

# **DRAFT: SCOPING REPORT**

## **ENVIRONMENTAL IMPACT ASSESSMENT**

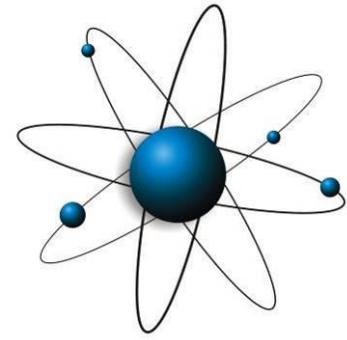
**FOR**

**ESTABLISHMENT OF BLACK ROCK  
SOLAR PV FACILITY, HOTAZEL,  
NORTHERN CAPE PROVINCE**

**July 2023**



**BLACK ROCK MINE OPERATIONS**



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## **PROJECT INFORMATION SHEET**

### **PROJECT:**

ESTABLISHMENT OF BLACK ROCK SOLAR PV FACILITY, HOTAZEL, NORTHERN CAPE PROVINCE

### **APPLICANT:**

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### **COMPETENT AUTHORITY:**

Department of Forestry, Fisheries and the Environment (DFFE)

DFFE Reference Number: Pending

### **REPORT STATUS:**

Draft Scoping Report

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## ABBREVIATIONS

Assmang	Assmang (Pty) Ltd
BRMO	Black Rock Mine Operations
DFFE	Department of Forestry, Fisheries and the Environment (DFFE)
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EO	Environmental Officer
MPRDA	Minerals and Petroleum Resources Development Act
NC DENC	Northern Cape Department of Environment and Nature Conservation
NCNCA	Northern Cape Nature Conservation Act (Act 109 of 2009)
NEMA	National Environmental Management Act, No. 107 of 1998 NEMA EIA
NEMBA	National Environmental Management: Biodiversity Act (Act10 of 2004)
NEMAQA	National Environment Management: Air Quality Act, No. 39 of 2004
NEMWA	National Environmental Management: Waste Act (Act No. 59 of 2008)
NHRA	National Heritage Resources Act (Act 25 of 1999)
NWA	National Water Act (Act 36 of 1998)
POPIA	Protection of Personal Information Act
RDL	Red Data Listed
SDF	Spatial development framework

# 1 INTRODUCTION

Assmang (Pty) Ltd mines manganese ore in the Black Rock area of the Kalahari, in the Northern Cape Province. The ore is mined from the Kalahari Manganese field. The Black Rock Mine Operations (BRMO) are approximately 60 km north-west of the town of Kuruman, in close proximity to the town of Hotazel.

EScience Associates (Pty) Ltd has been appointed to assist BRMO with environmental permitting requirements for a proposed Solar PV Facility, hereafter referred to as the Black Rock Solar PV Facility, and associated infrastructure.

The proposed facility will provide power to BRMO's operations and will have a maximum generating capacity of 100MW. The project will be built in phases with the first phase being 44MW, which will include:

- A solar PV plant (with eastern and western areas and a maximum height of 4.5m)
- 2 substations
  - Collector Substation (22kV, receiving 44MW AC power from the solar PV facility)
  - Consumer Substation (22kV, receiving 44MW AC from the solar PV facility through the 132kV OHLs and 38MW AC power from the BESS)
- Electrical distribution infrastructure.
  - 1 132kV OHL
  - 6 22kV OHLs
- Battery storage facility (situated at the consumer substation)

Future phases will be scheduled as applicable after completion and commissioning of the first phase.

The proposed solar facility is to be located on the Remaining Extent of Farm Klipling 271 and will have a development footprint of approximately 450ha in extent, with additional infrastructure for distributing the electricity to the BRMO's operations. This infrastructure will tie in to BRMO's existing infrastructure.

BRMO is the owner of all the properties on which the proposed project will occur. Although overhead distribution will span the Gamagara River, there will be no physical construction or activities within the flood plain of the river or a 32m buffer measured from the edge of the river.

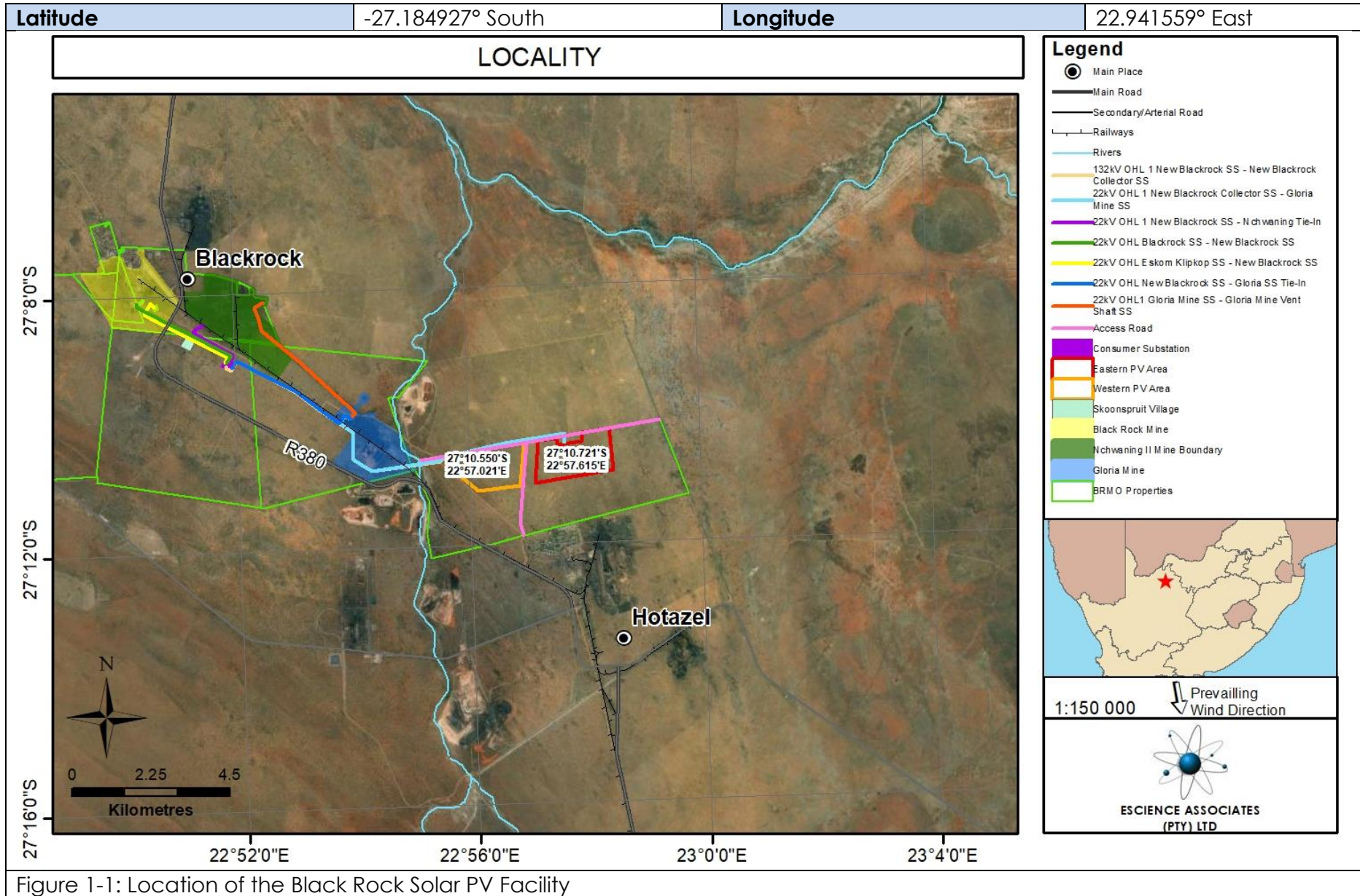
The climate, relief, the size of the affected property, and the availability of land for the development, are favourable for the establishment of a solar facility.

The proposed development includes activities listed in terms of the National Environmental Management Act (Act 107 of 1998), and thus BRMO has applied for an Environmental Authorisation in terms of the National Environmental Management Act. A scoping and environmental impact assessment (EIA) process must be undertaken, in accordance with the environmental impact assessment regulations GN. R 982 of 2014 as amended, to authorise the proposed activities.

## **1.1 REGIONAL LOCATION**

BRMO is located approximately 60 km north-west of the town of Kuruman and 12 kilometres north-west of the town of Hotazel (Figure 1-1). The proposed site for the Black Rock Solar PV Facility will be located on the Remaining Extent of Farm Klipling 271. The site proposed boundary is approximately 1.5 km north west from the nearest Hotazel infrastructure, and approximately 2.5km from centre to centre from the Hotazel town.

The proposed project site falls within the jurisdiction of the John Taolo Gaetsewe District Municipality, and the Joe Morolong Local Municipality.



## 1.2 ADMINISTRATIVE INFORMATION

The following section and associated set of tables, provides pertinent administrative information pertaining to Black Rock Solar PV Facility Applicant, as well as the environmental assessment practitioner who developed the scoping report (Table 1-1 to Table 1-4).

Table 1-1: Name and Address of Solar Facility	
Owner and Name of Mine	Assmang (Pty) Limited, Black Rock Mine Operations
Company Registration	1935/007343/06
Physical Address	Black Rock Mine Operations, Santoy, Northern Cape
Postal Address	PO Box 187, Santoy, Northern Cape, 8491
Telephone	053 751 5260
Fax	053 751 5555
Senior General Manager	Wilhemina Ngcobo

Table 1-2: Details of EAP	
Name of Company	EScience Associates (Pty) Ltd.
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Contact Person	Abdul Ebrahim
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Physical Address	9 Victoria Street, Oaklands, Johannesburg, 2192
Telephone	011 718 6380
Fax	072 268 1119
Email	abdul@escience.co.za
EAP Qualifications	B.Sc. (Hons) Environmental and Resource Studies
Curriculum Vitae	Refer to Appendix 1

Table 1-3: Report Authors	
Authors	Experience
Lehlogonolo Chuene	8 years
Abdul Ebrahim – Technical Lead	20 Years
Emma Jepsen – Candidate EAP	2 Years

Table 1-4: Project Applicable Servitudes Relevant to this application.		
Mine	Servitude Type	Servitude No.
Gloria	Rail	K38/83S
Gloria	Water pipeline (Sedibeng Water Vaal-Gamagara Supply)	K36/1978S

## 2 DESCRIPTION OF CURRENT LAND USE AND ACTIVITIES

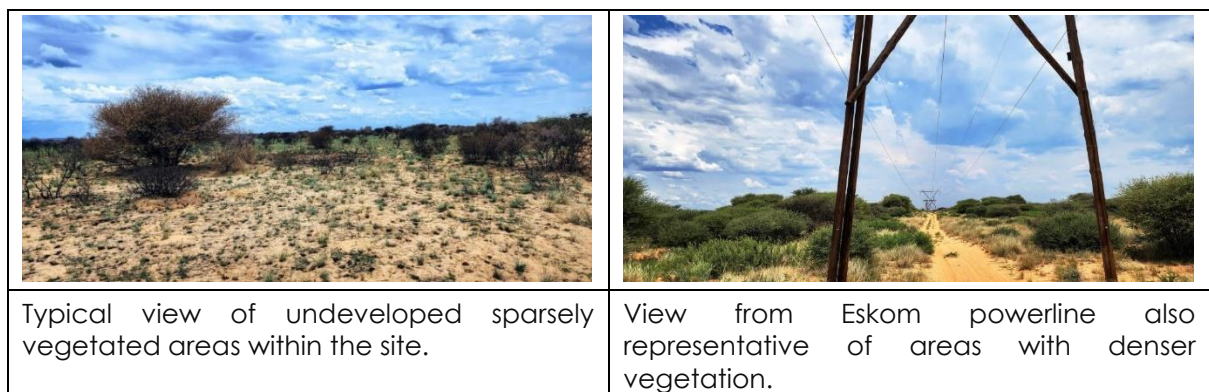
The affected properties where the Black Rock solar PV facility and associated distribution infrastructure will be established are owned by the applicant (Assmang (Pty) Ltd). The region surrounding the proposed development is dominated by mining, and agricultural (generally livestock production) land uses (Refer to Figure 2-2).





A basic summary of nearby activities and built-up areas is presented in Table 2-1 and Table 2-2.

Mine/Industry	Approximate distance and direction relative to the solar site boundary
BRMO surface operations	1.5 km west
East Manganese Mine	1.5 km north west
Mokala Manganese Mine	1.5 km east
South 32 Wessels Manganese Mine	9 km north west
Kalagadi Manganese Mine	3.5 km south east
South 32 Hotazel Manganese Mine	1.5 km south east
Good Rock (Pty) Ltd	8 km north west

Town	Approximate distance and direction from the centre of the site
Hotazel	2.5 km south east
Kuruman	80 km south east
Upington	267 km south west
Kimberley	320 km south east

The land where the solar PV facility is proposed to be established is currently used by BRMO for low density livestock rearing on a lease basis. The land is largely undeveloped with exception of fencing, and isolated farming facilities, and an existing Eskom overhead powerline running north to south through the farm, refer Figure 2-1 below.



	
<p>Derelict farmhouse</p>	<p>Old cattle kraal</p>
	
<p>Gloria Mine as viewed from the north western boundary of the farm Kipling.</p>	<p>Mokala Mine overburden stockpiles also viewed from the north western boundary of the farm Kipling.</p>
<p>Figure 2-1: General Photos of the site and surrounds</p>	

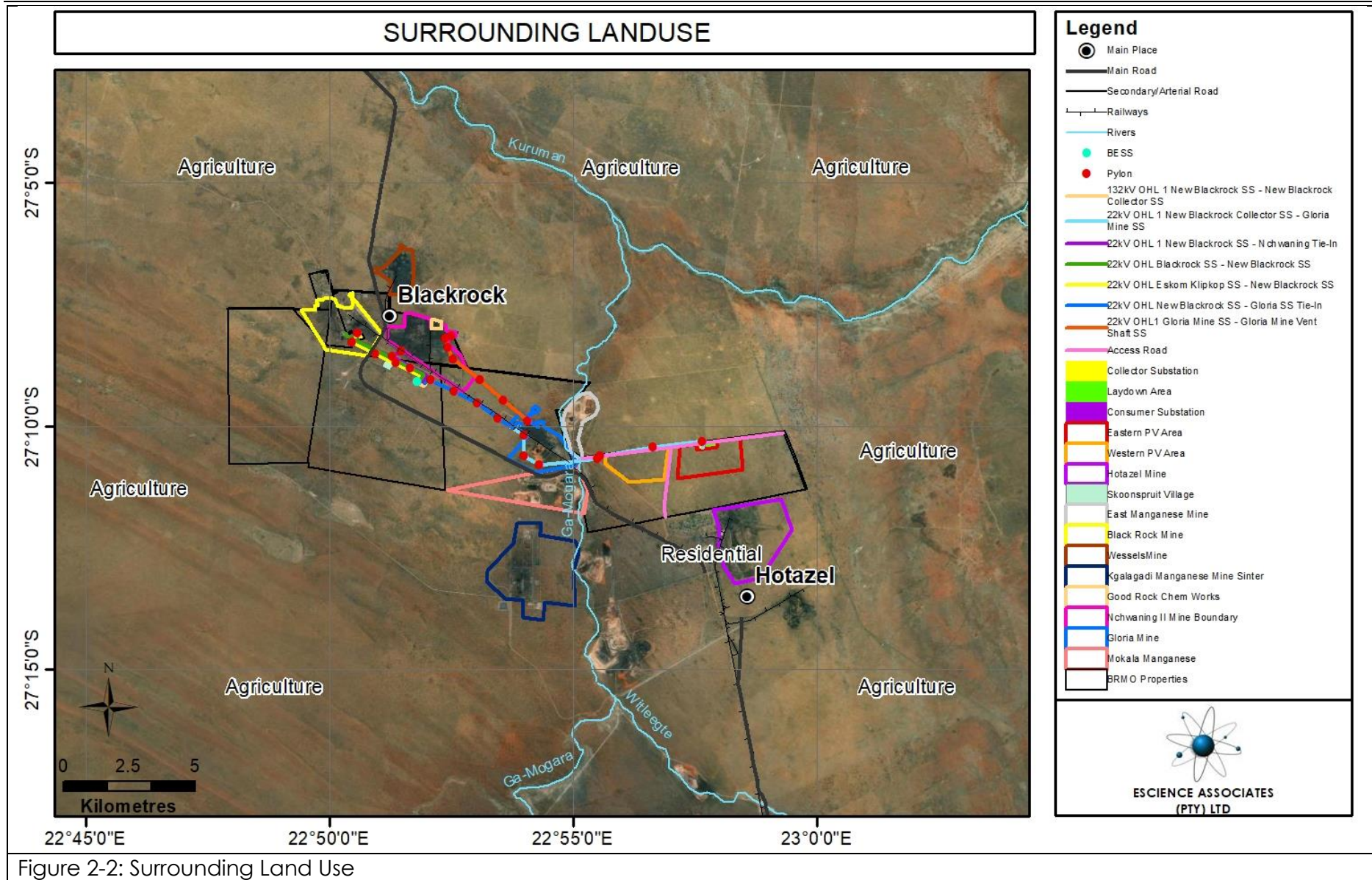


Figure 2-2: Surrounding Land Use



### 3 DESCRIPTION OF PROPOSED ACTIVITIES

The general descriptions herein are intended to convey a broad understanding of the activities associated with the proposed Block Rock Solar Facility development.

#### 3.1 SCOPE OF THE PROPOSED ACTIVITIES

BRMO proposes to construct and operate a solar power generation facility to supply its operations, with the primary aims of:

- Offsetting electricity grid supply risks and escalating costs.
- Reducing BRMO's carbon footprint with a long term view to net carbon neutrality.

The project will be built in phases with the first phase being 44MW, which will include:

- A solar PV plant (with eastern and western areas and a maximum height of 4.5m)
- 2 substations
  - Collector Substation (22kV, receiving 44MW AC power from the solar PV facility)
  - Consumer Substation (22kV, receiving 44MW AC from the solar PV facility through the 132kV OHLs and 38MW AC power from the BESS)
- Electrical distribution infrastructure.
  - 1 132kV OHL
  - 6 22kV OHLs
- Battery storage facility (situated at the consumer substation)

The collector substation is situated on Kipling farm at the solar PV farm where it steps up the voltage to 132kV. This provides the necessary voltage to transfer the 44MW AC to the consumer substation while staying within the volt drop parameters. The consumer substation receives the 44MW AC from the solar PV and has the 38MW AC from the BESS which is situated at the consumer substation where it then distributes the power on a 22kV level into the mines network. The BESS to be utilised is a liquid cooled lithium-ion BESS solution from a Tier 1 supplier.

Future phases will be scheduled as applicable after completion and commissioning of the first phase. The total generation capacity applied for is 100MW.

The proposed solar facility is to be located on the Remaining Extent of Farm Kipling 271 and will have a development footprint of approximately 450ha in extent, with additional infrastructure for distributing the electricity to the BRMO's operations. This infrastructure will tie in to BRMO's existing electrical distribution infrastructure. The farms that all the proposed activities will take place on are shown in Table 3-1 below. The details of the project infrastructure are included in Table 3-2 below.

Table 3-1: Properties for proposed activities		
Properties		
Alternative 1		
Farm Name	Portion No.	SG Code
Kipling	Remainder	C04100000000027100000
Gloria	1	C04100000000026600001
Mukulu	Remainder	C04100000000026500000
N'Chwaning	9*	C04100000000026700009
N'Chwaning	1	C04100000000026700001

\*There is some discrepancy regarding the property portion, see Appendix 3: Discrepancy in Farm Portions.

Table 3-2: Details of the proposed activities		
Substations, Laydown Areas, and PV Areas		
Infrastructure	Area (ha)	Coordinates of vertices
Collector Substation	1.27	27°10'25.35"S, 22°57'40.05"E
		27°10'28.59"S, 22°57'40.38"E
		27°10'28.30"S, 22°57'35.82"E
		27°10'25.20"S, 22°57'35.82"E
Consumer Substation	9.36	27° 8'42.76"S, 22°51'57.74"E
		27° 8'53.79"S, 22°51'58.61"E
		27° 8'54.11"S, 22°51'45.47"E
		27° 8'42.98"S, 22°51'45.47"E
Laydown Area	5	27°10'19.67"S, 22°57'54.30"E
		27°10'24.47"S, 22°57'55.37"E
		27°10'26.09"S, 22°57'43.44"E
		27°10'21.29"S, 22°57'42.37"E
Eastern PV Boundary	241	27°10'15.61"S, 22°58'26.36"E
		27°10'54.07"S, 22°58'29.11"E
		27°11'4.26"S, 22°57'8.00"E
		27°10'24.87"S, 22°57'11.96"E
		27°10'22.32"S, 22°57'34.17"E
		27°10'29.91"S, 22°57'34.75"E
		27°10'27.11"S, 22°57'58.20"E
Western PV Boundary	207	27°10'19.66"S, 22°57'56.88"E
		27°10'26.50"S, 22°56'57.08"E
		27°11'5.77"S, 22°56'52.17"E
		27°11'9.51"S, 22°56'8.75"E
		27°10'47.47"S, 22°55'39.92"E
27°10'36.05"S, 22°55'39.73"E		

Consumer Substation	9.36	27° 9'3.63"S, 22°52'0.92"E
		27° 9'11.97"S, 22°51'55.65"E
		27° 9'6.77"S, 22°51'45.48"E
		27° 8'58.69"S, 22°51'50.98"E
<b>OHL and Road Infrastructure</b>		
<b>Infrastructure</b>	<b>Length (km)</b>	<b>Coordinates of vertices</b>
Access Road	6.97	27°10'9.40"S, 22°59'19.10"E
		27°10'40.80"S, 22°55'8.40"E
Access Road	2.67	27°10'26.40"S, 22°56'59.00"E
		27°11'40.50"S, 22°56'51.30"E
		27°11'52.90"S, 22°56'53.70"E
22kV OHL 1 New Blackrock Collector SS - Gloria Mine SS	8.19	27°10'27.10"S, 22°57'39.80"E
		27°10'19.10"S, 22°57'40.10"E
		27°10'37.20"S, 22°55'33.80"E
		27°10'40.90"S, 22°55'30.40"E
		27°10'48.70"S, 22°54'19.50"E
		27°10'37.50"S, 22°54'0.60"E
		27°10'12.00"S, 22°53'59.80"E
		27°10'3.60"S, 22°53'47.20"E
		27° 9'56.70"S, 22°53'52.30"E
132kV OHL 1 New Blackrock SS - New Blackrock Collector SS	11.7	27°10'27.10"S, 22°57'39.90"E
		27°10'19.10"S, 22°57'40.10"E
		27°10'37.30"S, 22°55'33.90"E
		27°10'40.90"S, 22°55'30.50"E
		27°10'48.70"S, 22°54'19.50"E
		27°10'37.50"S, 22°54'0.60"E
		27°10'12.00"S, 22°53'59.90"E
		27° 9'32.70"S, 22°53'2.60"E
		27° 9'2.10"S, 22°52'1.80"E
		27° 9'10.90"S, 22°51'56.30"E
22kV OHL1 Gloria Mine SS - Gloria Mine Vent Shaft SS	4.7	27° 9'58.00"S, 22°53'59.90"E
		27° 9'53.70"S, 22°54'3.80"E
		27° 8'34.60"S, 22°52'29.20"E
		27° 8'13.40"S, 22°52'22.60"E
		27° 8'8.70"S, 22°52'31.10"E
22kV OHL New Blackrock SS - Gloria SS Tie-In	4.17	27° 9'59.40"S, 22°53'58.40"E
		27° 9'56.30"S, 22°53'52.10"E
		27°10'3.20"S, 22°53'46.80"E
		27° 9'31.80"S, 22°53'2.60"E
		27° 9'2.30"S, 22°52'1.30"E
		27° 9'8.70"S, 22°51'57.20"E
	1.99	27° 9'4.90"S, 22°51'54.10"E

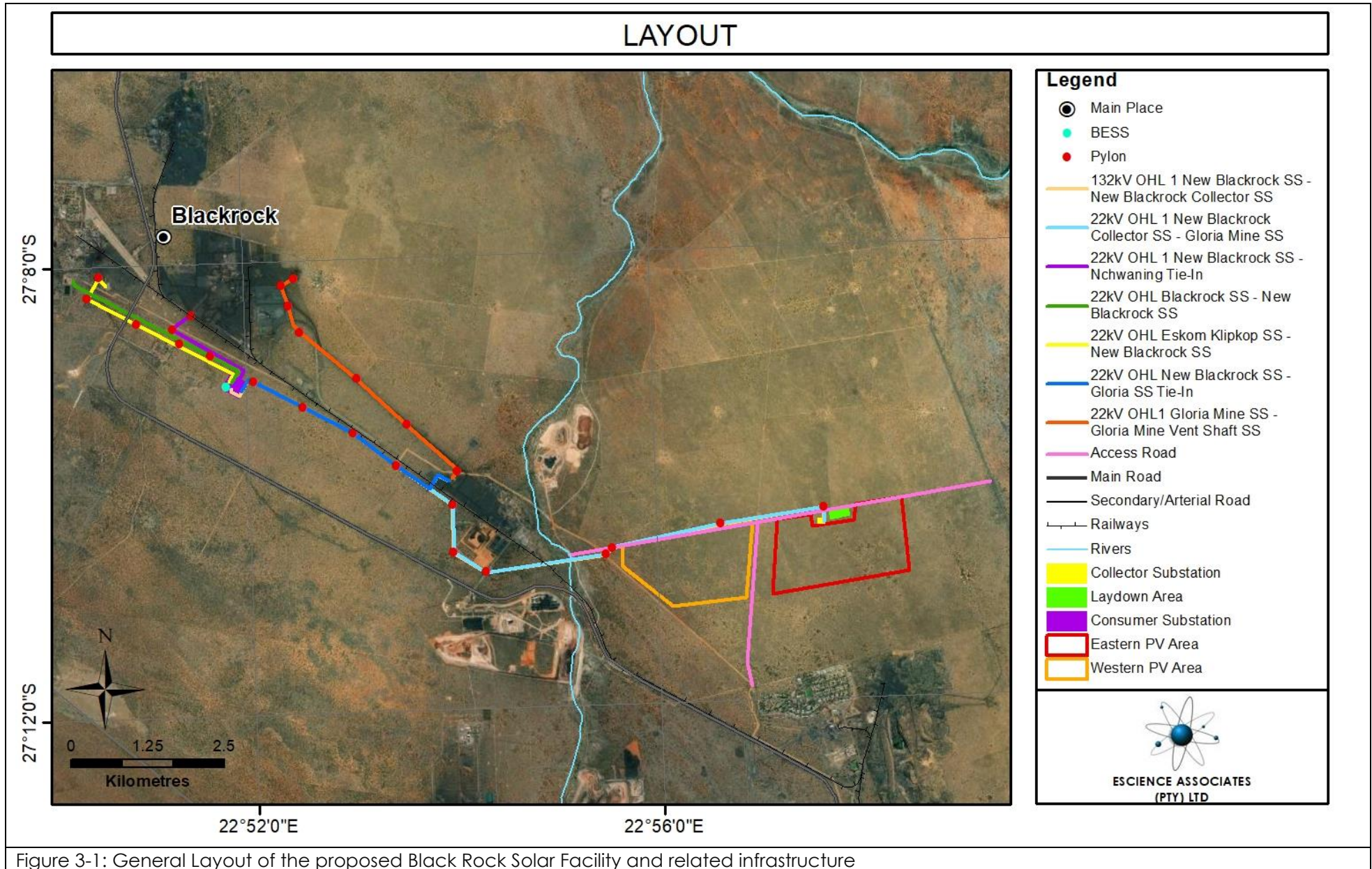
22kV OHL 1 New Blackrock SS - Nchwaning Tie-In		27° 8'57.90"S, 22°51'59.00"E
		27° 8'35.00"S, 22°51'17.90"E
		27° 8'32.40"S, 22°51'19.80"E
		27° 8'27.90"S, 22°51'28.70"E
22kV OHL Eskom Klipkop SS - New Blackrock SS	3.4	27° 9'3.40"S, 22°51'50.10"E
		27° 8'59.10"S, 22°51'52.60"E
		27° 8'17.10"S, 22°50'27.90"E
		27° 8'6.20"S, 22°50'34.80"E
		27° 8'10.70"S, 22°50'39.00"E
22kV OHL Blackrock SS - New Blackrock SS	3.34	27° 9'34.00"S, 22°51'51.60"E
		27° 8'57.30"S, 22°51'56.20"E
		27° 8'9.90"S, 22°50'20.90"E
		27° 8'6.80"S, 22°50'19.40"E
<b>BESS and Pylon Infrastructure</b>		
<b>Infrastructure</b>	<b>Coordinates</b>	
BESS	27° 9'6.00"S, 22°51'48.18"E	
Pylon	27°10'19.20"S, 22°57'39.60"E	
Pylon	27°10'26.40"S, 22°56'38.15"E	
Pylon	27°10'37.20"S, 22°55'33.60"E	
Pylon	27°10'40.80"S, 22°55'30.00"E	
Pylon	27°10'48.00"S, 22°54'18.64"E	
Pylon	27°10'37.20"S, 22°53'60.00"E	
Pylon	27°10'12.00"S, 22°53'60.00"E	
Pylon	27° 9'54.00"S, 22°54'3.60"E	
Pylon	27° 9'28.80"S, 22°53'34.80"E	
Pylon	27° 9'3.60"S, 22°53'6.00"E	
Pylon	27° 8'38.40"S, 22°52'33.00"E	
Pylon	27° 8'24.00"S, 22°52'26.40"E	
Pylon	27° 8'13.20"S, 22°52'22.80"E	
Pylon	27° 8'9.60"S, 22°52'30.00"E	
Pylon	27° 9'50.40"S, 22°53'27.60"E	
Pylon	27° 9'32.40"S, 22°53'2.40"E	
Pylon	27° 9'18.00"S, 22°52'33.60"E	
Pylon	27° 9'3.60"S, 22°52'4.80"E	
Pylon	27° 8'49.20"S, 22°51'39.60"E	
Pylon	27° 8'42.00"S, 22°51'21.60"E	
Pylon	27° 8'31.20"S, 22°50'56.40"E	
Pylon	27° 8'16.80"S, 22°50'27.60"E	
Pylon	27° 8'6.00"S, 22°50'34.80"E	
Pylon	27° 8'34.80"S, 22°51'18.00"E	
Pylon	27° 8'27.60"S, 22°51'28.80"E	

The project will include the following:

- Surveying and assessment of the proposed footprint;
- Vegetation clearance and establishment of access roads;

- Site establishment and laydown areas;
- Erection of fencing and access control;
- Striping of topsoil to be stockpiled where necessary;
- Transporting of materials to site;
- Excavations and erection of the proposed infrastructure;
- Establishment and connection of overhead distribution lines substations;
- Establishment of Battery Energy Storage System (BESS)

The general proposed layout is illustrated in Figure 3-1 below.



### **3.1.1 CONSTRUCTION PHASE**

The construction phase will broadly consist of:

- Erection of fences and access control;
- Clearing of vegetation and establishment of roads, contractor laydown areas and project service facilities;
- Stripping and stockpiling of topsoil where required;
- Excavations of foundations for support where required;
- Erection of solar PV generation and distribution facilities (including panels and collector substations);
- Erection of overhead lines;
- Establishment of a new substation to tie in overhead lines and existing distribution infrastructure;
- Establishment of a battery storage facility;
- Removal of construction facilities and rehabilitation of disturbed areas, where applicable, at the end of construction phase.

### **3.1.2 OPERATIONAL PHASE**

The operational phase will consist of:

- Operation of the facilities;
- Security and access control;
- Periodic maintenance and inspection of the panels;
- Cleaning of panels;
- Administrative functions.

### **3.1.3 CLOSURE AND DECOMMISSIONING PHASE**

The current life of mine is expected to exceed 25 years. The PV installations are anticipated to have an operational life of at least 25 years before panels may need to be replaced.

Replacement of the PV panels, after 25 years or more of operational life, will entail:

- Removal of the panels and replacement.
- Transporting of the panels to a recycling facility where the recyclable components can be recycled, and disposal of those components which are not recyclable.

Decommissioning of the facilities at end of life of the mine will entail:

- Removal of the panels and replacement.
- Transporting of the panels to a recycling facility where the recyclable components can be recycled, and disposal of those components which are not recyclable.
- Disassembly of supporting infrastructure and recycling of the recyclable components (e.g. steel and electrical cabling);
- Following the removal of all onsite components, the site will need to be rehabilitated.
- Removal of foundations and disposal or reuse of rubble;

- Ripping and scarifying of roads, and other compacted footprints;
- Depositing of subsoil and topsoil, on the exposed surfaces; and
- Rehabilitation and aftercare.

### 3.2 ALTERNATIVES CONSIDERED

The EIA regulations require that alternatives be considered. The regulations define "alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the -

- property on which or location where the activity is proposed to be undertaken;
  - type of activity to be undertaken;
  - design or layout of the activity;
  - technology to be used in the activity; or
  - operational aspects of the activity;
- and includes the option of not implementing the activity;

A summary of alternatives considered is set out in the ensuing sub-sections.

#### 3.2.1 LOCATION ALTERNATIVES

Two sites within BRMO's properties were considered for the proposed solar plant (Figure 8-1):

- Kipling Farm
- Belgravia Farm

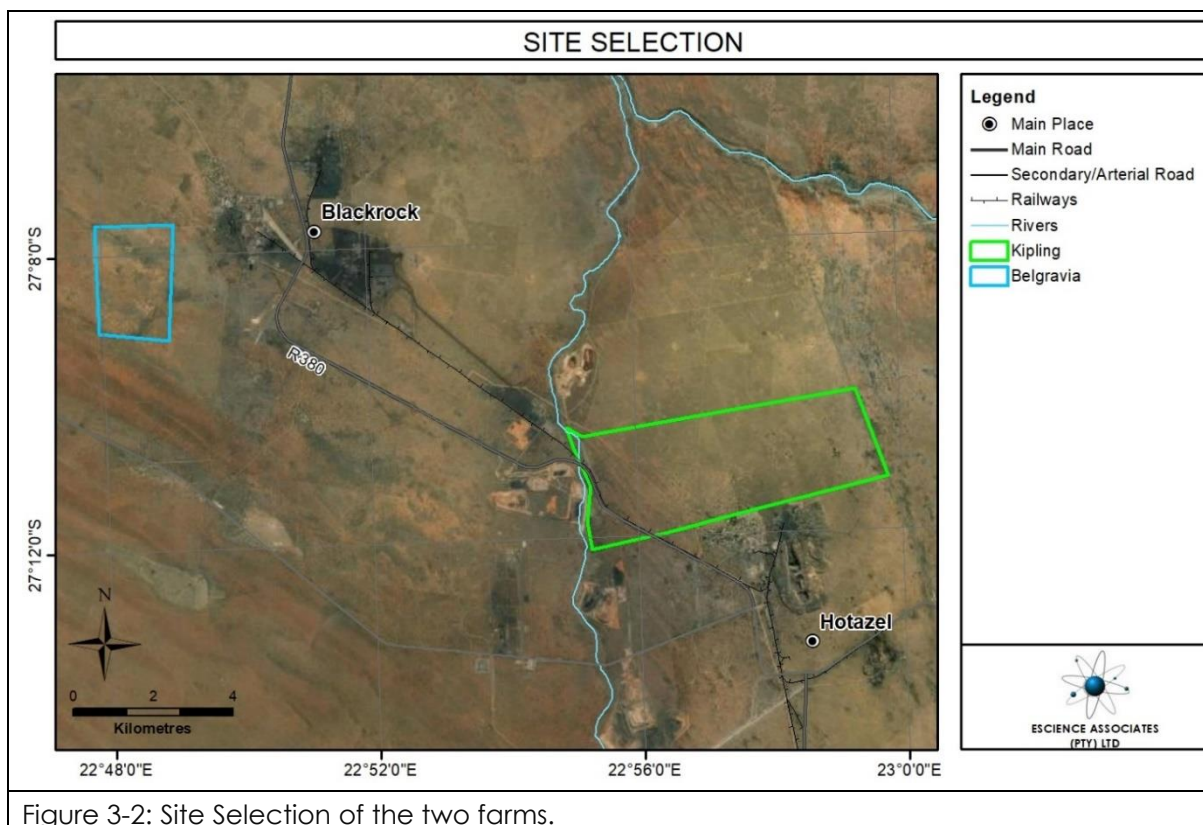


Figure 3-2: Site Selection of the two farms.



These locations for the solar PV facility were selected due to site specific characteristics such as the solar resource, land availability, topographical considerations, and environmental features. The two sites were reviewed and the Kipling farm was identified as the preferred site. Refer to section 7.6 of this report for more detail on the site selection.

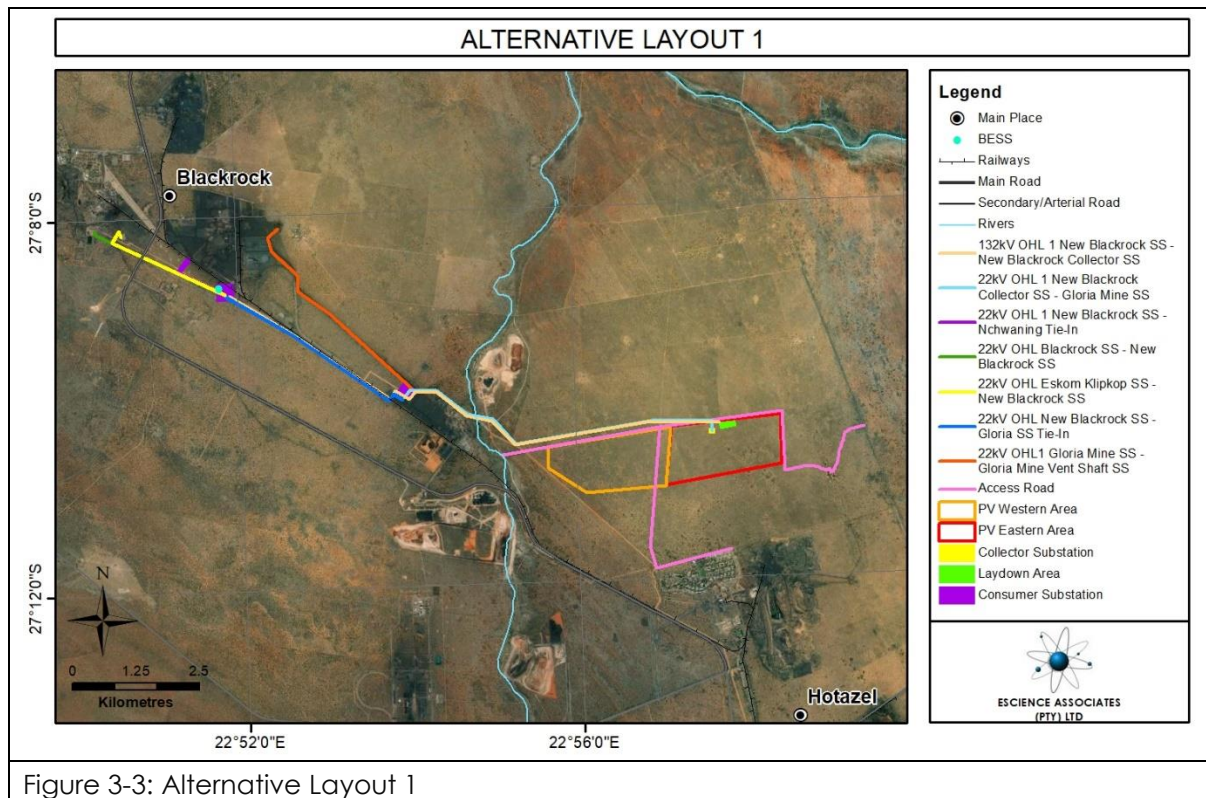
### 3.2.2 TYPE OF ACTIVITY TO BE UNDERTAKEN

The proposed site has historically been used for low density animal husbandry. Agricultural activities in this area are limited by a lack of rainfall and easily accessible water resources. The site is currently surrounded by mining activities and the town of Hotazel. The potential for mining activities on the site is determined by the available mineral resources. At present, mineral resource extraction for this site is not feasible via open cast mining. Therefore, the proposed activities do not impinge on potential future mining activities as these would be undertaken through underground mining.

Given the location, the nature of the land, and the need for sustainable electricity supply, the type of activity proposed is suited to the site.

### 3.2.3 DESIGN OR LAYOUT

Two layout alternatives were considered for the development (see Figure 3-3 and Figure 3-4 below). See Table 3-3 for a list of the properties on which the alternatives are located, and Table 3-4 and Table 3-5 for details of the infrastructure of the alternative layouts.



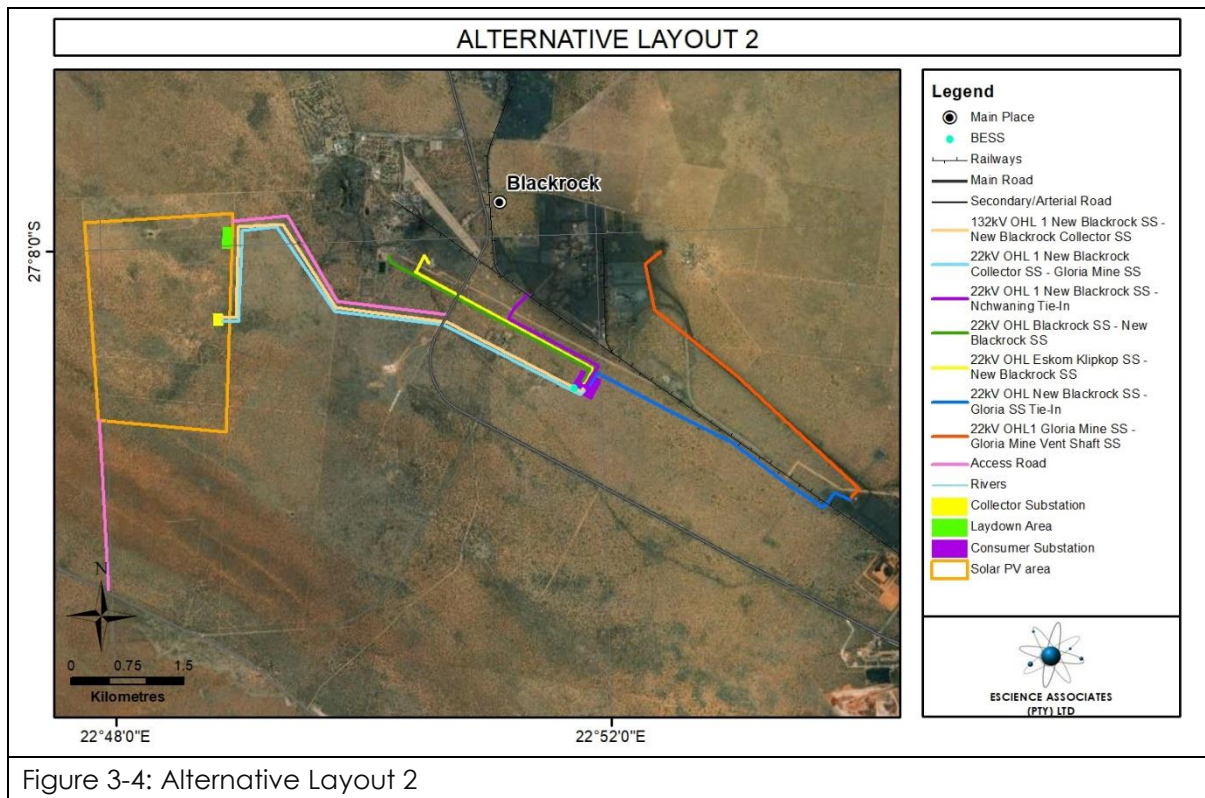


Figure 3-4: Alternative Layout 2

Table 3-3: Properties for the alternative layouts		
Properties		
Alternative 1		
Farm Name	Portion No.	SG Code
Kipling	Remainder	C04100000000027100000
Gloria	1	C04100000000026600001
Mukulu	Remainder	C04100000000026500000
N'Chwaning	9*	C04100000000026700009
N'Chwaning	1	C04100000000026700001
East	Remainder	C04100000000027000000
Alternative 2		
Farm Name	Portion No.	SG Code
Gloria	1	C04100000000026600001
Mukulu	Remainder	C04100000000026500000
Belgravia	Remainder	C04100000000026400000
N'Chwaning	9*	C04100000000026700009
N'Chwaning	1	C04100000000026700001

\*There is some discrepancy regarding the property portion, see Appendix 3: Discrepancy in Farm Portions.

Table 3-4: Alternative Layout 1 Details of Infrastructure		
OHL and Road Infrastructure		
Infrastructure	Length (km)	Coordinates of vertices
Access Road	3.14	27°10'38.21"S, 22°55'7.75"E

		27°10'23.17"S, 22°57'0.38"E
Access Road	5.87	27°10'23.19"S, 22°57'0.66"E
		27°10'15.58"S, 22°58'28.38"E
		27°10'53.59"S, 22°58'29.38"E
		27°10'51.31"S, 22°58'40.71"E
		27°10'51.75"S, 22°58'53.26"E
		27°10'53.05"S, 22°58'55.30"E
		27°10'54.08"S, 22°58'59.68"E
		27°10'53.31"S, 22°59'1.14"E
		27°10'54.69"S, 22°59'1.44"E
		27°10'55.49"S, 22°59'3.45"E
		27°10'48.26"S, 22°59'7.46"E
		27°10'39.79"S, 22°59'9.32"E
		27°10'33.11"S, 22°59'12.53"E
		27°10'30.68"S, 22°59'12.94"E
		27°10'28.28"S, 22°59'16.55"E
		27°10'27.53"S, 22°59'20.07"E
27°10'27.76"S, 22°59'21.09"E		
27°10'27.01"S, 22°59'22.16"E		
27°10'26.34"S, 22°59'26.49"E		
Access Road	4.33	27°10'23.82"S, 22°57'0.19"E
		27°11'40.08"S, 22°56'51.04"E
		27°11'53.66"S, 22°56'55.03"E
		27°11'42.34"S, 22°57'49.39"E
22kV OHL New Blackrock SS - Gloria SS Tie-In	8.39	27° 8'50.83"S, 22°51'55.12"E
		27°10'0.87"S, 22°53'47.19"E
		27° 9'54.66"S, 22°53'51.32"E
		27° 9'59.00"S, 22°53'58.53"E
132kV OHL 1 New Blackrock SS - New Blackrock Collector SS	10.9	27° 8'50.83"S, 22°51'55.12"E
		27°10'0.87"S, 22°53'47.19"E
		27° 9'54.66"S, 22°53'51.32"E
		27°10'0.94"S, 22°54'1.67"E
		27° 9'56.04"S, 22°54'5.94"E
		27° 9'56.05"S, 22°54'21.55"E
		27°10'11.95"S, 22°54'42.55"E
		27°10'15.79"S, 22°55'0.79"E
		27°10'31.45"S, 22°55'16.91"E
		27°10'19.81"S, 22°56'53.82"E
		27°10'20.57"S, 22°57'37.41"E
27°10'26.58"S, 22°57'37.85"E		
22kV OHL 1 New Blackrock Collector SS - Gloria Mine SS	6.78	27°10'0.94"S, 22°54'1.67"E
		27° 9'56.04"S, 22°54'5.94"E
		27° 9'56.05"S, 22°54'21.55"E
		27°10'11.95"S, 22°54'42.55"E
		27°10'15.79"S, 22°55'0.79"E

		27°10'31.45"S, 22°55'16.91"E
		27°10'19.81"S, 22°56'53.82"E
		27°10'20.57"S, 22°57'37.41"E
		27°10'26.58"S, 22°57'37.85"E
22kV OHL1 Gloria Mine SS - Gloria Mine Vent Shaft SS	4.7	27° 9'57.93"S, 22°53'59.50"E
		27° 9'54.26"S, 22°54'3.92"E
		27° 8'49.45"S, 22°52'44.87"E
		27° 8'38.33"S, 22°52'44.25"E
		27° 8'23.54"S, 22°52'25.83"E
		27° 8'14.60"S, 22°52'23.68"E
		27° 8'8.83"S, 22°52'31.61"E
22kV OHL Blackrock SS - New Blackrock SS	5.81	27° 8'6.71"S, 22°50'19.71"E
		27° 8'9.90"S, 22°50'20.82"E
		27° 8'50.80"S, 22°51'51.85"E
22kV OHL Eskom Klipkop SS - New Blackrock SS	5.69	27° 8'10.90"S, 22°50'38.66"E
		27° 8'7.03"S, 22°50'37.03"E
		27° 8'14.20"S, 22°50'32.34"E
		27° 8'50.80"S, 22°51'51.85"E
22kV OHL 1 New Blackrock SS - Nchwaning Tie-In	2.77	27° 8'34.92"S, 22°51'19.58"E
		27° 8'26.87"S, 22°51'27.36"E
		27° 8'25.98"S, 22°51'26.25"E
		27° 8'34.59"S, 22°51'18.10"E
		27° 8'50.80"S, 22°51'51.85"E
<b>Substations, Laydown Areas, and PV Areas</b>		
<b>Infrastructure</b>	<b>Area (ha)</b>	<b>Coordinates of vertices</b>
Consumer Substation 1	11.9	27° 8'42.76"S, 22°51'57.74"E
		27° 8'53.79"S, 22°51'58.61"E
		27° 8'54.11"S, 22°51'45.47"E
		27° 8'42.98"S, 22°51'45.47"E
Consumer Substation 2	7.28	27° 9'48.81"S, 22°53'58.00"E
		27° 9'54.24"S, 22°54'6.54"E
		27°10'0.68"S, 22°54'0.95"E
		27° 9'55.38"S, 22°53'52.47"E
Collector Substation	1.27	27°10'25.29"S, 22°57'40.11"E
		27°10'28.63"S, 22°57'40.31"E
		27°10'28.46"S, 22°57'35.84"E
		27°10'25.11"S, 22°57'35.84"E
Laydown Area	5	27°10'19.61"S, 22°57'54.41"E
		27°10'24.31"S, 22°57'55.46"E
		27°10'26.12"S, 22°57'43.45"E
		27°10'21.28"S, 22°57'42.42"E
Eastern PV Area	235	27°10'17.26"S, 22°58'26.93"E
		27°10'48.45"S, 22°58'27.31"E
		27°11'0.97"S, 22°57'3.71"E

		27°10'23.77"S, 22°57'8.80"E
Western PV Area	229	27°11'0.97"S, 22°57'3.71"E
		27°10'23.77"S, 22°57'8.80"E
		27°11'3.77"S, 22°56'6.75"E
		27°10'47.79"S, 22°55'40.19"E
		27°10'33.97"S, 22°55'39.98"E
<b>BESS Infrastructure</b>		
<b>Infrastructure</b>	<b>Coordinates</b>	
BESS	27° 8'45.97"S, 22°51'47.50"E	

Table 3-5: Alternative Layout 2 Details of Infrastructure		
OHL and Road Infrastructure		
Infrastructure	Length (km)	Coordinates of vertices
Access Road	3.14	27°10'38.21"S, 22°55'7.75"E
		27°10'23.17"S, 22°57'0.38"E
Access Road	5.87	27°10'23.19"S, 22°57'0.66"E
		27°10'15.58"S, 22°58'28.38"E
		27°10'53.59"S, 22°58'29.38"E
		27°10'51.31"S, 22°58'40.71"E
		27°10'51.75"S, 22°58'53.26"E
		27°10'53.05"S, 22°58'55.30"E
		27°10'54.08"S, 22°58'59.68"E
		27°10'53.31"S, 22°59'1.14"E
		27°10'54.69"S, 22°59'1.44"E
		27°10'55.49"S, 22°59'3.45"E
		27°10'48.26"S, 22°59'7.46"E
		27°10'39.79"S, 22°59'9.32"E
		27°10'33.11"S, 22°59'12.53"E
		27°10'30.68"S, 22°59'12.94"E
		27°10'28.28"S, 22°59'16.55"E
		27°10'27.53"S, 22°59'20.07"E
27°10'27.76"S, 22°59'21.09"E		
27°10'27.01"S, 22°59'22.16"E		
27°10'26.34"S, 22°59'26.49"E		
Access Road	4.33	27°10'23.82"S, 22°57'0.19"E
		27°11'40.08"S, 22°56'51.04"E
		27°11'53.66"S, 22°56'55.03"E
		27°11'42.34"S, 22°57'49.39"E
22kV OHL New Blackrock SS - Gloria SS Tie-In	8.39	27° 8'50.83"S, 22°51'55.12"E
		27°10'0.87"S, 22°53'47.19"E
		27° 9'54.66"S, 22°53'51.32"E
		27° 9'59.00"S, 22°53'58.53"E
132kV OHL 1 New Blackrock	10.9	27° 8'50.83"S, 22°51'55.12"E
		27°10'0.87"S, 22°53'47.19"E

SS - New Blackrock Collector SS		27° 9'54.66"S, 22°53'51.32"E		
		27°10'0.94"S, 22°54'1.67"E		
		27° 9'56.04"S, 22°54'5.94"E		
		27° 9'56.05"S, 22°54'21.55"E		
		27°10'11.95"S, 22°54'42.55"E		
		27°10'15.79"S, 22°55'0.79"E		
		27°10'31.45"S, 22°55'16.91"E		
		27°10'19.81"S, 22°56'53.82"E		
		27°10'20.57"S, 22°57'37.41"E		
		27°10'26.58"S, 22°57'37.85"E		
22kV OHL 1 New Blackrock Collector SS - Gloria Mine SS	6.78	27°10'0.94"S, 22°54'1.67"E		
		27° 9'56.04"S, 22°54'5.94"E		
		27° 9'56.05"S, 22°54'21.55"E		
		27°10'11.95"S, 22°54'42.55"E		
		27°10'15.79"S, 22°55'0.79"E		
		27°10'31.45"S, 22°55'16.91"E		
		27°10'19.81"S, 22°56'53.82"E		
		27°10'20.57"S, 22°57'37.41"E		
22kV OHL1 Gloria Mine SS - Gloria Mine Vent Shaft SS	4.7	27° 9'57.93"S, 22°53'59.50"E		
		27° 9'54.26"S, 22°54'3.92"E		
		27° 8'49.45"S, 22°52'44.87"E		
		27° 8'38.33"S, 22°52'44.25"E		
		27° 8'23.54"S, 22°52'25.83"E		
		27° 8'14.60"S, 22°52'23.68"E		
22kV OHL Blackrock SS - New Blackrock SS	5.81	27° 8'6.71"S, 22°50'19.71"E		
		27° 8'9.90"S, 22°50'20.82"E		
		27° 8'50.80"S, 22°51'51.85"E		
22kV OHL Eskom Klipkop SS - New Blackrock SS	5.69	27° 8'10.90"S, 22°50'38.66"E		
		27° 8'7.03"S, 22°50'37.03"E		
		27° 8'14.20"S, 22°50'32.34"E		
		27° 8'50.80"S, 22°51'51.85"E		
22kV OHL 1 New Blackrock SS - Nchwaning Tie-In	2.77	27° 8'34.92"S, 22°51'19.58"E		
		27° 8'26.87"S, 22°51'27.36"E		
		27° 8'25.98"S, 22°51'26.25"E		
		27° 8'34.59"S, 22°51'18.10"E		
	7.28	27° 8'50.80"S, 22°51'51.85"E		
		<b>Substations, Laydown Areas, and PV Areas</b>		
		<b>Infrastructure</b>	<b>Area (ha)</b>	<b>Coordinates of vertices</b>
		Consumer Substation 1	9.36	27° 8'42.76"S, 22°51'57.74"E
27° 8'53.79"S, 22°51'58.61"E				
27° 8'54.11"S, 22°51'45.47"E				
27° 8'42.98"S, 22°51'45.47"E				
		27° 9'48.81"S, 22°53'58.00"E		

Consumer Substation 2		27° 9'54.24"S, 22°54'6.54"E
		27°10'0.68"S, 22°54'0.95"E
		27° 9'55.38"S, 22°53'52.47"E
Collector Substation	1.27	27°10'25.29"S, 22°57'40.11"E
		27°10'28.63"S, 22°57'40.31"E
		27°10'28.46"S, 22°57'35.84"E
Laydown Area	5	27°10'25.11"S, 22°57'35.84"E
		27°10'19.61"S, 22°57'54.41"E
		27°10'24.31"S, 22°57'55.46"E
		27°10'26.12"S, 22°57'43.45"E
Eastern PV Area	235	27°10'21.28"S, 22°57'42.42"E
		27°10'17.26"S, 22°58'26.93"E
		27°10'48.45"S, 22°58'27.31"E
		27°11'0.97"S, 22°57'3.71"E
Western PV Area	229	27°10'23.77"S, 22°57'8.80"E
		27°10'23.77"S, 22°57'8.80"E
		27°11'3.77"S, 22°56'6.75"E
		27°10'47.79"S, 22°55'40.19"E
		27°10'33.97"S, 22°55'39.98"E
<b>BESS Infrastructure</b>		
<b>Infrastructure</b>		<b>Coordinates</b>
BESS		27° 8'45.97"S, 22°51'47.50"E

For a number of reasons both of these layouts were deemed to be less optimal than the preferred layout (Figure 3-1).

With regards to Alternative Layout 2, where the Solar PV Facility is on Belgravia Farm, Belgravia was deemed to be the less preferable option (see section 8 on Site Selection for more details). In summary, Belgravia farm is currently used as an informal conservation area and there would have been higher instances of vegetation clearance as well as the fact that there is a possibility for future mining on that farm. Similarly to all alternatives considered, the BESS is located in the consumer substation. The BESS itself is not a listed activity and is ideally placed at the substation from which power will be distributed.

With regards to Alternative Layout 1, the solar PV array is in a very similar position, but in the preferred layout, there is a gap between the eastern and western PV areas due to the buffer zone around the Eskom powerline service road. With regards to the access roads, both the preferred layout as well as alternative 1 use existing farm roads, however, the access roads in the preferred layout are much more direct.

For the positioning of the consumer substation it is ideal to consider minimising line loss and optimising distribution and tie in to the BRMO's current distribution systems along with providing redundancy for power distribution to facilitate maintenance and counteract potential downtime. The preferred alternative allows for easy access and maintenance without while optimising line losses by maximising the length of the high voltage OHL. The high voltage OHL has inherently lower current and hence lower

resistive losses. From a purely environmental point of view the alternatives sites are similar.

Finally, for the OHLs, they are directed to the preferred location of the consumer substation. In addition, the 132kV OHL 1 New Blackrock SS – New Blackrock Collector SS and the 22kV OHL 1 New Blackrock Collector SS – Gloria Mine SS run north into a property that does not belong to Black Rock Mining Operations, as well as passes farther north over the Gamagara river, in areas that have the potential to be used for future mining operations. Similarly to all alternatives considered, the BESS is located in the consumer substation.

For all of these reasons, the preferred layout was chosen.

### **3.2.4 TECHNOLOGY TO BE USED IN THE ACTIVITY**

There are various alternative means of generating and supplying electricity to BRMO. These include both renewable and non-renewable energy solutions, for example:

- Renewable options:
  - Concentrated Solar Power (CSP)
  - Wind energy
  - Solar Photovoltaic (Solar PV),
  - Concentrator Photovoltaic (CPV)
- Non-renewable options:
  - Diesel fired generators
  - Coal fired power plant

BRMO proposes to develop a sustainable energy supply and thus the non-renewable options have not been reviewed any further here.

#### **3.2.4.1.1 Solar Energy**

The site is well suited to solar power generation as illustrated in Figure 3-5 below.



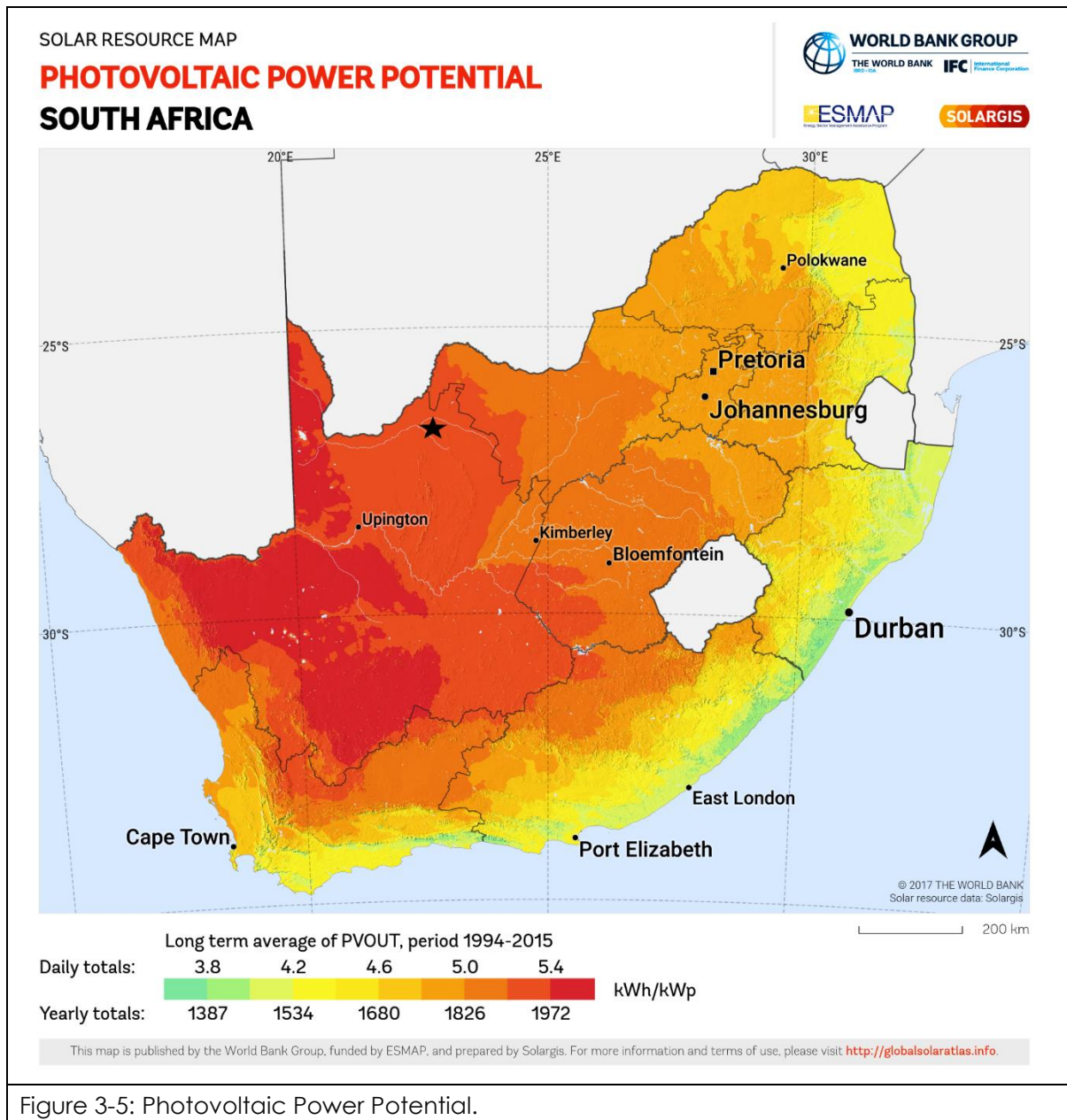


Figure 3-5: Photovoltaic Power Potential.

Solar PV and CPV use photovoltaics to convert energy from sunlight into electrical energy. These systems use semi-conductor materials which absorb the lights they are exposed to and transfer the energy to electrons, consequently generating an electric current. The PV panels are mounted on tracking systems that tilt and rotate to track the sun's trajectory through the day and thus maximise the collection of energy from the sun.

Whereas Solar PC systems use the incident sunlight directly, CPV systems concentrate sunlight using a lens or mirror onto high performance solar cells. PV materials become more efficient as the light becomes more concentrated, thus the overall efficiencies are obtained with CPV are higher than plain solar PV. This however also comes with higher cost and complexity. A solar PV system is therefore preferred; however, this does not eliminate CPV as an option too.

Concentrated solar power (CSP,) systems generate solar power by using mirrors or lenses to concentrate a large area of sunlight onto a receiver. The heat generated (solar thermal energy) is then used to drive generators using various technologies such

as steam turbines. CSP can store large amounts of energy through Thermal Energy Storage technologies (TES) which allow more consistent power generation both diurnally and as solar radiation fluctuates due to cloud cover. CSP outperforms PV in respect of overall conversion efficiency; however, it generally requires larger tracts of land and also a regular supply of water for the steam turbine systems and cooling systems. The large scale, capital outlay, and water required for such a plant are not practical for BRMO.

### 3.2.4.1.2 Wind Power

A wind energy facility is a potential renewable energy facility that may be considered in the future in the area. There is potential for wind energy. Solar power is however more predictable and requires less maintenance. Wind energy may be considered in future, however at this time solar is the preferred energy source.

The site has potential for wind power generation as illustrated in Figure 3-5 above.

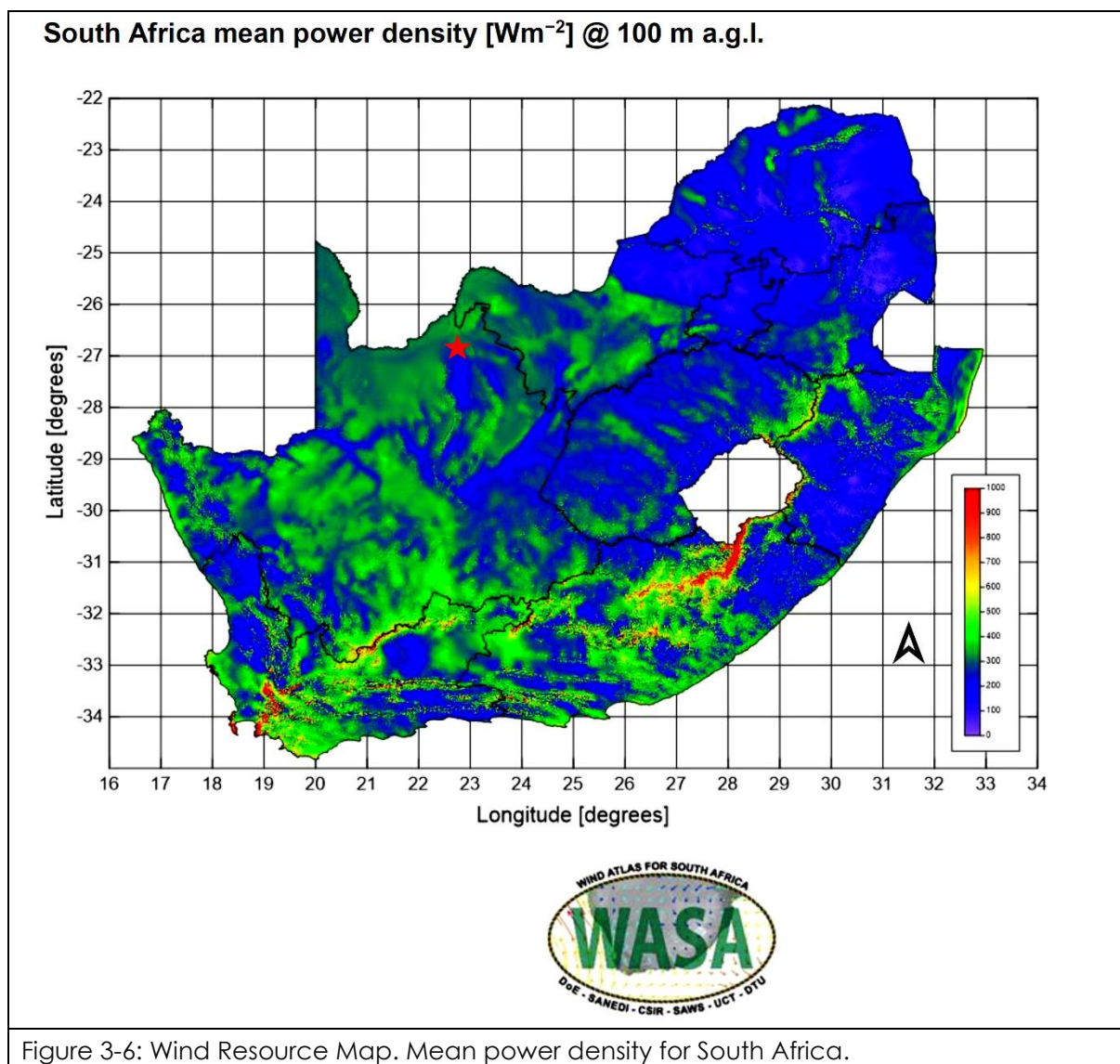


Figure 3-6: Wind Resource Map. Mean power density for South Africa.

### **3.2.5 MANAGEMENT ALTERNATIVES**

Management alternatives will apply mainly to the construction and decommissioning phases of the project. In particular, the working hours for the proposed activities, for example working hours during these phases may include:

- Single shift during normal working hours.
- Multiple shifts.

The latter option will reduce the total construction or decommissioning time, however may result in noise impact outside of normal operating hours and is therefore less desirable than the first option. The construction and decommissioning activities will therefore be undertaken during normal operational hours for the area. It is notable though that the baseline noise load from the surrounding mining operations is more significant than would be expected from the construction or decommissioning of a solar plant.

### **3.3 NO-GO ALTERNATIVE**

The 'Do-Nothing' alternative is the option of not constructing Black Rock Solar PV Facility. Should this alternative be selected, there would be no environmental impacts or benefits as a result of construction and operation activities associated with a solar PV facility. It is therefore necessary to consider the no-go alternative on the basis of the findings of the environmental impact assessment when it has been completed.

## 4 NEED AND DESIRABILITY

The securing of renewable energy sources, like solar PV, has become high priority for the Government, considering that the current energy production is not able to meet the increased energy demand of the Country. This leads to frequent electricity shortage and fluctuations in supply ("load shedding"), detrimental to the economic development of South Africa.

This project is in support of conventions, protocols, and agreements that have been signed and recognized internationally. The Sustainable Development Goals (SDGs) of the United Nations Development Programme (UNDP) are one of the international agreements and programs that South Africa has signed. The United Nations has established 17 global goals as part of the SDGs. The construction of the Black Rock Solar PV Facility would generate up to 100MW (generated capacity) of affordable and sustainable energy, which would help achieve Goal 7 of the SDGs. Since there are no emissions produced during the operation of PV technology, it is one of the cleanest methods of generating electricity.

At the outset it is important to note that it is understood that this type of facility will offset the need for national grid supplied electricity, which is largely coal based power generation from Eskom coal fired power stations. The proposed solar PV facility is a way for the BRMO to maintain mining operations without interruption while utilizing a more environmentally responsible source of electrical power than the grid supply which is largely derived from fossil fuel combustion.

The main producer of grid supplied electricity in South Africa is Eskom, and approximately 91% of Eskom power is produced from coal fired power stations according to the Eskom's 2021 annual report. The emission factor reported by Eskom is 0.97 kg of CO<sub>2</sub> emitted per kilowatt hour of electricity sold (Eskom, 2018). Eskom further reports average distribution and transmission losses of 7.7% and 2.0% respectively.

According to Eskom 2021 Integrated Report (dated 31 March 2021) The total available Eskom-owned nominal capacity is reported as 46 466 MW, of which:

- 38 773 MW is from coal fired power stations.
- 1 860 MW is from nuclear power.
- 2 724 MW Pumped storage capacity.
- 600 MW Hydro stations.
- 2 409 MW OCGTs
- 100 MW Wind Farm.

The percentage contributions of each source are illustrated in Table 4-1 and Table 4-2 below.

Source	MW	% of Total
Coal fired power stations	38 773	83.4%
OCGTs	2 409	5.2%
Nuclear power	1 860	4.0%

Source	MW	% of Total
Pumped storage capacity	2 724	5.9%
Hydro stations	600	1.3%
Wind Farm	100	0.2%
<b>Total</b>	<b>46 466</b>	<b>100.0%</b>

Eskom generated 201 400 GWh for the year reported, from the following primary energy sources:

Source	GWH	% of Total
Coal fired power stations	183 553	91.1%
OCGTs	9 903	4.9%
Nuclear power	4 795	2.4%
Pumped storage capacity	1 387	0.7%
Hydro stations	1 457	0.7%
Wind Farm	305	0.2%
<b>Total</b>	<b>201 400</b>	<b>100.0%</b>

The proposed plant will offset reliance on the national electricity grid, thereby reducing the impacts associated with electricity generated for grid supply. The majority of electrical power generated for grid supply is from fossil fuel combustion. There is therefore a reduction in:

- Fossil fuel based greenhouse gas emissions.
- Related atmospheric pollutant emissions:
  - SO<sub>2</sub>
  - NO<sub>x</sub>
  - CO
  - PM
- Water consumed for power station cooling.
- Ash generated from coal combustion.
- Impacts from the extraction, processing and transport of coal to the power plants.

Other benefits of solar PV facilities as opposed to fossil fuels are:

- Once the infrastructure is in place, the resource is freely available
- There are no potentially significant harmful emissions.
- Sunlight is infinitely renewable, while oil, gas and coal are becoming increasingly scarce.
- Sunlight as a resource in South Africa is extremely reliable and there will be no shortage leading to power interruptions.

From the above information it is clear that the proposed solar PV plant would represent a significantly lower GHG emission rate per unit power produced in comparison to the current conventional grid supply. It is therefore clear that the

related climate change impact would be significantly less in comparison to that of the national grid supply which relies heavily of coal.

The no-go alternative would result in electricity being procured from the conventional national grid supply and thus clearly a more significant climate change impact.

Therefore, the development of the proposed solar farms will represent a key feature in the fulfilment of the proposed goals of for sustainable new generation capacities for energy security.

The Black Rock Solar PV Facility has the potential to create some limited short- and medium-term (6 months to 18 months) employment during the project's development phase for residents of the local community (where available skills allow), the larger region, as well as nationally.

Below illustrates how the proposed project fits in to the NEMA Sustainable Development Principles.

<b>NEMA Sustainable Development Principle</b>	<b>Consideration for this proposed project and EIA Process</b>
<p>(1) The principles set out in this section apply throughout the Republic to the actions of all organs of state that may significantly affect the environment and –</p> <ul style="list-style-type: none"> <li>• Shall apply alongside all other appropriate and relevant considerations, including the State's responsibility to respect, protect, promote and fulfil the social and economic rights in Chapter 2 of the Constitution and in particular the basic needs of categories of persons disadvantaged by unfair discriminations;</li> <li>• Serve as the general framework within which environmental management and implementation plans must be formulated;</li> <li>• Serve as guidelines by reference to which any organ of state must exercise any function when taking any decision in terms of this Act; or any statute provision concerning the protection of the environment;</li> <li>• Serve as principles by reference to which a conciliator appointed under this Act must make recommendations; and</li> <li>• Guide the interpretation, administration and implementation of this Act, and any other law concerned with the protection of management of the environment.</li> </ul>	<p>All principles will be considered in the application and consideration for authorisation.</p>
<p>(2) Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.</p>	<p>This EIA process will consider both the natural and socio-economic environment and mitigation measures will be provided in response to this principle.</p>

<p>(3) Development must be socially, environmental and economically sustainable.</p>	<p>The need to improve the quality of life for all, and especially for the poor, through job creation is critical in South Africa. It is expected that the proposed project would contribute directly to the upliftment of local individuals and the societies in which they live. The proposed project would also include the following benefits that would contribute to environmentally and social sustainability:</p> <ul style="list-style-type: none"> <li>• Reducing pollution as the generation of energy from PV facilities produces far less pollution per MW/h than coalfired facilities;</li> <li>• Local economic development;</li> <li>• Local skills development;</li> <li>• Construction industry businesses will benefit from an increase in the demand for their goods, materials and services;</li> <li>• Increased business productivity will directly result to improved spending power; and</li> <li>• Increase in the competitiveness of the region in terms of energy generation.</li> </ul>
<p>(4) (a) Sustainable development requires the consideration of all relevant factors including the following:</p>	
<p>That disturbance of ecosystems and loss of biological diversity are avoided, or where they cannot be altogether avoided, are minimised and remedied;</p>	<p>Disturbance of the ecosystem and loss of biological diversity would be minimised through design measures and appropriate mitigation measures. Sensitive areas have informed the site selection and design phase to ensure that sensitive areas are avoided to limit the disturbance of ecosystems. Furthermore, an EMPr will be compiled to ensure that mitigation measures are implemented during the planning, construction, operational and decommissioning phases.</p>
<p>That pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;</p>	<p>An EMPr will be compiled to ensure that mitigation measures proposed in this EIA process are implemented during the planning, construction, operational and decommissioning phases.</p>
<p>That the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where is cannot be altogether avoided, is minimised and remedied;</p>	<p>Heritage and palaeontological impact assessments have been undertaken previously and are summarised in Section 7. Furthermore, specialist heritage and palaeontological assessments will be undertaken during the EIA phase.</p>
<p>That waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;</p>	<p>The project shall generate the least amount of waste possible by properly planning material procurement (ordering, transportation and delivery), ensuring proper material handling and storage to reduce the avoidable generation of wastage (i.e. broken and damaged materials) and reusing potential waste materials on site wherever possible. Of the inevitable waste that is generated, as many of the waste materials, as economically feasible shall be</p>



	<p>recovered and sorted for, reuse elsewhere or stored separately for recycling. The existing diesel tanks in use for the mine already will be utilised to avoid any potential contamination.</p>
<p>That the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;</p>	<p>This project will increase South Africa's generation capacity through renewable energy technologies.</p> <p>Advantages of solar power are many. Although solar power is an energy source that we have only recently tapped into, and is likely to become the most important energy source of the near future.</p> <p>Solar energy systems have very little impact on the environment, making them one of the cleanest power-generating technologies available today. While they are converting the sun's rays into electricity, they produce no air pollution, hazardous waste, or noise. The more electricity and heat that we convert from the sun's rays decreases our reliance and dependence on fossil fuels and on imported sources of energy. Finally, solar energy can be an effective economic development driver.</p> <p>In addition, the following are benefits of solar energy:</p> <ul style="list-style-type: none"> <li>• Solar power is a renewable and natural resource.</li> <li>• Solar power is non-polluting. Unlike coal-fired power stations, solar power does not emit greenhouse gases or carcinogens into the air during operation.</li> <li>• Light and energy from the sun costs nothing. Once you purchase the equipment to capture and convert energy from the sun, the operational costs are limited.</li> <li>• Solar cells require little maintenance, as compared with other power generation technologies.</li> <li>• Solar cells are durable, as compared with other power generation technologies.</li> <li>• Solar power is relatively silent, as compared with other power generation technologies.</li> </ul>
<p>That the development, use and exploitation of non-renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised. and equitable, and takes into account the consequences of the depletion of the resource;</p>	<p>This PV project would utilise solar energy to generate electricity. The most significant resource being utilised is water, which would be required for the cleaning of the solar panels and for the construction needs of the facility.</p>
<p>That a risk-averse and cautious approach is applied which takes into account the limits of current knowledge about the consequences of decisions and actions; and</p>	<p>Limitations and gaps in knowledge have been highlighted and taken into account in the EIA process. The information that is provided in the EIA is considered to be sufficient for decision-making purposes, and where there is uncertainty with predictions, monitoring was recommended.</p>

<p>That negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.</p>	<p>The possible impacts on the people of Hotazel will be investigated throughout the EIA process, and mitigation measures proposed which aim at reducing negative impacts, will be included in the EMPr.</p>
<p>(b) Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.</p>	<p>The impacts on the people of Hotazel will be investigated and mitigation measures proposed which aim at reducing negative impacts, will be included in the EMPr.</p>
<p>(c) Environmental justice must be pursued so that adverse environmental impacts shall not distribute in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons.</p>	<p>The EIA process, including the public participation process, outlined the possible impacts on the various groupings of people of Hotazel and mitigation measures are proposed to reduce negative impacts, including the vulnerable and disadvantaged.</p>
<p>(d) Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination.</p>	<p>Environmental resources, such as ecology, freshwater ecosystems, and land use, will be considered and avoidance or mitigation measures will be provided in the EMPr to ensure that none of these resources are compromised thereby limiting access thereto.</p>
<p>(e) Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle.</p>	<p>The EIA process considered the environmental, health and safety consequences of the development through the construction and operational life of the project.</p>
<p>(f) The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation by vulnerable and disadvantaged persons must be ensured.</p>	<p>Opportunity for public participation will be provided to all I&amp;APs throughout the EIA process in terms with the EIA Regulations</p>
<p>(g) Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognising all forms of knowledge, including traditional and ordinary knowledge.</p>	<p>The EIA process will take cognisance of all interests, needs and values adopted by all interested and affected parties.</p>
<p>(h) Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.</p>	<p>The EIA process will take cognisance of all interests, needs and values espoused by all interested and affected parties. Opportunity for public participation will be provided to all I&amp;APs throughout the EIA process in terms of the EIA Regulations.</p>
<p>(i) The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.</p>	<p>These will be assessed and are presented under the respective section to follow.</p>

<p>(j) The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected.</p>	<p>The project area is subject to both the health and safety requirements of the Occupational Health and Safety Act.</p>
<p>(k) Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law.</p>	<p>The EIA process has been thoroughly documented and all relevant information known to the Environmental Assessment Practitioner, as well as written comments received, have been included in the reporting for consideration by the authorities.</p>
<p>(l) There must be intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment.</p>	<p>The relevant authorities have been notified of the project and provided with opportunity to comment. This authority involvement process has been documented in the EIA documentation.</p>
<p>(m) Actual or potential conflicts of interest between organs of state should be resolved through conflict resolution procedures.</p>	<p>There has been no conflict between Departments to date.</p>
<p>(n) Global and international responsibilities relating to the environment must be discharged in the national interest.</p>	<p>The establishment of the Black Rock Solar PV facility would strengthen the existing electricity grid for the area. Moreover, the project will contribute towards meeting the national energy target as set by the DoE. Renewable energy is recognised internationally as a major contributor in protecting the climate, nature and the environment, as well as providing a wide range of environmental, economic and social benefits that can contribute towards long-term global sustainability</p>
<p>(o) The environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage.</p>	<p>The impacts are documented in the EIA process to inform decision-makers regarding potential ramifications of the proposed project so that an informed decision can be taken in this regard.</p>
<p>(p) 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 must be paid for those responsible for harming the environment.</p>	<p>The mitigation measures recommended in this environmental impact report to minimise negative impacts and enhance positive ones are for the cost of the proponent.</p>
<p>(q) The vital role of women and youth in environmental management and development must be recognised and their full participation therein must be promoted.</p>	<p>Public participation of all I&amp;APs has been promoted and opportunities for engagement been provided during the EIA process.</p>
<p>(r) Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems required specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.</p>	<p>Specialist assessments will be undertaken to investigate the biophysical and social impacts that the project may have. The outcome of the specialist's assessments indicated how significant impacts could be mitigated. Furthermore, the proposed development is not sited within a sensitive, vulnerable, highly dynamic, or stressed ecosystem.</p>

## 4.1 SPATIAL DEVELOPMENT FRAMEWORKS

BRMO is located within the John Taolo Gaetsewe District Municipality (JTGDM), and the Joe Morolong Local Municipality (JMLM) in the Northern Cape Province. One of the visions of the JTGM SDF is investment in, and exploitation of renewable sources of energy in the district to becoming self-reliant in the generation of electricity.

According to the JTGM SDF the significance of the JTGDM in the National Infrastructure Plan (NIP), lies in

- SIP 8 (Green Energy in support of the South African economy) has significance to the JTGD with specific reference to mining development, provision of basic infrastructure and green energy (i.e. solar energy) respectively;
- SIP 3 (South-Eastern node & corridor development – Increase manganese rail capacity in the Northern Cape, SIP 5 (Saldanha-Northern Cape development corridor - Expansion of iron ore mining production and beneficiation; and,
- SIP 6 (Integrated Municipal Infrastructure Project).

BRMO is located within the Gamagara Mining Corridor, as identified in the John Taolo Gaetsewe spatial development framework (SDF). According to the SDF, the Gamagara Mining Corridor that is currently loosely demarcated as an area stretching from Danielskuil and Postmasburg in the south to Hotazel and Moshaweng in the north, was identified as the area where a lack of infrastructure provision is causing serious constraints in the growth of the mining industry as well as limiting the economic development of the area.

The Gamagara Development Corridor is part of the Strategic Integrated Projects (SIPs). The SIPs are a product of the National Infrastructure Projects (NIP). The NIP was initiated to provide a background on cabinet's decision to establish a body to integrate and coordinate the long-term infrastructure build known as the Presidential Infrastructure Coordinating Council (PICC). The PICC presents the spatial mapping of infrastructure gaps which analyses future population growth, projected economic growth, and areas of the country which are not served with water, electricity, roads, sanitation, and communication.

According to the Northern Cape 20 Year review, The New Growth Path that was adopted by national government in 2010 identified the green economy as a new economic sector that will be key to the creation of jobs. The focus of the green economy is on renewable energy and the Northern Cape was identified as the solar hub of the country with a number of solar plants being established across the province.

From all the above it is clear that the proposed solar power generation facility will contribute to the sustainable operation and expansion of the BRMO's activities is desirable in terms of both the municipal SDF as well as the national SIPs. The proposed solar facility and related infrastructure are integral to the economically and environmentally sustainable operation of the Black Rock Mine Operations.

## 5 POLICY AND LEGISLATIVE CONTEXT

This section summarises relevant environmental legislation applicable to the proposed development in respect of anticipated environmental permitting requirements. This is not a complete review of the applicable environmental legislation but rather a synopsis of those which are crucial to the Environmental Authorisation process and the assessments required thereto.

### 5.1 CONSTITUTION OF SOUTH AFRICA

Section 24 of the Constitution provides the following rights:

*“Everyone has the right -*

- a. to 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 -*
  - i. prevent pollution and ecological degradation;*
  - ii. promote conservation; and*

*secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”*

Accordingly, legislative measures as summarised in ensuing sections have been promulgated.

### 5.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107 OF 1998)

The National Environmental Management Act (NEMA), 1998 (Act 107 of 1998, as amended) is South Africa's overarching environmental legislation, and contains a comprehensive legal framework to give effect to the environmental rights contained in section 24 of the Constitution. Section 2 of NEMA contains environmental principles that form the legislated foundation for sustainable environmental management in South Africa.

#### 5.2.1 EIA & ENVIRONMENTAL AUTHORISATION

NEMA introduces the principle of integrated environmental management that is achieved through the environmental assessment process in Section 24, which stipulates that certain identified activities may not commence without an Environmental Authorisation from the competent authority, in this case the Department of Forestry, Fisheries and the Environment (DFFE). Section 24(1) of NEMA requires applicants to consider, investigate, assess and report the potential environmental impact of these activities. The requirements for the investigation, assessment and communication of potential environmental impacts are contained in the so-called EIA regulations (currently GN. R 982:2014 amended by GN. R 326:2017).

The Regulations identify specific activities that are either subject to a Basic Assessment process, or Scoping and EIA process (GN R. 983, GN R. 984 and GN R. 985; 4 December 2014, as amended by GN R.324, GN .R325, GN R.326 and GN R.327 of 2017 respectively). The listed activities relevant to the proposed development are presented in Table 5-1. This is a preliminary list and may be amended as more detailed information becomes available; however, the list must be finalised prior to submission

of the application for environmental authorisation. A conservative approach has been taken in identifying the relevant listed activities, and some of these may be confirmed to not be relevant.

Table 5-1: NEMA Listed Activities

## GN.R 327 – Listing Notice 1, as amended

**Activity No. 11(i):** 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 275kV or more.
- (ii) (inside urban areas or industrial complexes with a capacity of 275 kilovolts or more; excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is—
  - (a) temporarily required to allow for maintenance of existing infrastructure;
  - (b) 2 kilometres or shorter in length;
  - (c) within an existing transmission line servitude; and
  - (d) will be removed within 18 months of the commencement of development.

**REASON:** A 132kV overhead line is proposed to connect the Black Rock solar PV facility from the onsite 22kV collector substation to the proposed new 22kV consumer substation.

**Activity No. 24(ii):** The development of a road –

- (i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or
  - (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;
- but excluding a road—
- (a) which is identified and included in activity 27 in Listing Notice 2 of 2014;
  - (b) where the entire road falls within an urban area; or
  - (c) which is 1 kilometre or shorter.

**REASON:** The facility will require construction of new access and maintenance roads in areas where no road reserve exists to provide access to the facility. These will be 10m wide.

**Activity No. 56(ii):** The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre –

- (i) where the existing reserve is wider than 13,5 meters; or
- (ii) where no reserve exists, where the existing road is wider than 8 metres;

**REASON:** Upgrades of existing farm roads will be required. Some of the existing farm roads are currently 3m wide and they will be widened to a width of 10m.

**Activity No. 67**

Phased activities for all activities—

Table 5-1: NEMA Listed Activities

- (i) listed in this Notice, which commenced on or after the effective date of this Notice or similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices;

excluding the following activities listed in this Notice—

- 17(i)(a-d);  
 17(ii)(a-d);  
 17(iii)(a-d); 17(iv)(a-d);  
 17(v)(a-d);  
 20;  
 21;  
 24(i);  
 29;  
 30;  
 31;  
 32;  
 34;  
 54(i)(a-d);  
 54(ii)(a-d);  
 54(iii)(a-d);  
 54(iv)(a-d);  
 54(v)(a-d);  
 55;  
 61;  
 64; and  
 65; or

- (ii) listed as activities 5, 7, 8(ii), 11, 13, 16, 27(i) or 27(ii) in Listing Notice 2 of 2014 or similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices;

where any phase of the activity was below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold.

**REASON:** As stipulated by the Competent Authority.

#### GN.R 325 – Listing Notice 2, as amended

**Activity No. 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.

**REASON:** The Black Rock Solar PV Facility is situated outside urban area and will use solar power technology and have a maximum generating capacity of 100MW.

Table 5-1: NEMA Listed Activities

**Activity No. 15:** The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for—

- (i) the undertaking of a linear activity; or
- (ii) maintenance purposes undertaken in accordance with a maintenance management plan.

**REASON:** The proposed activity is expected to require the clearance of land totalling around 475ha. This vegetation will mainly be comprised of Kathu Bushveld of which there are a few protected floral species including *Vachellia erioloba*, *Vachellia haemotoxolyn*, *Boscia albitrunca*, *Ammocaris coranica*, *Harpogophytum procumbens*, *Babianahypogaea*, and *Boophane disticha*. These would require permits to be moved.

A Scoping and EIA Process is therefore required.

### 5.2.2 DUTY OF CARE

NEMA also places a duty of care on all persons who may cause significant pollution or degradation of the environment. Specifically, Section 28 of the Act states:

*“28 (1) Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.*

*(2) Without limiting the generality of the duty in subsection (1), the persons on whom subsection (1) imposes an obligation to take reasonable measures, include an owner of land or premises, a person in control of land or premises or a person who has a right to use the land or premises on which or in which-*

- (a) any activity or process is or was performed or undertaken; or*
- (b) any other situation exists, which causes, has caused or is likely to cause significant pollution or degradation of the environment.*

*(3) The measures required in terms of subsection (1) may include measures to-*

- (a) investigate, assess and evaluate the impact on the environment;*
- (b) inform and educate employees about the environmental risks of their work and the manner in which their tasks must be performed in order to avoid causing significant pollution or degradation of the environment;*
- (c) cease, modify or control any act, activity or process causing the pollution or degradation;*
- (d) contain or prevent the movement of pollutants or the causant of degradation;*
- (e) eliminate any source of the pollution or degradation; or*



- (f) *remedy the effects of the pollution or degradation.*"

Consequently, BRMO must take "reasonable steps" to prevent pollution or degradation of the environment which may result from the proposed solar facility and related activities. These reasonable steps include the investigation and evaluation of the potential impact and identification of means to prevent an unacceptable impact on the environment, and to contain or minimise potential impacts where they cannot be eliminated.

### **5.3 NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT, 2008 (ACT 59 OF 2008)**

#### **5.3.1 DEFINITION OF WASTE**

The NEM:WA defines 'Waste' as

*"(a) any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to this Act; or*

*(b) any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the Gazette, but any waste or portion of waste, referred to in paragraphs (a) and (b), ceases to be a waste-*

*(i) once an application for its re-use, recycling or recovery has been approved or, after such approval, once it is, or has been re-used, recycled or recovered;*

*(ii) where approval is not required, once a waste is, or has been re-used, recycled or recovered;*

*(i) where the Minister has, in terms of section 74, exempted any waste or a portion of waste generated by a particular process from the definition of waste; or,*

*(ii) where the Minister has, in the prescribed manner, excluded any waste stream or a portion of a waste stream from the definition of waste."*

The Black Rock PV Facility will not include any listed waste-related activities; therefore, a waste management license is not required. During construction and operation, and decommissioning it will be necessary to manage hazardous and general waste. The following regulatory requirement must therefore be considered in the environmental impact assessment and the attendant environmental management programme:

- National Norms and Standards for Storage of Waste (GN 926 of 2013)
- Waste Classification and Management regulations (GNR 634 of 2013).
- National Norms and Standards for the Assessment of Waste for Landfill Disposal (GN 635 of 2013)
- National Norms and Standards for Disposal of Waste to Landfill (GN 636 of 2013)

## **5.4 NATIONAL WATER ACT (NWA), 1998 (ACT 36 OF 1998)**

The National Water Act (NWA), 1998 (Act 36 of 1998), aims to manage national water resources in order to achieve sustainable use of water for the benefit of all water users. This requires that the quality of water resources is protected, and integrated management of water resources takes place.

### **5.4.1 WATER USE LICENCE**

In terms of the National Water Act, Act No. 36 of 1998 (NWA) a water use licence is required for:

- (a) taking water from a water resource;*
- (b) storing water;*
- (c) impeding or diverting the flow of water in a watercourse;*
- (d) engaging in a stream flow reduction activity contemplated in section 36;*
- (e) engaging in a controlled activity identified as such in section 37 (1) or declared under section 38 (1);*
- (f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;*
- (g) disposing of waste in a manner which may 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;*
- (i) altering the bed, banks, course or characteristics of a watercourse;*
- (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; and*
- (k) using water for recreational purposes.*

The property (i.e., Remaining Extent of Farm Kipling) is bordered by the Gamagara River on its western boundary; however, the proposed solar is located approximately 600m from the Gamagara. The proposed overhead powerlines will have a pylon span of approximately 200m and will be placed outside of the Gamagara River with a buffer of at least 32m on either side of the banks.

### **5.4.2 DUTY OF CARE**

Similar to section 28 of NEMA, section 19 of the NWA, stipulates a duty to prevent and remedy pollution as follows:

#### *19. Prevention and remedying effects of pollution*

*(1) An owner of land, a person in control of land or a person who occupies or used the land on which –*

- (a) any activity or process is or was performed or undertaken, or*

(b) any other situation exists,

which causes, has caused or is likely to cause pollution of a water resource, must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring.

(2) The measures referred to in subsection (1) may include measures to –

(a) cease, modify or control any act or process causing the pollution;

(b) comply with any prescribed waste standard or management practice;

(c) contain or prevent the movement of pollutants;

(d) eliminate any source of the pollution;

(e) remedy the effects of the pollution; and

(f) remedy the effects of any disturbance to the bed and banks of a watercourse.

Consequently, BRMO must take reasonable steps to prevent pollution or degradation of water resources which may result from the proposed solar facility and related activities.

## 5.5 BIODIVERSITY

The proposed facility will be established in an area where the natural vegetation has been disturbed by low density livestock farming, however natural vegetation is present. Relevant permits to remove, transport, and/or relocate protected vegetation will be required. Protected species expected to be encountered are listed in Table 5-2 below. Further details in respect of the relevant Acts follows in the ensuing subsections.

Scientific Name	Common Name	Regulation
<i>Acacia Erioloba</i> (now <i>Vachellia Erioloba</i> )	Camel Thorn	National Forests Act (1998) - Department of Agriculture, Forestry and Fisheries
<i>Acacia Haemotoxylon</i> (now <i>Vachellia Haemotoxolyn</i> )	Grey Camel Thorn	
<i>Boscia albitrunca</i>	Shepherd's Tree	
<i>Ammocaris Coranica</i>	Karoo Lily	Schedule 4 Environmental and Conservation Ordinance No. 19 (1974) – Northern Cape Department of Environment and Nature Conservation
<i>Harpogophytum Procumbens</i>	Devil's Claw	
<i>Babiana Hypogaea</i>	Bobbejaanuintjie	
<i>Boophane Disticha</i>	Bushman's poison bulb	

It is important to note that BRMO is already subject to undertaking a biodiversity offset. The updating of offset does not form part of the scope of this project and is understood that it will be updated by BRMO.

### **5.5.1 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT (ACT 10 OF 2004)**

The National Environmental Management: Biodiversity Act (Act 10 Of 2004) (NEMBA) is the primary legislation governing biodiversity management in South Africa.

Section 2: "Objectives of the Act", states the following:

2. The objectives of this Act are-

- a) within the framework of the National Environmental Management Act, to provide for-
  - (i) the management and conservation of biological diversity within the Republic and of the components of such biological diversity.
  - (ii) the use of indigenous biological resources in a sustainable manner; and
  - (iii) the fair and equitable sharing among stakeholders of benefits arising from bio-prospecting involving indigenous biological resources;
- b) to give effect to ratified international agreements relating to biodiversity which are binding on the Republic;
- c) to provide for co-operative governance in biodiversity management and conservation; and
- d) to provide for a South African National Biodiversity Institute to assist in achieving the objectives of this Act.

Chapter 5 of NEMBA regulates activities involving invasive species, and lists duty of care as follows:

- the landowner/land user must take steps to control and eradicate the invasive species and prevent their spread, which includes targeting offspring, propagating material and regrowth, in order to prevent the production of offspring, formation of seed, regeneration or re- establishment.
- take all required steps to prevent or minimise harm to biodiversity; and
- ensure that actions taken to control/eradicate invasive species must be executed with caution and in a manner that may cause the least possible harm to biodiversity and damage to the environment.

An amendment to the NEMBA has been promulgated, which lists 225 threatened ecosystems based on vegetation types present within these ecosystems. Should a project fall within a vegetation type or ecosystem that is listed, actions in terms of NEMBA are triggered. Based on the preliminary sensitivity screening undertaken for the proposed site, none of the threatened ecosystems occur within the study area.

### **5.5.2 3.4.1. NATIONAL FORESTS ACT (ACT NO. 84 OF 1998)**

Various tree species that are protected per Government Notice No. 1012 under section 12(l)(d) of the National Forests Act, 1998 (Act No. 84 of 1998). In terms of section 5(1) of the National Forests Act, 1998 "no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a license granted by the Minister to an (applicant and subject to such period and conditions as may be stipulated)". These include camel and grey camel thorn for example.

Permits from the department of forestry will be required for the removal thereof.

### **5.5.3 NORTHERN CAPE NATURE CONSERVATION ACT (ACT 109 OF 2009)**

The Northern Cape Nature Conservation Act (Act 109 of 2009) {NCNCA} for the sustainable utilisation of wild animals, aquatic biota, and plants as well as permitting and trade regulations regarding wild fauna and flora within the province.

The NCNCA makes provision for Specially Protected and Protected species of fauna and flora. According to Section 49 of the Act:

(1) No person may, without a permit -

(a) pick;

(b) import;

(c) export;

(d) transport;

(e) possess;

(f) cultivate; or

(g) trade in,

a specimen of a specially protected plant.

(2) The provisions of subsection (1) (e), in so far as they prohibit the possession of a specially protected plant, do not apply to a landowner who is in possession of a specially protected plant which grows in its natural habitat and which was not planted by human interference.

“Protected plant” means a species of plant listed as such in Schedule 2. There are various protected species listed in schedule 2 of the Act that apply to the site. These include for example *Harpagophytum procumbens* (devil's claw) and *Boophone disticha* (Candelabra Flower). Permits for the removal, or relocation and transport, of relevant species will be applied for where relevant.

### **5.5.4 3.4.2. CONSERVATION OF AGRICULTURAL RESOURCES ACT (ACT 43 OF 1983)**

As per the Conservation of Agricultural Resources Act (CARA) (Act 43 of 1983), Conservation is defined as: “*in relation to the natural agricultural resources, includes the protection, recovery and reclamation of those resources;*”

The objectives of the CARA, as stated in section 2 of the Act, entitled “Objects of Act”, are:

“*The objects of this Act are to provide for the conservation of the natural agricultural resources of the Republic by the maintenance of the production potential of land, by the combating and prevention of erosion and weakening or destruction of the water sources, and by the protection of the vegetation and the combating of weeds and invader plants.*”

The objectives of CARA are noted, and the proposed project will strive to meet these objectives as far as practicably possible. Of most significance to the project are the

provisions stated in Regulation 5 of the Act for the "Prohibition of spreading weeds", which states that:

*No person shall-*

- (a) sell, agree to sell or offer, advertise, keep, exhibit, transmit, send, convey or deliver for sale, or exchange for anything or dispose of to any person in any manner for a consideration, any weed; or*
- (b) in any other manner whatsoever disperse or cause or permit the dispersal of any weed from any place in the Republic to any other place in the Republic.*

## **5.6 NATIONAL HERITAGE RESOURCES ACT (NHRA) (ACT 25 OF 1999)**

The NHRA aims to promote good management of the national estate, and to enable and encourage communities to nurture and conserve their legacy so that it may be bequeathed to future generations.

The Act protects as cultural heritage resources such as:

- a. Archaeological artefacts, rock structures, structures and sites older than 100 years;
- b. Ethnographic art objects (e.g. prehistoric rock art) and ethnography;
- c. Objects of decorative and visual arts;
- d. Military objects, structures and sites older than 75 years;
- e. Historical objects, structures and sites older than 60 years;
- f. Proclaimed heritage sites;
- g. Graveyards and graves older than 60 years;
- h. Meteorites and fossils; and
- i. Objects, structures and sites of scientific or technological value.

A Heritage Impact Assessment (HIA) is the process to be followed in order to determine whether any heritage resources are located within the area of interest, in particular as per S38(1) any development categorised as:

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

*(b) the construction of a bridge or similar structure exceeding 50m in length;*

*(c) any development or other activity which will change the character of a site -*

*(i) exceeding 5 000m<sup>2</sup> in extent; or*

*(ii) involving three or more existing erven or subdivisions thereof; or.*

*(iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or*

*(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;*

*(d) the re-zoning of a site exceeding 10 000m<sup>2</sup> in extent; or*

*(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,*

*Any person intending to undertake the above must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.*

The responsible heritage resources authority must, within 14 days of receipt of the notification indicate whether submit an impact assessment report and specify the information to be contained in the report.

The responsible heritage resources authority must then decide:

*(a) whether or not the development may proceed;*

*(b) any limitations or conditions to be applied to the development;*

*(c) what general protections in terms of this Act apply, and what formal protections may be applied, to such heritage resources;*

*(d) whether compensatory action is required in respect of any heritage resources damaged or destroyed as a result of the development; and*

*(e) whether the appointment of specialists is required as a condition of approval of the proposal.*

However, according to S38(8), the above does not apply where environmental impact assessment is required, provided that the consenting authority must ensure that the evaluation fulfils the requirements of the relevant heritage resources authority in terms of subsection (3), and any comments and recommendations of the relevant heritage resources authority with regard to such development have been taken into account prior to the granting of the consent.

#### **5.6.1.1 Structures**

Section 34 (1) of the NHRA states that no person may demolish any structure or part thereof which is older than 60 years without a permit issued by the relevant provincial heritage resources authority; where a structure means *'any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith'*.

Alter means *'any action affecting the structure, appearance or physical properties of a place or object, whether by way of structural or other works, by painting, plastering or the decoration or any other means'*.

#### **5.6.1.2 Archaeology, palaeontology and meteorites**

Section 35(4) of the Act deals with archaeology, palaeontology and meteorites. The Act states that *no person may, without a permit issued by the responsible heritage resources authority (national or provincial):*

*a) Destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site or any meteorite;*

*b) Destroy, damage, excavate, remove from its original position, collect or own any archaeological or paleontological material or object or any meteorite;*

- c) *Trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or paleontological material or object, or any meteorite;*
- d) *Bring onto or use at an archaeological or paleontological site any excavation equipment or any equipment that assists in the detection or recovery of metals or archaeological and paleontological material or objects, or use such equipment for the recovery of meteorites; or*
- e) *Alter or demolish any structure or part of a structure which is older than 60 years as protected.*

The above mentioned may only be disturbed or moved by an archaeologist, after receiving a permit from the South African Heritage Resources Agency (SAHRA). In order to demolish such a site or structure, a destruction permit from SAHRA will also be needed.

#### **5.6.1.3 Burial Grounds and Graves:**

According to section 36 (3) (a) No person may, without a permit issued by South African Heritage Resources Agency (SAHRA) or a provincial heritage resources authority:

- a) *destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;*
- b) *destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or*
- c) *bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.*

## **5.7 THE NOISE CONTROL REGULATIONS**

The Noise Control Regulations (R 154 GG 13717 of 10 January 1992) promulgated in terms of ECA, defines:

- Nuisance noise, as “any sound which disturbs or impairs or may disturb or impair the convenience or peace of any person”
- Disturbing noise, as “any noise level which exceeds the zone sound level or, if no zone sound level has been designated, a noise level which exceeds the ambient sound level at the same measuring point by 7 dBA or more”.

Regulation 4 states ‘No person shall make, produce or cause a disturbing noise, or allow it to be made, produced or caused by any person, machine, device or apparatus or any combination thereof.’

The proposed project is unlikely to cause a noise disturbance during operation. There may be noise during the construction, and decommissioning phases; however, is unlikely to be significant given the location of receptors and the type of activities producing the noise.



## 5.8 AIR QUALITY

Air Quality Management in South Africa is primarily regulated through the National Environmental Air Quality Act (NEMAQA) {Act 39 of 2004, as amended}. The object of this Act is:

(a) to protect the environment by providing reasonable measures for—

- (i) the protection and enhancement of the quality of air in the Republic;
- (ii) the prevention of air pollution and ecological degradation; and
- (iii) securing ecologically sustainable development while promoting justifiable economic and social development; and

(b) generally, to give effect to section 24(b) of the Constitution in order to enhance the quality of ambient air for the sake of securing an environment that is not harmful to the health and well-being of people.

NEMAQA defines atmospheric emissions as

"atmospheric emission" or "emission" means any emission or entrainment process emanating from a point, non-point or mobile source that results in air pollution;

Air pollution as:

""air pollution" means any change in the composition of the air caused by smoke, soot, dust (including fly-ash), cinders, solid particles of any kind, gases, fumes, aerosols and odorous substances;"

NEMAQA is an effects-based legislation; consequently, activities that result in atmospheric emissions are to be managed through the setting of environmental health based ambient air quality standards. Facilities with potential impacts on air quality should ideally be assessed not only in terms of its individual contribution, but in terms of its additive contribution to baseline ambient air quality i.e. cumulative effects must be considered.

### 5.8.1 DUSTFALL AND DUST CONTROL REGULATIONS

Section 32 states that the Minister, or MEC, may prescribe measures relating to dust control; these have been published in terms of National Dust Control Regulations GN. R 827 2013. GN. R 827:2013 and prescribe general measures for the control of dust in all areas. Dustfall standards for acceptable dustfall rates are given in Table 5-3 for residential and non-residential areas. The regulations also provide a method to be used for measuring dustfall rate and guidelines for locating sampling points. The method to be used is AST D1739:1970, or an equivalent method approved by any internationally recognised body.

Table 5-3: GN. R827:2013 Acceptable Dust Fall Rates

Restriction Areas	Dustfall rate (D) (mg/m <sup>2</sup> /day, 30-days average)	Permitted frequency of exceeding fall rate

Residential area	D <600	Two within a year, not sequential months
Non-residential area	600 < D <1200	Two within a year, not sequential months

The proposed activities are unlikely to result in significant dust generation, with the possible exception of periods where land is being cleared.

## 5.8.2 NATIONAL NORMS AND STANDARDS

According to S9 of NEMAQA:

“(1) The Minister, by notice in the Gazette-

(a) must identify substances or mixtures of substances in ambient air which through ambient concentrations, bioaccumulation, deposition or in any other way, present a threat to health, well-being or the environment or which the Minister reasonably believes present such a threat; and

(b) must, in respect of each of those substances or mixtures of substances, establish national standards for ambient air quality, including the permissible amount or concentration of each such substance or mixture of substances in ambient air; ...”

The Minister of Water and Environmental Affairs published limits for ambient air quality in Government Notice No 1210 of 24 December 2009, in terms of S9(1) of NEMAQA, as shown in Table 5-4.

Pollutant	Averaging period	Concentration ( $\mu\text{g}/\text{m}^3$ )	Permissible FOE*
PM <sub>10</sub>	24-hours	75	4
	Annual	40	0
NO <sub>2</sub>	1-hour	200	88
	Annual	40	0
SO <sub>2</sub>	10-min (running)	500	526
	1-hour	350	88
	24-hours	125	4
	Annual	50	0
CO	1-hour	30	88
	8-hours (running)^	10	11
Pb	Annual	0.5	0

\* FOE – Permitted Frequency of Exceedance in occurrences per year  
^ Calculated on 1-Hourly averages.

The Ministry of Water and Environmental Affairs further published limits for PM<sub>2.5</sub> on the 29<sup>th</sup> June 2012, in terms of S9(1) of NEMAQA, as shown in Table 5-5.

Table 5-5: National Ambient Air Quality Standards for PM<sub>2.5</sub> - GN 486:2012

Pollutant	Averaging period	Conc. $\mu\text{g}/\text{m}^3$	Permissible FOE*	Compliance date
PM <sub>2.5</sub>	24-hours	<b>60</b>	<b>4</b>	<b>immediate</b>
		40	4	01 January 2016
		25	4	01 January 2030
	Annual	25	0	immediate
		20	0	01 January 2016
		15	0	01 January 2030
* FOE – Permitted Frequency of Exceedance in occurrences per year				

BRMO is required to ensure that the impacts from their proposed development do not result in an impact on ambient air quality exceeding these standards. The proposed activities are not expected to result in significant emissions generation with the possible exception of the construction phase where land is being cleared.

## 5.9 NATIONAL ENERGY ACT (NO. 34 OF 2008)

The National Energy Act (No. 34 of 2008) defines "Energy Resource" as non-value-added material or mineral that can be used to produce energy or be converted to an energy carrier.

The National Energy Act (No. 34 of 2008) aims to ensure that a variety of energy resources are accessible to the South African economy in sustainable quantities and at reasonable costs in order to support economic growth and the reduction of poverty. This is done while taking into account environmental management requirements, interactions between economic sectors, and issues pertaining to renewable energy. The National Energy Act also outlines provisions for energy planning, increased renewable energy production and consumption, backup energy supplies, the storage of strategic energy feedstocks and carriers, and proper investment in, maintenance of, and access to energy infrastructure. The Act outlines steps for the provision of specific statistics and information regarding energy demand, supply, and generation, as well as for the establishment of an institution charged with fostering energy research and efficient production and use.

The Act offers the legal foundation necessary to support the construction of electricity producing facilities. The Act also specifies licenses and registration as a means of regulating the production, transmission, distribution, trade, and import and export of electricity. Due to the need for an energy generation license, the construction of the Black Rock Solar PV facility will need to ensure compliance with this Act.

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## 6 PUBLIC PARTICIPATION

### 6.1 INTRODUCTION

The public participation process requirements as stipulated in chapter 6 of the EIA regulations (GN 982:2014), will form the basis of the stakeholder engagement process, and will be seen as a set of minimum requirements.

Public participation provides the opportunity for interested and affected parties (IAPs) to participate in the Environmental Authorisation process on an informed basis, and to ensure that their concerns are considered during the environmental impact assessment process. In so doing, a sense of ownership of the project is vested in both the project proponent and interested or affected parties. The Public Participation Process is aimed at achieving the following:

- Provide opportunities for IAPs to obtain information about the expected environmental impacts of the proposed development.
- Establish a formal platform for IAPs to raise queries and give input regarding the environmental impact of the project.
- Utilise the opportunity to formulate ways for reducing or mitigating any negative environmental impacts of the project, and for enhancing its benefits.
- Enable the applicant to consider the needs, preferences and values of IAPs in their decisions.
- Ensure transparency and accountability in decision-making.

The public participation must include:

- Notification of the public and potential IAPs through newspaper advertisements;
- Notification of the public and potential IAPs through site notices at places conspicuous to and accessible to the public;
- Notifying specified IAPs, as stipulated in the EIA regulations, namely
  - the owners, occupiers, and persons in control of the site if the proponent or applicant is not the owner or person in control of the site.
  - owners, persons in control of, and occupiers of land adjacent to the site
  - the municipal councillor of the ward
  - the municipality which has jurisdiction in the area;
  - any organ of state having jurisdiction in respect of any aspect of the activity; and
  - any other party as required by the competent authority;
- 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 illiteracy, disability, or any other disadvantage.

### **6.1.1 PUBLIC REVIEW OF REPORTS**

The scoping report and subsequently the Environmental Impact Report must be available to registered IAPs for comment and input. These comments and input must be considered accordingly and addressed at each relevant stage in the scoping and EIA process.

### **6.2 STAKEHOLDER NOTIFICATION**

The public and stakeholder participation process to date has entailed the following:

- Advertising of the proposed activities and the associated S&EIR process in the Kathu Gazette on 01 July 2023 as well as in the Noordkaap Bulletin on 6 July 2023 (this is to be published in two days and proof will be included in the Final Scoping Report). The adverts indicated where the written comments may be directed to and who to contact in order to be registered as an IAP.
- Placement of site notices at visible points along the boundary of the development area (i.e. the boundaries of the affected property), in accordance with the requirements of the EIA Regulations at
  - the entrance to the site,
  - the main entrance to BRMO,
  - the Santoy shopping centre,
  - Hotazel shopping centre notice board,
- Pre-identification and notification to Interested and Affected Parties based on the existing list of the mines registered IAPs including neighbouring landowners and occupiers, the ward councillor, the local municipality, the district municipality, the provincial environmental authority, and other stakeholders.

The following is to be conducted through the distribution of the Scoping Report to registered interested and affected parties including:

1. owners and occupiers of the of the land adjacent to the site where the activity is or is to be undertaken,
2. the municipal councillor of the ward,
3. the local municipality,
4. the district municipality,
5. the provincial environmental authority,
6. any other party required by the competent authority

Refer to subsequent items for their relevant appendices:

- Proof of site notices (Refer to Appendix 2.1: Site Notices)
- Proof of Newspaper advertisements (Refer to Appendix 2.2: Advertisements)
- List of identified IAPs (Refer to Appendix 2.3: Interested and Affected Parties List).

## 7 DESCRIPTION OF THE RECEIVING ENVIRONMENT

The description of the receiving environment is provided herein based on observations at the site and the findings of previous environmental impact assessments undertaken for the wider mine's environmental management programme as well as a desk top review of EIAs in the area. Although this is sufficient for the scoping phase, further detail may be added or amended during the EIA phase.

The area of interest is adjacent to existing mine activities, the development area largely consists of land used for low density livestock rearing and relatively undisturbed bushveld. The area is classified as having natural/indigenous vegetation. The site is ***not*** located on a shallow water table, dolomitic, sinkhole, or doline areas, seasonally wet soils, unstable rocky slopes or steep slopes with loose soil, dispersive soils, soils with high clay content and or an area sensitive to erosion.

### 7.1 PHYSICAL

#### 7.1.1 CLIMATE

There are no South African Weather Stations (SAWS) in the region. As such, data for Kuruman is used to provide an overview of the climatology of the area. Kuruman is approximately 65km south east of the proposed Black Rock Solar PV Facility. The meteorological conditions at this site may not be exactly representative of meteorological conditions at the site, however they are expected to be representative of the general conditions of the region.

#### 7.1.2 WIND

The observed wind direction and wind speed are dominantly from the north northwest with an average wind speed of 4.1m/s (for the windier months of the year, July to January) (Figure 7-1). The length of the colour-coded line in the windroses is proportional to the frequency of occurrence of wind blowing from that direction. Wind speed classes are also colour coded and the length of each class/category is proportional to the frequency of occurrence of wind speed.

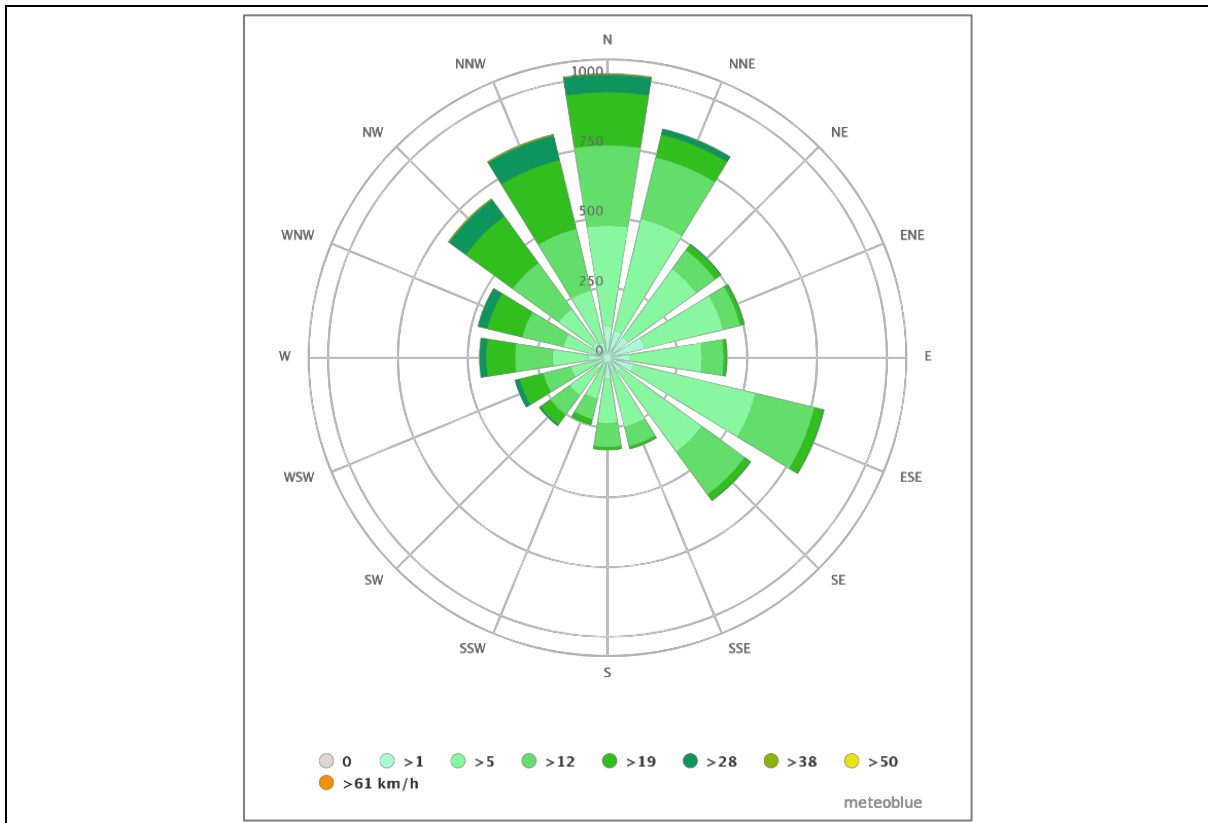


Figure 7-1: Annual windrose for Kuruman (right) (<https://www.meteoblue.com>)

### 7.1.3 RAINFALL AND TEMPERATURE

Rainfall occurs predominantly in summer and autumn (Dec – Apr) while the least amount of rain falls in the months of winter (May – Sep). The maximum daily temperature occurs in January/December whilst the minimum daily temperature occurs in July/August for Kuruman. The maximum daily temperature occurs in January whilst the minimum daily temperature occurs in July/August (Figure 7-2). Temperatures are high in summer months, with maximum temperature of around 32°C for Kuruman. Winter temperatures do drop below freezing, with the average minimum temperature for Kuruman being 1°C.

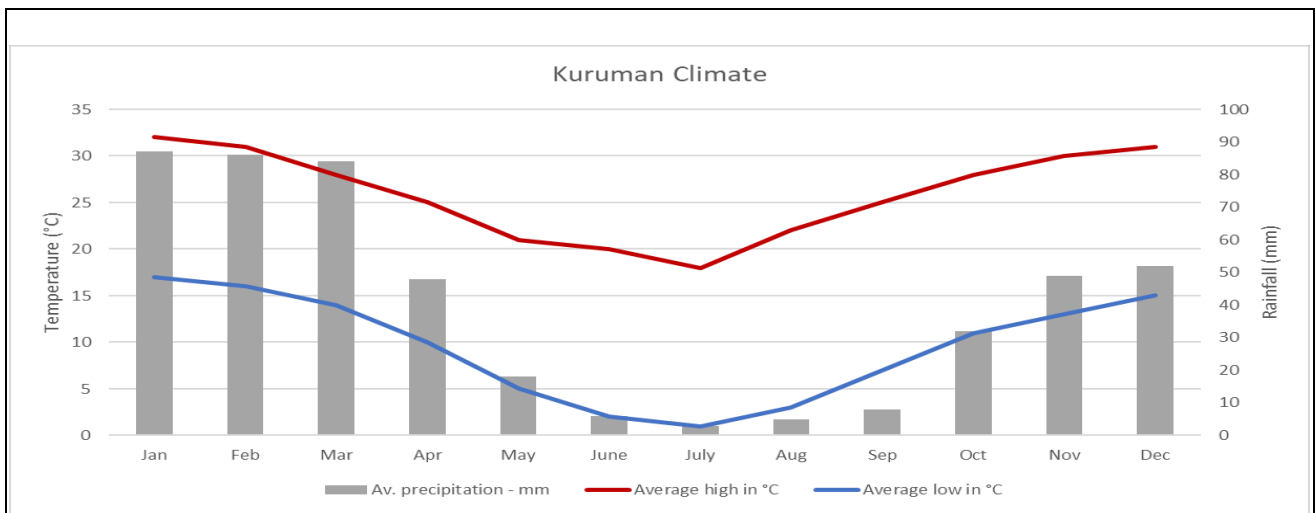


Figure 7-2: Monthly average temperature and rainfall for Kuruman (<https://www.climatedata.eu>)

### 7.1.4 EVAPORATION AND CLIMATIC WATER BALANCE

The region is arid with relatively high evaporation rates and low rainfall. Although site specific data is not available, the mean annual precipitation versus evaporation rates can be estimated from mean rates from other stations in the area.

Average monthly rainfall and evaporation data for the area was obtained from the following stations:

- Kuruman Station (D4E004), approximately 65 km south east.
- Olifantshoek station (D4E002), approximately 85 km north west.

The average monthly and annual data is summarised in Table 7-1.

Month	Kuruman-D4E004		Olifantshoek-D4E002	
	Rainfall (mm)	Evaporation (mm)	Rainfall (mm)	Evaporation (mm)
January	26.4	236.3	19	234.9
Feb	45.1	243.6	27.4	266.6
March	44.9	272.7	32.7	293.2
April	85.6	259	59.6	276.1
May	82.9	208.4	52.1	221.6
June	86.5	161.3	63.3	191.9
July	45.1	122.3	33.4	139.8
August	21.5	113.2	14.1	105.3
September	7.4	82.5	5.3	79.8
October	2.8	99.1	3.2	90.7
November	9.8	131.2	5.5	132.6
December	7.9	188.5	5.8	180.3
<b>Annual</b>	<b>465.9</b>	<b>2118.1</b>	<b>321.4</b>	<b>2212.8</b>
<b>Water Balance*</b>	<b>-1652</b>		<b>-1891</b>	

\* The climatic water balance is calculated as total rainfall - total evaporation.

It is clear from the above that there is a significantly negative climatic water balance for the area. This is significant for the site as it implies that there is limited potential for rainwater infiltration and related leaching of material disposed, and significant potential for loss of water through evaporation.

### 7.1.5 SURFACE WATER AND WETLAND/RIPARIAN ZONES

The gradient of the site is flat, and the landform associated with the site is plain. (Refer to Figure 7-4). Notably, the Gamagara river runs to the west of the site, however there are no apparent drainage channels to the river from the proposed project site. The Gamagara River and its associated wetland/riparian features (including a 32 m buffer zone) can be considered as an ecologically sensitive area in relation to the proposed development activities (Figure 7-3). The proposed solar site will be outside of this area, located to the east of the Gamagara River. The distance to the nearest solar site



boundary is approximately 500m from the banks the river. The proposed overhead powerlines will have a pylon span of approximately 200m and will placed outside of the Gamagara River with a buffer of at least 32m on either side of the banks of the river.

The high permeability of the sandy soils and flat topography result in rapid infiltration, as a result there are observable water courses or drainage lines on the site. According to a previous hydrological assessment undertaken at BRMO (African Environmental Development, report number AED0201/2011) the site is located in the arid and endorheic Kalahari Basin, it does not have any true surface water, although there are a few areas where quarries have intercepted the water table below a dry streambed and this water was considered to be surface water (with certain reservations). The study further demonstrated that the area where the mine is located is very flat with low slopes and that in general, hardly any actual surface run-off would enters the Gamagara River.

If, indeed surface run-off did reach the river, it would rapidly be absorbed by the riverbed and become part of the groundwater environment. Due to the endorheic nature of the Kalahari Basin, any contamination of groundwater would remain there for an extremely long time. This places an extended responsibility on BRMO and the other mines operating in this area, as negligent actions on the part of the mines leading to contamination of groundwater could be responsible for this contamination lingering in the groundwater, potentially for millions of years.

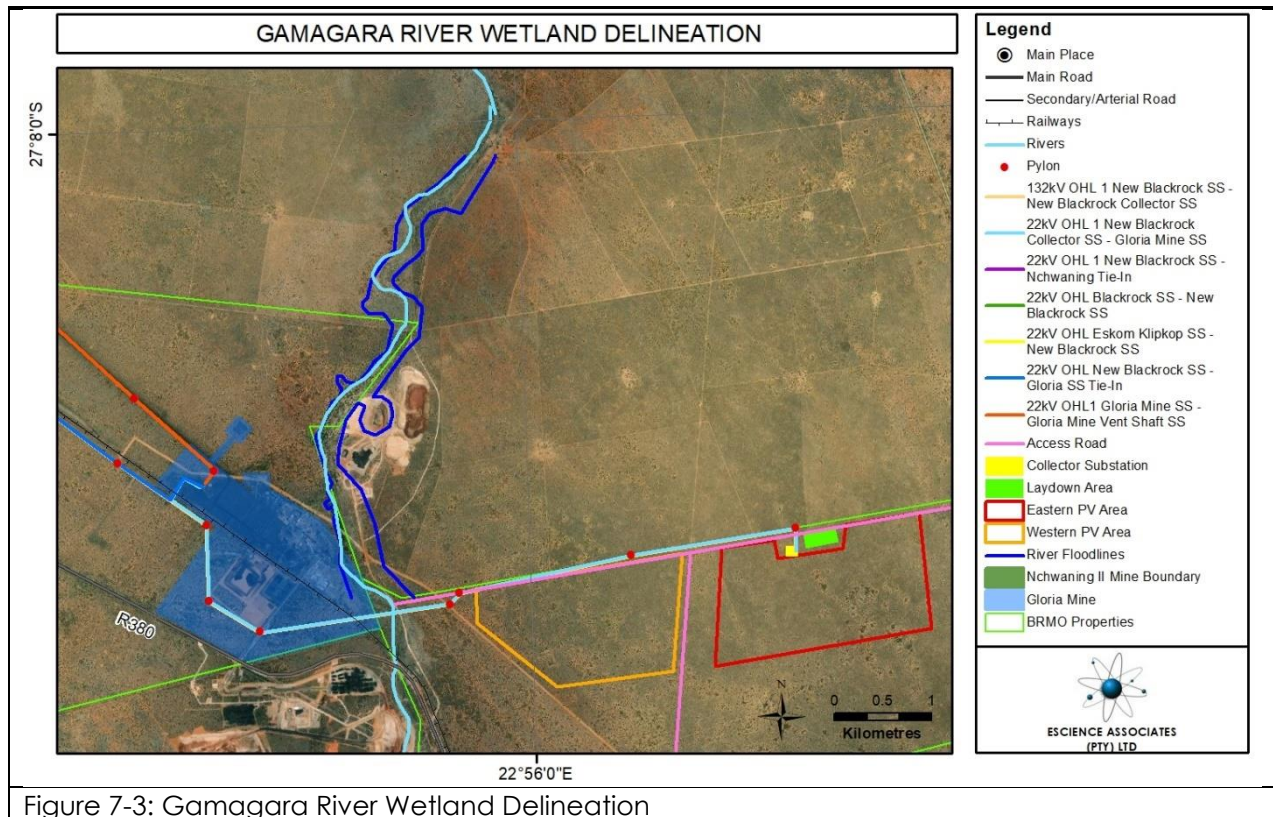


Figure 7-3: Gamagara River Wetland Delineation

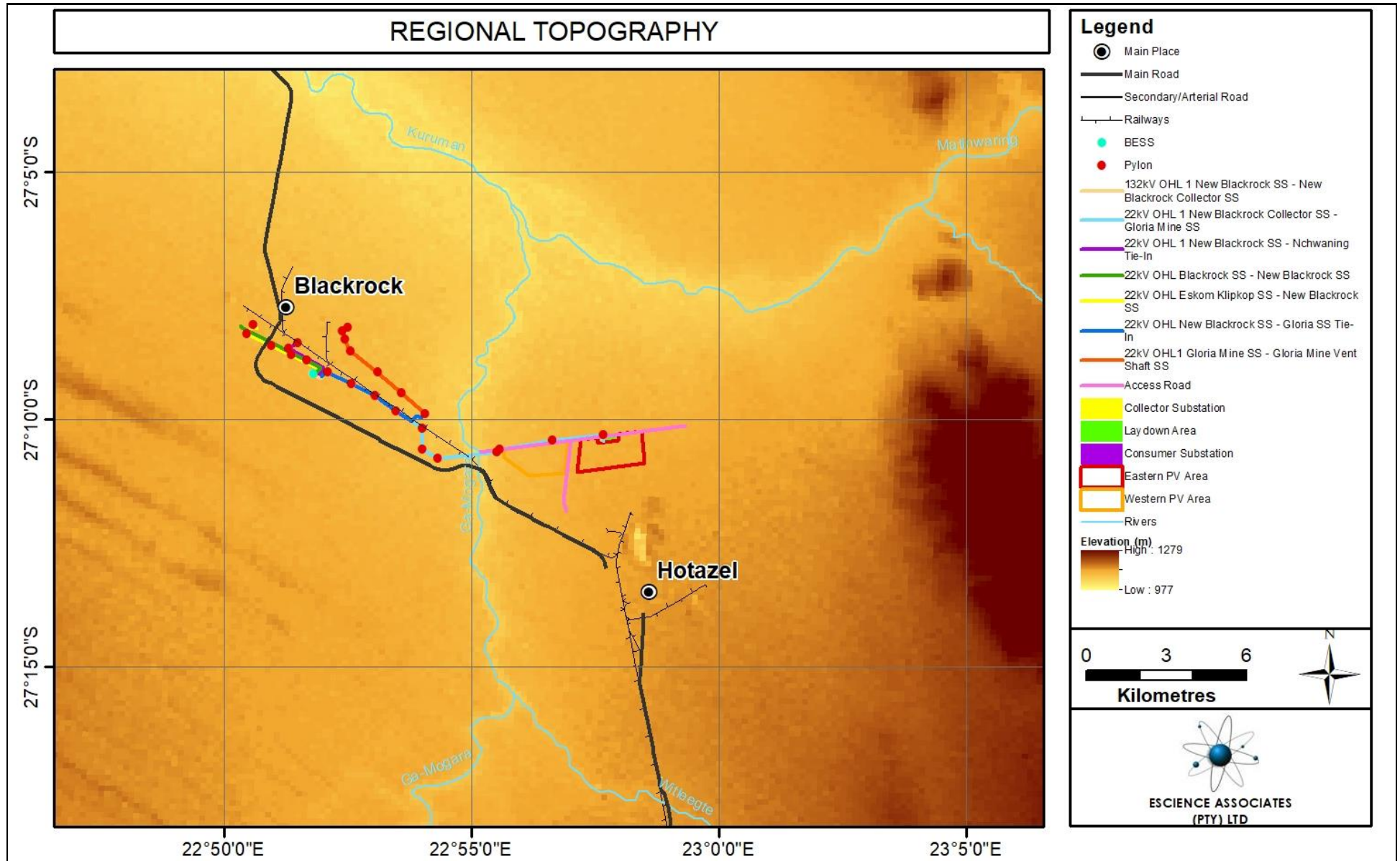


Figure 7-4: Regional topography displaying the relatively flat nature of the region

### **7.1.6 GROUNDWATER**

Various specialist hydrogeological assessments have been undertaken during EIA processes done at the BRMO and in the surrounding area. These include Geo Pollution Technologies (Report Reference Number: EBR-10-320, Envass report GEO- REP-107-08-19)). The project site is underlain by the Kalahari formation. This formation at BRMO consists of a top layer of aeolian sands followed by calcrete of tertiary age. If weathered, the calcareous sands have the favourable characteristics of porosity and permeability. There is limited surface runoff in the Kalahari area (high infiltration rates during precipitation). Due to high porosity and permeability of the Kalahari sands, the calcrete deposit below the top layer of Kalahari sands acts like a “sponge”.

Locally drainage is towards the Ga-Mogara River that flows from south west to north east, located to the south-east of the site. On a larger scale, drainage occurs towards the generalised flow of the Kuruman River which flows from southeast to the northwest.

The Kalahari Manganese Field (KMF) in the Kuruman area has a covering of calcretized sediments of the Kalahari Group, which is comprised of aeolian, unconsolidated sand of the Gordonia Formation unconformably overlying calcified sand and gravel. The Kalahari Group is up to 125 m thick (GPT, 2012), underlain by a ~30 m thick red clay layer and the Olifantshoek Supergroup (Puchner, 2002). The Olifantshoek Supergroup is comprised of the shales and quartzites of the Lucknow Formation, underlain by the Mapedi Formation shale with quartzite bands (Puchner, 2002).

Depth to groundwater below the site, estimated from existing borehole water levels measured over time, is inferred to be at mean of 46.85 mbgl.

### **7.1.7 SOIL**

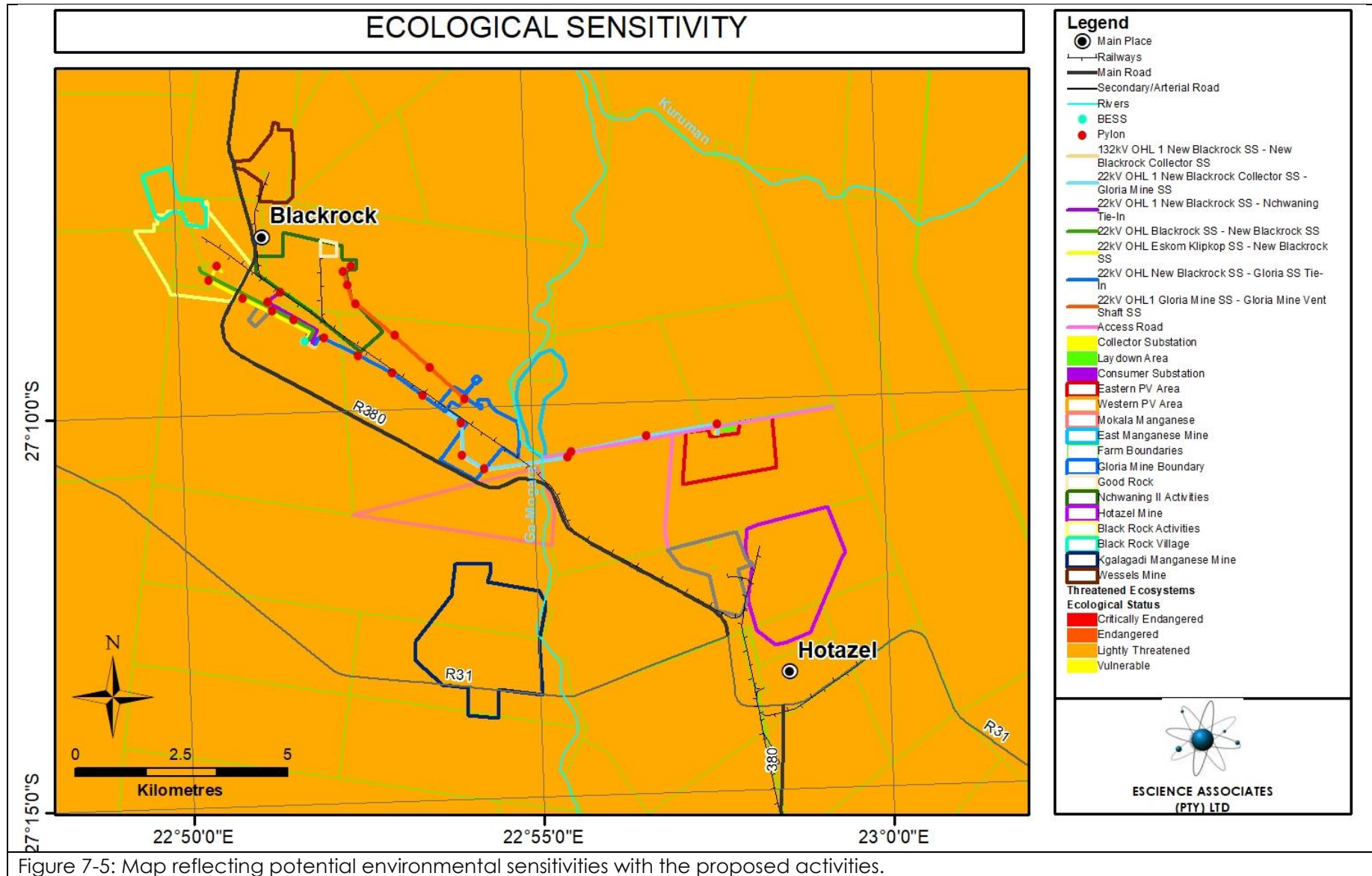
A soil survey has previously been undertaken at BRMO area to assess soil characteristics and establish how, and to what depth, topsoil should be removed to prepare the area, and how the removed soil should be stored and treated when reused to remediate the disturbed area after mine closure (Report: Soil Survey and Soil Management Program for the Black Rock Mine Operations Concerning Establishing A New Sinter Plant and Shaft Complex - Prof Claassens 2011). The area around Black Rock, in the vicinity where the mining operations are undertaken, consists mainly of Kalahari sand. Kalahari sand is typically homogenously very deep with the exception of certain areas which are under laid by calcrete. Soil fertility is low as is typical of sandy soils. Based on soil auguring undertaken the soils in the area surveyed were deep yellowish-red sandy soils.

## **7.2 BIOLOGICAL**

As previously mentioned, the project area is adjacent to existing mining activities, and the area largely consist of Kathu Bushveld. The area has significant natural/indigenous vegetation although somewhat impacted upon by low density livestock farming.

The surrounding area as depicted by the threatened ecosystems database is shown in Figure 7-5. The entire area is described as “lightly threatened”.

Based on the findings of previous assessments (Biodiversity Action Plan for The Assmang Black Rock Manganese Ore Mine authored by SAS Environmental, 2011, Report Reference N° SAS 211022), the biodiversity of the area is described in ensuing sections. This will be updated by specialist studies during the EIA phase that are specific to the target area.



## 7.2.1 BIODIVERSITY

Black Rock Solar PV Facility development area is located within the Savanna biome and more specifically within the Eastern Kalahari Bushveld Bioregion with some incursion into Kalahari Duneveld, according to a biodiversity assessment undertaken by Scientific Aquatic Services (Report Reference: SAS 21 1022 dated in May 2011, refer to Figure 7-6). The site consists of open veld (presently used through rental to farmers who graze livestock), the Belgravia Game Farm (the only on-site area presently considered of increased sensitivity), and limited riparian habitat (related to the Gamagara River).

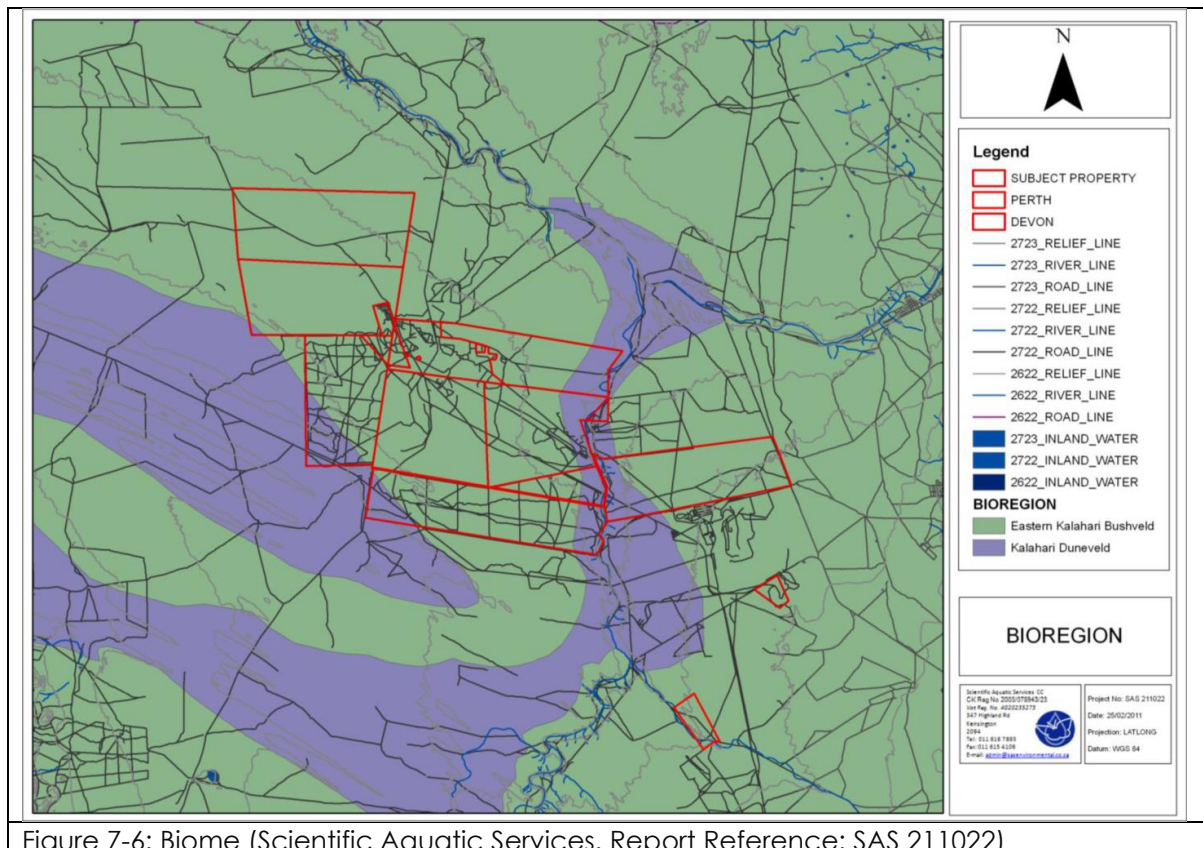


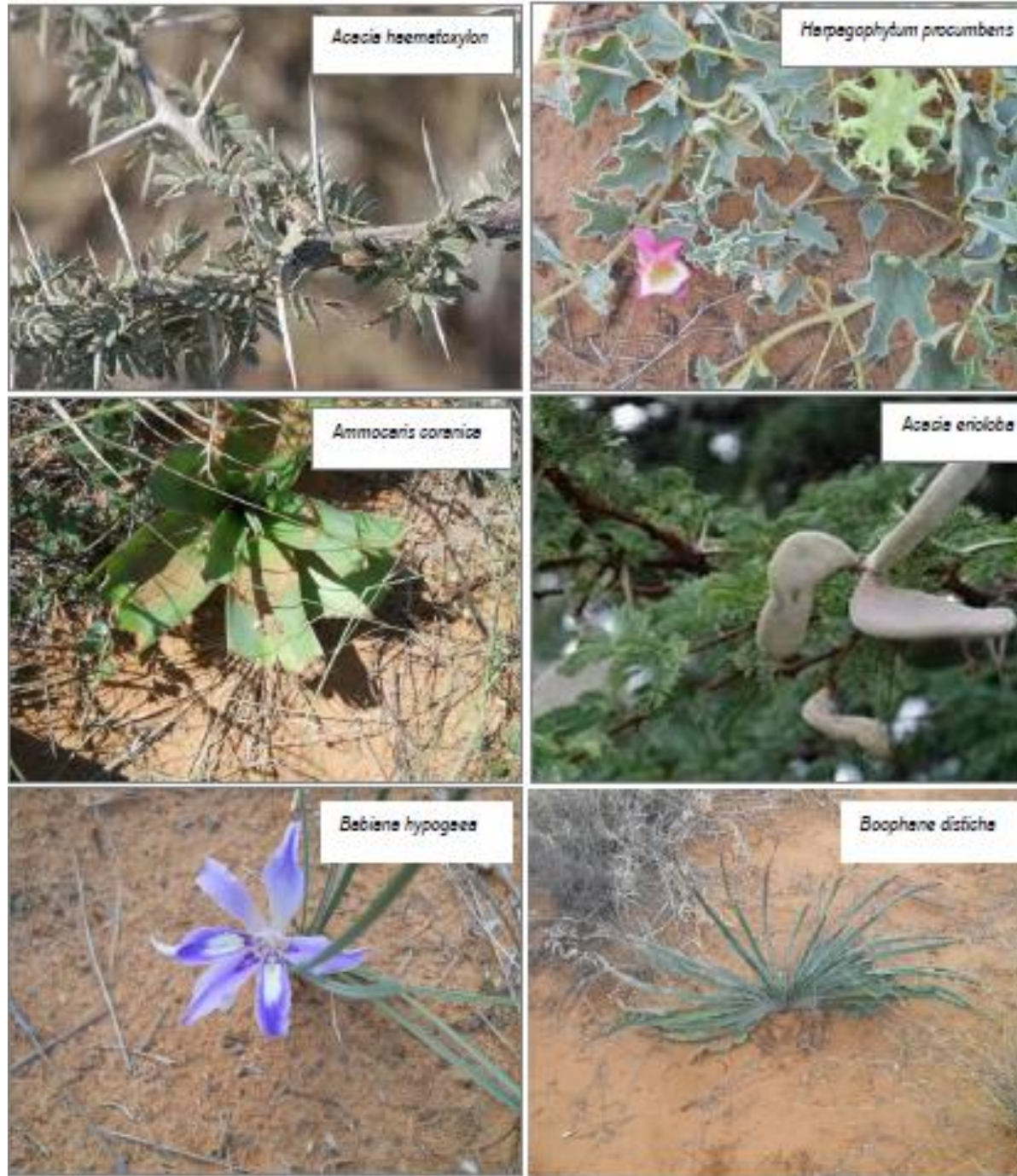
Figure 7-6: Biome (Scientific Aquatic Services. Report Reference: SAS 21 1022)

### 7.2.1.1 Floral Diversity

The development areas fall within the Kalahari Thornveld and Shrub Bushveld veld type, Kathu Bushveld vegetation type and partly in the Gordonia Duneveld vegetation type.

Several red data listed (RDL)/protected floral species are documented within the area, as shown in Table 7-2 below. The species identified are expected to be found throughout the site. None of the listed species may be cut, removed, relocated, or destroyed without permits having been issued by the relevant licensing authorities.

Table 7-2: Protected Floral Species Identified on Site



Scientific Name	Common Name	Regulation
<i>Acacia Erioloba</i> (now <i>Vachelia Erioloba</i> )	Camel Thorn	National Forests Act (1998) - Department of Agriculture, Forestry and Fisheries
<i>Acacia Haemotoxolyn</i> (now <i>Vachellia Haemotoxolyn</i> )	Grey Camel Thorn	
<i>Boscia albitrunca</i>	Shepherd's Tree	
<i>Ammocaris Coranica</i>	Karoo Lily	Schedule 4 Environmental and Conservation Ordinance No. 19 (1974) – Northern Cape Department of Environment and Nature Conservation
<i>Harpogophytum Procumbens</i>	Devil's Claw	
<i>Babiana Hypogaea</i>	Bobbejaanuintjie	
<i>Boophane Disticha</i>	Bushman's poison bulb	

### **7.2.1.2 Faunal Diversity**

Evidence of the Common Duiker, Whitetailed Mongoose, Suricate and Scrub Hare have been noted within the neighbouring properties as per previous studies done for the BRMO. Field signs (diggings) of Porcupine have also been noted. The old Black Rock mine works could provide suitable habitat for bats, of which there are several threatened species in the Northern Cape. Numerous bird species have been observed on the site based on studies done previously in the area. Various reptiles including lizards, skinks, snakes and tortoises are noted or expected within the site. The Gamagara River may also host amphibians. Numerous invertebrates also inhabit the site.

## **7.3 SOCIO-ECONOMIC**

The economic impacts from such a development are usually positive as the solar PV facility will contribute directly towards employment (locally and further afield as skills availability dictates), skills development locally, increase in the local fiscus related to procurement as well as the employment created, fiscal benefits on local, regional and national scale. The solar PV facility will also contribute directly to the economic sustainability of BRMO and hence to employment and production in the mines by mitigating electricity supply constraints.

In the context of the proposed development however an influx of employment seekers is unlikely and has not historically been the case due to the remoteness of site as well as there being no significant communities close-by that are not directly related to the mine that the solar PV is aimed to support (i.e. the Black Rock village for example is owned by the mine and houses only mine employees and their families).

## **7.4 HERITAGE**

### **7.4.1 ARCHAEOLOGICAL AND CULTURAL**

Heritage impact assessments have been undertaken at BRMO in 2009 (African Heritage Consultants CC, Cultural Heritage Impact Assessment, 2009) and 2011 (Archaeos, Culture & Cultural report ASBR, 2011), along with an updated heritage management plan in 2019. Various sites of significance have been identified within the BRMO properties; these include:

- The Old Black Rock Mine works (otherwise referred to as the Black Rock Koppie and associated infrastructure).
- Mine workers cemetery
- Sites of stone age origin in the Gamagara river basin.
- Farm cemetery on the farm Belgravia



Given the potential for identifying archaeological findings of significance, a heritage specialist will be required to provide a specialist assessment during the EIA phase.

### 7.4.2 PALAEOLOGICAL

Black Rock Solar PV Facility development is underlain by the Cretaceous to Tertiary Kalahari Formation (Qs) and underlying Griqualand West Basin rocks, Transvaal Supergroup of Vaalian age.

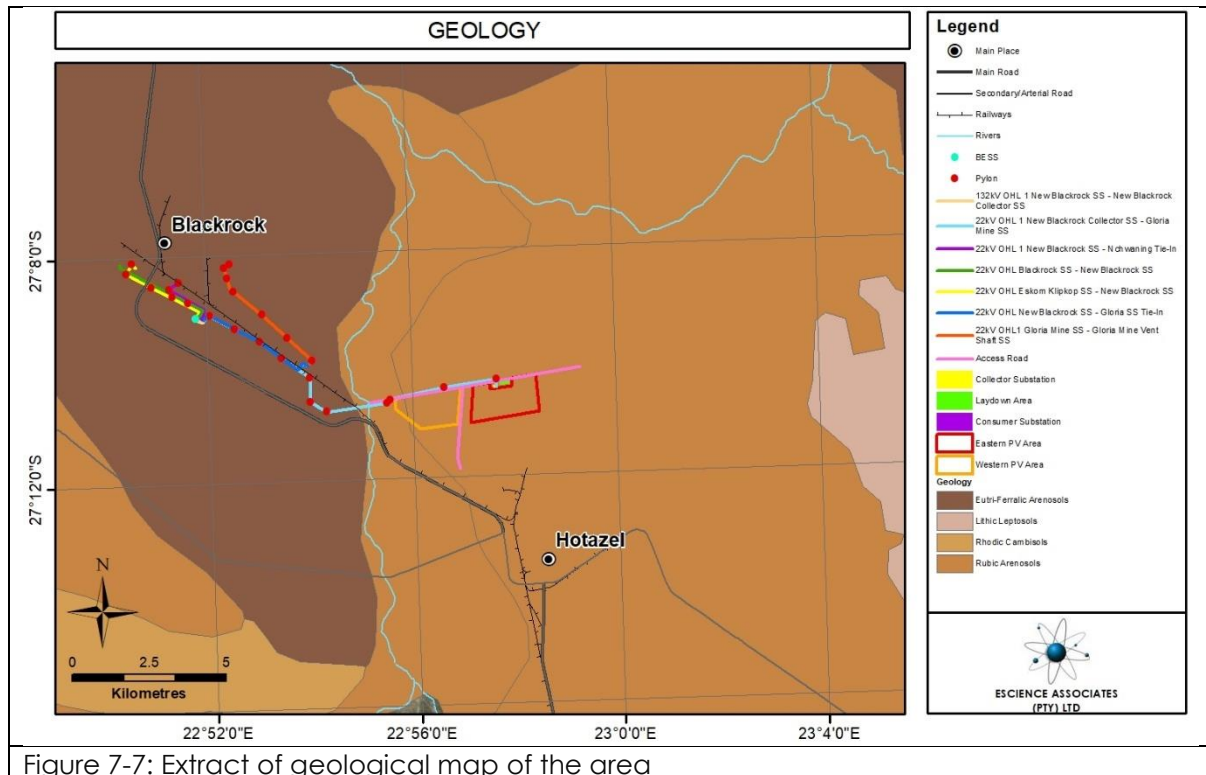


Figure 7-7: Extract of geological map of the area

The Kalahari deposits are approximately Ca 65 – 2.5 million years old (Ma). The Cenozoic Kalahari Group is the most widespread body of terrestrial sediments in southern Africa. The Cenozoic sands and calcretes of the Kalahari Group range in thickness from a few metres to more than 180m (Partridge et al., 2006). The youngest formation of the Kalahari group is the Gordonia Formation which is generally termed Kalahari sand and comprises of red aeolian sands that covers most of the Kalahari Group sediments. The pan sediments of the area originated from the Gordonia Formation and contains white to brown fine-grained silts, sands and clays. Some of the pans consist of clayey material mixed with evaporates that show seasonal effects of shallow saline groundwaters. Quaternary alluvium, aeolian sands, surface limestone, silcrete, and terrace gravels are also included in the Kalahari Group (Kent 1980).

The fossil assemblages of the Kalahari are generally very low in diversity and occur over a wide range and thus the palaeontological diversity of this Group is low. These fossils represent terrestrial plants and animals with a close resemblance to living forms, refer to Table 7-3. Fossil assemblages include bivalves, diatoms, gastropod shells, ostracods and trace fossils.

Table 7-3: Fossil Heritage (adapted from Almond and Pether 2009)

Subgroup/ sequence	Group	Formation	Fossil Heritage	Comment
Tertiary- Quaternary	Kalahari	-	Terrestrial organisms	Trace fossils, ostracods, bivalves, gastropod shells, diatoms
Griqualand West Super Group	Campbell	Ghaapplat o (Vgh)	Stromatolites	Cyanobacterial microfossils are present
-	Griquastad	Asbestos Hills	Stromatolites	Cyanobacterial microfossils are present

Hotazel is located in the Griqualand West Basin, Northern Cape Province which consists of clastic sediments as well as volcanic rocks, diamictites and banded iron formations. Manganese deposits are present in the Hotazel Formation, upper Postmasburg Group (approximately 2222 Ma). The Vryburg Formation is the basal unit and overlies unconformably the granite and rocks of the Ventersdorp Supergroup. The Campbell Group overlies the Vryburg Formation and consists of the Schmidtsdrif Formation and the upper Ghaap Plateau Formation. The Griquatown Group is divided into two formations namely the Asbestos Hills and Koegas Formations. The Gamagara Formation follows and is positioned on the Maremane Anticline and is overlain by the Makganyene Formation. The Cox Group comprises of the lower Ongeluk Formation and the upper Voëlwater Formation. The Ongeluk Formation was deposited under water and reaches a thickness of between 400 and 900 m. This Formation is basal and is mainly volcanic (Visser 1989). Manganese is present in the upper Voëlwater Formation (Snyman 1996). According to Kent (1980) and Snyman (1996) Griqualand West Basin attains a maximum thickness of 4500 m.

Algal growth structures, also known as "Stromatolites", are fossil structures described from the dolomites of the Transvaal Supergroup. Stromatolites are layered mounds, columns and sheet-like sedimentary rocks. These structures were originally formed by the growth of layer upon layer of cyanobacteria, a single-celled photosynthesizing microbe. Cyanobacteria are prokaryotic cells (simplest form of modern carbon-bases life). Stromatolites are first found in Precambrian rocks and are known as the earliest known fossils. The oxygen atmosphere that we depend on was generated by numerous cyanobacteria photosynthesizing during the Archaean and Proterozoic Era.

According to the SAHRIS palaeo-sensitivity map (Figure 7-8) there is a low to moderate chance of finding fossils in this area, and a desktop study of the area of interest is required. A paleontological specialist will be required to undertake such a study during the EIA phase.

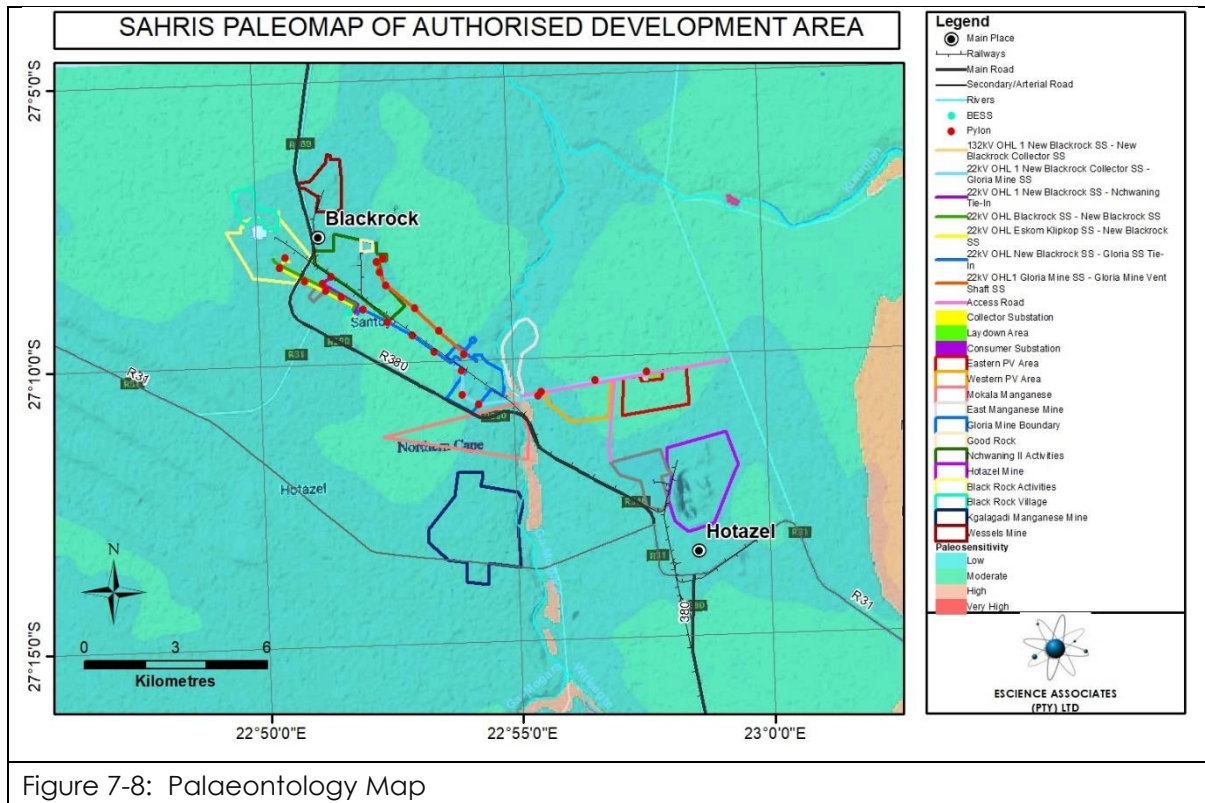
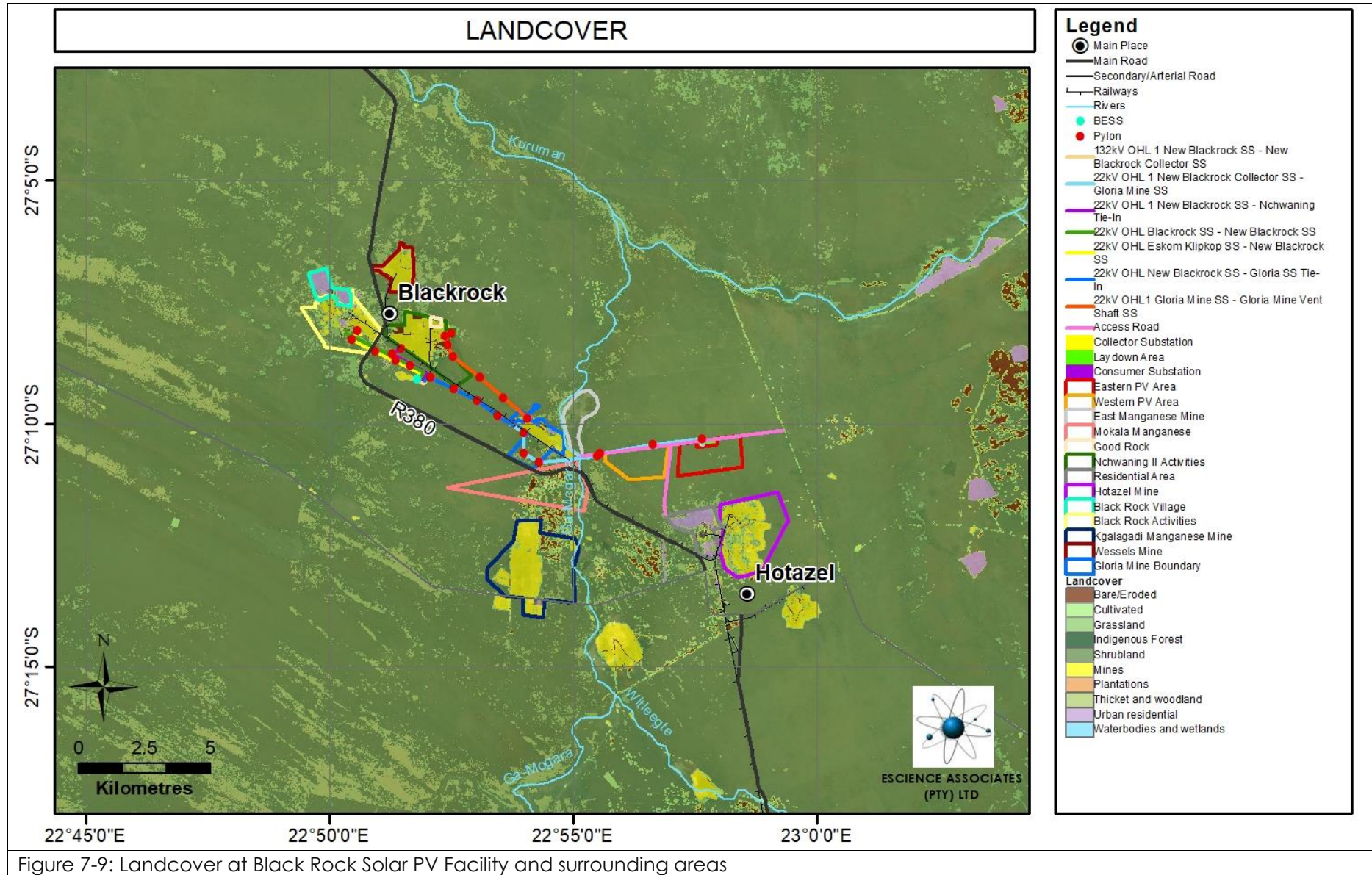


Figure 7-8: Palaeontology Map

## 7.5 CURRENT LAND USE AND LAND COVER

The current proposed project site is located within an area with sparse natural vegetation currently used for low density livestock rearing. The region surrounding Black Rock Solar PV Facility is dominated by mining, industrial and agricultural (generally livestock production) land uses. Land in the immediate vicinity of Black Rock Solar PV Facility that is not used for mining/industrial purposes, is utilised for livestock farming (i.e. sheep, goats, and cattle) and game farming (Refer to Figure 1 2). The proposed site is currently reserved for renewable energy facilities.



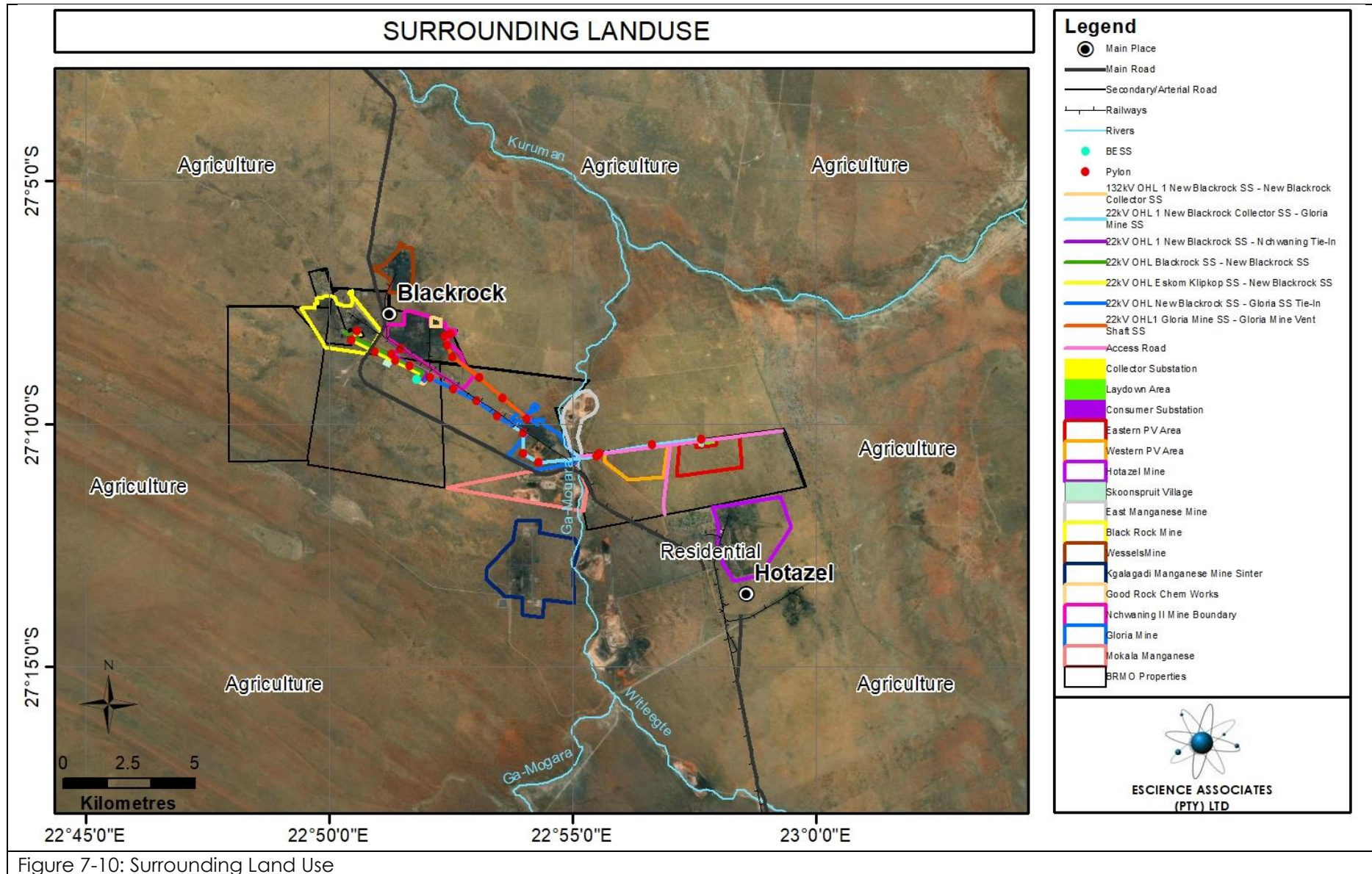


Figure 7-10: Surrounding Land Use

## 7.6 SITE SENSITIVITY

Figure 7-12 to Figure 7-13 below show the currently identified site sensitivities.

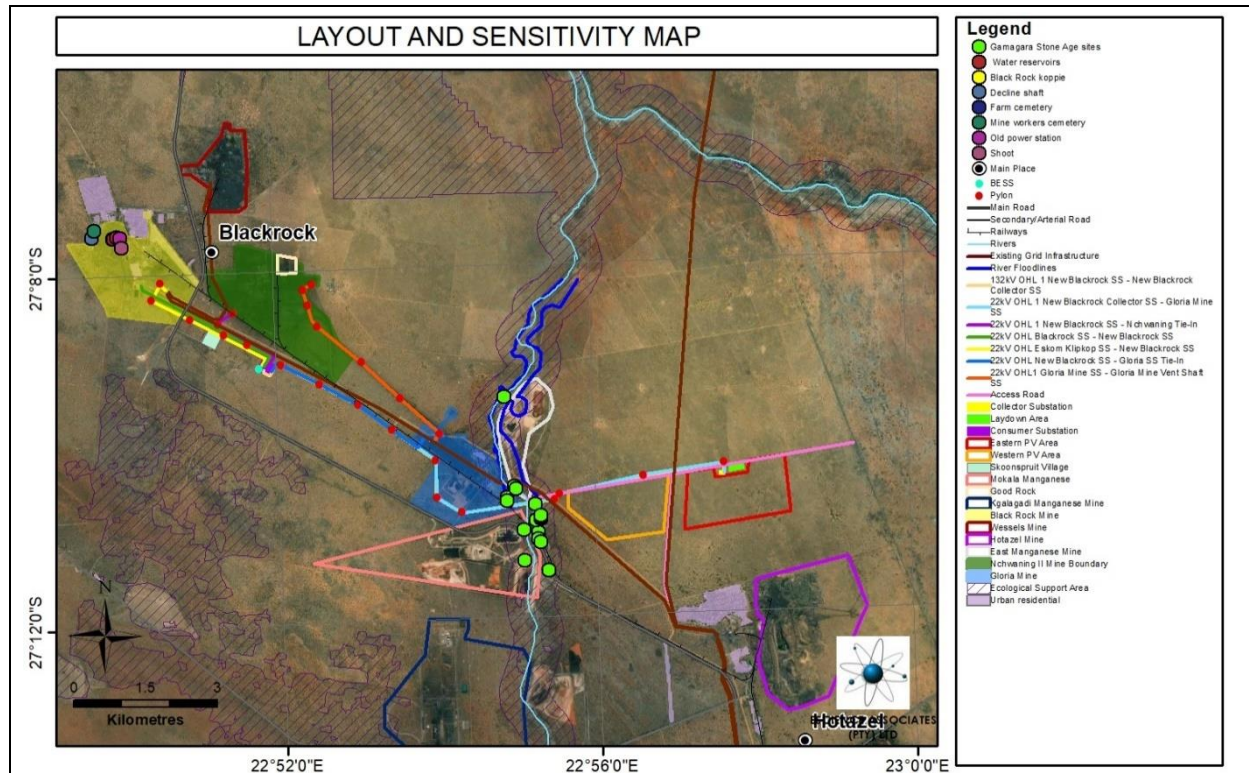


Figure 7-11: Site Sensitivity

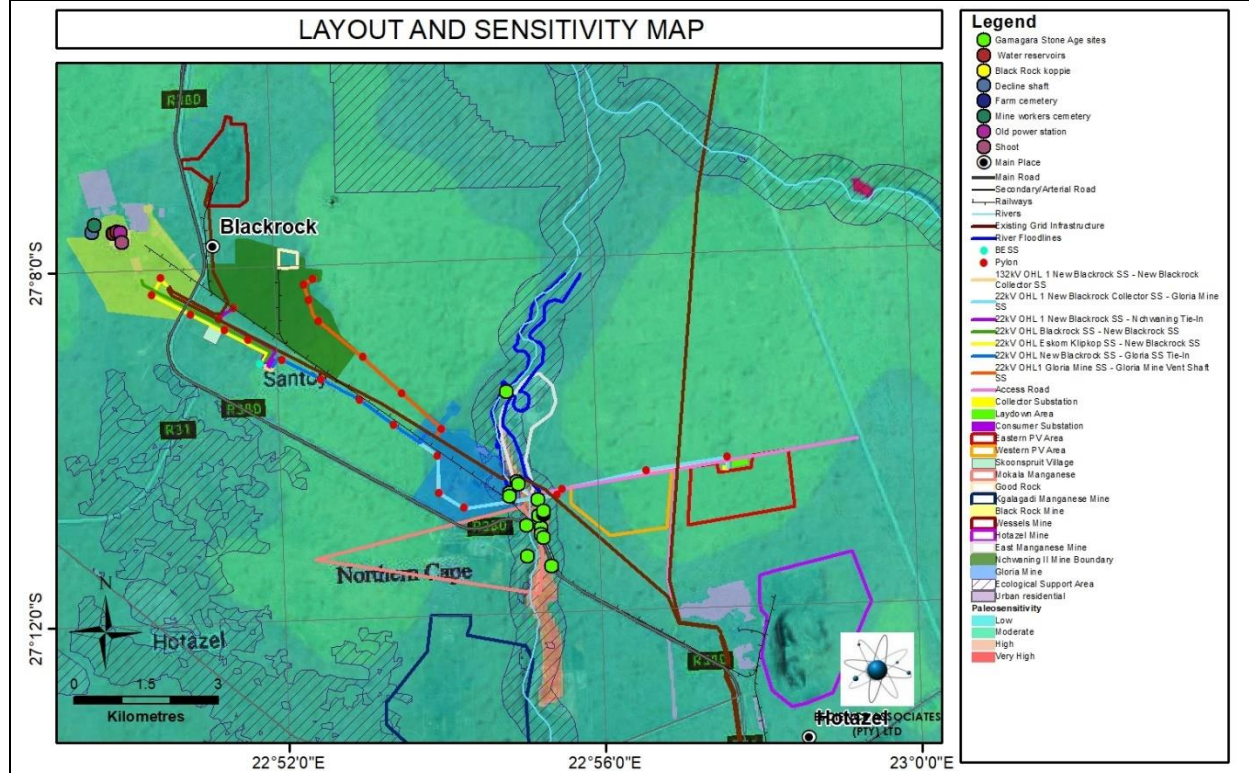
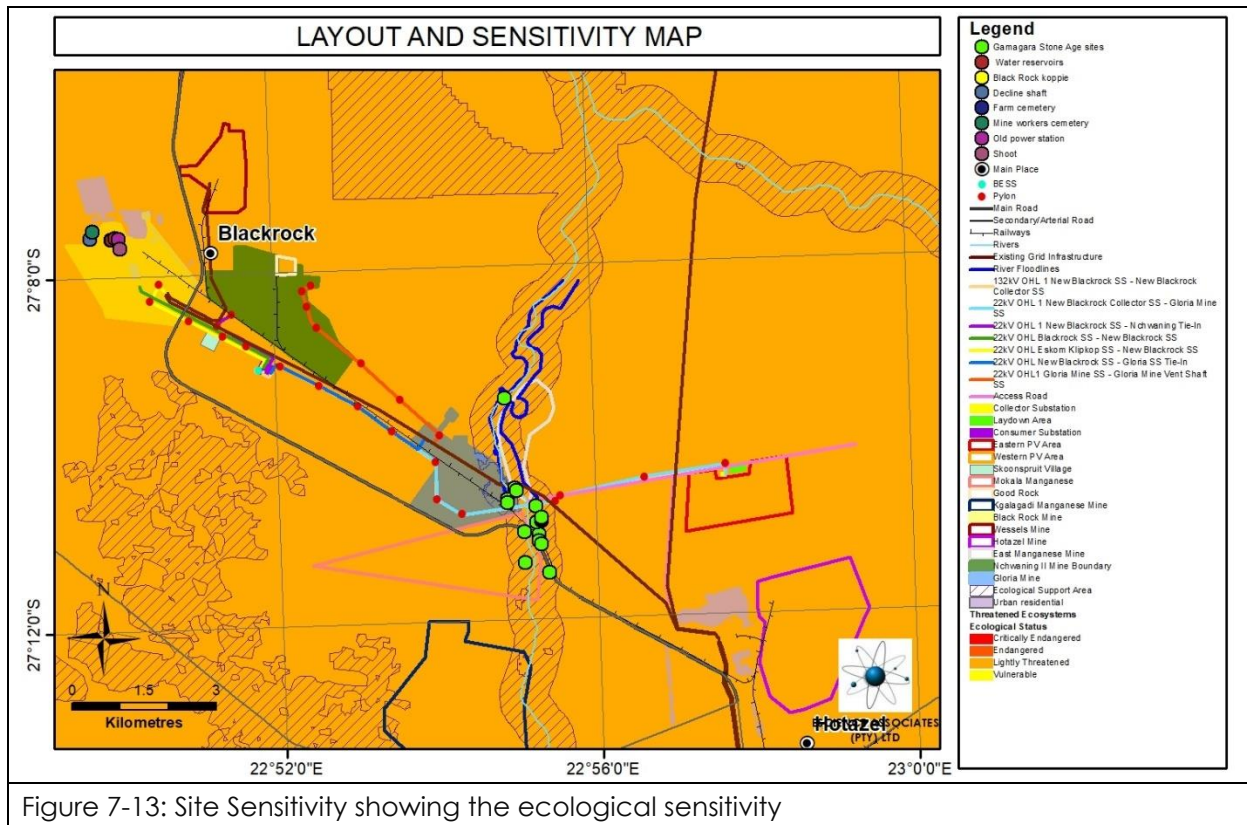


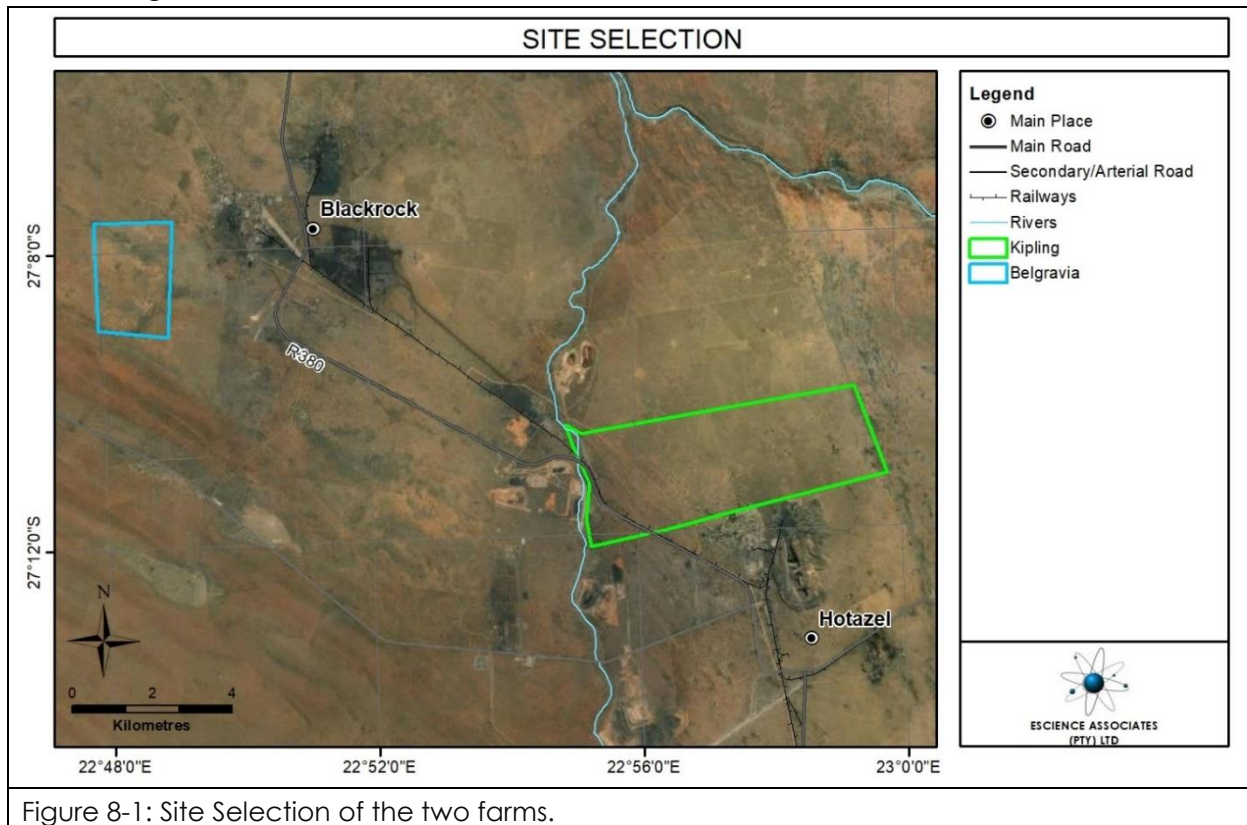
Figure 7-12: Site Sensitivity showing the paleosensitivity



## 8 SITE SELECTION

Two sites were considered for the proposed solar plant (Figure 8-1):

- Kipling Farm
- Belgravia Farm



Both properties belong to the applicant.

No fatal environmental flaws have been identified for the site locations considered. However, the possibility of future mining activities on the Belgravia farm makes it less desirable.

The scores in the adjacent columns, for each alternative, indicate whether the outcome is positive or negative for each aspect/criterion considered:

**+1** indicates a potential positive or avoidance of a potential negative impact.

**-1** indicates a potential negative impact or significant disadvantage relative to the other alternatives

**0** neutral. There is neither a potentially significant positive nor negative impact.

A cumulative sum at the bottom of the table indicates the net outcome of all considerations. Note that this is not a detailed impact assessment per site but a comparative assessment for the two sites. The purpose of the comparison is to assist in selection of the preferred site as per the requirements of the EIA regulations.

The assessment in Table 8-1 clearly indicates that the Kipling site preferable having considered various factors relevant to site selection.



Table 8-1: Site Selection Matrix				
Consideration	Kipling	Score	Belgravia	Score
Clearing of undisturbed land	Clearing required	-1	Clearing required	-1
Removal of indigenous vegetation	Removal required	-1	Removal required	-1
Removal of protected plant biota	Removal/relocation of protected plants and trees may be required	-1	Removal/relocation of protected plants and trees may be required	-1
Within 100m of a natural drainage channel or water course other than a wetland	located approximately 500m east of the Gamagara River. No anticipated impact on river.	+1	located approximately 10km west of the Gamagara River. No anticipated impact on river.	+1
Within 500m of a wetland, or riparian area	located approximately 500m east of the Gamagara River. No anticipated impact on river.	+1	located approximately 10km west of the Gamagara River. No anticipated impact on river.	+1
Proximity to seismic risk zones	None	0	None	0
Presence of dispersive soils	None	0	None	0
Underlain by unstable geology, dolomitic or karst areas where sinkholes and subsidence are likely	None	0	None	0
Proximity to ground water resources	No shallow ground water in proximity	+1	No shallow ground water in proximity	+1
Proximity to heritage resources	located approximately 500m west of LSA sites in the Gamagara River. Sites of significance unlikely within proposed boundary.	0	located approximately 1500m west of Black Rock koppie. Sites of significance unlikely within proposed boundary.	0
Within a declared conservation area	None.	+1	The Belgravia farm has been used by BRMO as a conservation area.	-1
Land use zoning	Mining	+1	Mining	+1
Proximity to human receptors	1.5km from Hotazel	0	1.5 km from Black Roc village	0
Surface gradient	Flat	0	Some relief on western side	-1
Servitudes within proposed site	Eskom overhead line; however, this will not interfere with the layout.	-1	None	+1

Visual impact	Land is flat. Proximal to existing mine activities. No change to aesthetic profile expected.	0	Proximal to existing mine activities. However, western side of site is elevated and may be of significance in respect of visibility of the panels.	-1
Noise	No potentially significant change to noise profile expected.	0	No potentially significant change to noise profile expected.	0
Proximity to access road	1.5km from nearest significant road.	0	2.8km from nearest significant road. Therefore requires more land clearing.	-1
Proximity to potential future mining activities	Future mining likely to be underground, does not impact on proposed site.	+1	Portions of this site may fall within blasting safety buffer for future open cast mining activities.	-1
<b>Outcome</b>	<b>Location 1</b>	<b>+2</b>	<b>Location 2</b>	<b>-3</b>

## 9 ENVIRONMENTAL ASPECTS & IMPACTS

Below is an initial assessment of environmental aspects and their associated impacts relating to the proposed project. Differentiation is made between significance of impact and priority for the management of an impact, which is determined by impact significance, and existence of applicable legislation. Detailed analysis/interrogation of the following impacts is proposed for the EIA phase of the project.

The following criteria and methodology is proposed to determine the significance of environmental impacts that may result from the facility. It must be noted that this preliminary assessment is undertaken in the absence of detailed specialist studies and is done to inform the plan of for environmental impact assessment and the environmental impact assessment phase.

### 9.1 TYPE/NATURE OF IMPACTS

Potential environmental impacts may either have a positive or negative effect on the environment, and can in general be categorised as follows:

a. Direct/Primary Impacts

Primary impacts are caused directly due to the activity and generally occur at the same time and at the place of the activity.

b. Indirect/Secondary Impacts

Secondary impacts induce changes that may occur as a result of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken.

c. Cumulative Impacts

Cumulative impacts are those that result from the incremental impact of the activity on common resources when added to the impacts of the other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

### 9.2 DETERMINING SIGNIFICANCE

The following criteria were used to determine the significance of an impact. The scores associated with each of the levels within each criterion are indicated in brackets after each description [like this].

#### 9.2.1 NATURE

Nature (N) considers whether the impact is:

- Positive [- ¼]
- Negative [+1].

#### 9.2.2 EXTENT

Extent (E) considers whether the impact will occur:

- on site [1]
- locally: within the vicinity of the site [2]
- regionally: within the local municipality [3]
- provincially: across the province [4]
- nationally or internationally [5].

### 9.2.3 DURATION

Duration (D) considers whether the impact will be:

- very short term: a matter of days or less [1]
- short term: a matter of weeks to months [2]
- medium term: up to a year or two [3]
- long term: up to 10 years [4]
- very long term: 10 years or longer [5].

### 9.2.4 INTENSITY

Intensity (I) considers whether the impact will be:

- negligible: there is an impact on the environment, but it is negligible, having no discernible effect [1]
- minor: the impact alters the environment in such a way that the natural processes or functions are hardly affected; the system does however, become more sensitive to other impacts [2]
- moderate: the environment is altered, but function and process continue, albeit in a modified way; the system is stressed but manages to continue, although not with the same strength as before [3]
- major: the disturbance to the environment is enough to disrupt functions or processes, resulting in reduced diversity; the system has been damaged and is no longer what it used to be, but there are still remaining functions; the system will probably decline further without positive intervention [4]
- severe: the disturbance to the environment destroys certain aspects and damages all others; the system is totally out of balance and will collapse without major intervention or rehabilitation [5].

### 9.2.5 PROBABILITY

Probability (P) considers whether the impact will be:

- unlikely: the possibility of the impact occurring is very low, due either to the circumstances, design or experience [1]
- likely: there is a possibility that the impact will occur to the extent that provisions must be made for it [2]
- very likely: the impact will probably occur, but it is not certain [3]
- definite: the impact will occur regardless of any prevention plans, and only mitigation can be used to manage the impact [4].

### 9.2.6 MITIGATION OR ENHANCEMENT

Mitigation (M) is about eliminating, minimising or compensating for negative impacts, whereas enhancement (H) magnifies project benefits. This factor considers whether –

- A negative impact can be mitigated:
- unmitigated: no mitigation is possible or planned [1]
- slightly mitigated: a small reduction in the impact is likely [2]

- moderately mitigated: the impact can be substantially mitigated, but the residual impact is still noticeable or significant (relative to the original impact) [3]
- well mitigated: the impact can be mostly mitigated, and the residual impact is negligible or minor [4]

A positive impact can be enhanced:

- unenhanced: no enhancement is possible or planned [1]
- slightly enhanced: a small enhancement in the benefit is possible [2]
- moderately enhanced: a noticeable enhancement is possible, which will increase the quantity or quality of the benefit in a significant way [3]
- well enhanced: the benefit can be substantially enhanced to reach a far greater number of receptors or recipients and/or be of a much higher quality than the original benefit [4].

### 9.3 CALCULATING IMPACT SIGNIFICANCE

The table below summarises the scoring for all the criteria.

CRITERION	SCORES					
	- ¼	1	2	3	4	5
<b>N-nature</b>	positive	Negative	-	-	-	-
<b>E-extent</b>	-	Site	local	municipal	provincial	national
<b>D-duration</b>	-	very short	short	moderate	long	very long
<b>I-intensity</b>	-	Negligible	minor	moderate	major	severe
<b>P-probability</b>	-	very unlikely	unlikely	likely	very likely	definite
<b>M-mitigation</b>	-	None	slight	moderate	good	-
<b>H-enhancement</b>	-	None	slight	moderate	good	-
<b>R-reversibility</b>	-	None	slight	moderate	good	-

Impact significance is a net result of all the above criteria. The formula proposed to calculate impact significance (S) is:

- For a negative impact:  $S = N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$ ; and
- For a positive impact:  $S = N \times (E+D) \times I \times P \times (H)$ .

Negative impacts score from 2 to 200. Positive impacts score from - ½ to -200.

### 9.4 UNDERSTANDING IMPACT SIGNIFICANCE

The following is a guide to interpreting the final scores of an impact (for negative impacts):

Final score (S)	Impact significance	
0 – 10	Negligible	The impact should result in no appreciable damage to the environment, except where it has the opportunity to contribute to cumulative impacts
10 – 20	Low	The impact will be noticeable but should be localized or occur over a limited time period and not cause permanent or unacceptable changes; it should be addressed in an EMP and managed appropriately.

Table 9-2: Final Significance Scoring		
Final score (S)	Impact significance	
20 – 50	Moderate	The impact is significant and will affect the integrity of the environment; effort must be made to mitigate and reverse this impact; in addition, the project benefits must be shown to outweigh the impact.
50 – 100	High	The impact will affect the environment to such an extent that permanent damage is likely, and recovery will be slow and difficult; the impact is unacceptable without real mitigation or reversal plans; project benefits must be proven to be very substantial; the approval of the project will be in jeopardy if this impact cannot be addressed.
100 – 200	Severe	The impact will result in large, permanent and severe impacts, such as, sterilising of essential environmental resources, local species extinctions, eco-system collapse; project alternatives that are substantially different should be considered, otherwise the project should not be approved.

#### 9.4.1 IMPACT MITIGATION/OPTIMISATION

Mitigation seeks to find ways of minimising the significance of, or eliminating, negative impacts, whereas optimisation enhances project benefits. Under each impact a summary is given of management actions recommended for the purpose of preventing or reducing the negative effects or enhancing the positive benefits of the development.

Mitigating/optimising measures to be implemented will be assimilated into the Environmental Management Programme.

#### 9.4.2 ASSIGNING IMPACT PRIORITY

The priority for the management of an impact is the product of impact significance and existence of applicable legislation. Thus, even insignificant impacts become high priorities if applicable legislation exists. The impacts below represent the impacts for all alternatives considered as the impacts are expected to be of similar magnitude.

## 9.5 CONSTRUCTION PHASE IMPACTS

### 9.5.1 MANAGEMENT AND DISPOSAL OF GENERAL WASTE

<b>Nature (N)</b>	Potential negative impact on water resource quality.		1
<b>Extent (E)</b>	Site: These activities will all occur within BRMO. BRMO operates a licensed general landfill that will receive all unrecyclable general waste.		1
<b>Duration (D)</b>	Long term: Waste will be permanently placed in landfill. Besides the landfill, impact on soil and water is only expected in the event of incorrect storage, transportation, or disposal of waste.		4
<b>Intensity (I)</b>	Minor: Natural processes or functions are not expected to be appreciably affected. Contaminants that have very limited possibility of entering groundwater and would be in small quantities and of limited risk. Existing groundwater monitoring at Black Rock does not indicate contamination from the landfill.		2
<b>Probability (P)</b>	Likely: The potential for incorrect storage of waste without proper mitigation and management in place is high.		3
<b>Mitigation (M)</b>	Can be well mitigated: Providing adequate waste storage skips and bins, which will largely eliminate the potential for soil and groundwater contamination. Disposal will be to the licenced BRMO landfill.		4
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Slightly reversible: Groundwater remediation is possible but is a lengthy and costly process.		2
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Moderate</b>	20
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Low</b>	10
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-

## 9.5.2 MANAGEMENT AND DISPOSAL OF HAZARDOUS WASTE

<b>Nature (N)</b>	Potential negative impact on water resource quality		1
<b>Extent (E)</b>	Provincial: Hazardous wastes are expected to be minimal (i.e., oils, lubricants, etc) These will be managed via BRMO's hazardous waste transfer facility. Hazardous wastes would however be disposed or recycled in other provinces due to the lack of suitable facilities locally.		4
<b>Duration (D)</b>	Long term: Impact on soil and water is only expected in the event of a significant spill outside of the bunded storage areas or during transport. The subsequent impact on groundwater for example may remain for several years.		5
<b>Intensity (I)</b>	Negligible: Very low quantities of waste will be generated by the construction phase of the facility. Natural processes or functions are not expected to be appreciably affected.		1
<b>Probability (P)</b>	Likely: The potential for incorrect storage and disposal of waste without proper mitigation and management in place is high.		3
<b>Mitigation (M)</b>	Can be well mitigated: Providing adequate bunded facilities, for storage will largely eliminate the potential for soil and groundwater contamination. Hazardous waste such as used oil and lubricants will in any case be stored in sealed drums/containers. Using a suitable waste management contractor for transporting waste to licenced management facilities will also effectively reduce risk.		4
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Slightly reversible: Groundwater remediation is possible but is a lengthy and costly process.		2
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Low</b>	18
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	9
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-



### 9.5.3 SOIL CONTAMINATION

<b>Nature (N)</b>	Direct Negative impact on the site.		1
<b>Extent (E)</b>	On site: If contamination occurs it would likely be from lubricants from mechanical equipment.		1
<b>Duration (D)</b>	Long term: Soil contamination, if it occurs, is most likely during the construction period which is anticipated to be 6 -12 months.		2
<b>Intensity (I)</b>	Minor: Natural processes or functions are not expected to be appreciably affected. Contaminants that may contaminate soil will be in small quantities.		2
<b>Probability (P)</b>	Unlikely: The probability of a significant spill taking place during construction is low. The probability of significant contamination from waste materials, spills, or leaking vehicles is also low. The majority of wastes are not hazardous. There will be limited storage and use of hazardous materials. Hazardous waste such as used oil and lubricants will in any case be stored in sealed drums/containers.		2
<b>Mitigation (M)</b>	Well mitigated: Providing adequate bunded facilities, for storage will largely reduce the potential for contamination. There are many measures that can be implemented in order to prevent soil and groundwater contamination.		4
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Moderately reversible: the impact requires that effort is taken immediately after the impact.		3
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Negligible</b>	6
<b>Significance Rating with Mitigation -Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	3
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H).$		-

### 9.5.4 NOISE

<b>Nature (N)</b>	Negative impact on site.		1
<b>Extent (E)</b>	On site: Localised to the site.		1
<b>Duration (D)</b>	Short term: Construction phase anticipated to be up to 12 months.		2
<b>Intensity (I)</b>	Negligible: The anticipated noise levels will be low. The facility is within an area surrounded by various mines. The nearest receptors are at 1.5 km away. Therefore it is not anticipated that the construction activities will significantly audible or significantly change the existing noise profile.		1
<b>Probability (P)</b>	Definite: Noise will be generated by construction equipment and activities.		5
<b>Mitigation (M)</b>	Well mitigated: To be limited to normal working hours, in accordance with locally applicable by-laws.		4
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Irreversible: The status quo will return to the previous status quo upon completion of construction.		1
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Low</b>	15
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	6
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-

### 9.5.5 BIODIVERSITY

<b>Nature (N)</b>	Negative impact on vegetation.		1
<b>Extent (E)</b>	Site: Construction will occur within the Black Rock Solar PV Facility boundary.		1
<b>Duration (D)</b>	Very long term. The solar facility has a predicted lifespan of 20 - 25 years.		5
<b>Intensity (I)</b>	Moderate: Trees and plants will be removed for construction. It is not expected that the removal will result in a critical impact on species diversity and vulnerable ecosystems in isolation, but it is important to consider this impact in the context of the wider cumulative impact.		3
<b>Probability (P)</b>	Definite: clearance of land will occur.		5
<b>Mitigation (M)</b>	May be well mitigated by relocation of protected plant species, and minimisation of tree removal, and offsetting inclusion in BRMO's biodiversity offset plan.		3
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Reversible: Site will be rehabilitated upon decommissioning based on EMPr developed as part of the EIA.		4
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Moderate</b>	36
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Moderate</b>	26
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-

### 9.5.6 SOCIO ECONOMIC

<b>Nature (N)</b>	Positive impact on job creation.		-0.25
<b>Extent (E)</b>	Local: Expected to have an impact within the surrounds of the local municipality.		2
<b>Duration (D)</b>	The duration of the construction will be short term.		2
<b>Intensity (I)</b>	Moderate: The number of jobs created will not be large and these construction phase jobs be temporary in the context of this site. Contractors may have existing employees.		3
<b>Probability (P)</b>	Definite: Impact will occur.		5
<b>Mitigation (M)</b>	N/A		-
<b>Enhancement (H)</b>	Moderate enhancement, in the form of the proponent making a concerted effort to employ personnel from the surrounding areas, can be applied.		3
<b>Reversibility (R)</b>	N/A		N/A
<b>Significance Rating Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H).$	<b>Positive (Moderate)</b>	-45

### 9.5.7 VISUAL/AESTHETIC

<b>Nature (N)</b>	Negative visual impact.		1
<b>Extent (E)</b>	The activities may be visible from Hotazel.		3
<b>Duration (D)</b>	Short term: Construction phase anticipated to be up to 12 months.		2
<b>Intensity (I)</b>	Moderate: the visual environment will be altered. However the area is surrounded by various existing mining activities.		3
<b>Probability (P)</b>	Likely: There is a possibility that the impact will occur, based on a preliminary viewshed exercise.		4
<b>Mitigation (M)</b>	Unmitigated: No practical mitigation is planned for the construction phase.		1
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Reversible: The visual impact from the construction phase once completed will be removed. This must not be confused with the operational phase impact from the panels which is reviewed under the operational phase scoping impact assessment.		4
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	Moderate	24
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	Moderate	24
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-

### 9.5.8 HERITAGE RESOURCES

<b>Nature (N)</b>	Negative impact on heritage resources if they are present.		1
<b>Extent (E)</b>	Locally: Localised to the site but may be of significance in respect of the wider heritage aspects of the surrounding area.		2
<b>Duration (D)</b>	Permanent: Once damaged or destroyed the impact may be permanent.		5
<b>Intensity (I)</b>	Minor: Previous studies of the area have shown that the probability of significant finds is low.		2
<b>Probability (P)</b>	Low: Although there are known late stone age heritage sites in the nearby Gamagara riverbed, previous studies of the area have shown that the probability of significant finds is low outside of the river.		2
<b>Mitigation (M)</b>	Well mitigated: Adequate assessment and planning may be effective for identifying protecting heritage resources.		3
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Not reversible.		1
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Moderate</b>	28
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Low</b>	14
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-

### 9.5.9 SURFACE WATER

<b>Nature (N)</b>	Negative impact on water quality.		1
<b>Extent (E)</b>	Site: there is no evidence of natural surface water or drainage on the site.		1
<b>Duration (D)</b>	Short term: Construction phase anticipated to be up to 12 months.		2
<b>Intensity (I)</b>	Minor: Natural processes or functions are not expected to be appreciably affected.		2
<b>Probability (P)</b>	Very unlikely: There is no evidence of natural surface water or drainage on the site. The site has high infiltration and evaporation rates.		1
<b>Mitigation (M)</b>	Well mitigated: Effective procedures can be adopted to prevent contamination of surface water from the proposed activities.		3
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Upon completion of construction the impacts the status quo will remain until closure.		1
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Negligible</b>	6
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	3
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-

### 9.5.10 GROUNDWATER CONTAMINATION

<b>Nature (N)</b>	Negative impact on water resource quality.		1
<b>Extent (E)</b>	Locally: Site and surrounds.		2
<b>Duration (D)</b>	Long term: Only if hazardous substances enter groundwater be a long process to remediate contaminated groundwater.		4
<b>Intensity (I)</b>	Minor: There is a low potential for affected water to percolate to groundwater. The likelihood of significant quantities of contaminates percolating to groundwater is very low due to the climatic water balance and the low quantities of potential sources that will be present. Therefore The intensity is expected to be low.		2
<b>Probability (P)</b>	Unlikely: There is a low probability of significant quantities of affected water percolating to groundwater.		2
<b>Mitigation (M)</b>	Well mitigated: Effective management measures (e.g. bunding for liquids storage) can prevent potentially significant impacts.		4
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Slightly reversible: Groundwater remediation is possible but is a lengthy and costly process.		2
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Low</b>	16
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	8
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H).$		-



## 9.5.11 TRAFFIC

<b>Nature (N)</b>	Negative impact on traffic in the area.		1
<b>Extent (E)</b>	Local and surrounds: The majority of vehicular movement will be within the site boundaries. With the exception of delivery of components to the site there will be very little change to the traffic regime.		3
<b>Duration (D)</b>	Short term: Construction phase anticipated to be up to 12 months.		2
<b>Intensity (I)</b>	Minor: Delivery of construction materials and components will affect traffic intensity however this effect is not anticipated to be potentially significant.		2
<b>Probability (P)</b>	Definite: There will be additional traffic.		4
<b>Mitigation (M)</b>	Moderate: Deliveries can be timed outside of peak traffic periods.		3
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Reversible: After construction is complete the traffic impact will largely be eliminated.		4
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Low</b>	16
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Low</b>	11
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-

## 9.5.12 AIR QUALITY

<b>Nature (N)</b>	Negative impact on ambient air quality.		1
<b>Extent (E)</b>	Site: Within the site.		1
<b>Duration (D)</b>	Short term: Construction phase anticipated to be up to 12 months.		2
<b>Intensity (I)</b>	Moderate: Construction activities could lead to increased dust in the air		3
<b>Probability (P)</b>	Likely: Construction activities and land clearing are likely to lead to increased dust in the air.		2
<b>Mitigation (M)</b>	Well mitigated: Dust suppression measures such as the wetting of cleared areas will help mitigate the amount of dust generated.		2

<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Reversible: The status quo will return to the previous status quo upon cessation of operation.		1
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Moderate</b>	36
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Low</b>	12
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-

### 9.5.13 ODOUR

#### Odour

<b>Nature (N)</b>	Negative nuisance impact on ambient air quality.		1
<b>Extent (E)</b>	Site: Besides fumes from diesel engines no odour impact is not expected.		1
<b>Duration (D)</b>	Short term: Construction phase anticipated to be up to 12 months.		2
<b>Intensity (I)</b>	Negligible: No natural processes or other receptors are expected to be appreciably affected.		1
<b>Probability (P)</b>	Negligible: No natural processes or other receptors are expected to be appreciably affected.		1
<b>Mitigation (M)</b>	No mitigation required.		1
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Upon completion of construction the impacts the status quo is expected to revert.		4
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Negligible</b>	1.2
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	1

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<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H).$	-
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## 9.6 OPERATION PHASE IMPACTS

### 9.6.1 MANAGEMENT AND DISPOSAL OF GENERAL WASTE

<b>Nature (N)</b>	Potential negative impact on water resource quality.		1
<b>Extent (E)</b>	Site: These activities will all occur within BRMO. BRMO operates a licensed general landfill that will receive all unrecyclable general waste.		1
<b>Duration (D)</b>	Long term: Waste will be permanently placed in landfill. Besides the landfill, impact on soil and water is only expected in the event of incorrect storage, transportation, or disposal of waste.		4
<b>Intensity (I)</b>	Negligible: Very low quantities of waste will be generated by the operational phase of the facility. Natural processes or functions are not expected to be appreciably affected.		1
<b>Probability (P)</b>	Likely: The potential for incorrect storage and disposal of waste without proper mitigation and management in place is high.		3
<b>Mitigation (M)</b>	Can be well mitigated: Providing adequate waste storage skips and bins, which will largely eliminate the potential for soil and groundwater contamination. Disposal will be to the licenced BRMO landfill.		4
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Slightly reversible: Groundwater remediation is possible but is a lengthy and costly process.		2
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Low</b>	10
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	5
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-

## 9.6.2 MANAGEMENT AND DISPOSAL OF HAZARDOUS WASTE

<b>Nature (N)</b>	Potential negative impact on water resource quality		1
<b>Extent (E)</b>	Provincial: Hazardous wastes are expected to be minimal. These will be managed via BRMO's hazardous waste transfer facility. Hazardous wastes would however be disposed or recycled in other provinces due to the lack of suitable facilities locally.		4
<b>Duration (D)</b>	Long term: Impact on soil and water is only expected in the event of a spill outside of the bunded storage areas or during transport. The subsequent impact on groundwater for example may remain for several years.		5
<b>Intensity (I)</b>	Negligible: Very low quantities of waste will be generated by the operational phase of the facility. Natural processes or functions are not expected to be appreciably affected.		1
<b>Probability (P)</b>	Unlikely: The potential for incorrect storage and disposal of waste without proper mitigation and management in place is low.		2
<b>Mitigation (M)</b>	Can be well mitigated: Providing adequate bunded facilities, for storage will largely eliminate the potential for soil and groundwater contamination. Hazardous waste such as used oil and lubricants will in any case be stored in sealed drums/containers. Using a suitable waste management contractor for transporting waste to licenced management facilities will also effectively reduce risk.		4
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Slightly reversible: Groundwater remediation is possible but is a lengthy and costly process.		2
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Low</b>	12
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	6
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-

### 9.6.3 SOIL CONTAMINATION

<b>Nature (N)</b>	Negative impact on water resource quality		1
<b>Extent (E)</b>	Site: This would apply to soil beneath the site, and immediate surrounds in case of a spill or slippage.		1
<b>Duration (D)</b>	Long term: If the impacted area is not addressed.		4
<b>Intensity (I)</b>	Minor: Natural processes or functions are not expected to be appreciably affected. Contaminants that may contaminate soil will be in small quantities.		2
<b>Probability (P)</b>	Unlikely: The potential for incorrect storage and disposal of waste without proper mitigation and management in place is low.		2
<b>Mitigation (M)</b>	Well mitigated: Effective design, monitoring and management measures can prevent potentially significant impacts.		4
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Reversible: Affected soil may be removed.		4
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Negligible</b>	8
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	5
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-

## 9.6.4 NOISE

<b>Nature (N)</b>	Negative impact on site.		1
<b>Extent (E)</b>	On site: Localised to the site.		1
<b>Duration (D)</b>	Very long term. The solar PV facility has a predicted lifespan past 20- 25 years.		5
<b>Intensity (I)</b>	Negligible: No significant noise will be generated at the site. The facility is within a mining area and there are no nearby noise receptors outside of the facility.		1
<b>Probability (P)</b>	Very unlikely: No significant noise will be generated.		1
<b>Mitigation (M)</b>	Well mitigated: Occasional planned maintenance activities may be undertaken during normal daytime working hours.		4
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Reversible: The status quo will return to the previous status quo upon completion of mine activities		4
<b>Significance Rating without Mitigation -Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Negligible</b>	2
<b>Significance Rating with Mitigation -Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	1.5

## 9.6.5 BIODIVERSITY

<b>Nature (N)</b>	Negative impact on vegetation.		1
<b>Extent (E)</b>	Established Site only. No new disturbed areas after construction is completed.		1
<b>Duration (D)</b>	Very long term. The solar PV Facility has a predicted lifespan of 20-25 years.		5
<b>Intensity (I)</b>	Negligible: No new disturbed areas.		1
<b>Probability (P)</b>	Negligible: No new disturbed areas.		1
<b>Mitigation (M)</b>	None. Mitigation not required.		1
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Reversible: Site will be rehabilitated upon decommissioning based on the existing mine wide EMPr for BRMO, and the EMPr developed as part of this Basic Assessment.		4
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Negligible</b>	2.4
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	2.4
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-



### 9.6.6 SOCIO ECONOMIC

<b>Nature (N)</b>	Positive impact on job creation.		-0.25
<b>Extent (E)</b>	Local: Expected to have an impact within the surround's local municipality.		2
<b>Duration (D)</b>	Long term: The duration of operation of the facility.		4
<b>Intensity (I)</b>	Moderate: There is expected to be a moderate level of job creation		3
<b>Probability (P)</b>	Definite		5
<b>Mitigation (M)</b>	N/A		-
<b>Enhancement (H)</b>	There will be moderate socio-economic benefits arising from the reduced grid reliance and improved social and environmental sustainability of the BRMO.		3
<b>Reversibility (R)</b>	N/A		N/A
<b>Significance Rating -Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .	<b>Positive (High)</b>	-67.5

## 9.6.7 VISUAL/AESTHETIC

<b>Nature (N)</b>	Negative visual impact.		1
<b>Extent (E)</b>	The panels may be visible from Hotazel in the early hours of the day.		3
<b>Duration (D)</b>	Very long term: The site will be operational for 20 - 25 years.		2
<b>Intensity (I)</b>	Moderate: the visual environment will be altered.		3
<b>Probability (P)</b>	Likely: There is a possibility that the impact will occur, based on a preliminary viewshed exercise.		4
<b>Mitigation (M)</b>	High: Mitigation such as vegetative screens may be used.		4
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Reversible: The visual impact from the construction phase once completed will be removed. This must not be confused with the operational phase impact from the panels which is reviewed under the operational phase scoping impact assessment.		4
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Moderate</b>	24
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Low</b>	15
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-

### 9.6.8 HERITAGE RESOURCES

<b>Nature (N)</b>	Negative impact on heritage resources if they are present.		1
<b>Extent (E)</b>	Locally: Localised to the site, but may be of significance in respect of the wider heritage aspects of the surrounding area.		2
<b>Duration (D)</b>	Permanent: Once damaged or destroyed the impact may be permanent.		5
<b>Intensity (I)</b>	Minor: Previous studies of the area have shown that the probability of significant finds is low.		2
<b>Probability (P)</b>	Very unlikely: Impact, if it occurs, will be in the construction phase.		1
<b>Mitigation (M)</b>	Well mitigated: Mitigation would have occurred during the construction phase.		4
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Not reversible		1
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Low</b>	14
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	6
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-

## 9.6.9 SURFACE WATER

<b>Nature (N)</b>	Negative impact on water quality.		1
<b>Extent (E)</b>	Site: there is no evidence of natural surface water or drainage on the site.		1
<b>Duration (D)</b>	Short term: Due to the low frequency of rainfall and absence of surface drainage it is unlikely that there would be any long-term surface water impacts.		2
<b>Intensity (I)</b>	Minor: Natural processes or functions are not expected to be appreciably affected.		2
<b>Probability (P)</b>	Very unlikely: There is no evidence of natural surface water or drainage on the site. The site has high infiltration and evaporation rates.		1
<b>Mitigation (M)</b>	Well mitigated: Effective procedures can be adopted to prevent contamination of surface water from the proposed activities.		3
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Upon completion of construction the impacts the status quo will remain until closure.		1
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Negligible</b>	6
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	3
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-

### 9.6.10 GROUNDWATER CONTAMINATION

<b>Nature (N)</b>	Negative impact on water resource quality.		1
<b>Extent (E)</b>	Locally: Site and surrounds.		2
<b>Duration (D)</b>	Long term: Only if hazardous substances enter groundwater will it be a long process to remediate contaminated groundwater.		4
<b>Intensity (I)</b>	Minor: There is a low potential for sources of groundwater contamination.		2
<b>Probability (P)</b>	Unlikely: There is a low probability of significant quantities of affected water percolating to groundwater.		2
<b>Mitigation (M)</b>	Well mitigated: Providing adequate bunded facilities, for storage will largely reduce the potential for soil and groundwater contamination.		4
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Slightly reversible: Groundwater remediation is possible but is a lengthy and costly process.		2
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Low</b>	16
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	8
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-

## 9.6.11 TRAFFIC

<b>Nature (N)</b>	Negative impact on traffic in the area.		1
<b>Extent (E)</b>	Site: Vehicular movement, will be limited employees and occasional planned maintenance		1
<b>Duration (D)</b>	Long term: The life of the project is 20- 25 years.		5
<b>Intensity (I)</b>	Negligible: No external users are expected to be appreciably affected by the low traffic volume.		1
<b>Probability (P)</b>	Definite: These impacts will occur as long as the facility is in operation.		4
<b>Mitigation (M)</b>	No mitigation required		1
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Upon closure impact the status quo is expected to revert to pre-establishment status quo.		4
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Negligible</b>	10
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	10
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-

## 9.6.12 AIR QUALITY

<b>Nature (N)</b>	Negative impact on ambient air quality.		1
<b>Extent (E)</b>	Site: Within the site if any impact at all.		1
<b>Duration (D)</b>	Long term: these impacts (if they occur) will occur as long as the facility is in operation.		4
<b>Intensity (I)</b>	Negligible: Natural processes or functions are not expected to be appreciably affected.		1
<b>Probability (P)</b>	Unlikely: No emissions of potential significance are expected during the operational phase.		1
<b>Mitigation (M)</b>	No potentially significant emissions are expected thus no practical mitigation has been identified.		1
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Reversible: The status quo will return to the previous status quo upon cessation of operation.		1

<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Negligible</b>	5
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	5
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H).$		-

### 9.6.13 ODOUR

<b>Nature (N)</b>	Negative nuisance impact on ambient air quality.		1
<b>Extent (E)</b>	Site: No odour impact (if it occurs) is not expected beyond the site.		1
<b>Duration (D)</b>	Long term: these impacts (if they occur) will occur as long as the facility is in operation.		4
<b>Intensity (I)</b>	Negligible: No natural processes or other receptors are expected to be appreciably affected.		1
<b>Probability (P)</b>	Negligible: No natural processes or other receptors are expected to be appreciably affected.		1
<b>Mitigation (M)</b>	No mitigation required.		1
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Upon completion of construction the impacts the status quo is expected to revert.		4
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Negligible</b>	2
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	2
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H).$		-

## 9.7 DECOMMISSIONING PHASE IMPACTS

### 9.7.1 MANAGEMENT AND DISPOSAL OF GENERAL WASTE

<b>Nature (N)</b>	Potential negative impact on soil and water resource quality.		1
<b>Extent (E)</b>	Site: These activities will all occur within BRMO. BRMO operates a licensed general landfill that will receive all unrecyclable general waste.		1
<b>Duration (D)</b>	Long term: Waste will be permanently placed in landfill. Besides the landfill, impact on soil and water is only expected in the event of incorrect storage, transportation, or disposal of waste.		4
<b>Intensity (I)</b>	Minor: Natural processes or functions are not expected to be appreciably affected. Contaminants that have very limited possibility of entering groundwater and would be in small quantities and of limited risk.		2
<b>Probability (P)</b>	Likely: The potential for incorrect storage of waste without proper mitigation and management in place is high.		3
<b>Mitigation (M)</b>	Can be well mitigated: Providing adequate waste storage skips and bins, which will largely eliminate the potential for soil and groundwater contamination. Disposal will be to the licenced BRMO landfill.		4
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Slightly reversible: Groundwater remediation is possible but is a lengthy and costly process.		2
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Moderate</b>	20
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Low</b>	10
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-



## 9.7.2 MANAGEMENT AND DISPOSAL OF HAZARDOUS WASTE

<b>Nature (N)</b>	Potential negative impact on water resource quality		1
<b>Extent (E)</b>	Provincial: Hazardous wastes are expected to be minimal. These will be managed via BRMO's hazardous waste transfer facility. Hazardous wastes would however be disposed or recycled in other provinces due to the lack of suitable facilities locally.		4
<b>Duration (D)</b>	Long term: Impact on soil and water is only expected in the event of a spill outside of the bunded storage areas or during transport. The subsequent impact on groundwater for example may remain for several years.		5
<b>Intensity (I)</b>	Minor: Natural processes or functions are not expected to be appreciably affected mainly due to the low quantities.		1
<b>Probability (P)</b>	Likely: The potential for incorrect storage of waste without proper mitigation and management in place is high.		3
<b>Mitigation (M)</b>	Can be well mitigated: Providing adequate bunded facilities, for storage will largely eliminate the potential for soil and groundwater contamination. Hazardous waste such as used oil and lubricants will in any case be stored in sealed drums/containers. Using a suitable waste management contractor for transporting waste to licenced management facilities will also effectively reduce risk.		4
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Slightly reversible: Groundwater remediation is possible but is a lengthy and costly process.		2
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Low</b>	18
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	9
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-

### 9.7.3 SOIL CONTAMINATION

<b>Nature (N)</b>	Negative impact on Soil and water resource quality.		1
<b>Extent (E)</b>	On site: If contamination occurs it would likely be from lubricants from mechanical equipment.		1
<b>Duration (D)</b>	Long term: Only contaminated soil is not remediated the impact can be expected to remain for a long period of time depending on the nature of the contaminants.		4
<b>Intensity (I)</b>	Minor: Natural processes or functions are not expected to be appreciably affected. Contaminants that may contaminate soil will be in small quantities.		2
<b>Probability (P)</b>	Very Likely: Without adequate mitigation there may a high probability of significant quantities of affected water percolating to subsoil. This must be assessed in the EIA phase.		4
<b>Mitigation (M)</b>	Well mitigated: Effective design, monitoring and management measures can prevent potentially significant impacts.		4
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Reversible: Affected soil may be removed.		4
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Low</b>	16
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Low</b>	10
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-

## 9.7.4 NOISE

<b>Nature (N)</b>	Negative impact on site and nearby receptors.		1
<b>Extent (E)</b>	On site: Localised to the site.		1
<b>Duration (D)</b>	Short term: Decommissioning phase activities anticipated to be up to 6 months. No noise expected post-closure.		2
<b>Intensity (I)</b>	Negligible: The facility is within a mining area and there are no nearby noise receptors outside of the facility.		1
<b>Probability (P)</b>	Definite: Noise will be generated by decommissioning activities and other equipment and activities.		5
<b>Mitigation (M)</b>	Well mitigated: To be limited to normal working hours, in accordance with locally applicable by-laws.		4
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Upon completion of closure phase activities, the impacts the status quo is expected to revert.		4
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Negligible</b>	6
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	4
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-

### 9.7.5 BIODIVERSITY

<b>Nature (N)</b>	Positive: impact on vegetation.		-0.25
<b>Extent (E)</b>	Site: The site will be rehabilitated.		1
<b>Duration (D)</b>	Permanent.		4
<b>Intensity (I)</b>	Moderate: Rehabilitation back to prior land use.		3
<b>Probability (P)</b>	Definite: A closure plan is in place along with closure quantum guarantees for the mine.		5
<b>Mitigation (M)</b>	N/A		-
<b>Enhancement (H)</b>	Can be enhanced by future declaration of conservation status. Although this is not guaranteed.		2
<b>Reversibility (R)</b>	Reversible: Site will be rehabilitated upon decommissioning based on the existing mine wide EMPr for BRMO, and the EMPr developed as part of this Basic Assessment.		N/A
<b>Significance Rating Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H).$	<b>Positive (Moderate)</b>	-38

## 9.7.6 SOCIO ECONOMIC

<b>Nature (N)</b>	Positive impact on job creation.	-0.25
<b>Extent (E)</b>	Local: Expected to have an impact within the surrounds of the local municipality.	2
<b>Duration (D)</b>	The duration of the closure phase activities will be short term.	2
<b>Intensity (I)</b>	Moderate: The number of jobs created will not be large and these jobs will be temporary. It is likely that contractors with existing employees will largely be used.	3
<b>Probability (P)</b>	Definite: Impact will occur.	5
<b>Mitigation (M)</b>	N/A	-
<b>Enhancement (H)</b>	Moderate enhancement, in the form of the proponent making a concerted effort to employ workers from the surrounding areas, can be applied.	3
<b>Reversibility (R)</b>	N/A	N/A
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .	<b>Positive (Moderate)</b> -45

**9.7.7 VISUAL/AESTHETIC**

<b>Nature (N)</b>	Negative impact on ambient air quality.		1
<b>Extent (E)</b>	Site: The activities facility will only be visible from the site.		1
<b>Duration (D)</b>	Short term: Decommissioning phase activities anticipated to be up to 6 months.		2
<b>Intensity (I)</b>	Negligible: No natural receptors are expected to be appreciably affected.		1
<b>Probability (P)</b>	Negligible: The activities facility will only be visible from the site.		1
<b>Mitigation (M)</b>	Moderately mitigated: Effective dust suppression methods readily available for transport, but less so for excavation and materials handling.		3
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Upon completion of closure phase activities, the impacts the status quo is expected to revert.		4
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Negligible</b>	2
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	1
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H).$		-

### 9.7.8 HERITAGE RESOURCES

<b>Nature (N)</b>	Negative impact on heritage resources if they are present.		1
<b>Extent (E)</b>	Locally: Localised to the site, but may be of significance in respect of the wider heritage aspects of the surrounding area.		2
<b>Duration (D)</b>	Permanent: Once damaged or destroyed the impact may be permanent.		5
<b>Intensity (I)</b>	Minor: Previous studies of the area have shown that the probability of significant finds is low.		2
<b>Probability (P)</b>	Very unlikely: Impact, if it occurs, will be in the construction phase.		1
<b>Mitigation (M)</b>	Well mitigated: Mitigation would have occurred during the construction phase.		4
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Not reversible		1
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Low</b>	14
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	6
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-

### 9.7.9 SURFACE WATER

<b>Nature (N)</b>	Negative impact on water quality.		1
<b>Extent (E)</b>	Site: there is no evidence of natural surface water or drainage on the site.		1
<b>Duration (D)</b>	Long term: If there are any impacts they may continue in perpetuity if not addressed during the closure design.		4
<b>Intensity (I)</b>	Minor: Natural processes or functions are not expected to be appreciably affected.		2
<b>Probability (P)</b>	Very unlikely: There is no evidence of natural surface water or drainage on the site. The site has high infiltration and evaporation rates.		1
<b>Mitigation (M)</b>	Well mitigated: Effective procedures can be adopted to prevent contamination of surface water from the proposed activities.		3
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Upon completion of closure phase activities, the impacts the status quo is expected to revert.		4
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Negligible</b>	4
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	3
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-



### 9.7.10 GROUNDWATER CONTAMINATION

<b>Nature (N)</b>	Negative impact on water resource quality.		1
<b>Extent (E)</b>	Locally: Localised to the site and immediate surrounds.		2
<b>Duration (D)</b>	Long term: Only if a plume enters groundwater will it be a long process to remediate contaminated groundwater.		4
<b>Intensity (I)</b>	Minor: Natural processes or functions are not expected to be appreciably affected. Contaminants that may enter groundwater will be in small quantities.		2
<b>Probability (P)</b>	Unlikely: The probability of a significant spill taking place during decommissioning is low. The probability of significant contamination from waste materials is also low as the majority of wastes are not hazardous. Hazardous waste such used oil and lubricants will in any case be stored in sealed drums/containers.		2
<b>Mitigation (M)</b>	Well mitigated: Providing adequate bunded facilities, for storage will largely reduce the potential for soil and groundwater contamination.		4
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Slightly reversible: Groundwater remediation is possible but is a lengthy and costly process.		2
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Low</b>	16
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	8
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-

## 9.7.11 TRAFFIC

<b>Nature (N)</b>	Negative impact on traffic in the area.		1
<b>Extent (E)</b>	Site: The majority of vehicular movement will be within the BRMO boundaries.		1
<b>Duration (D)</b>	Short term: closure phase activities anticipated to be up to 6 months.		2
<b>Intensity (I)</b>	Negligible: No external users are expected to be appreciably affected. The majority of vehicular movement will be within the BRMO boundaries.		1
<b>Probability (P)</b>	Negligible: The activities facility will only be visible from the site.		1
<b>Mitigation (M)</b>	No mitigation required.		1
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Upon completion of closure phase activities, the impacts the status quo is expected to revert.		4
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Negligible</b>	1
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	1
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-

## 9.7.12 AIR QUALITY

<b>Nature (N)</b>	Negative impact on ambient air quality.		1
<b>Extent (E)</b>	Locally: Localised to the site and immediate surrounds.		2
<b>Duration (D)</b>	Long term: Closure activities anticipated to be up to 6 months, but post closure impacts may continue in perpetuity.		2
<b>Intensity (I)</b>	Minor: Natural processes or functions are not expected to be appreciably affected by dust and dust deposition.		2
<b>Probability (P)</b>	Definite: Closure activities and transport of materials will result in entrainment of particulate matter. Without adequate closure procedures dust entrainment can occur over long periods after closure.		5

<b>Mitigation (M)</b>	Moderately mitigated: Effective dust suppression methods readily available for transport, but less so for excavation and materials handling.		3
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Upon completion of closure phase activities the impacts the status quo is expected to revert.		4
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Low</b>	16
<b>Significance Rating with Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Low</b>	11
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H)$ .		-

### 9.7.13 ODOUR

<b>Nature (N)</b>	Negative nuisance impact on ambient air quality.		1
<b>Extent (E)</b>	Site: Besides fumes from diesel engines no odour impact is not expected.		1
<b>Duration (D)</b>	Short term: closure phase activities anticipated to be up to 6 months.		2
<b>Intensity (I)</b>	Negligible: No natural processes or other receptors are expected to be appreciably affected.		1
<b>Probability (P)</b>	Negligible: No natural processes or other receptors are expected to be appreciably affected.		1
<b>Mitigation (M)</b>	No mitigation required.		1
<b>Enhancement (H)</b>	N/A		-
<b>Reversibility (R)</b>	Upon completion of closure phase activities the impacts the status quo is expected to revert.		4
<b>Significance Rating without Mitigation - Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(R)$	<b>Negligible</b>	1

<b>Significance Rating with Mitigation -Negative Impact (S)</b>	$N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$	<b>Negligible</b>	1
<b>Significance Rating - Positive Impact (S)</b>	$N \times (E+D) \times I \times P \times (H).$	-	

## 9.8 SUMMARY

A summary of the impact assessment outcomes is present in Table 9-3 below.

Phase	Impact	Without Mitigation	With Mitigation
Construction	Management and Disposal of General Waste	Moderate	Low
	Management and Disposal of Hazardous Waste	Low	Negligible
	Groundwater Contamination	Low	Negligible
	Soil Contamination	Negligible	Negligible
	Air Quality	Moderate	Low
	Noise	Low	Negligible
	Biodiversity	Moderate	Moderate
	Socio-Economic	Positive (Moderate)	Not Applicable
	Odour	Negligible	Negligible
	Visual/Aesthetic	Moderate	Moderate
	Heritage Resources	Moderate	Low
	Surface Water	Negligible	Negligible
	Traffic	Low	Low
Operation	Management and Disposal of General Waste	Low	Negligible
	Management and Disposal of Hazardous Waste	Low	Negligible
	Groundwater Contamination	Low	Negligible
	Soil Contamination	Negligible	Negligible
	Air Quality	Negligible	Negligible
	Noise	Negligible	Negligible
	Biodiversity	Negligible	Negligible
	Socio Economic	Positive (High)	Not Applicable
	Odour	Negligible	Negligible
	Visual/Aesthetic	Moderate	Low
	Heritage Resources	Low	Negligible
	Surface Water	Negligible	Negligible
	Traffic	Negligible	Negligible
Decommissioning	Management and Disposal of General Waste	Moderate	Low
	Management and Disposal of Hazardous Waste	Low	Negligible
	Groundwater Contamination	Low	Negligible
	Soil Contamination	Low	Low
	Air Quality	Low	Low
	Noise	Negligible	Negligible

	Biodiversity	Positive (Moderate)	Not Applicable
	Socio-Economic	Positive (Moderate)	Not Applicable
	Odour	Negligible	Negligible
	Visual/Aesthetic	Negligible	Negligible
	Heritage Resources	Low	Negligible
	Surface Water	Negligible	Negligible
	Traffic	Negligible	Negligible

### 9.9 CUMULATIVE IMPACTS

Figure 9-1 below shows other approved/proposed solar PV facilities within a 30km radius of the proposed Black Rock Solar PV Facility. These were identified by the DFFE Screening Tool. The main cumulative impacts will be with regards to flora and fauna as, cumulatively, there will be clearance of vegetation which will affect habitat as well as remove potentially sensitive floral species. Other impacts may also be of potential cumulative significance, and therefore each relevant specialist study will review the cumulative effect as far as is practical. It will therefore be important to examine these fully in the EIA process where the specialist assessments and appropriate mitigation measures will be developed. The outcomes thereof will be used to develop a cumulative impact statement.

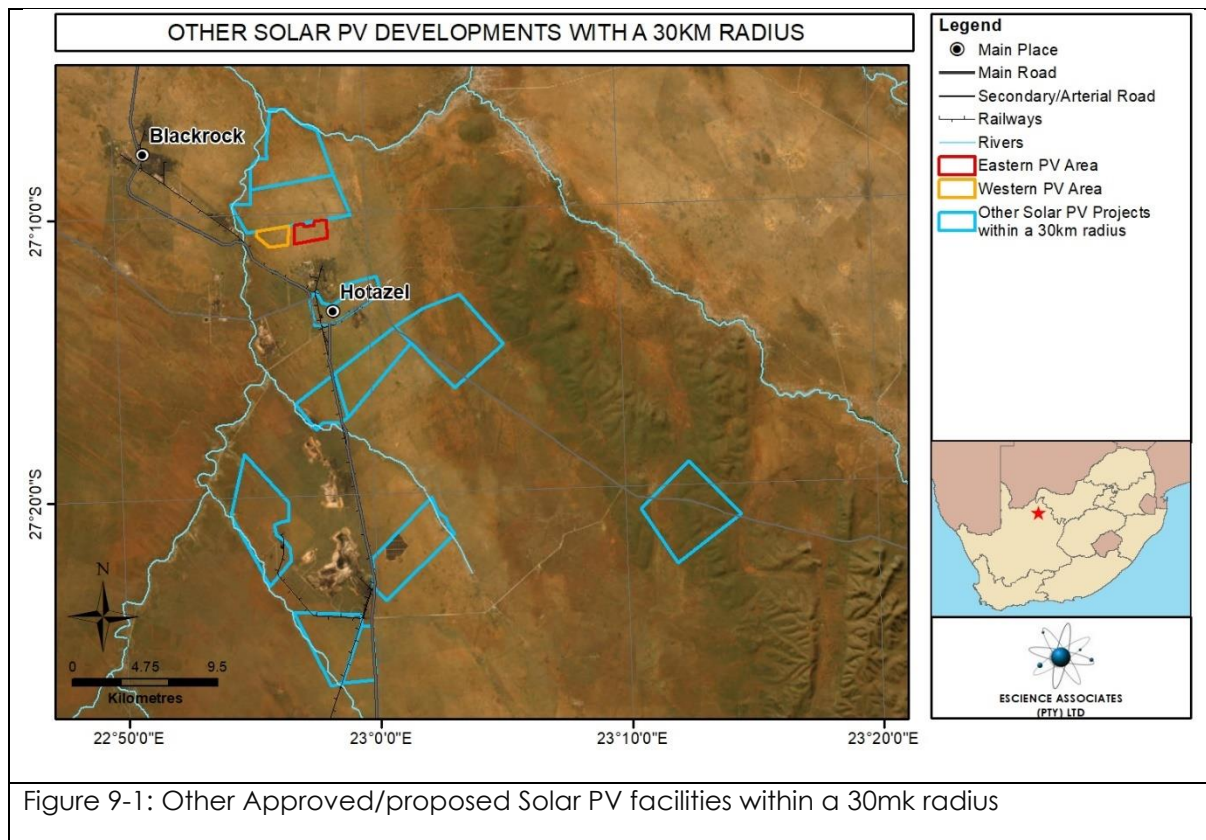


Figure 9-1: Other Approved/proposed Solar PV facilities within a 30mk radius

Figure 9-2 and Figure 9-3 below show the cumulative sensitivity of the area.

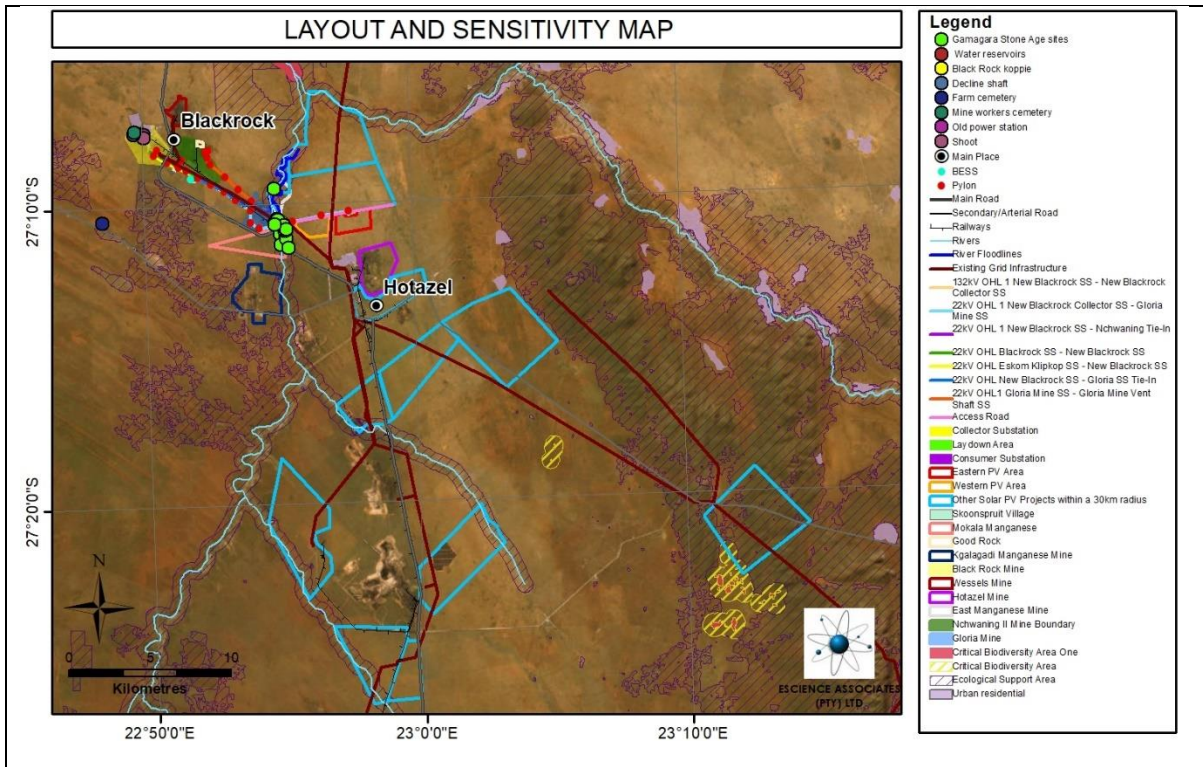


Figure 9-2: Cumulative sensitivity map of the area.

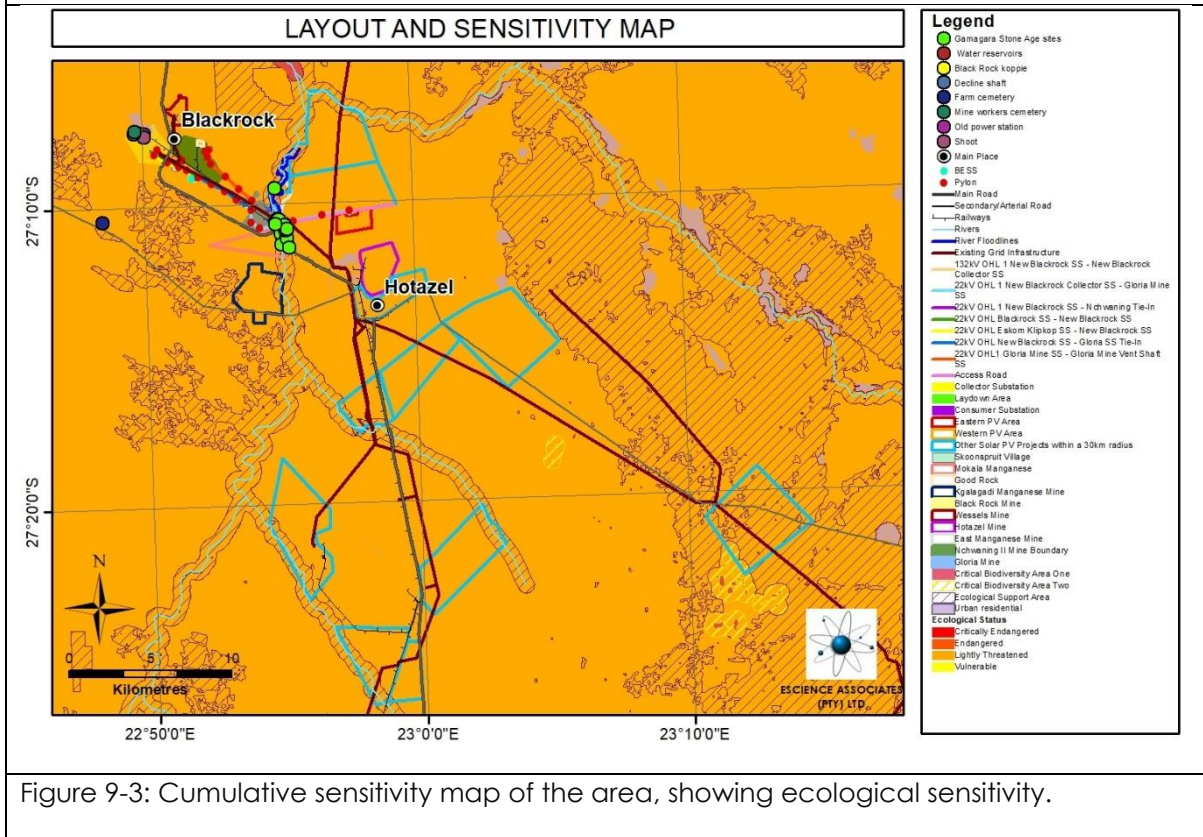


Figure 9-3: Cumulative sensitivity map of the area, showing ecological sensitivity.

## 10 PLAN OF STUDY FOR EIA

### 10.1 LEGAL REQUIREMENT FOR PLAN OF STUDY FOR EIA

This plan of study has been formulated to meet the requirements for a Plan of Study for Environmental Impact Assessment (EIA) as set out in Appendix 2(i) of GN R.982, which states:

*"A plan of study for undertaking the environmental impact assessment process to be undertaken, including-*

*(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 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."*

### 10.2 ALTERNATIVES TO BE CONSIDERED

A summary of alternatives to be considered is presented in Table 10-1.

Property location alternatives	or	The preferred locations will be in accordance with the site selection outcomes considered in section 7.6 of this report.
Design or layout of activity		Layout alternatives will be considered as per section 3.2.3 of the report.
Technology to be used in the activity		Technology alternatives will be considered as per section 3.2.4 of the report.
Operational aspects of activity		Operational alternatives will be considered as per section 3.2.2 of the report.
Not implementing activity		The no-go alternative relates to no proceeding with the proposed activities, i.e. maintaining the status quo. This will be assessed as required by the EIA regulations.



"No-Go Alternative"	
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### 10.3 ASPECTS TO BE ASSESSED

The aspects identified in section 0 of the report will be assessed.

#### 10.3.1 SPECIALIST ASSESSMENTS

The identification and initial assessment of environmental aspects as well as a screening assessment as per the DFFE National Screening Tool indicate the following potentially significant environmental aspects which require further detailed assessment (Table 10-2). These will be conducted during the EIA-phase. These are based on regulatory requirements as well as the impact assessment outcomes and the requirement to develop adequate management and mitigation measures as well.

Theme	Solar PV Screening Report Rating	OHL Screening Report Rating	Substation Screening Report Rating	Will the studies be conducted in the EIA-phase?
<b>Agricultural</b>	Medium	Medium	Medium	Yes
<b>Animal Species</b>	Low	Medium	Low	Yes
<b>Aquatic Biodiversity</b>	Low	Very High	Low	Yes
<b>Archaeological and Cultural Heritage</b>	Low	High	Low	Yes
<b>Avian</b>	Low			No – Not required
<b>Civil Aviation</b>	Medium	High	High	Yes
<b>Defence</b>	Low	Low	Low	No – not required
<b>Landscape</b>	Medium			Yes
<b>Palaeontology</b>	Medium	High	Medium	Yes
<b>Plant Species</b>	Low	Low	Low	No – not required
<b>RFI</b>	Low			No – not required
<b>Terrestrial Biodiversity</b>	Low	Very High	Low	Yes

- **Soil and Land Capability (Agricultural site sensitivity verification):** to determine the potential impacts to soils and agriculture by the proposed development;
- **Landscape/Visual Impact Assessment:** to assess the visual impacts of the solar PV Panels to sensitive receptors;
- **Biodiversity Assessment (including fauna and flora):** to identify and assess the potential impact on biota related in particular, but not limited to, to land clearing and the proposed activities;
- **Freshwater Screening Ecological Assessment:** to identify and assess the potential impact on biota related to potential impingement on the Gamagara River;
- **Archaeological Assessment:** to identify and assess the potential for sites/attributes of cultural and archaeological significance;

- **Palaeontology Assessment:** to identify and assess the potential for sites/attributes of palaeontological significance and propose management and mitigation measures;
- **Civil Aviation Site Sensitivity Verification:** This assessment is required in accordance with GN 960 of 2019 (GG 42561) and the outcomes of the mandatory DFFE screening tool which indicates high sensitivity, probably due to the current and historical presence of landing strips.

### 10.3.1.1 Archaeological Assessment

A heritage impact assessment was undertaken in 2011 (Archaetnos Culture & Cultural report ASBR 2011) which employed a literature review, field surveys, and a review of oral histories. A total of 14 sites with a Stone Age origin were recorded during a specialist archaeological field survey of the Gamagara river basin. Stone Age artefacts are located in and on the river banks, and the likelihood of uncovering archaeological material is very high.

Although the DFFE screening tool identified low archaeological and cultural sensitivity for the solar PV development area, as illustrated in Figure 10-1, the screening tool identified a high sensitivity for the OHLs (Figure 10-2) as it is within 100m of a grade III B Heritage Site, and given the known potential for identifying archaeological findings of significance, a heritage specialist will be required to provide a specialist assessment.

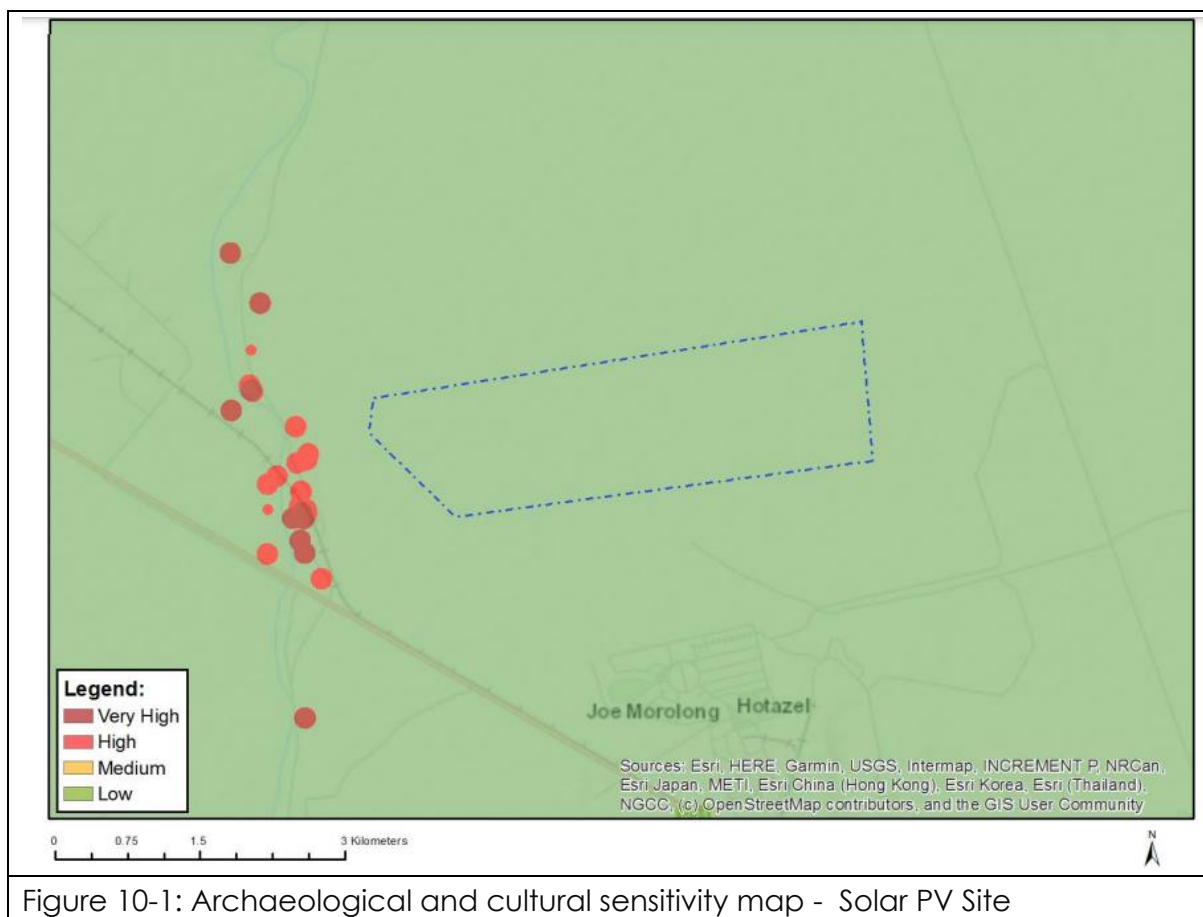


Figure 10-1: Archaeological and cultural sensitivity map - Solar PV Site

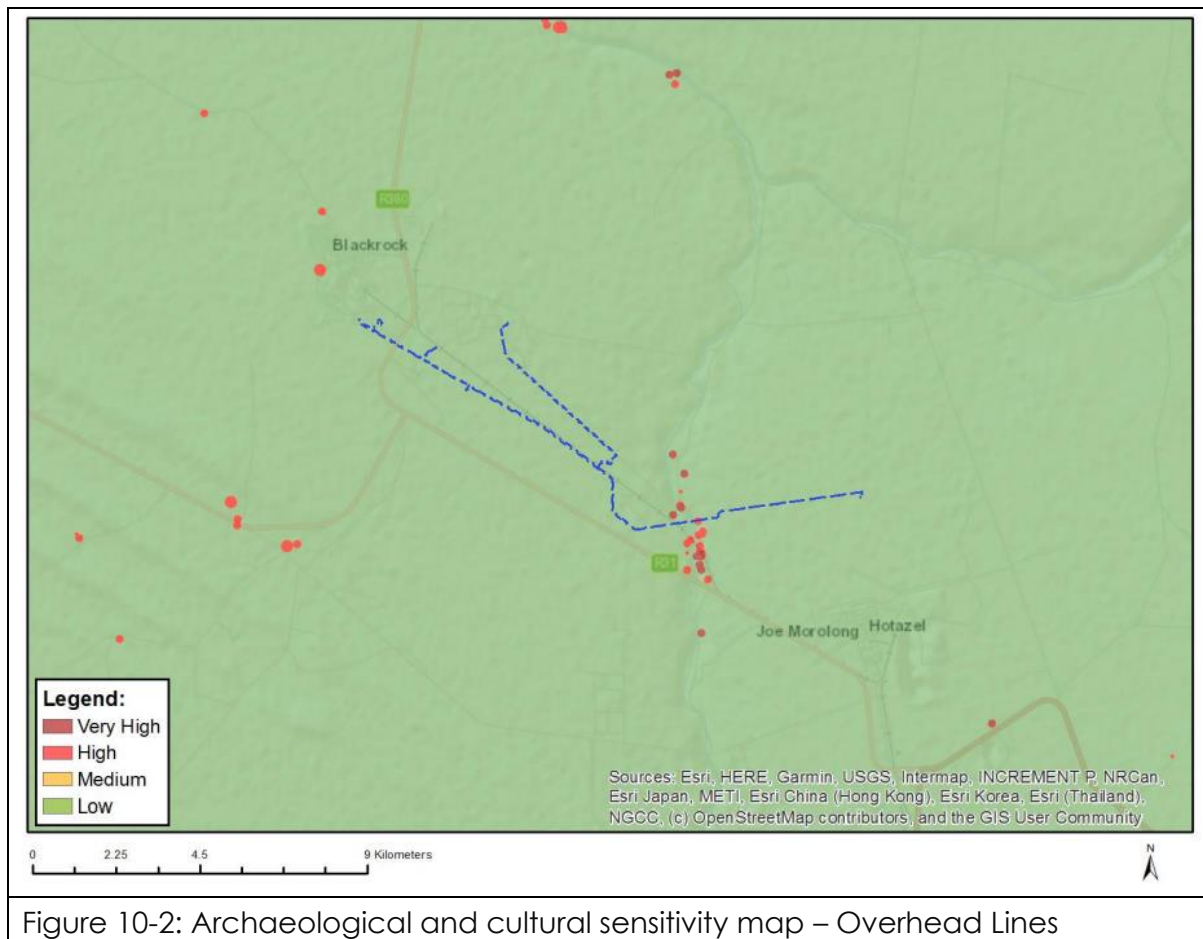


Figure 10-2: Archaeological and cultural sensitivity map – Overhead Lines

The following activities will be undertaken:

- Survey of literature
- Field survey
- Review of oral histories
- Documenting of sites, objects, features and structures identified
- Significance assessment
- Management recommendations

### 10.3.1.2 Palaeontology Assessment

The Black Rock Solar PV Facility development is underlain by the Cretaceous to Tertiary Kalahari Formation (Qs) and underlying Griqualand West Basin rocks, Transvaal Supergroup of Vaalian age.

The fossil assemblages of the Kalahari are generally very low in diversity and occur over a wide range and thus the palaeontological diversity of this Group is low. These fossils represent terrestrial plants and animals with a close resemblance to living forms, refer to Table 10-3 for fossil assemblages including bivalves, diatoms, gastropod shells, ostracods and trace fossils.

Table 10-3: Fossil Heritage (adapted from Almond and Pether 2009)

Subgroup/sequence	Group	Formation	Fossil Heritage	Comment
Tertiary-Quaternary	Kalahari	-	Terrestrial organisms	Trace fossils, ostracods, bivalves, gastropod shells, diatoms
Griqualand West Super Group	Campbell	Ghaapplato (Vgh)	Stromatolites	Cyanobacterial microfossils are present
-	Griquastad	Asbestos Hills	Stromatolites	Cyanobacterial microfossils are present

The DFFE screening tool identified medium paleontological sensitivity for the solar PV development area and the substation as illustrated in Figure 10-3 and Figure 10-5, due to features with a Medium paleontological sensitivity. For the OHLs, the DFFE Screening Tool identified a high sensitivity (Figure 10-4) due to features with a High paleontological sensitivity.

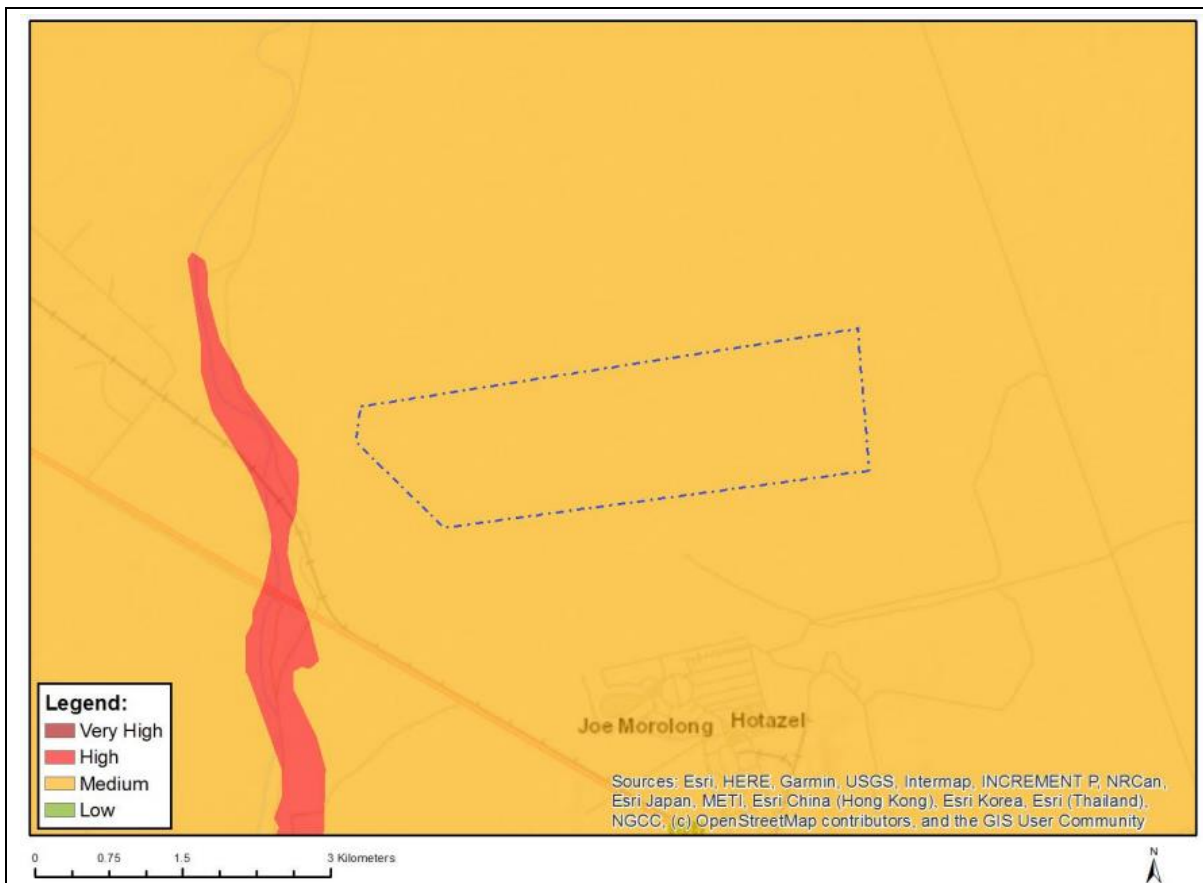


Figure 10-3: Paleontological sensitivity map – Solar PV Site

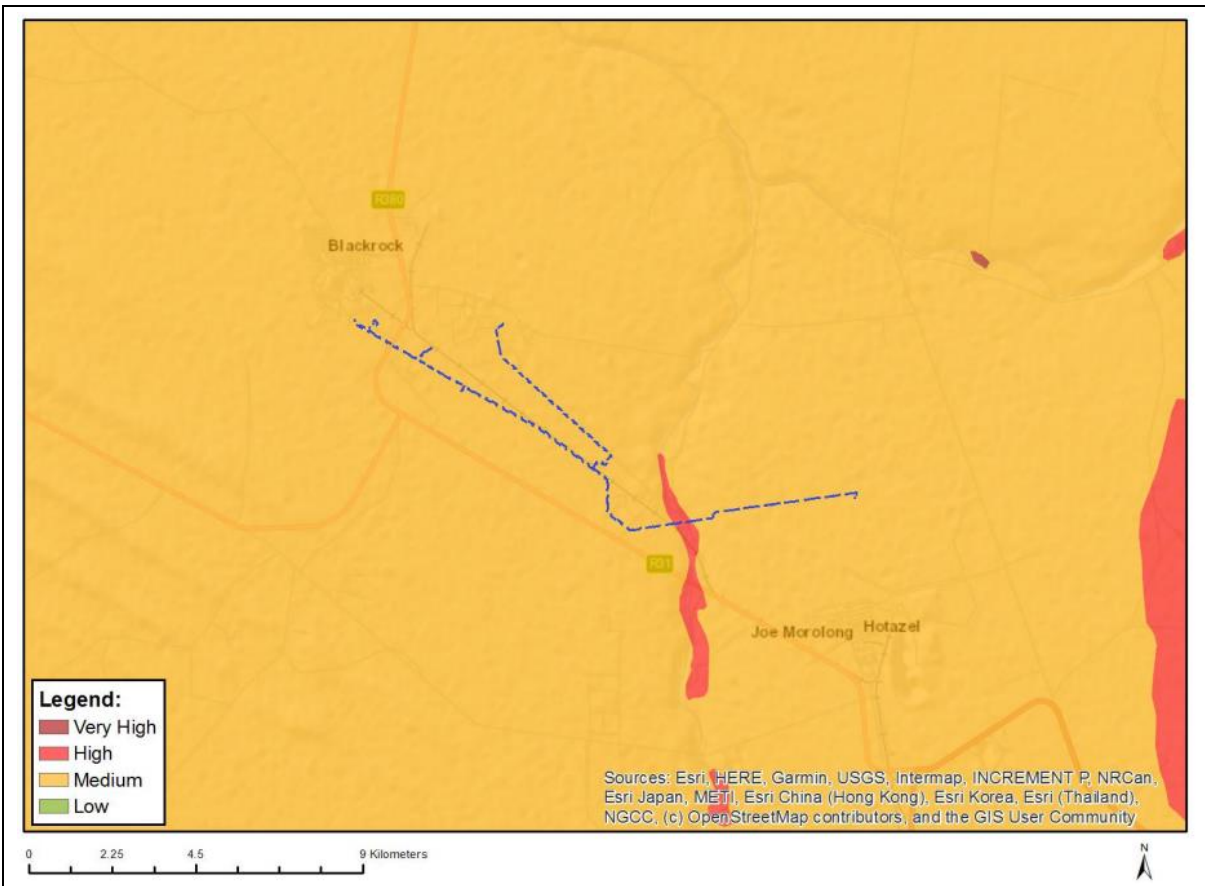


Figure 10-4: Paleontological sensitivity map – Overhead Lines

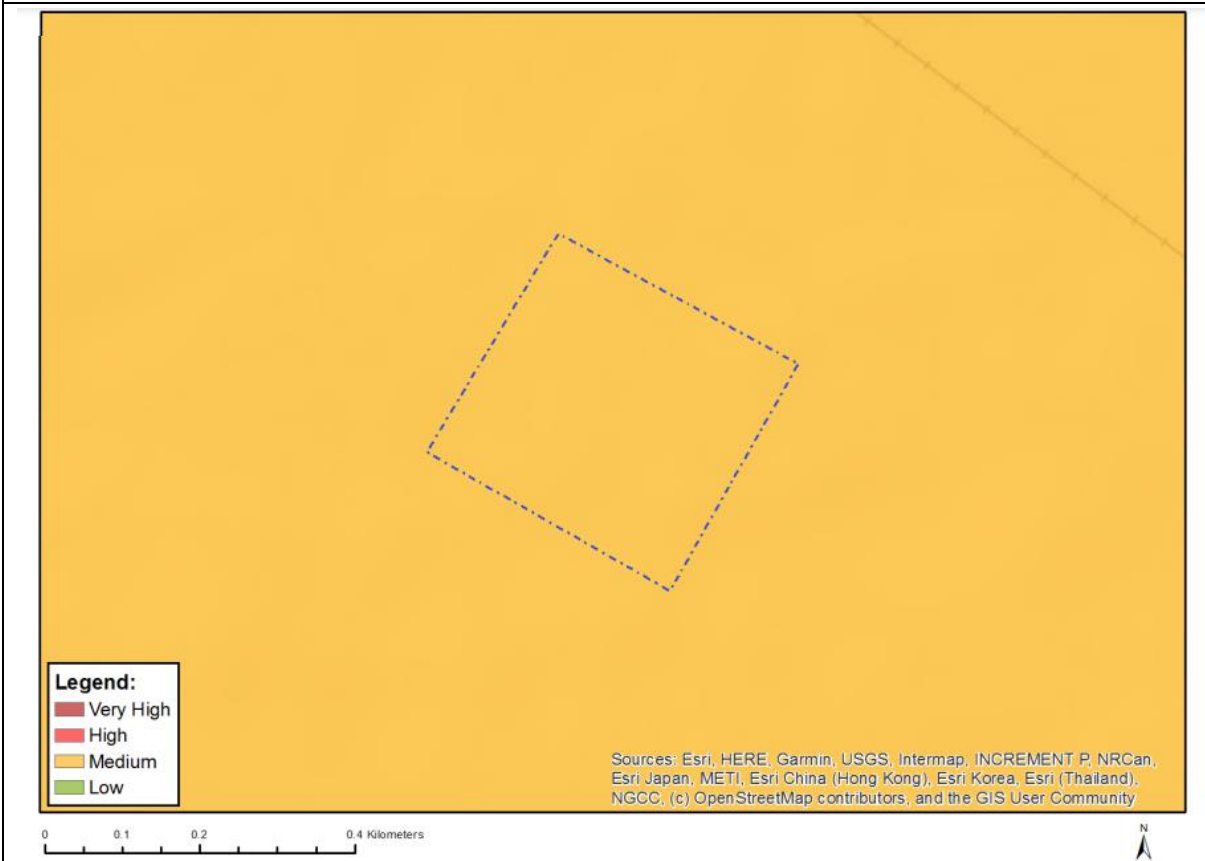


Figure 10-5: Paleontological sensitivity map – Substation

According to the SAHRIS Palaeosensitivity map (Figure 10-6) there is a moderate chance of finding fossils in this area (refer to Figure 10-6). Therefore, a palaeontology specialist will be required to provide a specialist paleontological desktop assessment.

The following activities will be undertaken:

- Desktop review of geological and paleontological history of the area
- Assessment of geographical attributes of the site
- Assessment of potential impact significance
- Recommendations and mitigation measures

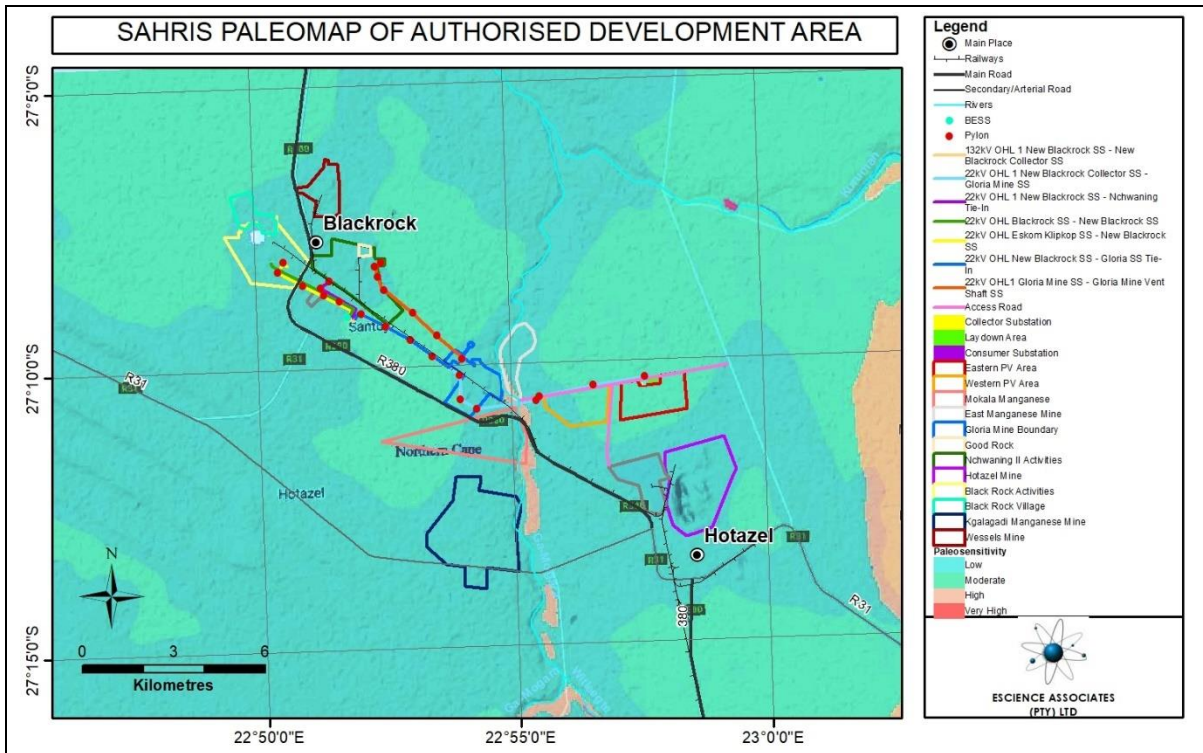


Figure 10-6: Extract of the 1 in 250 000 SAHRIS Palaeo Map (Council of Geosciences). Location of the proposed development is indicated in purple.

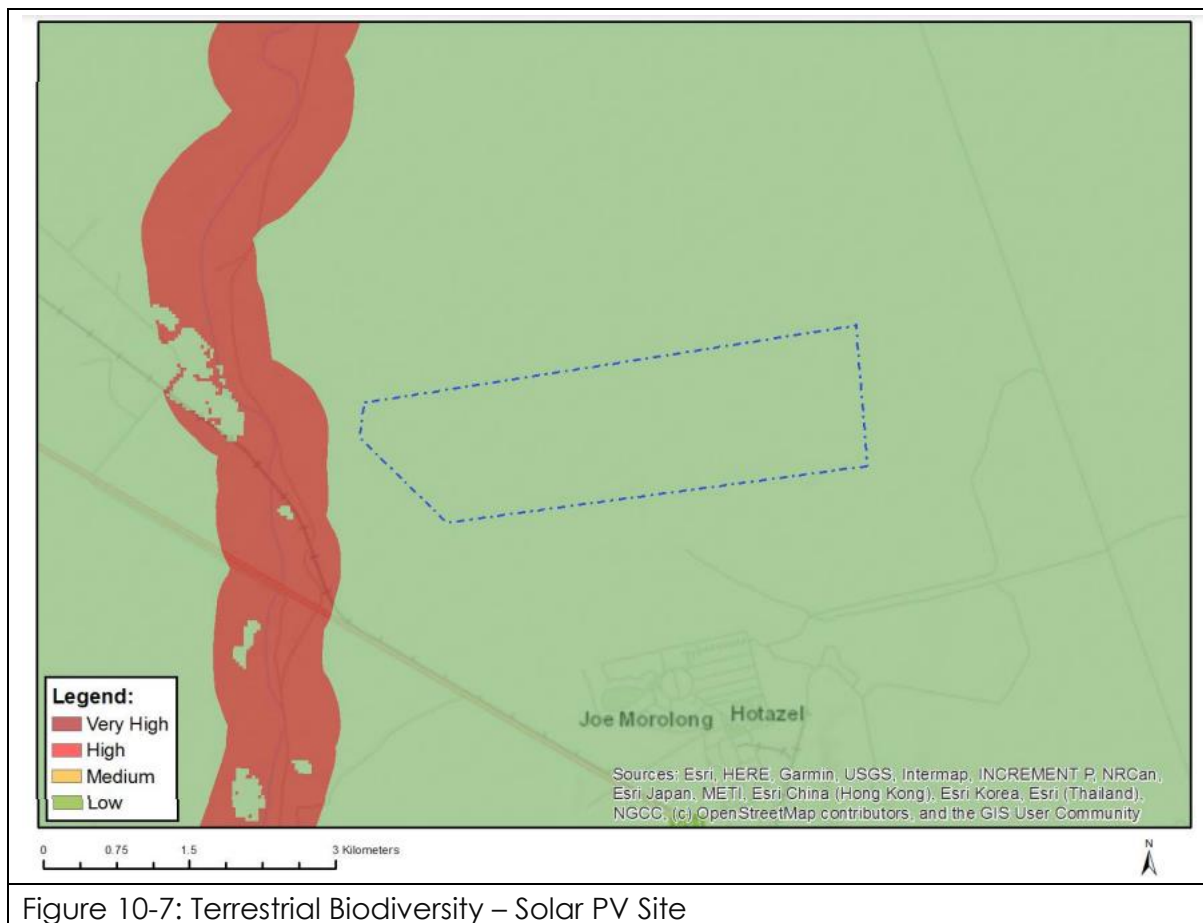
Colour	Sensitivity	Required Action
RED	VERY HIGH	Field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study; a field assessment is likely
GREEN	MODERATE	Desktop study is required
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	No palaeontological studies are required
WHITE/CLEAR	UNKNOWN	These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

### 10.3.1.3 Biodiversity Ecological Assessments

The DFFE screening tool identified a low terrestrial biodiversity sensitivity for the solar PV development area and the substation, however for the OHLs, the Screening Report identified a Very High sensitivity (Figure 10-8) due to an ESA and a FEPA Subcatchment. As per section 4 of this document, the proposed activities will be undertaken on land with undisturbed natural vegetation and in places impacted by low density livestock farming, and based on past studies done for the BRMO, there are protected plant species in the areas and a relevant permit to relocate any protected plant species that may be located on the proposed site will be required. The DFFE National Screening Report identified Low sensitivities for all infrastructure for the Plant Species Theme (see Figure 10-12 for example) and the avian theme for the solar PV facility (Figure 10-11). For the Animal Species Theme, the screening tool identified A medium sensitivity for the OHLs (Figure 10-10) due to the presence of *Aquila rapax*. However, no avian theme was identified for the OHLs.

Given that there are known significant populations of protected tree and plants species, and that permits for the removal of these will be required, a specialist assessment will be required. This specialist assessment will include an avian aspect due to the potential presence of *Aquila rapax*.

The assessment will also fulfil the ecological assessment requirements of the EIA as required in terms of the National Environmental Management Act (NEMA) and the associated regulations as well as other legal requirements applicable on both a national and provincial level, including the requirements of the Northern Cape Province.



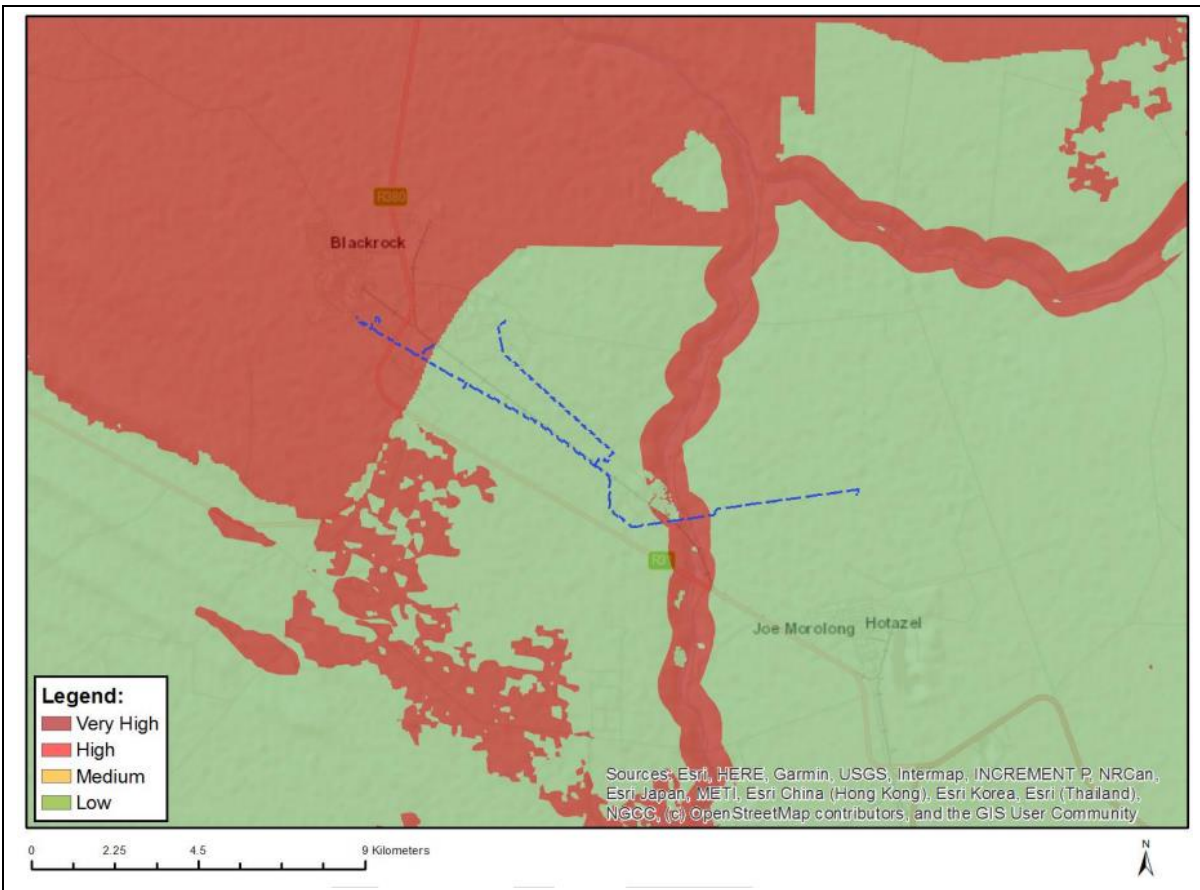


Figure 10-8: Terrestrial Biodiversity – Overhead Lines

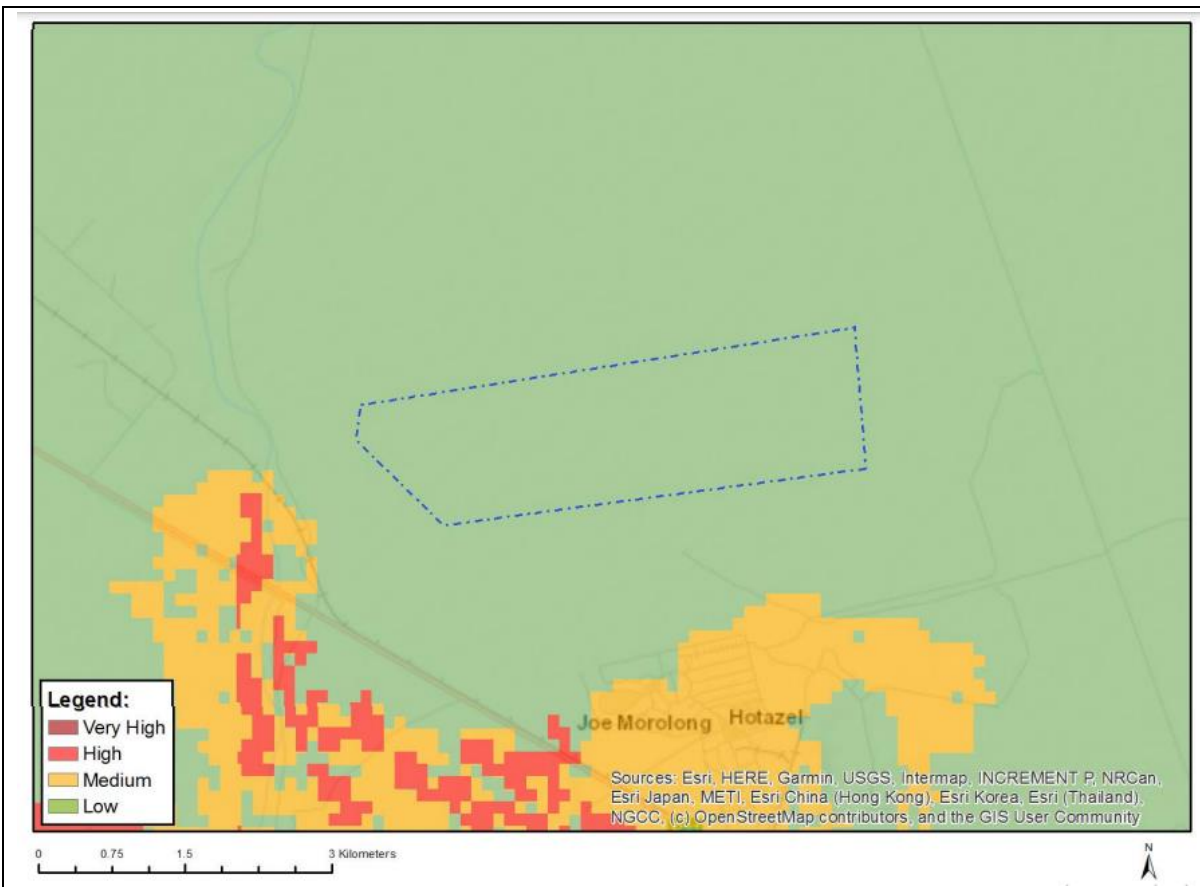


Figure 10-9: Animal Species – Solar PV Site



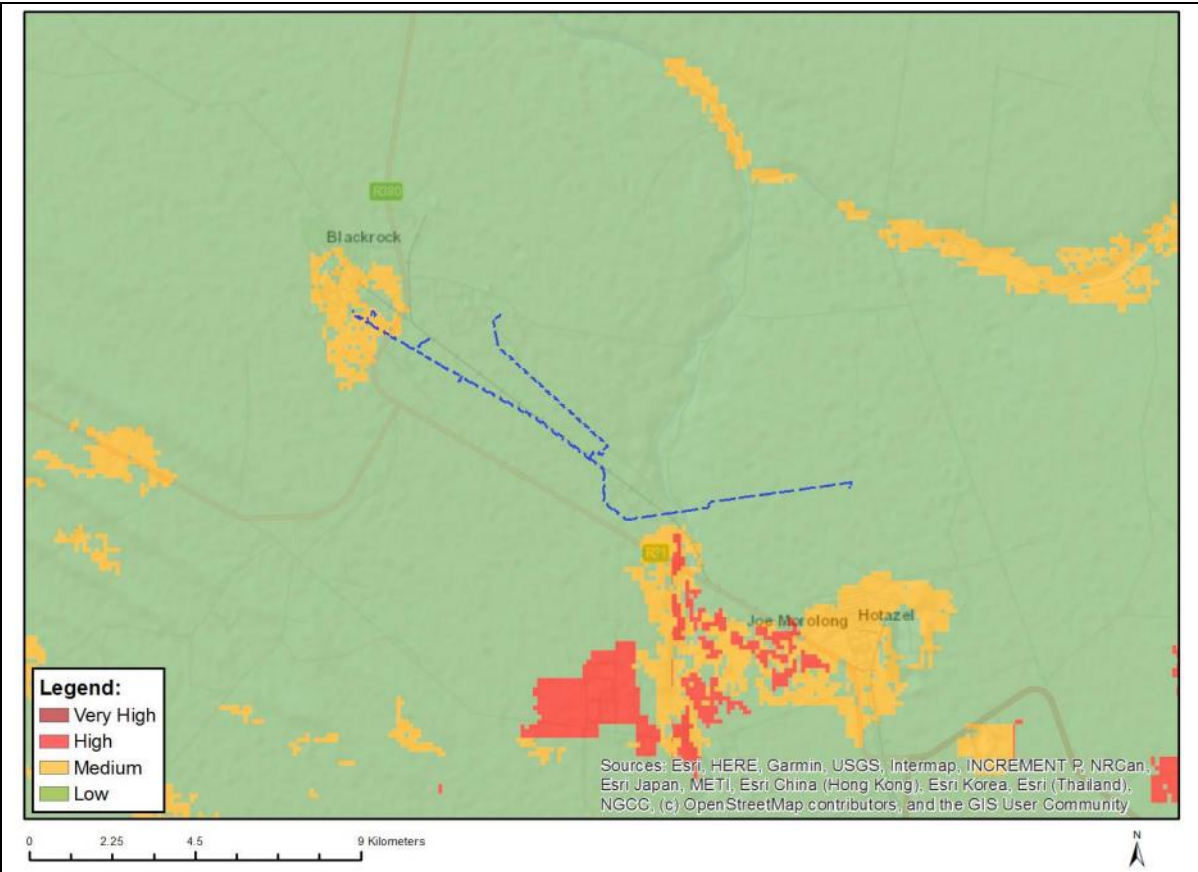


Figure 10-10: Animal Species – Overhead Lines

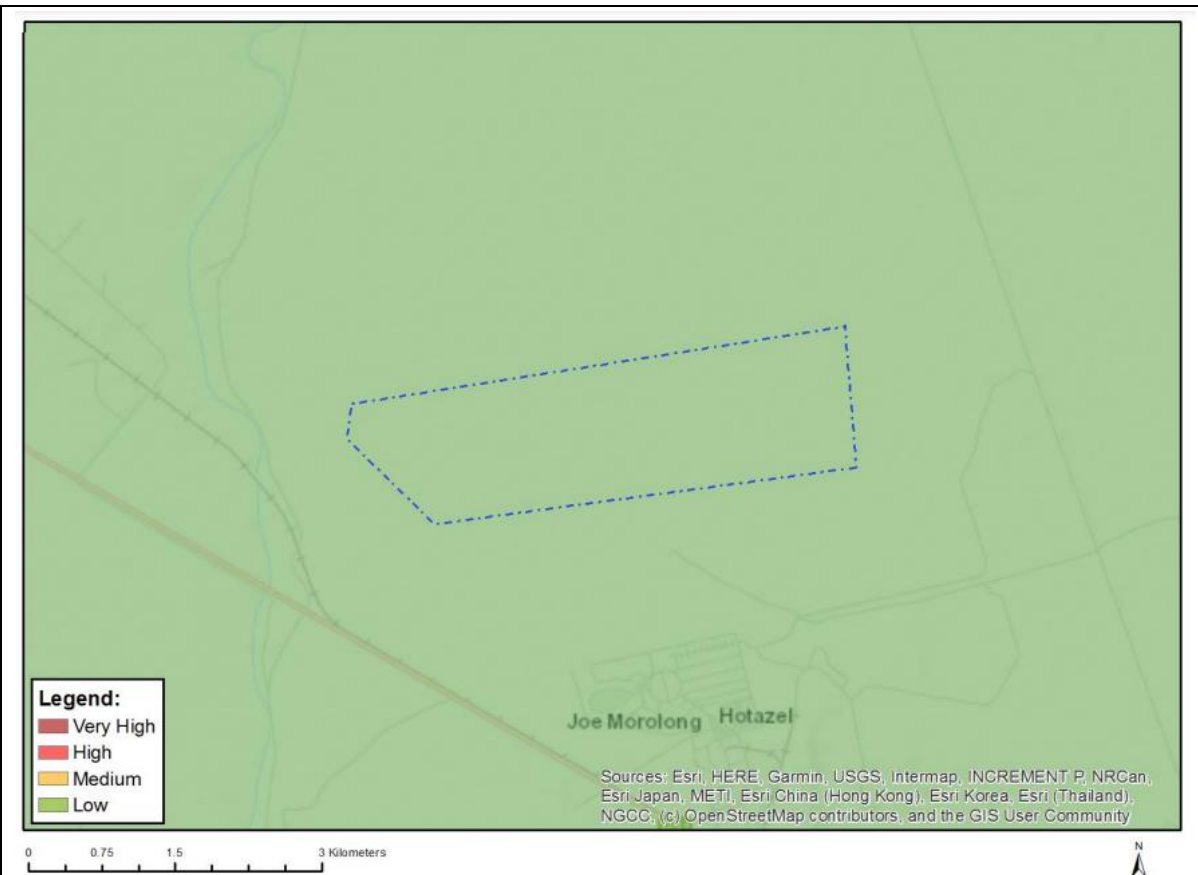
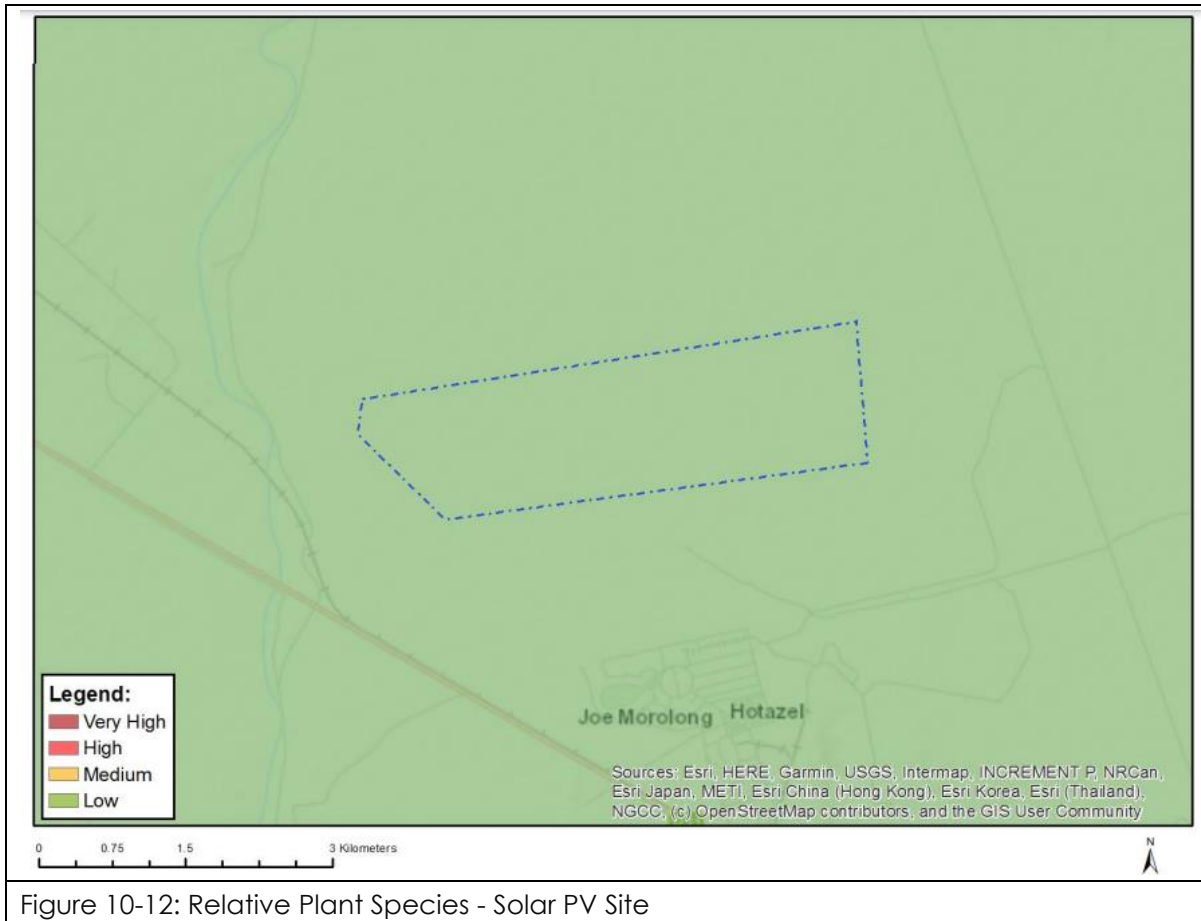


Figure 10-11: Avian Theme – Solar PV Site



The following activities will be undertaken:

- Desktop analysis of relevant conservation databases;
- Field assessment of the identified habitat units characterise the habitats' integrity, Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS) of the receiving ecological environment;
- Site sensitivity mapping;
- Identification of permitting requirements in terms of provincial and national legislation;
- Recommendations and mitigatory measures in order to minimise impacts on both local and regional ecology;

#### 10.3.1.4 Agriculture and Soil Impact Assessment

The DFFE screening tool identified medium agricultural sensitivity within parts of the area where the development is proposed to take place (Figure 10-13 to Figure 10-15). This rating is due to the land being assessed as having moderate land capability. The land and surrounding undeveloped areas are currently used for agricultural activities and thus the facility will impact on the area's agricultural potential.

According to the protocol for the specialist assessment and minimum report content requirements for environmental impacts on agricultural resources, published under GN 320 of 2020, a site sensitivity verification must be undertaken by a specialist. If the

outcome based on the initial site verification assessment is medium or low sensitivity, then an Agricultural Compliance Statement is required.

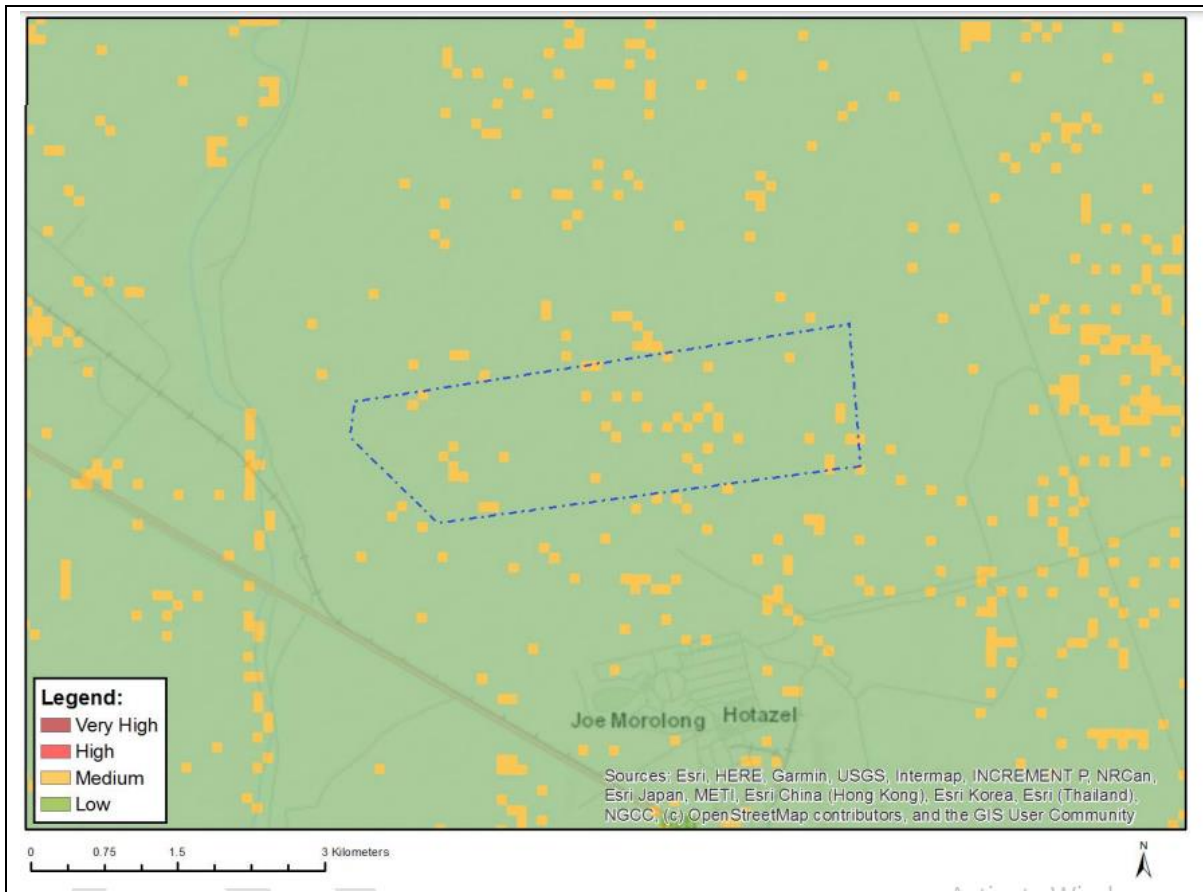


Figure 10-13: Agricultural Sensitivity – Solar PV Site

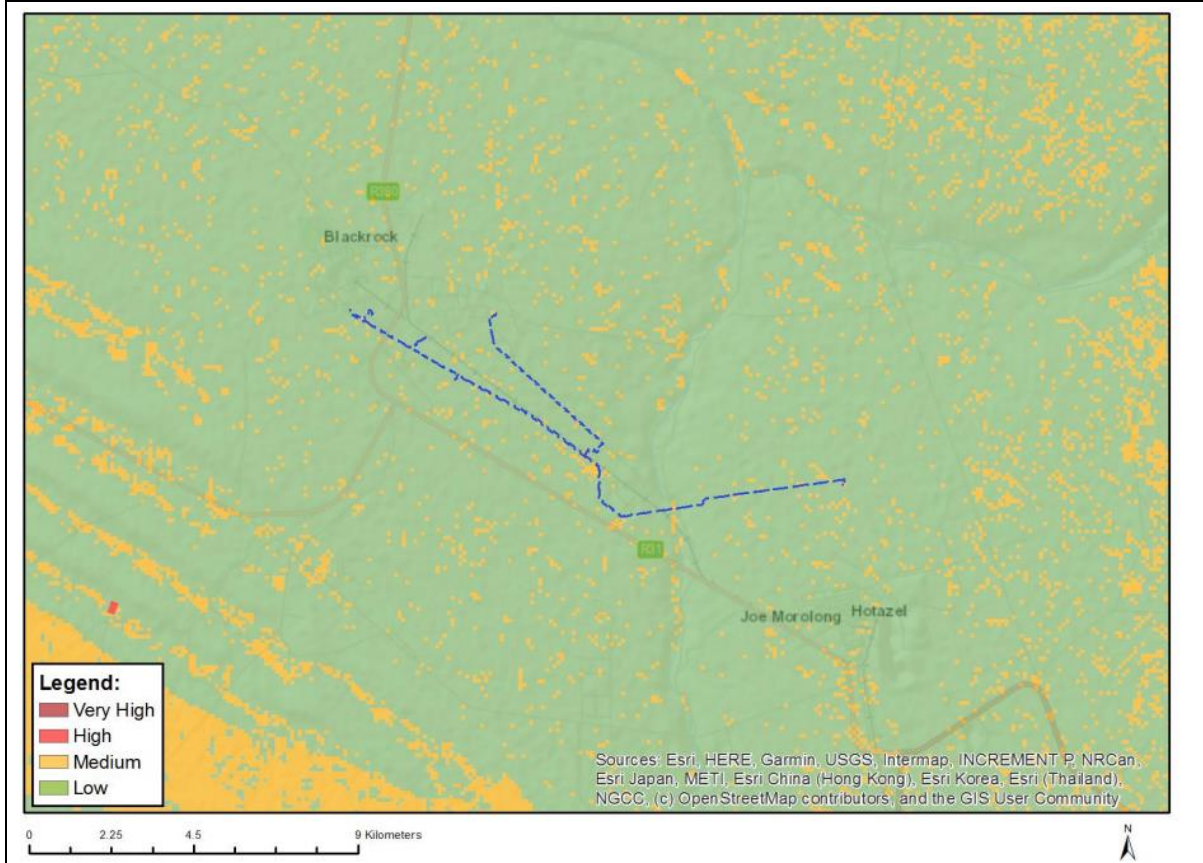


Figure 10-14: Agricultural Sensitivity – Overhead Lines

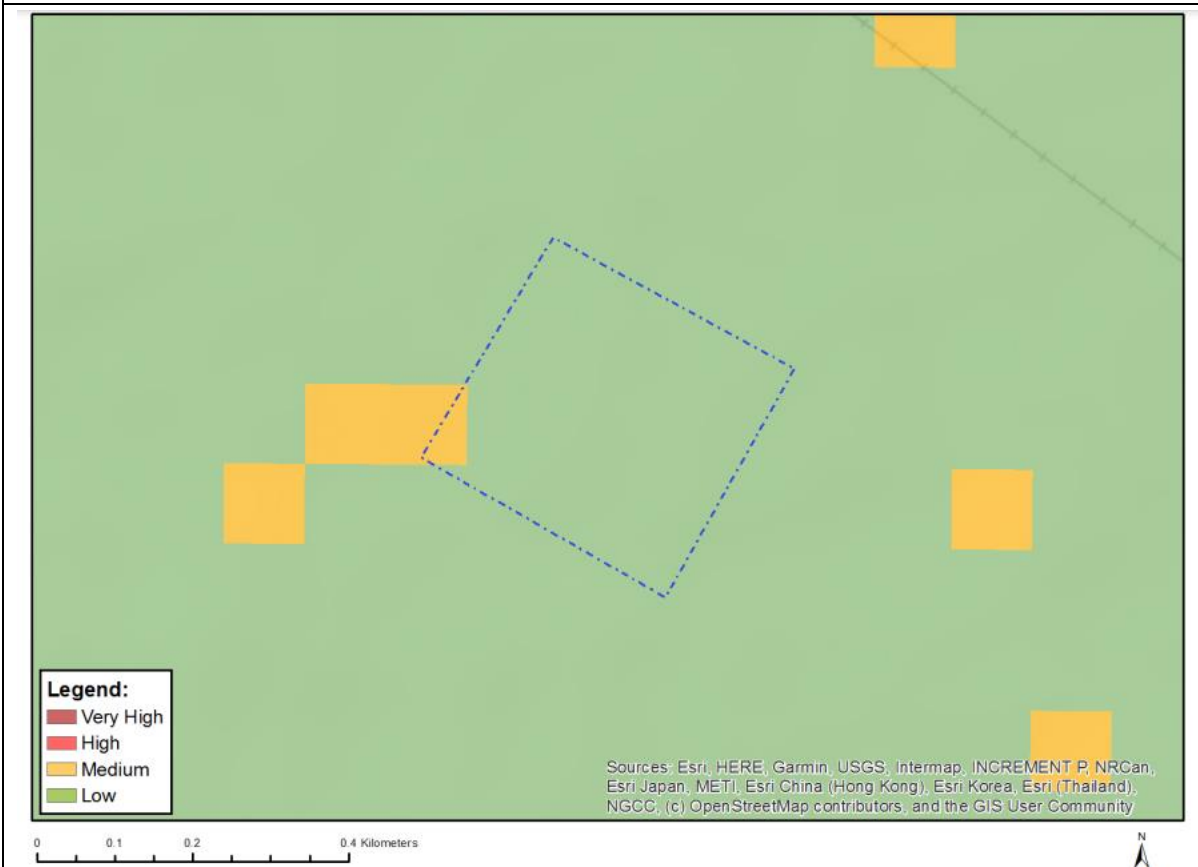


Figure 10-15: Agricultural Sensitivity – Substation

The following activities will be undertaken:

- Conduct a desktop assessment within the proposed development area using the digital satellite imagery and other suitable digital aids;
- Review historical as well as current land uses within the proposed development 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.
- A detailed soil classification survey will be conducted within the proposed development area;
- Subsurface soil observations will be made by means of a manual hand auger;
- 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); and
- Field assessment data will include a detailed description of physical soil properties
- Determine agricultural potential of the identified soil forms;

- Provide recommended mitigation measures to implement in order to manage the anticipated impacts and to comply with the applicable legislations;

### 10.3.1.5 Freshwater Assessment

The DFFE screening tool identified low aquatic biodiversity sensitivity on the proposed development area for the solar PV and substation (see Figure 4-6 for example). However, the OHLs were identified as having Very High sensitivity (Figure 10-17) due to a FEPA Subcatchment.

The Gamagara River borders the western boundary of the property where the development is to take place. The river is located approximately 500m from the development area. Based on google earth review, and a site visit, there are no watercourses within the development area. Furthermore, there will be a 200m buffer for the proposed OHLs on either side of the Gamagara River. However, it is recommended that an aquatic specialist undertake site verification based on the guidelines for the relevant sensitivities and complete Aquatic Compliance statement as per the DFFE screening tool specialist protocols.

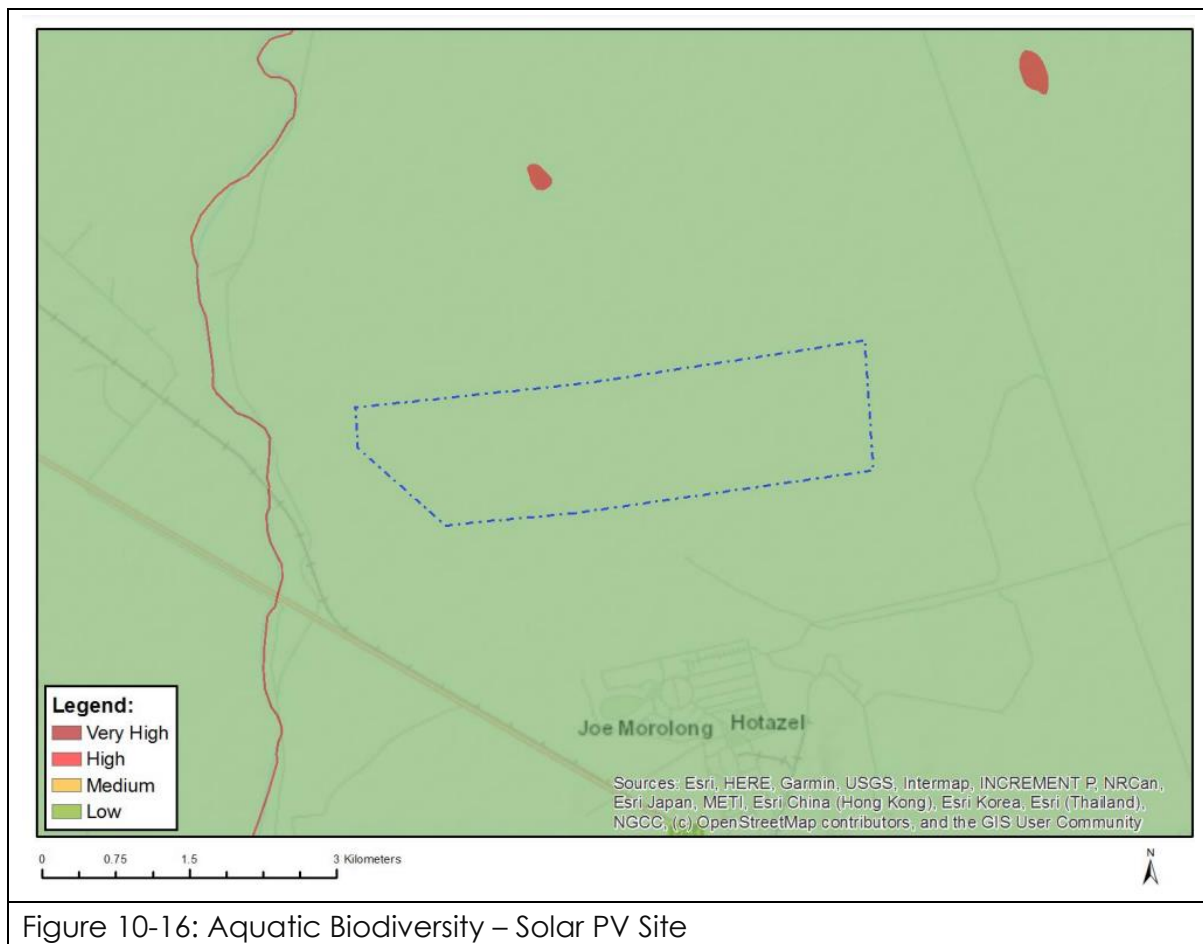


Figure 10-16: Aquatic Biodiversity – Solar PV Site

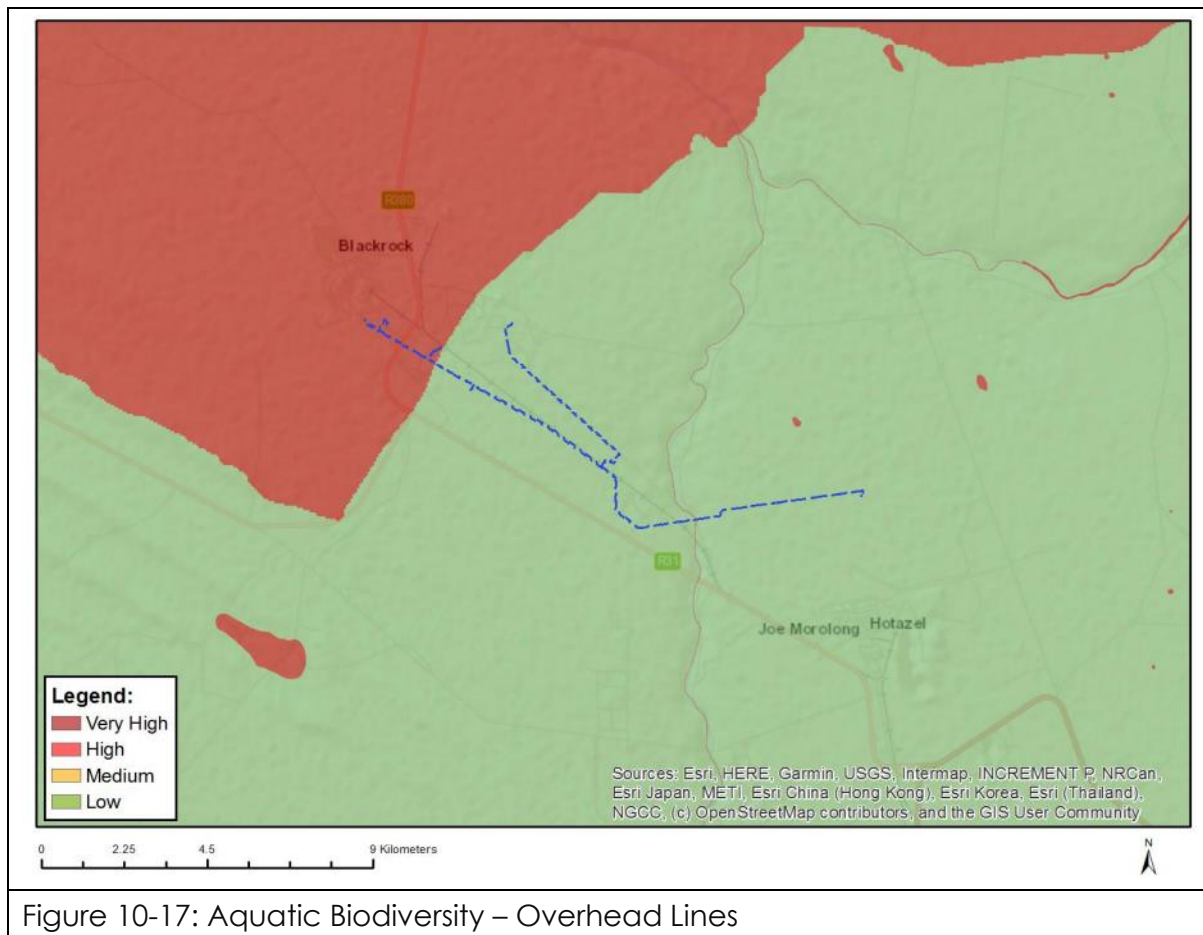


Figure 10-17: Aquatic Biodiversity – Overhead Lines

The following activities will be undertaken:

- Desktop review;
- Review of quaternary catchments, geology, topography and surface drainage directions;
- Determination of food lines;
- Assessment of potential impacts and development of management and mitigation recommendations.

#### 10.3.1.6 Civil Aviation Site Sensitivity Verification

The DFFE screening tool found that the OHLs and Substation are at a high aviation risk as illustrated in Figure 10-19 and Figure 10-20. This is due to being “within 8km of other civil aviation aerodrome”. The Solar PV development area was rated as having a medium sensitivity for the same reason (Figure 10-18).

According to the protocol for the specialist assessment and minimum report content requirements for environmental impacts on civil aviation installations, published under GN 320 of 2020, a site sensitivity assessment must be undertaken by a specialist. If the outcome based on the initial site verification assessment remains medium sensitivity, then a Civil Aviation Compliance Statement will be required. If the outcome is low sensitivity, then there will be no further requirements.

The main workstreams envisaged are:

1. Desktop analysis using satellite imagery and existing knowledge, to overlay over existing site data and the development proposals the current airspace classification in the environs of the site and associated analysis of risks posed to overflying civilian aircraft.
2. Liaison with ATNS, to confirm the location of any civil aviation radar installations within the guideline distances (per the protocol) of the site and, through further discussion and analysis, assessment of the risk posed to the operation of these installations by the proposed facility.
3. Assessment in terms of ICAO Annex 14 obstacle limitation criteria, the impact of the proposed mine and associated infrastructure on operations at nearby aerodromes. The Obstacle Limitation Surfaces (OLS) analysis will be executed by way of a desk-top study based on the AIP (Aeronautical Information Publication) data of the affected aerodromes, available satellite imagery and technical information on the proposed facility. The deliverable will be a report indicating compliance (or not) with the ICAO Annex 14 and/or associated applicable SACAA standards, including:
  - a. Inner and outer horizontal surfaces
  - b. Conical Surfaces
  - c. Approach surfaces
  - d. Take-off-climb surfaces
  - e. Inner and outer transitional surfaces (where applicable)
  - f. Extent of controlled airspace in the environs of the proposed facility
4. The above report will incorporate (if applicable) a motivation for amendment of the sensitivity status of the proposed facility to 'low', in which case a Civil Aviation Compliance Statement (in accordance with the protocol) will not be required.

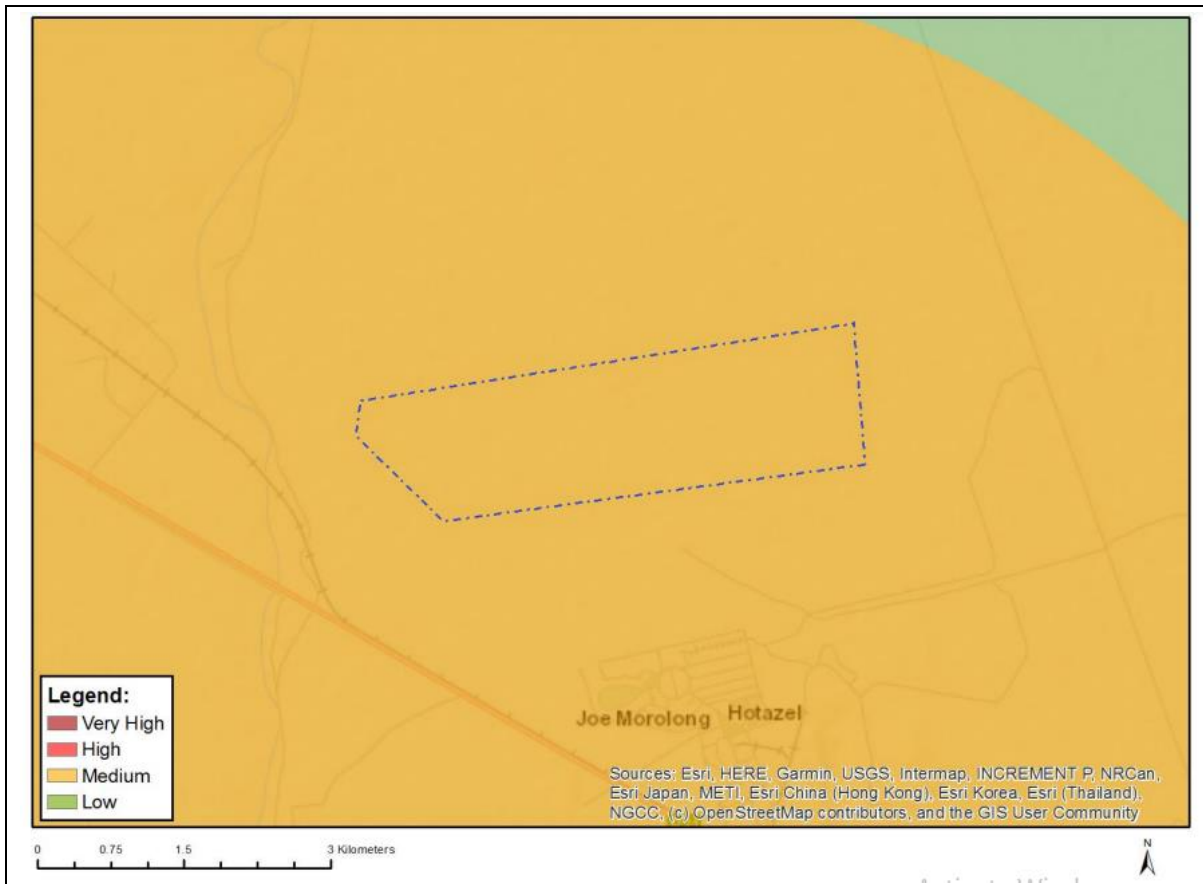


Figure 10-18: Civil Aviation Theme – Solar PV Site

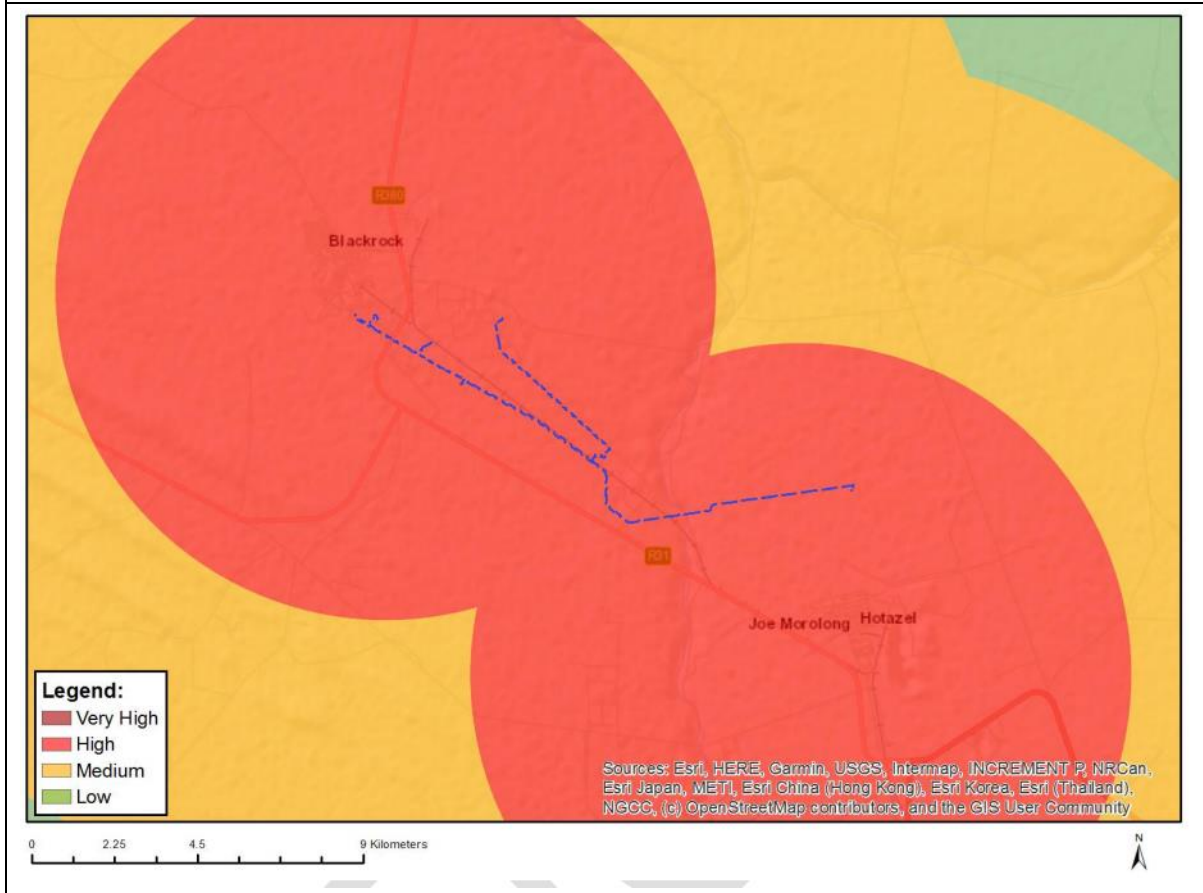


Figure 10-19: Civil Aviation Theme – Overhead Lines





Figure 10-20: Civil Aviation Theme – Substation

The following activities will be undertaken:

- Review of locality and identification of airfields in the vicinity;
- Review of legislative requirements per the South African Civil Aviation Authority (CAA); National Department of Transport (DoT), and the dictates of the International Civil Aviation Organisation (ICAO).
- ICAO Classification and Licensing Status review
- Airspace infringement assessment
- Obstacle Limitation Surfaces Assessment
- Aviation Risk Assessment and development of management and mitigation recommendations.

### 10.3.1.7 Visual Impact Assessment

Due to the proximity of the proposed solar facilities to the town of Hotazel, the screening report shows a relative landscape (solar) theme sensitivity of medium due to being within 2km of Hotazel and within 1000m of a wetland. A screening visual impact assessment will therefore be undertaken to assess the potential visual impact. Preliminary viewshed analysis indicates that the solar facility may be visible from Hotazel and the surrounds. A screening VIA will therefore be undertaken as follows:

- Desktop study, incorporating the generation of GIS data (locality, land use, vegetation, morphology, biomes, general sensitivity).

- Preparation of GIS data, pertaining to the topography, vegetation and land use of the area.
- Daytime photographing of VIA selected views.
- Audit of the receiving environment's Sense of Place.
- The execution of view simulations as viewed from selected vantage points, providing decision makers with a realistic, representative visual reference of what may be expected.
- Consideration of impact to nature and wildlife tourism receptors in terms of broad regional aesthetic impacts.

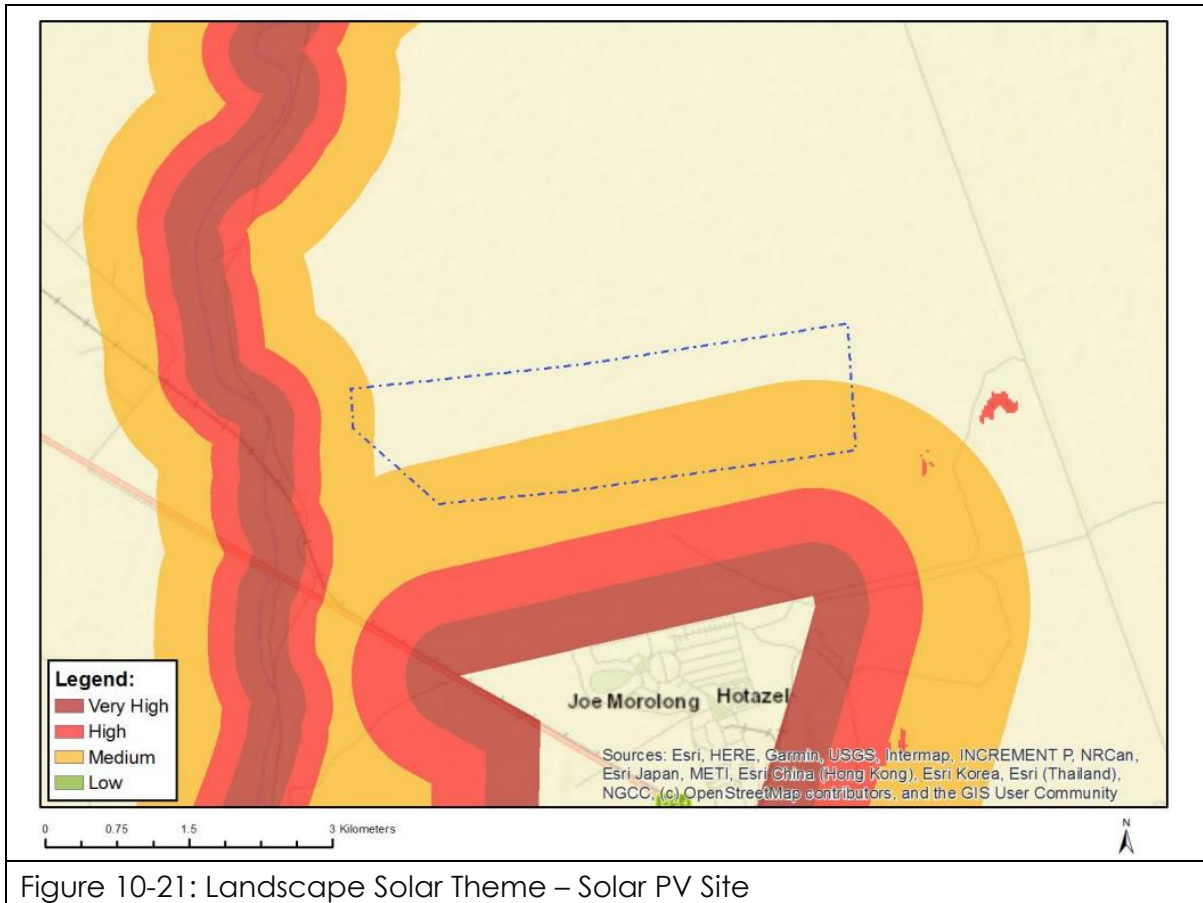


Figure 10-21: Landscape Solar Theme – Solar PV Site

## 10.4 CONSULTATION WITH THE COMPETENT AUTHORITY

Table 10-4: Authority Consultation	
Phase	Details
Application	Lodge application and declaration of interest
	Receive confirmation of application
Scoping	Lodge Draft Scoping Report (Including Plan of Study for EIA) for review
	Authority site visit if required
	Submit Final Scoping Report
	Receive confirmation of acceptance of Scoping Report
EIR	Lodge Draft Environmental Impact Assessment Report

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	Submit a Final Environmental Impact Assessment Report
	Decision on application

## 10.5 PUBLIC PARTICIPATION PROCESS

The proposed public participation process for the remainder of the Environmental Impact Assessment will consist of:

- Presenting registered Interested and Affected Parties and stakeholders with the opportunity to read and comment on environmental impact assessment report including specialist reports;
- Presenting registered Interested and Affected Parties and stakeholders with the opportunity to read and comment on draft environmental management programme;
- A stakeholder meeting to present and discuss the findings of the Environmental Impact Assessment and related specialist reports if requested by registered IAPs.

## **11 WAY FORWARD**

Based on the independent evaluation and assessment of the proposed project during the Scoping Phase by the Environmental Assessment Practitioner (EAP), a Plan of Study for Environmental Impact Assessment (PoSEIA) has been developed. The POSEIA would inform the accurate assessment and mitigation of potential environmental impacts that may arise from the proposed project. This would result in the compilation of a detailed EIA Report that would allow the competent authority to make an informed decision regarding the authorisation of the proposed project, or components thereof.

The EAP also believes that the information provided in this Scoping Report is sufficient/substantive, at a scoping stage, for I&APs to contribute meaningfully to the EIA process (as required by the EIA Regulations) and for the CA to make an informed decision as to whether, or not, the EAP can proceed to the EIA phase of the application process. It is, therefore, the EAPs recommendation that the CA approve this Scoping Report and Plan of Study for EIA (PoS), based on the content provided in the report itself and the procedure followed in compiling this Scoping Report.

## 12 AFFIRMATION BY EAP

EScience Associates (Pty) Ltd, as the Environmental Assessment Practitioner, led by Abdul Ebrahim hereby affirms that:

- The information herein is true and correct to the best of our knowledge;
- The EAP has kept a register of all interested and affected parties that participated in a public participation process;
- The EAP has ensured that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties has been facilitated in such a manner that all interested and affected parties have been provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- The Plan of Study that has been presented In the Scoping Report was distributed to Interested and Affected parties with the Scoping Report and no comments or objections thereto have been received, the EAP therefore concludes that the Plan of Study presented is of an acceptable standard.

### 13 DECLARATION BY EAP

EScience Associates (Pty) Ltd, as the Environmental Assessment Practitioner, led by Abdul Ebrahim hereby affirms that:

- The information herein is true and correct to the best of our knowledge;
- The EAP has kept a register of all interested and affected parties that participated in a public participation process;
- The EAP has ensured that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties has been facilitated in such a manner that all interested and affected parties have been provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- The EAP has included all comments and inputs made by stakeholders and interested and affected parties as well as the competent authority. Responses to comments are appended to this Environmental Impact Report.

\_\_\_\_\_ Abdul Ebrahim \_\_\_\_\_

NAME OF EAP

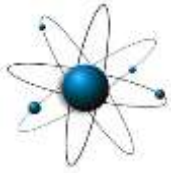
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\_\_\_\_\_ 22 June 2023 \_\_\_\_\_

SIGNATURE OF EAP

DATE

## **APPENDIX 1: EAP AND PROJECT TEAM CURRICULUM VITAE**



**EScience Associates**  
**9 Victoria Road, Oaklands**  
**Johannesburg, 2192**  
**Tel: +27 (0)11 718 6380**

**Curriculum Vitae:**

**Abdul**  
**Ebrahim**

**Surname:** Abdul Ebrahim  
**Date of birth:** 07 December 1977  
**Country of Residency:** Republic of South Africa  
**Position:** Director  
**Key Qualifications:** BEng (Hons) Environmental, BEng (Hons) Mechanical  
**Registrations:** EAPASA (2022/5504)

#### Contact details

☎: 011 7186380  
☎: 072 268 1119  
✉: [abdul@escience.co.za](mailto:abdul@escience.co.za)

#### Abstract

Abdul Ebrahim is a director of EScience Associates, an environmental consultancy specialising in waste and waste recovery, effluent, atmospheric emissions and air quality, as well as cleaner and renewable energy. EScience Associates caters for a diversity of industries and economic sectors and has forged strong relationships with other specialists, and specialist agencies, allowing the company to deal with complex and contentious environmental problems.

Abdul Ebrahim holds a BEng (Hons) in both Mechanical and Environmental Engineering disciplines. He specialises in air quality management, hazardous waste management and cleaner production, as well as their related environmental authorisation and licensing processes. His work experience includes numerous environmental impact assessments, cleaner production, waste recover-recuse-recycling, hazardous waste management assessments, and air quality impact management projects in power generation, manufacturing, minerals processing, and mining industries. His interests range from atmospheric modelling and wind energy, to the beneficial use of industrial wastes and effluents.

He is a certified Environmental Assessment Practitioner (EAP) and member of amongst other professional organisations: Engineering Council of South Africa (ECSA), and the National Association of Clean Air (NACA).

Abdul has provided Honours level lecturing at the University of Pretoria, UNISA, Cape Town University of Technology and various private training institutions in the fields of Environmental Compliance Enforcement, Environmental Impact Assessment, Cleaner Production and Air Quality Management since 2005.

His work experience includes:

- Environmental strategic, legal, and technical compliance advisory services
- Environmental Permitting - Environmental Authorisation, Waste Management Licensing, Atmospheric Emissions Licensing, Mine Environmental Management Programme development, and their relating environmental impact assessment and stakeholder engagement processes.
- Air quality management and Air Quality Management Plan development – Emissions quantification; meteorological and air quality modelling and impact assessment; development of emissions abatement and management strategies;
- Waste management consulting - classification, landfill assessment, mine residue liner risk assessments, development of waste minimisation treatment & recycling strategies;
- Development of specialist training courses (including EIA Administration and Review, Environmental Enforcement, Environmental Compliance Achievement for Industry).
- Environmental Due Diligence – due diligence assessment to inform purchase or ownership transfer of existing going concerns or proposed new establishments.

Abdul has 20 years post graduate experience of which four years are in industry, and the remainder in consulting.

#### Education

**BEng (Hons) Mechanical Engineering**  
**BEng (Hons) Environmental Engineering**

#### Languages

**English** (excellent speaking and writing)

Limited French and Portuguese





### Experience

Personal work experience includes:

- Waste management (classification, handling, storage, and disposal requirements and compliance assessment);
- Technical and environmental due diligence – industrial and energy projects
- Cleaner and renewable energy strategy development, plan and project development;
- Development of waste minimisation treatment & recycling strategies);
- Air quality management and emissions inventorying, development of abatement and management strategies;
- Environmental Impact Assessment and Permitting (EA, WML, AEL, WUL)
- Development and dissemination of specialist training for government and the private sector at NQF level 7 (honours degree).

Abdul's work experience in a wide diversity of economic sectors and industries and provides him with a good understanding of both small scale and large scale impacts of waste and pollution, as well as keeping up to date with various management alternatives available and their individual advantages and disadvantages, both locally and internationally implemented and pilot scale. Various waste streams have been dealt with to determine the most applicable disposal methods and impacts on the environment, from various industries:

- Metallurgical processes
- Power generation
- Mining
- Chemical Manufacturing
- Food processing
- Waste recovery, reuse, and recycling and waste to energy
- Cement manufacturing
- Other General Industrial and Commercial – waste management from various industries

### Hourly Rate

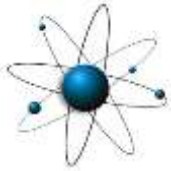
### Nature of expertise offered

- Ability to interpret and analyse technical material on wide range of subjects
- Engineering expertise in energy, waste, air quality and multi-disciplinary subjects
- Ability to undertake technology feasibility studies, technical and financial due diligence
- Understanding of the green economy and technologies, ICT and agricultural and agro-processing sectors
- Ability to undertake a market research and investigation into the industry
- Proposal evaluation expertise

### Experience and relevant projects

#### 1. WASTE CLASSIFICATION, HAZARD RISK ASSESSMENT AND MANAGEMENT

- Lanxess Chrome Chemicals
- Assmang Chrome Smelting
- Assmang Manganese Smelting
- Black Rock Mine Operations
- Wispeco Aluminium
- Idwala Lime Operations
- Idwala Asbestos Waste
- Weir Minerals Africa
- Heavy Bay foundry Port Elizabeth
- Lafarge Gypsum
- Consolidated Wire Industries



- BPB Gypsum
- PG Bison Manufacturing Plant
- ABBW Electrical Manufacturing Plant
- CBI copper and fibre optical cable manufacture
- Holcim Cement
- Hayes Lemmerz SA Aluminium
- Auto industrial group (Pty) Ltd
- CBI Electrical
- Brother CISA Chrome Chemicals
- Healthcare risk waste
- Various mining residues

**2. ENVIRONMENTAL IMPACT ASSESSMENT:**

- Assmang Black Rock Mine expansions, tailings facilities, water treatment facilities
- Highveld Steel furnace off-gas power generation
- Lanxess CISA chrome chemicals plant expansion and hazardous waste landfilling
- Samancor chrome chemicals plant development
- Herculon Ferrochrome power generation from furnace off-gases
- Kanhym Biogas project
- Alumicor secondary aluminium recovery rotary salt furnaces
- Hays Lemmerz Aluminium smelters, furnace and alloy die casting
- Agricultural Research Commission hazardous waste incineration plant
- Darkling Metal Industries
- Idwala Lime Danielskuil asbestos waste disposal
- Plettenburg Polo Estates
- PG Bison Decorative Panels
- British Aerospace Land Based OMC Systems
- BPB Gypsum phosphogypsum plant
- Extrupet HPDE and PET recycling plants
- Assmang BRMO
- Assmang Machadodorp
- Interwaste waste recovery and waste to energy plants
- PPC Cement expansions, electricity generation, use of alternative fuels and resources
- Sefhaku cement use of alternative fuels and resources
- ClinX Healthcare Risk Waste Management
- Turfontein Race Course night racing

**3. ENVIRONMENTAL LEGAL COMPLIANCE ASSESSMENT & RECTIFICATION PLANNING:**

- SASOL Synfuels
- NATCOS Petrochem
- Dwarsrivier Chrome Mine
- Angloplatinum Base Metals Recovery
- Samancor Hotazel Manganese Mines
- PG Bison (Pty) Ltd MDF manufacturing
- Samancor Manganese Division Samancor Metalloys Meyerton
- Holcim SA (Pty) Ltd Cement Plants:
  - DUDFIELD
  - ULCO
  - ROODEPOORT
- Natal Portland Cement Plants:



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**Curriculum Vitae:**

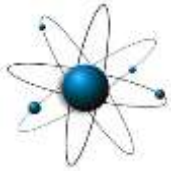
**Abdul**  
**Ebrahim**

- NEWCASTLE
- Consolidated Wire Industries
- South African Airways (Pty) Ltd Technical Division
- TWK forestry strategic environmental legal compliance assessment
- Inergy Automotive Systems(Pty) Ltd
- Consolidated Wire Industries
- Mittal Steel Vereeniging and Dunswart plants – specialist assistance to DEAT environmental management inspectors
- Assmang Black Rock Mining Operations
- ClinX Medical Waste Management
- Extrupet PET and HDEP recycling plants
- Scaw Metals High Chromium Ball Plant
- Unilever waste recovery, recycling, and zero waste-to-landfill
- Numerous waste recycling facilities
- Oilflow
- The Smart Company
- Darkling Industrial Metals CC
- Unilever waste recovery, recycling, and zero waste-to-landfill
- Central Waste
- AT Packaging
- EWaste Africa
- Mpact Recycling
- Wasteplan
- Fine Metals
- Living Earth
- Industrial Plastic Recyclers
- SA Paper Mills
- Interwaste
- Matchem
- TGS
- Verigreen
- SB Boxes
- Drumpal
- Oscars Meat
- FOSECO South Africa (Pty) Ltd

#### **4. AIR QUALITY MANAGEMENT:**

##### **1.1 Government & Regulatory**

- Vaal Triangle Air-shed Priority Area - Air Quality Management Plan review, development of emissions inventory and Ambient Air Quality Impact Assessment.
- Highveld Priority Area Air Quality Management Plan – development of emissions inventory, and mitigation strategies.
  - Reference: Dr Thulile Mdluli
  - Tel: 012 310 3436
  - Email : tmdluli@environment.gov.za
- Ekurhuleni Metropolitan Municipality - Development of an Air Quality Management Plan (AQMP)
  - Reference: Mr Edmund van Wyk
  - Tel: 011 999 2470
  - Email: Edmund.vWyk@ekurhuleni.gov.za



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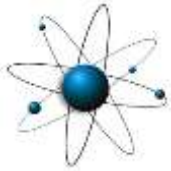
**Curriculum Vitae:**

**Abdul**  
**Ebrahim**

- Nkangala District Municipality - Development of an Air Quality Management Plan (AQMP)
  - Reference: Mr Vusi Mahlangu
  - Tel: 013 249 2164
  - Email: Mahlangumv@nkangaladm.gov.za
- North West Province - development of provincial emissions inventory (PM, NO<sub>x</sub>, SO<sub>2</sub> etc)
- Development of National Air Quality Officers Companion Guide for the Republic of South Africa
- Development of the atmospheric emissions licensing department for Nkangala District Municipality
- EThekweni Municipality (Durban) - Greenhouse gas emissions quantification
- Newcastle Local Municipality - Development of an Air Quality Management Plan (AQMP)
  - Reference: Mr Phelelani Ntshingila
  - Tel: 034 328 3300
  - Phelelani.Ntshingila@newcastle.gov.za

### **1.2 Industrial and Mining**

- A large variety of major industrial and mining operation across the Highveld and Vaal Triangle as part of Highveld Priority Area and Vaal Triangle Air-shed Priority Area AQMP projects.
- Lanxess CISA Chrome Chemicals Plant Expansion, CO<sub>2</sub> generation, Power Generation and hazardous waste treatment and recovery
- Samancor Chrome Proposed Chrome Chemicals plant
- Karbochem (Synthetic Rubber Manufacture) proposed Power Generation Plant
- PPC Cement Slurry Cement Plant Expansion
- PPC Cement Jupiter Cement Plant Expansion
- PPC Cement PE Cement Plant Expansion
- PPC Cement Dwaalboom waste heat recovery
- PPC Cement De Hoek, PE, Slurry, and Dwaalboom postponement applications
- Afrisam Cement - Dudfield Environmental Management Programme update.
- ClinX Medical Waste Incineration plant expansion
- Goedemoed organic waste incineration
- AWPP pyrolysis of organic waste
- Interwaste Waste Recovery, Waste to Energy and Waste Incineration plant
- Eskom power generation emissions off-setting
- Hayes Lemmerz SA Aluminium Wheel Manufacturing
- Evraz Highveld Steel and Vanadium proposed Powered Generation - Furnace Off-Gases
- Assmang Ferrochrome and Ferromanganese plants Powered Generation - Furnace Off-Gases
- Resource Generation Proposed Boikarabelo Power Station – coal fired
- Weir Minerals Africa (Isando, Alrode and Heavy Bay Foundries)
- Goedemoed Prison proposed Waste incineration and Landfill
- Consolidated Wire Industries Expansion
- Sylvania Proposed Open Cast PGE Mine and Processing Plant
- Assmang Black Rock proposed manganese mine expansion and sinter plant
- Assmang machadodorp proposed smelter plant expansion and cross-over to manganese
- Dwarsrivier Chrome Mine
- Nkwe proposed Platinum Mine
- Agricultural Research Commission hazardous and infectious waste incineration
- Sephaku Aganang proposed use of AFR's in cement manufacture
- Idwala Phalaborwa atmospheric emission licence for magnetite drying
- Mandini Wealth (Pty) Ltd tyre pyrolysis air quality health risk assessment



- Johnson Tiles a Division of Norcross Sa (Pty) Ltd Air quality health risk assessment
- Lanxess CISA (Pty) Ltd Air quality health risk assessment
- Namakwa Sands, South Africa – Tronox
- Devon Valley Landfill expansion
- Groblersdal limestone mine

**5. GREENHOUSE GAS QUANTIFICATIONS AND ASSESSMENTS**

- PPC Riebeeck
- Lafarge Lichtenburg
- Ilangabi Investments coal mining
- Lanxess CISA (Pty) Ltd
- Consolidated Wire Industries
- ClinX Waste Management
- ArcelorMittal Newcastle
- Development of emission factors for ferrochrome smelting

**6. CLEANER PRODUCTION AUDITS, WASTE TO ENERGY, ENERGY RECOVERY, WASTE RECOVERY AND RELATED PROJECTS:**

- Tuffy Plastics
- Proplas plastics
- WHS Distribution
- Premier Foods Pretoria Wheat Mill
- Alfred Nzou municipality
- Lanxess chrome chemicals residue recovery
- Karbochem power generation ash to bricks project
- Cement kilns alternative fuels and raw materials assessment for South Africa
- Kanhym Estates Biogas Generation from piggery effluent
- British American Tobacco:
- Tobacco Processors Zimbabwe
- Souza Cruz Brazil

**7. ENVIRONMENTAL MANAGEMENT SYSTEM DEVELOPMENT & IMPLEMENTATION:**

- British American Tobacco (full system development from scratch – ISO 14001 and ISO 9001)
  - Weir Minerals Aspects Identification, Rating, Assessment and Development of EMPs
  - Lafarge Gypsum Aspects Identification, Rating, Assessment and Development of EMPs
  - Environmental Aspects Identification, rating and formulation of EMPs for Samancor Metalloys Meyerton
  - Environmental Aspects Identification, rating and formulation of EMPs for DMS Powders.
  - Holcim Slagment development & implementation of EMS components including waste and air quality management
  - Holcim Roodepoort development & implementation of EMS components including waste and air quality management
  - Consolidated Wire Industries Environmental Aspects Identification, rating and formulation of EMPs and operational control procedures.
  - Samancor Metalloys Ferro Silicon Manganese and FerroSilicon production
  - DMS FeSi dense media production

**8. ISO14001 AUDITING:**

- Debswana Orapa and Letlhakane Mines



- Ingwe Colliery
- Arnot Colliery
- FOSECO South Africa (Pty) Ltd
- Lafarge Gypsum
- CWI

**9. SPECIALIST TRAINING COURSE DEVELOPMENT & PRESENTATION**

- 2011 Training of Atmospheric Emissions Licensing Authorities – air quality management, emissions quantification, regulation and enforcement.

- 2007-2015 Training of Authorities for EIA review and permitting

Responsible for development of NEMA EIA Review Course and Administrators EIA Review Manual, theoretical and practical training material, and training of Government Officials responsible for EIA Review - responsible for the whole manual other than Law applicable to EIA Review. As at May 2013 approximately 1000 officials from National, Provincial and Local Government.

- 2005&6 Bridging Training for Environmental Management Inspectors and Enforcement

ESA was part of a consortium selected to develop and conduct the EMI Training. More than 2000 officials and university students have completed the training.

- University Of Pretoria Specialist Lecturer

- Environmental Legal Compliance inspections and investigations (RSA)
- Environmental Legal Compliance achievement (RSA)
- Environmental Legal Compliance inspections and investigations (Africa)

- University Of South Africa Specialist Lecturer

- Environmental Legal Compliance inspections and investigations (RSA)

- Training for industry and mining

Development and presentation of training material for environmental impact identification and management in terms of South African environmental law for the SABS and other training institutions.

**10. SOIL AND GROUNDWATER CONTAMINATION ASSESSMENT:**

- Weir Heavy Bay Foundry
- Lafarge Gypsum
- Kanhym Estates
- SABAT (Pty) Ltd Johannesburg – investigation of heavy metal contamination of soils and groundwater
- Chemiphos SA (Pty) Ltd – investigation of phosphate and heavy metal contamination of soils and groundwater
- Castrol Lubricants Zimbabwe

**11. ENVIRONMENTAL DUE DILIGENCE AUDITS, INCLUDING ASSESSMENT OF ENVIRONMENTAL AND CLOSURE LIABILITY:**

- Determination and quantification of financial provision for the environmental rehabilitation and closure requirements of smelting operations for Highveld Steel & Vanadium operations:



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**Curriculum Vitae:**

**Abdul**  
**Ebrahim**

- HIGHVELD IRON AND STEEL WORKS
  - VANCHEM
  - TRANSALLOYS
  - RAND CARBIDE
  - MAPOCHS MINE
- 
- Determination and quantification of financial provision for the environmental rehabilitation and closure requirements of smelting operations for TransAlloys
  - Determination and quantification of financial provision for the environmental rehabilitation and closure requirements of mining operations for Samancor Chrome:
    - MIDDELBURG FERROCHROME
    - FERROMETALS
    - TUBATSE FERROCHROME
    - WESTERN CHROME MINES
    - EASTERN CHROME MINES
  - Determination of critical environmental liability associated with the purchase of Xmeco Foundry by Weir Minerals Africa, and subsequent legal compliance achievement programme

**12.**

#### **Possible timelines to commit to the assignment**

- Not available during the December holiday period - from 15 December until 05 January – due to company's closure for the festive season.
- General commencement within 2 weeks subject to existing project commitments.

## CURRICULUM VITAE OF LEHLOGONOLO PRUDENCE CHUENE

<b>Profession:</b>	Environmental Assessment Practitioner (EAPASA Reg. no: 2019/1567)
<b>Key Qualifications:</b>	MSc. in Geography (Current), BSc. (Hons) in Geography, BSc. in Environmental & Resource Studies
<b>Specialisation:</b>	Environmental Impact Assessment, Water Use Licences, Environmental Compliance Monitoring/Audits, Environmental Education & Training, Stakeholder & Public Engagements, and GIS.
<b>Work Experience:</b>	8 years' experience in Environmental Management Field

### VOCATIONAL EXPERIENCE

An EAPASA Registered Environmental Assessment Practitioner with over 8 years of experience in the environmental field. I hold a B.Sc. (Hons) qualification and a degree in B.Sc. Environmental and Resource studies both from the University of Limpopo. Currently perusing MSc. In Geography specialising in waste management.

I have experience and knowledge in working on projects dealing with different environmental fields such as applying for environmental authorizations and water use licenses applications for mining activities, renewable energy facilities (Wind and Solar), waste management facilities, and construction of roads, bridges, dams, residential areas, filling stations, borrow pits, and agricultural lands.

And I conduct thorough environmental compliance evaluations, public participation process and stakeholder engagements, drafting, and implementation of the EMPs. I have exceptional oral and written skills and the ability to collect and interpret data using computer software (including the various GIS Software such as ArcGIS and QGIS). I am a registered SETA Assessor, registered with ETDP SETA/ LGSETA/ EWSETA & Agri - SETA.

### SKILLS BASE AND CORE COMPETENCIES

- Project Management
- Undertaking projects and compiling of reports and other documentation as part of the following processes:
  - Environmental Impact Assessment, including full EIA and Basic Assessment.
  - Water Use License Application (WULA) covering a range of section 21 water uses.
  - Section 24G rectification applications for activities which transgressed - NEMA.
- Conduct regular environmental compliance monitoring on the projects and compile



compliance reports to submit to the relevant authorities and the client.

- Ensuring the proper implementation of the Environmental Management Programmes
- Usage of GIS software's (ArcGIS, SANBI BGIS, QGIS and Google Earth) to map, analyses and evaluate the spatial biodiversity information of the proposed project sites.
- Conduct public participation in variety of contexts, from rural to urban areas which each requires its own approach to ensure that the interested and affected parties and public in general are given adequate opportunities for having their voices heard.
- Working closely with officials from relevant authorities throughout the application processes.
- Excellent time management and ability to work through tight deadlines
- Organisational skills
- Effective communicator
- Reliable and Trustworthy
- MS Office Package (Word, PowerPoint and Excel)

## **EDUCATION AND PROFESSIONAL STATUS**

### **Degrees:**

- Master of Science in Geography (current), University of Limpopo
- BSc. (Hons) in Geography (2014), University of Limpopo
- BSc. Environmental and Resource Studies (2013), University of Limpopo

### **Short Courses:**

- IWRM, the NWA, and Water Use Authorisations, focusing on WULAS and IWWMPs, Carin Bosman Sustainable Solutions

### **Professional Society Affiliations:**

- Environmental Assessment Practitioners Association of South Africa – Environmental Assessment Practitioner
- Local Government Sector Education & Training Authority (LGSETA) - Assessor
- The Energy & Water Sector Education Training Authority (EWSETA)- Assessor
- Agriculture Sector Education Training Authority (Agri-SETA) - Assessor

### **Other Relevant Skills:**

- Compiling project budgets and proposals

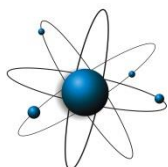
<b>EMPLOYMENT HISTORY</b>		
<b>Date</b>	<b>Company</b>	<b>Roles and Responsibilities</b>
<b>Current</b>	EScience Associates	<p><b>Senior Environmental Assessment Practitioner</b></p> <p><b>Task Include:</b></p> <ul style="list-style-type: none"> <li>• Environmental Impact Assessment, including Scoping &amp; EIA and Basic Assessment.</li> <li>• Water Use License Application (<b>WULA</b>) covering a range of section 21 water uses.</li> <li>• Environmental Monitoring and Environmental Compliance Audits.</li> <li>• Usage of GIS software (<b>ArcGIS</b>) to map project locality maps, project layout and landowner maps.</li> </ul>
<b>March 2022-September 2022</b>	Savannah Environmental Planning	<p><b>Senior Environmental Assessment Practitioner</b></p> <p><b>Task Include:</b></p> <ul style="list-style-type: none"> <li>• Environmental Impact Assessment, including Scoping &amp; EIA and Basic Assessment.</li> <li>• Water Use License Application (<b>WULA</b>) covering a range of section 21 water uses.</li> <li>• Usage of GIS software's (<b>ArcGIS</b>) to map project locality maps, project layout and landowner maps.</li> <li>• Drafting proposals for new projects</li> <li>• Environmental Monitoring and Environmental Compliance Audits.</li> <li>• Environmental Risk Management</li> <li>• Usage of GIS software's (ArcGIS) to map project locality maps, project layout and landowner maps.</li> </ul>

<p><b>July 2017- March 2022</b></p>	<p>Polygon Environmental Planning</p>	<p><b>Senior Environmental Consultant</b></p> <p><b><u>Tasks included:</u></b></p> <ul style="list-style-type: none"> <li>• Undertaking projects and compiling of reports and other documentation as part of the following processes: <ul style="list-style-type: none"> <li>○ Environmental Impact Assessment, including full <b>EIA</b> and Basic Assessment.</li> <li>○ Water Use License Application (<b>WULA</b>) covering a range of section 21 water uses.</li> <li>○ Section 24G rectification applications for activities which transgressed - NEMA.</li> </ul> </li> <li>• Environmental Compliance Officer monitoring on various projects.</li> <li>• Ensuring the proper implementation of the Environmental Management Programmes.</li> <li>• Usage of GIS software's (<b>SANBI BGIS, QGIS and Google Earth</b>) to map, analyses and evaluate the spatial biodiversity information of the proposed project sites.</li> <li>• Public participation and stakeholder engagement on various projects.</li> </ul>
<p><b>October 2016 – July 2017</b></p>	<p>Mthengenyha and Associates</p>	<p>Environmental Facilitator (<i>War- on- Leaks Project</i>)</p> <p><b><u>Tasks Included</u></b></p> <ul style="list-style-type: none"> <li>• Manage and lead a group of 30 water agents' trainees.</li> <li>• Facilitate and conduct lectures on water conservation, demand, management, and reticulation systems.</li> <li>• Asses the water agents' trainee's portfolio of evidence.</li> <li>• Do all the required weekly administrative work.</li> </ul>

<b>March 2016 – September 2016</b>	Wildlife and Environmental Society of Southern Africa	Environmental Educator <u><b>Tasks Included</b></u> <ul style="list-style-type: none"> <li>• Manage one of the environmental camps with over 100 school pupils weekly.</li> <li>• Facilitate and coordinate the outdoor environmental awareness programs for schools.</li> <li>• Ensure that everyone within the camp is always safe.</li> </ul>
<b>April 2015- February 2016</b>	Limpopo Department of Economic Development, Environmental and Tourism	Environmental Education and Awareness Intern <u><b>Tasks Included</b></u> <ul style="list-style-type: none"> <li>• Conduct environmental education at schools and the community.</li> <li>• Assist in formulating the environmental reading materials to be distributed to the public (Newspaper article and pamphlets readings about environmental calendar days).</li> <li>• Administration work for the whole directorate of Environmental Communication and Awareness in the Department.</li> <li>• Assisted during the assessment of the Greenest Municipality Competition.</li> </ul>

**REFERENCE  
S**

Abdul Ebrahim	Esience Associate	072 268 1119
Rendani Rasivhetshela	Savannah Environmental	072 721 4835
Thabang Mohale	Polygon Environmental Planning	071 325 1084
Nshalati Ndindani	Mthenganya & Associates	065 956 3454



**EScience Associates**  
**9 Victoria Road, Oaklands**  
**Johannesburg, 2192**  
**Tel: +27 (0)11 718 6380**

**Curriculum Vitae:**

**Emma**  
**Jepsen**

**Surname:** Jepsen

**Name:** Emma

**Date of birth:** 09 May 1997

**Residency:** South Africa

**Position:** Junior Environmental Consultant

**Key Qualifications:** MSc Zoology, BSc (Hons) Zoology, BSc Zoology

#### Contact details

☎: 011 718 6380/ 079 858 4019

✉: emma@escience.co.za

#### Education

##### MSc Zoology

University of Pretoria: 2019-2020

##### BSc (Hons) Zoology

University of Pretoria: 2018

##### Bachelor of Science

University of Pretoria: 2015-2017

#### Languages

**English** (Speaking and writing - Excellent)

#### Experience

##### Junior Environmental Consultant (January 2021 – current)

EScience Associates (Pty) Ltd

Key tasks and project experience:

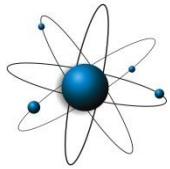
- Technical and Scientific Report Writing
- ArcGIS mapping
- R programming
- Data Capturing
- General administration and project management
- Tender/Grant Applications
- Public Participation

Technical and Scientific Reports:

- Visual Impact Assessments
- Noise Impact Assessments
- Faunal Impact Assessments
- Air Quality Impact Assessments
- Basic Assessment Reports
- Greenhouse Gas Impact Assessments

ArcGIS mapping

- Site Locality Maps
- Site Layout Maps
- Regional Topography Maps
- Landcover Maps
- Surrounding Landuse Maps
- Viewshed Maps



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**9 Victoria Road, Oaklands**  
**Johannesburg, 2192**  
**Tel: +27 (0)11 718 6380**

**Curriculum Vitae:**

**Emma**  
**Jepsen**

- Air Quality Dispersion Maps
- Terrestrial Development Maps
- Property Maps

**Public Participation**

- Comments and Responses Reports
- Site and Newspaper Advertisements
- Appeals process
- Contacting I&APs

## **APPENDIX 2.1: SITE NOTICES**

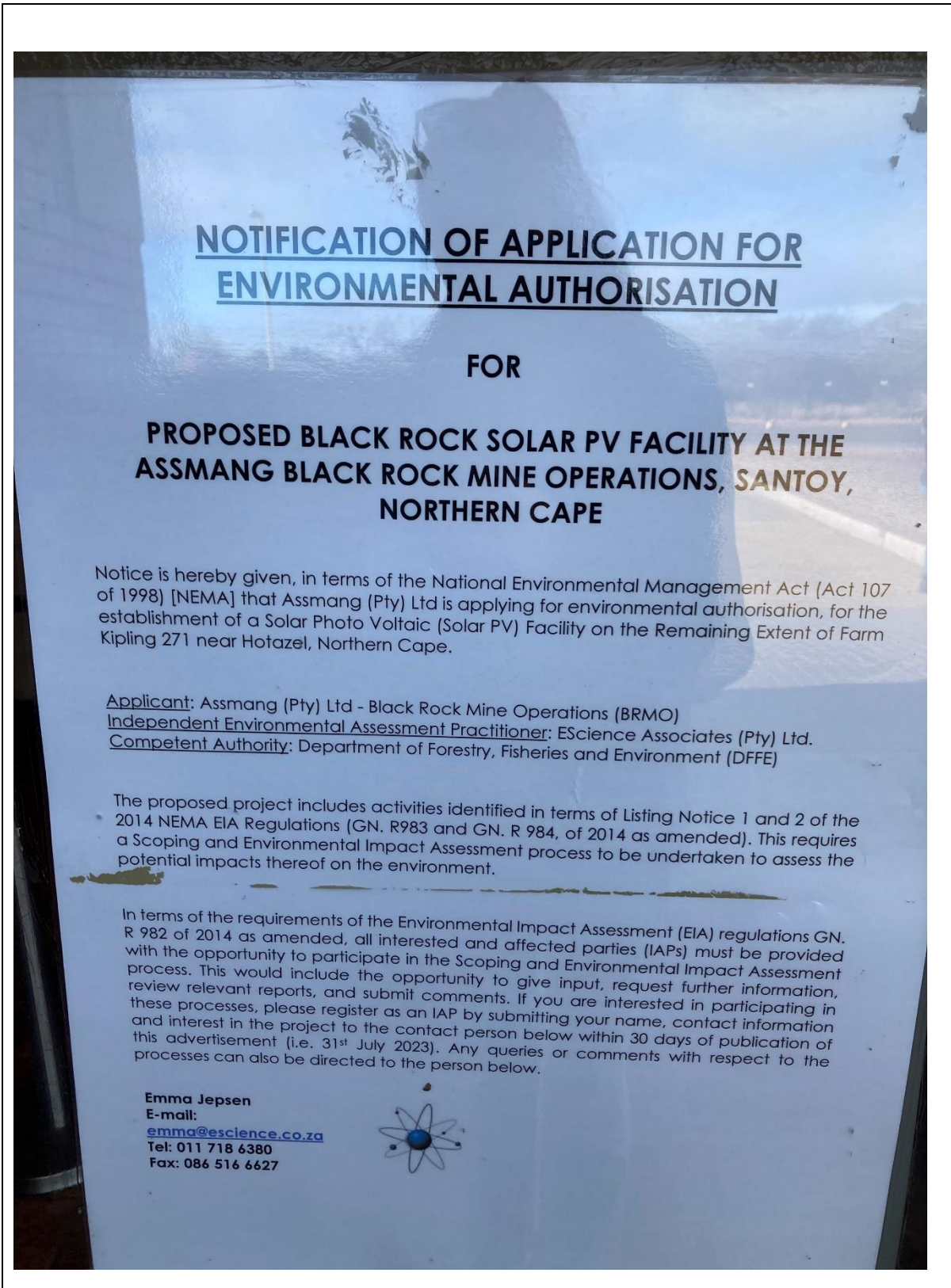






Figure 22: Black Rock Main Entrance (Grey House)





Figure 23: Kipling Farm Entrance





Figure 24: Kipling Farm Entrance





Figure 25: Kipling Farm Entrance







Figure 26: Kipling Fence across from Springbok St.

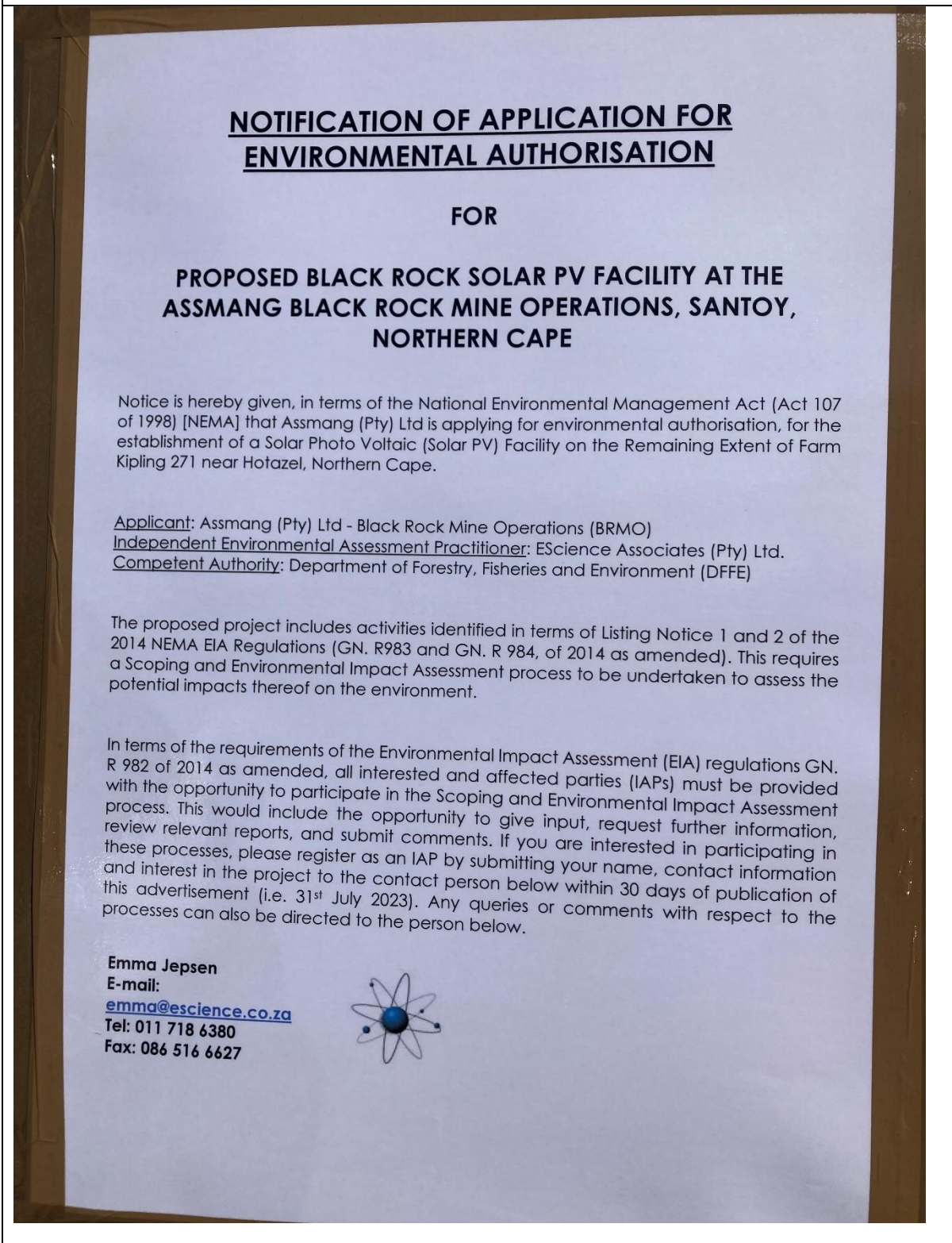




Figure 27: OK Black Rock (Santoy Shopping Centre)

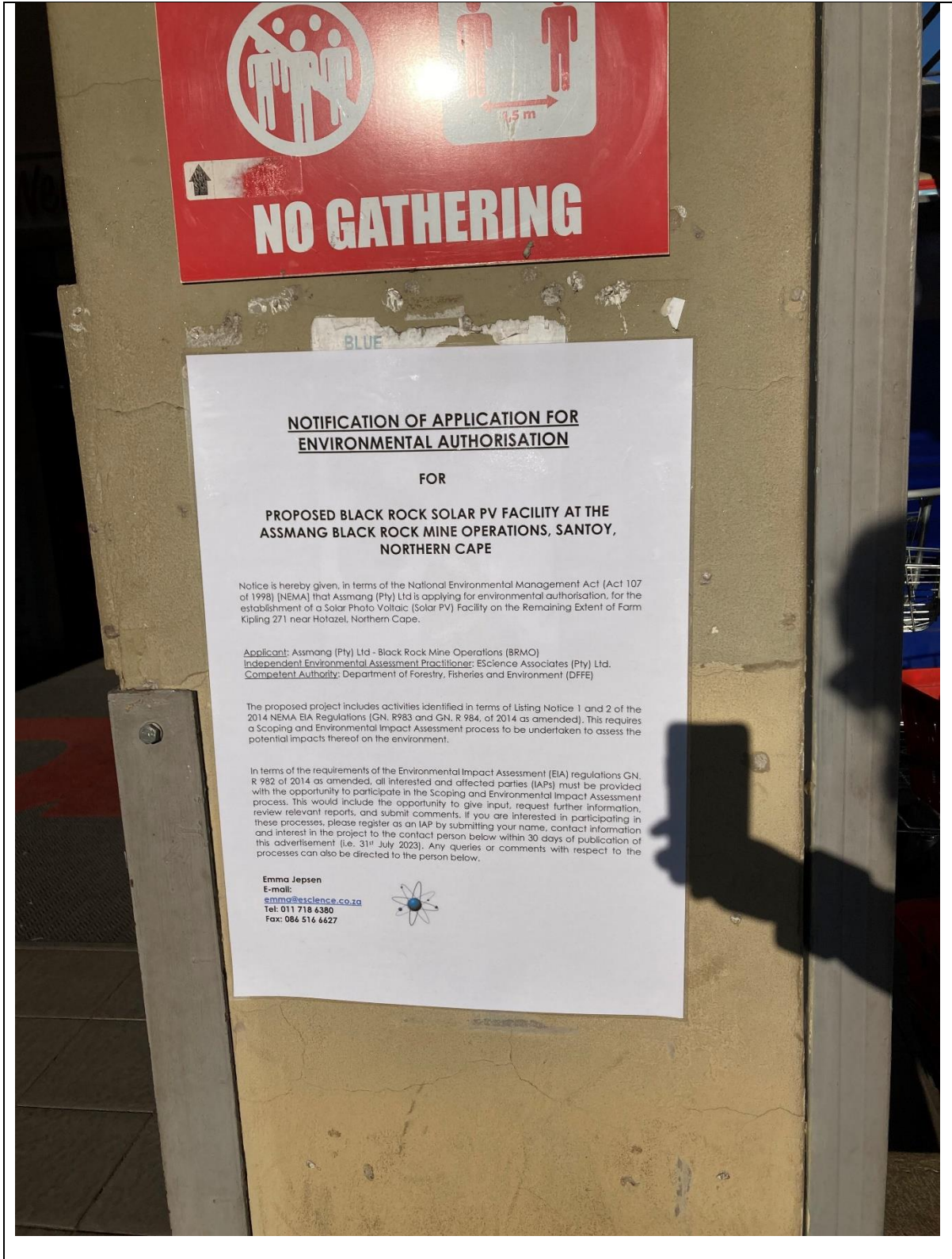




Figure 28: OK Hotazel (Hotazel Shopping Centre)

## **APPENDIX 2.2: ADVERTISEMENTS**

Please note that to date, an advertisement has been placed in the Kathu Gazette on 1 July 2023. The other advertisement is to be published in the Noordkaap Bulletin on 6 July 2023 and proof of this will be provided in the Final Scoping Report.



The participants listen attentively to the presentations.

The multi-stakeholder engagement was held in the Joe Morolong Municipal Chamber on 20 June 2023 at 10:00. SIOC-CDT had an engagement with the youth and business formations on programmes and projects the organisation is currently involved in with emphasis on local enterprise development, and the role these structures and youth themselves may benefit from.



At around 14:00 the Winchville engagement convened at the community hall and hosted their second multi-stakeholder engagement session for the day, the meeting with Ga-Segonyana youth and business formations as well as the individual SMMEs.

The two-day multi-stakeholder sessions across their beneficiary communities with youth and businesses of Taantabane at 10:00 and Gamaqaris at 14:00 ended on 21 June 2023.

SIOC-CDT has received worthy comments and suggestions from these formations and individual SMMEs on issues to consider to enhance their programmes to be more responsive and beneficial to their needs.

In attendance were also the media and youth, who were delighted to get further information on their bursary and other tertiary funding support programmes. These are important engagements that help shape and align their programmes to the needs of the communities.

**NOTIFICATION OF APPLICATION FOR ENVIRONMENTAL AUTHORISATION FOR PROPOSED BLACK ROCK SOLAR PV FACILITY AT THE ASSMANG BLACK ROCK MINE OPERATIONS, SANDY BAY, NORTHERN CAPE**

Notice is hereby given, in terms of the National Environmental Management Act (Act 107 of 1989) (NEMA) the Assmang (Pty) Ltd, applying for environmental authorisation, for the siting and construction of the Assmang Black Rock PV Facility on the Remaining Coloured Farm (Plot 71) near to town, Northern Cape.

Applicant: Assmang (Pty) Ltd - One of the Mine Operations (OSM)  
 Independent Environmental Assessment Provider: ES Science Associates (Pty) Ltd  
 Competent Authority: Department of Forestry, Fisheries and the Environment (DFFE)

The proposed project includes the installation of a 100 MW solar PV plant and associated infrastructure. This requires a Scoping and Environmental Impact Assessment (SEIA) in terms of the National Environmental Management Act (Act 107 of 1989) (NEMA) and the Environmental Impact Assessment Regulations (GN R566 of 2014) as amended. This requires a Scoping and Environmental Impact Assessment process to be undertaken to assess the potential impacts thereof on the environment.

In terms of the requirements of the Environmental Impact Assessment (EIA) regulations (GN R566 of 2014) as amended, all interested and affected parties (IAPs) must be provided with the opportunity to participate in the Scoping and Environmental Impact Assessment process. This would include the opportunity to provide input, request further information, advise relevant impacts and submit comments. IAPs are invited to participate in this process, please register as an IAP by submitting your name, contact information, and interest in the project to the contact details below with a copy of publication of this advertisement (on 31 July 2023). Any queries or comments with respect to the process can also be directed to the person below.

Contact us at:  
 Email: [enquiries@nkmedia.co.za](mailto:enquiries@nkmedia.co.za)  
 Tel: 011 786 2021 | Fax: 011 786 2027

**CHRISTIE'S PAWN SHOP**  
 We buy, sell & pawn!

For Jewellery sales call Christie 082 3727 359

Lots of new stock tools, gadgets and furniture

We buy & sell Curro uniforms

Get cash for your unwanted stuff!

Rietbok Street next to Kathu Gazette



**GA-SEGONYANA MUNICIPALITY/MUNISIPALITEIT**

**PROPOSED ZONING APPLICATION, PERMANENT DESTRUCTION AND REMOVAL OF RESTRICTIVE TITLE CONDITIONS FOR ERF 101, NURMANIENSTON 3, GA-SEGONYANA LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE**

NOTICE is hereby given that the Ga-Segonyana local municipality has received an application in terms of the proposed Procedures of the Ga-Segonyana Land Use Management Scheme (2023), read together with the Spatial Planning and Land Use Management Act (1996) for:

Applicant: Helica Town/Farmen  
 Land unit: 1130 m<sup>2</sup>  
 Locality of the property: Erf 101 (Kunman Depasitewing 3)  
 Physical address: The Involved Erf 101, is situated at 40 Nimaas Avenue, Inkhamsamedon, 5460  
 Registered owner: Francis Jacobus Nicolaas Louw  
 Current zoning: Residential Zone 1  
 Proposed zoning: Residential Zone 1  
 Purpose of the application:  
 It is the intent of the land owner to obtain the necessary land use rights for the purpose of demolishing dwelling units on erf 101, Kunman extension 3, removal of restrictive title deed conditions and the permanent departure of buildings on erf 101.

The Information regarding the proposed development can be obtained during office hours from the Municipal Office, Kunman. Objections, if any, against this application must be submitted in writing with full reasons and evidence, addressed to Mr Theobaldus Tryk Muisa (E-mail: [tmuisa@ga-segonyana.gov.za](mailto:tmuisa@ga-segonyana.gov.za), Tel: 053 712 9334) in order to reach the decision on the 15 August 2023. Any person who is aggrieved or who may be affected by this decision is invited to submit their objections, comments and representations.

MR THEOBALDUS TRYK MUISA  
 Phone: 053 712 9334  
 Kunman, 5460  
 01 July 2023

VOOR GESETTELDE AANDEK OM HIE ZONERING, PERMANENTE VERUITREK EN ONVERIFYG VAN BEPERKENDE TITELVOORWAARDIES VIR ERF 101, DOOR SLEUTELREINIG 3, GA-SEGONYANA PLAAS LINGE MUNISIPALITEIT, NOORD-KAAP PROVINSE

KENN OSEWING word hiermee gegee dat die Ga-Segonyana plaaslike munisipaliteit 'n aansoek ontvang het inrigging van voorgestelde prosedure van die Ga-Segonyana Grondgeboukeusekema (2023), saamgelees met die Wet op Ruimtelike Planne en Landgebruik (1996) vir:

Aansoeker: Helica Town/Farmen  
 Grondseenheid: 1130 m<sup>2</sup>  
 Ligging van die eiendom: Erf 101, Kunman Depasitewing 3  
 Plaasleed: Die betrokke Erf 101, is geleë by Nimaasaleen 40 in Kunman Depasitewing 3, 5460  
 Geagteleedde eienaar: Francis Jacobus Nicolaas Louw  
 Huidgebruiksoning: Residential Zone 1  
 Voorgestelde soning: Residential Zone 1  
 Doel van die aansoek:  
 Dit is die voorneme van die grondseiner om die nodige grondgebruik geregtelike toestemming te bekom om te vernietig die Erf 101, Kunman Depasitewing 3 se formele, opheffing van beperkende titelvoorwaarde en die permanente slyping van geboue op erf 101.

Die inligging met betrekking tot die voorgestelde ontwikkeling kan gedurende kantoorure by die munisipale kantore, Kunman, verkry word. Bescrywing, indien enige, teen hierdie aansoek moet aangeleë met volrede redes ingedien word, gerig aan Mr Theobaldus Tryk Muisa (E-pos: [tmuisa@ga-segonyana.gov.za](mailto:tmuisa@ga-segonyana.gov.za), Tel: 053 712 9334) om die besluit te bereik op of 15 Augustus 2023. Enige persoon wat aangeleë of anderszins beïnvloed kan word deur hierdie besluit is uitgenodig om sy/haar oënskynlike kommentare en voorstelle te maak.

MUNISIPALE BEWEGING  
 Phone: 053 712 9334  
 Kunman, 5460  
 01 Julie 2023

**Nelson Mandela Month 2023**  
1 to 31 July

In July, South Africa celebrates former President Nelson Mandela's birthday. July 18 has been declared Nelson Mandela International Day, but as South Africans we embrace the chance to celebrate Nelson Mandela's life for the whole of July. This gives everyone the opportunity to heed the call to action for people to recognise their individual power to make an imprint and change the world around them.

A global movement for positive change begins with small actions. As each person acts, they fuel momentum toward positive change, raising awareness and expanding the reach of Mr Mandela's values – fighting injustice, helping people in need and promoting reconciliation.

Find more areas where you can volunteer your services on the Nelson Mandela Day website.

Nelson Mandela Day Goals 2019-2029: Education and Literacy, Food and Nutrition, Shelter, Sanitation and Active Citizenship. Mr Mandela became South Africa's first democratically elected president in 1994.

As a champion of reconciliation, he was instrumental in the Truth and Reconciliation Commission, which was set up by South Africa's Government of National Unity to help deal with the atrocities of apartheid.

Before his presidency, Mandela was heavily involved in anti-apartheid activities. He served 27 years in prison, many of which were spent with other sentenced freedom fighters.

While officially retired, he continued to voice his opinion on topical humanitarian issues and campaigns globally for peace, children and the fight against HIV and AIDS.

Government calls on all South Africans to contribute to the social and economic security of Africans, by living the values of our Constitution that provides for the rights of all people living in our country and the affirms democratic values of human dignity, equality and freedom for all.

<https://www.gov.za/NelsonMandelaMonth>  
 1/2023

**SUBSCRIBE TO OUR WEBSITE AT**  
[www.nkmedia.co.za](http://www.nkmedia.co.za)

NOORD-KAAP MEDIA HOLDINGS

Figure 29: Advertisement in the Kathu Gazette – 1 July 2023.

**NOTIFICATION OF APPLICATION FOR ENVIRONMENTAL  
AUTHORISATION  
FOR  
PROPOSED BLACK ROCK SOLAR PV FACILITY AT THE ASSMANG  
BLACK ROCK MINE OPERATIONS, SANTOY, NORTHERN CAPE**

Notice is hereby given, in terms of the National Environmental Management Act (Act 107 of 1998) [NEMA] that Assmang (Pty) Ltd is applying for environmental authorisation, for the establishment of a Solar Photo Voltaic (Solar PV) Facility on the Remaining Extent of Farm Kipling 271 near Hotazel, Northern Cape.

**Applicant:** Assmang (Pty) Ltd - Black Rock Mine Operations (BRMO)

**Independent Environmental Assessment Practitioner:** EScience Associates (Pty) Ltd.

**Competent Authority:** Department of Forestry, Fisheries and Environment (DFFE)

The proposed project includes activities identified in terms of Listing Notice 1 and 2 of the 2014 NEMA EIA Regulations (GN. R983 and GN. R 984, of 2014 as amended). This requires a Scoping and Environmental Impact Assessment process to be undertaken to assess the potential impacts thereof on the environment.

In terms of the requirements of the Environmental Impact Assessment (EIA) regulations GN. R 982 of 2014 as amended, all interested and affected parties (IAPs) must be provided with the opportunity to participate in the Scoping and Environmental Impact Assessment process. This would include the opportunity to give input, request further information, review relevant reports, and submit comments. If you are interested in participating in these processes, please register as an IAP by submitting your name, contact information and interest in the project to the contact person below within 30 days of publication of this advertisement (ie 31 July 2023). Any queries or comments with respect to the processes can also be directed to the person below.

Emma Jepsen  
E-mail: [emma@escience.co.za](mailto:emma@escience.co.za)  
Tel: 011 718 6380 | Fax: 086 516 6627

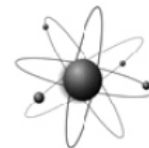


Figure 30: Advertisement in the Kathu Gazette – 1 July 2023.



## **APPENDIX 2.3: INTERESTED AND AFFECTED PARTIES LIST**

Due to the Protection of Personal Information (POPI) Act 4 of 2013, we are unable to share this information with I&APS. Only the Competent Authority will have access to this list. However, if comments are submitted, the I&AP name will be shown as long as the comment does not reveal any more personal information.

## **APPENDIX 2.4: PROOF OF DISTRIBUTION TO IAPS**

This is the draft report for distribution, comments will be detailed in the final report.

## APPENDIX 3: DISCREPANCY IN FARM PORTIONS

The DFFE Screening Tool has identified the below farm portion as portion 11. However, Assmang (Pty) Ltd, who is the owner of the farm, has a deed identifying it as portion 9. For this reason, we have used portion 9 in this report and the application for environmental authorisation instead of portion 11.

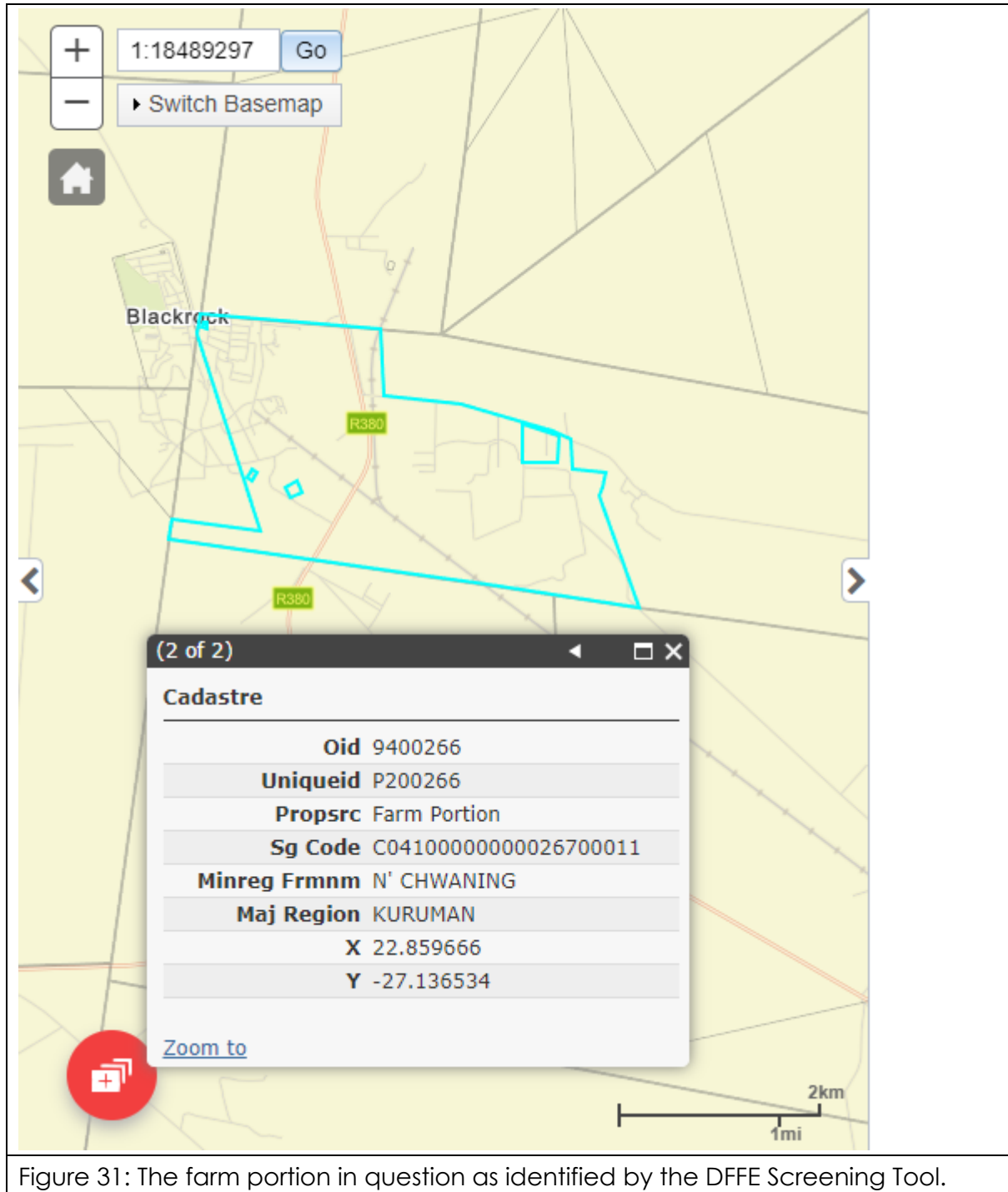


Figure 31: The farm portion in question as identified by the DFFE Screening Tool.

Printed: 2021/08/31 13:34

## Deeds Office Property


windeed

A LexisNexis® Product

**N'CHWANING, 267, 9 (VRYBURG)**

GENERAL INFORMATION

<b>Date Requested</b>	2021/08/31 13:34
<b>Deeds Office</b>	VRYBURG
<b>Information Source</b>	DEEDS OFFICE
<b>Reference</b>	-



\*\* This result is enriched with information from the WinDeed Database.

PROPERTY INFORMATION

<b>Property Type</b>	FARM
<b>Farm Name</b>	N'CHWANING
<b>Farm Number</b>	267
<b>Portion Number</b>	9
<b>Local Authority</b>	KALAHARI SDR
<b>Registration Division</b>	KURUMAN RD
<b>Province</b>	NORTHERN CAPE
<b>Diagram Deed</b>	T2144/2015
<b>Extent**</b>	743.9187 H
<b>Previous Description</b>	-
<b>LPI Code</b>	C04100000000026700009

OWNER INFORMATION

Owner 1 of 1

<b>Type**</b>	COMPANY
<b>Name</b>	ASSMANG LTD
<b>ID / Reg. Number</b>	193500734306
<b>Title Deed</b>	T2144/2015
<b>Registration Date</b>	2015/08/14
<b>Purchase Price (R)</b>	CCT
<b>Purchase Date</b>	-
<b>Share</b>	-
<b>Microfilm</b>	-
<b>Multiple Properties**</b>	NO
<b>Multiple Owners**</b>	NO

ENDORSEMENTS (3)

#	Document	Institution	Amount (R)	Microfilm
1	EX3/2020	-	-	-
2	CONSOLIDATE FROM	REG DIV KURUMAN RD ,NAME N'CHWANING ,NO 267 ,PRTN 8	-	-
3	CONSOLIDATE FROM	REG DIV KURUMAN RD ,NAME N'CHWANING ,NO 267 ,PRTN 3	-	-

HISTORIC DOCUMENTS

No documents to display

\*\* This result is enriched with information from the WinDeed Database.

DISCLAIMER

This report contains information gathered from our suppliers and we do not make any representations about the accuracy of the data displayed nor do we accept responsibility for inaccurate data. WinDeed will not be liable for any damage caused by reliance on this report. This report is subject to the terms and conditions of the [WinDeed End User Licence Agreement \(EULA\)](#).

Figure 32: The deed provided by Assmang (Pty) Ltd with regards to the farm portion in question.

L.G.NO. 513/2009

