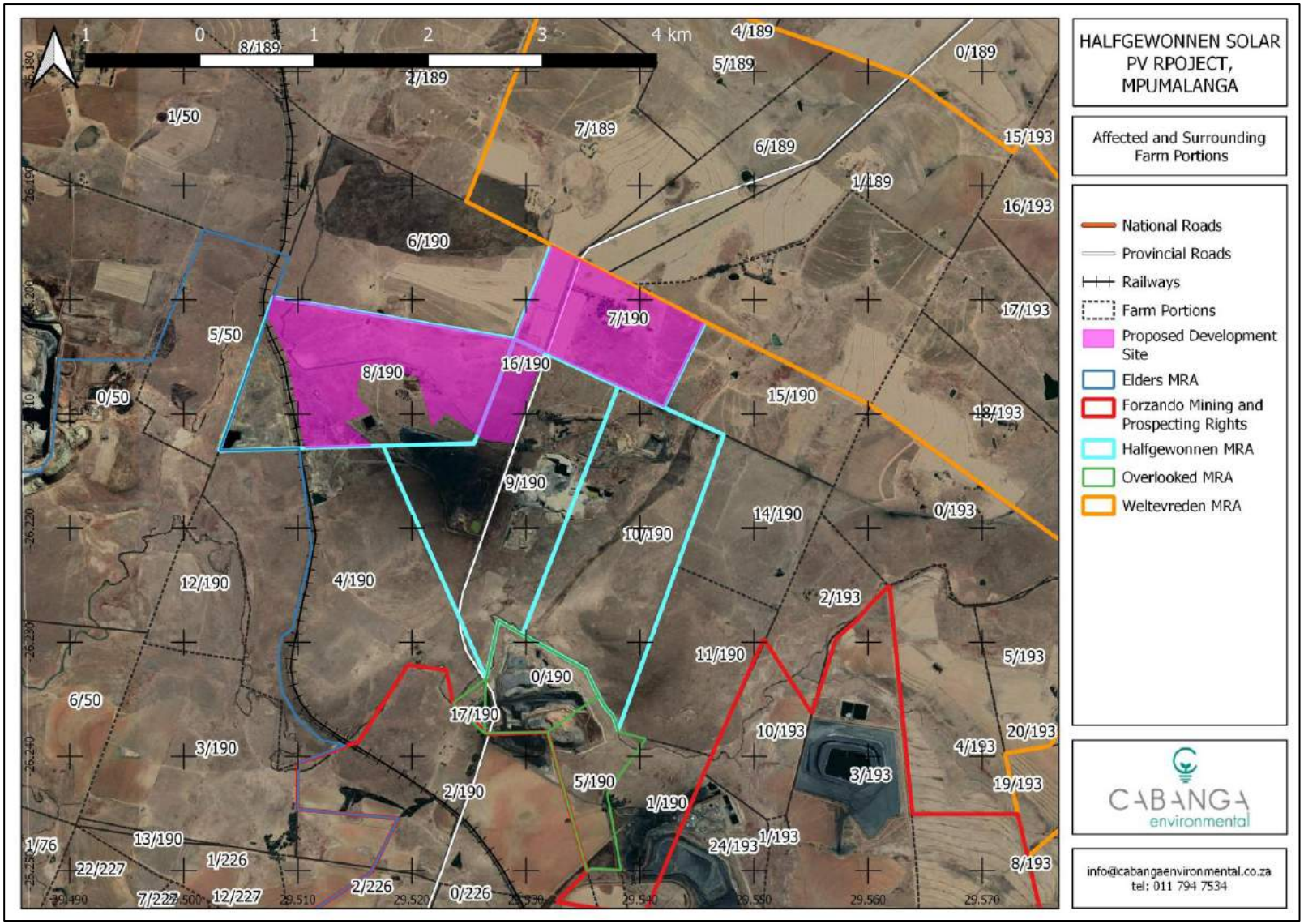
Table 5: 21-Digit Surveyor General Codes of affected properties

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**				

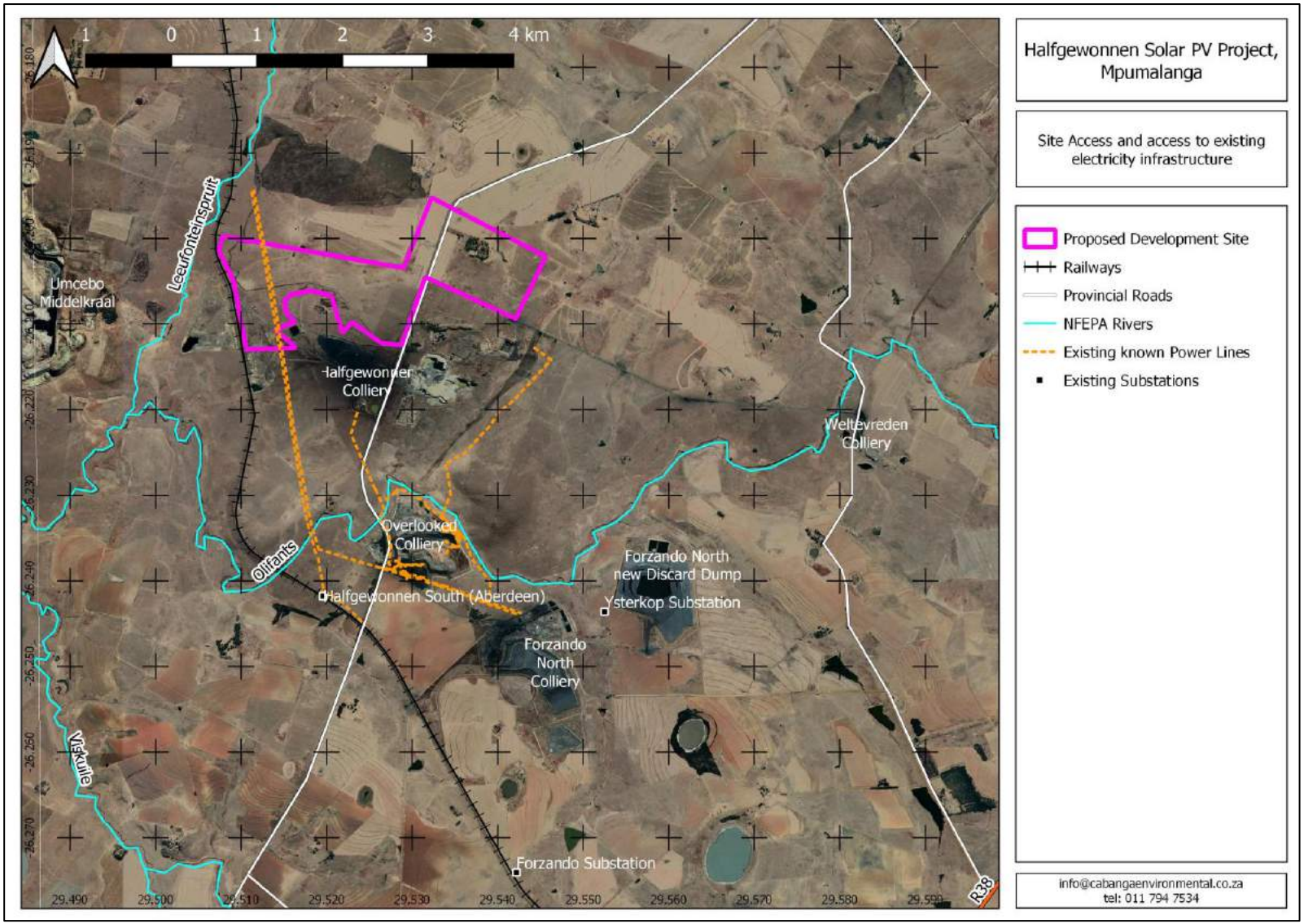
2.2 Detailed Project Description

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) (Plan 3).

The proposed PV facility will 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.



Plan 2: Farm Portions and Mining Rights



Plan 3: Proposed site in relation to powerlines and substations

2.2.1 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.

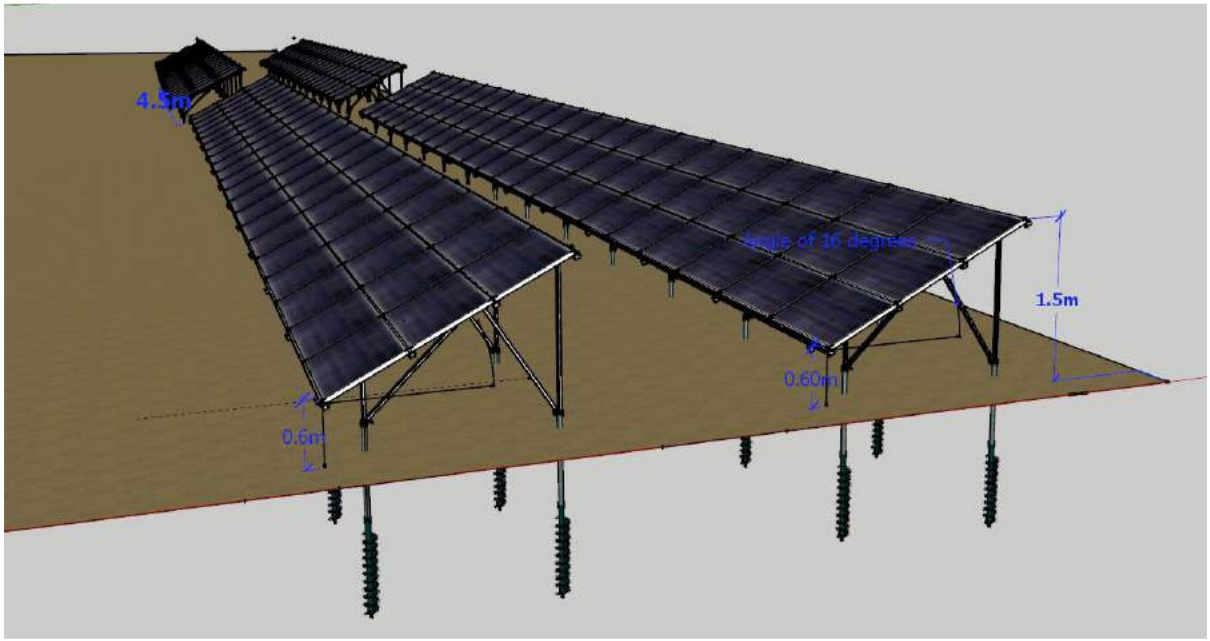


Figure 1: Typical Solar Array[1]

- **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

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

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 5 MW battery storage facility is proposed. Various energy storage technologies are currently being assessed as part of the feasibility studies.
- **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 4. A typical system design overview is presented in Figure 2.

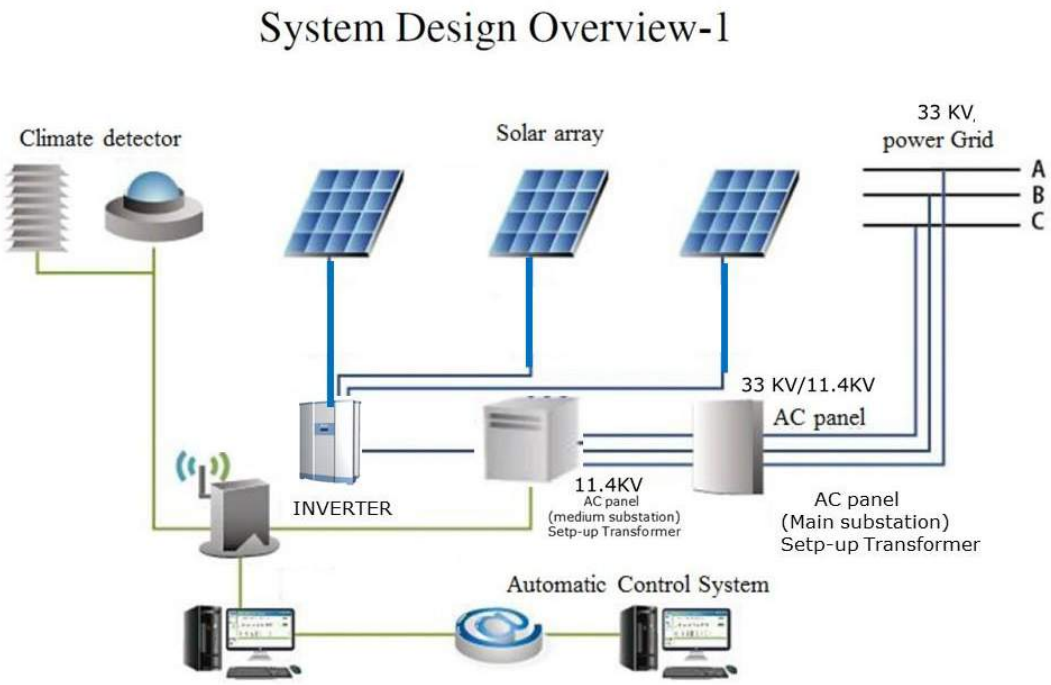
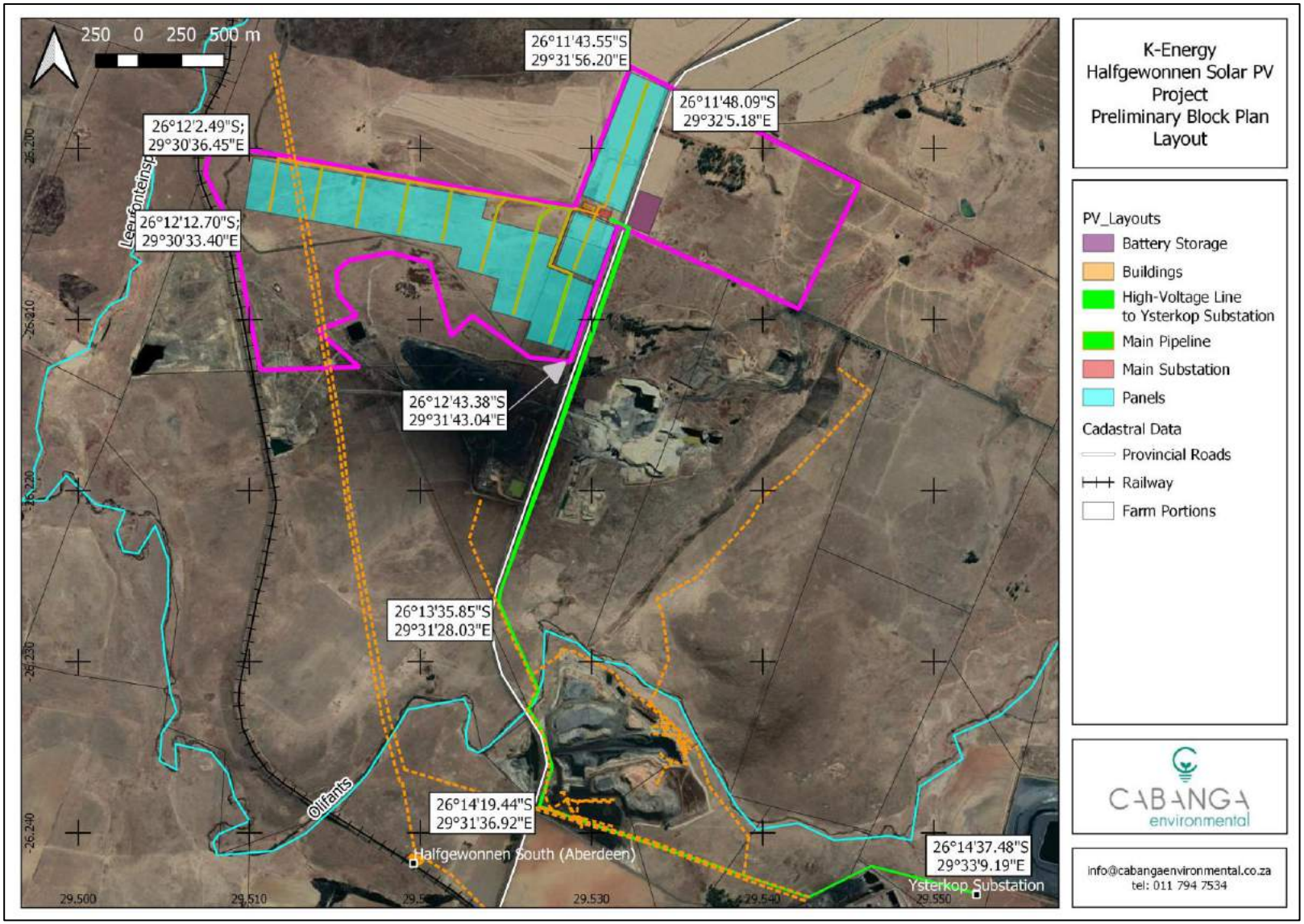


Figure 2: System Design Overview[2]

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



Plan 4: Block Plan Layout

2.2.2 Site Access and Security

The proposed development site borders on the D622 provincial road (also called the Halfgewonnen Road). A new access road from the D622 will have to be established (permission from the Provincial Roads Agency required), to gain access to the main administrative area of the Project west of the provincial road, and to the battery storage area east of the provincial road.

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

2.2.3 Provision of Services

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

2.2.3.1 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. Various alternatives are being explored for connection to the national grid.

2.2.3.2 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.

2.2.3.3 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 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.

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 convey the effluent on a weekly basis.

2.2.3.4 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.

2.2.3.5 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.

Stormwater generated by the Halfgewonnen Solar PV Facility will have a low runoff factor. The post-development flood risk will not increase significantly due to the fact that the existing ground surface will be left undisturbed. Solar panels will capture rain droplets but droplets will fall onto undisturbed in situ soil with the same characteristics as per the pre-development flood. Thus, stormwater runoff will be influenced mainly by the internal road network and mitigation measures will focus on limiting the effect that the internal road network will exert on the post-development flood risk.

Permanent structures associated with the Halfgewonnen Solar PV Facility, apart from the solar panels themselves, will only include a control room building. 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.

In order to mitigate all stormwater runoff from the Halfgewonnen Solar PV Facility, a berm must be constructed on site to intercept all stormwater. No subsequent development will be allowed within the imposed flood line.

The attenuation dam will be constructed on the site. The dam will have a cross sectional area of 3 540m² with an average depth of approximately 1.5m. Stormwater in the attenuation dam will gradually seep into the ground as well as evaporate into the atmosphere. Storms with intensities larger than 1:100-year flood events and storms with 1:100-year storm durations longer than 5 minutes will be diverted into an overflow system.

2.2.4 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 skill. During the construction period, the projects 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.

2.3 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 6. No Listed Waste Management Activities are proposed as part of the Project.

Table 6: 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	The proposed infrastructure will have a physical footprint exceeding 100m². A Freshwater Ecology and Surface Water Study

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.
	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; —	will be commissioned to confirm the presence / absence of watercourses on the site and the distance between the proposed infrastructure and watercourses (including wetlands). Available studies indicate that infrastructure will be in close proximity to wetland areas and that the powerline route will have to cross a non-perennial stream.
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, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs — (a) within an urban area; or (b) on existing infrastructure.	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.
4	The development and related operation of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.	Battery storage associated with the proposed Solar PV development will be associated with dangerous goods (**lithium** batteries). "**dangerous goods**" means goods containing any of the substances as contemplated in South African National Standard No. 10234, supplement 2008 1.00: designated "List of classification and labelling of chemicals in accordance with the Globally Harmonized Systems (GHS)" published by Standards South Africa, and where the presence of such goods, regardless of quantity, in a blend or mixture,

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.
		causes such blend or mixture to have one or more of the characteristics listed in the Hazard Statements in section 4.2.3, namely physical hazards, health hazards or environmental hazards.
15	The clearance of an area of 20 hectares or more of indigenous vegetation	The total proposed Solar PV Project will have a development footprint of approximately 120 Ha. A Biodiversity study will be commissioned as part of the EIA to determine the area of indigenous vegetation that may be affected (parts of the development site were previously under cultivation but parts contain seemingly natural 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 30 Ha of the proposed development footprint overlaps with a Critical Biodiversity Area (CBA) identified in terms of the Mpumalanga Biodiversity Sector Plan.
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	The proposed development footprint will exceed 10m² and portions of the proposed development site overlap with a Critical Biodiversity Area (CBA) identified in terms of the Mpumalanga Biodiversity Sector Plan.

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.
	systematic biodiversity plans adopted by the competent authority or in bioregional plans	

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 by GN R326, (EIA Regulations) GN R 327 (Listing Notice 1); GN R325 (Listing Notice 2) and GN R324 (Listing Notice 3) of 7 April 2017. 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 2.3 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 Photovoltaic 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 7. Application for a Water Use License (WUL) will likely be required.

Table 7: Legislated water uses

Section 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 not be required for the proposed project.
b	storing water.	This is applicable to the bulk storage of clean water and not relevant to the proposed project.
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	Waste will not be disposed of on site and this activity is not relevant to the proposed project.

Section 21	Description	Relevance to the proposed project
	detrimentally impact on a water resource.	
h	disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process.	The proposed project will not involve heating of water or the disposal of water heated through an 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 is 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 will be 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 Minerals 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 Solal PV 2 will be directly connected to the National Grid from the outset.

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 alternative 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 B). 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) may occur on the site, and a number of biodiversity specialist studies have been commissioned as part of the EIA Process. If there are protected species that must 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. A soil, land use and land capability assessment has been commissioned as part of the EIA process. Due to past disturbance of the site (from adjacent mining and agricultural activities), alien invasive species may be present and will be identified during the aforementioned ecological specialist studies. 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 has been commissioned 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) are included in the public participation process that is being undertaken as part of the EIA and will be provided with copies of the aforementioned Archaeological assessment of the site, once completed.

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 will be identified during the specialist avian, terrestrial- and aquatic biodiversity studies to be undertaken and appropriate management prescribed.

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. In areas such as eMalahleni, Steve Tshwete, Standerton and Secunda" (MPSDF, 2018). The proposed development site borders on the Steve Tshwete Local Municipality and is about 50km south of Middelburg (Plan 1).

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.

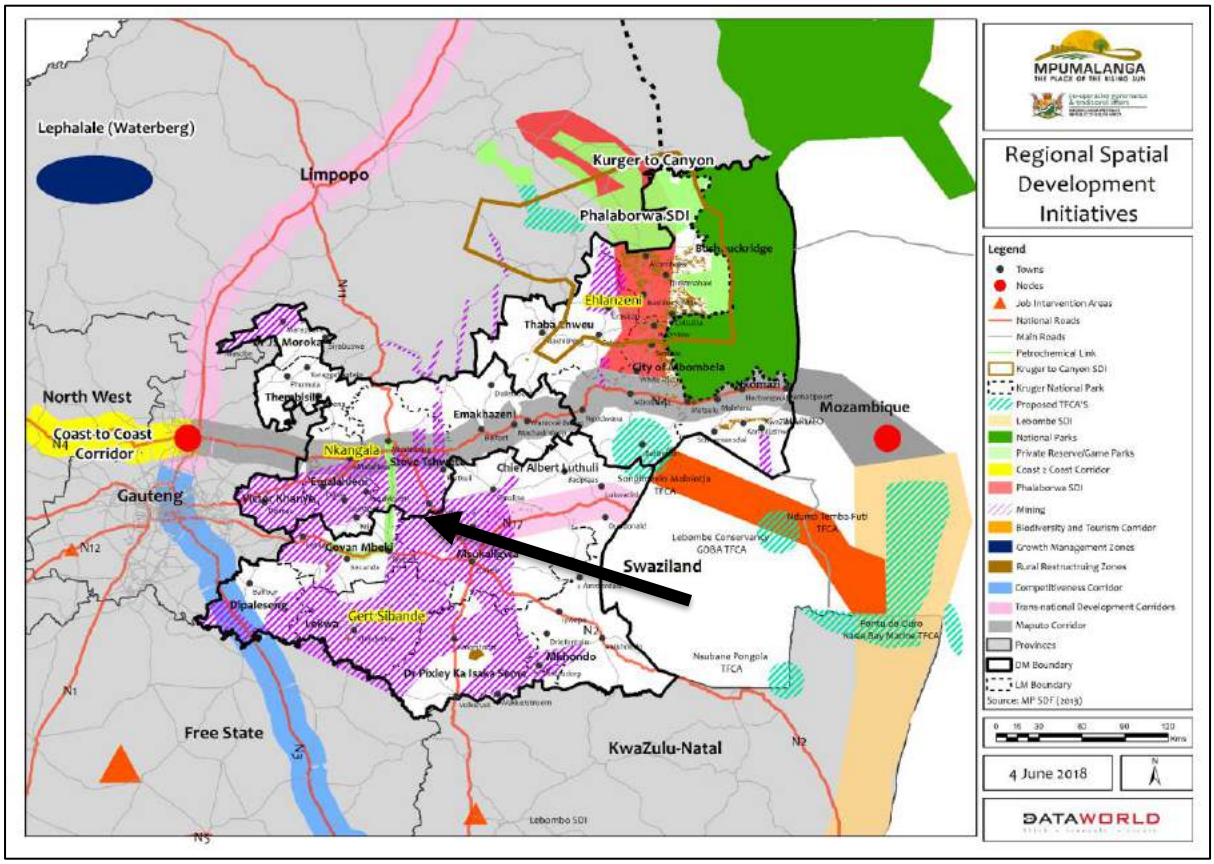


Figure 3: Mpumalanga SDF extract (Black arrow shows position of proposed development site)

3.6 Other relevant Legislation

In addition to the Laws and Guidelines discussed above, Table 8 summarises some of the other key legislation and guidelines relevant to this application:

Table 8: 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 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.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	HOW THIS DEVELOPMENT COMPLIES WITH THE LEGISLATION AND GUIDELINES
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 (See Appendix A for proof of consultation. If it is confirmed that there are land claims on the affected properties, the Claimants will be included in the I&AP database and the Project Proponent will consult with the land claimants throughout the project.
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 the environment. The proposed project in relation to the relevant SDF is discussed in section 3.4
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,

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	HOW THIS DEVELOPMENT COMPLIES WITH THE LEGISLATION AND GUIDELINES
	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 will include a decommissioning and rehabilitation plan for the site and a cost-estimation of the eventual decommissioning activities.
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 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

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	HOW THIS DEVELOPMENT COMPLIES WITH THE LEGISLATION AND GUIDELINES
	phase and battery storage will be incorporated into the EMP and 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 prima 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 commissioned as part of the EIA will further comment 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.

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 9.

Table 9: 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?	This will be determined in the EIA Process through the specialist biodiversity assessments, which will include an avian assessment, terrestrial ecology assessment and freshwater aquatic ecology assessment.
	How were the following ecological integrity considerations considered? • Threatened and sensitive ecosystems • Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) • Conservation targets	The state of ecosystems, biodiversity areas and conservation targets will be evaluated in the biodiversity assessments undertaken as part of the EIA Process. These will be assessed on a desktop-level first and verified on site. 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 30 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. 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, • 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.

Theme	Specific Questions	Answer related to this Application
		The project's direct association with the proposed generation of Solar PV energy (renewable energy) contributes to South Africa's international clean-energy commitments. Alignment with the Mpumalanga SDP is discussed in Section 3.4 of this report. 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 comprehensive impact assessment process has been commissioned. This question can't be comprehensively addressed at this early stage of the project. On a preliminary basis, it can be confirmed that large parts of the proposed development site were previously disturbed by agricultural and mining-related activity and likely do not represent pristine ecosystems. Detailed management and mitigation will be explored in the EIA Phase and incorporated into the EMP.
	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 and/or recycle or to safely treat and/or dispose of unavoidable waste?	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. Minimal office 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. Further details will be specified in the EIA/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	A heritage impact assessment has been commissioned as part of the EIA Process. Heritage resources that have been identified can and will be completely avoided by the proposed development footprints.

Theme	Specific Questions	Answer related to this Application
	and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Management measures to ensure in-situ preservation of heritage resources will be identified as part of the study and included in the Environmental Management Plan as part of the EIA.
	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?	Manufacture 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 proposed location, type and scale of development promote a reduced dependency on resources?	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 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	The power generation sector in South Africa presently and historically is largely focussed 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

Theme	Specific Questions	Answer related to this Application
	important priorities for which the resources should be used?	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 8.1. 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 10 of this report.
	How will the ecological impacts of this development impact on people's environmental rights?	This will be addressed in the impact assessment. On a preliminary basis, 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 health and safety is not threatened by this project.
	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 7.9 (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 socio-economic sustainability of the project will be assessed in the EIA-Phase. At this early stage of the project, it can be confirmed that 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 for the proposed Solar PV Project will be sourced and that transport opportunities will be integrated to existing transportation networks.

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	The proposed Solar PV Development compliments other land uses in the area in that is 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 projects. 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 will be evaluated in the specialist heritage impact assessment that has been commissioned as part of the EIA.

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. 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 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 be undertaken to ensure the opportunity for all potential I&APs to participate in meetings and the EIA process. PPP documentation will be made available in English and isiZulu. The reports themselves will be compiled in English. Public meetings (open days / discussion forums) will be presented in English and will also involve a translator to isiZulu. Documents for public review will be 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 I&AP process is still in the very beginning stages and the interests, needs and values of all I&APs will be expanded on as the application process progresses. At this early stage of the application process, it can be stated that 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 taken to ensure that the right of workers to	An environmental awareness training program will be developed as part of the EIA phase.

Theme	Specific Questions	Answer related to this Application
	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 40 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 • that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	The Scoping report contains a comprehensive discussion of the relevant legislative framework, looking at national, provincial and local legislation. Various government departments at different levels will also be 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
	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. A closure and rehabilitation plan will be compiled in the EIA phase.
	Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	Mitigation measures will be defined and refined in the EIA process, proportionate to the significance of the impacts that are anticipated. Mitigation measures will be specific (to minimise the likelihood or severity of the anticipated impact), practical (implementable) and auditable. Long-term environmental legacy and management options will be identified and assessed in the EIA phase, and 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 will be addressed in the rehabilitation and closure plan, which will be compiled as part of the EIA process. The EMP that will be compiled as part of the EIA will aim to identify measures to avoid pollution and environmental degradation wherever possible. Where it is not possible to avoid environmental degradation measures will be 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 alternative 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 identify and 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 plant with an installed capacity of 300MW and land requirement of 210Ha.

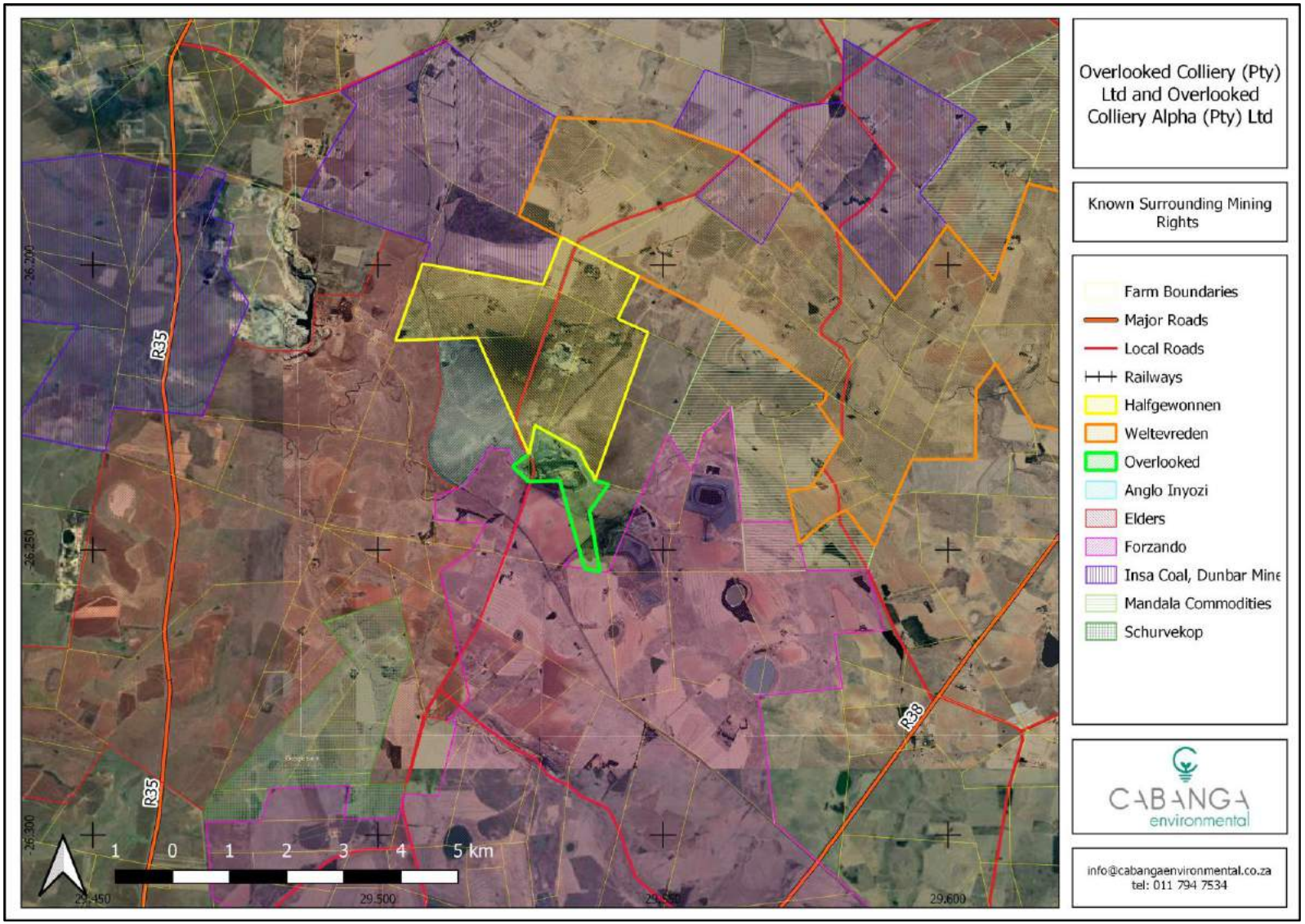
In the interest of sustainable and environmentally responsive development, the Applicant requested Cabanga Environmental to identify (on a desktop level) suitable sites for the proposed developments that:

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

The following properties were considered in the site selection process (Table 10). These properties as well as the surrounding Mining Rights and farm portions are shown in Plan 5.

Table 10: Summary of Properties

Farm	Portion	Surface Rights Owner	Mineral Rights	Total Size (Ha)
Halfgewonnen 190 IS	7	Overlooked Colliery Alpha (Pty) Ltd	Halfgewonnen Colliery	138.58
	8			284.79
	9			303.08
	10			284.29
	16			5.2
	2	Overlooked Colliery (Pty) Ltd	None (permit applications by Overlooked and Soft Wink; potential future mining)	370
	17		Overlooked Colliery	7.49
	RE			71.3
	5			73.2



Plan 5: Regional Location, showing surrounding mining rights and relevant surface rights

In evaluating the feasibility of land for development of the energy projects, the following primary considerations were relevant:

- **Ownership**: Only farm portions owned by Overlooked or Overlooked Alpha were considered, thus the Farm Halfgewonnen 190 IS Portions 0 (RE), 2, 5, 7 – 10, 16 and 17 were assessed for suitably for the energy projects' development;
- **Availability**: Land that is presently affected by mine pits or infrastructure (processing plants, waste or water management facilities, etc.) were excluded from the site selection;
- **Size**: The development area must be of sufficient size to accommodate the planned energy output, for any of the projects to be feasible;
- **Access**: Access for construction vehicles and equipment, operational and maintenance requirements must be planned for;
- Existing **power** reticulation: The energy projects must be able to tie in with existing electricity infrastructure. Preference is given to sites less than 1km from existing substations, while sites over 2.5km from existing sub-stations are not preferred;
- **Geotechnical** stability: Previously mined areas may have geotechnical stability issues if infrastructure is to be constructed over backfilled pits or undermined;
- **Slope**: The development area must be relatively flat to enable the effective construction of the Energy Projects;
- **Heritage** Sites, **Wetlands** and **Biodiversity** Considerations: areas where known heritage resources, wetlands or sensitive ecological systems are known to occur should preferably be avoided; and
- **Dust**: Areas associated with coal handling and/or bare areas may be associated with significant dust generation that could negatively affect the operation of Photovoltaic (PV) installations. The predominant wind direction in the area is from the north-east to the south-west. PV Projects should preferably be sited north-east of the coal handling areas.

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 Site Selection Report has been included as Appendix C hereto.

5.4 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 30 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.

5.5 Design and/or layout

The aforementioned site selection process also informed, to some degree, the proposed 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.

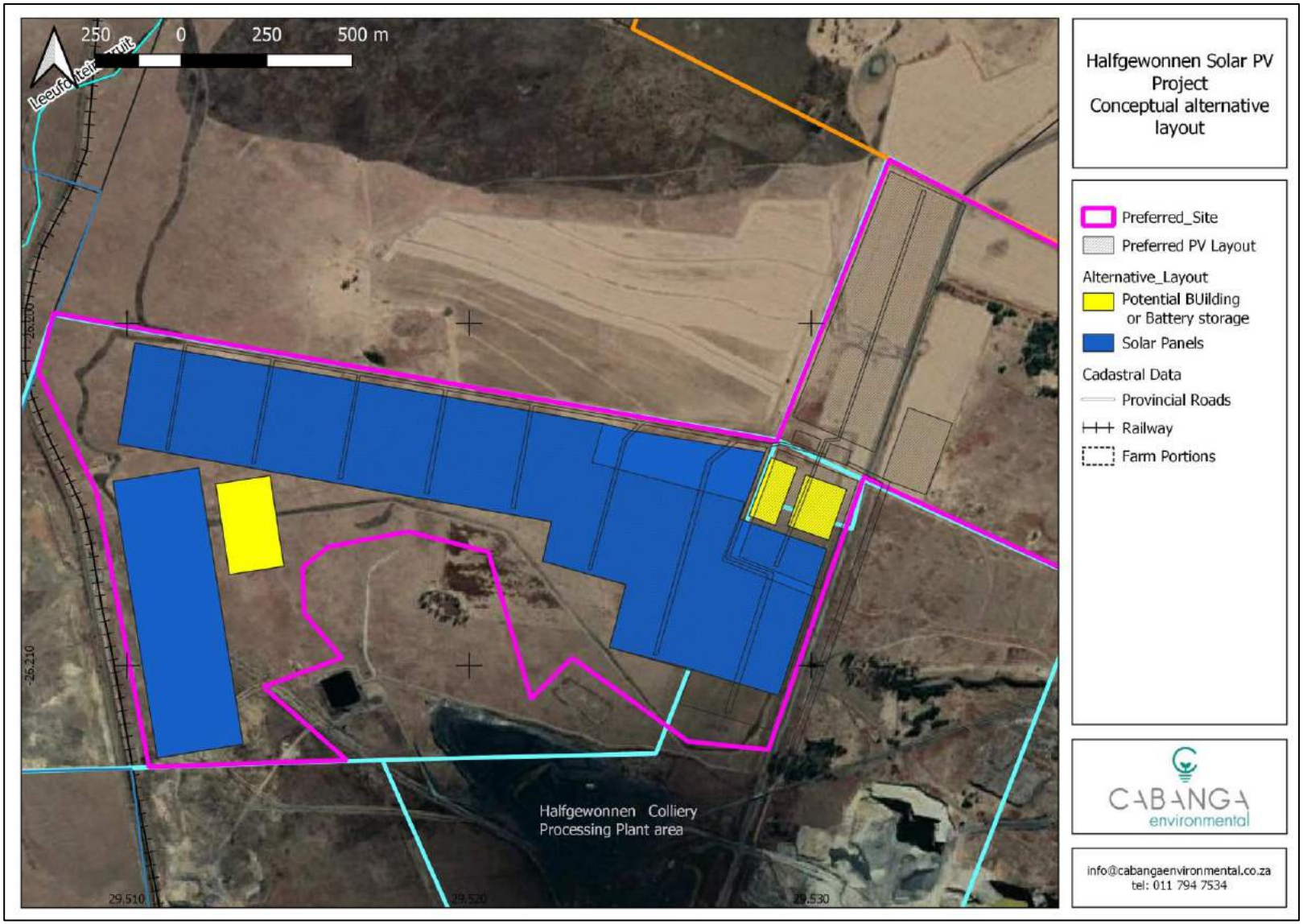
The site selection process identified an area of approximately 342 Ha that could host the proposed Solar PV development and associated supporting facilities (battery storage, offices etc.), the proposed layout of the facility only comprises approximately 135 Ha of the identified site. The proposed layout presented in this report may be adjusted based on site-specific sensitivities that may be identified during the specialist assessments and EIA Phase.

A conceptual alternative is shown in Plan 6. This alternative avoids the ongoing agricultural activities occurring in the west of Portion 7 of the Farm Halfgewonnen, but is not feasible due to geotechnical considerations due the fact that the south-western portion of the proposed development site was previously mined and backfilled. This alternative also places additional solar panels in closer proximity to the Halfgewonnen Colliery's processing plant, and the Richards Bay railway line, which could impact negatively on the operation of the solar panels due to dust.

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.

The sub-stations that were considered are shown on Plan 3.



Plan 6: Conceptual layout alternative (not preferred due to past mining in western section)

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 ream, 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.

5.7 Operational and Scheduling Alternatives

These 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 currently limited to those associated with the processing/beneficiation of coal. There are numerous other operational coal mines in the direct vicinity that are undertaking 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. The limited agricultural activities in the north of the Mining Rights Area will therefore be able to continue unhindered. The majority of the site is not being used productively. Any ecological impacts potentially associated with the proposed Solar PV Development will not be realized.

However, any positive benefits of the project will also 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, 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 proposed to make to the National Power Grid is expected to alleviate at least some of the pressure presently experienced by the power utility.

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 A to this report. 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 A):

- 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 present 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.

6.1 Public Participation Process to be undertaken

The PPP will comprise the following phases / steps:

1. Make the Scoping Report (this report) available in digital and hard copy to I&APs for review and comment for a minimum of 30 days.
2. Update the Scoping report with comments received and submit the updated report, including the plan of study for EIA, to the DEFF for consideration.
3. Once the DEFF approves the Scoping Report (including the plan of study for EIA), compile the EIA Report and similarly make the report available to I&APs for review and comment for a minimum of 30 days.
4. During the comment period, host an EIA-phase public meeting to present the findings of the specialist assessments and EIA to I&APs, and gather their comments. Incorporate I&AP comments into a final EIA report and EMP for submission to DEFF.
5. Once the DEFF 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.

Please refer to Appendix A for additional details and proof of the public participation undertaken to date.

7 Existing Site Attributes

A number of specialist assessments have been commissioned to form part of the EIA Process, as discussed in more detail in Section 9.1. This section of the report will therefore be expanded as the project progresses with information from the specialist assessments.

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 sites 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 site including, in some cases, the larger municipal area;
- The Halfgewonnen Parent Farm and immediately surrounding properties; and
- Site-specific – the site proposed for the development of the Solar PV Project.

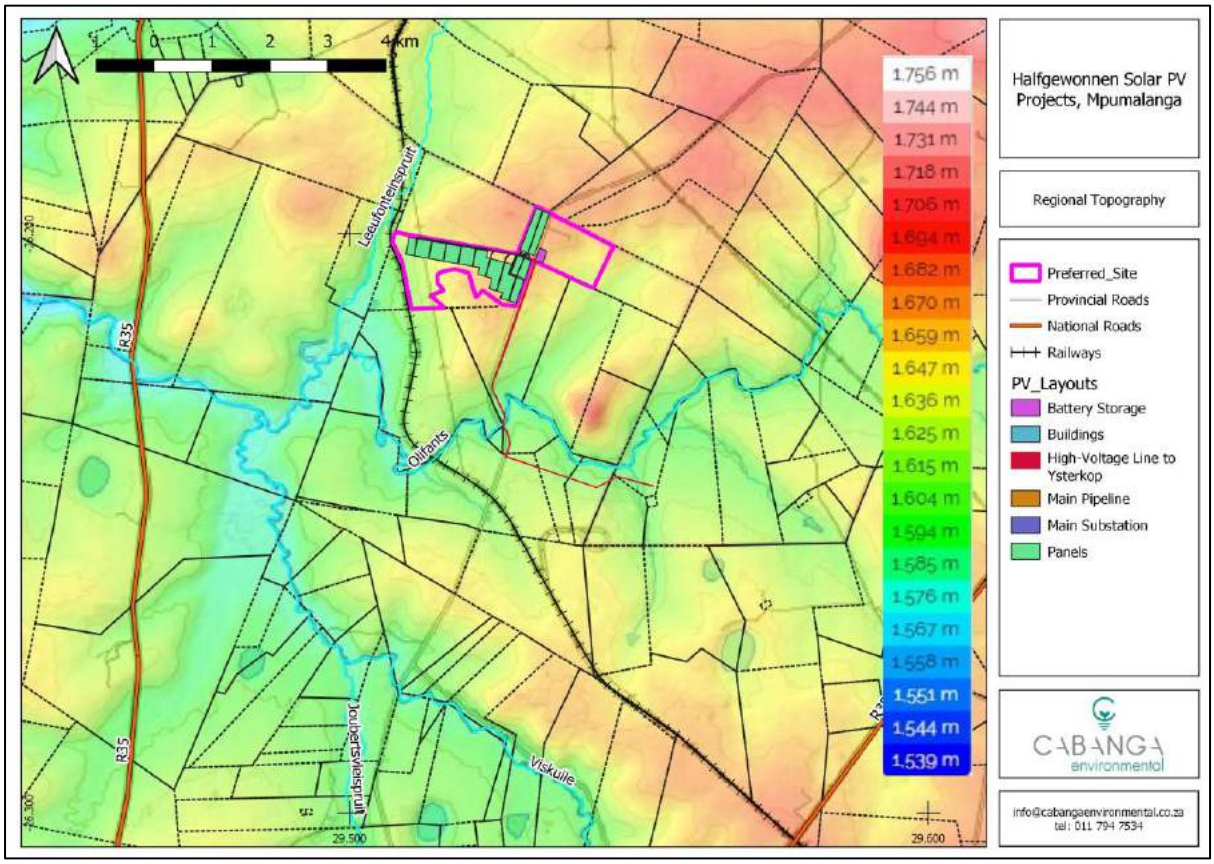
7.1 Geology, physiography and topography

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 7 illustrates the regional topography.

Figure 4: Regional Geology (Geotheta, February 2021)



Plan 7: 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.

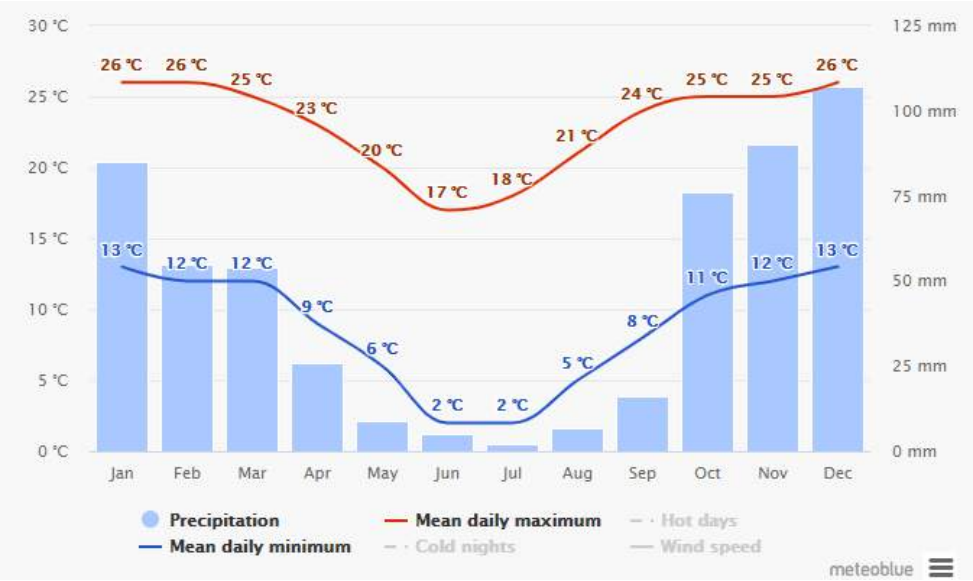


Figure 5: Modelled Climate data for the project area

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).

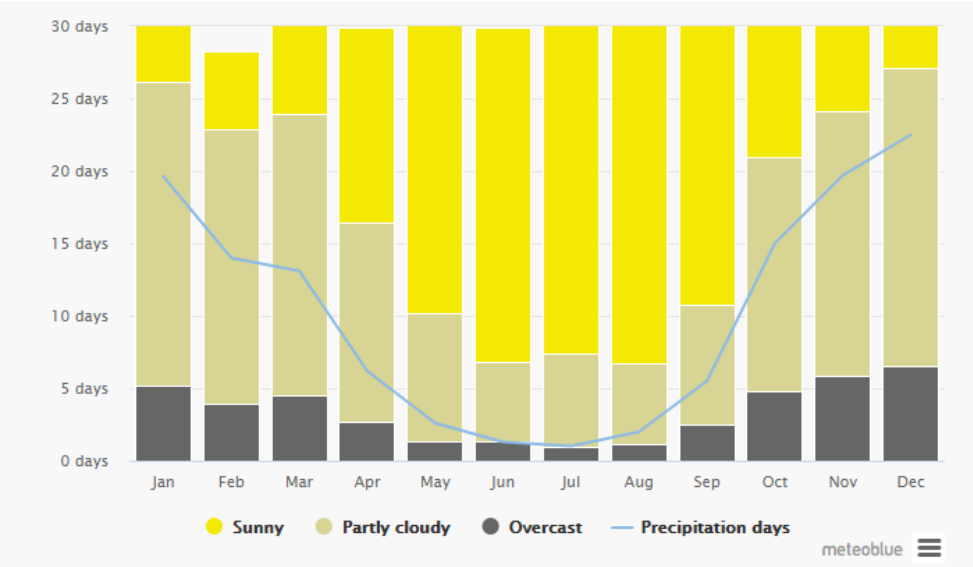


Figure 6: Sunny, cloudy and precipitation days

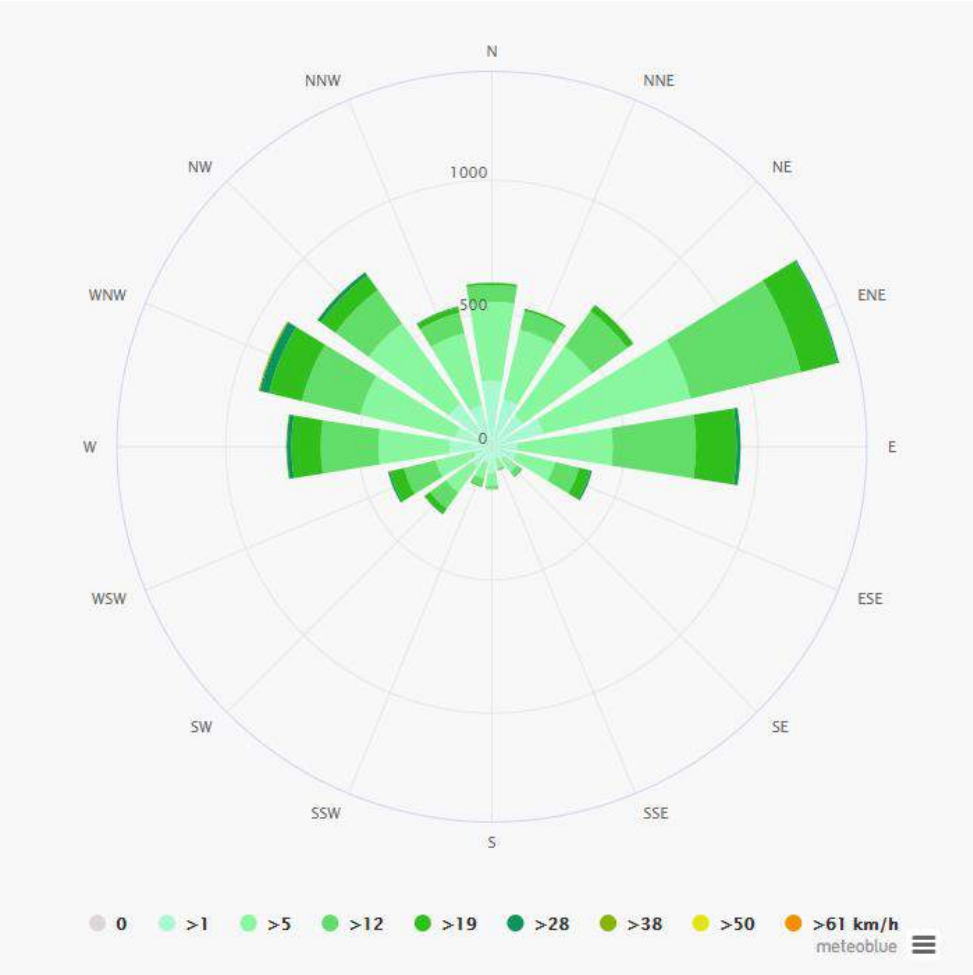


Figure 7: Wind Rose

7.3 Soils, land use and land capability

The major soil types encountered within the Halfgewonnen parent farm include those of the orthic phase Hutton, Clovelly, Glenrosa and Mispah forms along with the hydromorphic forms, including the Pinedene, Glencoe, Avalon and Westleigh forms. The results indicated light to moderate textured soils with a pH (KCl) of between 4.26 and 5.26, a base status ranging from 1.5me% to 7.8me% (dystrophic status), and nutrient levels reflecting acceptable levels of Calcium, Magnesium and Potassium, but slight deficiencies in the reserves of Sodium, with acceptable levels of Phosphorous, and the major metals (Zinc and Aluminium), (Cabanga Concepts, 2012)

The typical soil strata of the far eastern side of the site comprises topsoil underlain by soft to stiff sandy clay (transported material) overlying soft to stiff sandy clay (residual material).

The typical soil strata of the western side of the site comprises topsoil underlain by medium dense to dense silty sand (transported material) overlying medium dense to very dense silty sand and clayey sand (residual material) and soft rock sandstone.

Hardpan ferricrete was encountered in two of the tests pits as part of the geotechnical investigation (Geotheta, February 2021).

A Soil assessment has been commissioned and soils specifically encountered on the proposed project site will be described once the specialist study is available in the EIA phase.

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.

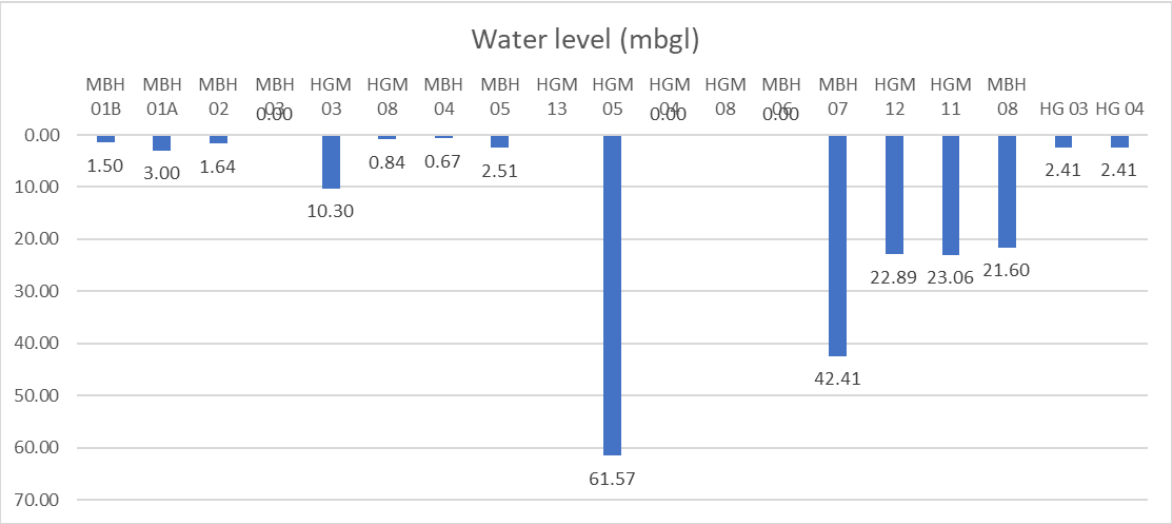


Figure 8: Groundwater levels

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.

Available surface water quality data indicates that historic and ongoing coal mining activity in the region may be contributing to deterioration of surface water quality.

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 surface water impact assessment has been commissioned as part of the EIA.

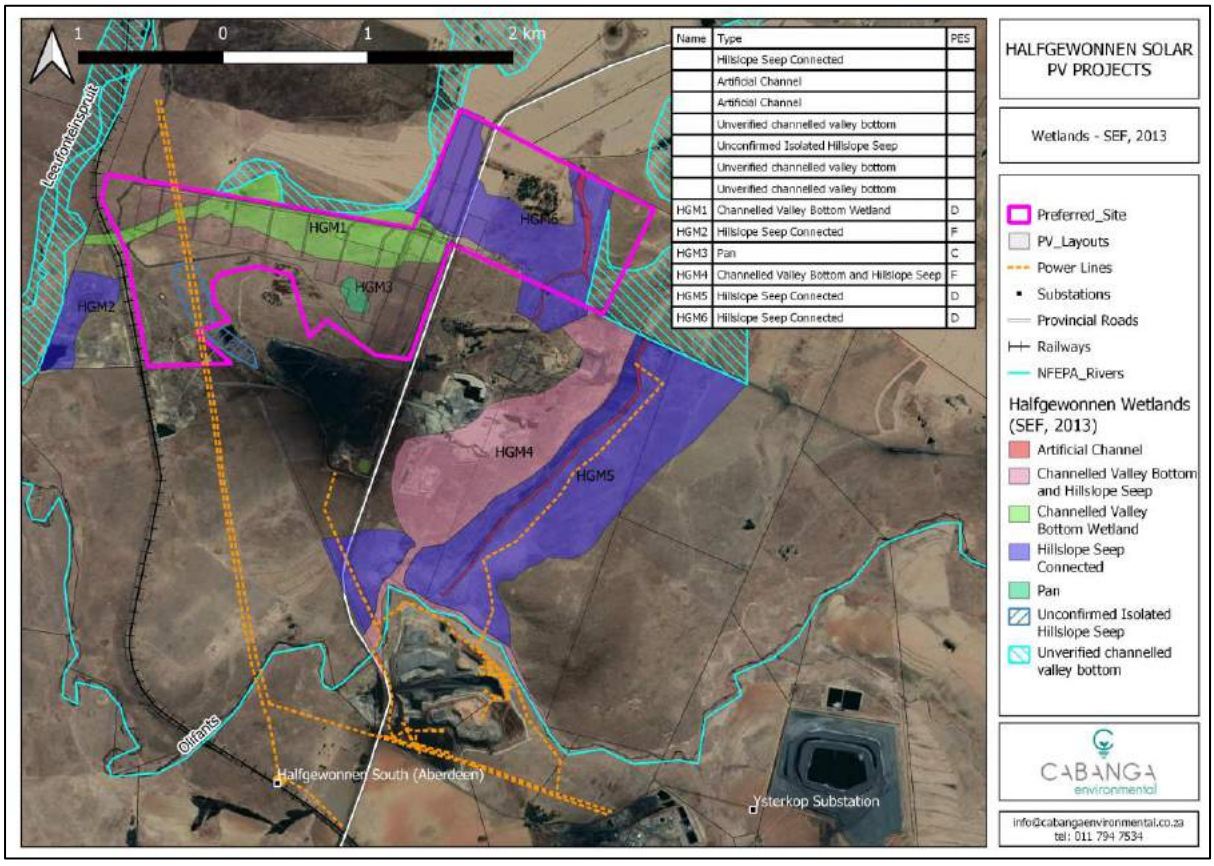
7.6 Wetlands

A freshwater ecological assessment (including wetland delineation and assessment) has been commissioned as part of the EIA.

Available studies previously undertaken in the area identified three types of hydrogeomorphic units (HGM) (SEF, May 2013), including valley bottom wetlands with a channel, hillslope seepage wetlands which feed a watercourse, and pan / depression wetlands (Plan 8).

Most of the wetlands had already been impacted by farming, mining and related activities. Present Ecological State (PES) categories varied from C (moderately modified) to F (critically modified). Environmental Importance and Sensitivity (EIS) scores ranged from Moderate to Very Low.

The majority of the HGM units were assigned a low EIS of the wetlands. This is as a result of the wetlands being largely to seriously modified owing to past and current land uses, including mining operations and agricultural activities (SEF, May 2013).



Plan 8: Wetland Delineation for Halfgewonnen Colliery (SEF, 2013)

7.7 Air Quality

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

7.8 Biological Environment

The proposed development site 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 conservation status of the vegetation unit is "endangered" with only a very small fraction conserved in statutory and private reserves and some 44% of the original extent already transformed by cultivation, mining, plantations, urbanisation and the building of dams. No serious alien invasions are reported, but *Acacia mearnsii* can become dominant in disturbed sites. Erosion is very low (Mucina & Rutherford, 2006).

Given the existing and past disturbance to previously occurring natural ecosystems by agriculture and mining activity, it is expected that most wildlife would have migrated to other areas. Feral domestic cats have been seen around the Halfgewonnen and Overlooked Mines' office areas. Cattle grazing is fairly common.

The Mpumalanga Province boasts diverse bird-life; the Mpumalanga Biodiversity Sector Plan (MTPA, 2014) recorded 49 bird species of conservation concern (SCC).

A terrestrial biodiversity study has been commissioned as part of the EIA. Additionally, an avifauna specialist assessment has been initiated. Please see Section 9 for the terms of reference for these studies.

7.9 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).

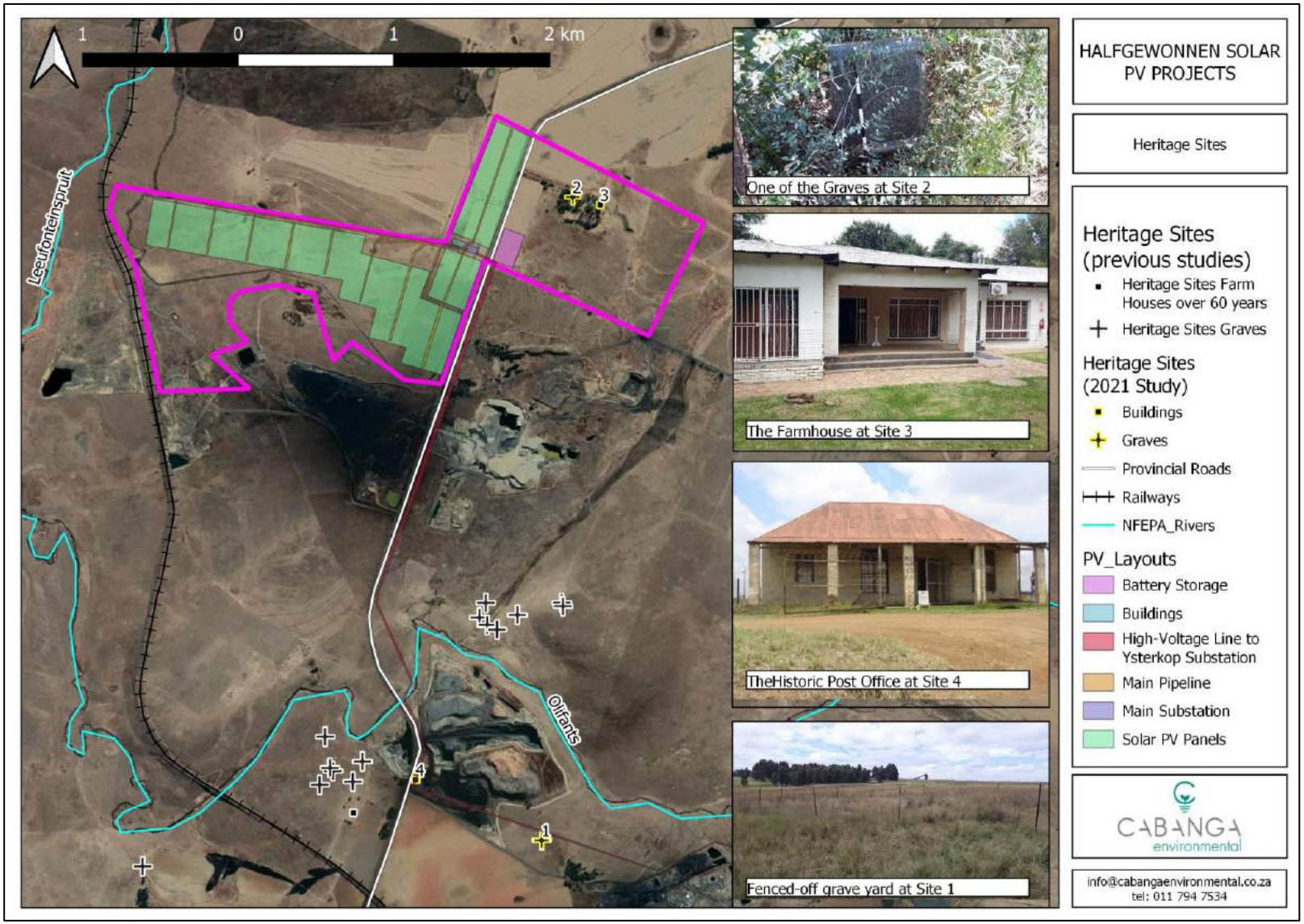
Govan Mbeki experienced growth rate of 3.3% per annum (p.a.) which is equal to the national growth rate, and higher than the provincial growth of 2.8% p.a. and the district growth rate of 2.7%.

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).

7.10 Heritage and Archaeology

A Phase 1 Archaeological Impact Assessment has been commissioned as part of the EIA phase of the application. Preliminary site surveys 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 9.



Plan 9: Heritage Sites in the vicinity of the Project

8 Impact Identification, assessment methodology and management strategy

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.

A detailed impact assessment will be undertaken as part of the EIA phase. This section of the report serves to identify preliminary anticipated impacts and their anticipated significance.

8.1 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 throughout the project.

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

Table 11: 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 12: 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 of vegetation removal.

Scale is rated according to the following criteria:

Table 13: 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 14: Matrix used to rate Intensity

Intensity	2	Not significant	**Magnitude**	Slight: Little effect, negligible disturbance / benefit	1
				Slight to Moderate: Effects are observable but natural process continue	2
	3	Slight		Moderate: ecosystem processes / social dynamics are permanently altered, but functioning.	3
	4	Slight - Moderate		Moderate - High: natural / social processes are altered to the point where function is limited	4
	5	Moderate		High: The aspect is affected so that its functioning is compromised and this effect is irreversible	5
	6	Moderate - High	**Sensitivity**	Not sensitive: The aspect is not sensitive to change (No irreplaceable loss of resource)	1
	7	High		Somewhat sensitive: The affected aspect is of not of significant value but is sensitive to change	2
	8	Very High		Sensitive: The affected aspect is of moderate value and is slightly resilient to change	3
	9	Extremely High		Very Sensitive: The affected aspect is of significant value and only slightly resilient to change	4
	10	Fatal Flaw		Irreplaceable: The affected aspect is valued and sensitive to change. Irreplaceable loss of significant resource	5

Therefore, considering the formula:

Significance = Consequence x Likelihood

Where ***Consequence = Duration + Scale + Intensity***

And ***Intensity = 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;
- >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 locating the proposed project on land previously disturbed by mining and agriculture, as opposed to locating the facility on pristine, undisturbed land, by ensuring operational controls like the re-use of water where feasible, by incorporating best-practice design principles 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.

8.2 Preliminary Impact Identification, assessment and Mitigation

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

Table 15: 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

Phase	Activities	Potential Impacts
	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
	Construction activities, vehicle movement and machinery operation	Increased noise and dust from activities on site
	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

Phase	Activities	Potential Impacts
		Safety Impacts to employees and visitors to the site.
	Maintenance of the Solar PV Facility and supporting infrastructure	Water use; potentially polluted water 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

Each of the activities associated with the proposed project aspects may be associated with various impacts to environmental aspects. Table 16 summarises the ways in which the proposed project could impact on various environmental aspects. Each impact was then rated on a preliminary basis according to the criteria discussed in Section 8.1.

Table 16: Impact Assessment and Mitigation

Activity	Description of potential impacts	Discussion of impact, and Mitigation	Rating	Probability		Sensitivity of the Aspect		Severity of the Impact		Duration		Scale / Extent		Significance	
Vegetation Clearance	Loss of sensitive plant species	The presence of protected or sensitive species on site will be verified by the specialist study in the EIA phase. At this stage it is considered unlikely that the site will contain unique or sensitive species. If such species are present, they must either be avoided and conserved in-situ or transplanted to nearby similar habitats that will not be affected by the proposed development, and preserved. This mitigation will reduce the probability that sensitive species will be affected, and reduce impact severity and duration by ensuring the re-establishment of potentially affected species.	Before Mitigation	3	Probable	2	Somewhat sensitive	4	Moderate to High	4	Long Term	1	Isolated	33	Low
			After Mitigation	2	Possible	2	Somewhat sensitive	2	Slight to Moderate	2	Short to Medium Term	1	Isolated	14	Insignificant
	Loss of viable ecosystems	Areas of the site are regarded as CBAs and will be affected though the sensitivity of affected systems is considered lower. Given the size of the affected CBA and the limited area to be affected by the proposed project: only 26 Ha of the 168 Ha CBA will be affected. The site must be clearly demarcated and disturbance outside of the required footprint prevented, reducing impact severity. Rehabilitation of areas between the directly affected footprints will also reduce impact duration.	Before Mitigation	4	Highly Probable	2	Somewhat sensitive	3	Moderate	4	Long Term	1	Isolated	40	Moderate
			After Mitigation	4	Highly Probable	2	Somewhat sensitive	2	Slight to Moderate	2	Short to Medium Term	1	Isolated	28	Low
	Fragmentation of ecosystems	Considering the project footprint to be closely associated with existing mining activities in the area, the development is unlikely to exacerbate fragmentation of habitats and ecosystems. The development footprint must not be allowed to expand beyond approved areas.	Before Mitigation	1	Unlikely	2	Somewhat sensitive	3	Moderate	4	Long Term	3	Local	12	Insignificant
			After Mitigation	1	Unlikely	2	Somewhat sensitive	3	Moderate	4	Long Term	2	Site	11	Insignificant
	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 potential wetlands, the Leeuwfontein Spruit and Olifants River. Erosion prevention measures are relatively easy to implement and must be planned to reduce the likelihood of the impact occurring.	Before Mitigation	4	Highly Probable	3	Sensitive	3	Moderate	3	Medium Term	3	Local	48	Moderate
			After Mitigation	1	Unlikely	3	Sensitive	3	Moderate	3	Medium Term	3	Local	12	Insignificant

Activity	Description of potential impacts	Discussion of impact, and Mitigation	Rating	Probability		Sensitivity of the Aspect		Severity of the Impact		Duration		Scale / Extent		Significance	
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 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.	Before Mitigation	2	Possible	3	Sensitive	4	Moderate to High	4	Long Term	3	Local	28	Low
			After Mitigation	1	Unlikely	3	Sensitive	4	Moderate to High	4	Long Term	1	Isolated	12	Insignificant
	Loss of land with agricultural potential	The specialist study during the EIA phase will confirm the actual agricultural potential of the proposed development site. Only 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	5	Definite	1	Not sensitive	4	Moderate to High	4	Long Term	1	Isolated	50	Moderate
			After Mitigation	5	Definite	1	Not sensitive	4	Moderate to High	4	Long Term	1	Isolated	50	Moderate
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 temporary stormwater measures are assumed.	Before Mitigation	4	Highly Probable	2	Somewhat sensitive	2	Slight to Moderate	3	Medium Term	1	Isolated	32	Low
			After Mitigation	4	Highly Probable	2	Somewhat sensitive	2	Slight to Moderate	3	Medium Term	1	Isolated	32	Low
	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 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 with danger tape or similar visible warnings. As few as possible excavations should be open at any given time.	Before Mitigation	2	Possible	3	Sensitive	5	High	4	Long Term	1	Isolated	26	Low
			After Mitigation	2	Possible	3	Sensitive	4	Moderate to High	3	Medium Term	1	Isolated	22	Low
Construction of stormwater		Excavations and retention of potentially polluted stormwater on the development site	Before Mitigation	4	Highly Probable	3	Sensitive	2	Slight to Moderate	4	Long Term	3	Local	48	Moderate

Activity	Description of potential impacts	Discussion of impact, and Mitigation	Rating	Probability		Sensitivity of the Aspect		Severity of the Impact		Duration		Scale / Extent		Significance	
management controls	Reduced / altered surface water runoff to remaining catchments	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.	After Mitigation	4	Highly Probable	3	Sensitive	1	Slight	4	Long Term	1	Isolated	36	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 for re-use or treated and tested before being allowed to run off to surrounding environments (if water quality is acceptable).	Before Mitigation	4	Highly Probable	3	Sensitive	4	Moderate to High	4	Long Term	3	Local	56	Moderate
			After Mitigation	2	Possible	3	Sensitive	4	Moderate to High	3	Medium Term	1	Isolated	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 how to use them, and what procedures to follow in the event of accidental spills of various types of potential pollutants.	Before Mitigation	4	Highly Probable	3	Sensitive	4	Moderate to High	1	Short Term	1	Isolated	36	Low
			After Mitigation	2	Possible	3	Sensitive	3	Moderate	1	Short Term	1	Isolated	16	Insignificant
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	4	Highly Probable	4	Very sensitive	1	Slight	1	Short Term	3	Local	36	Low
			After Mitigation	4	Highly Probable	4	Very sensitive	1	Slight	1	Short Term	3	Local	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. Preference will be given to employ local persons where possible. Employees will undergo environmental awareness training which must include a prohibition on littering, poaching and trespassing. Access to the construction site will be strictly controlled. If informal settlements are noted, the developer and land owner must	Before Mitigation	3	Probable	4	Very sensitive	4	Moderate to High	5	Permanent	3	Local	48	Moderate
			After Mitigation	2	Possible	4	Very sensitive	4	Moderate to High	1	Short Term	2	Site	22	Low

Activity	Description of potential impacts	Discussion of impact, and Mitigation	Rating	Probability		Sensitivity of the Aspect		Severity of the Impact		Duration		Scale / Extent		Significance	
		liaise with the police to prevent the establishment of informal settlements.													
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. Furthermore, dust suppression will be undertaken via watering cart on all dust-generating areas on the proposed development site. The appointed construction contractor should commit to this stipulation. Construction activities must be restricted to day-time.	Before Mitigation	3	Probable	3	Sensitive	3	Moderate	1	Short Term	3	Local	30	Low
			After Mitigation	2	Possible	3	Sensitive	2	Slight to Moderate	1	Short Term	3	Local	18	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. The specialist visual impact assessment during the EIA Phase will provide further detailed assessment of this aspect.	Before Mitigation	4	Highly Probable	1	Not sensitive	2	Slight to Moderate	1	Short Term	3	Local	28	Low
			After Mitigation	4	Highly Probable	1	Not sensitive	2	Slight to Moderate	1	Short Term	2	Site	24	Low
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 contractor and could thus possibly be re-deployed to continue employment on another construction project. Expectations of employees must be managed professionally.	Before Mitigation	4	Highly Probable	4	Very sensitive	1	Slight	1	Short Term	3	Local	36	Low
			After Mitigation	4	Highly Probable	4	Very sensitive	1	Slight	1	Short Term	3	Local	36	Low
Establishment of the battery storage facility	Potential impacts associated with the storage of hazardous substances	Battery storage facility will be assembled (at least in part) on site and it must be guaranteed by the supplier / installer that the necessary safety precautions and pollution (leak) prevention measures are implemented.	Before Mitigation	3	Probable	3	Sensitive	4	Moderate to High	4	Long Term	3	Local	42	Moderate
			After Mitigation	1	Unlikely	3	Sensitive	4	Moderate to High	4	Long Term	1	Isolated	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	Before Mitigation	4	Highly Probable	3	Sensitive	4	Moderate to High	4	Long Term	3	Local	56	Moderate
			After Mitigation	2	Possible	3	Sensitive	4	Moderate to High	2	Short to Medium Term	1	Isolated	20	Low

Activity	Description of potential impacts	Discussion of impact, and Mitigation	Rating	Probability		Sensitivity of the Aspect		Severity of the Impact		Duration		Scale / Extent		Significance	
		that may have established, and advise the developer and land owner of appropriate measures to eradicate such species.													
Presence of the Solar PV Facility and supporting infrastructure	Visual impact of the Solar PV Facilities and powerline	The exact nature and significance of this impact will be assessed by the specialist in the EIA phase. It is expected that a visual impact will occur but that this will not be severe given the existing visual impacts of the mining operations in the area, reducing the sensitivity of the visual resource.	Before Mitigation	4	Highly Probable	1	Not sensitive	3	Moderate	5	Permanent	3	Local	48	Moderate
			After Mitigation	4	Highly Probable	1	Not sensitive	1	Slight	5	Permanent	3	Local	40	Moderate
	Potential impacts to avifauna	The exact nature and significance of this impact will be assessed by the specialist in the EIA phase. In line with the precautionary principle, the impact is expected to be high and additional mitigation must be identified by the specialist in the EIA Phase.	Before Mitigation	4	Highly Probable	4	Very sensitive	4	Moderate to High	4	Long Term	3	Local	60	High
			After Mitigation	4	Highly Probable	4	Very sensitive	4	Moderate to High	4	Long Term	3	Local	60	High
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 in the EIA phase. 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	4	Highly Probable	3	Sensitive	4	Moderate to High	4	Long Term	3	Local	56	Moderate
			After Mitigation	2	Possible	3	Sensitive	2	Slight to Moderate	4	Long Term	1	Isolated	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	4	Highly Probable	4	Very sensitive	4	Moderate to High	2	Short to Medium Term	2	Site	48	Moderate
			After Mitigation	2	Possible	4	Very sensitive	2	Slight to Moderate	1	Short Term	1	Isolated	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	3	Probable	4	Very sensitive	4	Moderate to High	1	Short Term	3	Local	36	Low
			After Mitigation	1	Unlikely	4	Very sensitive	2	Slight to Moderate	1	Short Term	1	Isolated	8	Insignificant
Re-vegetation of the site		Post-demolition, the site must be rehabilitated (compacted areas ripped, topsoil re-instated	Before Mitigation	4	Highly Probable	4	Very sensitive	3	Moderate	4	Long Term	3	Local	56	Moderate

Activity	Description of potential impacts	Discussion of impact, and Mitigation	Rating	Probability		Sensitivity of the Aspect		Severity of the Impact		Duration		Scale / Extent		Significance	
	Potential for establishment of alien invasive species	and the 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 will be compiled as part of the EIA.	After Mitigation	3	Probable	4	Very sensitive	3	Moderate	2	Short to Medium Term	1	Isolated	30	Low

9 Plan of Study for Environmental Impact Assessment

The purpose of this section of the Scoping Report is to map a way forward to ensure that the EIA study will be undertaken in a manner that will include all relevant aspects of the proposed project in the context of the project site. This plan of study is set out as per the required contents of the plan of study as contained in the EIA Regulations, 2014 (as amended), as follows:

(i) a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;
(ii) a description of the aspects to be assessed as part of the environmental impact assessment process;
(iii) aspects to be assessed by specialists;
(iv) a description of the proposed method of assessing the environmental aspects, including aspects to be assessed by specialists;
(v) a description of the proposed method of assessing duration and significance;
(vi) an indication of the stages at which the competent authority will be consulted;
(vii) particulars of the public participation process that will be conducted during the environmental impact assessment process; and
(viii) a description of the tasks that will be undertaken as part of the environmental impact assessment process;
(ix) identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

The alternatives identified in this Scoping Report will be included in the EIA investigations to further refine the feasible project options. Additional alternatives identified through the PPP will also be included where feasible and where these are not further investigated, reasons will be provided.

The aspects that will be assessed as part of the EIA Process will be the same aspects as identified in Section 8 of this Scoping Report. If additional aspects are identified through the PPP and/or specialist assessments, these will be added to the assessment as necessary. These aspects will, in most instances, be assessed by specialists. The terms of reference for the specialist studies commissioned as part of the EIA Process are provided in Section 9.1.

The impact assessment methodology proposed in Section 8.1 will be used in the EIA phase to assess the significance of the identified impacts, though it is anticipated that a number of specialists will adopt alternative assessment methodologies specific to the relevant specialist field. Specialist studies will be attached to the EIA Report as appendices and the findings of the specialist impact assessments will be summarised in the EIA Report, according to the Impact Assessment Methodology described herein.

The future planned PPP, including authority consultation, is described in Section 6.1 of this report.

As the project description is further refined and the design developed, the activities associated with the project which could be associated with impacts (either positive or negative) on the receiving environment (physical, biological and socio-cultural) will be expanded. Each activity associated with the proposed project throughout its development phases (construction,

operation, decommissioning & closure) will be included in the assessment. In summary, the tasks that will be undertaken as part of the EIA process include:

1. Refine the project description to such an extent that the detail is sufficient to identify each project-related activity that could impact on the surrounding environment;
2. Describe the likely nature of the impacts (what aspect(s) of the environment are the activities likely to impact upon, is the impact positive or negative, is the impact avoidable or reversible, will the impact result in irreplaceable loss of resources etc.)
3. Define the significance of each impact, in the absence of management and mitigation measures, according to the Impact Assessment Methodology (Section 8.1).
4. Rank the impacts in order of significance and identify avoidance, management and/or mitigation measures for each that are appropriate to the impact significance.
5. Re-assess the impact significance taking the proposed management measures into account. Compile the management measures into a comprehensive EMP that must be implemented during the different project phases and against which compliance can be audited.
6. In addition to the management measures, formulate a monitoring and auditing plan for the proposed project to ensure the EIA/EMP is regularly updated and will remain valid and relevant throughout the project life-cycle, and that potential non-compliances can be addressed immediately.
7. Based on the impact significance, after mitigation measures have been applied, formulate a professional opinion on the benefits and risks of the project to assist the decision-making authorities in assessing the merit of the project and reaching a decision on the project.
8. All the preceding steps go hand-in-hand with public and authority consultation as well as specialist input.

9.1 Specialist studies to be undertaken in the EIA Phase, and the specialists' terms of reference

A number of specialist assessments have been commissioned as part of the EIA process. The terms of reference for each study are provided in the sections below. These may be updated/refined based on feedback received from the authorities and/or during the PPP.

Note: A Geotechnical Specialist Assessment has already been completed and is included in Appendix B to this Scoping Report.

9.1.1 Soil, land use and land capability assessment

Zimpande Research Collaborative has been commissioned to undertake the soil, land use and land capability assessment. The study will comprise of an initial desktop assessment, followed by in-field verification and will involve the following steps:

- Assess existing information, by undertaking a desktop assessment within the proposed project area using the digital satellite imagery and other suitable digital aids;
- Review historical as well as current land uses within the proposed project area; and

- Review and interpret existing soil maps and other relevant database(s) such as the Agricultural Geo-referenced Information Service (AGIS) to establish broad baseline conditions and areas of environmental sensitivity and sensitive agricultural areas.

Following the desktop study, a detailed soil classification survey will be conducted within the proposed project area. Subsurface soil observations will be made by means of a manual hand auger and dominant soil types will be classified, and soil boundaries established according to the South African Soil Classification System (Soil Classification Working Group, 2018).

Soil properties of survey points will be recorded using a Global Positioning System (GPS). Field assessment data will include a detailed description of physical soil properties including the following parameters:

- Terrain morphological units landscape position;
- Diagnostic soil horizons and their respective sequence;
- Texture, estimated as percentage clay according to the *in-situ* hand feel method;
- Depth of identified soil horizons;
- Soil classification according to the South African Soil Classification System;
- Depth to saturation (water table), if encountered; and

Uniform soil patterns will be grouped into map units, according to observed limitations. Thereafter the land use impacts of the proposed Solar PV Development on the receiving environment will be evaluated using the Zimpande Research Collaborative method. Zimpande will determine the agricultural potential of the identified soil forms and provide recommended mitigation measures to implement in order to manage the anticipated impacts and to comply with the applicable legislations.

The findings of the assessment will be presented in the form of an electronic report which will include:

- A soil type map, indicating the delineated soil types within study area;
- Photos of current environmental conditions on site and adjacent land uses;
- Integrated mitigation measures and recommended management practices to be implemented in order to reduce the significance of the identified impacts.

9.1.2 Terrestrial Biodiversity Assessment, and Avifaunal Assessment

The biodiversity assessment will similarly comprise of desktop research and field-work and will include:

- Floral Assessment (vegetation);
- Faunal Assessments (animals and available habitat)
- Avifaunal Assessment.

The ecological assessments will focus on the identification of sensitive habitat and the occurrence/ potential occurrence of Red Data Listed (RDL) species and species of concern as identified by the relevant provincial databases. The assessment will also fulfil the ecological assessment requirements of the EIA as required in terms of the NEMA and the associated regulations as well as other legal requirements applicable on both a national and provincial level.

The reports produced will also highlight key mitigatory and management measures in order to minimise impacts on both local and regional ecology. A site sensitivity map will be developed from the data gathered during the assessment.

The assessment will be conducted to best meet the requirements of the Mpumalanga province for ecological assessments and any other relevant regulations and other legal requirements applicable on both a national and provincial level such as the draft Minimum Requirements for Biodiversity (2016).

The Biodiversity Assessments will be undertaken by Scientific Terrestrial Services. Field work was completed in the summer season of 2021. Winter-season field work, specifically for the Avifauna study has been scheduled for the winter season on 2021.

9.1.3 Freshwater Ecological Assessment, including wetland delineation

Scientific Aquatic Services were commissioned to undertake a Freshwater Ecological Assessment of the proposed development site.

The scope of work will include an investigation of the watercourses within the study area, as well as the delineation of those watercourses within 500m thereof in fulfilment of Government Notice (GN)509 of 2016 as it relates to the NWA. The assessment will fulfil the ecological assessment requirements of both the EIA process as required in terms of the NEMA and the Water Use License Application (WULA) process in terms of the NWA.

A detailed desktop assessment will initially be undertaken in which all available background information will be reviewed. All relevant national and provincial databases, such as the National Biodiversity Assessment (NBA (2018), National Freshwater Ecosystem Priority Areas (NFEPA) database (2011) and the Biodiversity Geographic Information Systems (BGIS) website will be reviewed and searched as required, in order to further define the environmental sensitivities of the receiving environment.

As part of the desktop studies all watercourses will be mapped based on desktop delineation methods. The findings of the desktop studies will then be used to refine and focus the field work assessment.

A site visit will be undertaken at which time all watercourses associated with the study area will be assessed. Delineation of the watercourses within the study area and in a 500m radius thereof will be verified, according to "DWAF, 2008: A practical Guideline Procedure for the Identification and Delineation of Wetlands and Riparian Zones". Aspects such as soil morphological characteristics, vegetation types and wetness will be used to verify the delineation of the watercourse temporary zone according to the guidelines.

Applicable buffer zones and/or zones of regulation according to relevant legislation or provincial guidelines will then be delineated around the watercourses. The applicable buffer maps will be provided. The watercourse services provided by the resources within the study area will be assessed according to the method of Kotze *et al* (2009) in which services to the ecology of the site will be defined and services to the people of the area will be defined.

Based on the findings during the assessment, and based on the project plan and proposed layout plan as provided by the proponent, a detailed impact assessment on all identified significant risks will take place including cumulative impacts on watercourse assemblages in

the region. Recommendations on management and mitigation measures (including opportunities and constraints) with regards to the development/operation or decommissioning of the proposed development in order to improve manage and mitigate impacts on the freshwater ecology of the area will be provided. All results will be compiled into a specialist impact assessment report.

9.1.4 Visual Impact Assessment

The Visual Impact Assessment (VIA) will be conducted by Scientific Aquatic Services and will comprise three phases: As part of Phase 1, desktop information will be gathered to obtain background information on the project. As part of Phase 2, field assessments will be undertaken and assessment methods will be applied. Once site-specific issues have been identified an impact assessment will be undertaken according to a pre-defined impact assessment methodology. The VIA report will also highlight all management and mitigation measures deemed necessary in order to avoid and mitigate impacts associated with the proposed project. This will conclude Phase 3.

The VIA will be conducted in line with the following documents relating to South African VIA guidelines and methodology in South Africa, in addition to the use of other applicable reference material:

- Oberholzer, B., 2005. Guideline for involving visual & aesthetic specialists in EIA processes: Edition 1. CSIR Report No. ENV-S-C 2005 053 F. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town; and
- The Institute of Environmental Management and Assessment (IEMA)/ Landscape Institute (2013) Guidelines for Landscape and Visual Impact Assessment. 3rd Edition.

Receptor sites and potential sensitive receptors will be established through determining areas from where the proposed project might be visible to surrounding tourism areas, schools, residential areas, motorists, etc. and where such areas overlap with viewsheds as generated through digital elevation modelling. In addition, overall visual sensitivity of the region and potential horizon effects will be determined by a combined number of factors, such as prominent topographic or other scenic features, including high points and ridges. A visual exposure and line of sight analysis utilising digital terrain modelling and elevation profiles will be conducted to support the results of view shed and sensitive receptor identification.

Digital 3D topographic models will be developed to support the visual analyses, if required in line with the guidelines prepared by Oberholzer (2005). Areas will be recorded to show the characteristic landscape of the local area with three dimensional (3D) simulations of the proposed development indicated for illustrative purposes, as viewed from the key observation points.

9.1.5 Hydrological Impact Assessment

The Hydrological Assessment is proposed in line with the requirements of the National Water Act, 1998 (Act 36 of 1998) (NWA) as prescribed by the Department of Water and Sanitation (DWS). Letsolo Water and Environmental Services has been commissioned to undertake the study.

The study will be initiated by data collection and validation from desktop and on-site information sources. The potentially affected catchments will be characterised and a detailed hydrological baseline compiled.

The hydrological impact assessment report will outline the legal framework relevant to the management of surface water resources, erosion control measures, water management measures and include a conceptual stormwater management plan for the site. An operational water balance for wet and dry seasons in line with best practice will also be compiled. The Flood volumes (pre- and post-development) will be determined. Storm water flows and volumes (1:50 & 1:100-year recurrence intervals) for both the dirty (directly affected by construction) and clean water areas will be determined together with the infrastructure engineering team. For storm water containment purposes, the volumes for longer storm durations (24 hours) will also be determined.

9.1.6 Heritage / Archaeological Impact Assessment

Archaeotnos has been appointed to undertake an Archaeological Impact Assessment of the site, to ensure the identification of any potential heritage resources that may be affected by the proposed development, enabling prevention of impacts to sensitive heritage resources where possible, and appropriate mitigation where avoidance is not possible.

The Terms of Reference for the survey are to:

- Identify objects, sites, occurrences and structures of an archaeological or historical nature (cultural heritage sites) located on the property.
- Document the found cultural heritage sites according to best practice standards for heritage related studies.
- Study background information on the project area.
- Assess the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value.
- Describe the possible impact of the proposed project on these cultural remains, according to a standard set of conventions.
- Recommend suitable mitigation measures to minimize possible negative impacts on the cultural resources by the proposed development.
- Review applicable legislative requirements.

10 Assumptions and limitations relevant to this report

This Scoping Report has not yet incorporated the views of I&APs. The report is made available for a review and comment period of 30 days, and will be updated with comments received from authorities and the public following conclusion of the public review period.

The specialist studies that have been commissioned as part of this proposed project have not yet been completed. Where specialists contributed to the assimilation of baseline information, impacts or mitigation measures, such inputs have been referenced. Other information presented in this report is based on available desktop information. This report will therefore be updated as more site-specific specialist input is received.

The level of project detail presented in this report will be refined as engineering designs progress. It is not realistic to expect applicants to undertake detail designs of the proposed facility prior to commencing with EIA –

- the early commencement of the Scoping & EIA Process enables the engineering teams to take environmental matters into consideration in their designs of project infrastructure, often resulting in improved options analysis and sustainable development; and
- undertaking of detailed designs is associated with significant expenditure. It is fair to allow an applicant the opportunity to evaluate the environmental and permitting feasibility of a project prior to advancing to a detailed design stage.

The level of project detail presented in this report is sufficient to ensure a realistic identification of potential impacts. In assessing the potential significance of those impacts, the precautionary principle was implemented and a worst-case scenario assessed in each instance.

11 Conclusion

The applicant, Dreamworks, proposes the development of the Halfgewonnen Solar PV Project within the Mining Right Area of the Halfgewonnen Colliery in the Mpumalanga Province. The applicant and land owner have reached agreement on the proposed development and ongoing mining and mineral processing activities at the Halfgewonnen Colliery can co-exist on the site.

The proposed Halfgewonnen Solar PV Development comprises two components: PV1 (20MW) will initially supply electricity to coal mining operations and other consumers/land-users in the immediate vicinity, and supply power to the National Grid once these mines are no longer operational, while PV2 (60MW) will be connected to the National Grid from the onset.

The project forms part of the Department of Mineral Resources and Energy (DMRE) Renewable Energy Independent Power Producer Procurement Programme (REIPPP).

The applicant has submitted an application for Environmental Authorisation in terms of the NEMA for certain Listed Activities associated with the proposed project. The Department of Environment, Forestry and Fisheries (DEFF) is the competent authority in respect of the application.

This is the Draft Scoping Report and was prepared according to the provisions of the NEMA and EIA Regulations. This Scoping Report aims to:

- identify the relevant policies and legislation relevant to the proposed project (Section 3);
- motivate the need and desirability of the proposed project and the proposed project Site (Section 4);
- assess alternatives to the proposed project and proposed project site (Section 5);
- identify and confirm the preferred site, through a detailed site selection process, which includes an identification of impacts and risks inclusive of identification of cumulative impacts and a ranking process of all the identified alternatives focusing on the

geographical, physical, biological, social, economic, and cultural aspects of the environment (Appendix C);
- identify the key issues to be addressed in the assessment phase (Section 8.2);
- agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity (Section 9);
- identify possible measures to avoid, manage or mitigate identified impacts and determine the extent of the residual risks that need to be managed and monitored (Section 8.2).

This is the Scoping Report for the proposed Halfgewonnen Solar PV Project and is submitted to interested and affected parties and all known stakeholders for a comment period of 30 days.

Following the comment period, this report will be updated with comments received, and the EAPs responses to each comment received, and submitted to the DEFF for consideration. Once the DEFF approves the Scoping Report and Plan of Study for EIA, the EIA phase can be undertaken. During the EIA phase, the Draft EIA/EMP Report will similarly be made available for a 30-day public review and comment period, and a public meeting will be held should Covid-19 Regulations allow this.

11.1 Specific Information Required

The Scoping 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 17:

Table 17: 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 DEFF has been identified as the competent authority in terms of the application. DWS will be included in the public participation process and will be engaged as the competent authority pertaining to authorisations in terms of the NWA, in due course. The relevant conservation authorities and infrastructure / service delivery organs of state are also included in the consultation process.

Provision of NEMA	Relevance to this application and report
(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.
(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. This information will be updated as specialist studies are concluded.
(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	A preliminary impact identification and assessment is presented in Section 8 of this report. This will be expanded upon, refined and updated as the project and specialist assessments progress.
(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 and Appendix A of this report. This report is being made available for a public comment period.
(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 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;*	This is the Scoping Report and does not yet include detailed investigation of potential impacts or management measures. These can only be assessed in detail in the EIA phase of the project. Alternatives are however discussed in this report, including the no-development option.
(iii) investigation, assessment and evaluation of the impact of any proposed listed or specified activity on any national estate	Listed activities relevant to the proposed project are identified in this report. The

Provision of NEMA	Relevance to this application and report
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;	impact(s) of these activities must be assessed in further detail in the EIA phase. A specialist archaeological impact assessment has been commissioned as part of this project.
(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. This will be expanded upon as the studies progress.
(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;	Detailed monitoring and management measures are not included in this Scoping Report but will be included in the EIA phase once specialist assessments have been concluded. Preliminary management is discussed in Table 16.
(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 and will be expanded upon as the studies progress.
(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.

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Appendix A: Public Participation Report

CABANGA environmental

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Department of Environmental Affairs, Forestry and Fisheries (DEFF)

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Version 1: 17 February 2021 - Draft for comment from Authority

Version 2: 18 February 2021 - Updated with comments received from Authority

Changes as per the comments received from the Competent Authority have been underlined in the text.

18 February 2021

PUBLIC PARTICIPATION PLAN FOR THE PROPOSED HALFGEWONNEN SOLAR PV PROJECT

Name of the Applicant:	Keobakile Sedupane (for Dreamworks Haven Investments Pty Ltd)
Name of the landowner:	Overlooked Colliery Alpha (Pty) Ltd (Halfgewonnen Colliery)
Name of the Environmental Assessment Practitioner (EAP):	Cabanga Concepts cc trading as Cabanga Environmental Lelani Claassen Environmental Assessment Practitioners Association of South Africa (EAPASA) Registration Number 2018/153 South African Council for the Natural Sciences Professions (SACNASP) Pr. Sci. Nat 121645
Brief Project Description:	The Applicant (Dreamworks Haven Investments Pty Ltd) proposes to develop the Halfgewonnen Solar Photovoltaic (PV) Facilities on Portions of the Farm Halfgewonnen 190 IS in the Mpumalanga Province. The total proposed Halfgewonnen Solar PV Facility will generate approximately 80 Mega Watts (MW) of power. The Project will form part of the Department of Mineral Resources and Energy (DMRE) renewable energy independent power producer procurement programme (REIPPP).
Purpose of this Document:	This Public Participation Plan (PP Plan) has been prepared in accordance with the requirements of the NEMA, and the Directions

	issued by the Department of Environment Forestry and Fisheries (DEFF) in terms of the Disaster Management Act (Act 57 of 2002).
	The purpose of this PP Plan is to obtain agreement/approval from the relevant Competent Authority (in this case the DEFF) on the method of public engagement and participation to be conducted for the abovementioned application. The PP Plan is compiled to ensure that the Public Participation Process associated with the proposed application meets the requirements of Annexure 3 of GN 650 and ensures an effective PP Process is followed whilst adhering to the relevant health guidelines.

The Public Participation Process that is proposed, in line with the regulations, is detailed in Table 1 overleaf.

We trust that the PP Plan meets the requirements of the Competent Authority and look forward to hearing from you.

Thank you and regards,

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Table 1 NEMA PPP requirements (Chapter 6 of the EIA Regulations, 2014 (as amended))

Legal and Regulatory Requirement: NEMA Regulation 982 (as amended by GN326 of 07 April 2017).			How the requirements of the Regulation will be addressed during the public participation process for this application.
Regulation		**Description / Requirement**	
39	1	If the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an environmental authorisation in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land.	The proponent is not the land owner or the person in control of the land, however agreement has been reached with the land owner and formal land owner consent will be attached to the Application Form.
39	2	Sub-regulation (1) does not apply in respect of– (a) linear activities; (b) activities constituting, or activities directly related to prospecting or exploration of a mineral and petroleum resource or extraction and primary processing of a mineral or petroleum resource; and (c) strategic integrated projects as contemplated in the Infrastructure Development Act, 2014.	The abovementioned land owner consent will apply to the land portions directly affected by the proposed Solar PV infrastructure but not to the powerline connecting the Project to the Sub-station (two alternatives are being considered) as the powerline route is considered a linear development.
40	1	The public participation process… must give all potential or registered interested and affected parties (I&APs), including the competent authority, a period of at least 30 days to submit comments on each of the basic assessment report, EMPr, scoping report and environmental impact assessment report, and where applicable the closure plan, as well as the report contemplated in regulation 32, if such reports or plans are submitted at different times.	The draft scoping report and draft EIA/EMP report will each be subject to a public review period of at least 30 days.
40	2	The public participation process contemplated in this regulation must provide access to all information that reasonably has or may have the potential to influence any decision with regard to an application unless access to that information is protected by law and must include consultation with— (a) the competent authority; (b) every State department that administers a law relating to a matter affecting the environment relevant to an application for an environmental authorisation; (c) all organs of state which have jurisdiction in respect of the activity to which the application relates; and (d) all potential, or, where relevant, registered interested and affected parties.	A preliminary database of I&APs (including competent and commenting authorities and state departments) is attached as Appendix A to this document. The Competent Authority and State departments will be engaged largely via e-mail. If requested by the Authority or Departments, hard-copies of reports will also be submitted. Other I&APs (registered or potential) will be engaged via e-mail (where e-mail addresses can be obtained) and in person, during

Legal and Regulatory Requirement: NEMA Regulation 982 (as amended by GN326 of 07 April 2017).			How the requirements of the Regulation will be addressed during the public participation process for this application.
Regulation		**Description / Requirement**	
			distribution of the Background Information Documents (BID). On-site personal consultation will also enable the EAP to expand on the contact details available in the I&AP Database. The questionnaire (appended to the BID, Appendix C) also provides for I&APs to indicate their preferred method of communication.
40	3	Potential or registered interested and affected parties, including the competent authority, may be provided with an opportunity to comment on reports and plans contemplated in sub-regulation (1) prior to submission of an application but must be provided with an opportunity to comment on such reports once an application has been submitted to the competent authority.	Public review of the mentioned reports will be scheduled to take place after the submission of the application form to the Competent Authority (DEFF).
(41)	1	This regulation only applies in instances where adherence to the provisions of this regulation is specifically required.	Application for Environmental Authorisation for new Listed Activities - public participation is required.
	2	The person conducting a public participation process must take into account any relevant guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of an application or proposed application which is subjected to public participation by:	NEMA: Public Participation Guidelines (GNR807) and updated in 2017 will be followed. The proposed notification process and methods are described below.
	a	Fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of: (i) the site where the activity to which the application or proposed application relates is or is to be undertaken; and (ii) any alternative site;	A2 notices will be compiled in English and isiZulu and displayed at the following locations: • At the entrance to the Halfgewonnen Colliery, • on the Provincial Road adjacent to the proposed development site; • And two additional sites which are easily seen by the public. These posters will inform the public of the proposed activities and request people to

Legal and Regulatory Requirement: NEMA Regulation 982 (as amended by GN326 of 07 April 2017).			How the requirements of the Regulation will be addressed during the public participation process for this application.
Regulation		**Description / Requirement**	
			register as I&APs for the project. The poster will also contain a map of the project location. Appendix B contains a copy of the draft poster.
	b	(b) giving written notice, in any of the manners provided for in section 47D of the Act, to– (i) the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken; (ii) owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken; (iii) the municipal councillor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area; (iv) the municipality which has jurisdiction in the area; (v) any organ of state having jurisdiction in respect of any aspect of the activity; and (vi) any other party as required by the competent authority;	A Background information Document (BID) has been compiled in English and isiZulu (Appendix C) and will be distributed to all parties on the preliminary I&AP Database (Appendix A), and hand-delivered to land owners / users and adjacent land owners / users during the same time as the posters are erected. The BID will contain the following: • Invitation to members of the public to register as I&APs; • Introduce the proposed project, and inform the public on the application / environmental process and their involvement; • Provide information on the potential impacts the proposed activities may have on the environment which will be investigated further; and • Initiate a process of public consultation to record perceptions and issues.
	c	placing an advertisement in– (i) one local newspaper; or (ii) any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;	An Advertisement will be placed in English and isiZulu in one Newspaper, likely the Highvelder, Witbank News or Middelburg Observer. The Project Site is located in the Govan Mbeki Local Municipality of the Gert Sibande District Municipality, and borders on the Steve Tshwete Local Municipality of the Nkangala District
	d	placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be	

Legal and Regulatory Requirement: NEMA Regulation 982 (as amended by GN326 of 07 April 2017).			How the requirements of the Regulation will be addressed during the public participation process for this application.
Regulation		**Description / Requirement**	
		undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph (c)(ii);	Municipality. Affected and adjacent Municipalities are included in the I&AP Database (Appendix A). The mentioned newspapers distribute in these relevant areas. A draft of the advert is included in Appendix D.
	e	using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desirous of but unable to participate in the process due to– (i) illiteracy; (ii) disability; or (iii) any other disadvantage.	The site visit, to personally notify I&APs, is the selected method applied to overcome illiteracy, disability and any other disadvantage. All necessary Personal Protection Equipment (PPE) will be worn, hand sanitizer administered and social distancing undertaken during the site visit. The site visit will be undertaken by the Environmental Assessment Practitioner (EAP) and a representative of the Applicant familiar with the area to overcome potential language barriers. Furthermore, a public meeting will be undertaken during the EIA Phase, to verbally communicate the specialist findings to I&APs.
	3	(3) A notice, notice board or advertisement referred to in sub-regulation (2) must– (a) give details of the application or proposed application which is subjected to public participation; and (b) state– (i) whether basic assessment or S&EIR procedures are being applied to the application; (ii) the nature and location of the activity to which the application relates; (iii) where further information on the application or proposed application can be obtained; and (iv) the manner in which and the person to whom representations in respect of the application or proposed application may be made.	These requirements are addressed in the notice boards and advertisement (please refer to Appendix B and Appendix D.

Legal and Regulatory Requirement: NEMA Regulation 982 (as amended by GN326 of 07 April 2017).			How the requirements of the Regulation will be addressed during the public participation process for this application.
Regulation		**Description / Requirement**	
	4	A notice board referred to in sub-regulation (2) must– (a) be of a size of at least 60cm by 42cm; and (b) display the required information in lettering and in a format as may be determined by the competent authority.	Please see Appendix B – it is proposed to display this poster in A2 size-format (42 x 60 cm) as discussed previously.
	5	Where public participation is conducted in terms of this regulation for an application or proposed application, sub regulation (2)(a), (b), (c) and (d) need not be complied with again during the additional public participation process contemplated in regulations 19(1)(b) or 23(1)(b) or the public participation process contemplated in regulation 21(2)(d), [on the specified conditions].	The application related to the proposed Halfgewonnen Solar PV Project hasn't previously been subject to a PP Process and this sub-regulation is not considered relevant. Public Participation is proposed as set out in this document.
	6	When complying with this regulation, the person conducting the public participation process must ensure that– (a) information containing all relevant facts in respect of the application or proposed application is made available to potential interested and affected parties; and (b) participation by potential or registered interested and affected parties is facilitated in such a manner that all potential or registered interested and affected parties are provided with a reasonable opportunity to comment on the application or proposed application.	The proposed public participation process as set out in this document is anticipated to ensure that all potential I&APs have access to the relevant information and reasonable opportunity to comment on and participate in the proposed Project Application Process.
	7	Where an environmental authorisation is required in terms of these Regulations and an authorisation, permit or licence is required in terms of a specific environmental management Act, the public participation process contemplated in this Chapter may be combined with any public participation processes prescribed in terms of a specific environmental management Act, on condition that all relevant authorities agree to such combination of processes.	The application is made in terms of the NEMA. Other authorisations in terms of other Provincial and National Legislation may be identified as the Project and specialist studies progress, and authorisations will be sought where necessary, and the required public participation processes will be followed in due course.
42		A proponent or applicant must ensure the opening and maintenance of a register of interested and affected parties and submit such a register to the competent authority, which register must contain the names, contact details and addresses of–	Please see the Draft I&AP Register in Appendix A – it is expected that this register will grow as the application progresses and this register (as

Legal and Regulatory Requirement: NEMA Regulation 982 (as amended by GN326 of 07 April 2017).			How the requirements of the Regulation will be addressed during the public participation process for this application.
Regulation		**Description / Requirement**	
		(a) all persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP; (b) all persons who have requested the proponent or applicant, in writing, for their names to be placed on the register; and (c) all organs of state which have jurisdiction in respect of the activity to which the application relates.	updated) will be included in all submissions to the Competent Authority. I&APs who have access to the internet will be able to download electronic copies of reports from the Cabanga website. If requested, Cabanga will distribute reports via e-mail or Dropbox/Wetransfer. A Hard-copy of reports will also be made available at a publicly accessible place, such as the local library closest to the proposed development site (Bethal / Hendrina) (if such facilities are open at the time of public review). Alternatively, hard copies or CDs containing electronic copy of the reports can be couriered directly to I&APs who may request (via telephone, sms or e-mail) to received reports directly. Any form of written comments received via e-mail, fax, courier, post, sms etc. will be included in subsequent reports. Verbal comments communicated via telephone or during on-site consultations or at the proposed public meeting will also be captured and included in subsequent reports.
43	1	A registered interested and affected party is entitled to comment, in writing, on all reports or plans submitted to such party during the public participation process contemplated in these Regulations and to bring to the attention of the proponent or applicant any issues which that party believes may be of significance to the consideration of the application, provided that the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.	All comments received from I&APs will be included in the submissions to the Competent Authority as the application process progresses. The previous paragraph explains how Cabanga proposes to make reports available to I&APs, and how I&APs will be able to provide comments.

Legal and Regulatory Requirement: NEMA Regulation 982 (as amended by GN326 of 07 April 2017).			How the requirements of the Regulation will be addressed during the public participation process for this application.
Regulation		**Description / Requirement**	
	2	In order to give effect to section 24O of the Act, any State department that administers a law relating to a matter affecting the environment must be requested, subject to regulation 7(2), to comment within 30 days.	Relevant Departments are included in the I&AP Register (Appendix A) and will be requested to comment on the relevant reports as these are made available for public review.
44	1	The applicant must ensure that the comments of interested and affected parties are recorded in reports and plans and that such written comments, including responses to such comments and records of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these Regulations.	Each submission to the competent authority (Scoping Report and EIA/EMP Report) will include a Comment and Response Report (CRR) ~~summarising~~ containing the comments received from I&APs and the EAP's responses to each. Copies of correspondence will be included as Appendices.
	2	(2) Where a person desires but is unable to access written comments as contemplated in sub-regulation (1) due to– a) a lack of skills to read or write; b) disability; or c) any other disadvantage; reasonable alternative methods of recording comments must be provided for.	All efforts will be made to include all I&APs and potential I&APs in the public participation process. Verbal communication during initial on-site consultations, where the EAP will visit the site and surrounding areas, combined with the Public Meeting, and consultations with the relevant Ward Councillor(s) and other community representatives, should be able to overcome any barriers to effective public participation that may exist due to disability or illiteracy.

Appendix A: Preliminary I&AP Database

Affected and Adjacent Farm properties	
Farm	**Name/Company**
Halfgewonnen 190 IS Portion RE, Halfgewonnen 190 IS Portion 2,Halfgewonnen 190 IS Portion 5, Halfgewonnen 190 IS Portion 17	Overlooked Colliery Pty Ltd (James Venter)
Halfgewonnen 190 IS Portion 1, Geluk 226 Portion 226 Portion RE, Bankpan 225 Portion 15, Weltevreden 193 Portion 24,	ECC (Daniel Stapelberg)
	ECC (William Seabi)
Halfgewonnen 190 IS Portion 7, Halfgewonnen 190 IS Portion 8, Halfgewonnen 190 IS Portion 16, Halfgewonnen 190 IS Portion 9, Halfgewonnen 190 IS Portion 10	Overlooked Colliery Alpha Pty Ltd (Rebone Modipa Environmental Officer)
Halfgewonnen 190 IS Portion 9	Land User- Abel Vilakazi
Halfgewonnen 190 IS Portion 3, Geluk 226 Portion 226 Portion 2	Schoeman Susanna Cornelia (Owner Lives in Australia, Father lives in South Africa)
Halfgewonnen 190 IS Portion 4, Middelkraal 50 Portion 5	Anglo American Inyosi Coal Pty Ltd (Mineral Rights are owned by Forzando)
Halfgewonnen 190 IS Portion 6, Halfgewonnen 190 IS Portion 11, Halfgewonnen 190 IS Portion 15, Dunbar 189 Portion 7, Dunbar 189 Portion 3, Weltevreden 193 Portion 2, Dunbar 189 Portion 6, Halfgewonnen 190 IS Portion 14	Anton Pelser Eiendoms Trust
Middelkraal 50 Portion 1	Umcebo Prop Pty Ltd (Environmental Manager- Kubashni Mari)
Weltevreden 193 Portion 1, Weltevreden 193 Portion 3	Forzando Coal Mines Pty Ltd (ECC) Daniel Stapelberg
	Forzando Coal Mines Pty Ltd (ECC) William Seabi
Dunbar 189 Portion 2	Beestepan Boerdery Pty Ltd
Interested Parties	
Farm/Address	**Name/Company**
Mmakau Coal (Schurvekop)	Rowan Karstel
Mandala Commodities (Tala Bethal)	Nicholus Maloba (CEO)
Insa Coal, Dunbar Mine	Dirk Fourie
	Bjorn Goosen
Enertrag	Michael Barnes
Transnet	Bongiwe Senna
	Ndivhuwo Netshilaphala
Eskom Mpumalanga Grid Access Unit Region 3	Charmaine Masehela
TW Group (Farm Owner Schurvekop and rents Farm Halfgewonnen 190 IS Portion 2)	Dewald Te Water
TFD Land Surveyors	Tertius Dreyer
Barnard Town Planners	Jacques Barnard

Authorities	
Authority	**Name/Company**
Department of Environment, Forestry and Fisheries	Makhosi Yeni
Department of Environment, Forestry and Fisheries	MMatlala Rabothata
Department of Environment, Forestry and Fisheries	Olivia Letlalo

Authorities	
Authority	**Name/Company**
Department of Environment, Forestry and Fisheries	Portia Makitla
Department of Environment, Forestry and Fisheries	Thando Booi
Department of Mineral Resources and Energy	Seapei Sekgetho
Department of Water Affairs	M. Shabalala
Department of Water Affairs	Lindiwe Mabuza
Department of Water Affairs	M. Sehume
Department of Water Affairs (Olifants CMA)	Thembisa Torch
Govan Mbeki Local Municipality (Environmental)	Hendrik Van Der Merwe
Govan Mbeki Local Municipality Ward 15	Councillor MJ Mtsweni
Gert Sibande District Municipality	Environmental Services- Tebogo Mogakabe
Gert Sibande District Municipality	Environmental Services
Mpumalanga Department of Agriculture, Rural development, Land and Environmental Affairs (DARDLEA)	Surgeon Marebane
Mpumalanga Department of Agriculture, Rural development, Land and Environmental Affairs (DARDLEA)	Jan Venter
Land Claims Commission	Vusi Khoza
South African Heritage Resources Agency (SAHRA)	Online submission through https://www.sahra.org.za/sahris/
Mpumalnga Public Works, Roads & Transport	Fikile Sengwayo
South African Civil Aviation Authority (SACAA)	Lizell Stroh
National Energy Regulator of South Africa (NERSA)	Bianka Belinska
Steve Tshwete Local Municipality	M. Thembi
Nkangala District Municipality	Dani Mahlangu
Muskaligwa Local Municipality	D. Stander

Appendix B: Draft Poster / Notice

DREAMWORKS HAVEN INVESTMENTS (PTY) LTD

APPLICATION FOR ENVIRONMENTAL AUTHORISATION FOR THE PROPOSED HALFGEWONNEN SOLAR PV FACILITY

REFERENCE: 2021-01-0010

Dreamworks Haven Investments Pty Ltd proposes to develop the Halfgewonnen Solar Photovoltaic (PV) Facilities in the Mpumalanga Province. The proposed development site is located within the Mining Right Area (MRA) of the Halfgewonnen Colliery. Land access and use agreements between the Applicant and Land Owner have been reached.

The total proposed Halfgewonnen Solar PV Facility will generate approximately 80 Mega Watts (MW) of electricity. The proposed Halfgewonnen Solar PV Project comprises of two components:

- Halfgewonnen Solar PV Facility 1 will generate approximately 20 Mega Watts (MW) for initial use by the immediately surrounding mines. Construction is expected to take approximately 10 months. The total development footprint will not exceed 30 Ha.
- Halfgewonnen Solar PV Facility 2 will generate approximately 60 MW for distribution into the National Grid. Construction is expected to take approximately 12 months. The total development footprint will be about 60 Ha.

The Project will form part of the Department of Mineral Resources and Energy (DMRE) renewable energy independent power producer procurement programme (REIPPP).

The proposed development will involve the undertaking of Listed Activities identified in the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended), promulgated in terms of the National Environmental Management Act, Act No. 107 of 1998 (NEMA). A Scoping and Environmental Impact Assessment Process will be followed for the Application.

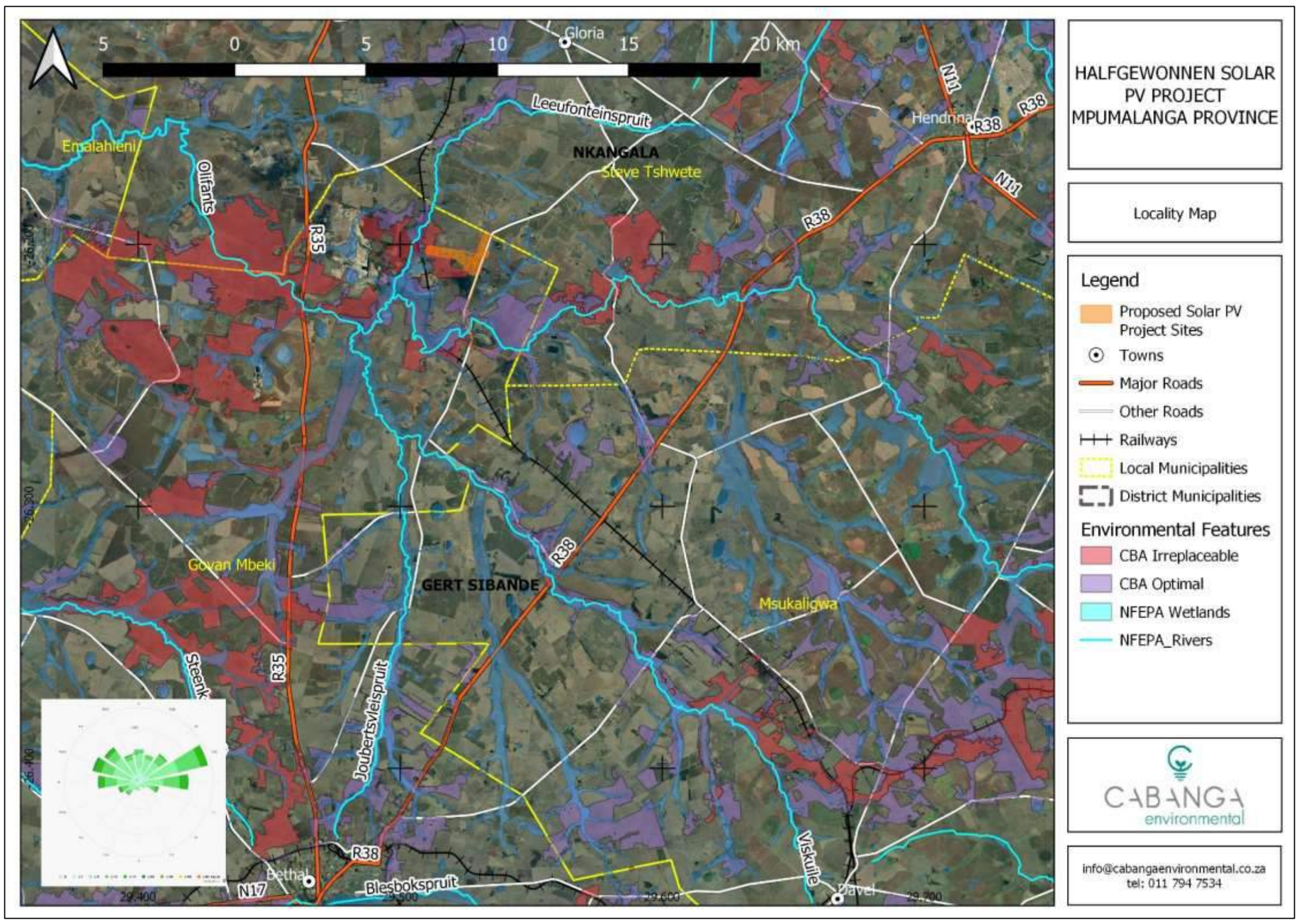
A Water Use License in terms of the National Water Act, Act No. 36 of 1998 (NWA) will be applied for in due course.

PROPONENT: Dreamworks Haven Investments Pty Ltd

LOCATION: The proposed project site is located on Portions 7, 8, 9 and 16 of the Farm Halfgewonnen 190 IS in the Govan Mbeki Local Municipality, Mpumalanga. **SITE CO-ORDINATES:** 26°12'16.58"S; 29°31'38.79"E

Cabanga Environmental has been appointed as the independent Environmental Assessment Practitioner (EAP) to complete the necessary environmental applications and the Public Participation Process.

PUBLIC PARTICIPATION: Please register as an Interested and Affected Party (I&AP) to receive notifications regarding the Proposed Project and Application Process. The Reports associated with the application will each be made available for public review and comment for a minimum period of thirty (30) days. Registered I&APs will be informed of the availability of reports in due course.



FOR MORE INFORMATION ON THE PROJECT, PLEASE CONTACT: Cabanga Environmental

Lelani Claassen

Tel: (011) 794 7534

Fax: (011) 794-6946

E-mail: info@cabangaenvironmental.co.za

www.cabangaenvironmental.co.za

Postnet Suite 470, P/Bag X3, Northriding, 2162

DREAMWORKS HAVEN INVESTMENTS (PTY) LTD: ISICELO SOKUGUNYAZWA NGOKWEZEMVELO NGOKO HLELO OLUHLONGOZWAYO LWESIPHEHLIMANDLA KUSETSHENZISWA ILANGA.

INKOMBA: 2021-01-0010

Umfaki wesicelo (uDreamworks Haven Investments Pty Ltd) uphakamisa isicelo sokwakha indawo yokuphehla ugesi ngelanga, eSifundazweni sase Mpumalanga. Indawo la kuzokwakhiwa khona lesisiphakamiso iphakathi kwendawo la iHalfgewonnen Colliery igunyazwe ukumayinela khona. Isivumelwano phakathi komnikazi wendawo nomfakisicelo, zokufinyelela noku sebenzisa umhlaba lakuzokwakhelwa khona seziphethiwe.

Lendawo yokuphehla ugesi ngelanga izophehla ugesi ongango 80 Mega Watts (MW) wegesi ngokuphelele. Lomsebenzi wokuphehla ugesi uhlukaniswe izigaba ezimbili:

- Indawo yokuqala yokuphehla ugesi izophehla ugesi ongango 20 Mega Watts (MW), ezokusetshenziswa kokuqala yizimayini eziseduze. Ukuyakha lendawo yokuqala kulindeleke ukuthi kuthathe izinyanga eziyishumi. Lendawo ekuzokwakhiwa kuyo ayizukuthatha indawo engaphezu kwezigaba ezingu 30 Ha.
- Indawo yesibili yokuphehla ugesi izophehla ugesi ongango 60 Mega Watts (MW), ezosatshalaliswa kuGridi kaZwelonke. Ukuyakha lendawo yesibili kulindeleke ukuthi kuthathe izinyanga eziyi shuminambili. Lendawo ekuzokwakhiwa kuyo ayizu kuthatha indawo engaphezu kwezigaba ezingu 60 Ha.

Lesisiphakamiso sizoba yingxenye yohlelo loMnyango wezokuMbiwa phansi kanye naMandla, lwabaphehli bogesi abazimele besebenzisa insiza ezivuselelekayo kabusha.

Lenthuthuko ehlongozwanyo izoba nohlelo leMisebenzi efakwe Kuhlu lomthethonqubo wokuhlaziya imithelela kwezeMvelo (HIM) zonyaka ka 2014 (njengoba kushintshiwe), kumenyezelwe ngokoMthetho kaZwelonke wokuPhathwa kwezeMvelo, uMthetho No.107 ka 1998. Uhlelo lokukala nokuhlaziya imithelela kwezeMvelo luzolandelwa ngokwesicelo esifakiwe.

Ngesikhathi esifaneleyo, kuzofakwa isicelo sencwadi egunyazwa ukusebenzisa amanzi ngokoMthetho waManzi Wezwelonke (MMZ), uMthetho No. 36 ka 1998.

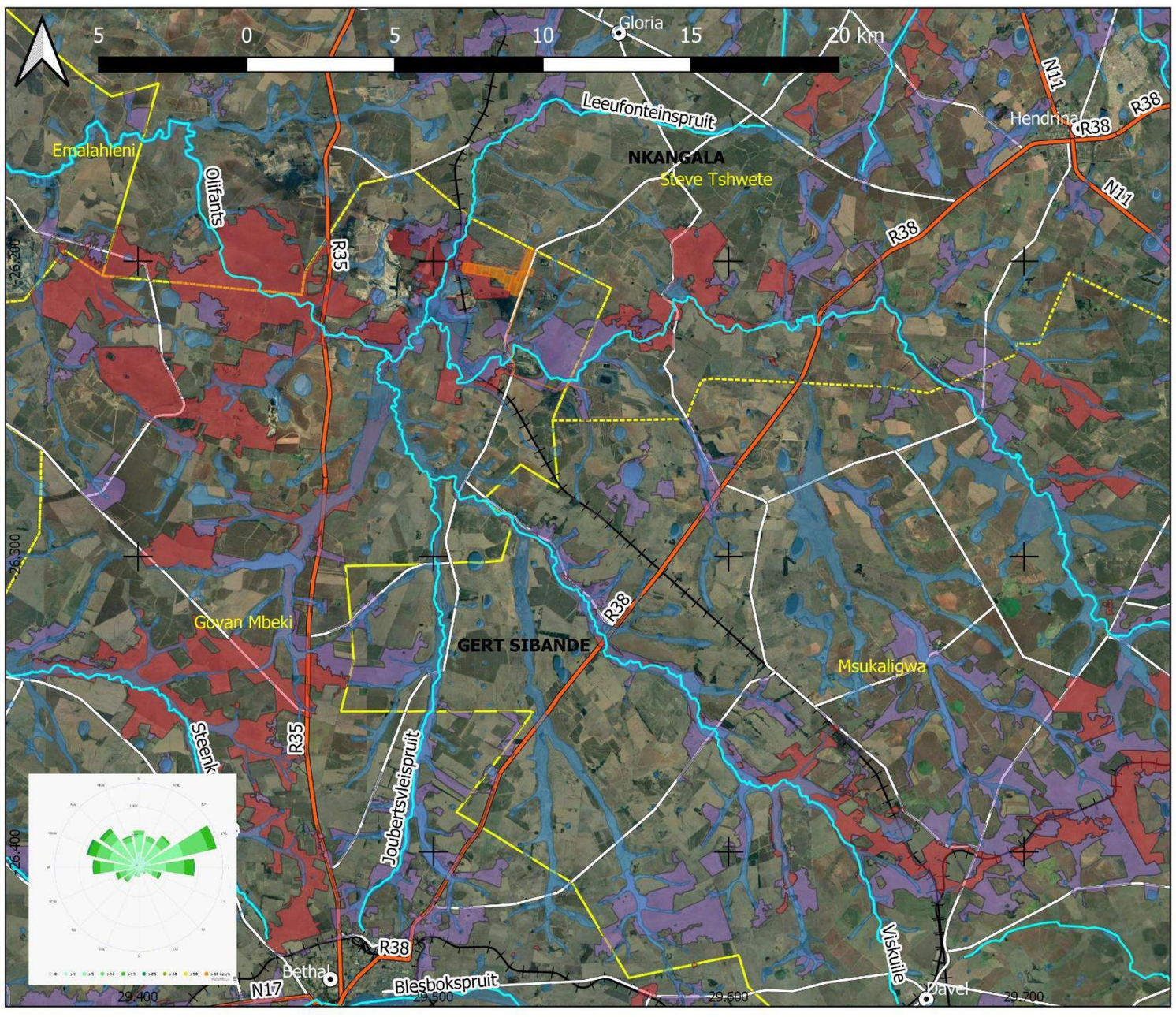
UMFAKISICELO: Dreamworks Haven Investment Pty Ltd

INDAWO: Indawo yalesiphakamiso esihlongozwayo itholakala kungxenye yomhlaba 7, 8, 9 no 16 zepulazi Halfgewonnen 190 IS, kumkhandlu i Govan Mbeki, eSifundazweni sase Mpumalanga.

Lendawo lakuzokwakhelwa khona itholakala mawufaka lezinombolo zoxhumano: 26°12'16.58"S; 29°31'38.79"E

iCabanga Environmental ikhethwe njengaba hlaziyi bezeMvelo abazimele ukuzofaka izicelo kwezemvelo nokwenza uhlelo lokubamba iqhaza komphakhathi.

UKUBAMBA IQHAZA KOMPHAKATHI: Sicela abantu ba bhalise njengeMibuthano yabantu abaneNthsisekelo nabaThintekayo (MNT) ukuze bazothola izaziso ngaloluhlelo lokufaka isicelo. Imibiko ehambisana nalesisicelo izokwenziwa itholakale izinsuku ezingamashumi amathathu, ukuze abantu bakwazi ukubuyekeza nokuphawula. Abantu ababhalisile njengeMNT, bazo kwaziswa ngokutholakala kwemibiko ngesikhathi esifanele.



HALFGEWONNEN SOLAR PV PROJECT MPUMALANGA PROVINCE

Locality Map

Legend

- Proposed Solar PV Project Sites
- Towns
- Major Roads
- Other Roads
- Railways
- Local Municipalities
- District Municipalities

Environmental Features

- CBA Irreplaceable
- CBA Optimal
- NFEPA Wetlands
- NFEPA_Rivers

CABANGA environmental

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tel: 011 794 7534

UKUTHOLA EMINYE IMININGWANE ENGAPHEZULU NGALOLUHLELO, SICELA NIXHUMANE NO: Cabanga Environmental

Lelani Claassen

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Appendix C: Background Information Document to be distributed

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BACKGROUND INFORMATION DOCUMENT:

PROPOSED HALFGEWONNEN SOLAR PV FACILITY

1. INTRODUCTION

The Applicant (Dreamworks Haven Investments Pty Ltd) proposes to develop the Halfgewonnen Solar Photovoltaic (PV) Facilities on Portions 7, 8, 9 and 16 of the Farm Halfgewonnen 190 IS in the Mpumalanga Province.

The total proposed Halfgewonnen Solar PV Facility will generate approximately 80 Mega Watts (MW) of electricity. The proposed Halfgewonnen Solar PV Project comprises of two components:

- Halfgewonnen Solar PV Facility 1 will generate approximately 20 Mega Watts (MW) for initial use by the immediately surrounding mines. Construction is expected to take approximately 10 months. The total development footprint will not exceed 30 Ha.
- Halfgewonnen Solar PV Facility 2 will generate approximately 60 MW for distribution into the National Grid. Construction is expected to take approximately 12 months. The total development footprint will be about 60 Ha.

The Project will form part of the Department of Mineral Resources and Energy (DMRE) renewable energy independent power producer procurement programme (REIPPP).

2. LEGAL CONTEXT

Prior to development of the proposed project, The Applicant must obtain authorisation in terms of the National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA) (as Amended) for activities identified in the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended).

Authorisation will also be required in terms of the National Water Act, 1998 (Act No 36 of 1998), for the potential placement of infrastructure in proximity to water resources.

Cabanga Environmental has been appointed by Dreamworks Haven Investments Pty Ltd to act as the independent Environmental Assessment Practitioner (EAP) and to manage the required application process and associated public participation process.

3. PURPOSE OF THIS DOCUMENT

This document (the Background Information Document or "BID") has been compiled to provide Interested and Affected Parties (I&APs), with information on the proposed project and the associated environmental authorisation application process.

The reader is hereby invited to participate freely and submit any questions or information that may contribute to the process. All comments received will be recorded and addressed as part of the Environmental Impact Assessment (EIA) process.

Please complete the attached questionnaire and return to us on Fax: 011 794 6946 or info@cabangaenvironmental.co.za to register as an I&AP. Alternatively, please contact us by telephone or e-mail at the details provided herein.

4. PROJECT OVERVIEW

Cabanga Environmental undertook a desktop environmental sensitivity analysis and feasibility investigation on various Portions of the Farm Halfgewonnen 190 IS. Portions of Portion 7, 8, 9 and 16 of the Farm Halfgewonnen 190 IS are proposed for development of the Solar PV Project.

The total proposed Halfgewonnen Solar PV Facility will generate approximately 80 Mega Watts (MW) of power in total, 20MW will be available for the immediately surrounding mining activities, while 60MW will be for distribution into the National Grid.

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).

Please refer to the maps and illustrations appended to this BID.

CABANGA environmental

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5. ENVIRONMENTAL AUTHORISATION PROCESS

An application for an environmental authorisation has been submitted to the Department of Environment, Forestry and Fisheries (DEFF)), as required by NEMA.

A Scoping and EIA Process will be followed. The steps in this process are briefly outlined below:

- Pre-Application: meeting with DEFF to discuss the project, approach to the application and public participation.
- Submit Application Form to DEFF.
- **Public Participation** Phase 1: Notification
  - Submit Public Participation Plan to DEFF for approval.
  - Identify I&APs.
  - Circulate BIDs, place site notices and advertisements.
- Compile Draft Scoping Report (and Plan of Study for EIA), to identify potential impacts, necessary specialist inputs etc.
- **Public Participation** Phase 2: Scoping – Make the Draft Scoping Report available to I&APs for review and comment.
- Finalise Scoping Report (including all comments received and responses thereto) and submit to DEFF for consideration.
- Undertake Specialist Assessments to better understand the potential environmental impacts of the project and management options.
- Once DEFF approves the Scoping Report and Plan of Study for EIA, compile the Draft EIA and Environmental Management Plan (EMP) Reports.
- **Public Participation** Phase 3: EIA – make the Draft EIA/EMP Report available for public review. Invite all I&APs to a public meeting (virtual or physical depending on the health and safety regulations applicable at the time) to present the findings of the specialist assessments.
- Finalise EIA/EMP Report including all comments received from I&APs and responses thereto, and submit to the DEFF for consideration.
- **Public Participation** Phase 4: Inform I&APs of the decision reached by the DEFF once the decision is communicated to the EAP. The notification will also include details of the available appeal processes.

Review of draft documents will be undertaken for a period of 30 days (excluding public holidays) for each phase. Registered I&APs will be informed throughout the application process of availability of reports and schedules of meetings. All comments received (and responses thereto) throughout the process will be captured in a Comment and Response Report that will also be available for public review.

6. LISTED ACTIVITIES

The following table summarises the list of activities identified in terms of NEMA as included in the application for environmental authorisation:

No	Description
Listing Notice 1 Activities	
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;
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; —
Listing Notice 2 Activities	
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.
4	The development and related operation of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.
15	The clearance of an area of 20 hectares or more of indigenous vegetation
Listing Notice 3 Activities	
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
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) in critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans

7. WATER USES

The lead authority for the authorisation of water uses in terms of the National Water Act (NWA) is the Department of Human Settlements, Water and Sanitation (DHSWS).

Water requirements for the project are expected to be minimal and restricted to that of potable use (drinking water for employees) and wash water for maintenance of the PV Panels. This water will be brought onto site and no abstraction of ground or surface water will be undertaken directly by the Project. Development of infrastructure in close proximity to watercourses also requires a water use license in certain circumstances.

The applicant will apply for the necessary water use authorisations prior to commencing the development and a separate public participation process will be followed as part of that application in due course.

8. POTENTIAL ENVIRONMENTAL IMPACTS

The following ***potential and preliminary*** impacts have been identified at this stage of the project, and will be investigated further (along with potential additional impacts that may be identified as the studies and application process progress):

- Loss of agricultural land capability.
- Soil contamination, erosion or compaction.
- Impact on sensitive flora, fauna and/or terrestrial or aquatic ecosystems.
- Impacts on water quality and availability.
- Loss of Wetlands.
- Dust generation.
- Visual Impacts.
- Accidental damage to previously undiscovered Heritage resources.

Should you be aware of any additional potential impacts please bring this to the EAP's attention by completing the attached questionnaire.

9. PUBLIC PARTICIPATION PROCESS

Public involvement is an essential component of the environmental assessment and application process. It addresses the right of I&APs to be informed of the proposed activities and to be involved in decisions that may affect them. It enables I&APs to contribute local knowledge to the assessment process. It also affords the environmental assessment practitioner (EAP) the opportunity to assess and address the issues and concerns raised by I&APs thus allowing the assessment of all the potential impacts of the proposed project.

10. INVITATION TO COMMENT:

The Reader is invited to participate in the Application process, by registering as an I&AP. As a Registered I&AP you will be kept informed of the Application processes, invited to attend public meetings and review draft reports compiled in terms of the applications. Furthermore, all comments that registered I&APs submit in terms of the Applications will be included in the relevant reports, and addressed throughout the process.

TO REGISTER: please provide us with your comments and contact details as soon as possible. The Draft Scoping Report is being prepared and will be made available for public comment soon. Details of the availability of the Report will be communicated to Registered I&APs. You are welcome to register and provide your comments at any time throughout the application process.

CABANGA environmental

Contact Us:

Lelani Claassen

Pr.Sci.Nat 121645

Registered EAP 2018/153

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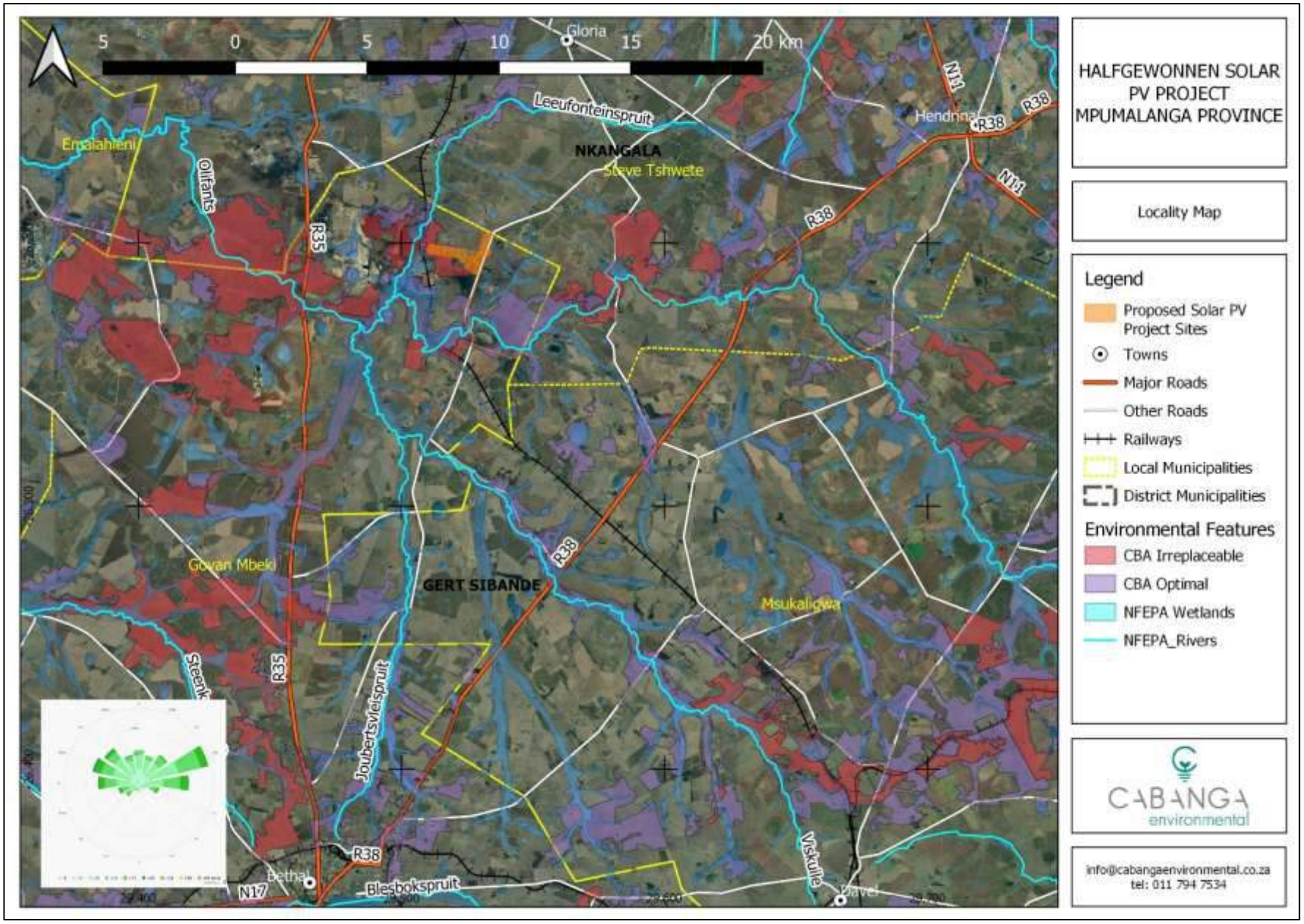
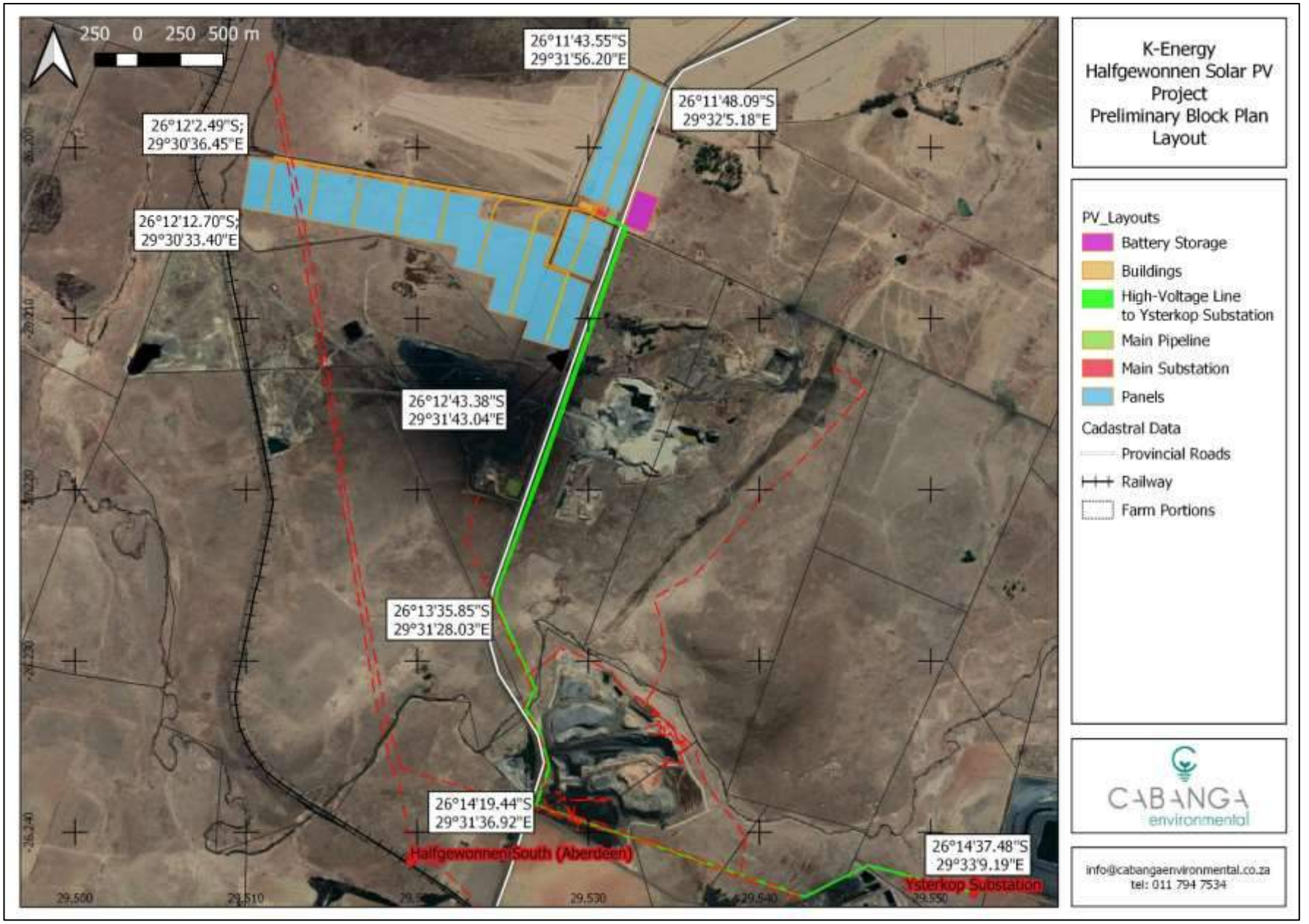


Plan 1: Regional Plan



Plan 2: Block-Plan proposed Layout

PUBLIC PARTICIPATION QUESTIONNAIRE: HALFGEWONNEN SOLAR PV FACILITY			
To register as an I&AP, please complete and return to Cabanga via e-mail, fax or post:			
Fax: (011) 794 6946 info@cabangaenvironmental.co.za; Postnet Suite 470, P/Bag X3, Northriding, 2162		**Alternatively**, **please register on** www.cabangaenvironmental.co.za **click on "Public Participation"**	
Name:		Surname:	
Telephone No.:		Fax No.:	
Post:			
E-mail:			
How would you prefer to be contacted?		☐E-mail ☐Fax ☐Post ☐Telephone ☐SMS	
Are you an immediately affected or adjacent land owner or user? If no, what is your interest in the project? If yes, please indicate your farm / property name as well as details on the current land use.		☐Yes ☐No	
Do you have any vested interest in the approval or refusal of this project? If yes, please elaborate.		☐Yes ☐No	
Do you feel that the proposed activities will impact on you and / or your socio-economic conditions? How?		☐Yes ☐No	
Are you aware of any additional impacts not yet identified?			
Are you aware of any sensitive areas that should be avoided (i.e. graves, cultural sites, endangered species, special environmental features or areas etc.)			
Do you have any alternative mitigation measures to propose?			
Do you know of any other persons, organisations or parties that should be notified? Please provide contact details.		☐Yes ☐No	
Do you have any additional comments, concerns or queries? (please feel free to submit separate sheets)			

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UMBHALO WESENDLALELO SOLWAZI

ISIPHAKAMISO SOKWAKHA INDAWO YOKUPHEHLA UGESI KUSETSHENZISWA ILANGA EHALFGEWONNEN

1. ISINGENISO

Umfaki wesicelo (uDreamworks Haven Investments Pty Ltd) uphakamisa isicelo sokwakha indawo, yokuphehla ugesi ngelanga, ezingxenyeni zomhlaba 7, 8, 9 no 16 epulazini Halfgewonnen 190 IS, eSifundazweni sase Mpumalanga.

Lendawo yokuphehla ugesi ngelanga izophehla ugesi ongango 80 Mega Watts (MW) ozosatshalaliswa kuGridi kaZwelonke. Lomsebenzi wokuphehla ugesi uhlukaniswe izigaba ezimbili:

- Indawo yokuqala yokuphehla ugesi izophehla ugesi ongango 20 Mega Watts (MW). Ukuyakha lendawo yokuqala kulindeleke ukuthi kuthathe izinyanga eziyishumi. Lendawo ekuzokwakhiwa kuyo ayizukuthatha indawo engaphezu kwezigaba ezingu 30 Ha.
- Indawo yesibili yokuphehla ugesi izophehla ugesi ongango 60 Mega Watts (MW). Ukuyakha lendawo yesibili kulindeleke ukuthi kuthathe izinyanga eziyi shuminambili. Lendawo ekuzokwakhiwa kuyo ayizu kuthatha indawo engaphezu kwezigaba ezingu 60 Ha.

Lomsebenzi uzoba yingxenye yohlelo loMnyango wezokuMbiwa phansi kanye naMandla, lwabaphehli bogesi abazimele besebenzisa insiza ezivuselelekayo kabusha.

2. UMONGO KWEZOMTHETHO

Ngaphambi kokuqala kokwakhiwa kwalesi siphakamiso somsebenzi, kumele kutholakale igunya ngokohlelo loMthetho kaZwelonke wokuPhathwa kwezeMvelo (MZPM) ka 1998, (uMthetho No.107 ka 1998), obhalelwe imisebenzi okumele ilandele iMithethonqubo yokuHlaziya Imithelela kwezeMvelo (HIM), yonyaka ka 2014.

Ukubeka kwengqalasizinda eduzane kwezindawo zamanzi kuzodinga ugunyazwa ngokoMthetho waManzi Wezwelonke (MMZ) ka 1998 (uMthetho No. 36 ka 1998).

Cabanga Environmental ikhethwe njengaba hlaziyi bezeMvelo abazimele abazophatha uhlelo lokufaka izicelo nelokubamba iqhaza komphakathi.

3. INJONGO YALO MBHALO

Lombhalo (Umbhalo weSendlalelo Solwazi (USS)) uhlanganiswe ukunikeza iMibutho yabantu abaneNtshisekelo nabaThintekayo (MNT) ulwazi ngalesi siphakamiso nango hlelo lokufaka izicelo zokugunyazwa ngezemvelo.

Umfundi walesi sikhanyiso umenywa ukuba yingxenye yokubamba iqhaza, afake imibuzo noma ulwazi olunga phonsa esivivaneni sohlelo. Ukuphawula konke kuzolotshwa besekuyadingidwa njenge ngxenye yohlelo loHIM.

Sicela nigcwalise lemibuzo enamathiselwe bese niyibuyisa kithina kule Fax: 011 794 6946 noma ku **info@cabangaenvironmental.co.za** ukubhalisa njengeMNT. Noma, sicela ukuthi nisithinte ngocingo noma ngesikhahlamezi kulemininingwane enikeziwe lana.

4. UKUBHEKWA KOHLELO LONKE

Cabanga Environmental iyeyayenza uphenyo ngokuzwela nokusebenzeka ezingxenyeni ezahlukene zomhlaba epulazini Halfgewonnen 190 IS. Izingxenye zengxenye zomhlaba 7, 8, 9 no 16 epulazini Halfgewonnen 190 IS, ziphakamiswe njenge zindawo lakuzokwakhiwa khona isakhiwo sokuphehla ugesi kusetshenziswa ilanga.

Lendawo yokuphehla ugesi ngelanga izophehla ugesi ongango 80 Mega Watts (MW) ozosatshalaliswa kwiGridi kaZwelonke, kakhulukazi ukuzuza imiphakathi yezimayini nezabalimi abahlala eduzane nalendawo ekuzokwakhelwa khona lesisiphakamiso.

Kucabangwe imigqa emithathu yezintambo zikagesi ukuhlanganisa ugesi ophehlwe kulendawo ezokwakhiwa kuGridi kaZwelonke, ngomugqa owodwa kulena emithathu ekhona enamandla angu 88kv esiteshini esicance sakwa Eskom (ezingu Halfgewonnen South, Forzando noYsterkop).

Sicela nibheke amabalazwe nemifanekiso ezihlanganiswe kuleUSS.

CABANGA environmental

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5. UKUGUNYAZWA KWEZEMVELO

Isicelo sokugunyazwa ngoko zemvelo sifakiwe kuMnyango wezeMvelo, aMahlathi kanye nezokuDoba (MMMD), okudingeka ngokoMZPM.

Uhlelo lokukala neloHIM lizolandelwa. Izinyathelo zaloluhlelo zichaziwe kafushane ngezansi:

- Isicelo sokuqala: umhlangano noMMMD ukuxoxisana ngalomsebenzi, indlela lekuzophathwa ngayo lesisicelo nokubamba iqhaza komphakathi.
- Kuthunyelwe ifomu lesicelo kuMMMD
- **Ukubamba Iqhaza Komphakhathi Isigaba 1: Isaziso**
  - Kuzothunyelwa ihlelo lokubamba iqhaza komphakathi ukuthi ligunyazwe nguMMMD
  - Kuzotholwa iMNT
  - Kuzungezwe uUSS, kufakwe izaziso zendawo kanye nemikhangiso.
- Kuzohlanganiswa umbiko wokukala osalungiswa (kanye nohlelo lokufunda lwekuHIM), nokukhomba imithelela engaba kona, nokokufaka okudingekile kwabochwepheshe.
- **Ukubamba Iqhaza Komphakhathi Isigaba 2:** Ukukala- Kuzokwenziwa umbiko wokukala osalungiswa utholwe yiMNT ukuze bakwazi ukubuyekeza nokuphawula.
- Kuzoqedwa umbiko wokukala (sekufakwe phakathi konke ukuphawula nazonke impendulo ezitholakele), ifakwe kuMMMD.
- Kuzoyenzwa ukuhlaziya kwabochwepheshe ukuze kuqondwe kangcono imithelela engaba khona kwezemvelo, kuhlaziywe nezindlela ekungakhethwa kizo zokuphatha loluhlelo.
- Uma uMMMD ugunyaza umbiko wokukala nohlelo lokufunda lwekuHIM, kuzo hlanganiswa imibiko yohlelo loHIM kanye noHlelo lokuPhathwa kwezeMvelo (HPM).
- **Ukubamba Iqhaza Komphakhathi Isigaba 3:** Ukuhlaziya Imithelela kwezeMvelo– kuzokwenziwa ukuthi umbiko woHIM/HPM osalungiswa, utholakale ukuze umphakathi ukwazi ukubuyekeza. Kuzomenywa yonke iMNT emhlanganweni womphakathi ukwethula okutholakele ekuhlaziyeni kwabochwepheshe (lomhlanagno uzoba mathupha noma ekhompiyutheni, kuzoya ngokuthi imithethonqubo imekanjani ngaleso sikhathi).
- Kuzoqedwa umbiko woHIM/HPM sekufakwe phakathi konke ukuphawula nazonke impendulo ezitholakele), ifakwe kuMMMD
- **Ukubamba Iqhaza Komphakhathi Isigaba 4:** Uma iCabanga Environmental iyaziswa ngesinqumo esithathwe nguMMMD, izokwazisa iMNT. Lesaziso sizofaka Phakathi imininingwane yohlelo lezikhalo ezikhona.

Ukubuyekeza kwemibhalo esalungiswa kuzokwenziwa isikathi esiyizinsuku ezingashumi amathathu (kungabalwa amaholide womphakathi) esigabeni ngasinye ngasinye. Imibutho yabantu abanentshisekelo nabathintekayo ebhalisile izohlezi iyaziswa ngokutholakala kwemibiko nekuhlelwa kwemihlangano kulo lonke uhlelo lokufaka isicelo. Konke ukuphawula okutholakele (nezimpendulo zakhona) kulo lonke uhlelo kuzolotshwa phansi kumbiko wekuphawula nezimpendulo zakhona, nawo lombiko kuzokwenzwa ukuthi utholakale ukuze umphakathi ukwazi ukubuyekeza.

6. IMISEBENZI ESOHLWINI

Letafula elilandelayo lifingqa lemisebenzi esohlwini ekhonjwe ngokoMZPM, njengoba kufakiwe kwisicelo sokugunyazwa ngokwezemvelo:

No	Incazelo
Imisebenzi efakwe Kuhlu leSaziso 1	
11	Ukuthuthukiswa kwendawo noma ingqalasizinda zokundlulisa nokusatshalaliswa kukagesi— (i) ngaphandle kwezindawo ezisemadolobheni noma izakhiwo zezimboni ezinamandla angaphezu kwe 33 kodwa angandluli ku 275 yamakilovolts noma (ii) ngaphakathi ezindaweni ezisemadolobeni noma izakhiwo zezimboni ezinamandla angango 275 yamakilovolts noma ngaphezulu
12	Ukuthuthukiswa kwe (ii) ngqalasizinda noma isakhiwo esingango 100 yamamitha ayisikwele noma ngaphezulu; lapho inthuhuthuko enjalo iyenzeka — (a) phakathi nendawo yenkambo yamanzi noma (c) uma kungana ukuhlehliswa kwenthuthuko okukhona, ngaphakathi kwamamitha angamashumi amathathu nambili kwinkambo yamanzi, kulinganiswa ngokusuka emaphethelweni wenkambo yamazi; —
14	Ukuthuthukiswa nokusebenza kwe ndawo noma ingqalasizinda, ukugcina, noma ukugcina nokuphatha, kwemphahla enobungozi, lapho khona lokugcina kuyenzeka eziqukathini ezinamandla ahlanganisiwe angango 80 yamamitha acubic noma angaphezulu kodwa angandluli ku 500 yamamitha acubic.
Imisebenzi efakwe Kuhlu leSaziso 2	
1	Ukuthuthukiswa kwendawo noma ingqalasizinda zokuphela ugesi kusentshenziswa insiza ezivuselelekayo lapho khona ukukhipha kwegesi kungandluli ku 20 megawatts noma ngaphezulu.
15	Ukususa izimila zomdabu endaweni engango 20 yamahektha noma ngaphezulu
Imisebenzi efakwe Kuhlu leSaziso 3	
12	Ukususa izimila zomdabu endaweni engango 300 yamamitha ayisikwele noma ngaphezulu, (f)eMpumalanga, (ii) ngaphakathi kwezindawo ezihlukahlukene zemvelo ezibucayi ezikhonjwe emahlelweni wezifunda.

No	Incazelo
Imisebenzi efakwe Kuhlu leSaziso 1	
14	Ukuthuthukiswa kwe— (ii) ngqalasizinda noma isakhiwo esingango 10 yamamitha ayisikwele noma ngaphezulu; lapho inthuthuko enjalo iyenzeka— (a) phakathi nendawo yenkambo yamanzi; noma (c) uma kungana ukuhlehliswa kwenthuthuko okukhona, ngaphakathi kwamamitha angamashumi amathathu nambili kwinkambo yamanzi, kulinganiswe ukususka emaphethelweni wenkambo yamazi; (f) eMpumalanga, (i) ngaphandle kwezindawo ezisemadolobheni (ff) ezindaweni ezihlukahlukene zemvelo ezibucayi noma izindawo zensizakalo ye-ecosystem ekhonjwe emahlelweni wekuhlukahlukana ngokwemvelo esentshenziswa inhloko yesifunda emahlelweni yezifunda.

7. UKUSENTSHENZISWA KWAMANZI

Ukugunyazwa kokusebenzisa amanzi kuyenziswa ngokoMMZ ophethwe nguMnyango wezokuHlaliswa kwaBantu, aManzi nokuThuthwa kwendle (MHBMT).

Izidingo zamanzi kuloluhlelo zilindeleke ukuthi zibezincane futhi zikhawulelwe kulokho okusetshenziswayo (amanzi wokuphuza waba sebenzi) kanye namanzi woku washa wokunakekela amaphaneli wePV. Lamanzi azolethwa kulendawo kuzosetshenzelwa khona futhi akuzukuba khona ukudonswa kwamanzi aphansi noma ngaphezulu okuzokwenziwa kuloluhlelo. Ukuthuthukiswa kwe ngqalasizinda duzane nenkambo zamanzi nako kudinga incwadi yokugunyazwa ukusetshenziswa kwa manzi ezimweni ezithile.

Umfakiscelo uzofaka isicelo esidingekayo sokugunyazwa ukusetshenziswa kwamanzi phambi kokuthi uhlelo lokuthuthukiswa luqale, nohlelo loku bamba iqhaza komphakathi elihlukene lizolandelwa njengengxenye yalesosicelo ngesikhathi esifanele.

8. IMITHELELA ENGABA KHONA EMVELWENI

Lemithelela engenzeka nekwandulelayo isikhojwe kulesisigaba saloluhlelo, futhi izophenywa ngokuqhubekayo (kanye neminye imithelela engabakhona esazokhonjwa njengoba izifundo nequbo yokufaka isicelo iqhubeka):

- Ukulahleka kwamandla omhlaba wezolimo
- Ukungcoliswa, ukuguguleka nokuminyaniswa kwenhlabathi,
- Imithelela kuzimbali ezizwelayo
- Imithelela ezingeni lamanzi nokutholakala kwamanzi
- Ukulahleka kwamaxhaphozi
- Ukudala uthuli
- Imithelela ebonakalayo
- Izindawo ezingamagugu ezitholiwe, futhi ezingahle zishabalalisiwe uma zingatholakalanga futhi zikhishiwe ngaphandle kokuthi umsebenzi uqalwe.

Umakungenzeka ukuthi uqaphele eminye imithelela engahle ibekhona sicela ukuthi uyilethe phambili ngokugcwalisa uhlu lwemibuzo olunamathiselwe lana.

9. UHLELO LOKUBAMBA IQHAZA KOMPHAKHATHI

Ukubandakanyeka komphakathi kuyingxenye ebalulekile ehlelwni lokuhlaziya ezemvelo nehlelweni lokufaka isicelo. Ibhekisisa ilungelo lweMNT lokwaziswa ngemisebenzi ephakamiswayo nokubandakanyeka eziqumweni ezingehle zibathinte. Iyenza ukuthi iMNT ikhone ukunikela ngolwazi lwendawo ehlelweni lokuhlaziya. Futhi linikeza abahlaziyi bezemvelo ithuba lokuhlaziya nokubhekisisa izingqinamba nokukhathazeka kweMNT, ukwenza kanjalo kusiza ukuthi kuhlaziyeke yonke imithelela engase ibekhona yaloluhlelo eliphakamiswayo.

10. ISIMEMO SOKUPHAWULA

Umfundi umenywa ukubamba iqhaza kwihlelo lokufaka isicelo, ngokubhalisa njengeMNT. Njenge MNT ebhalisile uzokwaziswa ngohlelo lokufaka isicelo, uzomenywa ukuza emihlanganweni yomphakathi futhi nokubeyekeza imibiko ehlanganiswe ngokwezicelo. Ngaphezu kwalokho konke ukuphawula kweMNT okuzofakwa ngokwezicelo, kuzofakwa emibikweni ehambelana nayo futhi ibhekisiswe kulo lonke uhlelo.

UKUBHALISA: sicela usinike ukuphawula kwakho nemininingwane yokuxhumana kungekudala. Umbiko osalungiswa wokukala usalungiselelwa futhi kuzokwenziwa ukuthi utholakale ukuze umphakathi uzokwazi ukuphawula maduze. Imininingwane yokutholakala kwalombiko izokwaziswa kumaMNT abhalisile. Wamukelekile ukubhalisa futhi uphawule ngasosonke isikhathi kulo lonke uhlelo lokufaka isicelo.

Xhumana nathi:

Lelani Claassen

CABANGA environmental

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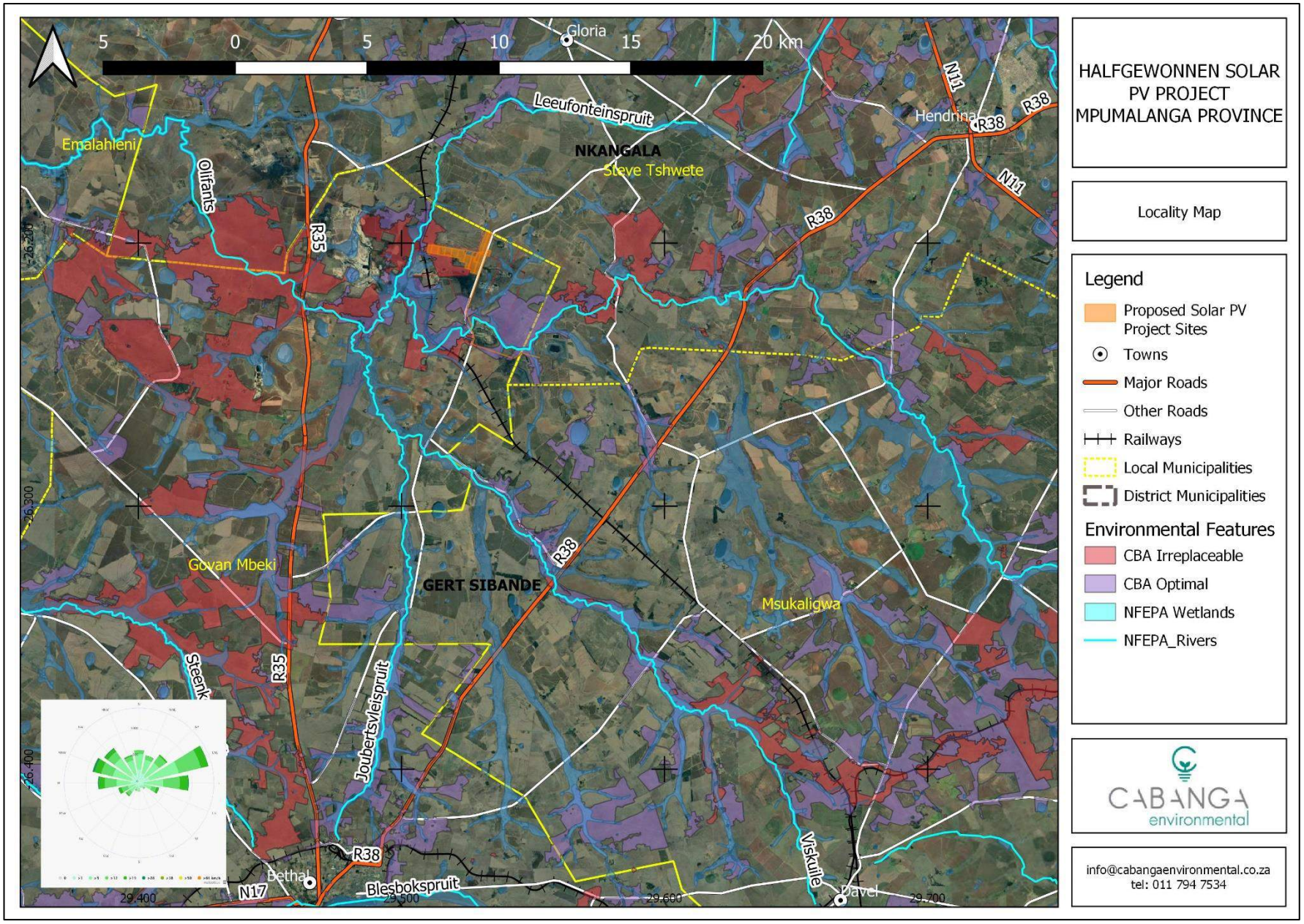
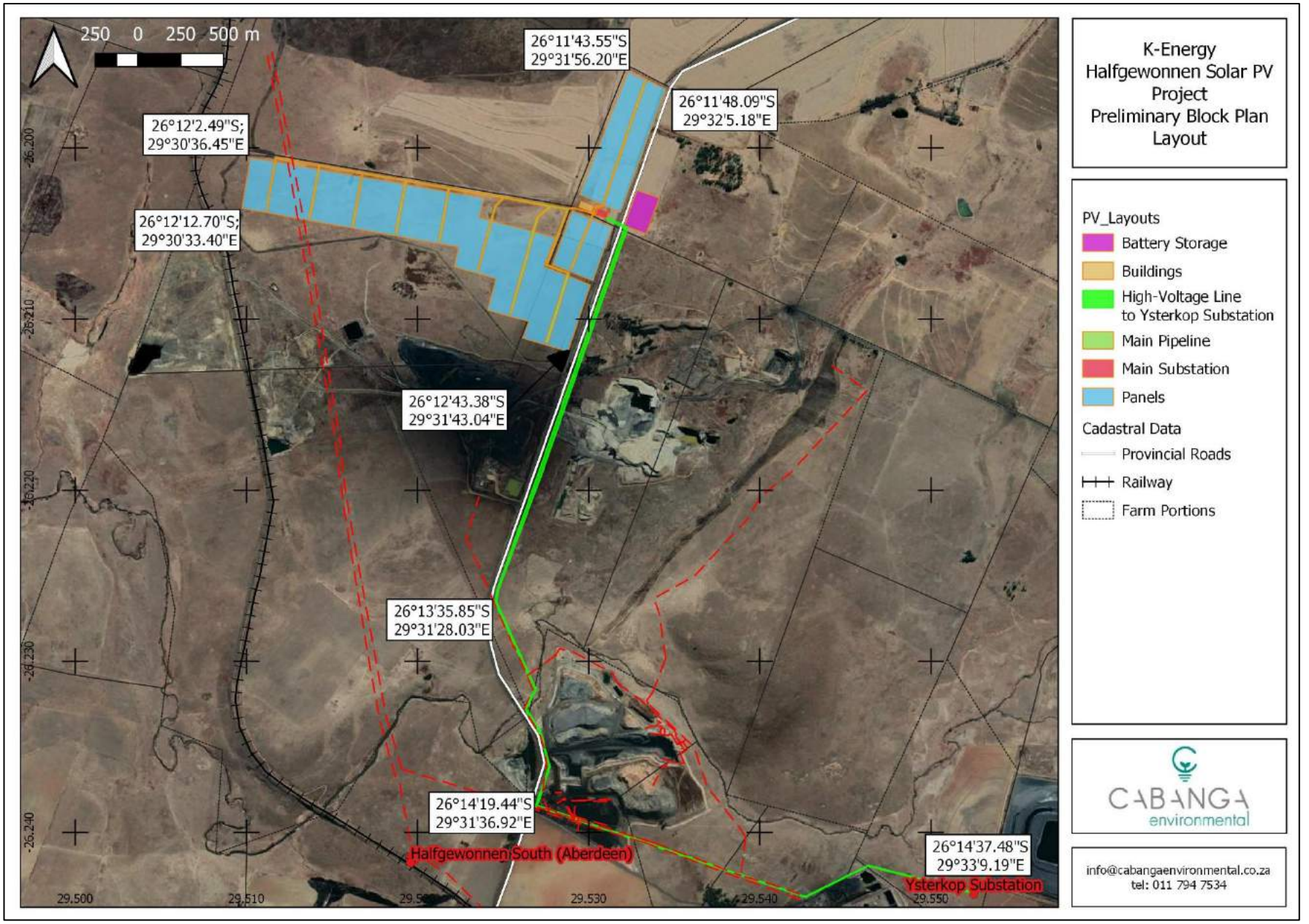


Ibalazwe 1: Uhlelo lesiFunda



Ibalazwe 2: Ibalazwe elikhomba indwawo ehlongozwayo yenthuthuko.

UHLU LWEMIBUZO LOKUBAMBA IQHAZA KOMPHAKATHI: INDAWO YOKUPHEHLA UGESI NGELANGA YASE HALFGEWONNEN			
Ukubhalisa njenge Mbutho waBantu abaneNtshisekelo nabaThintekayo, sicela nigcwalise futhi nibuyise ifomu ku Cabanga ngesikhahlamezi, fax noma ngeposi ku:			
Fax: (011) 794 6946 info@cabangaenvironmental.co.za; Postnet Suite 470, P/Bag X3, Northriding, 2162		**Kungenjalo, sicela ubhalise ku** www.cabangaenvironmental.co.za **ucofe ku "Bamba Iqhaza Komphakathi"**	
Igama:		Isibongo:	
Inombolo yocingo.:		Fax No.:	
Iposi:			
Sikhahlamezi:			
Ungathanda ukuthintwa njani?		☐iSkhahlamezi ☐Fax ☐Iposi ☐Ucingo ☐Mlayezo	
Ungumntu othinthekayo ngokushesha noma umnikazi womhlaba noma umuntu osebenzisa umhlaba? Uma kungenjalo, yini intshisekelo yakho kuloluhlelo? Uma kunjalo, sicela usho igama lepulazi/impahla yakho nemininingwane yokuthi umhlaba wakho usetshenziselwani kwamanje.		☐Yebo ☐Cha	
Unayo yini intshisekelo yokumukelwa noma yokunqatshwa kwa loluhlelo? Uma kunjalo, sicela uchaze kabanzi.		☐Yebo ☐Cha	
Ucabanga ukuthi loluhlelo oluhlongozwayo luzoba nomthelela kuwe/ noma esimweni sakho somnotho womphakathi? Kanjani?		☐Yebo ☐Cha	
Ikhona yini eminye imithelela oyaziyo engaka khonjwa?		☐Yebo ☐Cha	
Zikhona yini izindawo ezinozwelo ekumele zigwenywe (nje ngamathuna, izindawo zamasiko, uhlobo lwemvelo olusengozini yokushabalala, izici noma izindawo ezikhethekile zemvelo?		☐Yebo ☐Cha	
Unazo yini ezinye izindlela zokuncipisa imithelela ongazihlongoza?		☐Yebo ☐Cha	
Kukhona abantu, inhlangano, namaqembu owaziwo okumele aziswe ngaloluhlelo? Sicela imininingwane yabo yoxhumano.		☐Yebo ☐Cha	
Unayo yini imibono, ukuphawula, imibuzo, ukukhathazeka okungeziwe? (sicela ukhululeke ukufaka amanye amaphepha wezimpendulo akhlukene)		☐Yebo ☐Cha	

Appendix D: Draft Advertisement

DREAMWORKS HAVEN INVESTMENTS (PTY) LTD

APPLICATION FOR ENVIRONMENTAL AUTHORISATION FOR THE PROPOSED HALFGEWONNEN SOLAR PV FACILITY ON PORTIONS OF THE FARM HALFGEWONNEN 190 IS, MPUMALANGA PROVINCE

REFERENCE: 2021-01-0010

The Applicant (Dreamworks Haven Investments Pty Ltd) proposes to develop the Halfgewonnen Solar Photovoltaic (PV) Facilities in the Mpumalanga Province. The proposed development site is located within the Mining Right Area (MRA) of the Halfgewonnen Colliery. Land access and use agreements between the Applicant and Land Owner have been reached.

The total proposed Halfgewonnen Solar PV Facility will generate approximately 80 Mega Watts (MW) of electricity. The proposed Halfgewonnen Solar PV Project comprises of two components:

- Halfgewonnen Solar PV Facility 1 will generate approximately 20 Mega Watts (MW) for initial use by the immediately surrounding mines. Construction is expected to take approximately 10 months. The total development footprint will not exceed 30 Ha.
- Halfgewonnen Solar PV Facility 2 will generate approximately 60 MW for distribution into the National Grid. Construction is expected to take approximately 12 months. The total development footprint will be about 60 Ha.

The Project will form part of the Department of Mineral Resources and Energy (DMRE) renewable energy independent power producer procurement programme (REIPPP).

The proposed development will involve the undertaking of Listed Activities identified in the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended), promulgated in terms of the National Environmental Management Act, Act No. 107 of 1998 (NEMA). A Scoping and Environmental Impact Assessment Process will be followed for the Application.

A Water Use License in terms of the National Water Act, Act No. 36 of 1998 (NWA) will be applied for in due course.

PROPONENT: Dreamworks Haven Investments Pty Ltd

LOCATION: The proposed project site is located on Portions 7, 8, 9 and 16 of the Farm Halfgewonnen 190 IS in the Govan Mbeki Local Municipality, Mpumalanga.

SITE CO-ORDINATES: 26°12'16.58"S; 29°31'38.79"E

Cabanga Environmental has been appointed as the independent Environmental Assessment Practitioner (EAP) to complete the necessary environmental applications and the Public Participation Process.

PUBLIC PARTICIPATION: Please register as an Interested and Affected Party (I&AP) to receive notifications regarding the Proposed Project and Application Process. The Reports associated with the application will each be made available for public review and comment for a minimum period of thirty (30) days. Registered I&APs will be informed of the availability of reports in due course.

FOR MORE INFORMATION ON THE PROJECT, PLEASE CONTACT:

Cabanga Environmental

Lelani Claassen

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DREAMWORKS HAVEN INVESTMENTS (PTY) LTD

ISICELO SOKUGUNYAZWA NGOKWEZEMVELO NGOKO HLELO OLUHLONGOZWAYO LWESI PHEHLIMANDLA KUSETSHENZISWA ILANGA, ENGXENYENI ZEPULAZINI HALFGEWONNEN 190 IS, ESIFUNDAZWENI SASE MPUMALANGA.

INKOMBA: 2021-01-0010

Umfaki wesicelo (uDreamworks Haven Investments Pty Ltd) uphakamisa isicelo sokwakha indawo yokuphehla ugesi ngelanga, eSifundazweni sase Mpumalanga. Indawo la kuzokwakhiwa khona lesisiphakamiso iphakathi kwendawo la iHalfgewonnen Colliery igunyazwe ukumayinela khona. Isivumelwano phakathi komnikazi wendawo nomfakisicelo, zokufinyelela noku sebenzisa umhlaba lakuzokwakhelwa khona seziphethiwe.

Lendawo yokuphehla ugesi ngelanga izophehla ugesi ongango 80 Mega Watts (MW) wegesi ngokuphelele. Lomsebenzi wokuphehla ugesi uhlukaniswe izigaba ezimbili:

- Indawo yokuqala yokuphehla ugesi izophehla ugesi ongango 20 Mega Watts (MW), ezokusetshenziswa kokuqala yizimayini eziseduze. Ukuyakha lendawo yokuqala kulindeleke ukuthi kuthathe izinyanga eziyishumi. Lendawo ekuzokwakhiwa kuyo ayizukuthatha indawo engaphezu kwezigaba ezingu 30 Ha.
- Indawo yesibili yokuphehla ugesi izophehla ugesi ongango 60 Mega Watts (MW), ezosatshalaliswa kuGridi kaZwelonke. Ukuyakha lendawo yesibili kulindeleke ukuthi kuthathe izinyanga eziyi shuminambili. Lendawo ekuzokwakhiwa kuyo ayizu kuthatha indawo engaphezu kwezigaba ezingu 60 Ha.

Lesisiphakamiso sizoba yingxenye yohlelo loMnyango wezokuMbiwa phansi kanye naMandla, lwabaphehli bogesi abazimele besebenzisa insiza ezivuselelekayo kabusha.

Lenthuthuko ehlongozwanyo izoba nohlelo leMisebenzi efakwe Kuhlu lomthethonqubo wokuhlaziya imithelela kwezeMvelo (HIM) zonyaka ka 2014 (njengoba kushintshiwe), kumenyezelwe ngokoMthetho kaZwelonke wokuPhathwa kwezeMvelo, uMthetho No.107 ka 1998. Uhlelo lokukala noku hlaziya imithelela kwezeMvelo luzolandelwa ngokwesicelo esifakiwe.

Ngesikhathi esifaneleyo, kuzofakwa isicelo sencwadi egunyaza ukusebenzisa amanzi ngokoMthetho waManzi weZwelonke (MMZ), uMthetho No. 36 ka 1998.

UMFAKISICELO: Dreamworks Haven Investment Pty Ltd

INDAWO: Indawo yalesiphakamiso esihlongozwayo itholakala kungxenye yomhlaba 7, 8, 9 no 16 zepulazi Halfgewonnen 190 IS, kumkhandlu i Govan Mbeki, eSifundazweni sase Mpumalanga.

Lendawo lakuzokwakhelwa khona itholakala mawufaka lezinombolo zoxhumano: 26°12'16.58"S; 29°31'38.79"E

iCabanga Environmental ikhethwe njengaba hlaziyi bezeMvelo abazimele ukuzofaka izicelo kwezemvelo nokwenza uhlelo lokubamba iqhaza komphakhathi.

UKUBAMBA IQHAZA KOMPHAKATHI: Sicela abantu ba bhalise njengeMibuthano yabantu abane Nthsisekelo futhi abaThintekayo (MNT) ukuze bazothola izaziso ngaloluhlelo lokufaka isicelo. Imibiko ehambisana nalesisicelo izokwenziwa itholakale izinsuku ezingamashumi amathathu, ukuze abantu bakwazi ukubuyekeza nokuphawula. Abantu ababhalisile njenge MNT, bazo kwaziswa ngokutholakala kwemibiko ngesikhathi esifanele.

UKUTHOLA IMININGWANE ENGAPHEZULU NGALOLUHLELO, SICELA NIXHUMANE NO:

Cabanga Environmental

Lelani Claassen

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Appendix B: Geotechnical Report

GEOTHETA CONSULTING ENGINEERS AND SCIENTISTS

SOLAR PV PROJECT, MPUMALANGA

NEAR-SURFACE GEOTECHNICAL INVESTIGATION REPORT

Cabanga Environmental
Unit 5 & 6 Beyers Office Park
Bosbok Road
Randpark Ridge

2010329/R02 February 2021

Cabanga Environmental
Unit 5 & 6 Beyers Office Park
Bosbok Road
Randpark Ridge

Geotechnical Investigation and Report

Report Reference Number: 2010329/R02

Revision date: February 2021

1. Executive Summary

Cabanga Environmental commissioned Geotheta (Pty) Limited to prepare a geotechnical investigation report for a proposed new solar PV plant near Bethal in Mpumalanga Province.

A near-surface geotechnical investigation was done, and representative soil samples were retrieved.

The typical soil strata of the far eastern side of the site comprises topsoil underlain by soft to stiff sandy clay (transported material) overlying soft to stiff sandy clay (residual material).

The typical soil strata of the western side of the site comprises topsoil underlain by medium dense to dense silty sand (transported material) overlying medium dense to very dense silty sand and clayey sand (residual material) and soft rock sandstone. Hardpan ferricrete was also encountered in some areas.

Groundwater seepage was encountered in one test pit on the eastern side of the site. No groundwater seepage was encountered in any of the other test pits.

The soft rock sandstone and hardpan ferricrete is suitable as a founding horizon where encountered. For areas where soft rock sandstone or hardpan ferricrete are present, reinforced concrete pad footings should be used to support the solar PV panels and other load bearing structures. The pad footings can be founded on the soft rock sandstone or hardpan ferricrete at depths between 0.4m and 2.2m. The soft rock sandstone and hardpan ferricrete will provide a safe bearing capacity of 250kPa.

For areas where deep soil horizons are present, friction piles should be used to support the PV solar panels. Friction piles can be driven into the soil relatively quickly and easily. The piles should be driven into the ground until sufficient pull out resistance is achieved to ensure that the PV panels are adequately anchored to withstand the applied uplift loads. The optimum pile embedment depth will need to be determined by the design engineers.

As an alternative to the above recommendations, cast-iron piles can be driven into the rock or residual material. The cast-iron is non corrosive, and hence will not be affected by the pH and salinity of the soil. The solar panels can be attached direct to the piles, eliminating the need for structural steel supports and hold-down bolts.

Shoring and/or lateral support, or back battering, is required for excavations exceeding 1.5m deep.

Excavatability of the material on site is classed as *soft* to *intermediate* in the soils and *hard* once the soft rock sandstone and hardpan ferricrete is encountered.

Precautions should be taken to protect the foundations from moisture ingress. General precautionary measures, which are intended to prevent the concentrated ingress of water into the ground are also recommended. All external areas are to be free draining away from structures. Adequate storm water control needs to be implemented to direct the water away from excavations and foundations.

The material on site is not suitable for use as structural fill. Suitable material will need to be imported as required.

2. Disclaimer

2.1 Data provided to Geotheta

The opinions expressed in this Report have been based on the information supplied to Geotheta (Pty) Ltd (Geotheta) by Cabanga Environmental (Cabanga). The opinions in this report are provided in response to a specific request from Cabanga to do so. Geotheta has exercised all due care in reviewing the supplied information. Whilst Geotheta has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. Geotheta does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them.

2.2 Data obtained by Geotheta

Opinions presented in this report apply to the site conditions and features as they existed at the time of Geotheta's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this report, about which Geotheta had no prior knowledge nor had the opportunity to evaluate.

3. Statement of Geotheta Independence

Neither Geotheta nor any of the authors of this report have any material present or contingent interest in the outcome of this report, nor do they have any monetary or other interest that could be reasonably regarded as being capable of affecting their independence or that of Geotheta.

Geotheta has no beneficial interest in the outcome of the technical assessment being capable of affecting its independence.

Geotheta's fee for completing this report is based on its normal professional rates and/or fees plus incidental expenses. The payment of that professional fee or expense is not contingent upon the outcome of the report.

4. Table of Contents

5. List of abbreviations

CBR	:	California Bearing Ratio
Geotheta	:	Geotheta (Pty) Limited
kPa	:	kilo Pascal
Mod	:	Modified
N	:	Weinert N-value
OMC	:	Optimum Moisture Content
SANAS	:	South African National Accreditation System
Soillab	:	Soillab (Pty) Limited
TLB	:	Tractor Loader Backhoe
TP	:	Test Pit

6. Introduction

6.1 Cabanga Environmental commissioned Geotheta (Pty) Limited to prepare a geotechnical investigation report for the proposed solar PV plant near Bethal, in Mpumalanga Province.

6.2 A near-surface geotechnical investigation was done to determine the foundation conditions and appropriate founding depth for the proposed solar PV plant.

6.3 The investigation comprised test pit excavations and retrieval of samples for laboratory testing. The test results were analysed to determine the foundation conditions and the suitability of the in-situ soil for use in the construction works.

6.4 The site investigation work was done from 03 December 2020 to 07 December 2020 and from 15 January 2021 to 20 January 2021. The laboratory test results were received on 04 and 05 February 2021.

7. Terms of reference

7.1 Geotheta submitted proposal reference 2010329 - Cabanga Environmental - Solar PV Project Geotech - P01R on 02 November 2020.

7.2 Cabanga Environmental confirmed the appointment on 19 November 2020.

8. Scope of work

The following work was done:

8.1 Site geotechnical investigation

The following was done to determine the foundation geotechnical characteristics of the area:

8.1.1 Test Pits

8.1.2 A Tractor Loader Backhoe (TLB) excavator was provided and used to excavate test pits.

8.1.3 The test pits were profiled to determine the strata layers and characteristics. Soil samples were retrieved as necessary for laboratory testing.

8.2 Laboratory testing

8.2.1 The soil samples were sent to a SANAS certified geotechnical soils laboratory for testing and analysis. Foundation indicator, pH and Mod CBR tests were undertaken.

8.3 Report

8.3.1 This geotechnical report was written.

9. Site Location and Description

9.1 The site is located approximately 28km north of Bethal in Mpumalanga Province (see Figure 1). The site comprises a large open grassed area with visible rock outcrops in certain areas. Small portions of the site are used for agriculture.

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Figure 1 : Site Location

10. Geology

10.1 The regional geology of the area is shown in Figure 2.

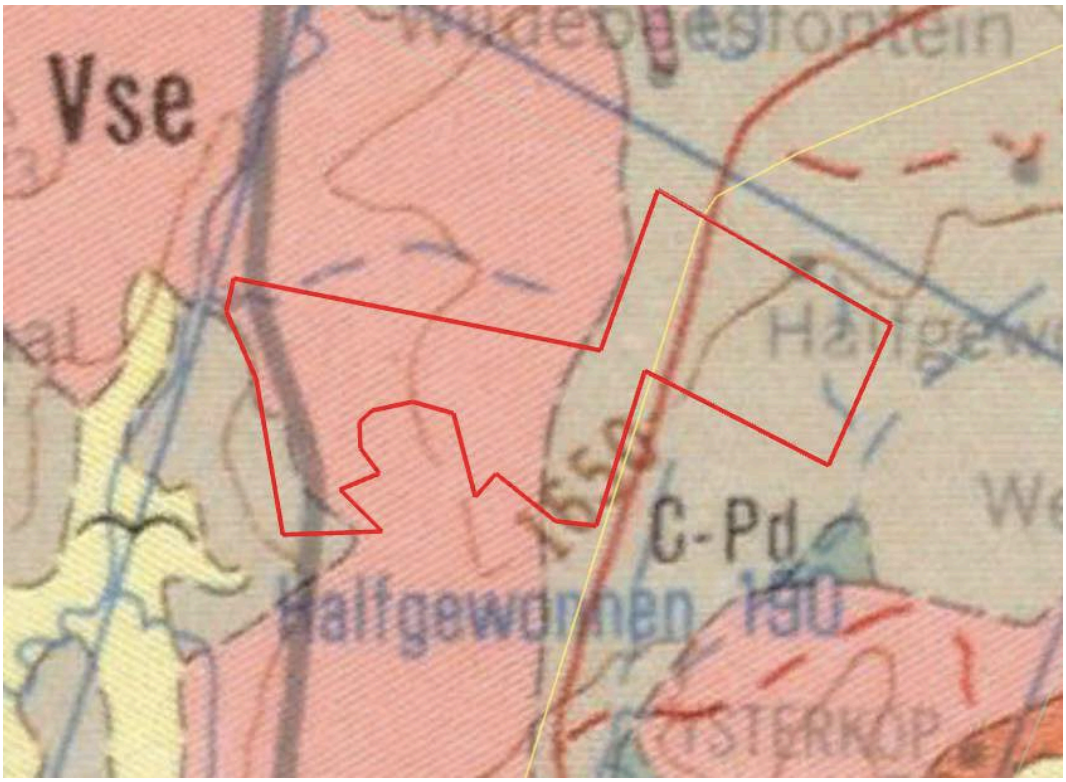
10.2 From the 1:250 000 geological map 2628 East Rand, the site area spans across a geological boundary.

10.3 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.

10.4 The eastern portion of the site is underlain by sandstone, shale and coal beds of the Vryheid Formation, Ecca Group of the Permian Era.

10.5 The typical soil strata of the far eastern side of the site comprises topsoil underlain by soft to stiff sandy clay (transported material) overlying soft to stiff sandy clay (residual material).

10.6 The typical soil strata of the western side of the site comprises topsoil underlain by medium dense to dense silty sand (transported material) overlying medium dense to very dense silty sand and clayey sand (residual material) and soft rock sandstone. Hardpan ferricrete was encountered in test pits TP17 and TP46.



GEOTHETA CONSULTING ENGINEERS AND SCIENTISTS	Solar PV Project Geotech	2010329

Figure 2: Regional Geology

11. Engineering Geology

11.1 The influence of climate on weathering is expressed by the N-value (H.H. Weinert 1980). The most important is where N=5. Where N is more than 5, disintegration is dominant, and where N is less than 5, decomposition is dominant.

11.2 The Weinert N-value is about 2.3 for this region, indicating that decomposition is the overriding process.

11.3 Weinert also mentions that where N is between 2 and 5, weathering profiles develop upwards from fresh rock to residual soil.

12. Method of Investigation

12.1 Desk study

12.1.1 The local geology was determined from the geological maps. This is discussed in sections 10 and 11 above.

12.2 Test Pits

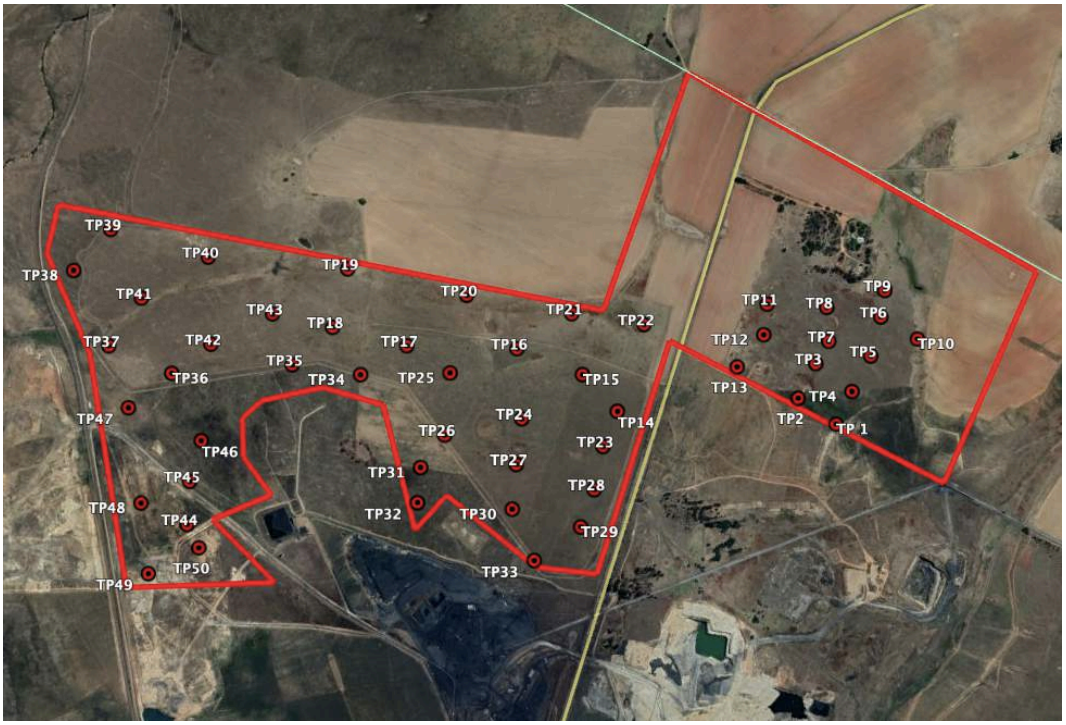
12.2.1 No formal grid spacing was used in setting out the test pit positions. Positions were selected to adequately cover the site and to determine any variations in the site geology.

12.2.2 Fifty test pits were excavated. The test pit positions are indicated in Figure 3.

12.2.3 Test pits were not excavated in the agricultural areas so as not to disturb this.

12.2.4 The test pits were excavated with a Tractor Loader Backhoe (TLB) and soil profiles were logged according to the standard method of Jennings, Brink and Williams (1973).

12.2.5 Test pit photographs and profiles are included in Appendix A and Appendix B respectively.



GEOTHETA CONSULTING ENGINEERS AND SCIENTISTS	Solar PV Project Geotech	2010329

Figure 3: Test Pit Positions

12.3 Soil Sampling

12.3.1 Disturbed samples were taken from test pits TP3, TP5, TP24, TP37, TP43 and TP48 to determine the material classification and the parameters of the soil types as well as the potential of the excavated material to be used as backfill material.

12.4 Laboratory Testing

12.4.1 The retrieved samples were submitted to Soillab in La Montagne, Pretoria, for testing.

12.4.2 Foundation Indicator, pH and Mod CBR tests were conducted.

12.4.3 The laboratory test results are included as Appendix C.

12.4.4 The results are discussed below.

13. Results

13.1 Site soils

13.1.1 The soil profiles from the test pits encountered on the site are as follows:

Test Pit No	Topsoil	Transported Material	Residual Material	Fill Material	Test pit depth (m)
TP1	0 – 0.4	0.4 – 1.9	1.9 – 2.8		2.8 – Max Reach
TP2	0 – 0.3	0.3 – 2.8	2.8 – 3.4		3.4 – Max Reach
TP3	0 – 0.3	0.3 – 2.0	2.0 – 2.6		2.6 – Max Reach
TP4	0 – 0.4	0.4 – 0.9	0.9 – 3.1		3.1 – Max Reach
TP5	0 – 0.3	0.3 – 2.0	2.0 – 3.0		3.0 – Max Reach
TP6	0 – 0.3	0.3 – 2.5	2.5 – 3.0		3.0 – Max Reach
TP7	0 – 0.3	0.3 – 2.2	2.2 – 3.1		3.1 – Max Reach
TP8	0 – 0.3	0.3 – 0.8	0.8 – 3.0		3.0 – Max Reach
TP9	0 – 0.4	0.4 – 2.1	2.1 – 3.0		3.0 – Max Reach
TP10	0 – 0.4	0.4 – 1.9	1.9 – 3.1		3.1 – Max Reach
TP11	0 – 0.4	0.4 – 0.9	0.9 – 2.7		2.7 – Max Reach
TP12	0 – 0.3	0.3 – 1.1	1.1 – 1.5		1.5 - Refusal
TP13	0 – 0.2	0.2 – 0.6	0.6 – 1.2		1.2 - Refusal
TP14	0 – 0.3	0.3 – 0.6	0.6 – 1.2		1.2 - Refusal
TP15	0 – 0.3	0.3 – 0.6	0.6 – 1.2		1.2 - Refusal
TP16	0 – 0.3	0.3 – 0.8	0.8 – 2.5		2.5 – Max Reach
TP17	0 – 0.3	0.3 – 0.6	-		0.6 - Refusal
TP18	0 – 0.2	0.2 – 0.5	0.5 – 1.1		1.1 - Refusal
TP19	0 – 0.4	-	-		0.4 - Refusal
TP20	0 – 0.2	0.2 – 0.6	0.6 – 1.6		1.6 - Refusal
TP21	0 – 0.3	0.3 – 0.6	0.6 – 2.7		2.7 – Max Reach
TP22	0 – 0.4	0.4 – 0.8	0.8 – 2.6		2.6 – Max Reach
TP23	0 – 0.3	0.3 – 0.5	0.5 – 1.0		1.0 - Refusal
TP24	0 – 0.5	0.5 – 0.7	0.7 – 2.2		2.2 - Refusal
TP25	0 – 0.4	-	0.4 – 1.5		1.5 - Refusal
TP26	0 – 0.4	0.4 – 0.7	0.7 – 1.3		1.3 - Refusal
TP27	0 – 0.5	-	0.5 – 1.0		1.0 - Refusal

TP28	0 – 0.3	0.3 – 0.5	0.5 – 1.1		1.1 - Refusal
TP29	0 – 0.3	0.3 – 0.7	0.7 – 1.8		1.8 - Refusal
TP30	0 – 0.3	-	0.3 – 0.6		0.6 - Refusal
TP31	0 – 0.4	-	0.4 – 0.9		0.9 - Refusal
TP32	0 – 0.5	-	0.5 – 1.1		1.1 - Refusal
TP33	0 – 0.5	-	0.5 – 1.2		1.2 - Refusal
TP34	0 – 0.6	-	0.6 – 1.8		1.8 - Refusal
TP35	0 – 0.3	-	0.3 – 1.5		1.5 - Refusal
TP36	0 – 0.4	-	0.4 – 1.5		1.5 - Refusal
TP37	0 – 0.3	0.3 – 0.5	0.5 – 1.5		1.5 - Refusal
TP38	0 – 0.3	0.3 – 0.5	0.5 – 1.1		1.1 - Refusal
TP39	0 – 0.4	-	-		0.4 - Refusal
TP40	0 – 0.3	-	0.3 – 0.6		0.6 - Refusal
TP41	0 – 0.2	-	0.2 – 0.4		0.4 - Refusal
TP42	0 – 0.3	0.3 – 0.5	0.5 – 1.2		1.2 - Refusal
TP43	0 – 0.8	-	0.8 – 1.3		1.3 - Refusal
TP44	0 – 0.2	-	0.2 – 1.1		1.1 - Refusal
TP45	0 – 0.3	-	0.3 – 0.9		0.9 - Refusal
TP46	0 – 0.4	0.4 – 0.8	-		0.8 - Refusal
TP47	0 – 0.2	0.2 – 0.3	0.3 – 0.5		0.5 – Refusal
TP48	0 – 0.3	-	0.3 – 2.5		2.5 – Max Reach
TP49	0 – 0.1			0.1 – 2.4	2.4 – Max Reach
TP50	0 – 0.1	-	0.1 – 0.4		0.4 - Refusal

13.1.2 Sixteen test pits were excavated until the maximum reach of the TLB at depths between 2.4m to 3.4m below ground level. The remaining thirty-four test pits were excavated until refusal of the TLB at depths between 0.4m to 2.2m.

13.1.3 Groundwater seepage was encountered in test pit TP2 at a depth of 1.6m below ground level. No groundwater seepage was observed in any of the other test pits.

13.2 Laboratory Results

13.2.1 TP03

- The transported material classified as a poorly graded sand to silty sand (SP – SM). The Liquid Limit is 42 and the Linear Shrinkage is 4.0. The value of the Grading Modulus is 2.36.

- The material plotted as a LOW activity on the van der Merwe Activity Diagram.
- With a CBR value of 21 compacted to 95% Mod AASHTO, the transported material classifies as a G7 according to COLTO specifications. The material is therefore not suitable for structural fill.
- The transported material from test pit TP3 has a pH of 6.79 and an electrical conductivity of 0.032 S/m which classifies as a soil with medium corrosion potential.

13.2.2 TP05

- The transported material classified as a low plasticity silt (ML). The Liquid Limit is 46 and the Linear Shrinkage 3.0. The value of the Grading Modulus is 0.55.
- The material plotted as a LOW activity on the van der Merwe Activity Diagram.
- The transported material from test pit TP5 has a pH of 6.54 and an electrical conductivity of 0.036 S/m which classifies as a soil with medium to high corrosion potential.

13.2.3 TP24

- The residual material tested classified as a silty sand (SM). The Liquid Limit is 31 and the Linear Shrinkage is 3.5. The value of the Grading Modulus is 1.35.
- This material plotted as a LOW activity on the van der Merwe Activity Diagram.
- The residual material from test pit TP24 has a pH of 4.81 and an electrical conductivity of 0.052 S/m which classifies as a soil with high corrosion potential.

13.2.4 TP37

- The residual material tested classified as a silty sand (SM). The Liquid Limit is 36 and the Linear Shrinkage is 4.0. The Grading Modulus is 1.25.
- The material plotted as a LOW activity on the van der Merwe Activity Diagram.
- The residual material from test pit TP37 has a pH of 4.84 and an electrical conductivity of 0.052 S/m which classifies as a soil with high corrosion potential.

13.2.5 TP43

- The topsoil material tested classified as non-plastic silty sand (SM). The Grading Modulus is 1.03.
- The material plotted as a LOW activity on the van der Merwe Activity Diagram.
- The topsoil from test pit TP43 has a pH of 4.45 and an electrical conductivity of 0.052 S/m which classifies as a soil with high corrosion potential.

13.2.6 TP48

- The residual material tested classified as a low plasticity clay to low plasticity silt (CL - ML). The Liquid Limit is 25 and the Linear Shrinkage is 2.0. The Grading Modulus is 0.65.
- This material plotted as a LOW activity on the van der Merwe Activity Diagram.
- The residual material from test pit TP48 has a pH of 4.44 and an electrical conductivity of 0.053 S/m which classifies as a soil with high corrosion potential.

14. Discussion of results

14.1 Soil profiles

14.1.1 The typical soil strata of the far eastern side of the site comprises topsoil underlain by soft to stiff sandy clay (transported material) overlying soft to stiff sandy clay (residual material).

14.1.2 The typical soil strata of the western side of the site comprises topsoil underlain by medium dense to dense silty sand (transported material) overlying medium dense to very dense silty sand and clayey sand (residual material) and soft rock sandstone. Hardpan ferricrete was encountered in test pits TP17 and TP46.

14.2 Construction material

14.2.1 The transported material tested classified as G7 according to COLTO specifications. This material is not suitable for use as structural fill.

14.2.2 Suitable material will need to be imported for use as structural fill where required.

14.3 Foundations

14.3.1 The soft rock sandstone and hardpan ferricrete is suitable as a founding horizon where encountered. For areas where soft rock sandstone or hardpan ferricrete are present, reinforced concrete pad footings should be used to support the solar PV panels and other load bearing structures. The pad footings can be founded on the soft rock sandstone or hardpan ferricrete at depths between 0.4m and 2.2m. The soft rock sandstone and hardpan ferricrete will provide a safe bearing capacity of 250kPa.

14.3.2 For areas where deep soil horizons are present, friction piles should be used to support the PV solar panels. Friction piles can be driven into the soil relatively quickly and easily. The piles should be driven into the ground until sufficient pull out resistance is achieved to ensure that the PV panels are adequately anchored to withstand the applied loads. The pull-out strength of the pile can be determined during installation. The optimum pile embedment depth will need to be determined by the design engineers.

14.3.3 As an alternative to the above recommendations, cast-iron piles can be driven into the rock or residual material. The cast-iron is non corrosive, and hence will not be affected by the pH and salinity of the soil. The solar panels can be attached direct to the piles, eliminating the need for structural steel supports and hold-down bolts. This has been successfully done for solar PV plants in the Northern Cape where the piles were driven into calcrete. The deployment and installation was very rapid and cost effective.

14.3.4 Shoring and/or lateral support, or back battering, is required for excavations exceeding 1.5m deep.

14.4 Excavatability

14.4.1 Excavatability of the material on site is classed *soft* to *intermediate* in the soils and *hard* once the soft rock sandstone and hardpan ferricrete is encountered.

15. Summary, conclusions and recommendations

15.1 Fifty test pits were excavated using a TLB to determine the subsoil conditions. Sixteen test pits were excavated until the maximum reach of the TLB at depths between 2.4m to 3.4m below ground level. The remaining thirty-four test pits were excavated until refusal of the TLB at depths between 0.4m to 2.2m below ground level.

15.2 The typical soil strata of the far eastern side of the site comprises topsoil underlain by soft to stiff sandy clay (transported material) overlying soft to stiff sandy clay (residual material).

15.3 The typical soil strata of the western side of the site comprises topsoil underlain by medium dense to dense silty sand (transported material) overlying medium dense to very dense silty sand and clayey sand (residual material) and soft rock sandstone. Hardpan ferricrete was encountered in test pits TP17 and TP46.

15.4 The soft rock sandstone and hardpan ferricrete is suitable as a founding horizon where encountered. For areas where soft rock sandstone or hardpan ferricrete are present, reinforced concrete pad footings should be used to support the solar PV panels and other load bearing structures. The pad footings can be founded on the soft rock sandstone or hardpan ferricrete at depths between 0.4m and 2.2m. The soft rock sandstone and hardpan ferricrete will provide a safe bearing capacity of 250kPa.

15.5 For areas where deep soil horizons are present, friction piles should be used to support the PV solar panels. Friction piles can be driven into the soil relatively quickly and easily. The piles should be driven into the ground until sufficient pull out resistance is achieved to ensure that the PV panels are adequately anchored to withstand the applied loads. The optimum pile embedment depth will need to be determined by the design engineers.

15.6 Driven cast-iron piles can be considered as an alternative.

15.7 Groundwater seepage was encountered in test pit TP2 at a depth of 1.6m below ground level. No groundwater seepage was observed in any of the other test pits.

15.8 Excavatability of the material on site is classed *soft* to *intermediate* in the soils and *hard* once the soft rock sandstone and hardpan ferricrete is encountered.

15.9 Precautions should be taken to protect the foundations from moisture ingress. General precautionary measures, which are intended to prevent the concentrated ingress of water into the ground are also recommended. All external areas are to be free draining away from structures. Adequate storm water control needs to be implemented to direct the water away from excavations and foundations.

15.10 Precautions should be taken to protect sub-surface infrastructure from potential corrosion. Suitable materials should be selected, or the sub-surface infrastructure adequately coated to prevent any potential corrosion to sub-surface infrastructure.

15.11 The material on site is not suitable for use as structural fill. Suitable material will need to be imported where required.

Prepared by

Meisie Kekana – BTech Structural Eng

In terms of Geotheta Quality Policy, this report has been reviewed, product corrected and certified okay for distribution and use.

Reviewed by

Ian Hammond Pr Eng

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

16. References

16.1 WEINERT, HH. 1980. The natural road construction materials of southern Africa. Pretoria: Academica.

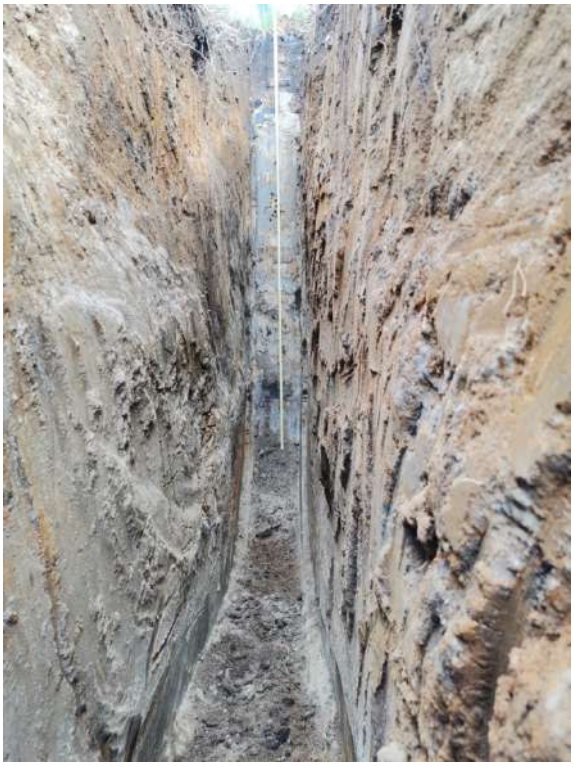
16.2 JENNINGS JE, BRINK ABA, and WILLIAMS AAB. 1973. Revised guide to soil profiling for civil engineering purposes in southern Africa, The Civil Engineer in South Africa, Jan 1973 Trans SAICE, Vol 15 No 1.

16.3 VAN DER MERWE, DH. 1964. The prediction of heave from the plasticity index and the percentage clay fraction of soils. The Civil Engineer in South Africa. June 1964, pp 103-107.

16.4 UNIFIED SOIL CLASSIFICATION SYSTEM. CALTRANS

APPENDICES

APPENDIX A: TEST PIT PHOTOS



TP01

TP02

TP03

TP04

TP05

TP06

TP07

TP08

TP09

TP10

TP11

TP12

TP13

TP14

TP15

TP16

TP17

TP18

TP19

TP20

TP21

TP22

TP23

TP24

TP25

TP26

TP27

TP28

TP29

TP30


E 29°31'19,38482" (LONG)
20 January 2021 09:43

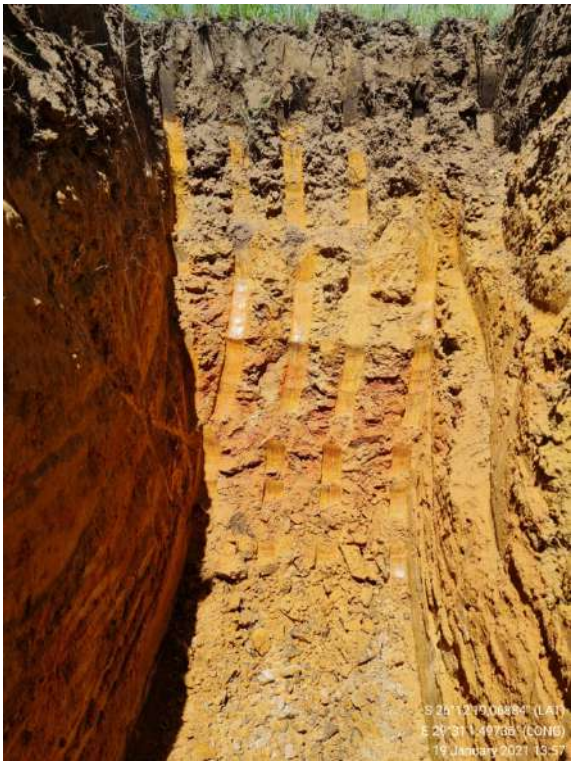
TP31


S 26°12'36,28476" (LAT)
E 29°31'16,93668" (LONG)
20 January 2021 09:56

TP32

TP33

TP34



TP35

TP36


S 26°12'16,59168" (LAT)
E 29°30'35,56692" (LONG)
19 January 2021 14:40

TP37

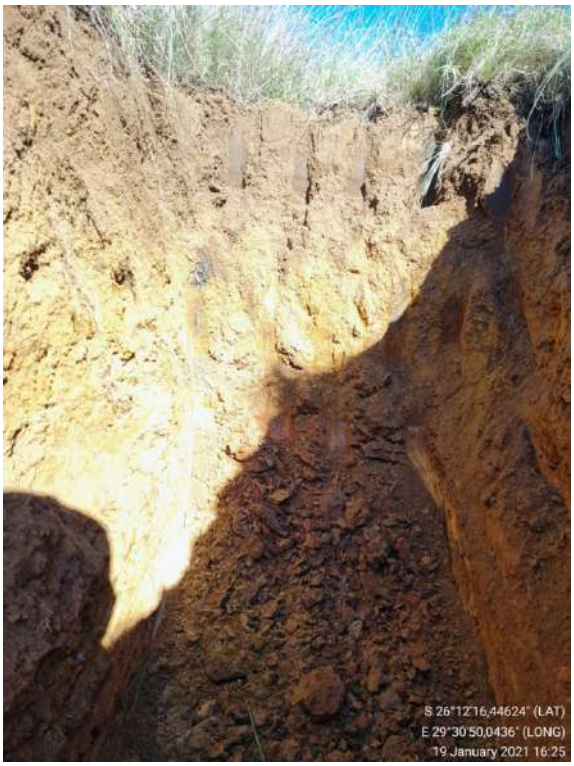

S 26°12'7,15104" (LAT)
E 29°30'30,62304" (LONG)
19 January 2021 15:06

TP38

TP39

TP40

TP41



TP42

TP43

TP44

TP45

TP46

TP47

TP48

TP49

TP50

APPENDIX B: TEST PIT PROFILES

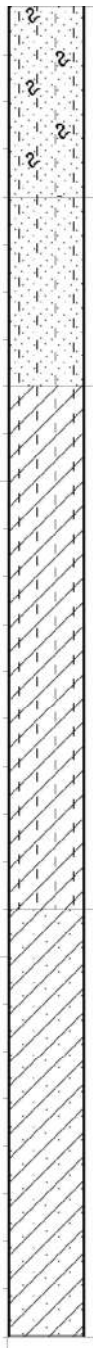
GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP1
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:15



0.00	Moist, dark brown, very loose, intact, silty SAND with roots. Topsoil.
0.40	Moist, orange and light brown, loose, intact, silty SAND. Transported.
0.80	Slightly moist, orange-grey mottled black, firm, intact, silty CLAY. Transported.
1.90	Slightly moist, grey streaked orange and black, stiff, intact, sandy CLAY. Residual.
2.80	End of TP.

NOTES

1) No groundwater seepage.
2) No refusal.
3) No sample taken.

CONTRACTOR : Plant hire
MACHINE : JCB TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Fahad Khan
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 400mm Trench
DATE : 3 December 2020
DATE : 3 December 2020

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

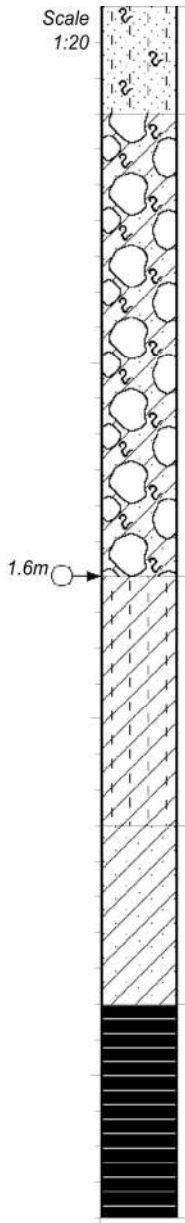
HOLE No: TP1

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP2
Sheet 1 of 1

JOB NUMBER: 2010329



0.00	Slightly moist, dark brown, very loose, intact, silty SAND with roots. Topsoil.
0.30	Moist, black with orange, firm to stiff, intact, sandy CLAY with boulders and some roots. Transported.
1.60	Wet, greyish green mottled orange, soft, intact, silty CLAY. Transported.
2.30	Wet, brown streaked black, soft to firm, intact, sandy CLAY. Transported.
2.80	Wet, black streaked grey, medium dense, intact, Coal beds. Residual
3.40	End of TP.

NOTES

1) Groundwater seepage at 1.6m
2) No refusal.
3) No sample taken.

CONTRACTOR : Plant hire
MACHINE : JCB TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Fahad Khan
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 4 December 2020
DATE : 4 December 2020

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

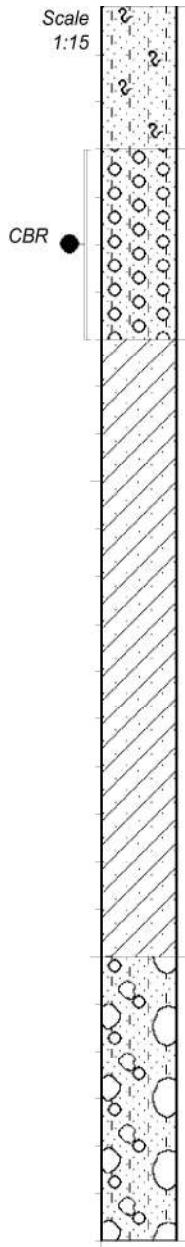
HOLE No: TP2

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP3
Sheet 1 of 1

JOB NUMBER: 2010329



0.00	Moist, dark brown, very loose, intact, silty SAND with roots. Topsoil.
0.30	Slightly moist, brown mottled black and orange, loose to medium dense, intact, gravel in a matrix of silty SAND. Transported.
0.70	Slightly moist, grey streaked orange and black, firm, intact, sandy CLAY. Transported.
2.00	Slightly moist, brown mottled black, medium dense, pinhole voided, gravelly silty SAND with cobbles. Residual.
2.60	End of TP.

NOTES

1) No groundwater seepage.
2) No refusal.
3) Sample taken at 0.3--0.7 for foundation indicator, Mod CBR and pH.

CONTRACTOR : Plant hire
MACHINE : JCB TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Fahad Khan
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 4 December 2020
DATE : 4 December 2020

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP3

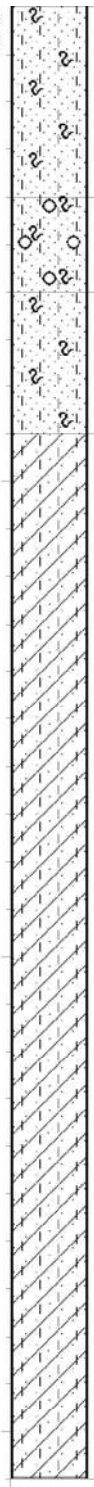
GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP4
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:15



0.00	Slightly moist, dark brown, very loose, intact, silty SAND with roots. Topsoil.
0.40	Moist, brown speckled orange and black, loose, intact, gravelly silty SAND with roots. Transported.
0.60	Moist, greyish brown, loose, intact, silty SAND with some roots. Transported.
0.90	Slightly moist, grey and orange streaked black and red, medium dense to dense, intact, sandy silty CLAY. Residual.
3.10	End of TP.

NOTES

1) No groundwater seepage.
2) No refusal.
3) No sample taken.

CONTRACTOR : Plant hire
MACHINE : JCB TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Fahad Khan
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 4 December 2020
DATE : 4 December 2020

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

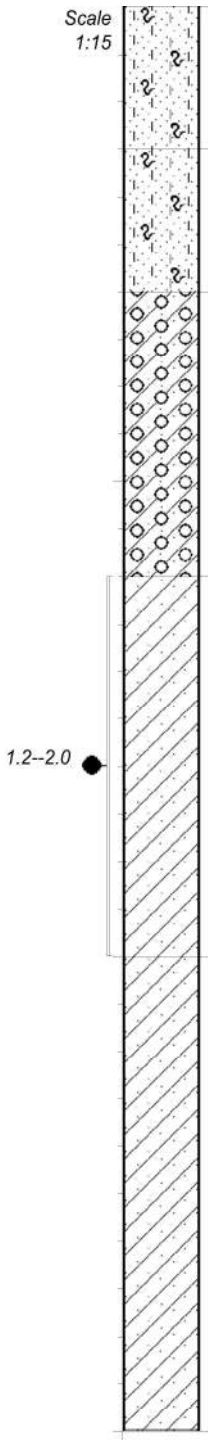
HOLE No: TP4

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP5
Sheet 1 of 1

JOB NUMBER: 2010329



0.00 Moist, dark brown, loose, intact, silty SAND with roots. Topsoil.

0.30 Moist, light brown, loose to medium dense, intact, silty SAND with roots. Transported.

0.60 Slightly moist, grey with orange and black, medium dense to dense, intact, gravel in a matrix of sandy CLAY. Transported.

1.20 Slightly moist, grey with orange and black, firm to stiff, intact, sandy CLAY. Transported.

2.00 Moist, grey, soft to firm, intact, sandy CLAY. Residual.

3.00 End of TP.

NOTES

1) No groundwater seepage.
2) No refusal.
3) Sample taken at 1.2--2.0 for foundation indicator.

CONTRACTOR : Plant hire
MACHINE : JCB TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Fahad Khan
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 4 December 2020
DATE : 4 December 2020

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP5

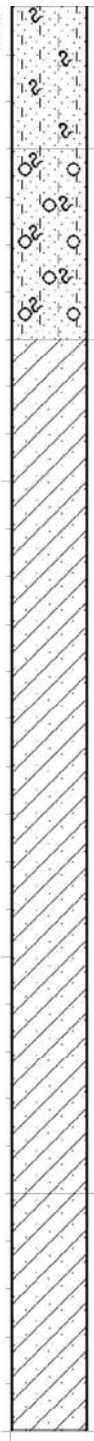
GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP6
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:15



0.00 Moist, dark brown, loose, intact, silty SAND with roots. Topsoil.

0.30 Moist, brown speckled orange and black, loose, intact, gravelly silty SAND with roots. Transported.

0.70 Slightly moist, grey with orange and black, firm to stiff, intact, sandy CLAY. Transported.

2.50 Moist, grey, soft to firm, intact, sandy CLAY. Residual.

3.00 End of TP.

NOTES

1) No groundwater seepage.
2) No refusal.
3) No sample taken.

CONTRACTOR : Plant hire
MACHINE : JCB TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Fahad Khan
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 4 December 2020
DATE : 4 December 2020

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP6

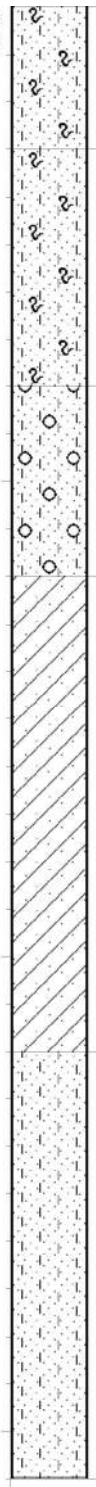
GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP7
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:15



0.00 Moist, dark brown, loose, intact, silty SAND with roots. Topsoil.

0.30 Moist, light brown, loose to medium dense, intact, silty SAND with roots. Transported.

0.80 Slightly moist, grey streaked orange and black, dense, intact, gravelly silty SAND. Transported.

1.20 Slightly moist, grey with orange and black, firm to stiff, intact, sandy CLAY. Transported.

2.20 Moist, light grey streaked brown and black, medium dense, intact, silty SAND. Residual.

3.10 End of TP.

NOTES

1) No groundwater seepage.
2) No refusal.
3) No sample taken.

CONTRACTOR : Plant hire
MACHINE : JCB TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Fahad Khan
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 4 December 2020
DATE : 4 December 2020

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP7

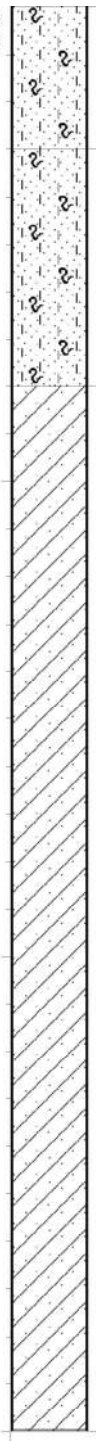
GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP08
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:15



0.00	Slightly moist, light brown, loose, intact, silty SAND with roots. Topsoil.
0.30	Moist, dark brown, loose, intact, silty SAND with roots. Transported.
0.80	Moist, yellow-orange and grey mottled black, firm, intact, sandy CLAY. Residual.
3.00	End of TP.

NOTES

1) No groundwater seepage.
2) No refusal.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 15 January 2021
DATE : 15 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP08

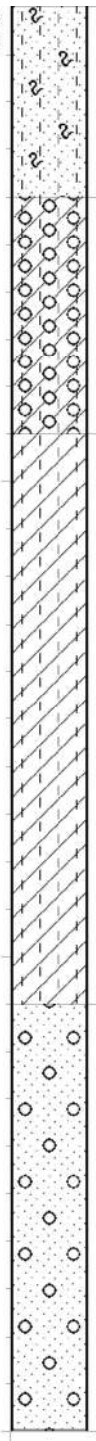
GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP9
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:15



0.00	Slightly moist, dark brown, loose, intact, silty SAND with roots. Topsoil.
0.40	Slightly moist, reddish brown, soft to firm, intact, gravel in a matrix of silty CLAY. Transported.
0.90	Slightly moist, greenish grey, firm, intact, silty CLAY. Transported.
2.10	Slightly moist, grey and orange mottled black, loose to medium dense, gravelly SAND. Residual.
3.00	End of TP.

NOTES

1) No groundwater seepage.
2) No refusal.
3) No sample taken.

CONTRACTOR : Plant hire
MACHINE : JCB TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Fahad Khan
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 7 December 2020
DATE : 7 December 2020

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP9

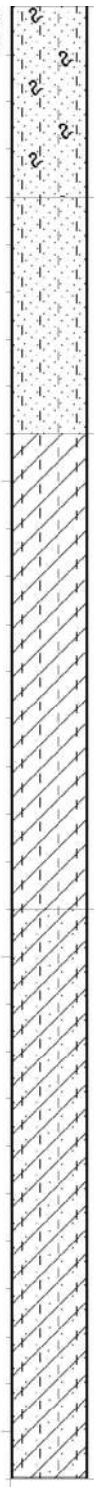
GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP10
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:15



0.00	Slightly moist, dark brown, loose, intact, silty SAND with roots. Topsoil.
0.40	Slightly moist, light brown, loose, intact, silty SAND. Transported.
0.90	Slightly moist, light brown, firm to stiff, intact, silty CLAY. Transported.
1.90	Slightly moist, grey and orange streaked black and red, medium dense to dense, intact, sandy silty CLAY. Residual.
3.10	End of TP.

NOTES

1) No groundwater seepage.
2) No refusal.
3) No sample taken.

CONTRACTOR : Plant hire
MACHINE : JCB TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Fahad Khan
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 7 December 2020
DATE : 7 December 2020

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP10

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP11
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:15

0.00	Slightly moist, dark brown, loose, intact, silty SAND with roots. Topsoil.
0.40	Slightly moist, light brown, loose, intact, silty SAND. Transported.
0.90	Moist, yellow-orange and grey, medium dense, intact, clayey SAND. Residual.
2.30	Moist, light grey, soft, intact, silty CLAY. Residual.
2.70	End of TP.

NOTES

1) No groundwater seepage.
2) No refusal.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 15 January 2021
DATE : 15 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP11

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP12
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10

0.00	Slightly moist, dark brown, loose, intact, silty SAND with roots. Topsoil.
0.30	Dry, light brown, medium dense, intact, silty SAND with roots. Transported.
0.50	Moist, brown, loose to medium dense, intact, silty SAND with occasional roots. Transported.
1.10	Moist, yellow-orange and grey mottled black, dense to very dense, intact, clayey SAND. Residual.
1.50	End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 1.5m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 15 January 2021
DATE : 15 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP12

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP13
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10

0.00	Slightly moist, dark brown, loose, intact, silty SAND with roots. Topsoil.
0.20	Slightly moist, brown, loose, intact, silty SAND. Transported.
0.60	Slightly moist, yellow-orange and grey mottled black, dense to very dense, intact, silty SAND. Residual.
1.20	End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 1.2m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 15 January 2021
DATE : 15 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP13

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP14
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10

0.00	Slightly moist, dark brown, loose, intact, silty SAND with roots. Topsoil.
0.30	Slightly moist, dark brown, loose, intact, gravelly silty SAND with roots. Transported.
0.60	Slightly moist, orange-red and grey mottled black, very dense, intact, silty SAND. Residual.
1.20	End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 1.2m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 15 January 2021
DATE : 15 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP14

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP15
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10

0.00	Slightly moist, dark brown, loose, intact, silty SAND with roots. Topsoil.
0.30	Slightly moist, dark brown, loose, intact, gravelly silty SAND with roots. Transported.
0.60	Slightly moist, orange-red and grey mottled black, dense to very dense, intact, clayey silty SAND. Residual.
1.20	End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 1.2m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 15 January 2021
DATE : 15 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP15

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP16
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:15

0.00	Slightly moist, dark brown, loose, intact, silty SAND with roots. Topsoil.
0.30	Dry, light grey, loose, intact, silty SAND with roots. Transported.
0.40	Moist, light grey, firm, intact, sandy CLAY. Transported.
0.80	Moist, yellow-orange and grey, medium dense, intact, clayey SAND. Residual.
2.50	End of TP.

NOTES

1) No groundwater seepage.
2) No Refusal
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 15 January 2021
DATE : 15 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP16

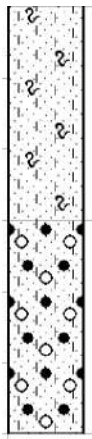
GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP17
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10



0.00 Slightly moist, dark brown, loose, intact, silty SAND with roots. Topsoil.

0.30 Slightly moist, light brown and yellow-orange, medium dense to dense, intact, gravelly silty SAND with ferricrete nodules. Transported.

0.60 End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 0.6m on hardpan ferricrete.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 15 January 2021
DATE : 15 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP17

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP18
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10

0.00	Slightly moist, dark grey, loose, intact, silty SAND with roots. Topsoil.
0.20	Slightly moist, light grey and orange mottled black, medium dense, intact, gravelly silty SAND. Transported.
0.50	Moist, yellow-orange and grey mottled black, dense to very dense, intact, clayey silty SAND. Residual.
1.10	End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 1.1m
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 15 January 2021
DATE : 15 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP18

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP19
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10

0.00 Moist, dark brown, loose, intact, silty SAND with roots. Topsoil.

0.40 End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 0.4m
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 15 January 2021
DATE : 15 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP19

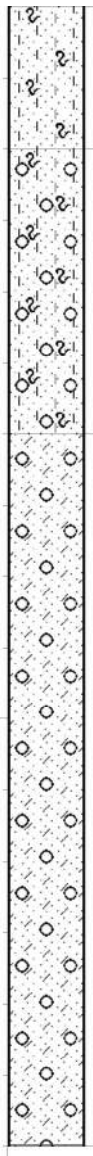
GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP20
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10



0.00	Slightly moist, dark brown, loose, intact, silty SAND with roots. Topsoil.
0.20	Slightly moist, light brown, loose to medium dense, intact, gravelly silty SAND with roots. Transported.
0.60	Slightly moist, dark red and yellow mottled black, dense to very dense, intact, gravelly clayey SAND. Residual.
1.60	End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 1.6m
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 15 January 2021
DATE : 15 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP20

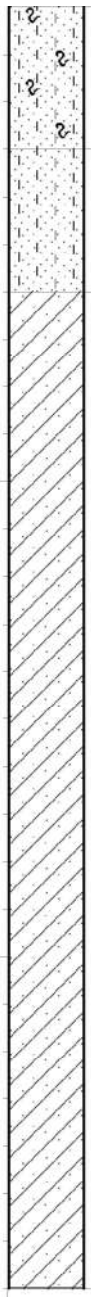
GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP21
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:15



0.00	Slightly moist, dark brown, loose, intact, silty SAND with roots. Topsoil.
0.30	Slightly moist, light brown, loose, intact, silty SAND. Transported.
0.60	Moist, yellow-orange and grey, firm, intact, sandy CLAY. Residual.
2.70	End of TP.

NOTES

1) No groundwater seepage.
2) No refusal.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 15 January 2021
DATE : 15 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP21

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP22
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:15

0.00	Slightly moist, dark brown, loose, intact, silty SAND with roots. Topsoil.
0.40	Slightly moist, light brown, loose, intact, silty SAND with occasional roots. Transported.
0.80	Moist, yellow-red and grey, loose, intact, clayey SAND. Residual.
1.70	Moist, yellow-red and grey, dense, intact, clayey SAND. Residual.
2.60	End of TP.

NOTES

1) No groundwater seepage.
2) No refusal.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 19 January 2021
DATE : 19 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP22

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP23
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10

0.00	Slightly moist, brown, loose, intact, silty SAND with roots. Topsoil.
0.30	Slightly moist, brown, loose, intact, gravelly silty SAND with roots Transported.
0.50	Moist, yellow-orange mottled black, medium dense to dense, intact, silty SAND. Residual.
1.00	End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 1.0m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 19 January 2021
DATE : 19 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP23

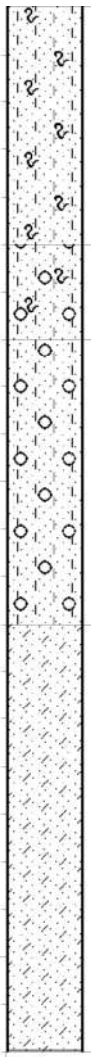
GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP24
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:15



0.7--2.2m

0.00	Slightly moist, brown, loose, intact, silty SAND with roots. Topsoil.
0.50	Slightly moist, brown, loose, intact, gravelly silty SAND with roots Transported.
0.70	Moist, orange-red mottled black, medium dense, intact, gravelly silty SAND. Residual.
1.30	Moist, orange-red and grey mottled black, dense, intact, clayey SAND. Residual.
2.20	End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 2.2m.
3) Sample taken at 0.7--2.2m for foundation indicator and pH.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 19 January 2021
DATE : 19 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP24

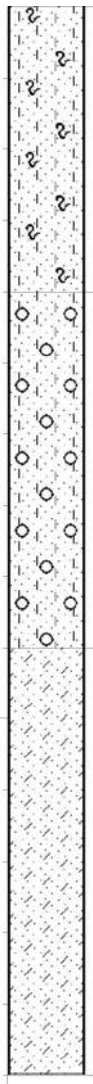
GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP25
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10



0.00 Slightly moist, brown, loose, intact, silty SAND with roots. Topsoil.

0.40 Moist, brown and yellow-orange mottled black, loose to medium dense, intact, gravelly silty SAND. Residual.

0.90 Moist, orange-red and grey mottled black, dense, intact, clayey SAND. Residual.

1.50 End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 1.5m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 19 January 2021
DATE : 19 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP25

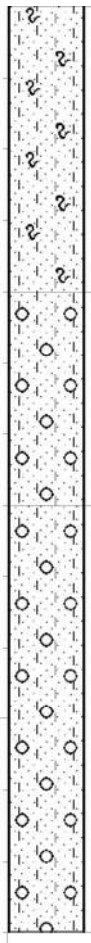
GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP26
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10



0.00	Slightly moist, brown, loose, intact, silty SAND with roots. Topsoil.
0.40	Moist, brown mottled black, medium dense, intact, gravelly silty SAND. Transported.
0.70	Moist, orange-red and grey, dense to very dense, intact, gravelly silty SAND. Residual.
1.30	End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 1.3m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 19 January 2021
DATE : 19 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP26

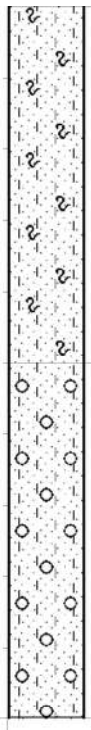
GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP27
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10



0.00 Slightly moist, brown, loose, intact, silty SAND with roots. Topsoil.

0.50 Slightly moist, orange-brown mottled black, dense, intact, gravelly silty SAND. Residual.

1.00 End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 1.0m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 19 January 2021
DATE : 19 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP27

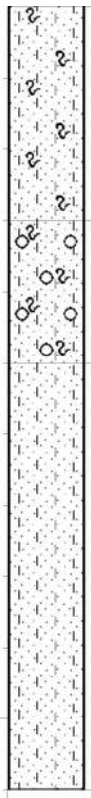
GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP28
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10



0.00	Slightly moist, brown, loose, intact, silty SAND with roots. Topsoil.
0.30	Slightly moist, brown, loose, intact, gravelly silty SAND with roots. Transported.
0.50	Slightly moist, orange-red and grey mottled black, very dense, intact, silty SAND. Residual.
1.10	End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 1.1m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 19 January 2021
DATE : 19 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP28

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP29
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10

0.00	Slightly moist, brown, loose, intact, silty SAND with roots. Topsoil.
0.30	Slightly moist, yellow-orange mottled black, dense to very dense, intact, silty SAND with ferricrete nodules and roots. Transported.
0.70	Moist, orange-red mottled black, medium dense, intact, silty SAND. Residual.
1.30	Moist, orange-red mottled black, dense to very dense, intact, silty SAND. Residual.
1.80	End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 1.8m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 19 January 2021
DATE : 19 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP29

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP30
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10

0.00 Slightly moist, brown, loose, intact, silty SAND with roots. Topsoil.

0.30 Slightly moist, greyish-orange mottled black, dense, intact, silty SAND with cobbles. Residual.

0.60 End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 0.6m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 19 January 2021
DATE : 19 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP30

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP31
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10

0.00 Slightly moist, brown, loose, intact, silty SAND with roots. Topsoil.

0.40 Slightly moist, yellow-orange and grey mottled black, dense to very dense, intact, silty SAND. Residual.

0.90 End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 0.9m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 20 January 2021
DATE : 20 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP31

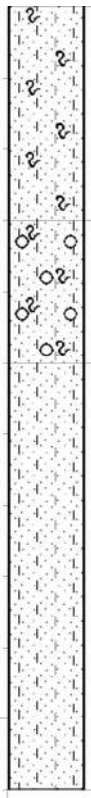
GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP32
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10



0.00	Slightly moist, brown, loose, intact, silty SAND with roots. Topsoil.
0.30	Slightly moist, brown, loose, intact, gravelly silty SAND with roots. Topsoil.
0.50	Slightly moist, yellow-orange and grey mottled black, dense, intact, silty SAND. Residual.
1.10	End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 1.1m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 20 January 2021
DATE : 20 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP32

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP33
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10

0.00	Slightly moist, brown, loose, intact, silty SAND with roots. Topsoil.
0.30	Slightly moist, brown, loose, intact, gravelly silty SAND with roots. Topsoil.
0.50	Slightly moist, orange-red and grey mottled black, dense, intact, silty SAND. Residual.
1.20	End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 1.2m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 19 January 2021
DATE : 19 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP33

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP34
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10

0.00	Slightly moist, brown, loose, intact, silty SAND with roots. Topsoil.
0.30	Slightly moist, brown, dense, intact, gravelly silty SAND with roots. Topsoil.
0.60	Slightly moist, yellow-orange and grey mottled black, dense, intact, silty SAND. Residual.
1.80	End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 1.8m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 19 January 2021
DATE : 19 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP34

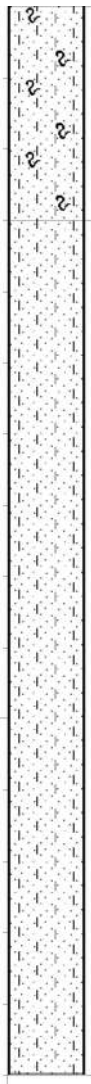
GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP35
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10



0.00 Slightly moist, brown, loose, intact, silty SAND with roots. Topsoil.

0.30 Slightly moist, yellow-orange and grey mottled black, dense, intact, silty SAND. Residual.

1.50 End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 1.5m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 19 January 2021
DATE : 19 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP35

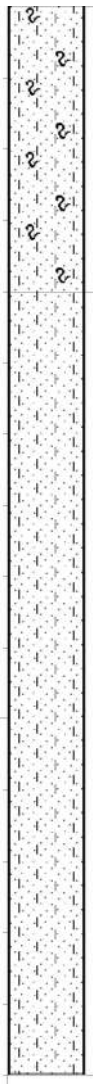
GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP36
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10



0.00 Slightly moist, brown, loose, intact, silty SAND with roots. Topsoil.

0.40 Slightly moist, yellow-orange and grey mottled black, dense to very dense, intact, silty SAND. Residual.

1.50 End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 1.5m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 19 January 2021
DATE : 19 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP36

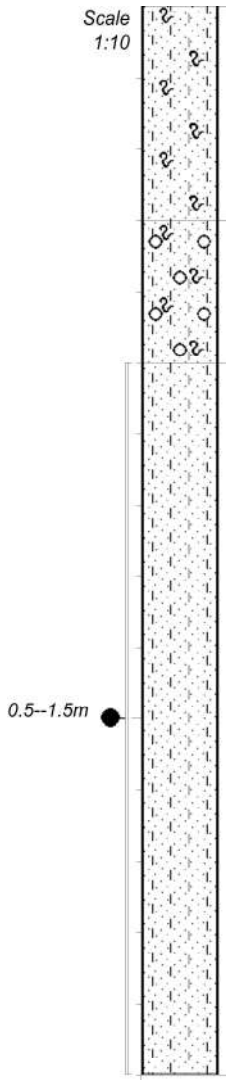
GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP37
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10



0.00	Slightly moist, brown, loose, intact, silty SAND with roots. Topsoil.
0.30	Slightly moist, brown, loose, intact, gravelly silty SAND with roots. Transported.
0.50	Moist, yellow-orange and light grey, dense to very dense, intact, silty SAND. Residual.
1.50	End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 1.5m.
3) Sample taken at 0.5--1.5m for foundation indicator and pH.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 19 January 2021
DATE : 19 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP37

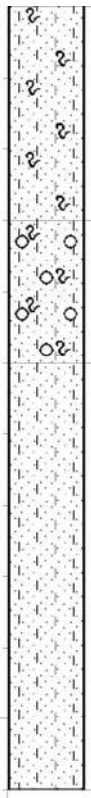
GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP38
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10



0.00	Slightly moist, brown, loose, intact, silty SAND with roots. Topsoil.
0.30	Slightly moist, light brown, loose, intact, gravelly silty SAND with roots. Transported.
0.50	Moist, yellow-orange and light grey, dense to very dense, intact, silty SAND. Residual.
1.10	End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 1.1m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 19 January 2021
DATE : 19 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP38

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP39
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10

0.00 Slightly moist, brown, loose, intact, silty SAND with roots. Topsoil.

0.40 End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 0.4m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 19 January 2021
DATE : 19 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP39

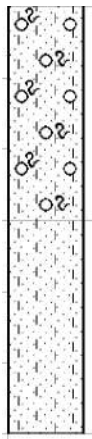
GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP40
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10



0.00 Slightly moist, brown, loose, intact, gravelly silty SAND with roots. Topsoil.

0.30 Slightly moist, yellow-orange and grey mottled black, dense, intact, silty SAND. Residual.

0.60 End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 0.6m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 19 January 2021
DATE : 19 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP40

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP41
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10

0.00 Slightly moist, brown, loose, intact, silty SAND with roots. Topsoil.

0.20 Moist, yellow-orange and light grey, dense, intact, silty SAND. Residual.

0.40 End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 0.4m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 19 January 2021
DATE : 19 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP41

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP42
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10

0.00	Slightly moist, brown, loose, intact, silty SAND with roots. Topsoil.
0.30	Slightly moist, brown, loose, intact, gravelly silty SAND with roots. Transported.
0.50	Slightly moist, yellow-orange and grey mottled black, medium dense, intact, silty SAND. Residual.
0.80	Slightly moist, yellow-orange and grey mottled black, dense to very dense, intact, silty SAND. Residual.
1.20	End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 1.2m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 19 January 2021
DATE : 19 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP42

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP43
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10

0.00 Moist, brown, loose, intact, silty SAND with roots. Topsoil.

0.80 Slightly moist, yellow-orange and grey mottled black, dense, intact, silty SAND. Residual.

1.30 End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 1.3m.
3) Sample taken at 0--0.8 for foundation indicator and pH.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 19 January 2021
DATE : 19 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP43

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP44
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10

0.00 Moist, brown, loose, intact, silty SAND with roots. Topsoil.

0.20 Moist, yellow-orange and light grey, dense, intact, silty SAND. Residual.

1.10 End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 1.1m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 20 January 2021
DATE : 20 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP44

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP45
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10

0.00 Moist, brown, loose, intact, silty SAND with roots. Topsoil.

0.30 Dry, yellow-orange and light grey, dense, intact, silty SAND. Residual.

0.90 End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 0.9m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 20 January 2021
DATE : 20 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP45

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP46
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10

0.00 Moist, brown, loose, intact, silty SAND with roots. Topsoil.

0.40 Slightly moist, light brown and yellow-orange blotched black, dense to very dense, intact, partially cemented ferricrete. Pedogenic.

0.80 End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 0.8m on hardpan ferricrete.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 20 January 2021
DATE : 20 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP46

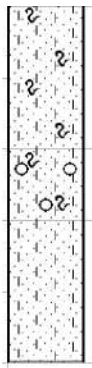
GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP47
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10



0.00	Moist, brown, loose, intact, silty SAND with roots. Topsoil.
0.20	Moist, light brown, loose, intact, gravelly silty SAND with roots. Transported.
0.30	Slightly moist, light grey and yellow-orange, dense to very dense, intact, silty SAND. Residual.
0.50	End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 0.5m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 20 January 2021
DATE : 20 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

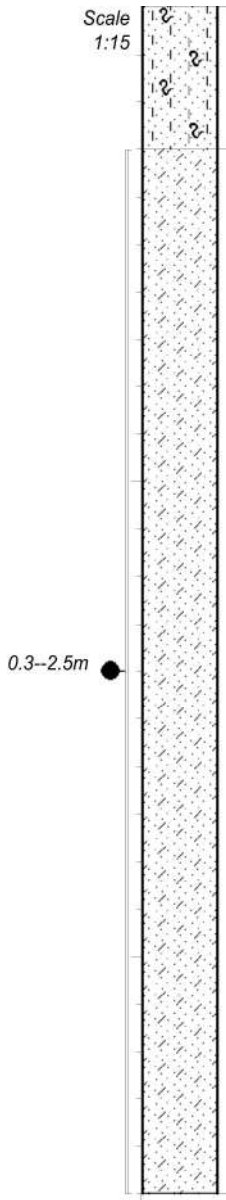
HOLE No: TP47

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP48
Sheet 1 of 1

JOB NUMBER: 2010329



0.00 Moist, light brown, loose, intact, silty SAND with roots. Topsoil.

0.30 Moist, dark red and grey mottled black in places, dense, intact, clayey SAND. Residual.

2.50 End of TP.

NOTES

1) No groundwater seepage.
2) No refusal.
3) Sample taken at 0.3--2.5m for foundation indicator and pH.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 20 January 2021
DATE : 20 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP48

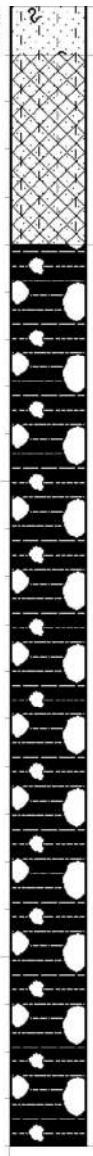
GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP49
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:15



0.00	Dry, light brown, loose, intact, silty SAND with roots. Topsoil.
0.10	Slightly moist, yellow-orange, dense, intact, silty SAND. Fill.
0.50	Slightly moist, dark grey, dense to medium dense with depth, intact, coal fragments and cobbles in a matrix of silty SAND. Fill.
2.40	End of TP.

NOTES

1) No groundwater seepage.
2) No refusal.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 20 January 2021
DATE : 20 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP49

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

HOLE No: TP50
Sheet 1 of 1

JOB NUMBER: 2010329

Scale 1:10

0.00	Slightly moist, brown, loose, intact, gravelly silty SAND with roots. Topsoil.
0.10	Dry, light grey and yellow-brown, dense, intact, silty SAND. Residual.
0.40	End of TP.

NOTES

1) No groundwater seepage.
2) Refusal at 0.4m.
3) No sample taken.

CONTRACTOR : NJP Transport
MACHINE : Case 570T TLB
DRILLED BY :
PROFILED BY :

TYPE SET BY : Massimo Gollino
SETUP FILE : STANDARD.SET

INCLINATION : Vertical
DIAM : 600mm Trench
DATE : 20 January 2021
DATE : 20 January 2021

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION : NGL
X-COORD :
Y-COORD :

HOLE No: TP50

GEOTHETA

Cabanga Environmental
Solar PV Project Geotech

LEGEND
Sheet 1 of 1

JOB NUMBER: 2010329

BOULDERS	{SA01}
GRAVEL	{SA02}
GRAVELLY	{SA03}
SAND	{SA04}
SANDY	{SA05}
SILTY	{SA07}
CLAY	{SA08}
CLAYEY	{SA09}
COAL	{SA52}
FERRICRETE NODULES	{SA24}
PARTIALLY CEMENTED	{SA30}
FILL	{SA32}
DISTURBED SAMPLE	{SA38}
ROOTS	{SA40}
WATER SEEPAGE/water strike	{CH50}
COBBLES	{SA58}

Name

14.5

CONTRACTOR :
MACHINE :
DRILLED BY :
PROFILED BY :

TYPE SET BY : Fahad Khan
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM :
DATE :
DATE :

DATE : 26/01/2021 11:18
TEXT : ..es\2010329TPProfiles.doc

ELEVATION :
X-COORD :
Y-COORD :

LEGEND
SUMMARY OF SYMBOLS

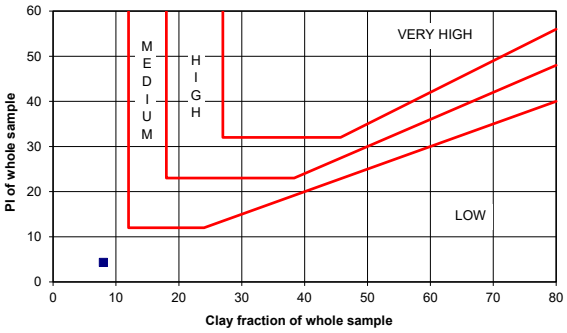
APPENDIX C: LABORATORY RESULTS

PARTICLE SIZE ANALYSIS

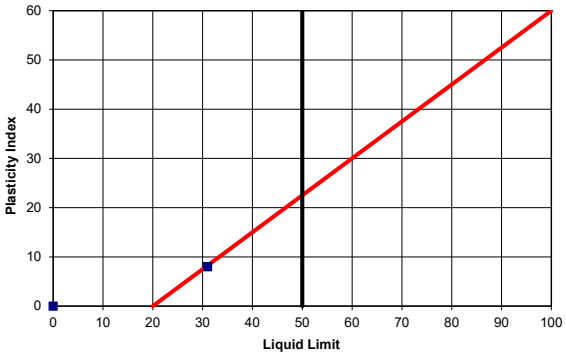
Sample No.	1
Soillab Sample No.	S20-032-01
Depth (m)	0.7 - 2.2
Position	TP 24
Material Description	LIGHT REDDISH ORANGE FERRICRETE GRAVELLY SAND
Relative density on < 2 mm **(SANS 5844)**	2.647
Organic Material	
Moisture (%) / Dispersion (%)	
SCREEN ANALYSIS (% PASSING) **(SANS 3001:GR1)**	
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	98
5.0 mm	85
2.00 mm	72
0.425 mm	54
0.075 mm	39
HYDROMETER ANALYSIS (% PASSING) **(SANS 3001:GR3)**	
57 µm	22
34 µm	18
14 µm	11
6 µm	8
2 µm	6
% Clay	8
% Silt	14
% Sand	50
% Gravel	28
ATTERBERG LIMITS **(SANS 3001:GR10)**	
Liquid Limit	31
Plasticity Index	8
Linear Shrinkage (%)	3.5
Grading Modulus	1.35
Classification	A-4 (0)
Unified Classification	SM
Chart Reference	

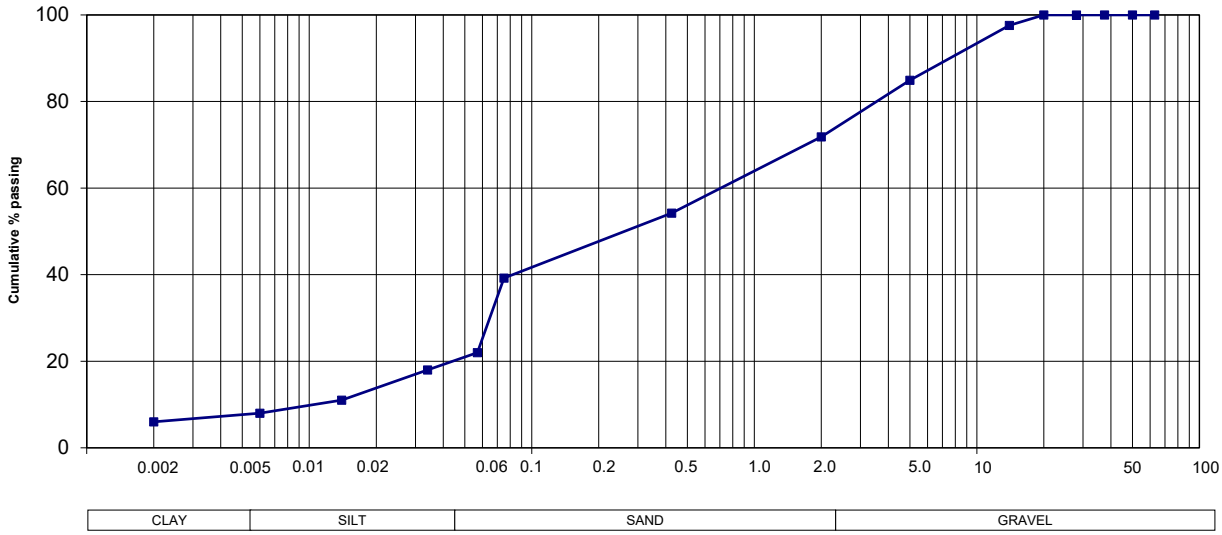
PROJECT : 2010329-CABANGA
JOB No. : S20-032
DATE : 2020/02/01

POTENTIAL EXPANSIVENESS



PLASTICITY CHART





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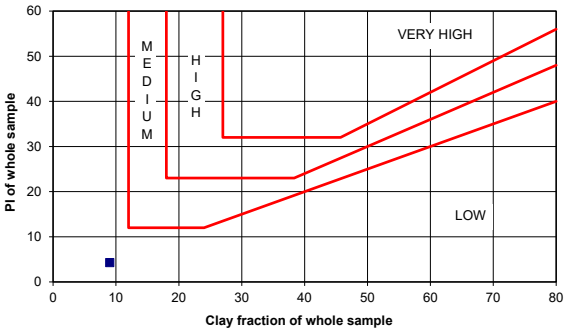
PARTICLE SIZE ANALYSIS

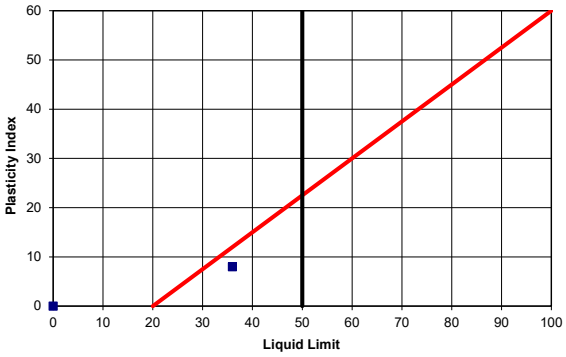
Sample No.	02
Soillab Sample No.	S20-032-02
Depth (m)	0.5 - 1.5
Position	TP 37
Material Description	DARK YELLOW GRAVELLY SAND
Relative density on < 2 mm **(SANS 5844)**	2.66
Organic Material	
Moisture (%) / Dispersion (%)	
SCREEN ANALYSIS (% PASSING) **(SANS 3001:GR1)**	
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
5.0 mm	94
2.00 mm	78
0.425 mm	53
0.075 mm	44
HYDROMETER ANALYSIS (% PASSING) **(SANS 3001:GR3)**	
56 µm	22
33 µm	18
14 µm	12
6 µm	9
2 µm	6
% Clay	9
% Silt	13
% Sand	56
% Gravel	22
ATTERBERG LIMITS **(SANS 3001:GR10)**	
Liquid Limit	36
Plasticity Index	8
Linear Shrinkage (%)	4.0
Grading Modulus	1.25
Classification	A-4 (1)
Unified Classification	SM
Chart Reference	

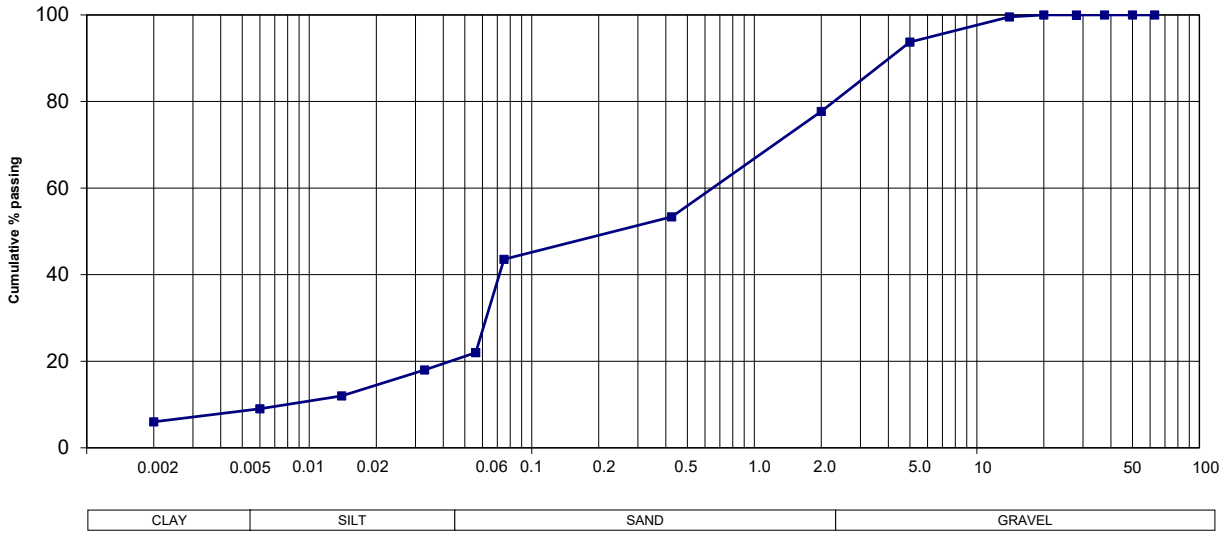
PROJECT : 2010329 -CABANGA
JOB No. : S20-032
DATE : 2020/02/01

POTENTIAL EXPANSIVENESS



PLASTICITY CHART





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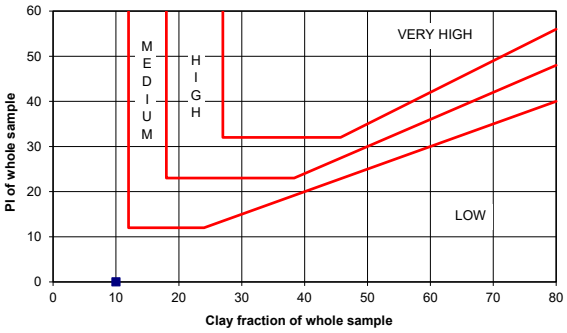
PARTICLE SIZE ANALYSIS

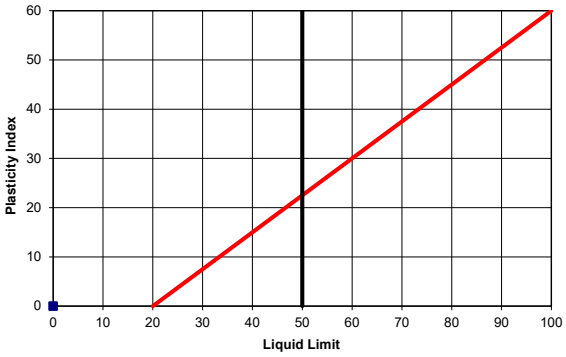
Sample No.	03
Soillab Sample No.	S20-032-03
Depth (m)	0.0 - 0.8
Position	TP 43
Material Description	LIGHT GREY FERRICRETE SILTY SAND
Relative density on < 2 mm **(SANS 5844)**	2.681
Organic Material	
Moisture (%) / Dispersion (%)	
SCREEN ANALYSIS (% PASSING) **(SANS 3001:GR1)**	
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
5.0 mm	94
2.00 mm	89
0.425 mm	77
0.075 mm	31
HYDROMETER ANALYSIS (% PASSING) **(SANS 3001:GR3)**	
58 µm	22
34 µm	18
14 µm	12
6 µm	10
2 µm	6
% Clay	10
% Silt	12
% Sand	67
% Gravel	11
ATTERBERG LIMITS **(SANS 3001:GR10)**	
Liquid Limit	
Plasticity Index	NP
Linear Shrinkage (%)	0.0
Grading Modulus	1.03
Classification	A-2-4 (0)
Unified Classification	SM
Chart Reference	

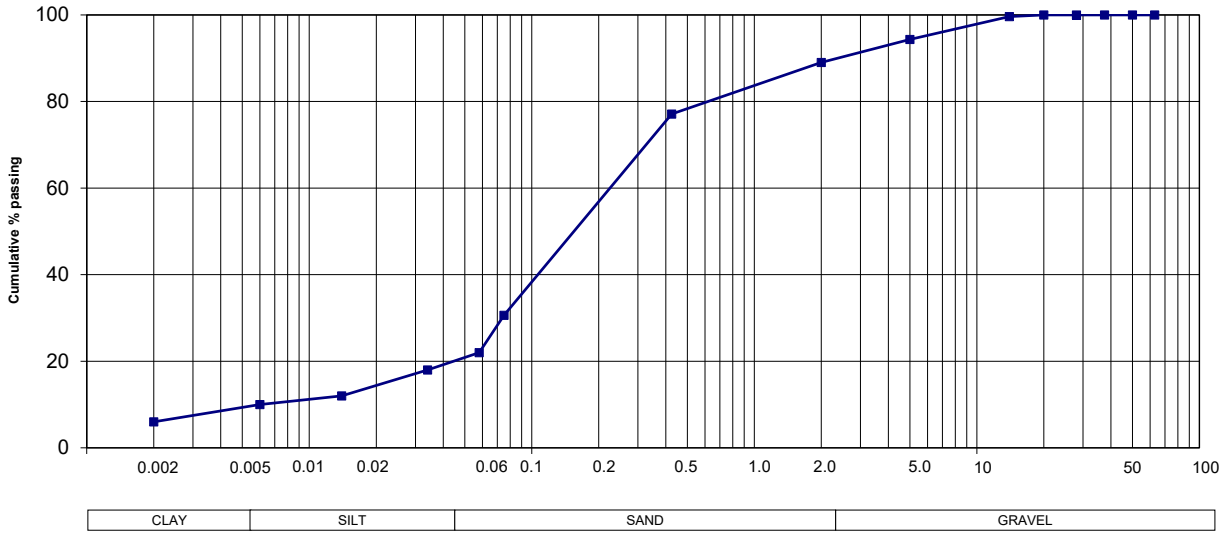
PROJECT : 2010329 - CABANGA
JOB No. : S20-032
DATE : 2020/02/01

POTENTIAL EXPANSIVENESS



PLASTICITY CHART





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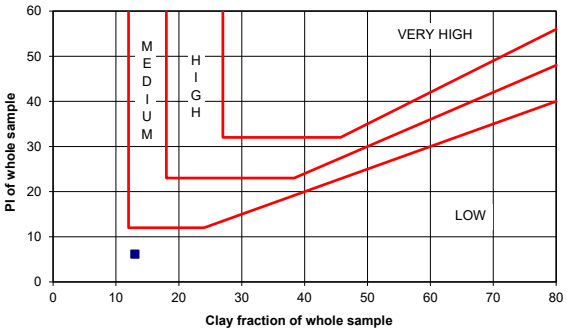
PARTICLE SIZE ANALYSIS

Sample No.	04
Soillab Sample No.	S20-032-04
Depth (m)	0.3 - 2.5
Position	TP 48
Material Description	LIGHT RED FERRICRETE SILTY SAND
Relative density on < 2 mm **(SANS 5844)**	2.694
Organic Material	
Moisture (%) / Dispersion (%)	
SCREEN ANALYSIS (% PASSING) **(SANS 3001:GR1)**	
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
5.0 mm	99
2.00 mm	97
0.425 mm	88
0.075 mm	51
HYDROMETER ANALYSIS (% PASSING) **(SANS 3001:GR3)**	
56 µm	32
33 µm	27
14 µm	17
6 µm	13
2 µm	12
% Clay	13
% Silt	19
% Sand	65
% Gravel	3
ATTERBERG LIMITS **(SANS 3001:GR10)**	
Liquid Limit	25
Plasticity Index	7
Linear Shrinkage (%)	2.0
Grading Modulus	0.65
Classification	A-4 (1)
Unified Classification	CL & ML
Chart Reference	

PROJECT : 2010329 - CABANGA
JOB No. : S20-032
DATE : 2020/02/01

POTENTIAL EXPANSIVENESS



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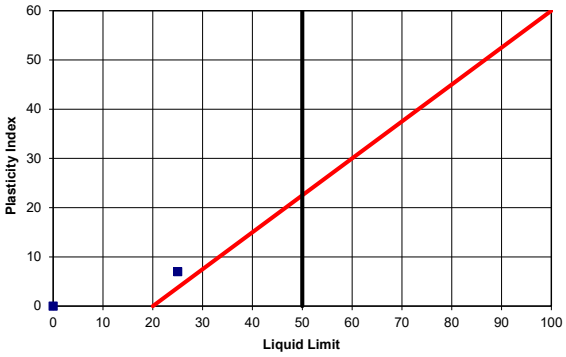

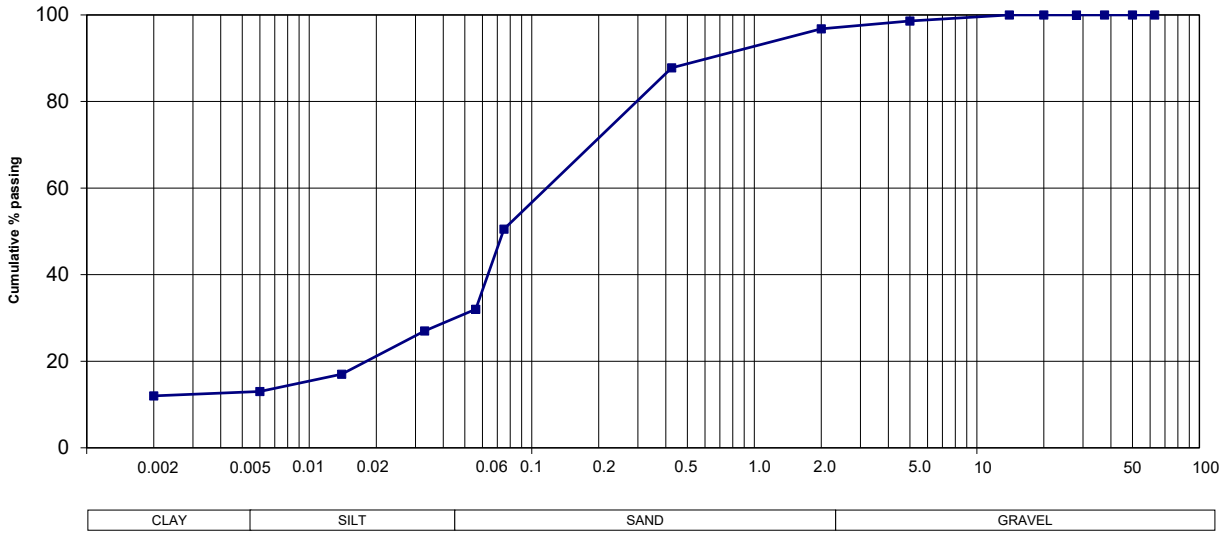

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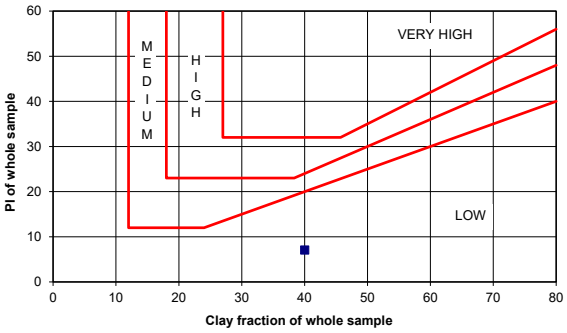
PARTICLE SIZE ANALYSIS

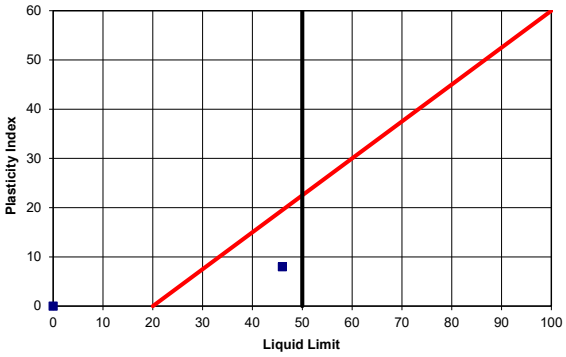
Sample No.	05
Soillab Sample No.	S20-032-05
Depth (m)	1.2 - 2.0
Position	TP 05
Material Description	LIGHT OLIVE FERRICRETE CLAYEY SAND
Relative density on < 2 mm **(SANS 5844)**	2.667
Organic Material	
Moisture (%) / Dispersion (%)	
SCREEN ANALYSIS (% PASSING) **(SANS 3001:GR1)**	
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
5.0 mm	98
2.00 mm	95
0.425 mm	88
0.075 mm	62
HYDROMETER ANALYSIS (% PASSING) **(SANS 3001:GR3)**	
53 µm	50
31 µm	47
12 µm	42
5 µm	40
2 µm	38
% Clay	40
% Silt	10
% Sand	45
% Gravel	5
ATTERBERG LIMITS **(SANS 3001:GR10)**	
Liquid Limit	46
Plasticity Index	8
Linear Shrinkage (%)	3.0
Grading Modulus	0.55
Classification	A-5 (5)
Unified Classification	ML
Chart Reference	

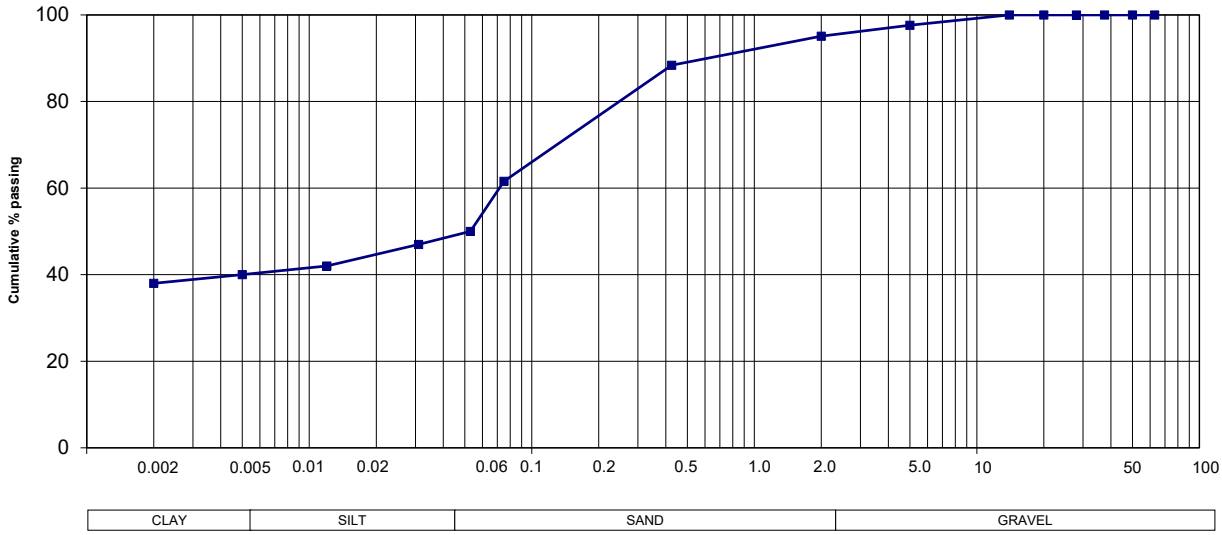
PROJECT : 2010329 - CABANGA
JOB No. : S20-032
DATE : 2020/02/01

POTENTIAL EXPANSIVENESS



PLASTICITY CHART





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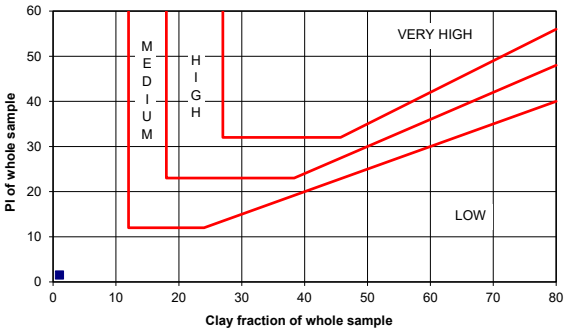
PARTICLE SIZE ANALYSIS

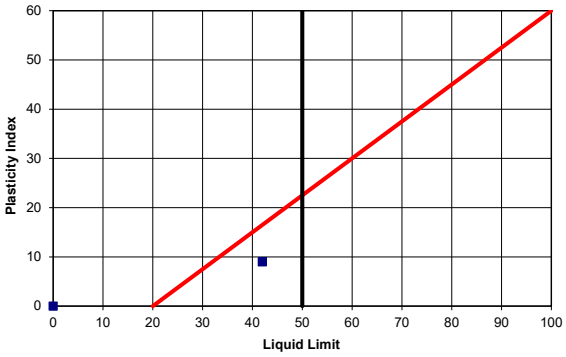
Sample No.	06
Soillab Sample No.	S20-032-06
Depth (m)	0.3 - 0.7
Position	TP 03
Material Description	DARK OLIVE DOLERITE SANDY GRAVEL
Relative density on < 2 mm **(SANS 5844)**	2.471
Organic Material	
Moisture (%) / Dispersion (%)	
SCREEN ANALYSIS (% PASSING) **(SANS 3001:GR1)**	
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	98
20.0 mm	91
14.0 mm	90
5.0 mm	67
2.00 mm	36
0.425 mm	17
0.075 mm	11
HYDROMETER ANALYSIS (% PASSING) **(SANS 3001:GR3)**	
61 µm	6
36 µm	4
15 µm	2
7 µm	1
2 µm	0
% Clay	1
% Silt	5
% Sand	30
% Gravel	64
ATTERBERG LIMITS **(SANS 3001:GR10)**	
Liquid Limit	42
Plasticity Index	9
Linear Shrinkage (%)	4.0
Grading Modulus	2.36
Classification	A-2-5 (0)
Unified Classification	SP - SM
Chart Reference	

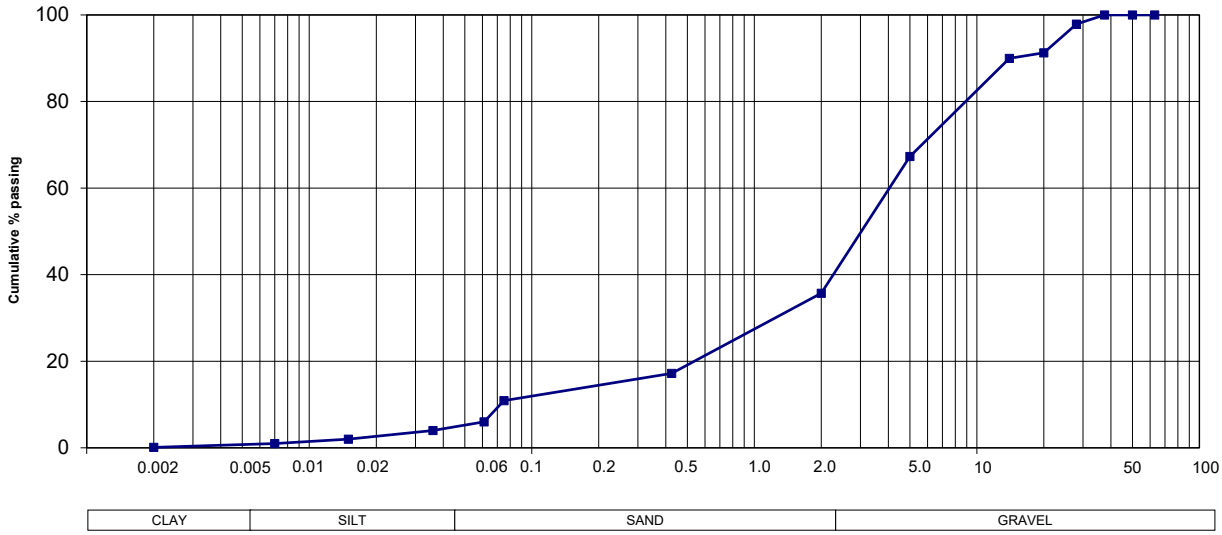
PROJECT : 2010329- CABANGA
JOB No. : S20-032
DATE : 2020/02/01

POTENTIAL EXPANSIVENESS



PLASTICITY CHART





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Fax: (+27) (12) 481 3941 / 3812
Email: info@soillab.co.za
PO Box 72928, Lynnwood Ridge,
South Africa, 0040

Project Description

Client:	GEOTHETA CONSULTING ENGINEERS &SCIENTISTS	Soillab Job No.:	S21-0032
Job Description:	2010329-CABANGA	Contract Number:	
Date:	2021/02/02	Reference Number:	

Sample Description

Soillab Sample No.:	S21-0032-01
Sample Description:	TP03
Sample Depth:	0.3 - 0.7
Material Description:	DARK OLIVE

Screen Analysis (% Passing) - SANS 3001-GR1

75,00 mm	100
63,00 mm	100
50,00 mm	100
37,50 mm	100
28,00 mm	98
20,00 mm	91
14,00 mm	90
5,00 mm	67
2,000 mm	36
0,425 mm	17
0,075 mm	11

Soil-mortar percentages - SANS 3001-PR5

Coarse Sand	2.000-0.425mm	52
Coarse Fine Sand	0.425-0.250mm	8
Medium Fine Sand	0.250-0.150mm	5
Fine Fine Sand	0.150-0.075mm	5
Silt and clay	<0.075mm	30

Constants

Grading Modulus	SANS 3001-PR5	2.36
Liquid Limit	SANS 3001-GR10	42
Plasticity Index		9
Linear Shrinkage		4.0

MOD AASHTO - SANS 3001-GR30

Max Dry Density (kg/m³)	2083
Optimum Moisture Content (%)	12.2

CBR - SANS 3001-GR40

MOD AASHTO	
Moulding Moisture Content (%)	12.3
Dry Density (kg/m³)	2089
% of Max Dry Density	100.3
100% MOD CBR (%)	46
% Swell	0.6
NRB	
Dry Density (kg/m³)	1980
% of Max Dry Density	95.0
100% NRB CBR (%)	21
% Swell	0.4
PROCTOR	
Dry Density (kg/m³)	1875
% of Max Dry Density	90.0
100% PROCTOR CBR (%)	10
% Swell	0.8
CBR (%)	
100% Mod AASHTO	44
98% Mod AASHTO	33
97% Mod AASHTO	28
95% Mod AASHTO	21
93% Mod AASHTO	16
90% Mod AASHTO	10
COLTO Classification:	**G7**

W.I. 7.8.1 (a)i

SNALAB CIVIL ENGINEERING LABORATORY

sanas T0345

SNA CIVIL AND STRUCTURAL ENGINEERS (PTY) LTD
191 VONKPROP ROAD SAMCORPARK PRETORIA
PO Box 72727 Lynnwood Ridge '0040
Tel :(012) 751-9388
E-MAIL : snalab@sna.co.za
REG. NO. 2005/006128/07

SANAS accredited facility since 2007

TEST REPORT

REPORT NUMBER 25903

Client :	SOILLAB
Address:	P.O BOX 72928 LYNNWOOD RIDGE 0040
Cell :	073 489 2321 / 012 813 4900
E-Mail:	choeum@soillab.co.za
ATTENTION:	MANTSHA CHOEU
Project/Order:	2010329 - CABANGA / S21-0032
Brief :	PH & COND

Date requested	27/01/2021			
Date sampled	SAMPLED BY CLIENT			
Date received	27/01/2021			
Date Tested	Start date :	05/02/2021	End date :	05/02/2021
Location of sampling	SAMPLED BY CLIENT			
Sampling method/methods	SAMPLED BY CLIENT			
Sampling plan	SAMPLED BY CLIENT			
Sampled by	SAMPLED BY CLIENT			
Sample number	REFER TO TEST REPORT			
Sample Condition/Description	REFER TO TEST REPORT			
Sample classification	N/A			
Sampling Environmental condition	SAMPLED BY CLIENT			
Test Method/Methods used	REFER TO TEST REPORT			
Test done at	SNALAB (PTA)			

Deviation to test methods : Deviations, exclusions or additions will be noted on test result sheets

Test/Tests marked # Not SANAS Accredited in this report are not included in the SANAS Schedule of Accreditation for this laboratory.

The results relate only to the items tested. Any opinions ,classifications , comments and interpretations do not fall within the scope of our SANAS accreditation.

This certificate is issued without any corrections what so ever.

Test report/reports shall not be reproduced except in full, without written approval of the Laboratory.

This test report relates only to samples received.

If the report is referred to as an INTERIM REPORT it is not fit for publication.

Information above noted as" **Supplied by Client/Sampled by Client**" may effect the validity of the test results.

Hendrik Diederiks. Pr Tech Eng
Laboratory Manager
Technical Signatory

05/02/2021
DATE ISSUED:

SNALAB CIVIL ENGINEERING LABORATORY

Project	2010329-CABANGA / S21-0032	Lab No :	25903
Rd/Sect/Bp		Client No :	2300
Layer/ Test pit		Date :	05/02/2021

INDICATORS

W.I.7.8.1(e)

Methods:	SANS 3001-GR 1 + GR2 + GR5	SANS 3001 GR 10	TMH 1: A20	TMH 1: A21T

HOLE & / SAMPLE No. MATERIALS DESCRIPTION	DEPTH (m)	% PASSING 100.0	90.0	75.0	63.0	50.0	37.5	28.0	20.0	14.0	5.0	2.0	0.425	0.075	SOIL MORTAR ANAL (% vs # mm) 2.0 - 0.425	0.425-0.250	0.250 - 0.150	0.150 - 0.075	<0.075	GM	ATTERBERG LIMITS (%) LL	LS	PI	pH	ELEC-TRIC CONDUC. (S/m)	AASTHO Classification #
TP03	0.3-2.7																							6.79	0.032	A-1-a (0) (1)
FERRICRETE IN LIGHT BROWN GRAVEL																										
TP05	1.2-2.0																							6.54	0.036	A-1-a (0) (2)
FERRICRETE IN LIGHT BROWN GRAVEL																										
TP24	0.7-2.2																							4.81	0.052	A-1-a (0) (3)
FERRICRETE IN LIGHT BROWN GRAVEL																										
TP37	0.5-1.5																							4.84	0.052	A-1-a (0) (4)
LIGHT BROWN GRAVEL																										
TP43	0.0-0.8																							4.45	0.052	A-1-a (0) (5)
DARK BROWN GRAVEL																										
TP48	0.3-2.5																							4.44	0.053	A-1-a (0) (6)
REDDISH BROWN GRAVEL																										
																										( ) (7)
																										( ) (8)
																										( ) (9)
																										( ) (10)

REMARKS:		Tech:	
		Date:	05/02/2021

Geotheta Report Distribution Record

Report No.	2010329/R02
Copy No.	Electronic

Name/Title	Company	Copy	Date	Authorised by
Ms. Lelani Claasen	Cabanga Environmental	Electronic	February 2021	Ian Hammond

Approval Signature:

Appendix C: Site Selection Report

CABANGA environmental

Telephone: +27 11 794 7534
Fax: +27 11 794 6946
E-mail: info@cabangaenvironmental.co.za

Attention: Keobakile Sedupane

KGATELOPELE ENERGY

Via e-mail: keo@k-energy.co.za

19 October 2020

DESKTOP ENVIRONMENTAL SCAN OF SPECIFIED PORTIONS OF THE FARM HALFGEWONNEN 190 IS FOR THE POTENTIAL DEVELOPMENT OF SOLAR PV AND COAL FIRED POWER PLANT AS PART OF THE DMRE RENEWABLE ENERGY INDEPENDENT POWER PRODUCER PROCUREMENT PROGRAMME (REIPPPP).

Dear Sir;

We would like to thank you for providing Cabanga with the opportunity to be involved in the above-mentioned project.

This memorandum presents the findings of our initial desktop environmental assessment with a view to identify the preferred development site option(s) and requirements for further information / studies, in support of the feasibility studies being undertaken for the development of the energy projects.

The assessment was limited to portions of the Farm Halfgewonnen 190IS to which Overlooked Colliery Alpha (Pty) Ltd ("Overlooked Alpha" hereafter) and Overlooked Colliery (Pty) Ltd ("Overlooked" hereafter) hold the surface rights.

1 Introduction

Kgatelopele Energy ("K-Energy" hereafter) is investigating the feasibility of developing Energy Projects (both Solar PV and Coal Fired Generators) with the land owners, Overlooked and Overlooked Alpha. The properties considered in this desktop site selection are described in Table 1. These properties as well as the surrounding Mining Rights and Farm Portions are shown in Figure 1.

K-Energy has proposed the development of three components:

- Solar PV1 with an installed capacity of <20MW and land requirement of 30Ha;
- Solar PV2 with an installed capacity of 40MW and land requirement of 60Ha; and
- A Coal plant with an installed capacity of 300MW and land requirement of 210Ha.

The Projects are being developed as part of the Department of Mineral Resources and Energy (DMRE) Renewable Energy Independent Power Producer Procurement Programme (REIPPPP).

Activities identified in the Environmental Impact Assessment (EIA) Regulations 2014 (as amended), published in terms of the National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA), requires environmental authorisation prior to implementation. The development of facilities or infrastructure for the generation and distribution of electricity is one such activity that will be relevant to the development of the Energy Projects (among others). A comprehensive identification of relevant Listed Activities will form part of the application process, once a site is selected and project design is complete.

In the interest of sustainable and environmentally responsive development, K-Energy requested Cabanga Environmental to identify 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.

Table 1: Summary of Properties

Farm	Portion	Surface Rights Owner	Mineral Rights	Total Size (Ha)	Description
Halfgewonnen 190 IS	7	Overlooked Colliery Alpha (Pty) Ltd	Halfgewonnen Colliery	138.58	Contains old farm house, currently used as mine offices. Bisected by provincial road.
	8			284.79	Contains Halfgewonnen pits, discard dump, PCD, explosives magazine. Bisected by railway.
	9			303.08	Contains Halfgewonnen pits, overburden and infrastructure area (including plant). Bisected by provincial road.
	10			284.29	Contains mining pit and boxcut, river diversion and topographical high-point.
	16			5.2	Vacant
	2	Overlooked Colliery (Pty) Ltd	None (permit applications by Overlooked and Soft Wink; potential future mining)	370	Overlooked Infrastructure. Permit applications for open pit mining. Agriculture lease on portions. Bisected by railway and provincial road.
	17		Overlooked Colliery	7.49	Pit B
	RE			71.3	Pit A
	5			73.2	Overburden Dump. South vacant, will be undermined.

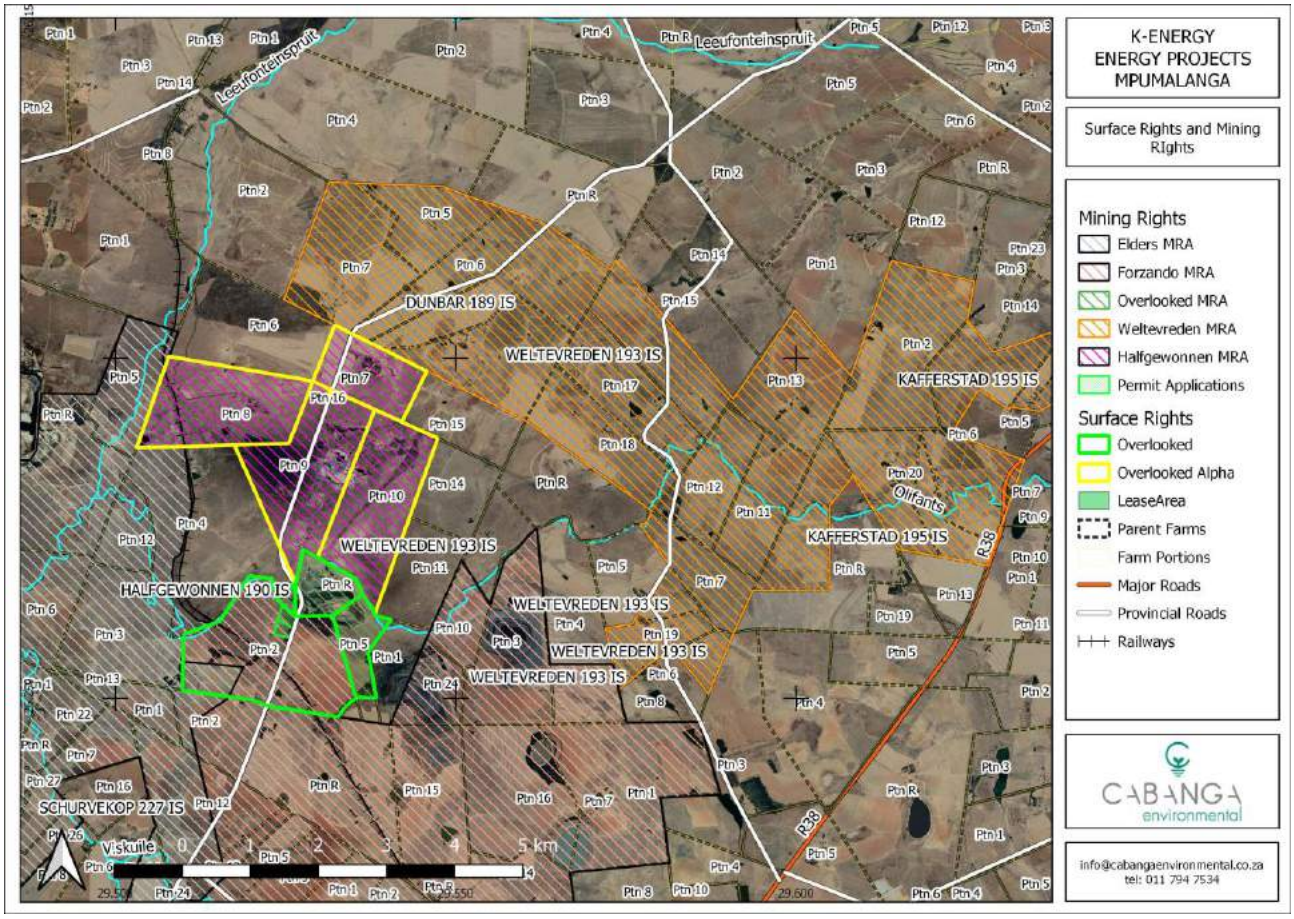

Figure 1: Regional Location, showing surrounding mining rights and relevant surface rights

2 Site Selection Criteria

In evaluating the feasibility of land for development of the energy projects, the following primary considerations are relevant:

Table 2: Site Selection Criteria

Criteria	Description	Conclusion
Ownership	Only farm portions where Overlooked or Overlooked Alpha owns the surface rights will be considered at this stage.	Only the Farm Halfgewonnen 190 IS Portions 0 (RE), 2, 5, 7 – 10, 16 and 17 are included in the assessment.
Availability	Land that is presently affected by mine pits or infrastructure (processing plants, waste or water management facilities, etc.) is excluded from the site selection.	Portion 0 and 17 are entirely excluded from the assessment. Parts of the remaining portions are also excluded.
Size	The development area must be of sufficient size to accommodate the planned energy output.	Available development areas must be assessed in terms of land availability.

Criteria	Description	Conclusion
Access	Access for construction vehicles and equipment, operational and maintenance requirements must be planned for.	Access to the development site should be readily available from existing roads where possible, and where new access is required these should be as short as possible and avoid environmental sensitivities as far as possible
Existing power reticulation	The energy projects must be able to tie in with existing electricity infrastructure. Proximity of the development to existing substations must be considered.	Preference is given to sites less than 1km from existing substations, while sites over 2.5km from existing sub-stations are not preferred.
Geotechnical stability	Previously mined areas may have geotechnical stability issues if infrastructure is to be constructed over backfilled pits.	Portion 8, west of the railway line, may be excluded due to anticipated geotechnical issues.
Slope	The development area must be relatively flat to enable the effective construction of the Energy Projects.	Areas with steep slopes should be avoided as these areas may not be suitable for development.
Wetlands	The majority of all properties fall within the 500m regulated zone of delineated and/or NFEPA[1] wetlands, and a Water Use Authorisation in terms of the National Water Act (Act 36 of 1998) may be required.	Delineated wetlands should preferably be avoided (as far as possible) given the ecological importance and sensitivity of wetland systems. Further Wetland delineation/ verification is required for the Overlooked Alpha properties.
Biodiversity	The Mpumalanga Biodiversity Sector Plan identifies Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) aimed at conserving biodiversity pattern and ecological processes on Provincial Level.	Areas demarcated as CBAs and ESAs require further specialist investigation to verify the ecological importance of such areas prior to development.
Heritage Resources	Previous studies have identified graves and heritage structures on the properties. These must preferably be preserved *in-situ*.	Further Heritage assessment is required, known heritage resources should be avoided if possible.
Dust	Areas associated with coal handling and/or bare areas may be associated with significant dust generation that could negatively affect the operation of Photovoltaic (PV) installations.	The predominant wind direction in the area is from the north-east to the south-west. PV Projects should preferably be sited north-east of the coal handling areas.

[1] National Freshwater Ecosystem Priority Areas

3 Site Ownership, Availability and Size evaluation

Only the Farm Halfgewonnen 190 IS Portions 0 (RE), 2, 5, 7 – 10, 16 and 17 are included in the assessment. Of these, the areas directly affected by mining activity are excluded from further assessment. Additionally, areas in-between the existing mining activities that are too small (less than 30 ha) to accommodate any of the three Energy Projects are also excluded from further assessment.

The remaining areas have been delineated and are illustrated in Figure 2.

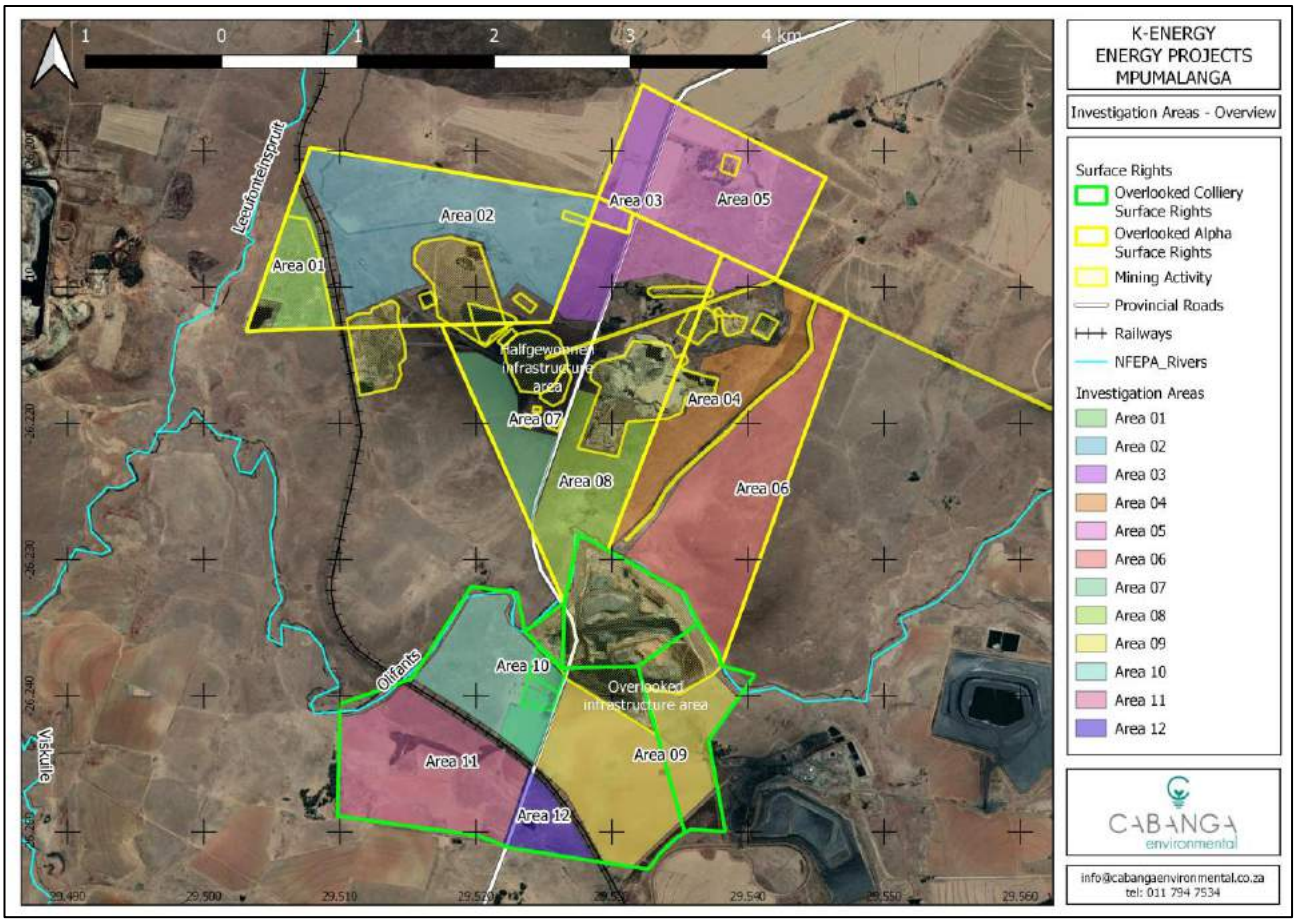

Figure 2: Investigation Areas

Table 3 overleaf evaluates the total size of each delineated area and thus each area's suitability to accommodate the development size requirements of the Solar PV and Coal Plant Projects.

From Table 3 it is evident that no single evaluation area can meet the size requirements for the development of the Coal Plant (210 Ha). The Coal Plant site must be identified in terms of available combinations of Areas.

Table 3: Criteria – development size

Area	Size	PV 1 Suitability	PV 2 Suitability	Coal Plant Suitability		Additional Notes
1	37 Ha	**Yes**	**No**	**No**		May be evaluated for **PV1** development only
2	165 Ha	**Yes (both)**	**Yes (both)**	**No**	**Yes (if combined)**	May be considered for **PV1**, or **PV2**, or **both**
3	62 Ha	**Yes (either)**	**Yes (either)**	**No**		Maybe considered for **PV1** or **PV2**, not both.
4	75 Ha	**Yes (either)**	**Yes (either)**	**No**	**Combine with 6 and 8**	Maybe considered for **PV1** or **PV2**, not both.
5	143 Ha	**Yes (both)**	**Yes (both)**	**No**		May be considered for **PV1**, or **PV2**, or **both**
6	148 Ha	**Yes (both)**	**Yes (both)**	**No**	**Combine with 4 and 8**	May be considered for **PV1**, or **PV2**, or **both**
7	37 Ha	**Yes**	**No**	**No**		May be evaluated for **PV1** development only
8	66 Ha	**Yes (either)**	**Yes (either)**	**No**	**Combine with 4 and 6**	Maybe considered for **PV1** or **PV2**, not both.
9	135 Ha	**Yes (both)**	**Yes (both)**	**No**	**Possible combinations, with consideration of railway and road separating these sites.**	May be considered for **PV1**, or **PV2**, or **both**
10	70 Ha	**Yes (either)**	**Yes (either)**	**No**		Maybe considered for **PV1** or **PV2**, not both.
11	120 Ha	**Yes (both)**	**Yes (both)**	**No**		May be considered for **PV1**, or **PV2**, or **both**
12	22 Ha	**No**	**No**	**No**		Too small for development, unless combined.

4 Site Assessment

The following sub-sections evaluate each of the assessment areas in terms of the site selection criteria stipulated in Table 2, with the aim to identify the preferred site(s) for each of the Energy Projects.

The assessment is grouped into the following categories:

- Access considerations (road access and access to existing electricity infrastructure);
- Geotechnical and slope considerations; and
- Environmental sensitivity considerations.

4.1 Site Access and access to existing electricity infrastructure

Table 4: Criteria – Access (See Figure 3 overleaf)

Area	Road Access Description	Access Evaluation	Electricity Access Description	Electricity Access Evaluation
1	Underpass at railway	Not preferred	3.3km from Halfgewonnen South sub-station	Not preferred
2	From Halfgewonnen Plant OR D622 (over area 3)	Suitable	3.4km from Halfgewonnen South sub-station	Not preferred
3	Direct from D622	Preferred	3.3km from Halfgewonnen South sub-station	Not preferred
2&3	Direct from D622	Preferred		Not preferred
4	Via Halfgewonnen East Pits	Suitable	1.7 km from Halfgewonnen South sub-station	Suitable
5	Direct from D622	Preferred	3.9 km from Ysterkop sub-station. 3.7km from Halfgewonnen South sub-station	Not preferred
6	Via Halfgewonnen East Pits and crossing river diversion.	Not preferred	1.5 km from Ysterkop sub-station.	Suitable
7	Direct from D622	Preferred	1.6 km from Halfgewonnen South sub-station	Suitable
8	Direct from D622	Preferred	1.2 km from Halfgewonnen South sub-station	Suitable
4, 6 & 8	Direct from D622	Preferred		Suitable
9	Direct from D622	Preferred	1.3 km from Ysterkop sub-station. 600m from Hlafgewonnen South sub-station	Suitable
10	Direct from D622	Preferred	Halfgewonnen South sub-station on site	Preferred
11	Direct from D622	Preferred	Halfgewonnen South sub-station across railway	Suitable
12	Direct from D622	Preferred	Halfgewonnen South sub-station 600m away	Suitable

Area	Road Access Description	Access Evaluation	Electricity Access Description	Electricity Access Evaluation
			(across the road and railway)	
9, 10, 11 & 12	Direct from D622, but no access from one area directly to another without crossing the road or railway.	**Suitable**	Halfgewonnen South sub-station at Area 10	**Preferred**

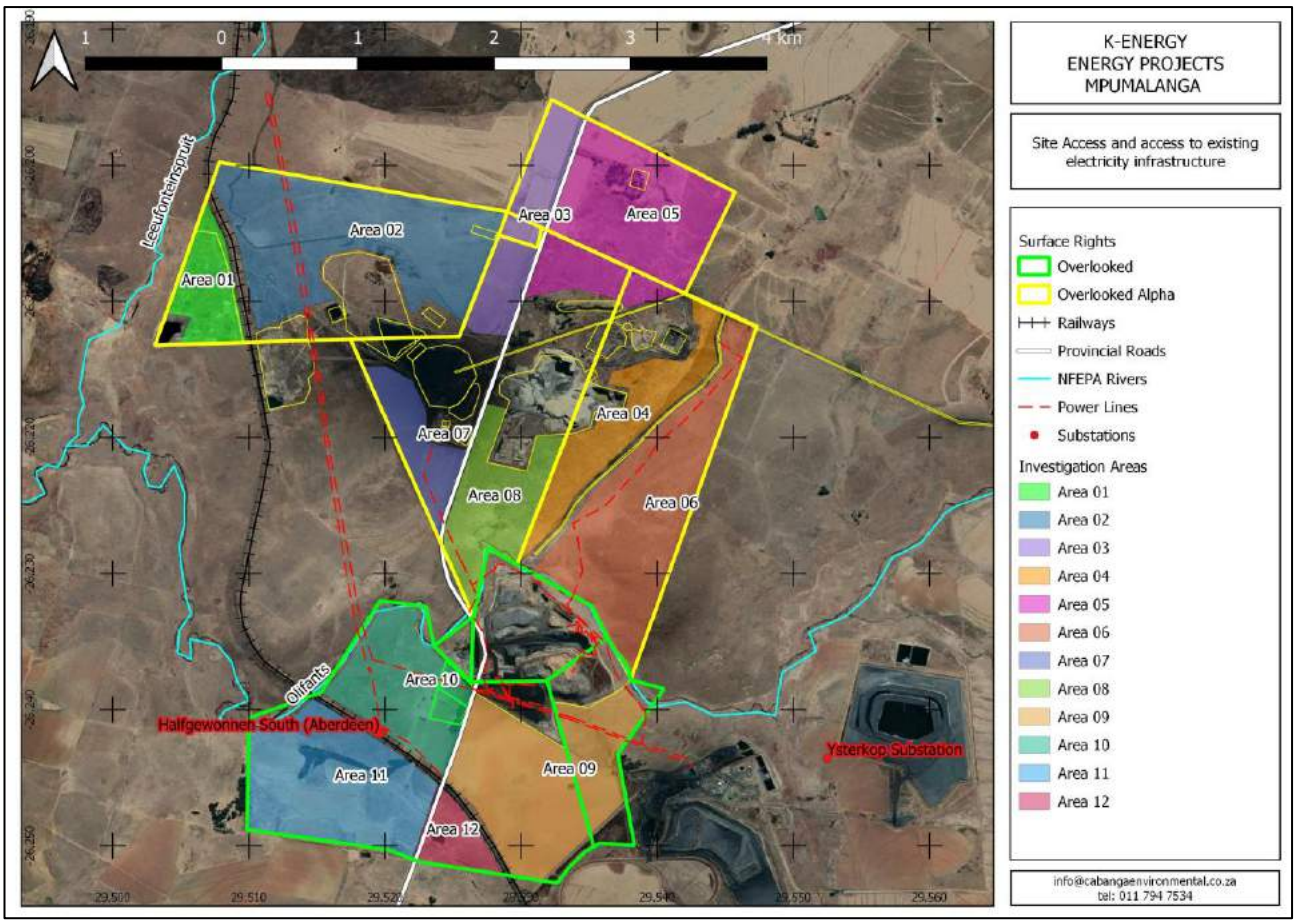

Figure 3: Site Access and Existing Electricity Infrastructure

4.2 Geotechnical and slope considerations

Table 5: Criteria – Geotech and Slope (See Figure 4)

Area	Geotech description	Geotech Assessment	Slope Description	Slope Assessment
1	Previously Mined	**Not preferred**	Backfilled Pit	**Unknown**
2	Presumed stable (discard dump approved)	**Assumed Suitable** (study required)	Relatively Flat	**Suitable**
3	Presumed stable	(study required)	Relatively Flat	**Suitable**
2&3	Presumed stable	(study required)	Relatively Flat	**Suitable**
4	Presumed stable	(study required)	Slopes to River Diversion	**Not preferred**
5	Presumed stable	(study required)	Relatively Flat	**Suitable**
6	Presumed stable	(study required)	Slopes: River Diversion and Ysterkop.	**Not preferred**
7	Presumed stable	(study required)	Relatively Flat	**Suitable**
8	Presumed stable	(study required)	Slopes to River Diversion and Olifants	**Not preferred**
4, 6 & 8	Presumed stable	(study required)	Slopes to River Diversion and Olifants River	**Not preferred**
9	Presumed stable	(study required)	Relatively Flat	**Suitable**
10	Presumed stable	(study required)	Relatively Flat	**Suitable**
11	Presumed stable	(study required)	Relatively Flat	**Suitable**
12	Presumed stable	(study required)	Relatively Flat	**Suitable**
9, 10, 11 & 12	Presumed stable	(study required)	Relatively Flat	**Suitable**

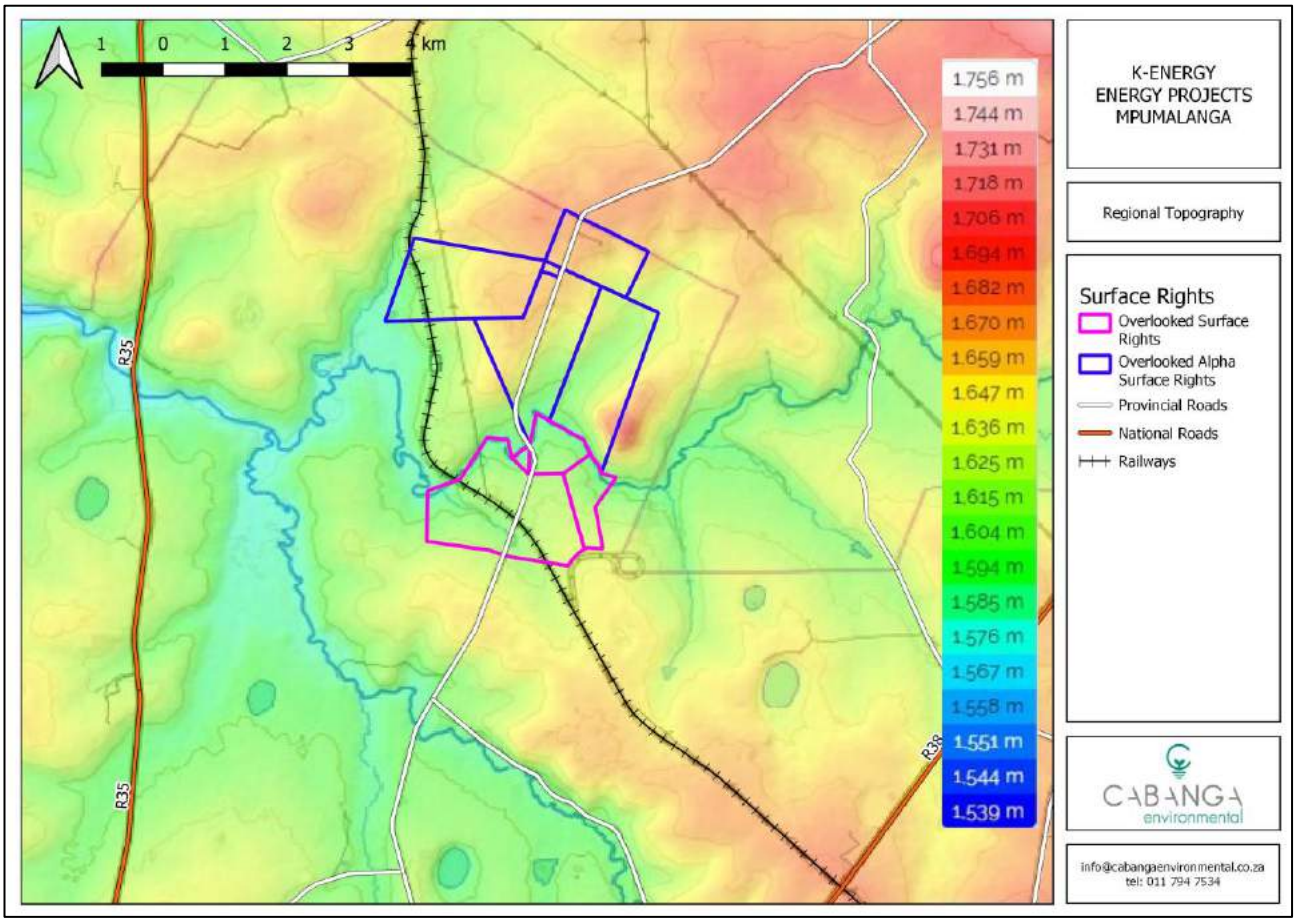

Figure 4: Regional Elevations

4.3 Environmental sensitivity considerations.

In considering the environmental sensitivity of the investigation areas, the following information was considered:

- Halfgewonnen Colliery Wetland Identification and Impact Assessment. Strategic Environmental Focus (Pty) Ltd (SEF). May 2013.
- Cabanga Environmental. (2013). Wetland Assessment for Portion 5, Portion 17 and Remaining Extent of Halfgewonnen 190 IS and a part of Portion 0 of Forzando 592 IS, Bethal Mpumalanga.
- Cabanga Environmental. (2019). Overlooked Colliery (Pty) Ltd. Wetland Risk and Impact Assessment Report.
- Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, and South African National Biodiversity Institute. 2013. Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector. Pretoria.
- NFEPA Metadata: South African National Biodiversity Institute (SANBI).
- Mpumalanga Biodiversity Sector Plan GIS data (SANBI).

4.3.1 Wetlands

Table 6: Criteria – Wetlands (See Figure 5)

Area	Wetlands description	Conclusion
1	Affected by connected Hillslope Seep Wetland, Channelled Valley Bottom Wetland and additional NFEPA Wetlands. Approximately 15Ha remaining if wetlands are excluded.	Not preferred
2	Affected by Channelled Valley Bottom Wetland, Pan, Unconfirmed Isolated Hillslope Seep and additional NFEPA Wetlands. Approximately 95 Ha remaining if wetlands are excluded.	Suitable
3	Affected by Hillslope Seep and Channelled Valley Bottom Wetlands. Approximately 24 Ha remaining if wetlands are excluded.	Not preferred
2&3	Affected by Channelled Valley Bottom Wetland, Pan, unconfirmed isolated hillslope seep, Hillslope Seep and additional NFEPA Wetlands. Approximately 119 Ha remaining if wetlands are excluded.	Suitable
4	Entire Area affected by delineated and NFEPA Wetlands.	Not preferred
5	Approximately 38 Ha remaining if wetlands are excluded.	Suitable
6	Entire Area (except for Ysterkop) affected by delineated and NFEPA Wetlands.	Not preferred
7	Small portion of Hillslope Seep in south of area. Approximately 35 Ha remaining if wetlands are excluded.	Suitable
8	All but 10 Ha affected by delineated and NFEPA Wetlands.	Not preferred
4, 6 & 8	All but 10 Ha affected by delineated and NFEPA Wetlands.	Not preferred
9	27 ha affected by seeps and depression, approximately 105 Ha remaining if wetlands are excluded.	Suitable
10	Approximately 61 Ha remaining if wetlands are excluded.	Suitable
11	Wetlands bisecting the area – remaining areas if wetlands excluded will be isolated.	Not preferred
12	Wetlands bisecting the area – remaining areas if wetlands excluded will be isolated.	Not preferred
9, 10, 11 & 12	Approximately 200 Ha remaining if wetlands are excluded, but area bisected by Road, Railway, and wetlands.	Not preferred

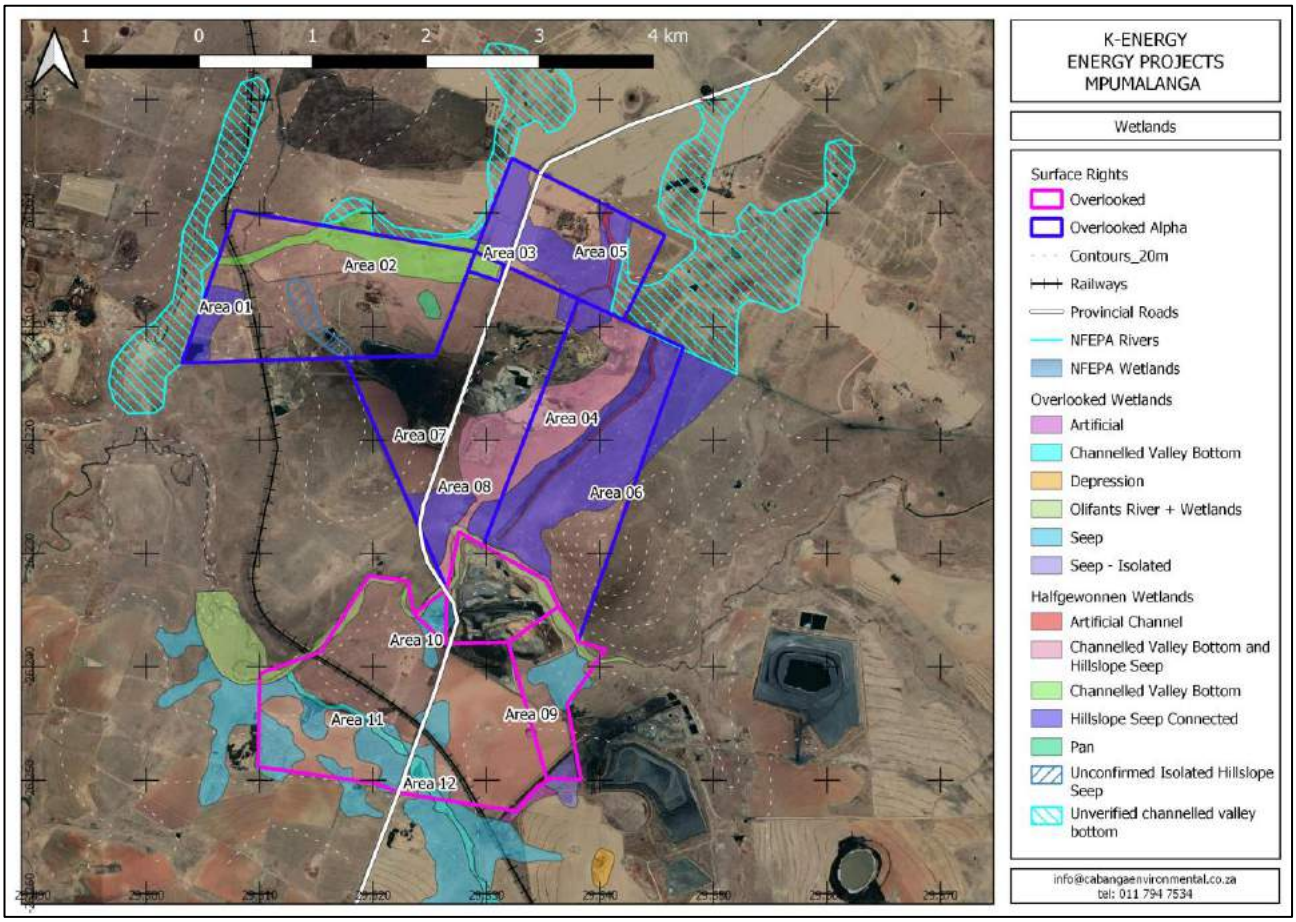

Figure 5: Wetlands and investigation areas

4.3.2 Biodiversity

Table 7: Criteria – Biodiversity (See Figure 6)

Area	Biodiversity Classification (Mpumalanga Biodiversity Sector Plan (MBSP) Terrestrial Assessment (based on SANBI GIS)	Conclusion
1	"Heavily Modified".	**Preferred**
2	Central Portion: "Critical Biodiversity Area (CBA) Optimal".	**Not preferred**
3	"Heavily Modified" and "Moderately Modified".	**Preferred**
2&3	CBA Optimal (Area 2), "Heavily Modified" and "Moderately Modified". Approximately 100 ha remaining if CBA excluded.	**Preferred**
4	"Heavily Modified" and "Moderately Modified".	**Preferred**
5	"Heavily Modified", "Moderately Modified" and "Other Natural Areas closely associated with Farm House Site .	**Preferred**
6	"CBA Optimal".	**Not preferred**
7	Mostly "CBA Optimal".	**Not preferred**

Area	Biodiversity Classification (Mpumalanga Biodiversity Sector Plan (MBSP) Terrestrial Assessment (based on SANBI GIS)	Conclusion
8	Mostly "Heavily Modified" with small portions in the south classified as CBA Optimal and CBA Irreplaceable.	Suitable
4, 6 & 8	Cumulatively, approximately 100 ha remaining if CBA areas excluded.	Suitable
9	CBA Optimal in northern section, remaining 110 Ha classified as Heavily Modified.	Suitable
10	Mostly CBA Optimal and CBA Irreplaceable, approximately 19 Ha of Heavily and Moderately Modified land remaining.	Not preferred
11	Approximately 81 Ha of heavily and moderately modified land (southern portions), mostly CBA Irreplaceable in the north.	Suitable
12	Classified as Moderately Modified.	Preferred
9, 10, 11 & 12	Approximately 220 Ha of Heavily and Moderately Modified lands, with the remaining areas as CBAs. Note, the areas are bisected by the railway line and provincial road.	Suitable

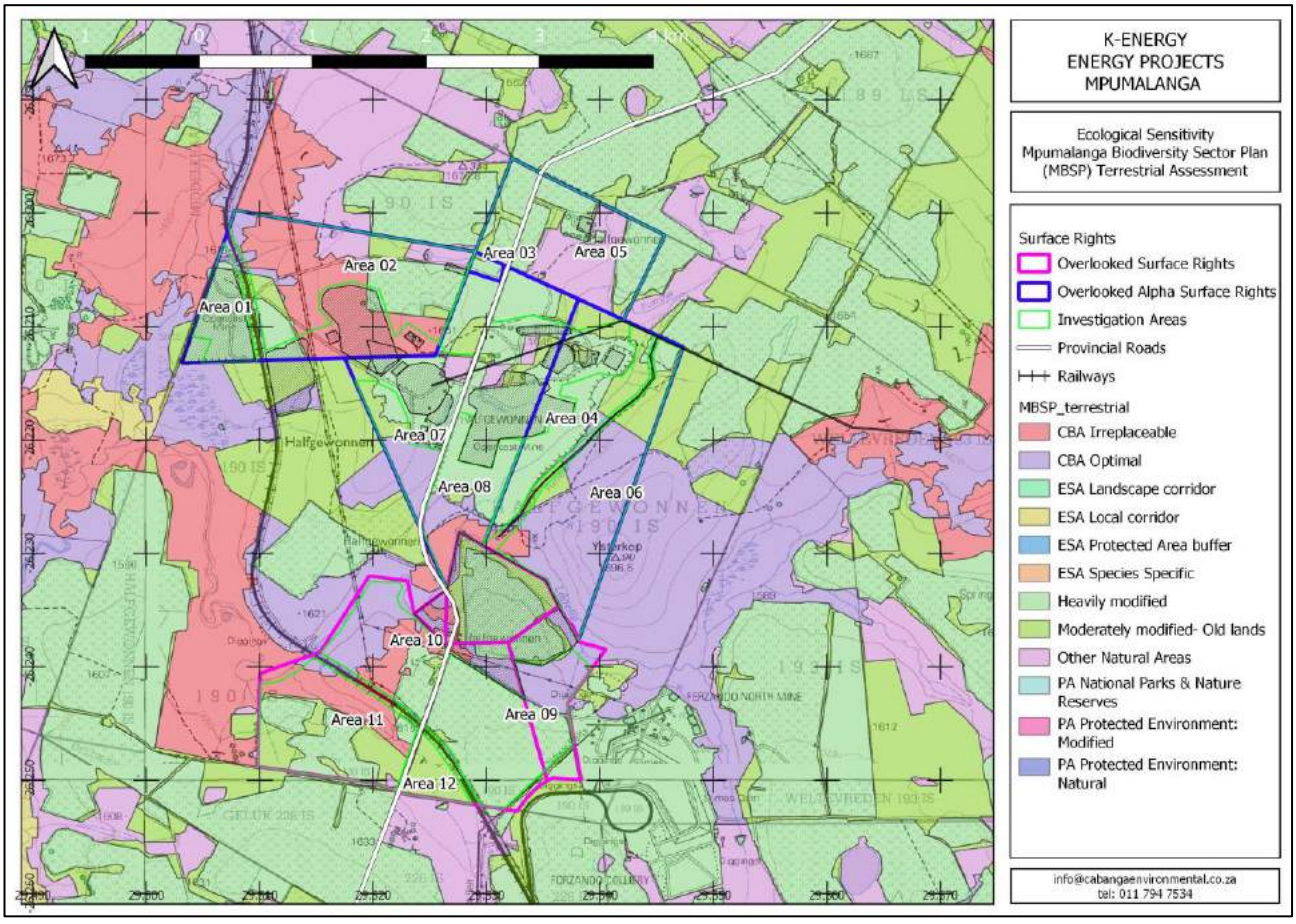

Figure 6: Terrestrial Biodiversity Assessment

4.3.3 Heritage resources

Previous Heritage and Archaeological Studies that were completed for the Overlooked and Halfgewonnen Mining operations didn't fully cover the entire Surface Rights Areas. Based on the available information, the following heritage resources are known to exist on the sites:

Table 8: Criteria – Heritage and Archaeology (See Figure 7)

Area	Heritage Resources	Conclusion
1	None Known	**Study Required**
2	None Known	**Study Required**
3	None Known	**Study Required**
2&3	None Known	**Study Required**
4	Two possible graves (GR1 Homestead) and GR7 (packed stones, possible grave) in the southern corner.	**Exclude from development**
5	None Known	**Study Required**
6	GR2 (Kraal) - reportedly relocated. GR3 (1/2 graves), GR4 (6/7 graves), GR5 (Headstone) and GR6 (Circular grave) remain	**Exclude from development**
7	None Known	**Study Required**
8	None Known	**Study Required**
4, 6 & 8	Graves within Area 4 and Area 6 must be verified and avoided.	**Study Required**
9	Mahlangu Graveyard is located in this area.	**Exclude from development**
10	Ruins as well as several graves are located in this area.	**Exclude from development**
11	None Known	**No restrictions**
12	None Known	**No restrictions**
9, 10, 11 & 12	Ruins as well as several graves are located in this area.	**Exclude from development**

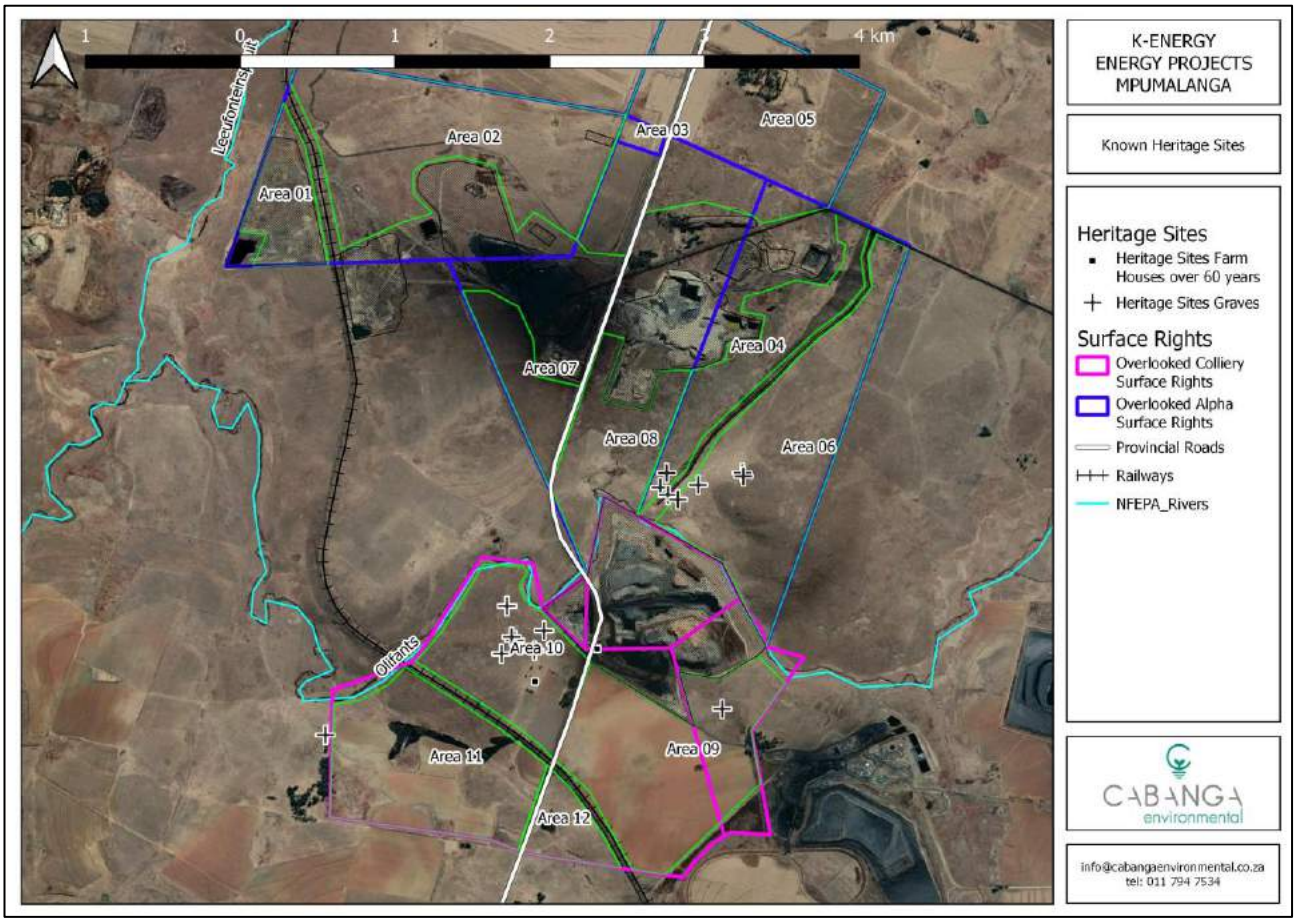

Figure 7: Known Heritage Resources

4.3.4 Dust considerations

Modelled climatic data indicates that the predominant wind-direction is from the East-North-East (Figure 8). (https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/-26.259N29.541E)

Therefore, the PV Projects should preferably be constructed North or East of the main infrastructure areas, to avoid the potential impacts that increased dust from these areas could have on the Solar PV installations.

Area 2; Area 3 and Area 5 are therefore preferable sites for the Solar PV Projects.

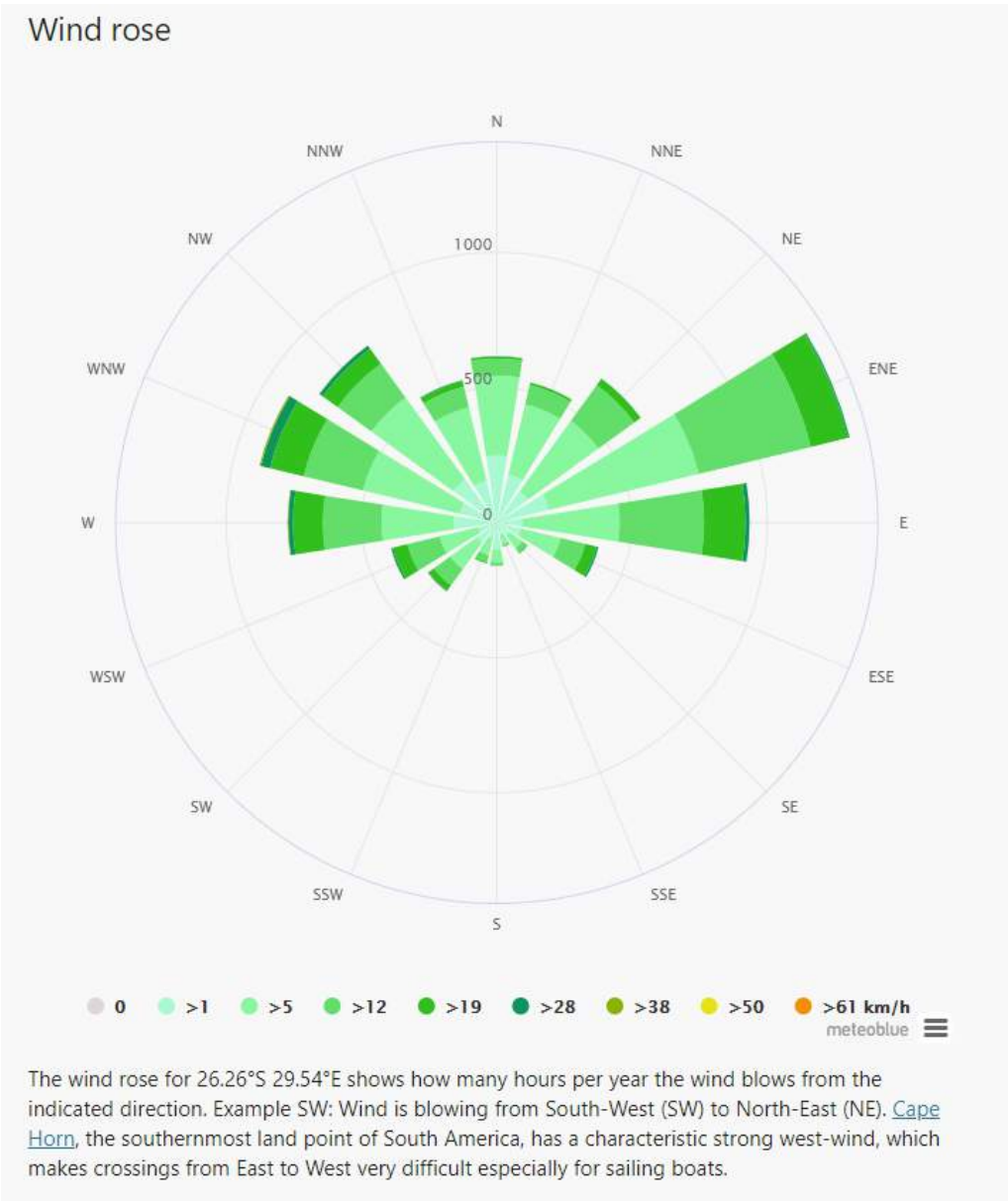

Figure 8: Wind Rose for the area

5 Site Evaluation

Each of the sites included in the desktop assessment are evaluated against the site selection criteria in Table 9.

Table 9: Desktop Site Evaluation

Area	Development Potential	Access	Power Access	Power access	Geotechnical stability	Slope	Wetlands	Biodiversity	Heritage	Wind
1	PV1 **only**	Not preferred	Not preferred	Not preferred	Not preferred	Unknown	Not preferred	Preferred	Study Required	Not preferred
2	PV1 **and** PV2	Suitable	Not preferred	Suitable	Assumed Suitable	Suitable	Suitable	Not preferred	Study Required	Preferred
3	PV1 **or** PV2	Preferred	Not preferred	Not preferred	(study required)	Suitable	Not preferred	Preferred	Study Required	Preferred
2&3	Coal Plant, or PV1 and/or PV2	Preferred	Not preferred	Suitable	(study required)	Suitable	Suitable	Preferred	Study Required	Preferred
4	PV1 **or** PV2	Suitable	Suitable	Not preferred	(study required)	Not preferred	Not preferred	Preferred	Exclude from development	Not preferred
5	PV1 **and** PV2	Preferred	Not preferred	Not preferred	(study required)	Suitable	Suitable	Preferred	Study Required	Preferred
6	PV1 **and** PV2	Not preferred	Suitable	Suitable	(study required)	Not preferred	Not preferred	Not preferred	Exclude from development	Not preferred
7	PV1 **only**	Preferred	Suitable	Suitable	(study required)	Suitable	Suitable	Not preferred	Study Required	Not preferred

Area	Development Potential	Access	Power Access	Power access	Geotechnical stability	Slope	Wetlands	Biodiversity	Heritage	Wind
8	PV1 **or** PV2	**Preferred**	**Suitable**	**Suitable**	(study required)	**Not preferred**	**Not preferred**	**Suitable**	**Study Required**	**Not preferred**
4, 6 & 8	Coal Plant	**Preferred**	**Suitable**	**Suitable**	(study required)	**Not preferred**	**Not preferred**	**Suitable**	**Study Required**	**Not preferred**
9	PV1 **and** PV2	**Preferred**	**Suitable**	**Suitable**	(study required)	**Suitable**	**Suitable**	**Suitable**	**Exclude from development**	**Not preferred**
10	PV1 **or** PV2	**Preferred**	**Preferred**	**Preferred**	(study required)	**Suitable**	**Suitable**	**Not preferred**	**Exclude from development**	**Not preferred**
11	PV1 **and** PV2	**Preferred**	**Suitable**	**Not preferred**	(study required)	**Suitable**	**Not preferred**	**Suitable**	No restrictions	**Not preferred**
12	None	**Preferred**	**Suitable**	**Not preferred**	(study required)	**Suitable**	**Not preferred**	**Preferred**	No restrictions	**Not preferred**
9, 10, 11 & 12	Coal Plant	**Suitable**	**Preferred**	**Preferred**	(study required)	**Suitable**	**Not preferred**	**Suitable**	**Exclude from development**	**Not preferred**

6 Conclusion

Area 1 warrants no further investigation – it is preferred from a terrestrial biodiversity point of view, but presents challenges with access, wetlands, and geotechnical considerations. If the wetland areas are excluded, insufficient space remains on the site to accommodate any of the proposed developments.

Area 2 presents suitable opportunities for development and warrants further investigation (Geotechnical investigation, detailed wetland delineation, Heritage Impact Assessment etc.).

Area 3 may not warrant further investigation on its own, but in conjunction with Area 2 presents suitable development opportunities.

Area 4 does not warrant further investigation on its own but may be further considered in conjunction with Area 6 and Area 8 (neither of these areas present suitable opportunities on their own either).

Area 5 may be further evaluated for the development of Solar PV Projects. Potential to develop Area 5 in conjunction with Area 2 and 3 may also be considered (crossing of the provincial road will have to be assessed from a road traffic safety perspective).

Area 7 may be suitable for the development of PV1 only, however the risk that the existing processing facilities at Halfgewonnen may pose to Solar PV in terms of dust generation must be considered.

Area 9 – 12 present increased opportunity for development if considered together. However, the safety implications of the sites being bisected by the provincial road and railway line must be carefully considered by the relevant engineering team.

From the desktop assessment undertaken, the following can be concluded:

6.1 Coal Plant Sites

The possible sites that have been identified for the development of the Coal Plant present significant challenges:

- Area 2 and Area 3 combined may address the area-requirement of 210 Ha, if the potential wetlands on the Areas are included in the development footprint (not preferred). Given the location of these areas north of the processing area at Halfgewonnen, it is anticipated that these areas would be better suited to development of the PV Projects.
- Area 4, 6 and 8 combined addresses the area-requirement of 210 Ha, however, the area contains graves, wetlands, and the Halfgewonnen River Diversion as well as Ysterkop, a topographical high-point that may not be suited to development without significant earth-works being undertaken.
- Area 9, 10, 11 and 12 combined addresses the area-requirement of 210 Ha, however, none of these areas are contiguous to one another (these areas are separated from each other by the Provincial Road and by the Railway line). Furthermore, Area 11 and 12 contain significant wetlands. Area 10 contains numerous heritage resources and is also earmarked for expansion of the Overlooked Mining Activities (via mining permit applications by Soft Wink Properties and Overlooked Colliery).

6.2 Solar PV Sites

Areas 2, 3 and 5 all presents suitable opportunities (in conjunction or individually) for the development of Solar PV Projects and should be investigated further as potential development sites for PV1 and PV2.

Area 7 meets the area requirements (30 Ha) for PV1, but it is recommended to exclude this site given its location south-west of the Halfgewonnen Processing area. Considering the dominant wind direction, it is anticipated that a Solar PV Project in this area would not be feasible due to dust from the Halfgewonnen Operations.

6.3 Way Forward

It is recommended that additional surface rights be identified for further investigation of the Coal Plant as none of the sites included on the current investigation are considered optimal.

It is recommended to initiate geotechnical, wetland, biodiversity and heritage studies on areas 2, 3 and 5 to further define and confirm the development potential of these areas for the solar PV projects. The recommended site is illustrated in Figure 9.

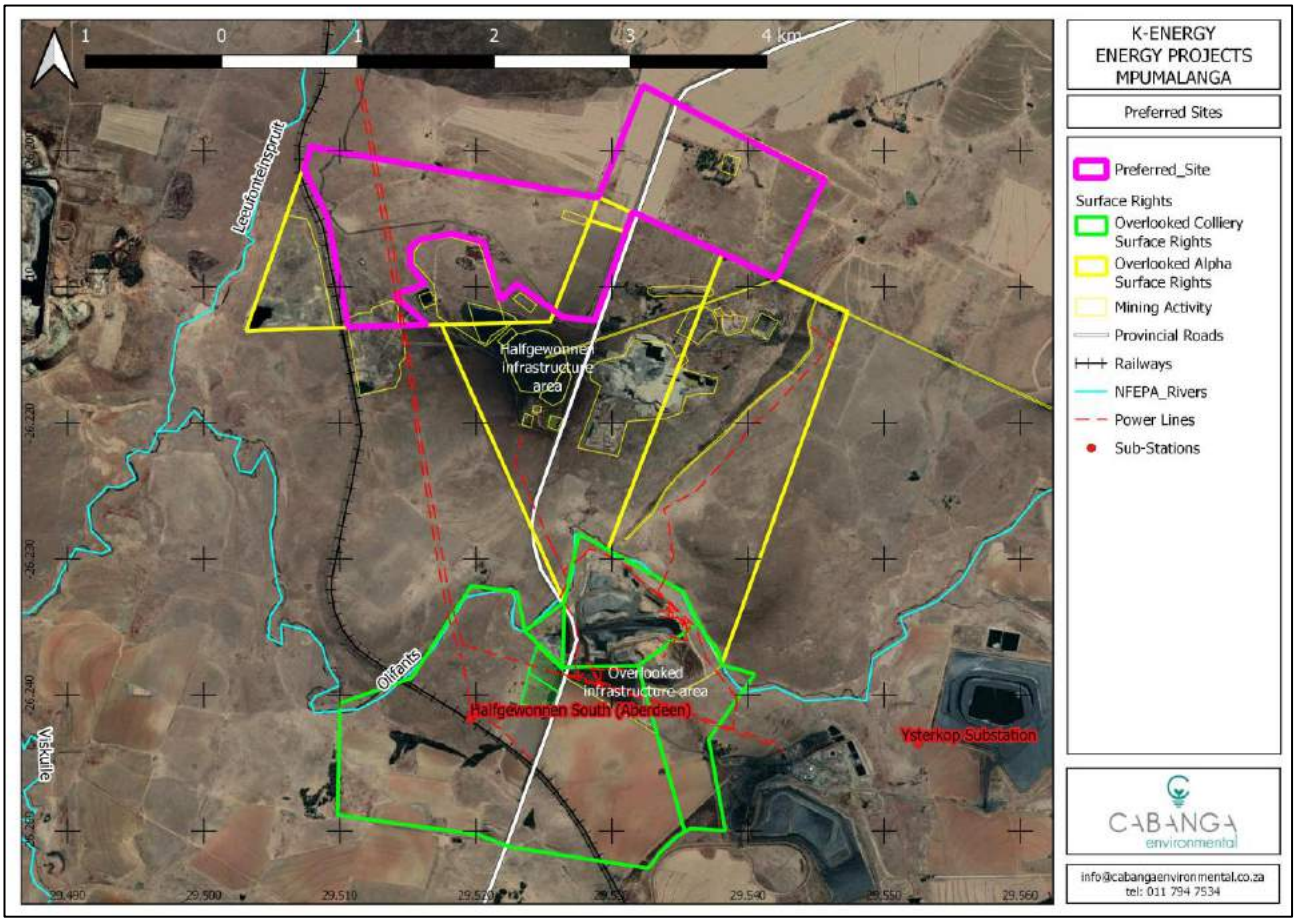

Figure 9: Preferred Site

7 Assumptions and Knowledge Gaps

- The water requirements for the development of the proposed Energy Projects are not currently known, and a feasible water source to address the Projects' water requirements will also need to be determined.
- No detailed contour surveys were provided for inclusion in this assessment, where contours are shown, these have been digitized at 20m intervals from available topographic maps.
- No comprehensive surveys of the existing electricity distribution infrastructure (especially related to the Halfgewonnen Mine/Overlooked Alpha properties) were provided. The data on Figure 3 was collated from information provided by the Overlooked Colliery, available topographical maps, site photographs and Google Earth Aerial Imagery. Substation positions were provided by K-Energy via e-mail on 19 October 2020.
- The biodiversity assessment was based on the MBSP and not on detailed site-specific biodiversity studies.
- The wetland assessment was based on the available specialist studies; however, it is noted that these studies are to some extent outdated (especially in the case of the Halfgewonnen Mine/Overlooked Alpha areas).
- The Permit Application Areas affecting Area 10 have been excluded from the area calculations presented in this memo. It is noted that additional space will be required by these projects for the establishment of topsoil stockpiles and overburden dumps.
- It is assumed at this stage that development of the Projects will require authorisation in terms of the NEMA and the National Water Act (Act 36 of 1998) regardless of the development site(s) chosen. A detailed legal assessment will need to be undertaken as part of the application process.
- The Mining Rights indicated in Figure 1 are based on available information – Cabanga did not undertake any detailed reviews of the actual rights, their legal status or validity
- **Portion 16 has been included in the Assessment, it is noted however that this property has not been listed under the definition of "Properties" in the Transactional Agreement between Overlooked Alpha and Sudor Coal (Pty) Ltd.**