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Department:
Environment & Nature Conservation
NORTHERN CAPE PROVINCE
REPUBLIC OF SOUTH AFRICA

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**PROPOSED DEVELOPMENT OF A SOLAR PV FACILITY AND ASSOCIATED INFRASTRUCTURE
AT THE SISHEN IRON ORE MINE**

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Application Number:	
Date Received:	

Basic Assessment Report in terms of the Environmental Impact Assessment Regulations, 2014, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

Kindly note that:

1. This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2014 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.
2. This report format is current as of **08 December 2014**. It is the responsibility of the applicant to ascertain whether subsequent versions of the form have been published or produced by the competent authority
3. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
4. Where applicable **tick** the boxes that are applicable in the report.
5. An incomplete report may be returned to the applicant for revision.
6. The use of “not applicable” in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.
7. This report must be handed in at offices of the relevant competent authority as determined by each authority.
8. No faxed or e-mailed reports will be accepted.
9. The signature of the EAP on the report must be an original signature.
10. The report must be compiled by an independent environmental assessment practitioner.
11. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
12. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.
13. Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report must also be submitted.

SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section?

YES	NO
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If YES, please complete the form entitled “Details of specialist and declaration of interest” for the specialist appointed and attach in Appendix I.

Please refer to Appendix I for the “Details of specialist and declaration of interest” included for the specialist assessments undertaken for the Project as indicated in Table 1 below:

Table 1: Specialist Team

Name	Organisation	Role
Michael van Niekerk	SLR Consulting	Climate Change Specialist
Stephen van Staden	Scientific Aquatic Services	Freshwater Ecology Specialist
Stephen van Staden	Scientific Terrestrial Services	Avifauna (Birds) Specialist
Sanja Erwee	Scientific Aquatic Services	Visual Specialist
Dr Neville Bews	Dr Neville Bews & Associates	Social Specialist
Jon Heeger	GWI Aviation Advisory	Civil Aviation Specialist
Jaco van de Walt	Beyond Heritage (Pty) Ltd Cultural Resource Consultants	Heritage and Archaeology Specialist (including Palaeontology)

1. ACTIVITY DESCRIPTION

a) Describe the project associated with the listed activities applied for

1.1 INTRODUCTION

Sishen Iron Ore Company (SIOC), an Anglo American company, owns the opencast Sishen Iron Ore Mine (Sishen Mine). The Sishen Mine is located close to the town of Kathu in the Northern Cape Province. SIOC proposes to develop a 150 megawatt (MW) solar photovoltaic (PV) facility and associated infrastructure within Sishen Mine’s Mining Right area (the Project). The overall objective of the Project is to generate renewable electricity (by capturing solar energy) to supply the Sishen Pit substation 2, from where it will be distributed in accordance with the load requirements. The Project is proposed to be developed on the existing G80 waste rock dump (WRD) which is located on portion 2 and the remaining extent (RE) of the Farm Sacha 468, and Portion 1 of the Farm Sims 462 (Figure 1 and Figure 2 in Appendix A).

SLR Consulting (South Africa) (Pty) Ltd (SLR), an independent firm of environmental consultants, has been appointed by Kumba Iron Ore Limited (Kumba) to manage the environmental authorisation application processes and to conduct the necessary public participation.

The proposed solar PV development will have a maximum generation capacity of up to 150 MW and will comprise: a solar PV facility (including pedestal mounted solar PV panels, inverter stations, a switchyard, electrical cables to collect generated power at a central substation for distribution, a battery energy storage system (BESS) and maintenance roads); associated transmission infrastructure (including substations and 132 kilovolt (kV) transmission lines); and an access road.

In terms of the National Environmental Management Act (No 107 of 1998) (NEMA) the proposed Project requires an Environmental Authorisation (EA) from the Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARDLR) as the Competent Authority (CA).

The Project will exceed a generation capacity threshold of more than 20 MW of electricity from a renewable resource as stipulated in Activity 1 of the Environmental Impact Assessment (EIA) Regulations Listing Notice 2 of 2014 (GN R 984 of 2014, as amended). However, due to the location of the Project on the WRD and the interpretation of “existing infrastructure” (per Department of Forestry, Fisheries, and the Environment (DFFE), attached in Appendix J), the Project is excluded from a full Scoping and EIA process as stipulated in the Environmental Impact Assessment (EIA) Regulations (GN R 982, as amended) (EIA Regulations, 2014). As such, the environmental assessment of the Project will comprise a Basic Assessment (BA) process as stipulated in the EIA Regulations (2014). All relevant legislation and guidelines will be consulted during the BA process and will be complied with at all times.

In terms of the National Water Act, 1998 (No. 36 of 1998) and the Regulations Regarding the Procedural Requirements for Water Use Licence (WUL) Applications and Appeals (GN R 267 of March 2017), a General

Authorisation (GA) process must be followed with the Department of Water and Sanitation (DWS) as the CA.

1.2 COMPETENCY

Anglo American intends to develop multiple (no. 19) renewable (solar and wind) energy generation projects to create a Regional Renewable Energy System (RREE) that optimises the provision of renewable energy to obtain a 24/7 carbon-neutral electricity supply across all of their operations in southern Africa. This Project, located at the Sishen Mine, forms one part of this RREE. A new SPV (special purpose vehicle) will also be created, in the form of a South African (SA) Clean Energy Company, which will develop, operate, and maintain the projects within the RREE.

In terms of Section 24C of the NEMA, the Minister / Member of the Executive Council (MEC) has identified the provincial authority (i.e. DAEARDLR) as the CA for granting of environmental Authorisations in respect of activities listed in the EIA Regulation Listing Notices.

Section 24 C subsection 2 (A) of the NEMA stipulates that the Minister responsible for mineral resources must be the CA when listed activities, are directly related to the prospecting or extraction and primary processing of a mineral resource. The competency of the mineral resources Minister is understood to extend to EA applications for renewable electricity generation projects at mines, where the electricity is being generated by a mine, either on or off the mining right area¹.

However, given the nature of the RREE and distinct listed activities of renewable energy generation, the Sishen Project is seen as ring-fenced and separate from the Sishen Mine activities. Further to this, the formation of SA Clean Energy Company will result in a scenario in which electricity may be sold to any of the Anglo American mining operations or other users. It follows that the activity of generating electricity, by SA Clean Energy Company is unrelated to mining at Sishen Mine and Anglo American is merely the energy company's off-taker.

Anglo American engaged with the Northern Cape Department of Mineral Resources and Energy (DMRE) leadership on 8 March 2022. During this engagement, the DMRE advised that solar PV power generation is not part of a mining right application and is therefore considered as a non-mining activity. The DMRE recommended a parallel approach to permitting with the:

- DAEARDLR as the CA for the Environmental Authorisation in terms of NEMA; and
- DMRE the CA for permits which may include applications in terms of sections 53 and 102 of the Mineral and Petroleum Resources Development Act (No. 28 of 2002), and exemption in terms of Section 79 of the Mine Health and Safety Act (No 29 of 1996).

It follows that the Sishen Solar PV project is not considered a mining activity and the DAEARDLR is identified as the CA.

1.3 DESCRIPTION OF THE AFFECTED ENVIRONMENT:

1.3.1 Climate

The climate of the Sishen Mine area is semi-arid with a mean annual precipitation of 390 mm. Mean annual evaporation (S-pan) in the region is 2 165 mm/a. The semi-arid landscape is largely due to the significant difference between the rainfall and evaporation in the region.

Rain tends to fall in summer and early autumn, with the largest rainfall recorded during February 2016. An uneven rainfall distribution over the wet season (November to March) is created due to the fact that rain typically occurs primarily as storms and individual rainfall events can be intense. In addition to significant seasonal variations, quaternary catchment D41J, experiences significantly variable rainfall in the lowland areas (proximal to the mines) (360-380 mm/a) compared with the highlands (Kuruman Hills and Koranna Berg) (480 mm/a). Average monthly rainfall data for the period 1963 to 2018 is displayed in Table 2.

¹ The Mineral Resources Minister has taken the view that anything on a Mining Right area falls within their competency, which is being applied to Independent Power Producer(s) using land covered by a Mining Right.

Table 2: Mean monthly rainfall data for Sishen Mine

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean Rainfall (mm)	83	65	64	38	15	9	2	5	8	22	30	49

Source: Sishen Western Expansion Project: Phase 2 (Shangoni Management Services, October 2021)

Temperatures vary between -9°C and $+42^{\circ}\text{C}$, with an average daily temperature of 19.2°C . Lowest temperatures are recorded in July, whereas the maximum temperatures occur in December. Temperatures reach a minimum just before sunrise and a maximum between midday and sunset.

The wind field is dominated by winds from the north and north-north-west with calm conditions occurring only 7.7% of the time. All other winds had a frequency of occurrence of less than 10%. The highest wind speeds (8 to 10 m/s) occurred 0.3% of the time. During the day, more frequent winds at higher wind speeds occurred from the north-westerly sector, with 3% calm conditions. Night-time airflow had less frequent winds from the north-westerly sector and at lower wind speeds with winds mostly occurring from the south-easterly sector. Dust sources located in areas that experienced the highest wind speeds and/or highest frequency of occurrence (above 10%) are likely to contribute to increased dustfall in the areas downwind of the sources.

The Sesheng community is located closest to the Sishen Mine. As such, this community is sensitive to dust impacts from existing operations. Sishen Mine has established ambient dust fallout monitoring stations within the town. The mine also monitors for PM10, PM2.5, together with Nitrogen Oxide (NOx) and Sulphur Oxide (SOx) emissions.

1.3.2 Biophysical Environment

1.3.2.1 Topography

The natural topography of the area is generally flat with isolated areas of undulation. Maximum elevation reaches 1 350 mamsl in the form of several hills towards the southeast of the Sishen mining areas. The general slope of the land, specifically in the Sishen Mine area, is in a westerly and south-westerly direction towards the ephemeral Gamagara River. The main topographical features of the Sishen Mine are the existing WRDs which reach a height of 110 m above the surrounding ground level.

1.3.2.2 Wetlands

See Section 5 on Page 47.

1.3.2.3 Biodiversity

See Section 9 (d) on Page 51.

1.3.2.4 Visual

Visually, the Sishen Mine is characterised by open, undulating to flat sandy plains, with a sequence of hills orientated in a north-south axis, including the Langberg and Kuruman mountain ranges, forming a backdrop for the otherwise flat plains. The long-term mining activities have altered this landscape through the deposition of waste rock and slimes, and the construction of the mine infrastructure.

The semi-arid, flat and open nature of the landscape renders it particularly sensitive to visual intrusion. Views in the area are predominantly dominated by the mine WRDs that can be seen from great distances, due to the landscape's relatively flatness.

In terms of visual impacts, areas frequented by tourists are generally regarded as more sensitive than agricultural areas. However, there are no established guest farms/ guest houses on any of the private farms immediately adjacent to the mine (NEWLA 2011 and EndemicVision, 2011). In addition, Sishen Mine has been in operation since 1953, and all surrounding farms are owned by Kumba. As such mining workers occupy the majority of the farmsteads in the surrounding area, therefore limiting the potential for sensitive receptors.

Residents of Sesheng and Kathu are accustomed to the mining infrastructure.

1.3.3 Socio-Economic

See Section 8 on Page 49.

1.3.4 Cultural Heritage Resources

See Section 7 on Page 49.

1.3.5 Traffic

The road networks in the vicinity of Sishen Mine include:

- The N14 national road to the east of the mine;
- The R380 road from Kathu to Hotazel;
- The R325 road, which starts along the N14 and provides access to Dingleton on the western side of the mine. This road is closed just north of Dingleton and provides no public thoroughfare further than Dingleton.
- The DR 3333 is a short link between the N14 to the R325 to the south of the mine.
- The Dingleton-Dibeng public gravel road that runs along the Gamagara River, from Dingleton to Dibeng, which is located approximately 21 km north-west of the mine.

The N14 National Road carries a significant amount of traffic. The R380 also carries reasonably significant volumes of traffic during the day for access to Kathu and the Sishen Mine, as the primary access road to Dibeng in the north-west, and as a major link to the Mamatwan Manganese Mine to the north and to Hotazel further to the north. The R325 provides a link between the N14 and Dingleton and also to the Khumani Mine and, indirectly, secondary access to Dibeng.

1.3.6 Current Land Use

The Solar PV Project will be located on an existing G80 WRD on portion 2 and the RE of the Farm Sacha 468, and portion 1 of the Farm Sims 462– within Sishen Mine’s Mining Right area. The Sishen Mine surface rights and operating assets are owned by SIOC.

The Department of Rural Development and Land Reform: Land Claims Commissioner was contacted on 15 June 2022 to confirm if any land claims have been lodged on the farms Sacha 468 and Sims 462. The Land Claims Commissioner has confirmed that no land claims have been lodged on the abovementioned farms. Proof of correspondence is included in Appendix C.

Land use at the project site includes existing mining activities and infrastructure associated with Sishen Mine. The specific target site for the solar PV facility is a WRD.

Land uses surrounding the Sishen Mine is a mixture of agriculture, residential areas, infrastructure/servitudes and surface-based mining. More detail is provided below:

- Kumba owned surface rights to the south-west and south-east, including the Brooks and Sishen Nature Reserves..
- Agricultural activities represented by privately-owned farms mainly used for grazing are located to the north-west, west, and south-west along the Gamagara River and to the east and southeast along the N14 highway.
- Nearest towns / residential areas to the mine include:
 - Dingleton town situated approximately 35 km to the west of mine;
 - Sesheng located approximately 10 km to the north of the mine; and
 - Kathu located approximately 10 km to the north-east of the mine.
- Mining represented by the Khumani Mine which is owned by Assmang, and Burke Mining is located to the south and southeast of the mine.

1.4 PROJECT DESCRIPTION

1.4.1 Project Location

The details of the project location are summarised in Table 3, and shown in Figure 1 and Figure 2 in Appendix A. The process that was followed in reaching the preferred site alternative is provided in Section 2.

Table 3: Location of the Project

Details		Description	
Province:	Northern Cape		
District municipality:	John Taolo Gaetsewe District Municipality		
Local municipality:	Gamagara Local Municipality		
Nearest town (and distance)	Kathu – 5 km north-east		
Solar PV Facility			
Physical address(es)	Hendrik van Eck Street, Kathu, 8446		
Farm names and portions	Portion 2 and the RE of Farm Sacha 468 (existing G-80 WRD at Sishen Mine)		
21-digit Surveyor General Code for each farm portion	Farm Name & Portion	21-digit Surveyor General Code	
	Farm Sacha 468, Portion 2	C0410000000046800002	
	Farm Sacha 468, Remaining Extent	C0410000000046800000	
Centre point coordinates of the property/properties	S 27° 41,836' E 22° 58,584'		
Total area of property/properties:	3129,551 ha		
Developmental footprint:	252.4 ha (PV plant + solar PV substation)		
Transmission Line			
Physical address(es)	Hendrik van Eck Street, Kathu, 8446		
Farm names and portions	Portion 2 and the RE of Farm Sacha 468 (existing G-80 WRD at Sishen Mine); and Portion 1 of Farm Sims 462		
21-digit Surveyor General Code for each farm portion	Farm Name & Portion	21-digit Surveyor General Code	
	Farm Sacha 468, Portion 2	C0410000000046800002	
	Farm Sacha 468, Remaining Extent	C0410000000046800000	
	Farm Sims 462, Portion 1	C0410000000046200001	
Centre point coordinates of the property/properties	<u>Farm Sacha 468:</u> S 27° 41,836' E 22° 58,584' <u>Farm Sims 462:</u> S 27° 42,283' E 23° 1,221'		
Total area of property/properties:	3 129,551 ha (Sacha 468) 2 683,483 ha (Sims 462)		
Developmental footprint:	Grid connection corridor: 100 ha		

See Appendix J for the complete set of coordinates of the boundary of the property and transmission line corridor.

1.4.2 Project Layout

The preferred layout of the Project is shown in Figure 3 in Appendix A.
 A description of the key Project components is provided in Section 1.4.3 to follow.
 The process that was followed in reaching the preferred layout alternative is provided in in Section 2.

1.4.3 Project Components

Solar PV systems produce energy by converting photons “solar radiation” into electrons which then flow as electricity or heat. This process is referred to as the ‘Photoelectric Effect’. Three types of solar panels are proposed and has been assessed in the Impact Assessment Section of this report. These include monocrystalline, polycrystalline, and thin film modules solar panels.

Table 4 below presents a brief description of the key Project components to be utilised for this Project and the estimated development footprint. The preferred location of these activities is shown in Figure 3 in Appendix A.

Table 4: Description of the key Project components

Activities	Description
Solar PV Facility	
Installed capacity:	Up to 150 MW
Total footprint	340 ha (PV plant + solar PV substation)
PV cells:	<p>A PV cell is the device that generates electricity when exposed to solar radiation. The absorbed solar energy excites the electrons inside the PV cell and produces electrical energy. All PV cells produce Direct Current (DC). There are three main types of solar cells:</p> <ul style="list-style-type: none"> • Monocrystalline – made from a single silicon crystal; • Polycrystalline - made from multiple silicon crystals; and • Thin film - common material used for thin film modules are Cadmium Telluride (CdTe) and Copper Indium Gallium Selenide (CIGS).
PV modules:	<p>The PV module is the set of interconnected photovoltaic cells encapsulated between a transparent front (usually glass) and a backing support material of either laminate or glass then mounted in an aluminium frame, or frameless with durable tempered glass. The modules will appear dark blue or black and will be mounted in an aluminium frame or laminated between durable glass sheets. The modules are designed to absorb the solar radiation and hence are not susceptible to reflection or glinting. Newer modules can also absorb irradiation reflected off the ground via the back of the panel if the back of the panel is glass. This type of module technology is referred to as bi-facial modules which are produced by a number of panel suppliers and can be produced in either monocrystalline or polycrystalline form. The proposed solar PV facility will utilise monofacial or bifacial PV modules.</p> <ul style="list-style-type: none"> • Type: Monofacial or Bifacial PV modules • Total footprint: 253 ha • Maximum height: ≤ 8 m. <p>For more detailed description of the monofacial and bifacial PV modules, see Section 2.</p>
PV array:	<p>The PV array is the complete power generating plant consisting of multiple PV modules wired in series and in parallel. The PV modules will be connected by DC cables to combiner boxes mounted underneath the PV module mounting structures.</p>

BASIC ASSESSMENT REPORT

	Each combiner box will occupy an area of approximately one square metre. The power generated by many PV module strings is combined in the combiner box and transmitted via DC cables to an inverter and transformer enclosure.
Mounting structures:	<p>Multiple PV modules are bolted onto a mounting structure which tracks the sun's progress across the sky usually in an east to west direction. PV arrays either use fixed or tracking (single or double axis) mounting structures in order to optimise the amount of solar irradiation. In a tracking system, the panels are mounted on a steel or aluminium rack and a tracking motor is placed at the end of the PV panel array to control the tilt and movement of the array as required to track sunlight.</p> <ul style="list-style-type: none"> • Type: Fixed tilt or tracking (single or double axis mounting structures). • Total footprint: Included in PV modules. • Maximum height: ≤ 8 m.
Inverters:	<p>The inverter converts the DC to alternating current (AC). The inverter and transformer are anticipated to be housed within the same inverter station housing (typically an insulated, steel-framed 6 m shipping container, or small brick building). The transformers transform the low voltage AC from the inverter to medium voltage. The inverters will vary in size and frequency depending on technology. Inverter stations will be installed in between the PV panel rows, in a line inside the layout area at the end of each row, located on a concrete plinth. The inverter stations will be located within the area of the PV array.</p> <ul style="list-style-type: none"> • Type: Centralised or string inverter stations • Total footprint: Located within Solar PV plant area of 253 ha • Number of inverters ≤ 1 500 • Height of inverters ≤ 5 m.
Cabling:	Underground direct current (DC) cables connecting the PV modules to the inverters and underground alternating current (AC) cables connecting the inverters to the onsite substation.
Onsite substation:	<p>The on-site substation comprises an inverter (step-up facility) which converts power from DC to AC and will step up electrical current from 33 kV to 132 kV. The substation will consist of at least one small building, outdoor electrical plant, equipment, and transformers.</p> <ul style="list-style-type: none"> • Capacity: up to 190 MVA with a max line voltage of 132 kV • Total footprint: 3.7 ha. • Maximum height: 21 m (lightning mast on sub is the highest point).
Transmission Line	
Installed capacity	All generated power will be transmitted via transmission lines up to a capacity of 132 kV (either overhead or underground).
Total footprint	100 ha (including transmission line corridor).
Corridor width and length:	<ul style="list-style-type: none"> • Width: 255 m • Length: ≤ 4 km • Overhead transmission line from the onsite substation to the nearest mine substation - Pit Substation 2.
Nearest mine substation	<ul style="list-style-type: none"> • Installed capacity: 66 kV/ 11 kV • Total footprint: 2.2 ha • Maximum height: 16 m. • The nearest mine substation (Pit Substation 2) will not need to be expanded.
Associated Structures and Infrastructures	

<p>Battery Energy Storage System (BESS):</p>	<p>The BESS allows for the storage of surplus energy generated by the solar PV facility for later use. The BESS enables a balance between supply and demand of electricity during the day and allows for use of stored energy during peak demand periods, i.e., morning and evenings. Energy generated from the PV panel array is DC and converted to AC by the inverters and then transferred to the on-site substation where it is determined if the energy should be stored or evacuated. When the energy is required, it is evacuated into the grid network, and when it is not required, it is transferred to the BESS and stored for later use. A BESS consists of stacked up containers, or a multi-story building.</p> <p>Several battery technologies are being considered for BESS for the proposed Project. These include solid state and flow type batteries. Solid state batteries consist of one or more electrochemical cell(s) that convert chemical energy into electrical energy. Each cell consists of an anode and cathode. Electrolytes within the cells allow ions to move between the electrodes and terminals, which enables the flow of current out of the battery. Examples of solid-state batteries include Lithium-ion and Sodium Sulphur batteries. Flow batteries are rechargeable and the rechargeability function is enabled by the dissolution of chemical components in liquids contained within the system that are separated by a membrane. The advantage associated with flow batteries is that they are easily rechargeable through the replacement of the electrolyte fluid. Typical examples of flow batteries include Vanadium Redox (VRB) flow batteries. The preferred BESS technology for utilisation for the proposed Project will be selected during the detailed design of the solar PV facility post the issuance of the Environmental Authorisation, once the EPC contractor has been appointed and a supplier of the batteries has been appointed. This Basic Assessment Report (BAR) will consider and assess solid state and redox flow BESS technology options.</p> <ul style="list-style-type: none"> • Redox Flow or Lithium-Ion Batteries • Output capacity: Up to 100 MWh • Storage capacity: Up to 100 MWh (at 4 hours storage) • Total footprint: 5 ha (within the area of the substation with a total area of up to 8.7 ha) • Maximum height: 8 m
<p>Operation and Maintenance Buildings:</p>	<p>Additional infrastructure is required in order to support the operations of a solar PV facility, and to provide services to personnel tasked with the operations and maintenance of a facility. Operations & Maintenance Buildings (O&M) typically include offices, operational and control centre, workshop, warehouse, storage areas and ablution facilities. No one will be living onsite during the construction and operational phases.</p> <ul style="list-style-type: none"> • Total footprint: 0.25 ha • Maximum height: 9 m
<p>Laydown Area:</p>	<p>A construction laydown area would be required for temporary storage of equipment and supplies.</p> <ul style="list-style-type: none"> • Total footprint: 8 ha
<p>Security:</p>	<p>During construction, the site will be fenced off and access to the site controlled by 24-hour security services. The site may have a CCTV surveillance system to provide protection for the equipment, buildings and employees. Security lighting will be installed on-site to illuminate the site during the night.</p>
<p>Roads:</p>	<p>An existing access road from the existing road network, located at the north of the G80 WRD will provide a separate, secure and dedicated access to the solar PV facility separate from the mine's main access. This road may require widening to ensure that it is suitable for use. Within the Project site, internal access and</p>

	<p>maintenance roads will be constructed to provide access to the PV panel array and other components of the solar PV facility.</p> <ul style="list-style-type: none"> • The main access road will be approximately 50 m wide (including horizontal curve radius) and 5 km long. • The internal roads will cover an aerial size of 13 ha (up to 15 m wide including horizontal curve radius). The length of these roads will be determined once the design layouts have been finalised. • All the roads will be gravel surfaced.
<p>Stormwater Infrastructure:</p>	<p>The stormwater management plan for the Project needs to align with the stormwater drainage as required for the rehabilitated slopes of the WRD, and the general stormwater management for the Sishen Mine area.</p> <p>The results from recent leach tests indicated that the water quality of run-off from the WRD is not considered dirty and is not classified as waste. In addition, stormwater run-off from the proposed solar PV facility area is not expected to have any negative effect on stormwater quality as it is deemed to be a 'clean' area. Therefore, stormwater run-off from the WRD and proposed solar PV facility is not required to report to a Pollution Control Dam and can be integrated with the existing clean stormwater management system.</p> <p>Run-off from the WRD currently report to the following existing stormwater management facilities:</p> <ul style="list-style-type: none"> • Eastern Stormwater Sump; and • Western Stormwater Dam. <p>In order for the stormwater drainage to be directed to these facilities, specific areas within the solar PV facility need to be flattened as much as possible to achieve a consistent slope.</p> <p>It is therefore anticipated that no significant changes will be required to the current stormwater management system, except for managing and controlling flow rates to the existing stormwater dams/ sumps.</p>
<p>Water Storage Tank:</p>	<p>The Project also includes the establishment of water storage tanks for temporary storage of water onsite.</p> <ul style="list-style-type: none"> • Total capacity: <= 2 000 m³ • Total footprint: 0.5 ha
<p>Water Treatment Plant</p>	<p>Water for the cleaning of the PV modules will be supplied from groundwater extracted as part of the Sishen Mine operations. Results from recent groundwater quality monitoring conducted in the area surrounding the WRD indicate high mineral salt concentrations. The presence of mineral salts is not favourable for the cleaning of the PV modules as it will leave a residue and potentially damage the anti-reflective coating of the modules. A modular water treatment plant will therefore be required to treat the water to an acceptable quality through reverse osmosis.</p> <p>A water treatment plant will generally produce two waste streams, namely gypsum and brine. Because the volumes of water to be treated are so small the amount of gypsum produced will be very small. The liability of disposing of the gypsum will be transferred to the mobile treatment plant contractors. It will be stipulated that the gypsum be disposed of at a licenced waste disposal facility.</p> <p>With the technology available and the quality of the water to be treated, it is anticipated that no brine will be produced.</p>

	Total capacity: <= 2 000 m ³ per day.
Services	
Power Supply:	Power for construction activities will be sourced from Eskom through the existing Sishen Mine operations and supplemented by diesel generators where required.
Water Supply:	<p>During the construction and operational phases of the proposed Project, water will be sourced from the Sishen Mine operations. The anticipated water usage for the Project for the duration of the construction and operational phases is estimated to be less than 26 000 m³/annum.</p> <p>During the construction phase water would be required for the following uses:</p> <ul style="list-style-type: none"> • Drinking; • Ablution facilities; • Access Road construction; • Dust suppression; • Fire-fighting reserve; • Cleaning of facilities; and • Concrete batching and construction of foundations for PV panel mounting structures and substation. <p>During the operational phase water would be required for the following uses:</p> <ul style="list-style-type: none"> • Domestic; • Dust suppression; • Cleaning of the PV modules. <p>The solar PV panels will be cleaned with water, particularly outside the rainy season as the dustiness of the region creates the need for frequent PV panel cleaning cycles. No chemicals will be used for the cleaning of the PV modules.</p>
Wastewater:	<p>Portable chemical toilets and temporary ablution facilities would be utilised at various work sites, and at the guard house and O&M buildings. Approximately 300 m³ per annum and 120 m³ per annum of effluent will be generated and stored in septic/conservancy tanks during the construction and operational phases, respectively. Portable toilets would be serviced by external service providers on a regular basis, and wastewater will be collected and trucked offsite for disposal at the nearest Wastewater Treatment Works.</p> <p>Alternatively, the sewage collection and pump stations would be connected to the sewage treatment infrastructure of the mine.</p>
Waste:	<p>There will be solid waste generated for the duration of the proposed Project and will comprise of general and hazardous waste components. During the construction and operation phase of the proposed Project, general waste components will comprise packaging material (i.e., paper, cardboard, plastic & wooden pallets), building rubble (i.e., bricks, wood & concrete), domestic waste and organic waste (i.e., food waste, vegetation cleared from site). Such wastes are likely in larger volumes during construction, reducing substantially during operations</p> <p>Hazardous materials used on site during operations will include fuels, oils, lubricants, cleaning products, and specialised gases (for use in switchgear etc.). Any excess materials and empty containers would comprise hazardous waste. Minimal volume of such waste is expected to be generated during the operation phase. For certain types or transformers or backup generators, oil that needs to be replaced will be recycled, if possible, or safely stored and removed from the site and correctly disposed of.</p>

	<p>All solid wastes generated (hazardous and general) will be temporarily stored onsite (for less than 90 days), and will be disposed of at a licensed landfill site by means of contracting a suitably registered waste handling company. This will be the responsibility of the Engineering Procurement Construction (EPC) Contractor during construction phase of the proposed Project and will have overall oversight to verify that the collection, transport, handling, and disposal of these wastes is being undertaken in a suitable manner.</p> <p>During operations the SPV will have overall responsibility for waste management. In addition, the SPV will have to ensure that any waste due to breakdowns and maintenance of the BESS is collected by the battery supplier or a licensed service provider and disposed in the appropriate manner in accordance with environmental legislation and best practice guidelines.</p> <p>Waste during the decommissioning phase will be similar to that produced during the construction phase; this includes wooden and plastic packaging, cable off-cuts, disused solar PV panels, office, and domestic waste. All solid wastes generated will be disposed of at appropriately licenced landfill sites for general, and/or hazardous waste streams.</p>
Transportation:	<p>It is anticipated that there will be an average of 10 to 20 trucks per day (~ 2 000 trucks in total) during the construction phase of the Project, for the delivery of Project components, machinery, and labour. The transportation route has not yet been finalised but is most likely to be one of the following routes:</p> <ul style="list-style-type: none"> • Durban via Johannesburg; • Saldanha via Calvinia and Upington; • East London via Bloemfontein and Kimberley; and • Cape Town via Calvinia and Upington. <p>Transport routes for the Project will be finalised once all suppliers are finalised after undergoing a procurement period. Traffic volumes are anticipated to diminish during the construction phase of the Project, and only a limited number of vehicles will travel to and from the Project site for operation and maintenance purposes. Where appropriate, mitigation and management measures for the control and management of traffic-related impacts have been included in the Environmental Management Programme (EMPr) for the Project.</p>
Employment Opportunities	
Construction:	At least 300 people however the number of people employed at one time may vary as different contracts and subcontracts on the Project
Operations:	At least 30 people and this is due to the fact that the staff will mainly be responsible for the daily operations and maintenance activities of the project.

1.4.4 Project Phases and Timelines

The Project will be carried out in the following phases:

- Development and Planning;
- Site preparation;
- Construction;
- Operation; and
- Decommissioning.

Activities to be undertaken during each of the phases are described in the following sections of this report.

1.4.4.1 Development and Planning Phase

During the development and planning phase of the Project, the developer will assess the key parameters required for the construction and operation of the solar PV facility. This will include:

- Obligations in the EA and other permitting requirements;
- A detailed layout of the Project; and
- Detailed geotechnical investigations of the Project site.

During the development and planning phase, the Project will be adapted in order to meet regulatory requirements, time schedules and expectations of all relevant parties.

1.4.4.2 Site Preparation Phase

Should the Project be granted a positive EA decision by the CA and Financial Close be achieved, site preparation activities will commence. This phase would include the installation of perimeter fencing and levelling of the site and preliminary earthworks. Thereafter the Project site will be marked out, and the access road to the site be upgraded (widening). The clearance of vegetation is not anticipated due to the proposed location on an existing WRD.

1.4.4.3 Construction Phase

The construction phase of the Project will be initiated following the completion of the site preparation activities. The construction phase will include the following:

- Establishment of laydown area on site;
- Transportation of materials, machinery, equipment, and supplies to site (e.g. PV support structure materials; graders, excavators, trucks, cement mixers etc.);
- Provision of water for dust suppression, concrete batching and potable water during the construction phase;
- Construction of internal roads;
- Excavation of cable trenches;
- Ramming or drilling of the mounting structure frames;
- Installation of the PV modules onto the frames;
- Installation of measuring equipment;
- Laying of cables between the module rows to the inverter stations;
- Optionally laying of gravel or aggregate from nearby quarries placed in the rows between the PV panel array for enhanced reflection onto the panels, assisting in vegetation control and drainage;
- Construction of foundations for the inverter stations and installation of the inverters;
- Construction of the substation and BESS foundations and installation of the substation components and placement of BESS;
- Construction of operations and maintenance buildings;
- Undertaking of rehabilitation on cleared areas where required;
- Testing and commissioning; and
- Removal of construction equipment, machinery and waste from site.

Where possible, materials, plant and equipment will be sourced from suppliers within the vicinity of the Project site. The bulk of the specialist equipment, i.e., PV modules, inverters, BESS, substation components etc., will be imported from China, Europe or the United States of America and be shipped to South Africa.

The construction phase of the Project will be for a period of up to 12 – 18 months.

1.4.4.4 Operational Phase

The Project will be operated on a 24 hour, 7 days a week basis. The operation phase of the Project will comprise the following activities:

- Regular cleaning of the PV modules by trained personnel;
- Vegetation management under and around the PV modules to allow maintenance and operation at full capacity;

- Maintenance and monitoring of all components including PV modules, mounting structures, trackers, inverters, substation transformers and relays, BESS, and equipment;
- Office management and maintenance of operations and maintenance buildings;
- Supervision of the solar PV facility operations; and
- Site security monitoring.

The duration of the operational phase/ life of the Project is anticipated to be approximately 30 years.

1.4.4.5 Decommissioning and Closure Phase

Once the solar PV facility reaches the end of its life, the facility will be decommissioned or will continue to operate depending on the outcomes of the investigation of its continued economic viability. If decommissioned, all components will be removed, and the site rehabilitated. Where possible all materials will be recycled, otherwise they will be disposed of in accordance with local regulations and international best practice.

Rehabilitation of the Project site will comprise of the following:

- Covering the dump with a layer of competent material e.g., calcrete on top of the clay layer of the WRD.
- On top of the competent layer, another thin layer of either topsoil or a type of gravel.
- Seeding of the entire area or topsoiled, for very light vegetation as it is on top of the WRD. It should be noted that seeding will only take place after the life of the solar PV facility.

b) Provide a detailed description of the listed activities associated with the project as applied for

Listed activity as described in GN 734, 735 and 736 ²	Description of project activity
GN R. 983 of 2014, Activity 11: The development of facilities or infrastructure for the transmission and distribution of electricity - (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.	The Project will require the construction and operation of internal distribution electrical infrastructure which is required to connect the solar PV facility components internally and to the Sishen Mine Pit substation 2. The Project will include the development of either underground or overhead transmission infrastructure within the Project site and within the mining right area of the Sishen Mine, up to a capacity of 132 kV. The transmission line corridor is estimated to be an area of 100 ha, width of 255 metres and length of approximately 4 km.
GN R. 983 of 2014, Activity 12: The development of - (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs - (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.	It is possible that the access road or other associated infrastructure would need to cross a watercourse/ drainage line located within the Project site. The physical footprint of the Project will exceed 100 square metres. The proposed Access Road Corridor Entrance 2 will be located within 32 meters of a Valleyhead seep depression wetland. The solar PV facility footprint will also be located within 100 metres of drainage lines.
GN R. 983 of 2014, Activity 14: The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	The proposed Project would require the storage and handling of dangerous goods which could include fuel, (i.e., diesel or petrol for the operation of machinery and equipment, etc), lubricants and electrolytes for the BESS. The storage capacity for the dangerous goods for the Project is not anticipated to exceed 500 cubic metres.

² Listed Activity as described in the National Environmental Management Act: EIA Regulations, 2014 (as amended)

Listed activity as described in GN 734, 735 and 736 ²	Description of project activity
GN R. 983 of 2014, Activity 19: The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.	It is possible that the access road or other associated infrastructure would need to cross a watercourse/ drainage line located within the Project site. The physical footprint of the Project will exceed 100 square metres.. The solar PV facility footprint will also be located within 100 metres of drainage lines.
GN R. 983 of 2014, Activity 21D: Any activity including the operation of that activity which requires an amendment or variation to a right or permit in terms of section 102 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity contained in this Listing Notice or in Listing Notice 3 of 2014, required for such amendment.	A section 102 EMPr amendment will be required to the DMRE to make an amendment to the Sishen Mine Mining Right taking future Solar PV generation on the WRD into account. This will include making changes to the mine's integrated EMPr giving reference to the changes in activities within the mine's rights area and the changes in the rehabilitation plans.
GN R. 983 of 2014, Activity 24: 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.	Internal access and maintenance roads will be developed within the solar PV facility. The internal access and maintenance roads would be constructed during the construction phase of the proposed Project.
GN R. 983 of 2014, Activity 56: 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; excluding where widening or lengthening occur inside urban areas.	The proposed Project would require upgrading an existing road to provide access to the Project within an access road corridor (width of 50 m and up to 5 km in length). The access road would be upgraded during the construction phase of the proposed Project.

2. FEASIBLE AND REASONABLE ALTERNATIVES

“**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—

- (a) the property on which or location where it is proposed to undertake the activity;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

Describe alternatives that are considered in this application as required by Appendix 1 (3)(h), Regulation 2014. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity (NOT PROJECT) could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed.

The determination of whether site or activity (including different processes, etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report, the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees, minutes and seconds. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

a) Site alternatives

Solar PV Facility

The solar PV facility needs to be located within the mine site in close proximity to a substation. Three alternative sites (capacity and location) were considered by Kumba within the Sishen Mine Mining Right area, on land owned by Kumba (see Figure 4 in Appendix A). The alternative sites included the following:

- Option 1: 150 MW solar PV facility, located on the existing G80 WRD on portions 2 and the RE of the Farm Sacha 468, and portion 1 of the Farm Sims 462.
- Option 2: 432 MW solar PV facility, located on the remaining extent of the Farm Kathu 465. Land leased to the Kathu Solar Park.
- Option 3: 432 MW solar PV facility, located on the RE of the Farm Sekgame 461.

Option 1 was selected as the preferred site for the solar PV facility because of the following:

- The solar PV facility will be located on existing infrastructure and tie into existing infrastructure.
- The preferred location will result in revitalisation of disturbed mining areas into productive land and will not disturb other greenfield sites.
- The preferred location provides for an alternative use of the WRD post closure.
- The preferred location moves away from traditional rehabilitation to a more productive use of the land after mine closure.

No alternative sites have been assessed further as part of the BA process for the Project as the placement of solar PV installations is dependent on several factors, all of which are favourable at the preferred site location. This included location within the mine site, land availability and ownership, topography, environmental sensitivities, close proximity to a substation, distance to solar resource/ long-term average of direct normal irradiation, site accessibility and current land use. The Northern Cape Province in South Africa has favourable solar irradiation potential. The Project site receives an annual Global Horizontal Irradiation (GHI) ranging between 2118 and 2 264 kWh/m²/year.

The Project site has a flat topography which is suitable for the development of a solar PV facility. In addition, the proposed development site also has no agricultural potential and is not populated. The solar PV facility is easily accessible via an existing access road, located at the north of the G80 WRD which will provide a separate, secure and dedicated access to the solar PV facility separate from the mine's main access. In addition, there is little existing infrastructure present within the solar PV facility site that would constrain the proposed development.

The proposed site is therefore considered highly suitable for the proposed development and no other locations are being considered.

Transmission Line Corridor

No alternative sites for the transmission line corridor have been considered or assessed as part of the current BA process.

Access Road Corridor

Four alternative access road corridor entrances are proposed. These entrance options all fall within the Sishen Mine Mining Right area, on Portion 1 of the Farm Sims 462 which is owned by SIOC (see Appendix A). The alternative entrances include the following:

- Access Road Corridor: Utilisation of an existing road crossing off the main Sesheng road. Upgrading (widening) is required of an existing road servitude traversing between the Kumba Northern Cape Project Hub offices and parking area, along the toe and up the bench of the WRD.
- Access Road Corridor Entrance 1: Utilisation of an existing road crossing off the main Sesheng road, northwest of the Access Road Corridor. Construction is required of a new road section (130 m in length) to connect with an existing road servitude. Upgrading (widening) is required of the existing road servitude that traverses along the eastern side of the Sishen Mine G80 Eastern Sump.
- Access Road Corridor Entrance 2: Utilisation of an existing road crossing off the Access Road Corridor. Upgrading (widening) is required of an existing road servitude traversing to the north and eastern side around the Kumba Northern Cape Project Hub offices and along the G80 Eastern canal.
- Access Road Corridor Entrance 3: Utilisation of an existing road crossing off the main Sesheng road, northwest of Access Road Entrance 2. Upgrading (widening) is required of an existing road servitude traversing around the eastern side of the Sishen Mine G80 Eastern Sump.

These four alternative entrances have been considered and assessed as part of the current BA process.

In the case of linear activities:

Alternative:

Alternative S1 (preferred)

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

Latitude (S):

Longitude (E):

Please refer to Appendix J for the list of co-ordinates for the Project.

Alternative S2 (if any)

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

Not Applicable	Not Applicable
Not Applicable	Not Applicable
Not Applicable	Not Applicable

Alternative S3 (if any)

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

Not Applicable	Not Applicable
Not Applicable	Not Applicable
Not Applicable	Not Applicable

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment.

Please refer to Appendix J for the list of co-ordinates for the Project.

In the case of an area being under application, please provide the co-ordinates of the corners of the site as indicated on the lay-out map provided in Appendix A of this form.

b) Lay-out alternatives

No alternative layouts for the PV facility and associated infrastructure have been considered or assessed as part of the current BA process.

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
Not applicable		
Alternative 2		
Not applicable		

c) Technology alternatives

There are very few alternative technologies available for solar PV facilities. For the proposed Sishen solar PV facility the PV panels being proposed at this stage will be either single axis tracking or fixed tilt mounting, and the modules will be either crystalline silicon or thin film technology. The impacts on the environment of the different types of PV technology are the same during construction, operation and decommissioning. Therefore, no technology alternatives will be considered during the BA process. The choice of technology used will ultimately be determined by technological and economic factors at a later stage.

Alternative 1 (preferred alternative)		
Not applicable		
Alternative 2		
Not applicable		
Alternative 3		
Not applicable		

d) Other alternatives (e.g. scheduling, demand, input, scale and design alternatives)

No further alternatives were assessed in the BA process, as none are available for solar PV installations. Final design details are yet to be confirmed, however it is unlikely that the final PV technology choice would change any of the impacts as assessed. These details will be confirmed during the final design stages of the proposed development, before construction commences.

Alternative 1		
Not applicable		
Alternative 2		
Not applicable		
Alternative 3		
Not applicable		

e) No-go alternative

The 'No-go' alternative is the option of not implementing the proposed development. This alternative would result in no environmental impacts from the proposed development on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the BAR. The entire Project area is largely modified or in a transformed state, due to some areas of the WRD either being rehabilitated with vegetation or unrehabilitated. The 'no-go' would therefore imply that the land would remain as per the status quo, rehabilitated with vegetation.

On a regional scale, the 'No-go' alternative is not preferred. Renewable energy facilities are key to the success of South Africa's plan to build resilience against climate change. South Africa currently relies almost completely on fossil fuels as a primary energy source (approximately 72%). Coal combustion in South Africa is the main contributor to carbon dioxide emissions, which is one (1) of the main greenhouse gasses that has been linked to climate change. With the global focus on climate change, the government is under pressure to explore alternative energy sources in addition to coal-fired power stations.

An emphasis has therefore been placed on securing South Africa's future power supply through the diversification of power generation sources. Furthermore, South Africa would have to invest in a power generation mix, and not solely rely on coal-fired power generation, to honour its commitments made under the Paris Agreement (ratified during November 2016) to mitigate climate change challenges.

The Department of Forestry, Fisheries and the Environment (DFFE) acknowledges the risks posed to South Africa by climate change confirming that 'South Africa has been experiencing the severe effects of drought conditions catalysed by the worst El Nino event in decades. The rising sea temperatures in the Pacific Ocean that resulted in increased temperatures and reduced rainfall in many parts of the world, was exacerbated by rising global temperatures associated with climate change. South African scientists and weather forecasters warn that this is what can be expected in the decades to come, if ambitious global action is not taken urgently to reduce the concentration of greenhouse gases in the atmosphere' (DEA, 2016b).

The current South African plan to achieve the goal set under the Paris Agreement, is rated as Highly Insufficient due to an unresolved strategy to secure a 'just transition' from coal to renewables, successfully and timeously implement a carbon tax and update the Integrated Resource Plan. In 2020, Climate Action Tracker rated South Africa's plan as 'Highly Insufficient' as at the time we committed to increasing renewable energy to enable our emissions to peak between 2020 and 2025. Based on the dismal performance to date downgrading our climate action plan from medium to highly insufficient, it is clear that the trajectory South Africa is on is insufficient to reach the goals set to avoid catastrophic climate change.

Although solar power is not the only solution to solving the energy crisis in South Africa, not establishing the proposed solar PV facility would be detrimental to the mandate that the government has set to promote the implementation of greener energy generation. It is a suitable sustainable solution to the energy crisis and this Project could contribute to addressing the problem. This proposed development will aid in achieving South Africa's goals in terms of sustainability, energy security, mitigating energy cost risks, local economic development and national job creation. It will also assist in reducing the procurement of fossil fuels and ensure that renewable energy has a role to play in the future South African Energy mix.

Not proceeding with the Project will also result in SIOC not being able to achieve a reduction in their carbon emissions/ footprint as part of the Anglo American group's commitments to "FutureSmart Mining" and "Carbon Neutrality Energy Strategy". In addition, the opportunity to enhance security of power supply, reduce costs of electricity, and the enhancement of the national grid with a renewable source of energy will also be lost. Thus the No-go alternative is not supported by Anglo American or Sishen Mine.

An assessment of the 'No-Go' alternative was undertaken by the specialists (where possible) and is incorporated in Section D of the BAR.

Paragraphs 3 – 13 below should be completed for each alternative.

3. PHYSICAL SIZE OF THE ACTIVITY

a) **Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):**

Alternative:

- Alternative A1³ (preferred activity alternative)
- Alternative A2 (if any)
- Alternative A3 (if any)

Size of the activity:

340 ha.
Not Applicable
Not Applicable

or, for linear activities:

Alternative:

- Alternative A1 (preferred activity alternative)
- Alternative A2 (if any)
- Alternative A3 (if any)

Length of the activity:

Not Applicable
Not Applicable
Not Applicable

b) **Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):**

Alternative:

- Alternative A1 (preferred activity alternative)
- Alternative A2 (if any)
- Alternative A3 (if any)

Size of the site/servitude:

Not Applicable
Not Applicable
Not Applicable

4. SITE ACCESS

Does ready access to the site exist?
 If NO, what is the distance over which a new access road will be built

YES	

Describe the type of access road planned:

An existing access road from the existing road network, located at the north of the G80 WRD will provide a separate, secure and dedicated access to the solar PV facility separate from the mine's main access. This gravel road may require widening to ensure that it is suitable for use.

5. LOCALITY MAP

An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.). The map must indicate the following:

- an accurate indication of the project site position as well as the positions of the alternative sites, if any;
- indication of all the alternatives identified;

³ "Alternative A.." refer to activity, process, technology or other alternatives.

- closest town(s);
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection).

6. LAYOUT/ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document.

The site or route plans must indicate the following:

- the property boundaries and numbers of all the properties within 50 metres of the site;
- the current land use as well as the land use zoning of the site;
- the current land use as well as the land use zoning each of the properties adjoining the site or sites;
- the exact position of each listed activity applied for (including alternatives);
- servitude(s) indicating the purpose of the servitude;
- a legend; and
- a north arrow.

7. SENSITIVITY MAP

The layout/route plan as indicated above must be overlain with a sensitivity map that indicates all the sensitive areas associated with the site, including, but not limited to:

- watercourses;
- the 1:100 year flood line (where available or where it is required by DWS);
- ridges;
- cultural and historical features;
- areas with indigenous vegetation (even if it is degraded or infested with alien species); and
- critical biodiversity areas.

The sensitivity map must also cover areas within 100m of the site and must be attached in Appendix A. [The sensitivities identified are illustrated on Figure 5 included in Appendix A.](#)

8. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this report. It must be supplemented with additional photographs of relevant features on the site, if applicable.

[The sit photographs are included in Appendix B.](#)

9. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of at least 1:200 as Appendix C for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

The facility illustrations are included in Appendix C.

10. ACTIVITY MOTIVATION

Motivate and explain the need and desirability of the activity (including demand for the activity):

Project motivation

Anglo American is committed to being part of the solution to climate change and aim to play their part in maintaining global temperature rise to below 2°C as called for by the Paris Agreement. South Africa is particularly vulnerable to climate change impacts and have developed a strategic response as set out in the Climate Change Bill (2018). Anglo American has committed to achieve carbon neutrality on Scope 1 and 2 emissions and to reduce their Scope 3 emissions by 50% by 2040, across their operations. One way to achieve this is through FutureSmart Mining™, an Anglo American innovation-led approach to sustainable mining. Integral to FutureSmart Mining™ is their Sustainable Mine Plan, designed to tackle the most pressing environmental, social and governance challenges such as climate change. The Anglo American Green House Gas emission reduction ambitions are built on the following4:

- Scope 1: Deployment of FutureSmart Mining™ is central to reducing energy demand and delivering the step-change innovation required for avoiding emissions, including the capture and use of fugitive methane.
- Scope 2: The procurement and rapid roll-out of renewable power supply, including through embedded generation where necessary.

As part of the Anglo American group and in alignment with the Anglo “FutureSmart Mining” and “Carbon Neutrality Energy Strategy”, SIOC has committed to reducing their carbon footprint. Anglo American intends to develop multiple (no. 19) renewable (solar and wind) energy generation projects to create a RREE that optimises the provision of renewable energy to obtain a 24/7 carbon-neutral electricity supply across all of their operations in southern Africa. This Project, located at the Sishen Mine, forms one part of this RREE. The development of the solar PV facility will allow for security of power supply, reduced costs of electricity and reduced carbon emissions. An added benefit to the development of the Project is the repurposing of otherwise unproductive land (WRD), into land which is economically productive again. SIOC sees this strategy as an enhancement to the disturbed area and an alternative vision for the closure of the WRD which will allow for a more constructive end land use.

1. Is the activity permitted in terms of the property’s existing land use rights?	YES	NO	Please explain
The property is within the Sishen Mine Mining Right area and is currently being used for mining activities – notably the existing G80 WRD. SIOC will apply for a Section 53 in terms of the MPRDA to change the use of the land surface rights from mining, and to exclude the solar PV facility footprint from future mining activities.			

⁴ Anglo American Climate Change Report 2021.

2. Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	YES	NO	Please explain
As per the Northern Cape Province's Twenty Year Review (2014), the green economy was identified as a new economic sector for creating new job opportunities. This forms part of the new growth path adopted by the South African government. Renewable energy (e.g., solar PV, wind energy, pumped hydro) is the focus point of the green economy. The Northern Cape has also been identified as the solar hub of the country due to the establishment of numerous solar PV facilities within the province. In addition, the development of the Solar PV Project will boost economic development as envisaged by the Northern Cape PSDF and is therefore aligned with the PSDF.			
(b) Urban edge / Edge of Built environment for the area	YES	NO	Please explain
The proposed Project will not be within the urban edge/edge of built environment for the area. The solar PV facility and associated infrastructure will be located within the Sishen Mining Right area on portions of the farms Sacha 468 and Sims 462 owned by SIOC.			
(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	YES	NO	Please explain
The integrity of the Gamagara Local Municipality's IDP and SDF would not be compromised by the proposed Project. The Gamagara Local Municipality identified solar energy initiatives as one of the key drivers of economic growth within the local municipality.			
(d) Approved Structure Plan of the Municipality	YES	NO	Please explain
The solar PV facility and associated infrastructure will be located within the Sishen Mining Right area on portions of the farms Sacha 468 and Sims 462 owned by SIOC. It is therefore unlikely that this project will be in conflict with the relevant Municipal Structure Plans.			
(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)	YES	NO	Please explain
The solar PV facility and associated infrastructure will be located within the Sishen Mining Right area on portions of the farms Sacha 468 and Sims 462 owned by SIOC. It is therefore unlikely that this project will be in conflict with the existing environmental management priorities for the area.			
(f) Any other Plans (e.g. Guide Plan)	YES	NO	Please explain
Not applicable.			

<p>3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?</p>	YES	NO	Please explain
<p>The property is within the Sishen Mining Right area and is currently being used for mining activities – existing G80 WRD. SIOC will apply for a Section 53 in terms of the MPRDA to change the use of the land surface rights from mining, and to exclude the solar PV facility footprint from future mining activities.</p> <p>The Gamagara Local Municipality identified solar energy initiatives as one of the key drivers of economic growth within the local municipality. The John Taolo Gaetsewe District Municipality states that the district will become self-reliant in the generation of electricity through investment and the exploitation of renewable energy sources. The generation of renewable energy will also enable the development of additional grid capacity. In addition, the development of the Solar PV Project will boost economic development as envisaged by the Northern Cape PSDF. The Project is therefore in-line with the key planning targets on a provincial and municipal level.</p> <p>An added benefit to the development of the Project is the repurposing of otherwise unproductive land (WRD), into land which is economically productive again. SIOC sees this strategy as an enhancement to the disturbed area and an alternative vision for the closure of the WRD which will allow for a more constructive end land use.</p>			
<p>4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)</p>	YES	NO	Please explain
<p>The Gamagara Local Municipality identified solar energy initiatives as one of the key drivers of economic growth within the local municipality. The John Taolo Gaetsewe District Municipality states that the district will become self-reliant in the generation of electricity through investment and the exploitation of renewable energy sources. The generation of renewable energy will also enable the development of additional grid capacity. In addition, the development of the Solar PV Project will boost economic development as envisaged by the Northern Cape PSDF. The community/area therefore need the activity and the associated land use.</p>			
<p>5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)</p>	YES	NO	Please explain
<p>The necessary services (e.g., water supply, power supply and waste management) with adequate current capacity will be provided by Sishen Mine. To be further addressed in the BAR for submission to the DAEARDLR once comment has been received from the Gamagara Local Municipality.</p>			
<p>6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)</p>	YES	NO	Please explain
<p>The solar PV facility and associated infrastructure will be located within the Sishen Mining Right area on portions of the farms Sacha 468 and Sims 462 owned by SIOC. It is therefore unlikely that this project will implicate the infrastructure planning of the municipality. To be further addressed in the BAR for submission to the DAEARDLR once comment has been received from the Gamagara Local Municipality.</p>			

7. Is this project part of a national programme to address an issue of national concern or importance?	YES	NO	Please explain
<p>The Project does not form part of a national programme such as the Renewable Energy Independent Power Producer Procurement Programme (REIPPP) or the Independent Power Producer (IPP) procurement programmes.</p> <p>The Project does however form part of Anglo American’s commitment to reduce their carbon footprint and is in alignment with the Anglo “FutureSmart Mining” and “Carbon Neutrality Energy Strategy”. This strategy will aid in addressing the issue of national concern/ importance to solve the energy crisis in South Africa and the mandate that the government has set to promote the implementation of greener energy generation. This proposed development will also aid in achieving South Africa’s goals in terms of sustainability, energy security, mitigating energy cost risks, local economic development and national job creation. It will also assist in reducing the procurement of fossil fuels and ensure that renewable energy has a role to play in the future South African Energy mix.</p>			
8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)	YES	NO	Please explain
<p>The solar PV facility needs to be located within the mine site in close proximity to a substation. The location was preliminary selected as the preferred site for the solar PV facility because of the following:</p> <ul style="list-style-type: none"> • The Solar PV facility will be located on existing infrastructure and tie into existing infrastructure. • The preferred location will result in revitalisation of disturbed mining areas into productive land and will not disturb other greenfield sites. • The preferred location provides for an alternative use of the WRD post closure. • The preferred location moves away from traditional rehabilitation to a more productive use of the land after mine closure. 			
9. Is the development the best practicable environmental option for this land/site?	YES	NO	Please explain
<p>The property is within the Sishen Mining Right area and is currently being used for mining activities – existing G80 WRD. An added benefit to the development of the Project is the repurposing of otherwise unproductive land (WRD), into land which is economically productive again. SIOC sees this strategy as an enhancement to the disturbed area and an alternative vision for the closure of the WRD which will allow for a more constructive end land use.</p>			
10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	YES	NO	Please explain
<p>The benefits of the Solar PV Project includes:</p> <ul style="list-style-type: none"> • Its location on existing infrastructure and it will tie into existing infrastructure. • The revitalisation of disturbed mining areas into productive land and will not disturb other greenfield sites. • An alternative use of the WRD post closure. • Moving away from traditional rehabilitation to a more productive use of the land after mine closure. 			
11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?	YES	NO	Please explain
<p>In the last ~5 years the Kathu area has seen significant solar PV development (e.g., Adams, Sishen, Deben, Kalahari Solar Power) According to the South African Renewable Energy EIA Application Database (REEA, 2021) the Project area is surrounded by several applications for solar facilities which have already been approved. The Sishen Solar PV Project will however set a precedent as it is the first in its kind to be developed on top of a WRD which adds the following benefits:</p> <ul style="list-style-type: none"> • The revitalisation of disturbed mining areas into productive land and will not disturb other greenfield sites. 			

<ul style="list-style-type: none"> An alternative use of the WRD post closure. Moving away from traditional rehabilitation to a more productive use of the land after mine closure. 			
12. Will any person's rights be negatively affected by the proposed activity/ies?	YES	NO	Please explain
<p>The solar PV facility and associated infrastructure will be located within the Sishen Mining Right area on portions of the farms Sacha 468 and Sims 462 owned by SIOC. The nearest community to the Project is Sesheng, situated directly adjacent to the access road. This is an existing road that will need to be upgraded (widened) during the construction phase of the Project. The impacts to the nearby community will therefore be of a low to negligible significance.</p>			
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?	YES	NO	Please explain
<p>The proposed Project will not compromise the urban edge. The solar PV facility and associated infrastructure will be located within the Sishen Mining Right area on portions of the farms Sacha 468 and Sims 462 owned by SIOC.</p>			
14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	YES	NO	Please explain
<p>The National Infrastructure Plan (2012) supports green energy initiatives in support of the South African economy through a diverse range of clean energy options as outlined in the Integrated Resource Plan IRP2010 through the Strategic Integrated Project (SIP 8). As such, the proposed development will contribute to SIP 8.</p>			
15. What will the benefits be to society in general and to the local communities?	Please explain		
<p>Socio-economic benefits of the proposed Project include:</p> <ul style="list-style-type: none"> Skills development and the creation of both direct and indirect jobs which will have a positive economic benefit within the region; Broader positive socio-economic benefits, at a national level, regarding the potential to contribute towards the national grid requirements; 			
16. Any other need and desirability considerations related to the proposed activity?	Please explain		
<p>Anglo American intends to develop multiple (no. 19) renewable (solar and wind) energy generation projects to create a RREE that optimises the provision of renewable energy to obtain a 24/7 carbon-neutral electricity supply across all of their operations in southern Africa. This Project, located at the Sishen Mine, forms one part of this RREE.</p> <p>The proposed Project is also located within an associated strategic transmission corridor – the Northern Corridor as identified by the Strategic Environmental Assessment (SEA) for Wind and Solar PV Energy in South Africa (CSIR, 2015). The SEA identified formally gazetted Renewable Energy Development Zones (REDZ) that are of strategic importance for large-scale wind and solar PV development in terms of Strategic Integrated Project 8: Green Energy in Support of the South African Economy, as well as five (5) associated strategic transmission corridors, including the rollout of its supporting transmission and distribution infrastructure, in terms of Strategic Integrated Project 10: Electricity Transmission and Distribution. The Project is therefore expected to contribute towards the requirement of renewable energy highlighted by the development of these zones which has in turn informed the transmission corridors.</p>			
17. How does the project fit into the National Development Plan for 2030?	Please explain		
<p>The National Development Plan (NDP), 2011 – 2030, aims to address parts of the South African triple development challenges of poverty and inequality by 2030. In order to achieve this, numerous enabling</p>			

milestones and critical actions have been formulated. One (1) of the critical actions is the formulation and implementation of interventions that aim to ensure environmental sustainability and resilience to future shocks.

The emphasis is on South African investment and assistance in the exploitation of various opportunities for low-carbon energy in the clean energy sources of Southern Africa (National Planning Commission, 2011).

A more efficient and competitive infrastructure is envisaged, particularly infrastructure that facilitates economic activity and is conducive to growth and job creation. The plan identifies key services that need strengthening; namely commercial transport, energy, telecommunications and water, while ensuring their long-term affordability and sustainability. The National Planning Commission argues that South Africa has missed a generation of capital investment in many infrastructure including electricity. Therefore, one (1) infrastructure investment priority is in the procurement of at least 20 000 MW of renewable energy-efficiency (National Planning Commission, 2011).

The proposed development is thus well aligned with the aims of the NDP.

18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.

In this report, the general objectives of Integrated Environmental Management are taken into account as follows:

- The report identifies, predicts and evaluates the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities;
- This report ensures that the effects of activities on the environment receive adequate consideration by undertaking specialist studies;
- A public participation process with adequate and appropriate opportunities for comment is in progress for the Project;
- The consideration of environmental attributes for management and decision making is an integral part of the EMPr;
- The following principles of environmental management as set out in section 2 of the NEMA are applicable to this Project:
 - 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;
 - Development must be socially, environmentally and economically sustainable; and
 - Assessment and application of applicable sustainable development objectives, as outlined in Chapter 1, Section 2 of the NEMA.

19. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.

Actions and outcomes of the EMPr include considerations for effective environmental management and the principles of sustainable development (Chapter 1, Section 2 (4) of the NEMA) when undertaking any development. Such development must be socially, environmentally and economically sustainable and must place people and their needs at the forefront of its concern, serving their physical, psychological, developmental, cultural and social interests equitably.

By developing a comprehensive EMPr (Appendix G) where the potential environmental impacts are well understood, the best practicable environmental option can be determined. This would include using local knowledge and addressing concerns from local interested and affected parties (I&APs), acknowledging that all elements of the environment are linked and interrelated, and consideration of the effects of decisions on all aspects of the environment and all people in the environment.

11. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
<p>National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA)</p>	<p>NEMA, as amended, establishes principles, and provides a regulatory framework for decision-making on matters affecting the environment. Section 2 of NEMA sets out a range of environmental principles that are to be applied by all organs of state when taking decisions that significantly affect the environment. Included amongst the key principles is that all development must be socially, economically, and environmentally sustainable and that 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. The participation of I&APs is stipulated, as is that decisions must consider the interests, needs and values of all I&APs.</p> <p>Chapter 5 of NEMA provides a framework for the integration of environmental issues into the planning, design, decision-making and implementation of plans and development proposals. Section 24 provides a framework for granting of environmental authorisations. To give effect to the general objectives of Integrated Environmental Management (IEM), the potential impacts on the environment of listed or specified activities must be considered, investigated, assessed, and reported on to the CA. Section 24(4) provides the minimum requirements for procedures for the investigation, assessment, management, and communication of the potential impacts.</p>	<p>DAEARDLR</p>	<p>19 November 1998</p>
<p>Environmental Impact Assessment Regulations, 2014 (EIA Regulations 2014) and Environmental Impact Assessment Regulations Listing notices 1, 2 and 3 published in terms of NEMA in Government Notices 982, 983, 984 and 985, 2014 (as amended)</p>	<p>The EIA Regulations 2014 promulgated in terms of Chapter 5 of NEMA and published in Government Notice (GN) R982 (as amended) control certain listed activities. These activities are listed in GN R983 (Listing Notice 1; as amended), R984 (Listing Notice 2; as amended) and R985 (Listing Notice 3; as amended), and are prohibited until an EA has been obtained from the CA. Such an EA, which may be granted subject to conditions, will only be</p>	<p>DAEARDLR</p>	<p>4 December 2014</p>

BASIC ASSESSMENT REPORT

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	<p>considered once there has been compliance with GN R982 (as amended).</p> <p>GN R982 (as amended) sets out the procedures and documentation that need to be complied with when applying for an EA. A BA process must be applied to an application if the authorisation applied for is in respect of an activity or activities listed in Listing Notices 1 and/or 3 and a Scoping and EIA process must be applied to an application if the authorisation applied for is in respect of an activity or activities listed in Listing Notice 2. As the Sishen Solar PV Project includes activities listed in Listing Notice 1, it is necessary that a BA process is undertaken in order for the DAEARDLR to consider the application in terms of NEMA.</p>		
National Water Act, 1998 (No. 36 of 1998) (NWA)	<p>Chapter 4 of the NWA requires proponents of proposed developments to submit applications to the CA (Regional Office of the DWS) where a water use listed under Section 21 of the Act is triggered. Water Use is defined broadly by the Act and includes, taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), alteration of a watercourse, removing water underground for certain purposes and recreation.</p> <p>Possible water uses that could be triggered by the development of the proposed Project are outlined below. An application for a WUL or General Authorisation (GA) must be undertaken in accordance with the regulations of GN R267 of 2017 and be submitted to the CA following the granting of an EA by DAEARDLR.</p> <p>A General Authorisation would be required for the Project for the following water uses:</p> <ul style="list-style-type: none"> • Section 21 (a) - taking water from a water resource with a capacity not exceeding 45 m³/hectare/annum per property as per GN R 538 of 2016. • Section 21 (b) - storing of water in tanks with a capacity not exceeding 2 000 m³/annum per property, within the Vaal Water Management Area as per GN R 538 of 2016; 	DWS	2 June 2014
Regulations Regarding the Procedural Requirements for Water Use Licence Applications and Appeals published in terms of NWA in Government Notice 267			24 March 2017
Several General Authorisations have been published in terms of Section 39 of the NWA (various dates)			Various dates
Purification of Waste Water or Effluent, published in terms of the Water Act, 1956 in Government Notice 991			18 May 1984

BASIC ASSESSMENT REPORT

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	<ul style="list-style-type: none"> • Section 21 (c) - impeding or diverting the flow of water in a watercourse. The access road corridor encroaches on the 500 m regulated zone of a temporary wetland. A General Authorisation is required for the 'impeding or diverting of the flow of water in a watercourse' if the activity is considered low risk as per GN. 509 of 2016. The activity was assessed as a low risk by the Freshwater Aquatic Specialist (May 2022, Appendix D). • Section 21 (g) - disposing of waste for temporary sanitation/ablution facilities with a capacity of up to 10 000 m³ per property or land as per GNR 399 of 2004. • Section 21 (i) - altering the bed, banks, course or characteristics of a watercourse. The access road corridor encroaches on the 500 m regulated zone of a temporary wetland. A General Authorisation is required for 'altering the beds, banks, course or characteristics of a watercourse' if the activity is considered low risk as per GN. 509 of 2016. The activity was assessed as a low risk by the Freshwater Aquatic Specialist (May 2022, Appendix D). 		
<p>National Environmental Management: Waste Act, 2008 (No. 59 of 2008) (NEM:WA)</p>	<p>NEM:WA regulates all aspects of waste management and has an emphasis on waste avoidance and minimisation. NEM:WA creates a system for listing and licensing waste management activities. Listed waste management activities above certain thresholds are subject to a process of impact assessment and licensing. Activities listed in Category A require a BA process, while activities listed in Category B require an EIA process. NEM:WA also provides for the setting of norms and standards for the storage and disposal of waste. These norms and standards are listed in GN R926 of 2013 (storage) and GN R636 of 2013 (disposal).</p> <p>The proposed development of the Project does not trigger a waste management activity in terms of NEM:WA, thus a Waste Management License for the Project is not required. Any waste product produced would be disposed of via suitably qualified and licensed third-party service providers.</p>	<p>DAEARDLR</p>	<p>6 March 2009</p>
<p>National Heritage Resources Act, 1999 (No. 25 of 1999)</p>	<p>The NHRA provides for the identification, assessment, and management of the</p>	<p>SAHRA</p>	<p>14 April</p>

BASIC ASSESSMENT REPORT

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
1999) (NHRA)	<p>heritage resources of South Africa. Section 38(1) of the NHRA lists development activities that would require authorisation by the responsible heritage resources authority. Activities considered applicable to the proposed Project include the following:</p> <p>“(a) The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length; (c) Any development or other activity which will change the character of a site; (i) exceeding 5 000 m² in extent”.</p> <p>The NHRA requires that a person who intends to undertake a listed activity notify the relevant provincial heritage authority at the earliest stages of initiating such a development. The relevant provincial heritage authority would then in turn, notify the person whether a Heritage Impact Assessment (HIA) should be submitted. However, according to Section 38(8) of the NHRA, a separate report would not be necessary if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act (No. 73 of 1989) (now replaced by NEMA) or any other applicable legislation. The decision-making authority should, however, ensure that the heritage evaluation fulfils the requirements of the NHRA and take into account in its decision-making any comments and recommendations made by the relevant heritage resources authority</p>		1999
Mineral and Petroleum Resources Development Act, 2002 (No. 28 of 2002) (MPRDA) and Regulations, as amended	<p>SIOC will apply separately for a Section 102 amendment of the Sishen Mine EMPr in terms of the MPRDA for changes in activities within the SIOC Mining Rights area to include the rehabilitation plan insofar as the change from vegetation to solar PV on the WRD.</p> <p>SIOC will apply for a Section 53 in terms of the MPRDA to exclude the solar PV facility footprint from future mining activities.</p> <p>SIOC will apply separately for a Section 102 amendment of the Sishen Mine EMPr in terms of the MPRDA to exclude the solar PV footprint from the Sishen</p>	DMRE	3 October 2002

BASIC ASSESSMENT REPORT

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	Mining Right area.		
ADDITIONAL APPLICABLE LEGISLATION			
Mine Health and Safety Act, 1996 (No. 29 of 1996) (MHSA) and Regulations	SIOC will apply for exemption from Section 79 of the MHSA	DMRE	30 May 1996
Occupational Health and Safety Act, 1993 (No. 85 of 1993) and Major Hazard Installation Regulations	<p>The OHSA provides for the health and safety of persons at work and the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work. Every employer shall provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to the health of his employees.</p> <p>The construction and operation of the proposed Project will include activities that are deemed as hazards and/risk to the health and safety of the employees employed on the Project. Such hazards/risks should be managed in accordance with the relevant requirements of the Act.</p>	Department of Labour	23 June 1993
National Environmental Management: Biodiversity Act, 2004 (No. 10 of 2004)	<p>Biodiversity has been taken into account as part of Project planning.</p> <p>The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA), as amended, aims to provide for the management and conservation of South Africa's biodiversity within the framework of NEMA, the protection of species and ecosystems that warrant national protection, the sustainable use of indigenous biological resources and the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources. The Act places severe restrictions on activities that could have adverse effects on threatened or protected species.</p> <p>The purpose of the Act includes the following:</p> <ul style="list-style-type: none"> • The management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998; • The protection of species and ecosystems that warrant national protection; and 	DAEARDLR	31 May 2004

BASIC ASSESSMENT REPORT

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	<ul style="list-style-type: none"> • The sustainable use of indigenous resources and the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources. <p>The Act makes provision for the protection of threatened or protected ecosystems and species as well as provisions guarding against the introduction of alien and invasive species. The Act identifies restricted activities involving listed threatened, protected or alien species. These activities include picking parts of, or cutting, chopping off, uprooting, damaging, or destroying, any specimen of a listed threatened or protected species. As stipulated in Section 57 of the Act, a person may not carry out a restricted activity involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 7.</p> <p>A permit will be required to engage in restricted activities for the proposed Project in accordance with Section 88 of the Act.</p>		
<p>Conservation of Agricultural Resources Act, 1983 (No. 43 of 1983)</p>	<p>The Conservation of Agricultural Resources Act, 1983 (No. 43 of 1983) (CARA) provides for the control over the utilization of the natural agricultural resources of the country in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants. Section 5 of the Act prohibits the spread of weeds through the prohibition of their sale. GN R1084 (published under CARA) provides categories for the classification of the various weeds and invader plants, and restrictions where these species may occur. Regulation 15E of GN R1084 provides methods to be implemented for the control of weeds and invader species. CARA finds application throughout the lifecycle of the proposed Project. As a result, soil conservation and erosion prevention management and mitigation measures need to be implemented. Furthermore, an Alien and Invasive Plant species Control and Management Plan must be developed and implemented for the</p>	<p>DAEARDLR</p>	<p>21 April 1983</p>

BASIC ASSESSMENT REPORT

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	duration of the life cycle of the proposed Project.		
National Veld and Forest Fire Act, 1998 (No. 10 of 1998) (NVFA)	<p>The NVFA in Chapter 4 requires landowners to prepare and maintain firebreaks, as well as the role of adjoining landowners and the fire protection association in an area.</p> <p>The Act through Chapter 5 requires all landowners to acquire firefighting equipment and have available personnel for firefighting. Landowners with land where a veldfire may start or burn or from whose land it may spread must have firefighting equipment and personnel available.</p> <p>There are no permitting requirements for the proposed Project in accordance with the NVFA. However, it must be ensured that firebreaks within the boundaries of the Project site are prepared and maintained and that firefighting equipment and personnel for the duration of the Project life cycle of the proposed development is made available.</p>	DAEARDLR	19 November 1998
Northern Cape Nature Conservation Act No. 9 of 2009 (NCNCA)	<p>Chapter 4 and Section 30 of the Act prohibits any persons from removing indigenous species listed in Schedule 6 of the Act without a valid permit from the relevant authority.</p> <p>This Act finds relevance to the Sishen Solar PV Project on the basis that protected plant species in terms of the Act may be present within the Project site and floral permits will be required from the relevant authority prior to the commencement of the construction phase for the removal of identified protected plant species. SIOC will be required to obtain permits from the relevant authority for the removal of protected indigenous plant species in terms of the Act following the completion of the final site walkdown survey of the Project site and prior to the commencement of the construction phase.</p>	DAEARDLR	15 December 2009
Hazardous Substances Act, 1973 (Act No. 15 of 1973)	The Hazardous Substances Act, 1973 (Act No. 15 of 1973) (HAS) was promulgated to provide for the control of substances which may cause injury, ill-health, or death. Substances are defined as hazardous if their inherent nature is toxic, corrosive, irritant, strongly sensitising, flammable and pressure	Department of Health	26 March 1973

BASIC ASSESSMENT REPORT

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	<p>(under certain circumstances) which may injure ill-health, or death in humans.</p> <p>The Act provides for the division of hazardous substances or products into four groups in relation to the degree of danger, the prohibition and control of the importation, manufacture, sale, use, operation, application, and disposal of such substances.</p> <ul style="list-style-type: none"> • Group 1: includes all hazardous substances defined in the Act; • Group 2: substances include mixtures of Group 1 substances; • Group 3: substances include substances found in certain electronic products (i.e., product with an electronic circuit); and • Group 4: substances includes all radioactive substances. <p>The use or sale of Group I, II and III hazardous substances is prohibited. Should the use of these substances be required for the proposed Project, a permit application should be submitted in terms of Section 4 of the Act.</p>		
Municipal Systems Act, 2000 (Act No. 32 of 2000)	<p>The Municipal Systems Act, 2000 (Act N. 32 of 2000) was promulgated for the administration of municipalities. The Act requires that the Constitution and other legislation, i.e., NEMA be incorporated into strategic plans at local government level. The Act regulates municipal service delivery and provides a comprehensive range of service delivery mechanisms through which municipalities may provide municipal services. The Act explains the process to be applied and the criteria to be considered in reviewing and selecting municipal service delivery mechanisms.</p> <p>The Act provides that each municipal council must adopt a single, inclusive, and strategic Integrated Development Plan (IDP) for the development of the municipality. At a municipal level, IDPs may require the implementation of renewable energy projects. As a result, IPPs should consult with the relevant structures of the municipality within which a development is located.</p>	Gamagara Local Municipality	24 August 2001

BASIC ASSESSMENT REPORT

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
<p>The Spatial Planning and Land Use Management Act, 2013 (No. 6 of 2013) (SPLUMA)</p>	<p>SPLUMA aims to confirm and regulate the role of municipalities in land use planning and management. Objectives of the Act relevant to the proposed Project ensure that the system of spatial planning and land use management promotes social and economic inclusion and to provide for the sustainable and efficient use of land.</p> <p>The current zoning of the Project site is special purpose; thus, a rezoning application would not be required to change the zoning of the site.</p>	<p>Spatial Planning and Land Use Management</p>	<p>2 August 2013</p>
<p>Astronomy Geographic Advantage Areas Act, 2007 (Act No. 21 of 2007)</p>	<p>The then Minister of Science and Technology in 2010 declared all land in the Northern Cape Province situated 250 km from the centre of the South African Large Telescope Dome as an 'Astronomy Advantage Area (AAA)' for optical astronomy purposes and the whole of the territory of the province, excluding Kimberly as an astronomy advantage area for radio astronomy purposes.</p> <p>From a renewable energy perspective, wind energy projects are more likely to contravene the objects of the Act. As a result, the proposed Project requires the construction and operation of a solar PV facility and the Project site is located within an Astronomy Advantage Area. Although the proposed Project is not anticipated to contravene the objects of the Act, the administering authorities will be consulted throughout the BA process.</p>	<p>Square Kilometre Array (SKA) and South African Large Telescope (SALT)</p>	<p>17 June 2008</p>
<p>Renewable Energy Development Zones (REDZs) and Strategic Transmission Corridors</p>	<p>The Strategic Environmental Assessment (SEA) for Wind and Solar PV Energy in South Africa (CSIR, 2015) originally identified eight (8) formally gazetted REDZs that are of strategic importance for large-scale wind and solar PV development in terms of Strategic Integrated Project 8: Green Energy in Support of the South African Economy. Five (5) formally gazetted strategic transmission corridors were also identified for the rollout of the large-scale wind and solar PV developments' supporting transmission and distribution infrastructure, in terms of Strategic Integrated Project 10: Electricity Transmission and Distribution.</p> <ul style="list-style-type: none"> • REDZs for large-scale wind and solar photovoltaic development; 	<p>DFFE</p>	<p>16 February 2018</p>

BASIC ASSESSMENT REPORT

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	<ul style="list-style-type: none"> • associated Strategic Transmission Corridors which support areas where long-term electricity grid will be developed; • exclusion of activities from the requirement to obtain environmental authorisation; • process of BA to be followed and reduced decision-making timeframe for processing of applications for environmental authorisation in terms of the NEMA; and • acceptance of routes which have been pre-negotiated with all landowners as part of applications for environmental authorisations for power lines and substations. <p>In addition to the eight (8) formally gazetted REDZs mentioned above, the Phase 2 SEA for Wind and Solar Photovoltaic Energy in South Africa (2019) identified three (3) additional REDZs (namely REDZ 9, REDZ 10 and REDZ 11) that are of strategic importance for large scale wind and solar photovoltaic energy development. These REDZs were published under Government Notice No. 786, Government Gazette No. 43528 of 17 July of 2020, and were officially gazetted under Government Notice No. 144, Government Gazette No. 44191 of 26 February 2021.</p> <p>Although the proposed Project is not located within any of the above-mentioned REDZs, it is located within an associated strategic transmission corridor – the Northern Corridor. The Project is therefore expected to contribute towards the requirement of renewable energy highlighted by the development of these zones which has in turn informed the transmission corridors.</p>		
Renewable Energy Development Zones (REDZs) and Strategic Transmission Corridors	The Strategic Environmental Assessment (SEA) for Wind and Solar PV Energy in South Africa (CSIR, 2015) originally identified eight (8) formally gazetted REDZs that are of strategic importance for large-scale wind and solar PV development in terms of Strategic Integrated Project 8: Green Energy in Support of the South African Economy, as well as five (5) associated strategic	DFFE	16 February 2018

BASIC ASSESSMENT REPORT

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	<p>transmission corridors, including the rollout of its supporting transmission and distribution infrastructure, in terms of Strategic Integrated Project 10: Electricity Transmission and Distribution.</p> <ul style="list-style-type: none"> • REDZs for large-scale wind and solar photovoltaic development; • associated Strategic Transmission Corridors which support areas where long-term electricity grid will be developed; • process of BA to be followed and reduced decision-making timeframe for processing of applications for environmental authorisation in terms of the NEMA; and • acceptance of routes which have been pre-negotiated with all landowners as part of applications for environmental authorisations for power lines and substations. <p>In addition to the eight (8) formally gazetted REDZs mentioned above, the Phase 2 SEA for Wind and Solar Photovoltaic Energy in South Africa (2019) identified three (3) additional REDZs (namely REDZ 9, REDZ 10 and REDZ 11) that are of strategic importance for large scale wind and solar photovoltaic energy development. These REDZs were published under Government Notice No. 786, Government Gazette No. 43528 of 17 July of 2020, and were officially gazetted under Government Notice No. 144, Government Gazette No. 44191 of 26 February 2021.</p> <p>Although the proposed Project is not located within any of the above-mentioned REDZs, it is located within an associated strategic transmission corridor – the Northern Corridor. The Project is therefore expected to contribute towards the requirement of renewable energy highlighted by the development of these zones which has in turn informed the transmission corridors.</p>		
National Road Traffic Act, 1996 (No. 93 of 1996)	The Act and the National Traffic Regulations, 2000 provide certain limitations on vehicle dimensions and axle and vehicle masses that a vehicle using a public road at any given time must comply with. Certain vehicles and loads	South African National Roads Agency	12 November 1996

BASIC ASSESSMENT REPORT

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	<p>cannot be moved on public roads without exceeding the limitations in terms of the dimensions and/or mass as prescribed. Where such a vehicle or load cannot be dismantled, without disproportionate effort, expense, risk, or damage, into units that can travel or be transported legally. Such load is classified as an abnormal load and is permitted to be transported on public roads under an exemption permit issued in terms of Section 81 of the Act.</p> <p>A permit application in terms of Section 81 of the Act will be required for the transportation of key infrastructure components and machinery to the Project site during the construction phase of the proposed Project.</p>		
<p>Civil Aviation Act, 2009 (Act No. 13 of 2009) (CAA)</p>	<p>The CAA governs civil aviation in the Republic. The Act provides for the establishment of a stand-alone authority mandated with the controlling, promoting, regulating, supporting, developing, enforcing, and continuously improving levels of safety and security throughout the civil aviation industry. This mandate is fulfilled by the South African Civil Aviation Authority (SACAA), an agency of the Department of Transport (DoT).</p> <p>The SACAA achieves the objectives of the Act by complying with the Standard and Recommended Practices (SARPs) of the International Civil Aviation Organisation (ICAO), while considering the local context when issuing the South African Civil Aviation Regulations (SA CARs). All proposed developments or activities in South Africa that potentially could affect civil aviation must be assessed by SACCAA in terms of the CARs and the South African Civil Aviation Technical Standards (SA CATs) in order to ensure civil aviation safety.</p> <p>The SACAA will be provided with the BAR of the proposed Project for their comment during the 30-day review and comment periods.</p>	<p>SACAA</p>	<p>27 May 2007</p>
GUIDELINES			
<p>Procedures for the Assessment and Minimum Criteria for reporting on identified environmental</p>	<p>Provides procedures for ground-truthing environmental themes identified by the web-based Screening Tool. The baselines studies used in the Scoping</p>	<p>DFFE</p>	<p>2020</p>

BASIC ASSESSMENT REPORT

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation	Report have been undertaken in accordance with the requirements of this Notice, where relevant.		
Best Practice Guidelines Birds & Solar Energy	Provide guidelines for assessing and monitoring the impact of solar generation facilities on birds in Southern Africa.	Birdlife South Africa and Endangered Wildlife Trust	2017
Public Participation in terms of NEMA, EIA Regulations	The purpose of this guideline is to ensure that an adequate public participation process was undertaken during the Scoping and EIA process.	DFFE	10 October 2012
Guideline on need and desirability in terms of the EIA Regulations	These guidelines inform the consideration of the need and desirability aspects of the proposed Project.	DFFE	20 October 2014

12. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?

YES	NO
200 m ³	

If YES, what estimated quantity will be produced per month?

How will the construction solid waste be disposed of (describe)?

All solid wastes generated (hazardous and general) will be disposed of at a licensed landfill site by means of contracting a suitably registered waste handling company.

Where will the construction solid waste be disposed of (describe)?

All wastes that cannot be reused or recycled would be collected by contracting a suitably registered waste handling company to transport, handle and dispose of at a licensed landfill site.

Will the activity produce solid waste during its operational phase?

YES	NO
200 m ³	

If YES, what estimated quantity will be produced per month?

How will the solid waste be disposed of (describe)?

All solid wastes generated (hazardous and general) will be disposed of at a licensed landfill site by means of contracting a suitably registered waste handling company.

If the solid waste will be disposed of into a municipal waste stream, indicate which registered landfill site will be used.

Kathu Municipal landfill site

Where will the solid waste be disposed of if it does not feed into a municipal waste stream (describe)?

Not applicable.

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the NEM:WA?

YES	NO
-----	----

If YES, inform the competent authority and request a change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

All solid wastes generated (hazardous and general) will be temporarily stored (for less than 90 days) at an onsite facility with a capacity not exceeding the thresholds of Category C of the List of Waste Management Activities in terms of NEM:WA. Solid waste will also be disposed of at a licensed landfill site by means of contracting a suitably registered waste handling company. The proposed development of the Project does not trigger Category A or B waste management activities in terms of NEM:WA, thus a Waste Management License and a full Scoping and EIA process are not required for the Project.

Is the activity that is being applied for a solid waste handling or treatment facility?

YES	NO
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If YES, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?

YES	NO
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If YES, what estimated quantity will be produced per month?

Not applicable.

Will the activity produce any effluent that will be treated and/or disposed of on site?

YES	NO
-----	----

If YES, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Not applicable.

Will the activity produce effluent that will be treated and/or disposed of at another facility?

YES	NO
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If YES, provide the particulars of the facility:

Facility name:	Sewage treatment infrastructure at Sishen Mine.		
Contact person:	Nadia Williams		
Postal address:	Private Bag X506, Kathu		
Postal code:	8446		
Telephone:	053 739 2203	Cell:	081 033 1159
E-mail:	Nadia.williams@angloamerican.com	Fax:	-

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

No wastewater other than normal sewage will be generated by the proposed Project.

c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere other than exhaust emissions and dust associated with construction phase activities?

YES	NO
-----	----

If YES, is it controlled by any legislation of any sphere of government?

YES	NO
-----	----

If YES, the applicant must consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If NO, describe the emissions in terms of type and concentration:

Not applicable

d) Waste permit

Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM:WA?

YES	NO
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If YES, please submit evidence that an application for a waste permit has been submitted to the competent authority

Not applicable.

e) Generation of noise

Will the activity generate noise?

YES	NO

If YES, is it controlled by any legislation of any sphere of government?

Describe the noise in terms of type and level:

Not applicable

13. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):

Municipal	Water board	River, stream, dam or lake	Other	The activity will not use water
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If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:

2 166 m³/month

Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water Affairs?

YES	NO
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If YES, please provide proof that the application has been submitted to the Department of Water Affairs.

Proof will be provided upon submission to DWS.

14. ENERGY EFFICIENCY

Describe the design measures, if any, which have been taken to ensure that the activity is energy efficient:

The nature of the Project and main activity is the development of a facility for the generation of electricity from a renewable resource in order to reduce SIOC's carbon footprint. As part of the Project the BESS is also driven by energy efficiency as it allows for the storage of surplus energy generated by the solar PV facility for later use. The BESS enables a balance between supply and demand of electricity during the day and allows for use of stored energy during peak demand periods, i.e., morning and evenings. Energy generated from the PV panel array is DC and converted to AC by the inverters and then transferred to the on-site substation where it is determined if the energy should be stored or evacuated. When the energy is required, it is evacuated into the grid network, and when it is not required, it is transferred to the BESS and stored for later use.

In addition, all energy efficiency guidelines will be followed during the planning and design stage including supply of energy efficient equipment etc.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

Power for construction activities will be sourced from Eskom through the existing Sishen Mine operations and supplemented by diesel generators where required. No alternative energy sources have been taken into account.

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

1. For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section B and indicate the area, which is covered by each copy No. on the Site Plan.

Section B Copy No. (e.g. A):

2. Paragraphs 1 - 6 below must be completed for each alternative.

3. Has a specialist been consulted to assist with the completion of this section? YES NO

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed and attach it in Appendix I. All specialist reports must be contained in Appendix D.

Property description/physical address:

Province	Northern Cape	
District Municipality	John Taolo Gaetsewe District Municipality	
Local Municipality	Gamagara Local Municipality	
Ward Number(s)	Ward 5	
Farm name and number	Farm Sacha 468 and Farm Sims 462	
Portion number	Farm Sacha 468: Portion 2 and Remaining Extent Farm Sims 462: Portion 1	
SG Code	Farm name & portion	21-digit Surveyor General Code
	Farm Sacha 468, Portion 2	C0410000000046800002
	Farm Sacha 468, Remaining Extent	C0410000000046800000
	Farm Sims 462, Portion 1	C0410000000046200001

Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above.

Current land-use zoning as per local municipality IDP/records:

Special Zone - Mining

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

Is a change of land-use or a consent use application required? YES NO

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7.5	1:7.5 – 1:5	Steeper than 1:5
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Alternative S2 (if any): Not applicable

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7.5	1:7.5 – 1:5	Steeper than 1:5
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Alternative S3 (if any): Not applicable

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7.5	1:7.5 – 1:5	Steeper than 1:5
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2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

2.1 Ridgeline	<input type="checkbox"/>	2.4 Closed valley	<input type="checkbox"/>	2.7 Undulating plain / low hills	<input checked="" type="checkbox"/>
2.2 Plateau	<input type="checkbox"/>	2.5 Open valley	<input type="checkbox"/>	2.8 Dune	<input type="checkbox"/>
2.3 Side slope of hill/mountain	<input type="checkbox"/>	2.6 Plain	<input type="checkbox"/>	2.9 Seafront	<input type="checkbox"/>
2.10 At sea	<input type="checkbox"/>				

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following?

	Alternative S1:		Alternative S2 (if any):		Alternative S3 (if any):	
Shallow water table (less than 1.5m deep)	YES	NO	YES	NO	YES	NO
Dolomite, sinkhole or doline areas	YES	NO	YES	NO	YES	NO
Seasonally wet soils (often close to water bodies)	YES	NO	YES	NO	YES	NO
Unstable rocky slopes or steep slopes with loose soil	YES	NO	YES	NO	YES	NO
Dispersive soils (soils that dissolve in water)	YES	NO	YES	NO	YES	NO
Soils with high clay content (clay fraction more than 40%)	YES	NO	YES	NO	YES	NO
Any other unstable soil or geological feature	YES	NO	YES	NO	YES	NO
An area sensitive to erosion	YES	NO	YES	NO	YES	NO

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted.

4. GROUNDCOVER

Indicate the types of groundcover present on the site. The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld in good condition ^E	Natural veld with scattered aliens ^E	Natural veld with heavy alien infestation ^E	Veld dominated by alien species	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an “E” is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn’t have the necessary expertise.

5. SURFACE WATER

Indicate the surface water present on and or adjacent to the site and alternative sites?

Perennial River	YES	NO	
Non-Perennial River	YES	NO	
Permanent Wetland	YES	NO	
Seasonal Wetland	YES	NO	
Artificial Wetland	YES	NO	
Estuarine / Lagoonal wetland	YES	NO	

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

The site assessment confirmed the presence of the following surface water features within the investigation area (500 m regulated area buffer zone) associated with the proposed Sishen Solar PV Project:

- Sishen Mine sumps which are located to the west and north-eastern portions of the investigation area;
- artificial preferential flow path to the north the Project area;
- artificial ponding to the north of the Project area;
- artificial dam which is located in the western portion of the investigation area
- cryptic (temporary depression) wetland to the north;
- valleyhead seep depression wetland to the north-eastern portion of the investigation area; and
- two drainage lines which are located in the north-eastern portion of the investigation area.

Only the access road corridor and entrance alternatives encroach on the 500 m (GN 509) regulated zone of the identified cryptic (temporary depression) and the valleyhead seep depression wetlands. The cryptic (temporary depression wetland) is within ~ 60 m from the pre-existing access road corridor entrance alternatives 1 and 3. The pre-existing access road corridor entrance alternative 2 is within the 32 m NEMA zone of regulation of the valleyhead seep depression wetland.

6. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

Natural area	Dam or reservoir	Pole fields
Low density residential	Hospital/medical centre	Filling station ^H
Medium density residential	School	Landfill or waste treatment site
High density residential	Tertiary education facility	Plantation
Informal residential ^A	Church	Agriculture
Retail commercial & warehousing	Old age home	River, stream or wetland
Light industrial	Sewage treatment plant ^A	Nature conservation area
Medium industrial ^{AN}	Train station or shunting yard ^N	Mountain, koppie or ridge
Heavy industrial ^{AN}	Railway line ^N	Museum
Power station	Major road (4 lanes or more) ^N	Historical building
Office/consulting room	Airport ^N	Protected Area
Military or police base/station/compound	Harbour	Graveyard
Spoil heap or slimes dam ^A	Sport facilities	Archaeological site
Quarry, sand or borrow pit	Golf course	Other land uses (describe)

If any of the boxes marked with an "N" are ticked, how this impact will / be impacted upon by the proposed activity? Specify and explain:

Not applicable.

If any of the boxes marked with an "Aⁿ" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

Not applicable.

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

Not applicable.

Does the proposed site (including any alternative sites) fall within any of the following:

Critical Biodiversity Area (as per provincial conservation plan)	YES	NO
Core area of a protected area?	YES	NO
Buffer area of a protected area?	YES	NO
Planned expansion area of an existing protected area?	YES	NO
Existing offset area associated with a previous Environmental Authorisation?	YES	NO
Buffer area of the SKA?	YES	NO

If the answer to any of these questions was YES, a map indicating the affected area must be included in Appendix A.

7. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site? If YES, explain:

YES	NO
Uncertain	

Not applicable.

If uncertain, conduct a specialist investigation by a recognised specialist in the field (archaeology or palaeontology) to establish whether there is such a feature(s) present on or close to the site. Briefly explain the findings of the specialist:

The Project area is completely transformed through initial iron ore mining activities, with subsequent expansion of the WRD over time. These developments would have destroyed surface indicators of heritage resources if any were present in the area. Areas within the farms Sacha 468 and Sims 462 were excavated in the 1980s by Peter Beaumont. As such any artefacts of heritage value related to Stone Age sites that could have been impacted on by the mining activities, have already been removed and preserved leaving isolated artefacts of low significance behind. The extensive disturbance of the site and the fact that no in-situ deposit will be disturbed by the Project means that the Project area is considered to be of low heritage potential.

Based on the SAHRA paleontological map the Project area is of high sensitivity. An independent assessment by Bamford (2022) concluded that the WRD on which the proposed Project will be developed lie on potentially moderately fossiliferous Tertiary surface limestone. However, the Project area is highly disturbed and the waste rock is likely to be non-fossiliferous banded iron of the Kuruman Formation. Therefore, the chance of finding fossils is extremely low. Nonetheless, a Fossil Chance Find Protocol has been included in the EMP. See 'Application for Exemption from a Heritage Impact Assessment for the Proposed Development of a Solar PV Facility and Associated Infrastructure at the Sishen Iron Ore Mine in Appendix D.

Will any building or structure older than 60 years be affected in any way?

YES	NO
YES	NO

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

If YES, please provide proof that this permit application has been submitted to SAHRA or the relevant provincial authority.

8. SOCIO-ECONOMIC CHARACTER

a) Local Municipality

Please provide details on the socio-economic character of the local municipality in which the proposed site(s) are situated.

Level of unemployment:

According to Census 2011, 17.7% of the population within the Gamagara Local Municipality was unemployed, with a youth (15 – 34 years) unemployment rate of 22.4%. The employment rate of the population within Ward 5 of the local municipality was 57.6%, with 14.4% employed within the informal and 70.1% within the formal sectors. The average annual household income was R 29 400.

Economic profile of local municipality:

The Project is situated in the Gamagara Local Municipality, which is one of three local municipalities within the John Taolo Gaetsewe District Municipality.

The local municipality had a population of 53 656 people in 2016. Population density is around 16 people per square kilometre. According to Census 2011, Ward 5 of the local municipality had a population density of 11 people per square kilometre. In the Project specific footprint level, located within the Gamagara non-urban (NU) area, had a population of 992 people in 2011 and a population density of 0.42 people per square kilometre.

According to the Community Survey 2016, more than 74.5% of the population in the local municipality falls within the 15 - 64 age cohort, while 23.2% are under 15 years old. About 2.3% of the population is older than 65 years. The population growth rate in 2016 was 5.771% per year. The dependency ratio is 34.2 per 100 people within the 15 - 64 age cohort. In the Project footprint area 78.6% of the population falls within the 15 – 64 cohort, while 16.5% are under 15 years of age. About 4.8% of the population is older than 65 years.

According to the Community Survey 2016, there are 15 723 households in the local municipality, with an average household size of 3 persons. Almost 22% of households are female-headed households. Almost 80% of households live in formal dwellings. There are 452 households within the Project footprint area, with an average household size of two persons. More than 18% of households are female-headed households. More than 85.1% of households live in formal dwellings.

In the local municipality, the language most spoken at home is Setswana (67.4%), and 90.7% of the population is considered “Black African.” The language most spoken at home in the Project footprint area is Afrikaans (51.77%), and 50.35% of the population is “Black African”.

The information was sourced from the Social Impact Assessment for the Proposed Development of a Solar PV Facility and Associated Infrastructure at the Sishen Iron Ore Mine in Appendix D.

Level of education:

According to Community Survey 2016, 8% of the population within the local municipality has no schooling, 33.0% has Matric and 10.8% has higher education. According to Census 2011, 61.42% of the population within Ward 5 of the local municipality has completed Grade 9 or higher and 29.4% have completed Matric or higher, with 87% of school-aged children (5 - 17 years), attending school. On a Project footprint area level, 21.6% of the population has completed matric and 12.2% completed a higher education.

b) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	R 906 722 8501 million
What is the expected yearly income that will be generated by or as a result of the activity?	More than R 65 million
Will the activity contribute to service infrastructure?	YES NO
Is the activity a public amenity?	YES NO
How many new employment opportunities will be created in the development and construction phase of the activity/ies?	300 people
What is the expected value of the employment opportunities during the development and construction phase?	To be determined

What percentage of this will accrue to previously disadvantaged individuals?	To be determined
How many permanent new employment opportunities will be created during the operational phase of the activity?	30 people
What is the expected current value of the employment opportunities during the first 10 years?	To be determined
What percentage of this will accrue to previously disadvantaged individuals?	To be determined

9. BIODIVERSITY

Please note: The Department may request specialist input/studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed activity/ies. To assist with the identification of the biodiversity occurring on site and the ecosystem status consult <http://bgis.sanbi.org> or BGIShelp@sanbi.org. Information is also available on compact disc (cd) from the Biodiversity-GIS Unit, Ph (021) 799 8698. This information may be updated from time to time and it is the applicant/ EAP’s responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) must be provided as an overlay map to the property/site plan as Appendix D to this report.

[The Aquatic Ecology Impact Assessment Specialist Report \(Scientific Aquatic Services, 2022\)](#) and [the Avifaunal Impact Assessment Specialist Report \(Scientific Terrestrial Services, 2022\)](#) are included in Appendix D. A Sensitivity Map is included in Appendix A.

- a) **Indicate the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category)**

Systematic Biodiversity Planning Category				If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan
Critical Biodiversity Area (CBA)	Ecological Support Area (ESA)	Other Natural Area (ONA)	No Natural Area Remaining (NNR)	<p>The bio-physical environment of the preferred Project site has already been altered by the existing mining operations and the historical use of the Project site as a WRD.</p> <p>A very small eastern portion of the access road corridor is considered to have a very high sensitivity. The triggered sensitivity features include an ESA. The majority (95%) of the Project area is considered to have a low sensitivity.</p> <p>According to the Technical Guidelines for Critical Biodiversity Area Maps document, ESAs are areas that must retain their ecological processes in order to meet biodiversity targets for ecological processes that have not been met in CBAs or protected areas; meet biodiversity targets for the representation of ecosystem types or Species of special concern when it's not possible to meet them in CBAs; support ecological functioning of protected areas or CBAs or a combination of these (SANBI, 2017).</p> <p>A small area of the western portion of the solar PV plant and a small area of the eastern portion of the access road corridor falls within an area that is identified as ONA.</p> <p>According to the Technical Guidelines for CBA Maps document, ONAs consist of all those areas in good or fair ecological condition that fall outside the protected area network and have not been identified as CBAs or ESAs (SANBI, 2017).</p> <p>Several avifaunal Species of Conservation Concern (SCC) have distribution ranges which encompass the Project area, however, only one species may make use of the Project area for foraging purposes, namely <i>Polemaetus bellicosus</i> (Martial Eagle, EN).</p>

b) Indicate and describe the habitat condition on site

BASIC ASSESSMENT REPORT

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes etc).
Natural	0%	
Near Natural (includes areas with low to moderate level of alien invasive plants)	65%	This habitat comprises all areas that had either been previously cleared during mining activities or such areas that form part of the existing WRD. All these areas have now been rehabilitated through active revegetation activities undertaken by Sishen Mine.
Degraded (includes areas heavily invaded by alien plants)	0%	
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	35%	This includes all areas devoid of vegetation that form part of the active mining area. Such areas include buildings, parking areas and the active mining footprint where no vegetation is present.

c) Complete the table to indicate:

- (i) the type of vegetation, including its ecosystem status, present on the site; and
- (ii) whether an aquatic ecosystem is present on site.

Terrestrial Ecosystems		Aquatic Ecosystems								
Ecosystem threat status as per the National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	Critical	Wetland (including rivers, depressions, channelled and unchannelled wetlands, flats, seeps pans, and artificial wetlands)			Estuary		Coastline			
	Endangered									
	Vulnerable									
	Least Threatened									
		YES	NO	UNSURE	YES	NO	YES	NO		

d) Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats)

1. TERRESTRIAL ECOSYSTEM

1.1 Vegetation Type

The Project area is located within the Griqualand West Centre (GWC) of plant endemism. This semi-arid region is broadly described as savanna, forming part of the eastern Kalahari Bushveld Bioregion. Studies investigating the endemism of the GWC report at least 23 plant species that have restricted distributions (Frisby et al. 2019). The Project area falls within the Savanna Biome and only a portion of the access road corridor (north-eastern) and a small portion of the Solar PV Facility (eastern) is situated within the Kathu Bushveld vegetation, a Least Concerned vegetation type.

1.2 Habitat Units and Sensitivity

Three habitat units were identified by SAS namely the Kathu Bushveld, the Modified Habitat and the Transformed Habitat. The Kathu Bushveld Habitat comprises the remaining naturally vegetated areas within the Project area that have not been previously cleared or revegetated as part of rehabilitation activities. This habitat provides suitable structure in terms of woody and herbaceous species and as such, is considered the most suitable habitat for avifauna in the study area. However, although the habitat is more intact than the other habitat units, the surrounding mining activities and edge effects have impacted upon avifaunal diversity and abundance.

The Modified Habitat comprises all areas that had either been previously cleared during mining activities or such areas that formed part of the existing WRD. All these areas have now been rehabilitated through active revegetation activities undertaken by Sishen Mine. This habitat comprises a mix of indigenous pioneer and subclimax grasses that produce a high number of seeds. The grass sward is dense with limited bare patches visible, except where recent heavy rainfall has led to erosion, notably on the sides of the WRD. In some areas woody species (*Vachellia* sp and *Senegalia* sp) have been planted or naturally colonized this habitat unit.

The Transformed Habitat unit includes all areas devoid of vegetation that form part of the active mining area. Such areas include buildings, parking areas and the active mining footprint where no vegetation is present.

The sensitivity and development implications for the three habitat units identified is included in Table 5 below.

Table 5: Habitat Units in the Project area (STS, 2022)

Habitat unit	Sensitivity	Development Implications
Kathu Bushveld Habitat	Moderately Low Sensitivity <u>Conservation Objective for areas of Low Sensitivity:</u> Optimise development potential while improving biodiversity integrity of surrounding natural habitat and managing edge effects.	This habitat unit comprises indigenous woody and herbaceous plant species which provide suitable, albeit of limited extent in the Project area, for avifauna. This habitat unit within the Project area forms a small portion of the larger Kathu Bushveld vegetation type beyond the study area. This habitat unit is primarily associated with areas adjacent existing roads and mining structures, resulting in impacts from edge effects, notably noise and dust. Although common avifauna do make use of this habitat, it is limited and likely forms peripheral foraging grounds for these species. Only commonly occurring species widespread from the region were observed, with no SCC likely to make use of this habitat unit.
Modified Habitat	Low Sensitivity <u>Conservation Objective for areas of Low Sensitivity:</u> Optimise development potential while improving biodiversity integrity of surrounding natural habitat and managing edge effects.	The vegetation in this habitat unit is largely homogenous in nature and structure, limiting habitat and food resources for avifaunal species. The modified habitat has the potential to support several commonly occurring avifaunal species, however this habitat unit is not considered important for avifaunal SCC.

<p>Transformed Habitat</p>	<p>Low Sensitivity <u>Conservation Objective for areas of Low Sensitivity:</u> Optimise development potential while improving biodiversity integrity of surrounding natural habitat and managing edge effects</p>	<p>Development within this habitat unit poses no threat to avifaunal species neither within the Project area nor in the adjacent areas.</p>
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2. AVIFAUNA SPECIES OF CONSERVATION CONCERN

No avifaunal SCC were observed by SAS within the Project area. Further, assessments of the areas adjacent to the Project area, notably below the WRD, did not yield any observations of avifaunal SCC either. From the desktop study, it is evident that avifaunal SCC abundance and diversity is very limited in the associated pentads, with only a single species, namely *Polemaetus bellicosus* (Martial Eagle, EN) recorded previously. This species is a wide-ranging raptor and will forage over large expanses in search of prey items. This species may forage along the lower lying areas of the WRD where prey items such as scrub hares may occur. The slopes and the upper reaches of the WRD however provide limited foraging opportunities due to the dense grass layer and limited prey species. Although this avifaunal SCC have a medium to high Probability of Occurrence (POC) within the Project area, the Project area may form a peripheral forage area and is not considered to be an important area for this species. It is important to note however that the solar PV facility is unlikely to exhibit any negative influence on this species beyond the footprint area.

Although not listed in the pentads associated with the Project area, *Ardeotis kori* (Kori Bustard, NT) and *Sagittarius serpentarius* (Secretarybird, VU) may occur within the areas surrounding the Project area to the north and the west, though these species are unlikely to occur within the Project area itself.

The solar PV facility is however unlikely to pose any threat to these species nor are the construction or operational activities likely to result in any negative influences on these species beyond the Project area.

3. AQUATIC ECOSYSTEM CHARACTERISATION

SAS has compiled a summary of the key conservation characteristics of the Project area. Relevant mapping figures are provided in the freshwater assessment report (refer to Appendix D). The following main points can be summarised from this information (SAS, 2022):

- Sishen Mine is located within the Lower Vaal Water Management Area and drained by the endorheic Gamagara River.
- The proposed Solar PV Project and investigation areas fall within the Sishen/Kathu provincial Surface Water Source Areas.
- Several wetlands (natural and artificial) occur in close proximity to the Project area and are considered largely natural to moderately modified;
- The Project area is located in the Kathu Bushveld (Eastern Kalahari Bushveld Group 1) wetland vegetation type, which is classified as Least Threatened;
- The most proximal sub-quaternary catchment is D41J-02419 and has a present ecological status (PES) of C (moderately modified), moderate ecological importance and very low ecological sensitivity; and
- There is a buffer zone associated with the wetlands in proximity to the Project area.

SAS identified four watercourses during the field assessment. The watercourses which lie within 500 m of the proposed infrastructure were also assessed in detail during the field assessments. These watercourses, which include wetlands, are described in Table 6 below and illustrated in Figure 6 in Appendix A.

Table 6: Description of watercourses identified in the Project area (SAS, 2022)

Watercourse	Locality within the Project area	General characterisation
Cryptic (temporary) depression wetland	To the north of the Project area, within 60 m of the Access Road Corridor Entrance 1 and 3.	Plain Level 3: Landscape unit Depression: a landform with closed elevation contours that increases in depth from the perimeter to a central area of greatest depth, and within which water typically accumulates.
Valleyhead seep depression wetland	To the north-east of the Project area, within 32 m of Access Road Corridor Entrance 2.	
Drainage line 1	To the north of the Project area, outside 500 m of the solar PV facility.	Valley Level 3: Landscape unit A linear landform with a clearly discernible bed, which permanently or periodically carries a concentrated flow or water.
Drainage line 2		

The results of the field assessments are summarised in the Table 7 below. These results show that the watercourses have all been impacted upon to a small degree by the historical and current mining activities and linear infrastructure.

There is a buffer zone enforced by GN 509 of 2016 which apply to the watercourses in the Project area. Only the access road corridor and entrance alternatives encroach on the 500 m regulated zone of the identified cryptic (temporary depression) and the valleyhead seep depression wetlands. The cryptic (temporary depression wetland) is within ~ 60 m from the pre-existing access road corridor entrance alternatives 1 and 3. The pre-existing access road corridor entrance alternative 2 is within the 32 m NEMA zone of regulation of the valleyhead seep depression wetland. Refer to Figure 7 in Appendix A for the zones of regulation associated with the watercourses in proximity to the Project area.

The proposed Project activities situated further than 500 m of a watercourse are considered to have a negligible impact on those watercourses due to the topography and the existing developments within the Project area, and have therefore not been further assessed.

Table 7: Summary of Watercourse Field Assessment (SAS, 2022)

Watercourse	PES	Ecoservices provision	Ecological importance and sensitivity (EIS)
Cryptic (temporary) depression wetland Valleyhead seep wetland	<p>PES Category: B</p> <p>The wetland has been subjected to few impacts, and the extents thereof are relatively minor. No significant impacts to the geomorphic or hydraulic regime were discerned during the site assessment, with the exception of the wetland's proximity to the access road which accumulates water during high rainfall periods. Berms around the access road which contribute to ponding in the road may have contributed to reduced catchment yield, affecting the hydraulic regime of the depression. The floral community was dominated by <i>Eragrostis curvula</i> and <i>Leptochloa fusa</i>, although vegetation cover was inconsistent.</p>	<p>Very low to Moderately low</p> <p>Due to the temporary nature of the depression wetland, as well as the endorheic geomorphological setting, ecological service provision is generally of very low levels, with the exception of biodiversity maintenance, which is deemed 'moderately low' and cultivated foods (which is a function of the mineral soils rather than an indication of actual conditions on site). Socio-cultural service provision is considered very low due to the location of the wetland within an access-controlled area as well as the temporary character of the wetland.</p>	<p>EIS Category: Moderate</p> <p>The depression wetland is considered ecologically moderately important and sensitive, largely due to the relatively unique character of the system within a transformed area. The wetland's importance can be attributed to the fact that the area it is located within is relatively dry and wetlands in this region are important for ecosystem support and biodiversity maintenance of fauna and flora adapted to such conditions.</p>
Drainage line 1 Drainage line 2	<p>PES Category: IHI: C / VEGRAI: C</p> <p>The episodic drainage lines have been subjected to very few modifiers although there have been some impacts to the flow paths as a result of the construction of mine infrastructure, some of which (such as the WRD) may have caused the loss of a portion of the headwaters of these drainage lines. Stormwater and clean and dirty water management systems likely direct surface flow away from the drainage lines, thus recharge of the systems is probably reduced, in turn impacting floral community composition.</p>	<p>Moderately low</p> <p>The absence of water for much of the year reduces reliance on the drainage lines from both a faunal (biodiversity) and human perspective, as well as being the primary limiting factor in the provision of ecological services such as nutrient and toxicant assimilation, sediment trapping and flood attenuation. Socio-cultural service provision is significantly decreased partly due to the semi-arid climate as well as the location of the drainage lines within an access-controlled area.</p>	<p>EIS Category: Moderate</p> <p>Although the two small episodic drainage lines in this network are limited by water availability in terms of providing various ecoservices, they nevertheless provide some habitat and migratory cover for fauna, particularly as they are associated with the Gamagara River to the west of the mine.</p>

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT AND NOTICE

Publication name	Noordkaap Bulletin
Date published	9 June 2022

Publication name	Kathu Gazette
Date published	17 June 2022

Publication name	Memorandum Kalahari
Date published	24 June 2022

Site notice placement	Sishen Mine entrance	Well-known retail facilities in Kathu
	Kathu Local Library	Gamagara Local Municipality offices
	Ga-Segonyana Municipality office	Joe Morolong Municipality office
	Siyathemba Youth Centre	Deben Youth Centre;
	Olifantshoek Community Stalls;	Mapoteng Community Centre.
Date Placed	31 August 2022	

Include proof of the placement of the relevant advertisements and notices in Appendix E1. Proof of advertisements are included in Appendix E1. Photographic evidence of site notices which were placed are shown in Appendix E1.

2. DETERMINATION OF APPROPRIATE MEASURES

Provide details of the measures taken to include all potential I&APs as required by Regulation 41(2)(e) and 41(6) of GN 733.

As part of the BA process required for this Project, it is necessary to engage with all Project Affected Persons (PAPs) and I&APs. PAPs/ I&APs include all interested stakeholders, technical specialists, and the various relevant organs of state who work together to produce better decisions. The public participation process adhered to the requirements of Regulations 41 and 42 (Government Notice Regulation (GN R.) 326) of the NEMA EIA Regulations 2014. In addition, the provisions as set out in the Public Participation Guideline document (compiled by the Department of Forestry, Fisheries, and the Environment (DFFE) in 2017) was implemented. The public participation process also conformed to the International Finance Corporation (IFC) Performance Standards and the Anglo American Social Way.

The approach followed for the public participation process is detailed below. It must also be noted that the Project requires the authorisation of water uses as required in terms of the NWA and the Regulations Regarding the Procedural Requirements for WUL Applications and Appeals (GNR 267 of March 2017) from the DWS. The public participation process undertaken for this BA process also meets the requirements of the NWA.

Identification of Stakeholders

The stakeholder engagement process was founded on the principles of openness and transparency and will ensure that all PAPs/ I&APs have access to all information that has or may have the potential to influence any decision or comment made unless such access to information is protected by law. A database of all was compiled and maintained throughout the duration of the Project.

Details of the identified I&AP stakeholders (PAPs/ IA&Ps including Organs of State and Local Municipal Councillors) was collated to produce a project Stakeholder database which was updated throughout the Project and were considered as registered I&APs. This public participation process took cognisance of the Protection of Personal Information Act (2013). As such, registered I&APs were informed of their right to withdraw as a registered I&AP at any stage of the BA process.

Pre-Application Consultation

A pre-application meeting was held with the CA (DAEARDLR) on the 06 April 2022. During this meeting, the procedural aspects of the application were discussed, and a brief overview of the public participation process was presented to the department's officials. The officials provided recommendations for inclusion into the public participation process. These recommendations were thereafter included in the public participation process approach undertaken for this BA process. Consultation with the DWS Northern Cape (Kimberley) as the CA for the Water Use Authorisation application processes is being undertaken concurrently with this BA process. Further detail relating to the pre-application consultation is provided in Section 6.

Landowner Notification / Consent

As part of the process to identify stakeholders, all landowners within the proposed Project area, land occupiers and directly neighbouring the site must be identified and added to the stakeholder database. In addition, the relevant landowners, land occupiers and neighbours must be consulted to ensure full involvement in the process. The Project will be located on the existing G80 WRD on Portion 2 and RE of the Farm Sacha 468, and Portion 1 of the Farm Sims 462, which are owned by the Applicant (SIOC). It follows that additional landowner notification was not required.

Site Notification

The NEMA EIA Regulations 2014 (as amended) require that a site notice be fixed at a place conspicuous to the public at the boundary or on the fence of the site where the activity to which the application relates is to be undertaken and on any alternative sites. Site notices printed in English, Afrikaans and Setswana was placed at the areas identified in Section C, Part 1 above.

Background Information Documents

A Background Information Document (BID) was compiled in English and Afrikaans and was distributed electronically to all registered stakeholders on the stakeholder database.

Advertisement

In compliance with the NEMA EIA Regulations 2014 (as amended), notification of the proposed Project was advertised in English and Afrikaans in the following newspapers: Kathu Gazette, Noordkaap Bulletin and Kalahari Memorandum. Refer to Section C, Part 1 above for further information regarding the placement of the newspaper advertisement.

SMS Notifications

"SMS" text messages will be sent to all I&APs, including neighbouring landowners, on the stakeholder database, where cell phone numbers were available. SMS texts will include a link to the Project website, where the reports can be accessed.

Public Review of Reports

The BAR (English) and Non-Technical Summary (English) are being made available for public review and comment from 09 September 2022 – 10 October 2022, in order to provide I&APs with an opportunity to comment on any aspect of the Project and the findings of the environmental assessment process. I&APs were notified of the public review period by text message, e-mail and post (where no other contact information was available). The Non-Technical Summary will be translated to any I&AP upon request.

Full copies of the BAR and the Non-Technical Summary were placed on the SLR website (<https://www.slrconsulting.com/en/public-documents>) and the SLR data-free website (<https://slrpublicdocs.datafree.co/en/public-documents/>). The Non -Technical Summary will be translated upon request. Hard copy documents of the BAR and EMPr for public review and comment will be available at the Kathu Public Library and the security offices at the Sishen Mine entrance from the 11 September 2022 – 10 October 2022. All I&APs may submit their comments and concerns in writing to Gugu Dhlamini at KIOSolarPVSishen@slrconsulting.com or telephonically on (011) 467 0945.

Comments and Responses Report

All comments received during the Project are being captured in a Comments and Responses Report (CRR) throughout the Project lifecycle. A summary of comments received to date is provided in Section C, Part 3 of this BAR. An updated CRR report (which will include a full record of issues raised and how the issues were addressed throughout the BA process) will be integrated into the BAR and EMPr report submitted to the CA for decision making.

Submission of the BAR to the CA

Following the 30-day public review period, the CRR, will be updated to include any comments and concerns received by I&APs and commenting authorities. The BAR and EMPr will be updated to reflect the integration of comments, where applicable. The updated BAR will be delivered in hard copy to the DAEARDLR. Hard copy documents will be made to the commenting authorities upon request.

Notification of Decision

On receipt of the Environmental Authorisation (positive or negative) for the proposed Project, stakeholders registered on the Project database will be informed of this decision and its associated terms and conditions as well as the appeal process by email correspondence.

Key stakeholders (other than organs of state) identified in terms of Regulation 41(2)(b) of GN 733

Title, Name and Surname	Affiliation/ key stakeholder status	Contact details (tel number or e-mail address)
The Protection of Personal Information Act (No 04 of 2013) (POPIA), as is applicable to this authorisation process, provides for the protection of personal information processed by public and private bodies. In compliance with the provisions of POPIA, a complete list of stakeholders consulted as part of the BA process may only be included in the BAR and EMPr submitted to the CA for decision making.		

Include proof that the key stakeholder received written notification of the proposed activities as Appendix E2. This proof may include any of the following:

- e-mail delivery reports;
- registered mail receipts;
- courier waybills;
- signed acknowledgements of receipt; and/or
- or any other proof as agreed upon by the competent authority.

The Protection of Personal Information Act (No 04 of 2013) (POPIA), as is applicable to this authorisation process, provides for the protection of personal information processed by public and private bodies. In this regard, the proof of distribution of the BID and initial Project notification includes sensitive information which cannot be publicly disclosed. In compliance with the provisions of POPIA, the proof of distribution will be included in the BAR and EMPr submitted to the CA for decision making. A copy of the BID distributed to I&APs are included in Appendix E2.

3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summary of main issues raised by I&APs	Summary of response from EAP
Vested interest in the development – local procurement. Two I&APs were noted to express interest in procurement opportunities as part of the Project development.	The procurement of local community suppliers and vendor selection process will be communicated to the I&APs following confirmation from the Applicant. All procurement opportunities and award thereof will be aligned to the Anglo American Social Way and Sishen Procurement Processes.
Authority consultation – Pre-application meeting A pre-application meeting was held on the 6 th April 2022 with the DAEARDLR.	Refer to Appendix E6 for the meeting minutes.
Authority acknowledgment of Application form submission.	No response required.
Spam / Phishing - A single comment requesting quotation for the manufacture of goods was received. This does not relate to the Project.	No response required.

4. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments received from I&APs and respond to each comment before the Draft BAR is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to the Final BAR as Appendix E3. The current CRR with initial comments submitted to SLR is included in Appendix E3. The CRR will be updated on an ongoing basis and once the BAR has undergone public review. The final CRR will be included for submission to the CA.

5. AUTHORITY PARTICIPATION

Authorities and organs of state identified as key stakeholders:

Authority/Organ of State	Contact person (Title, Name and Surname)	Tel No	Fax No	e-mail	Postal address
Please refer to Appendix E5 for a list of the authorities and organs of state consulted as part of this process.					

Include proof that the Authorities and Organs of State received written notification of the proposed activities as appendix E4.

In the case of renewable energy projects, Eskom and the SKA Project Office must be included in the list of Organs of State. Proof of notification of the Project to the SKA Project Office and Eskom is provided in Appendix E4. These entities will also be notified of the public review and comment period and the proof thereof will be included in the BAR and EMPr submitted to the CA for decision making.

6. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for any activities (linear or other) where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub-regulation to the extent and in the manner as may be agreed to by the competent authority.

Proof of any such agreement must be provided, where applicable. Application for any deviation from the regulations relating to the public participation process must be submitted prior to the commencement of the public participation process.

Not applicable, as no deviation from the regulations relating to the public participation process has been applied for.

Copies of any correspondence and minutes of any meetings held must be included in Appendix E6.

Due to the location of the Project on a WRD, a meeting was held with the DAEARDLR on the 06 April 2022. The purpose of the meeting was as follows:

- to provide an introduction to the proposed Project;
- to engage with the Department on the understanding of the environmental legislative framework and associated authorisation and rehabilitation requirements;
- agree on procedural aspects and the way forward for the environmental authorisation for the Project;
- to discuss the planned public participation approach; and
- to record any comments and issues raised.

At the meeting the CA was confirmed as the DAEARDLR. The procedural aspects of the application were discussed, and a brief overview of the public participation process was presented to the department official. The official provided recommendations for inclusion into the public participation process. These recommendations were thereafter included in the public participation approach. Notes of the Pre-Application consultation is included in Appendix E6.

The Environmental Assessment Practitioner (EAP) will also consult with the DWS Northern Cape (Kimberley) in order to confirm approach and expectations for the authorisation process in terms of the NWA.

SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014 and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

Provide a summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed. This impact assessment must be applied to all the identified alternatives to the activities identified in Section A(2) of this report.

A complete impact assessment in terms of Regulation 19(3) of GN 733 must be included as Appendix F.

The full Impact Assessment is included in Appendix F. Table 8 (site preparation phase), Table 9 (construction phase), Table 10 (operational phase) and Table 11 (decommissioning and closure phase) summarise the identified impacts and the impact significance rating before and after mitigation.

Table 8: Summary of site preparation phase impact significance ratings pre and post mitigation

Impact	Potential Impact	Impact Rating Pre-Mitigation	Impact Rating Post-Mitigation
Freshwater Habitat	Indirect increased run-off and consequent erosion and sedimentation impacts as well as possible contamination impacts from stored fuels, oils and other hazardous substances and liquids to depression wetlands.	Negative Low	Negative Low
Avifauna	Not applicable	Not Applicable	Not Applicable
Terrestrial Habitat	Not applicable	Not Applicable	Not Applicable
Climate Change	Not applicable	Not Applicable	Not Applicable
Visual	Not applicable	Not Applicable	Not Applicable
Social	Availability of sufficient local construction materials for Solar PV facility.	Negative High	Negative Low
Heritage	Not applicable	Not Applicable	Not Applicable
Palaeontology	Not applicable	Not Applicable	Not Applicable

Table 9: Summary of construction phase impact significance ratings pre and post mitigation

Impact	Potential Impact	Impact Rating Pre-Mitigation	Impact Rating Post-Mitigation
Freshwater Habitat	Changes in ecological service provision, impacts on hydrology, sediment balance, and water quality (Solar PV Facility)	Negative Low	Negative Low
	Loss of wetland habitat and ecological structure and impacts on hydrology (access road corridor alternative entrances)	Negative Medium	Negative Low
Avifauna	Loss of avifaunal habitat and species diversity	Negative Very Low	Negative Very Low
	Decrease in avifaunal SCC associated with the Project area	Insignificant	Insignificant
Terrestrial Habitat	Loss and/or fragmentation of vegetation due to clearing for construction of infrastructure	Insignificant	Insignificant
Climate Change	Contribution to national GHG emissions	Negative Low	Negative Low
	Contribution to reduction of National Carbon Intensity	Positive Low	Positive Low
Visual	Impact on the landscape character and sense of place	Negative Low	Negative Low
	Impact due to night-time lighting on the landscape character and sense of place	Negative Low	Negative Low
Social	Health and social wellbeing – annoyance (air quality & noise); increase in crime and risk of HIV infections; influx of construction workers; hazard exposure.	Negative Very Low	Insignificant
	Disruption of daily living patterns	Negative Very Low	Insignificant
	Disruptions to social and community infrastructure	Negative Low	Negative Low
	Economic production	Positive Low	Positive Low
Heritage	Impact on heritage resources	Negative Low	Negative Low
Palaeontology	Impact on palaeontological resources	Negative Low	Negative Low

Table 10: Summary of operational phase impact significance ratings pre and post mitigation

Impact	Potential Impact	Impact Rating Pre-Mitigation	Impact Rating Post-Mitigation
Freshwater Habitat	Changes in ecological service provision, impacts on hydrology, sediment balance, and water quality (Solar PV Facility)	Negative Low	Negative Low
	Loss of wetland habitat and ecological structure (access road corridor options)	Negative Low	Negative Low
Avifauna	Loss of avifaunal habitat and species diversity	Negative Very Low	Insignificant
	Decrease in avifaunal SCC associated with the Project area	Insignificant	Insignificant
Terrestrial Habitat	Establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors	Negative Low	Negative Low
	Runoff and erosion due to the presence of hard surfaces that change the infiltration and runoff properties of the landscape	Negative Low	Negative Low

BASIC ASSESSMENT REPORT

Impact	Potential Impact	Impact Rating Pre-Mitigation	Impact Rating Post-Mitigation
Climate Change	Reduction of Sishen Mine's GHG Emissions	Positive Medium	Positive Medium
	Reduce Sishen Mine's Carbon Unit Intensity	Positive Medium	Positive Medium
Visual	Impact on the landscape character and sense of place	Negative Low	Negative Low
	Impact due to night-time lighting on the landscape character and sense of place	Insignificant	Insignificant
Social	Health and social wellbeing – Glint and glare	Negative Very Low	Negative Very Low
	Job creation and skills development	Positive Low	Positive Low
	Socio-economic stimulation	Positive Very High	Positive Very High
Heritage	Not applicable	Not Applicable	Not Applicable
Palaeontology	Not applicable	Not Applicable	Not Applicable

Table 11: Summary of decommissioning and closure phase impact significance ratings pre and post mitigation

Impact	Potential Impact	Impact Rating Pre-Mitigation	Impact Rating Post-Mitigation
Freshwater Habitat	Changes in ecological service provision, impacts on hydrology, sediment balance, and water quality (Solar PV Facility)	Negative Low	Negative Low
	Loss of wetland habitat and ecological structure (access road corridor alternative entrances)	Negative Medium	Negative Low
Avifauna	Not applicable	Not Applicable	Not Applicable
Terrestrial Habitat	Loss and disturbance of natural vegetation due to the removal of infrastructure and need for working sites	Negative Low	Negative Low
	Continued establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors	Negative Low	Negative Low
	Continued runoff and erosion due to the presence of hard surfaces that change the infiltration and runoff properties of the landscape	Negative Low	Negative Low
Climate Change	Not applicable	Not Applicable	Not Applicable
Visual	Impact on the landscape character and sense of place	Negative Low	Negative Low
	Impact due to night-time lighting on the landscape character and sense of place	Negative Low	Negative Low
Social	Health and social wellbeing – annoyance (air quality & noise); increase in crime and risk of HIV infections; influx of construction workers; hazard exposure.	Negative Very Low	Insignificant
	Disruption of daily living patterns	Negative Very Low	Insignificant
	Disruptions to social and community infrastructure	Negative Low	Negative Low
	Economic production	Positive Low	Positive Low
Heritage	Not applicable	Not Applicable	Not Applicable
Palaeontology	Not applicable	Not Applicable	Not Applicable

Cumulative Impacts

The cumulative impacts of the Sishen Solar PV Project along with other developments in the area have been assessed to be of low significance. This is primarily due to the location of the proposed Project on existing infrastructure (WRD and road network) and the limited overlap of the Project's direct area of influence with environmental and social receptors.

Due to the proposed location of the solar PV facility on the existing WRD, it is unlikely for the Project to result in socially based cumulative impacts. In addition, the construction phase of the Project will be of short duration (12-18 months) and once operational will only require a workforce of 30 people. The Project will also make a negligible contribution to South Africa's National GHG emissions during the construction phase, and the contribution of the Project to the National Power Pool during operation will negligibly decrease the carbon intensity of South Africa's Power Grid.

Negative cumulative impacts on the loss of wetland habitat and ecological structure and impacts on hydrology, include risks of sediment and hydrocarbons entering the wetlands via runoff from the access road corridors due to potential indiscriminate movement of vehicles during the operational phase in close proximity of watercourses. In addition, the abandonment of the road and its maintenance after the solar PV facility has reached its life cycle could also result in proliferation of alien vegetation.

Negative cumulative impacts on changes in ecological service provision, impacts on hydrology, sediment balance and water quality during the construction phase include:

- Regular movement of vehicles on access roads including the excavation of soil to facilitate foundations for mounting and installation of solar PV panels including mounting of rods into foundations and associated transmission lines;
- Soil disturbance and vegetation clearing for construction vehicles, construction machinery, and personnel access to facilitate mounting of solar PV panels and associated building;
- Potential excavation and stockpiling of soils for solar PV panel, water storage tank, and the two conservancy tank pedestals and concrete works to fill pedestal excavations.

In addition negative cumulative impacts during the operational phase include, sediment compaction due to vehicle movement, dust particles, oil spillage from vehicles and solar PV components. While negative cumulative impacts in the decommissioning phase include:

- The disturbance to soils and any established vegetation habitats during the life of the solar PV facility;
- A change in landscape characteristics arising from the operational activities creating areas of preferential flow paths, ponding, and wet response areas.

Negative cumulative impacts on the loss of avifaunal habitat and diversity stemming from the clearance of vegetation in the Project area during the construction phase are anticipated to be minimal. This is due to the Modified habitat unit being associated with areas that were historically disturbed and which have been revegetated as part of the mine's rehabilitation plan. This habitat unit is still in the early stages of succession, possesses little to no woody species and as such, is not significantly contributing to avifaunal habitat or food resource provisioning in the region. As such, impacts herein will not contribute further to any cumulative impacts in the region. Provided that all mitigation and management measures are implemented prior to and during the operational phase, cumulative impacts will likely be minimal and not significantly contribute further to localised and regional impacts on avifaunal species.

Cumulative impacts on the loss of avifaunal habitat and diversity in the Transformed areas, will likely be minimal and will not significantly contribute further to localised and regional impacts on avifaunal species, provided that all mitigation and management measures are implemented prior to and during the construction and operational phases.

Cumulative impacts on the decrease in avifaunal SCC associated with the Project area will likely be minimal and will not significantly contribute further to localised and regional impacts on avifaunal SCC, provided that all mitigation and management measures are implemented prior to and during the construction and operational phases.

Renewable energy facilities have the potential to cause large scale visual impacts and the location of several such developments in close proximity to each other could significantly alter the sense of place and visual character in the greater landscape. According to the SA REEA Database, several renewable energy applications have been approved within a 10 km radius of the study area. Powerlines and substations are relatively small developments when compared to renewable energy facilities, however they may still introduce a more industrialised character into the landscape, thus altering the sense of place. Therefore, cumulative visual impacts resulting from the already altered landscape in conjunction with any approved or future renewable energy facilities (wind and/ or solar facilities) in the broader area, must be considered in future. The Project will however not contribute to negative cumulative impacts of night-time lighting, due to the Sishen Mine and town of Kathu being two significant existing sources of night-time lighting. Negative cumulative impacts as a result of the traffic generated by the Project will also be limited by utilising the existing road network as far as possible.

As a result of the low significance of the cumulative impacts, no additional mitigation measures, over and above those recommended for the direct impacts of the Project, have been recommended.

2. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Alternative A (preferred alternative)

For the site preparation phase two negative impacts were identified (see Table 8) which have been rated **High** and **Low** significance respectively. Although specific attention needs to be focussed in the area where the impact has been rated as **High**, the impact can be reduced to **Low** with the implementation of mitigation measures as stipulated in the EMPr (Appendix G).

Negative impacts that have been identified for the construction phase (see Table 9) are largely of **Low** significance and some can be reduced to **Insignificant** with the implementation of mitigation measures. Positive impacts associated with economic production have been rated as being **Low**, due to the short duration of the construction phase.

Negative impacts during the operational phase (Table 10:) have been rated as being **Low**, **Very Low** or **Insignificant** prior to mitigation. Positive impacts have been rated as being **Very High**, **Medium** or **Low**, with the only real impacts associated with the stimulation of the socio-economic environment and the reduction of Sishen Mine's GHG emissions and Carbon Unit Intensity.

Decommissioning and closure phase impacts (Table 10:) have been rated as being **Medium**, **Low** or **Very Low** significance prior to mitigation. With the only real impact associated with the loss of habitat and ecological structure of the cryptic and valleyhead seep wetlands in close proximity to the access road corridor and entrance alternatives. This is due to the abandonment of the access road corridor and its maintenance after the life of the solar PV facility which could result in the proliferation of alien vegetation. The impact can be reduced to **Low** with the implementation of mitigation measures as stipulated in the EMPr (Appendix G).

The specialist assessments were conducted to assess the potential impacts relating to the proposed development in order to ascertain the significance of each identified impact, as well as to recommend mitigation measures which may be required. The results of the specialist assessments have indicated that the layout being proposed for authorisation has no fatal flaws that should prevent the proposed Project from proceeding. In light of this, it is the EAP's reasoned opinion that authorisation can be granted for the Project and layout proposed as part of this BA process (provided there are no concerns raised during the public participation process).

Furthermore, SLR, as the independent EAP, is therefore of the view that:

- The site location and Project description can be authorised based on the findings of the suite of specialist assessments;
- A preferred layout has been identified which is environmentally acceptable and will not result in significant impacts, provided that the recommended mitigation measures are implemented and the placement of infrastructure associated with the proposed development avoids the identified sensitive and 'no-go' areas, which it has (Appendix A);
- A cumulative impact assessment of similar developments in the area was undertaken by the respective specialists. Based on their findings, majority of the cumulative impacts associated with the proposed development can be kept low after the implementation of mitigation measures; and
- Through the implementation of mitigation measures, together with adequate compliance monitoring, auditing and enforcement thereof by the appointed ECO as well as the CA, the potential detrimental impacts associated with the proposed development can be mitigated to acceptable levels.

The date on which the activity will commence (i.e. enter construction) is planned for the fourth quarter of 2023. The proposed development will require an EA of at least 30 years.

It is therefore the opinion of the EAP that, provided substantive comments and concerns are not raised during public review of the BAR, the information provided in this BAR is sufficient to enable the CA to consider the potential impacts and benefits of the Project to make an informed decision on the application. Furthermore, it is the opinion of the EAP that based on the findings of the BA and the specialist studies, the proposed development should be granted an EA and allowed to proceed, provided further comments and concerns are addressed during the ongoing public participation process and provided the following conditions are adhered to:

- Where applicable, monitoring should be undertaken to evaluate the success of the mitigation measures recommended by the various specialists; and
- The final layout should be submitted to the CA (namely the DAEARDLR) for approval prior to commencing with the activity.

It is trusted that the BAR provides adequate information to the I&APs / stakeholders to provide input and for the CA to make an informed decision regarding the proposed development.

It should be noted that this section (namely the Environmental Impact Statement) is deemed to be in line with the requirements of Appendix 1 of the EIA Regulations 2014, as amended, and contains a summary of the key findings of the environmental impact assessment, a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers (see Appendix A) and a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.

Alternative B

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Alternative C

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No-go alternative (compulsory)

The assessment of this option requires a comparison between the options of proceeding with the Project with that of not proceeding with the Project. Proceeding with the Project attracts potential economic benefits and a positive impact to Climate Change, as well as potential negative environmental and social impacts as detailed in this report. Not proceeding with the Project retains the status quo, but with loss of potential opportunities in job creation and skills development, socio-economic stimulation, economic production which will be created from proceeding with the development.

Not proceeding with the Project will also result in SIOC not being able to achieve a reduction in their carbon emissions/ footprint as part of the Anglo American group's commitments to "FutureSmart Mining" and "Carbon Neutrality Energy Strategy". In addition, the opportunity to enhance security of power supply, reduce costs of electricity, and the enhancement of the national grid with a renewable source of energy will also be lost. Thus the No-go alternative is not supported by Anglo American or Sishen Mine.

In the "no-go" scenario, the current land use activities will remain and the current commitment to rehabilitate the WRD will continue without formal economic benefit to the local and regional economy. The added Project benefit of repurposing otherwise unproductive land (i.e. the WRD), into land which is economically productive will also be lost.

The No-go alternative is counter to national and municipal policies and is thus not the preferred alternative.

SECTION E. RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?

YES	NO
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If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment).

Not applicable.

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application.

Management actions, including monitoring requirements, as outlined in the EMPr included in Appendix G, should form part of the conditions of the environmental authorisation.

Is an EMPr attached?

YES	NO
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Please refer to Appendix G for the EMPr for the Project.

The details of the EAP who compiled the BAR and the expertise of the EAP to perform the Basic Assessment process must be included as Appendix H.

Please refer to Appendix H for the details and expertise of the EAP for the Project.

If any specialist reports were used during the compilation of this BAR, please attach the declaration of interest for each specialist in Appendix I.

Please refer to Appendix I for the "Details of specialist and declaration of interest" included for the specialist assessments undertaken for the Project.

Any other information relevant to this application and not previously included must be attached in Appendix J.

NAME OF EAP

SIGNATURE OF EAP

DATE

SECTION F: APPENDIXES

The following appendixes must be attached:

Appendix A: Maps

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports (including terms of reference)

Appendix D1: Climate Change Risk Assessment Report

Appendix D2: Freshwater Ecological Impact Assessment Report

Appendix D3: Avifaunal Impact Assessment Report

Appendix D4: Visual Impact Assessment Report

Appendix D5: Social Impact Assessment Report

Appendix D6: Civil Aviation Sensitivity Study Report

Appendix D7: Heritage and Archaeology (including Palaeontology) Impact Assessment Exemption Report

Appendix E: Public Participation Documents

Appendix F : Impact Assessment

Appendix G : Environmental Management Programme (EMPr)

Appendix H: Details of EAP and expertise

Appendix I: Specialist's declaration of interest

Appendix J: Additional Information

APPENDIX A: MAPS

- Figure 1: Regional Locality Map
- Figure 2: Locality Map
- Figure 3: Site Layout Map
- Figure 4: Alternative Sites Considered by SIOC
- Figure 5: Site Sensitivity Map
- Figure 6: Watercourse Delineation Map
- Figure 7: Watercourse Zone of Regulation Map

APPENDIX B: PHOTOGRAPHS

APPENDIX C: FACILITY ILLUSTRATION(S)

APPENDIX D: SPECIALIST REPORTS (INCLUDING TERMS OF REFERENCE)

APPENDIX E: PUBLIC PARTICIPATION DOCUMENTS

APPENDIX F: IMPACT ASSESSMENT

APPENDIX G: ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

APPENDIX H: DETAILS OF EAP AND EXPERTISE

APPENDIX I: SPECIALIST'S DECLARATION OF INTEREST

APPENDIX J: ADDITIONAL INFORMATION