Preferred Alternative Impact Assessment

Pre-construction Phase

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Identification (and assessment) of impacts and risks for each alternative

3(1) A basic assessment report… must include –

(h) a full description of the process followed to reach the proposed preferred alternative within the site, including – (v) ***the impacts and risks identified for each alternative, including*** *the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts - (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; (vii)* ***positive and negative impacts that the proposed activity and alternatives will have*** *on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (viii)* ***the possible mitigation measures*** *that could be applied and level of residual risk.*

Appendix 1 (Basic Assessment Report) of the EIA Regulations, 2014 as amended

Assessment of Preferred Alternative

The identified impacts, comments received from I&APs and findings contained in specialist assessments, were assigned to the applicable phases of development (planning and design, pre-construction, construction, and post-construction) and aspects of the receiving environment so that they can be logically managed /mitigated for by the responsible role players at the appropriate time.

The receiving environment referred to as "environmental attributes" or "aspects" in Appendix 1 of the EIA Regulations, 2014 as amended, includes:

(1) Legal System, (2) Terrestrial fauna, (3) Terrestrial flora, (4) Aquatic fauna, (5) Aquatic flora, (6) Soil and Rock, (7) Ground and Surface Water, (8) Atmosphere, (9) Terrestrial and Avian ecosystem, (10) Aquatic ecosystem, (11) Economical, (12) Social, (13) Property, (14) Land use, (15) Health and Safety, (16) Security, (17) Public services, (18) Visual aesthetics and (19) Heritage and Culture.

Similar impacts, those are impacts resulting in the same response from the receiving environment are assessed collectively as cumulative impacts.

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Receiving Environment: Legal System

Description of potential impacts:

Management Category	Sub-activity	Environmental Aspect	Impact-Consequence	Change	Impact No.
Contractor Readiness	Awarding of preferred bidder	N/A	I**mpact:** Contractor is unaware of EA and EA and EMP: **Consequence:** poor implementation of environmental management or mitigations resulting in significant impacts (Risk)	NA	01
Contractor Readiness	Acquiring permits, licenses, Letters of consent and permissions	ESKOM	**Impact:** The repair and rebuilding of the Burgerville District Road will impact Eskom's 400 kV power lines servitude (Line 1 and Line 2). Construction without permission will constitute an offence in terms of the relevant legislation. **Consequence:** - The applicant can be fined and/or imprisoned as a result of damage to Eskom's apparatus (Section 27(3) of Electricity Act, 1987 (Act No. 41 of 1987), as amended in 1994) - repealed by Electricity Regulation Act, 2006 (Act No. 4 of 2006) as amended.	NA	01
Contractor Readiness	N/A	SANRAL	**Impact:** Any services that need to be constructed over or under a national road, (in this case the N10) or within 60 m measured from the road reserve fence will have an impact on SANRAL (pers. comm. Nicole Abrahams, Environmental Coordinator, Western Region, AbrahamsN@nra.co.za). **Consequence:** Fine and/or delays in construction.	NA	01
Contractor Readiness	N/A	DMRE	**Impact:** Permission may be required from DMRE to use the land surface for an access road as the establishment of a formal servitude could detrimentally affect the mining of mineral resources on that parcel of land. **Consequence:** Fine, delays in construction.	NA	01

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Contractor Readiness	N/A	Other approvals	**Impact:** Failure to obtain approvals, licenses or permits. **Consequence:** Delayed commencement of construction and increased project cost (indirect).	NA	01
Contractor Readiness	Employment of labour	Appointment	**Impact:** Conditions of EA and EMP are not enforced or penalised through employment contracts: **Consequence:** Significant Impacts on different aspects of the environment (Risk).	NA	01
Contractor Readiness	Employment of labour	Training	**Impact:** Lack of environmental awareness **Consequence:** significant environmental impacts (direct)	NA	01
Contractor Readiness	Development of Method Statements	NA	**Impact:** An EMP designed to manage different aspects or attributes of the environment may be difficult for a contractor to implement. **Consequence:** Significant environmental impacts (Risk).	NA	01
Site Establishment (Layout)	Construction Camp	Fuel storage and refuelling area	**Impact:** non-compliance **Consequence:** fine	NA	01
Site Establishment (Layout)	Construction Camp	Sanitation/Ablutions	**Impact:** Unsafe disposal - soil contamination and water pollution. **Consequence:** Health risks	NA	01

*The source of information used in identifying the impact is either the Leipold Matrix (Matrix), Interested and Affected Parties (I&APs) and/or Specialist studies (Specialist)

Any assumptions, uncertainties & limitations, or gaps in knowledge with predicting the impacts

Impact 01 (Water Uses)

- The use of on-site supplementary water sources such as grey water could reduce the Average Annual Daily Demand (AADD) requirement from the borehole water supply system (underground aquifer). The potential reduction in AADD to be supplied by the underground aquifer depends on the extent that such measures can be implemented for construction demand. Only one potential source of non-potable water that can be re-used for certain construction activities has been identified, namely wastewater generated by the washing of the concrete mixer trucks and/or in the production of concrete.

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- "Domestic wastewater" means wastewater arising from domestic and commercial activities and premises, and may contain sewage (GA for Section 21(g), 2013).
- Assuming the estimated demand for potable water is **2,25 m3/day** during construction (45 staff and the provision of 50 litres of potable water per person per day) and the sewerage flow contribution as a percentage of Average Annual Daily Demand (AADD) for business, commercial, industrial land use categories is 80% (DHS Redbook, Section K, Table K.4), then ± 1,8 m3 of "domestic wastewater" shall be generated each day.
- During peak construction of Cluster 1, the labour force should reach 400 employees, thereby generating 16 m3 of "domestic wastewater" each day. However, the access road project will be completed within 6 to 8 weeks and will therefore not contribute towards (cumulative) wastewater generation during peak construction.
- "On-site disposal" refers to the disposal of wastewater on individual properties not permanently linked to a central waste collection, treatment, and disposal systems, such as septic tank systems, conservancy tank systems, soakaway systems, french drains, pit latrines, some package plants and related activities (GA for Section 21(g), 2013).
- The sanitation system adopted by the contractor(s) at the construction camp will be a containerised system whereby domestic wastewater will be stored in a conservancy tank(s) for safe disposal elsewhere and/or a package plant for the on-site disposal, using a septic tank-soakaway system.
- *Storage for disposal (conservancy tank system)* - In terms of section 3.8 of the GA for Section 21(g) (2013), a person who lawfully occupies property registered in the Deeds Office or lawfully has access to land on which the use of water takes place, may store up to 10 000 m3 of domestic wastewater per property for the purpose of disposal if the storing of the wastewater does not impact on a water resource or on any other person's water use, property or land, and is not detrimental to the health and safety of the public in the vicinity of the activity.
- A person who stores wastewater in terms of the GA for Section 21(g) (2013) must submit a registration form for registration of the water use before commencement of storage if more than 1 000 m3 are stored for disposal. Given the unlikelihood of all contractors (combined) storing more than 1 000 m3 of domestic wastewater at the construction camp for disposal, this water use will not need to be registered, but is subject to the limits and conditions contained therein.
- Given the large volumes for storage above, DWS may interpret "storage" as wastewater storage dams, and not a conservancy tank system, particularly since a conservancy tank system is included in the definition of "on-site disposal."
- In other words, the storage of domestic wastewater using conservancy tanks for the purpose of disposal may not be permissible under the abovementioned section (3.8) of the General Authorisation, requiring an application for a Water Use License.

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- *On-site Disposal (septic tank-soakaway system)* - Alternatively, section 3.9 of the same GA for Section 21(g) (2013), allows a person who lawfully occupies property registered in the Deeds Office or lawfully has access to land on which the use of water takes place, to dispose of domestic wastewater to a communal conservancy tank serving no more than 50 households or domestic wastewater generated by a single household not permanently linked to a central waste collection, treatment and disposal system to an on-site disposal facility.
- A person who disposes of wastewater in terms of the GA for Section 21(g) (2013) must submit a registration form for registration of the water use before the commencement of the disposal if more than 50 m3 of domestic wastewater is disposed of on any given day. Given the unlikelihood of all contractors (combined) disposing more than 50 m3 of domestic wastewater on any given day at the construction camp, this water use will not need to be registered. However, section 3.9 of the GA for Section 21(g) (2013) refers to a communal conservancy tank serving no more than **50 households** and domestic wastewater generated by **a single household**. Consequently, DWS may not consider domestic wastewater generated by 45 labourers for the road contractor (**± 1,8 m^3**), or by 400 labourers for all contractors combined during peak construction (**± 16 m^3**), permissible under the abovementioned section (3.9) of the General Authorisation, requiring an application for a Water Use License.

Impact 01 (Mining)

- **Road material or aggregate will be purchased from a licensed commercial source.**
- Section 53 of the MPRDA, reads *"53. Use of land surface rights contrary to objects of Act (1) Subject to subsection (2), any person who intends to use the surface of any land in any way which may be contrary to any object of this Act or which is likely to impede any such object must apply to the Minister for approval in the prescribed manner."*
  "Kindly note that if you want to apply for section 53, you can lodge your application online on the Department's website. Check for SAMRAD applications and follow the steps to create your profile. You must select land use application which is section 53." (*pers. comm. Mmboneni Mutheiwana, MMboneni.Mutheiwana@dmre.gov.za).*
- A Section 53 application was lodged via SAMRAD on 21 February 2023 (ref no: NC30/5/4/2/11505SU).

Impact 01 (Land Use)

- Sanral or the Department of Roads and Public Works Northern Cape are the road authorities of rural roads in the district, and you are advised to liaise with them. The District Municipality is no longer responsible for road maintenance since 2011 (*pers. comm. Hennie Greeff, Senior Manager Infrastructure Development, Housing and Planning, Pixley ka Seme District Municipality, Private Bag X1012, 1 Culvert Road, De Aar, 7000).*
- Please provide a formal application letter in your company letter head detailing the proposed work within our servitude. Furthermore, for road applications underneath Eskom Tx lines, please ensure to provide the following information;

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- 1. Need location of new road crossing, which line and towers affected.
- 2. Need final designs for road, showing the final elevation and road surface level.
- 3. Need construction methodology for road.
- 4. Need details on how surface will be made, graders, blasting etc.
- 5. Need timelines for road construction.
- 6. Need applicant to conduct survey to gather current conductor positions of line being crossed and current surface levels of servitude (pers. comm. Nomzamo Mdunyelwa ST(SA)0991, Senior Advisor Audit and Investigation, Servitude and Land Management, Asset Management - Transmission Division, Eskom (Tel: 053 830 5947, Mobile: 081 046 5341, Email:MdunyeNC@eskom.co.za))

Assessment without mitigation:

Legend					
Criteria		**Reversibility, Irreplaceability, & Mitigatory Potential**		**Significance (Impact Magnitude & Impact Importance**	
Abbreviation	**Description**	**Abbreviation**	**Description**	**Abbreviation**	**Description**
H	High	L	Low	0	Non-significant
M	Medium	M	Moderate	1	Significant
L	Low	H	High		
-I/R	Negative Impact/Risk				
+I/R	Positive Impact/Risk				

Alternative Site No. 1 (preferred)

Impact	**Intensity**	**Spatial**	**Duration**	**Status**	**Nature**	**Prob.**	**MAGNITUDE**	**Accept.**	**Prob.**	**IMPORTANCE**
01	NA	NA	NA	-I	NA	NA	NA	H	H	1
Reversibility	NA		**Irreplaceability**	NA		**Mitigatory Potential**	H			

Any aspects which were conditional to the findings of the assessment (to be included as conditions of authorisation):

- Construction may not commence without a water use license from the regional office of the Department of Water and Sanitation.

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- The proposed activities do not include operational aspects. Consequently, the environmental authorization is required for development only, including the following phases: planning and design, pre-construction, construction, and post-construction (rehabilitation and monitoring).The validity period of the environmental authorisation shall be the maximum permissible period given the scale of the project, anticipated time to complete construction, and the uncertainty of when a water use license will be granted.

References (legal, scientific, social, or other criteria) used for the assessment and mitigations:

- Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
- National Water Act, 1998 (Act No 36 of 1998) published in Government Notice No. 1091 of Gazette No. 19182 as amended, including Section 144 and Chapter 4: Use of water.
    - General Authorisation for S21(c) & (i) published in GN 509 of 26th August 2016 in GG No. 40229.
    - General Authorisation for S21(a) & (b) published in GN 538 of 02nd September 2016 in GG No. 40243
    - General Authorisations for S21(g) & (e) published in GN 665 of 06th September 2013 in GG No. 36820
- National Environmental Management Act, 1998 (Act No. 107 of 1998); Section 49A (1) A person is guilty of an offence if that person - (c) fails to comply with or contravenes a condition of an environmental authorisation granted for a listed activity or specified activity or an approved environmental management programme

Mitigations:

Impact Management Outcome(s):

- Environmentally sensitive and responsible conduct by employees
- Compliance with the EA and EMPr
- Compliance
- Reduced occurrence of labour being non-compliant with EA and EMPr
- Lawful dangerous goods storage

Targets:

- Method Statement
- Course outline of Environmental Awareness training
- Signed attendance register of Environmental Awareness training.
- Contractor has an environmental file on site including the EA and EMPr
- Written permission from Eskom prior to commencement within or within proximity to Eskom's servitudes.

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- Written permission from SANRAL prior to commencement of work within 60 m of the road reserve fence.
- Written approval from the Minister of DMRE
- Application reference number
- Approvals/Permits
- Clause within labour employment contracts relating to a penalty system for incidences of non-compliance with the EA and EMPr
- Fuel storage is below 30 cubic meters
- Section 21 (g) authorization

Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
01	Contractor Readiness	An EMP designed to manage different aspects or attributes of the environment may be difficult for a contractor to implement.	Compliance with EMPr	Method Statement	The contractor should develop method statement for each "management category" by incorporating the applicable management actions identified in this EMP to mitigate various aspects of the receiving environment, prior to the commencement of construction	Contractor	Pre-construction	Compliance to be verified by ECO and IEA.
01	Contractor Readiness	Lack of environmental awareness: Significant environmental impacts	Environmentally sensitive and responsible conduct by employees	Signed attendance register of Environmental Awareness training	All contractors, sub-contractors and their workers shall participate in an Environmental Awareness Training before being allowed to enter site. Refresher environmental awareness training is available as and when required.	Contractor, ECO	Pre-construction	Compliance to be verified by ECO and IEA.
01	Contractor Readiness	Lack of environmental awareness: Significant	Environmentally sensitive and responsible conduct by employees	Signed attendance register of Environmental	The Contractor must allow for sufficient sessions to train all personnel with no more than 20 personnel attending each course	Contractor, ECO	Pre-construction	Compliance to be verified by ECO and IEA.

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		environmental impacts		Awareness training				
01	Contractor Readiness	Lack of environmental awareness: Significant environmental impacts	Environmentally sensitive and responsible conduct by employees	Course outline of Environmental Awareness training	All staff are aware of the conditions and controls linked to the EA and within the EMPr and made aware of their individual roles and responsibilities in achieving compliance with the EA and EMPr;	Contractor, ECO	Pre-construction	Compliance to be verified by ECO and IEA.
01	Contractor Readiness	Lack of environmental awareness: Significant environmental impacts	Environmentally sensitive and responsible conduct by employees	Course outline of Environmental Awareness training	Environmental awareness training must include as a minimum the following: a) Description of significant environmental impacts, actual or potential, related to their work activities; b) Mitigation measures to be implemented when carrying out specific activities; c) Emergency preparedness and response procedures; d) Procedures to be followed when working near or within sensitive areas; e) Wastewater management procedures; f) Water usage and conservation; g) Solid waste management procedures; h) Sanitation procedures; i) Fire prevention; and j) Disease prevention.	Contractor, ECO	Pre-construction	Compliance to be verified by ECO and IEA.

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01	Contractor Readiness	Lack of environmental awareness: Significant environmental impacts	Environmentally sensitive and responsible conduct by employees	Signed attendance register of Environmental Awareness training	A record of all environmental awareness training courses undertaken as part of the EMPr and staff attendance registers must be available	Contractor, ECO	Pre-construction	Compliance to be verified by ECO and IEA.
01	Contractor Readiness	Lack of environmental awareness: Significant environmental impacts	Environmentally sensitive and responsible conduct by employees	Course outline of Environmental Awareness training	Course material must be available and presented in appropriate languages that all staff can understand.	Contractor, ECO	Pre-construction	Compliance to be verified by ECO and IEA.
01	Contractor Readiness	Lack of environmental awareness: Significant environmental impacts	Environmentally sensitive and responsible conduct by employees	Signed attendance register of Environmental Awareness training	All contractors, sub-contractors and their workers shall participate in an Environmental Awareness Training before being allowed to enter site. Refresher environmental awareness training is available as and when required.	Contractor, ECO	Pre-construction	Compliance to be verified by ECO and IEA.
01	Contractor Readiness	Lack of environmental awareness: Significant environmental impacts	Environmentally sensitive and responsible conduct by employees	Signed attendance register of Environmental Awareness training	The Contractor must allow for sufficient sessions to train all personnel with no more than 20 personnel attending each course	Contractor, ECO	Pre-construction	Compliance to be verified by ECO and IEA.
01	Contractor Readiness	Lack of environmental awareness: Significant environmental impacts	Environmentally sensitive and responsible conduct by employees	Course outline of Environmental Awareness training	All staff are aware of the conditions and controls linked to the EA and within the EMPr and made aware of their individual roles and responsibilities in achieving compliance with the EA and EMPr;	Contractor, ECO	Pre-construction	Compliance to be verified by ECO and IEA.

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01	Contractor Readiness	Lack of environmental awareness: Significant environmental impacts	Environmentally sensitive and responsible conduct by employees	Course outline of Environmental Awareness training	Environmental awareness training must include as a minimum the following: a) Description of significant environmental impacts, actual or potential, related to their work activities; b) Mitigation measures to be implemented when carrying out specific activities; c) Emergency preparedness and response procedures; d) Procedures to be followed when working near or within sensitive areas; e) Wastewater management procedures; f) Water usage and conservation; g) Solid waste management procedures; h) Sanitation procedures; i) Fire prevention; and j) Disease prevention.	Contractor, ECO	Pre-construction	Compliance to be verified by ECO and IEA.
01	Contractor Readiness	Lack of environmental awareness: Significant environmental impacts	Environmentally sensitive and responsible conduct by employees	Signed attendance register of Environmental Awareness training	A record of all environmental awareness training courses undertaken as part of the EMPr and staff attendance registers must be available	Contractor, ECO	Pre-construction	Compliance to be verified by ECO and IEA.
01	Contractor Readiness	Lack of environmental awareness: Significant	Environmentally sensitive and responsible	Course outline of Environmental	Course material must be available and presented in appropriate languages that all staff can understand.	Contractor, ECO	Pre-construction	Compliance to be verified by ECO and IEA.

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		environmental impacts	conduct by employees	Awareness training				
01	Contractor Readiness	Contractor is unaware of EA and EA and EMP.	Compliance with the EA and EMPr	Contractor has an environmental file on site including the EA and EMPr	Contractor must be provided with a copy of the EA and EMPr	Holder, Contractor	Pre-construction	Compliance to be verified by ECO and IEA.
01	Contractor Readiness	Repairing and rebuilding the Burgerville District Road will impact Eskom's 400 kV powerline servitudes (Line 1 and Line 2). Construction without permission will constitute an offence in terms of the relevant legislation. (Section 27(3) of Electricity Act, 1987 (Act No. 41 of 1987), as amended in 1994) - repealed by Electricity Regulation Act, 2006 (Act	Compliance with Eskom requirements	Eskom 400 kV servitude (Line 1 and 2) Servitude Agreement and Letter of Consent	The applicant must provide a formal application letter to Eskom on its company letter head detailing the proposed work within Eskom's 400 kV overhead Hydra-Poseidon Transmission line servitudes (Line 1 and 2).	Holder	At least 30 days before the intended date of commencing with constriction within Eskom's servitude.	Compliance to be verified by ECO and IEA.

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		No. 4 of 2006) as amended.						
01	Contractor Readiness	Repairing and rebuilding the Burgerville District Road will impact Eskom's 400 kV powerline servitudes (Line 1 and Line 2). Construction without permission will constitute an offence in terms of the relevant legislation. (Section 27(3) of Electricity Act, 1987 (Act No. 41 of 1987), as amended in 1994) - repealed by Electricity Regulation Act, 2006 (Act No. 4 of 2006) as amended.	Compliance with Eskom requirements	Eskom 400 kV servitude (Line 1 and 2) Servitude Agreement and Letter of Consent	Furthermore, for road applications underneath Eskom Tx lines, please ensure to provide the following information: 1. Need location of new road crossing, which line and towers affected. 2. Need final designs for road, showing the final elevation and road surface level. 3. Need construction methodology for road. 4. Need details on how surface will be made, graders, blasting etc. 5. Need timelines for road construction. 6. Need applicant to conduct survey to gather current conductor positions of line being crossed and current surface levels of servitude.	Holder	At least 30 days before the intended date of commencing with constriction within Eskom's servitude.	Compliance to be verified by ECO and IEA.
01	Contractor Readiness	Repairing and rebuilding the Burgerville	Compliance with Eskom requirements	Eskom 400 kV servitude (Line 1 and 2)	The application should be submitted to Nomzamo Mdunyelwa ST(SA)0991,	Holder	At least 30 days before the intended date of	Compliance to be verified by ECO and IEA.

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		District Road will impact Eskom's 400 kV powerline servitudes (Line 1 and Line 2). Construction without permission will constitute an offence in terms of the relevant legislation. (Section 27(3) of Electricity Act, 1987 (Act No. 41 of 1987), as amended in 1994) - repealed by Electricity Regulation Act, 2006 (Act No. 4 of 2006) as amended.		Servitude Agreement and Letter of Consent	Senior Advisor Audit and Investigation, Servitude and Land Management, Asset Management - Transmission Division, Eskom (Tel: 053 830 5947, Mobile: 081 046 5341, Email:MdunyeNC@eskom.co.za) at least 30 days before the intended date of commencement to prevent any unnecessary delays.		commencing with constriction within Eskom's servitude.	
01	Contractor Readiness	Any services that need to be constructed over or under a national road, (in this case the N10) or within 60 m measured	Compliance	Written permission from SANRAL prior to commencement of work within 60 m of the road reserve fence.	Apply for a written permission from South African National Roads Agency SOC Limited (SANRAL) before any work is carried out at the N10/Burgerville District Road intersection, and specifically within 60 m	Holder	Pre-construction	Compliance to be verified by ECO and IEA.

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		from the road reserve fence will have an impact on SANRAL (pers. comm. Nicole Abrahams, Environmental Coordinator, Western Region, AbrahamsN@nra.co.za).			from the road reserve fence (wrstatutory@nra.co.za).			
01	Contractor Readiness	Permission may be required from DMRE to use the land surface for an access road as the establishment of a formal servitude could detrimentally affect the mining of mineral resources on that parcel of land.	Compliance	Written approval from the Minister of DMRE	Apply for a written approval from the Minister of the DMRE to use the surface of the land for an access road in terms of Section 53 of the MPRDA, 2002, before the commencement of construction, particularly on the private properties (e.g., not the district road section),	Holder	Pre-construction	Compliance to be verified by ECO and IEA.
01	Contractor Readiness	Permission may be required from DMRE to use	Compliance	Application reference number	Submit the application using the online application portal on the Department's website. Check for	Holder	Pre-construction	Compliance to be verified by ECO and IEA.

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		the land surface for an access road as the establishment of a formal servitude could detrimentally affect the mining of mineral resources on that parcel of land.			SAMRAD applications and follow the steps to create your profile. Select land use application which is section 53 (pers. comm. Mmboneni Mutheiwana, MMboneni.Mutheiwana@dmre.gov.za).			
01	Contractor Readiness	Failure to obtain approvals, licenses or permits.	Compliance	Approvals/Permits	Obtain where applicable the approvals identified in the Planning and Design Phase (under "Legal Compliance") prior to commencing construction.	Holder	Pre-construction	Compliance to be verified by ECO and IEA.
01	Contractor Readiness	Conditions of EA and EMP are not enforced or penalised through employment contracts:	Reduced occurrence of EPC being non-compliant with EA and EMPr	Clause within EPC contract relating to a penalty system for incidences of non-compliance with the EA and EMPr	Contractor should include in labour EPC contract a penalty system regarding incidences of non-compliance with the EA and EMPr, e.g., littering should be a finable offence.	Contractor	Pre-construction	Compliance to be verified by ECO and IEA.
01	Site establishment	Non-compliance with regards to dangerous goods (fuel) storage	Lawful dangerous goods storage	Fuel storage is below 30 cubic meters	Combined fuel storage capacity must remain below 30 cubic meters	Contractor, ECO	Pre-construction	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
01	Site establishment	Unsafe disposal - soil contamination and water pollution.	Compliance	Section 21 (g) authorization	Any person who stores or disposes of domestic wastewater are subject to (must comply with) the limits and conditions set out in the General Authorisation for Section 21(g) Disposing of waste in a manner which may detrimentally impact on a water resource published in GN No. 665 of Government Gazette No. 36820 on 06th September 2013 or alternatively, the conditions contained in the water use license.	Holder, Contractor	Pre-construction	Compliance to be verified by ECO and IEA.

Assessment with mitigation:

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
01	NA	NA	NA	+I	NA	NA	NA	L	L	0

Residual Risk (feeds back into "Mitigations"):

- The residual risk of undertaking unlawful activities (**01**) after mitigation is assumed to be Low.
- A person may feel compelled to commence with construction without a water use license if an environmental authorisation has been granted by the competent authority and the validity period requires the applicant to conclude the authorised activity within a restrictive timeframe that is limited to one dry season.

Receiving Environment: Terrestrial Fauna

Description of potential impacts:

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat.) & S.D. MacGregor (M.Sc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Management Category	Sub-activity	Environmental Aspect	Impact-Consequence	Change	Impact No.
Planning	Stakeholder Engagement	Communication	**Impact:** The construction of a solar electricity generating facility and its associated infrastructure will lead to a change of land use and livelihoods. **Consequence:** Change of land use can potentially impact negatively on the livelihood of the affected farmer, which is sheep farming.	Quantity	02
Contractor Readiness	Employment of labour	Training	**Impact:** Farm gates being left open, or not being closed properly by construction teams. **Consequence:** Loss of livestock	quantity	02
Contractor Readiness	Employment of labour	Training	**Impact:** Poaching **Consequence:** Economic losses due to loss of livestock/game/property	quantity	03
Contractor Readiness	Employment of labour	Training	**Impact:** Lack of environmental awareness training **Consequence:** -the loss/damage of flora and fauna through poaching or illegal harvesting, etc. - the loss of threatened (Red Data) species may result in a loss of biodiversity and ecosystem resilience to climate change (direct). - the loss of threatened keystone species may alter the functioning of an ecosystem (direct).	Quantity	03
Contractor Readiness	Commencement & Construction times	NA	**Impact:** Bird mortalities during the construction phase due to vehicle collisions or collisions with infrastructure. Disturbance to breeding or destruction of bird roosts during the construction phase. **Consequence:** Decrease in avifauna population (directly) due to loss of offspring/breeding pairs for generation (indirectly). Forced redistribution out of home ranges or territories can cause stress and conflict, leading to injury or death of individuals (indirect). The loss of threatened (Red Data) species may result in a loss of biodiversity and ecosystem resilience to climate change (direct). The loss of threatened keystone species may alter the functioning of an ecosystem (direct).	quantity	03

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Site Establishment (Layout)	Site Selection	NA	**Impact:** Sedentary mammals or nesting birds could be injured or killed, resulting in a direct loss of terrestrial animals or aves from construction footprint. **Consequence:** - the loss of threatened (Red Data) species may result in a loss of biodiversity and ecosystem resilience to climate change. - the loss of threatened keystone species may alter the functioning of an ecosystem.	quantity	03
Site Establishment (Layout)	Perimeter/boundary fence	N/A	**Impact:** Animals may enter the contraction camp and have access to waste, hazardous substances, equipment, etc.: **Consequence:** Injury or death (Risk)	quantity	03

*The source of information used in identifying the impact is either the Leipold Matrix (Matrix), Interested and Affected Parties (I&APs) and/or Specialist studies (Specialist)

Any assumptions, uncertainties & limitations, or gaps in knowledge with predicting the impacts

Impact 02 (Damage to property/livestock)

- During the construction phase all livestock would need to be moved to different parts of the farm as the construction activities may be distressing for the animals.
- The movement of workers and vehicles on the site could cause damage to farm infrastructure (e.g., fencing, water troughs and gates), during construction and operation.
- Farm owners are concerned about the impact of fences on water flow during heavy rain. If fences are not kept clear of debris, there is a risk that it can affect the waterflow into dams in the area, which is critical in a dry area like the Karoo.
- There is a risk of stock loss due to farm gates being left open, or not being closed properly by construction teams.
- There are concerns that poaching incidents may increase, especially when the fencing is erected and when a number of construction teams are active in the area.

Impact 03 (Animal species)

- The site lies within the range of 63 terrestrial mammals, including three listed species (EWT & SANBI, Red Data Book of Mammals of South Africa, Lesotho and Swaziland, 2016). The five listed species are the Brown Hyaena Hyaena brunnea (NT), South African Hedgehog Atelerix frontalis (NT), the African White-tailed Rat Mystromys albicaudatus (VU), the Black-footed Cat Felis nigripes (VU) and the Serval Leptailrus

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serval (NT). While the Hedgehog and Black-footed Cat are likely to occur in the broad area, the Brown Hyaena is less likely to be present due to naturally low population density as well as persecution from farmers. Adequate cover and water are essential habitat requirements for the Serval and given the sparse cover at the site this species is unlikely to occur here and the area is not viewed as important habitat for this species which favours tall grassland.

- Sedentary animals pose a higher risk of harm than active animals.
- Faunal diversity in the area is quite high and a wide array of species were directly or indirectly observed during the site visit. The majority of species observed are medium sized mammals, typical of the area and no particularly rare or notable species were observed. Species that were observed in the area include Cape Porcupine Hystrix africaeaustralis, Steenbok Raphicerus campestris, Duiker Sylvicapra grimmia, Springbok Antidorcas marsupialis, Aardvark Orycteropus afer, Rock Hyrax Procavia capensis, Cape Hare Lepus capensis, Hewitt's Red Rock Rabbit Pronologus saundersiae, South African Ground Squirrel Xerus inauris, Springhare Pedetes capensis, Namaqua Rock Mouse Aethomys namaquensis, Black-backed Jackal Canis mesomelas, Bat-eared Fox Otocyon megalotis, Yellow Mongoose Cynictis penicillata and African Wild Cat Felis silvestris.
- Impacts on mammals are likely to be restricted largely to disturbance during the construction phase and habitat loss during the operational phase. Although this is relatively low in the context of the landscape, impacts on habitat fragmentation and landscape connectivity are likely to be increasingly significant as the landscape becomes increasingly transformed as a result of the large number of the developments in the area. The Brak River is likely of significance in terms of landscape connectivity for fauna and it would be important to maintain this clear of development to ensure that it retains this function.
- The DFFE Screening Tool identified the site as having a high sensitivity for the animal species theme.

Impact 03 (Important Bird Area)

- The study area occurs in the Platberg-Karoo Conservancy (SA037) Important Bird and Biodiversity Area (IBA), covering c. 1 240 000 ha with a protected status of "Unprotected". The folding process has forged several large peaks and plateaus in this area. The IBA encompasses a continuous chain of mountains and includes several State forests, mountain catchment areas and provincial nature reserves. A total of 289 bird species have been recorded in the IBA during SABAP2 (Avifauna Final EIA Report prepared by Sam Laurence of Enviro-Insight cc, dated October 2022). Although this region appears typical of much of the upper Nama Karoo, this IBA contributes greatly to conservation by supporting populations of several red-listed species, many of which are collision-prone medium to large terrestrial birds (cranes, bustards, korhaans) and raptor species (Avi Faunal Specialists EIA Report in May 2017).
- 84 bird species were observed within and around the Combined Project Area out of an expected total of 104 species, based on previous surveys, the SABAP Pentad analysis and habitat suitability, based Probability of Occurrences.
- IBA trigger species are the Globally threatened Blue Crane, Ludwig's Bustard, Kori Bustard, Secretary bird, Martial Eagle, Blue Korhaan, Black Harrier and Denham's Bustard. Regionally threatened species are Black Stork, Lanner Falcon, Tawny Eagle, Karoo Korhaan and Verreauxs' Eagle (BirdLife website, 2015).

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- The most significant breeding habitat recorded during the survey were the active Verreaux's Eagle and Tawny Eagle nests. The nesting site is at this stage the highest sensitivity found within proximity of the study area. A portion of the preferred Alternative Route No. 1, specifically existing farm tracks that will be rebuilt to Eskom specification, are within the 1 km buffer of the Verreaux Eagle's nest (Avifauna Final EIA Report, 2022).
- Verreaux's Eagles breed with one partner for their entire life, and only replace a partner in the event of death. **Mating takes place all year round and egg-laying season is between April and July** (Verreaux's Eagle - SANBI, 2014).
- Essentially, all habitat attractants should be eliminated so that avifaunal populations will not embedded themselves within the infrastructure over time.
- Significant risks are associated with the likelihood of project vehicles flushing birds into fencing infrastructure.
- Average monthly rainfall peaks from October to May, whereas average monthly run-off peaks from December to April (Hydrology Assessment, 2023).
- Conservation Issues/Threats:
    - Habitat loss (including foraging and breeding) and fragmentation due to displacement (avoidance of disturbance). Habitat loss has the tendency to not only destroy existing habitat but also displace bird species from large areas of natural habitat. This specifically has a greater impact on bird species restricted to a specific habitat and its requirements.
    - Disturbance due to noise such as, machinery movements and maintenance operations during the construction.

Assessment without mitigation:

Legend					
Criteria		**Reversibility, Irreplaceability, & Mitigatory Potential**		**Significance (Impact Magnitude & Impact Importance**	
Abbreviation	**Description**	**Abbreviation**	**Description**	**Abbreviation**	**Description**
H	High	L	Low	0	Non-significant
M	Medium	M	Moderate	1	Significant
L	Low	H	High		
-I/R	Negative Impact/Risk				
+I/R	Positive Impact/Risk				

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat.) & S.D. MacGregor (M.Sc., Pr.Sci.Nat.)
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02	M	M	M	-I	M	H	1	H	M	1
Reversibility	H	**Irreplaceability**	H	**Mitigatory Potential**	H					

Impact	**Intensity**	**Spatial**	**Duration**	**Status**	**Nature**	**Prob.**	**MAGNITUDE**	**Accept.**	**Prob.**	**IMPORTANCE**
03	M	M	M	-I	M	H	1	H	M	1
Reversibility	H	**Irreplaceability**	H	**Mitigatory Potential**	H					

Any aspects which were conditional to the findings of the assessment (to be included as conditions of authorisation):

- None

References (legal, scientific, social, or other criteria) used for the assessment and mitigations:

- Avifauna Specialist Assessment (Final) prepared by Enviro-Insight CC (Sam Laurence and A.E. van Wyk) dated October 2022).
- (BirdLife International (2022) Species factsheet: Neotis ludwigii. Downloaded from http://www.birdlife.org on 30/03/2022; http://datazone.birdlife.org/species/factsheet/ludwigs-bustard-neotis-ludwigii).
- Verreaux's Eagle - SANBI article prepared by Mandisa Kondlo and Thato Moeketsane of Walter Sisulu National Botanical Garden on September 2014.
- Environmental Impact Assessment for the proposed Soventix Solar PV Project, De Aar, Northern Cape: Fauna & Flora Specialist EIA Report prepared by Simon Todd Consulting dated May 2017.
- Screening Assessment Reports.
- "Hydrological Assessment for additional listed activities and water uses relating to the development of the Sun Central Cluster 1 300 MW Solar PV facility (previously known as Phase 1) in the Northern Cape", Version – Final 1, prepared by Hendrik Botha and dated 09 January 2023 (GCS Ref – 22 - 1054).
- Screening Assessment Reports.
  BirdLife website (https://www.birdlife.org.za/iba-directory/platberg-karoo-conservancy - page last updated Friday 13th February 2015)
  Avifauna Final EIA Report prepared by Enviro-Insight CC (Sam Laurence and A.E. van Wyk) dated October 2022

Mitigations:

Impact Management Outcome(s):

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat.) & S.D. MacGregor (M.Sc., Pr.Sci.Nat.)
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- Minimize disturbance to local famers
- Minimize change in livelihoods of surrounding communities
- Ensure the protection of fauna, aves and livestock
- Ensure least impact on breeding, e.g., bird roosts and nests are not disturbed.
- Compliance

Targets:

- No vehicle incidences with livestock
- Construction programme provide to affected farmers
- No poaching (snares etc.)
- Signed attendance register of Environmental Awareness training
- Environmental Awareness training course material
- Minimal bird injuries & mortalities recorded.
- Least impact on breeding, e.g., bird roosts and nests are not disturbed.
- Preservation of Species of Conservation Concern (SCC).
- No incidents of animals entering the construction camp

Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
02	Planning	Farm gates being left open, or not being closed properly by construction teams.	Minimize disturbance to local famers	Signed attendance register of Environmental Awareness training	The construction teams must be educated about the closing/locking farm gates, through toolbox talks.	Contractor, SEO	Pre-construction	Compliance to be verified by ECO and IEA.
02	Planning	Farm gates being left open, or not being closed properly by construction teams.	Minimize disturbance to local famers	No vehicle incidences with livestock	Livestock must have right of way.	Contractor	Continuous	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
02	Planning	Farm gates being left open, or not being closed properly by construction teams.	Minimize disturbance to local famers	No vehicle incidences with livestock	Construction vehicles must wait for the animals to cross before they continue with their journey.	Holder, Contractor	Continuous	Compliance to be verified by ECO and IEA.
02	Planning	The construction of a solar electricity generating facility and its associated infrastructure will lead to a change of land use and livelihoods.	Minimize change in livelihoods of surrounding communities	Construction programme provide to affected farmers	The farmers must be given a construction programme with sufficient leeway to ensure that they can move their livestock before construction activities commence.	Holder, Contractor.	Pre - Construction Phase	Compliance to be verified by ECO and IEA.
03	Contractor Readiness	Loss of fauna/ livestock through poaching	Ensure the protection of fauna and livestock	No poaching (snares etc.)	SAE must have a zero-tolerance policy regarding poaching, and make it clear what the punishment and consequences would be	Contractor, ECO	Continuous	Compliance to be verified by ECO and IEA.
03	Contractor Readiness	Lack of environmental awareness training	Ensure the protection of fauna and livestock	Signed attendance register of Environmental Awareness training	The contractor's staff must be made aware of the prohibitions relating to wild animals in an induction, specifically: No wild animal may under any circumstance	Contractor, ECO, SEO	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat.) & S.D. MacGregor (M.Sc., Pr.Sci.Nat.)
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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
					be handled, removed, or be interfered with unless done so by a trained handler. No wild animal may be fed on site. No wild or domesticated animal may under any circumstance be hunted, snared, injured or killed.			
03	Contractor Readiness	Lack of environmental awareness training	Ensure the protection of fauna and livestock	Environmental Awareness training course material	Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness as to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas, fauna and in particular awareness about not harming or collecting species	Contractor, ECO, SEO	Pre-construction	Compliance to be verified by ECO and IEA.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat.) & S.D. MacGregor (M.Sc., Pr.Sci.Nat.)
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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
					such as snakes, tortoises and owls which are often persecuted out of superstition etc.			
03	Contractor Readiness	Bird mortalities during the construction phase due to vehicle collisions or collisions with infrastructure. Disturbance to breeding or destruction of bird roosts during the construction phase	Ensure the protection of Aves. Ensure least impact on breeding, e.g., bird roosts and nests are not disturbed.	Minimal bird injuries & mortalities recorded. Least impact on breeding, e.g., bird roosts and nests are not disturbed.	As far as possible, limit construction within sensitive flood plains, watercourses and associated buffers to May, June, July, and August to avoid breeding periods of Avian species.	Holder, Contractor	Pre-construction and Dry season	Compliance to be verified by ECO and IEA.
03	Contractor Readiness	Bird mortalities during the construction phase due to vehicle collisions or collisions with infrastructure. Disturbance to breeding or destruction of bird roosts during the construction phase	Ensure the protection of Aves. Ensure least impact on breeding, e.g., bird roosts and nests are not disturbed.	Minimal bird injuries & mortalities recorded. Least impact on breeding, e.g., bird roosts and nests are not disturbed.	As far as possible, schedule work in the vicinity of nests or roosts of species of conservation concern outside of the breeding season of the nesting bird; construction of that portion of the preferred Alternative Route No. 1 that is within the 1.5 km buffer of the Verreaux Eagle's nest should be	Contractor	Pre-construction and outside of the breeding season of the nesting bird.	SEO to monitor 1.5 km buffer. Compliance to be verified by ECO and IEA.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat.) & S.D. MacGregor (M.Sc., Pr.Sci.Nat.)
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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
					completed outside its breeding season, which is from April to July, and preferably August as well.			
03	Site establishment	Sedentary mammals or nesting birds could be injured or killed, resulting in a direct loss of terrestrial animals or aves from construction footprint.	Compliance	Preservation of Species of Conservation Concern (SCC).	Pre-construction walk-through of the access road, pipeline routes and other construction footprints (e.g., camp and staging areas) in order to locate species of conservation concern (e.g., endemic, threatened and/or protected fauna), particularly local sedentary or burrowing fauna as well as ground nesting birds that can be translocated.	Contractor, ECO, SEO	Pre-construction prior to clearing.	Compliance to be verified by ECO and IEA.
03	Site establishment	Sedentary mammals or nesting birds could be injured or killed, resulting in a direct loss of terrestrial animals or aves from construction	Compliance	Preservation of Species of Conservation Concern (SCC).	If any sedentary animals or ground nesting birds are found, then these are to be relocated to a suitable distance and habitat by the ECO or appropriately qualified environmental	Contractor, ECO, SEO	Pre-construction prior to clearing.	Compliance to be verified by ECO and IEA.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat.) & S.D. MacGregor (M.Sc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
		footprint.			officer, and only if it is not possible to relocate the footprint.			
03	Site establishment	Sedentary mammals or nesting birds could be injured or killed, resulting in a direct loss of terrestrial animals or aves from construction footprint.	Compliance	Preservation of Species of Conservation Concern (SCC).	Vegetation clearing to commence only after walk through has been conducted, the necessary permits and/or license have been obtained, and/or sedentary animals/aves have been safely translocated.	Contractor, ECO, SEO	Pre-construction prior to clearing.	Compliance to be verified by ECO and IEA.
03	Site establishment	Sedentary mammals or nesting birds could be injured or killed, resulting in a direct loss of terrestrial animals or aves from construction footprint.	Compliance	Preservation of Species of Conservation Concern (SCC).	ECO to provide supervision and oversight of vegetation clearing activities within sensitive areas such as near drainage areas.	ECO	Pre-construction prior to clearing.	Compliance to be verified by ECO and IEA.
03	Site Establishment	Animals may enter the contraction camp and have access to waste, hazardous	Ensure the protection of fauna	No incidents of animals entering the construction camp	Erect and maintain a barrier (e.g., shade cloth fence) around the perimeter of the construction camp.	Contractor	Continuous	Compliance to be verified by ECO and IEA.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat.) & S.D. MacGregor (M.Sc., Pr.Sci.Nat.)
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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
		substances, equipment, etc.						

Assessment with mitigation:

Alternative Route No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
02	L	L	L	-I	L	L	0	L	M	0

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
03	L	L	L	neutral	L	L	0	L	L	0

Residual Risk (feeds back into "Mitigations"):

- Sedentary or burrowing fauna, as well as ground nesting birds, may occupy the development site after their observed absence during the basic assessment process.
- Although the development footprint is small relative to animal home rages and territories, sound can travel further, beyond the boundaries of the footprint.
- Although sedentary animals pose a higher risk of harm than active animals, both types of animals are susceptible to harm when construction vehicles are driven at speed.

Receiving Environment: Terrestrial Flora

Description of potential impacts:

Management Category	Sub-activity	Environmental Aspect	Impact-Consequence	Change	Impact No.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat.) & S.D. MacGregor (M.Sc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Planning	Fire Management Plan	NA	**Impact:** Risk of veld fires caused by workers during the construction of the facility. **Consequence:** - Runaway fires on neighbouring properties will result in a loss of grazing for livestock and/or wild game, increasing the running costs to provide supplementary feed.	quantity	04
Contractor Readiness	NA	Other approvals	**Impact:** Picking a protected, specially protected or indigenous* plant without the applicable permits and/or license constitutes an offence. * within an area bordering a natural water course, whether wet or dry, up to and within a distance of 100 metres from the middle of a river on either side of the natural water course. **Consequence:** - A person convicted of an offence in terms of this Act is liable to a fine, or to imprisonment for a period not exceeding 10 years, or to both a fine and such imprisonment (Section 67(1) of Northern Cape Nature Conservation Act, 2009 (Act No. 09 of 2009). - A person who is guilty of a first category offence (such as contravening the prohibition on picking any protected tree except under a license) may be sentenced to a fine or imprisonment for a period of up to 3 years, or to a fine and such imprisonment (S58(1) of NFA, 1998). - A person convicted of an offence is liable to a fine not exceeding R10 million, or an imprisonment for a period not exceeding ten years, or to both such a fine and such imprisonment (S102 read with 101 of NEMBA, 2004).	quantity	04
Contractor Readiness	Employment of labour	Training	**Impact:** Risk of veld fires caused by workers during the construction of the facility. **Consequence:** - Runaway fires on neighbouring properties will result in a loss of grazing for livestock and/or wild game, increasing the running costs to provide supplementary feed.	quantity	04
Contractor Readiness	Employment of labour	Training	**Impact:** Direct loss of terrestrial plants from construction activities on land. **Consequence:** - the loss of threatened (Red Data) species may result in a loss of biodiversity and ecosystem resilience to climate change (direct). - the loss of threatened keystone species may alter the functioning of an ecosystem (direct).	quantity	04

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat.) & S.D. MacGregor (M.Sc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Site Establishment (Layout)	Site Selection	NA	**Impact:** Direct loss of terrestrial plants from construction camp footprint. **Consequence:** - the loss of threatened (Red Data) species may result in a loss of biodiversity and ecosystem resilience to climate change. - the loss of threatened keystone species may alter the functioning of an ecosystem.	quantity	04

*The source of information used in identifying the impact is either the Leipold Matrix (Matrix), Interested and Affected Parties (I&APs) and/or Specialist studies (Specialist)

Any assumptions, uncertainties & limitations, or gaps in knowledge with predicting the impacts

Impact 04 (Fire)

- The De Aar area falls within the Nama Karoo biome. Runaway fires could result in a decrease in grazing capacity and loss of plant species.

Impact 04 (Protected Plants)

- According to the SIBIS database, a total of 407 plant species are found in the QDS 3024, of which only four red data-listed plant species are represented, Chasmatophyllum maninum and Chasmatophyllum rouxii (listed as DDD (data deficient, insufficient information)), Cynodon polevansii, which is listed DDT (Data Deficient – Taxonomically Problematic), and Rapanea melanophloeos, which is listed as Declining. The Chasmatophyllum species are associated with rocky flats and areas of exposed bedrock and Chasmatophyllum maninum is confirmed present at the site. Rapanea is associated with forest patches that usually occur around the base or in small kloofs of sandstone outcrops in vegetation types such as Besemkaree Koppies Shrubland and as it was not observed at the site and it is highly unlikely to be present.
- Other species of significance observed at the site include Stomatium pluridens and Euphorbia crassipes, which are regional endemics and provincially protected, while other protected species include Aloe broomii var. broomii, Aloe claviflora, Pachypodium succulentum, Ammocharis coranica, and Boscia albitrunca.

Assessment without mitigation:

Legend					
Criteria		**Reversibility, Irreplaceability, & Mitigatory Potential**		**Significance (Impact Magnitude & Impact Importance**	
Abbreviation	**Description**	**Abbreviation**	**Description**	**Abbreviation**	**Description**
H	High	L	Low	0	Non-significant

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat.) & S.D. MacGregor (M.Sc., Pr.Sci.Nat.)
Reg: 2006/023163/23

M	Medium	M	Moderate	1	Significant
L	Low	H	High		
-I/R	Negative Impact/Risk				
+I/R	Positive Impact/Risk				

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
04	L	M	L	-I	M	M	1	M	M	1
Reversibility	H	**Irreplaceability**	H	**Mitigatory Potential**	H					

Any aspects which were conditional to the findings of the assessment (to be included as conditions of authorisation):

- None

References (legal, scientific, social, or other criteria) used for the assessment and mitigations:

- National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998)
- National Environmental Management: Biodiversity Act (Act No. 10 of 2004); Chapter 4 Threatened or Protected Ecosystems and Species
- 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 (S57(1)).
- National Forest Act, 1998 (Act No. 84 of 1998); Part 3 Protection of Trees
- No person may cut, disturb, damage or destroy any protected tree except under a license granted by the Minister (S15(1)(a)).
- Northern Cape Nature Conservation Act, 2009 (Act No. 9 of 2009); Section 51(1) "No person may, without a permit, pick an indigenous plant - (c) within an area bordering a natural water course, whether wet or dry, up to and within a distance of 100 metres from the middle of a river on either side of the natural water course."
- "pick" includes to collect, to cut, to chop off, to take, to gather, to pluck, to uproot, to break, to damage or to destroy;
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004); Section 73(2) "A person who is the owner of land on which a listed invasive species occurs must- (a) notify any relevant competent authority, in writing, of the listed invasive species occurring on that land; (b) take steps to control and eradicate the listed invasive species and to prevent it from spreading; and (c) take all the required steps to prevent or minimise harm to biodiversity."

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Reg: 2006/023163/23

Mitigations:

Impact Management Outcome(s):

- No run-away (uncontrolled) fires
- Lawful activities involving any threatened or protected flora.
- Preserve protected plant species that may not have been identified during the EIA Phase
- Compliance

Targets:

- No run-away (uncontrolled) fires.
- Appointed person/agent to deal with fires.
- Trained firefighting personal.
- A license under the NFA, 1998, a permit under NCNCA, 2009 and/or a permit under NEMBA, 2004.
- Signed register of attendance, and content of induction.
- Preservation of Species of Conservation Concern (SCC) Protected plant permits (if applicable)

Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
04	Planning	Risk of veld fires caused by workers during the construction of the facility decreases grazing capacity	No run-away (uncontrolled) fires	Fire management plan	Undertake a risk analysis to determine inter alia the probability and frequency of a wildfire during construction and operation and prepare a fire management plan accordingly.	Holder	Pre-construction	Compliance to be verified by ECO and IEA.
04	Contractor Readiness	Risk of veld fires caused by workers during the	No run-away (uncontrolled) fires	Appointed person/agent to deal with fires	Appoint a responsible person (or agent) who will extinguish a	Holder, Contractor	Pre-construction	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
		construction of the facility.			fire or assist in doing so.			
04	Contractor Readiness	Risk of veld fires caused by workers during the construction of the facility.	No run-away (uncontrolled) fires	Trained firefighting personal	If no agent is appointed, a team of designated firefighting personal shall be trained and readily available to immediately deal with any runaway veld fires.	Holder, Contractor	Pre-construction	Compliance to be verified by ECO and IEA.
04	Contractor Readiness	Picking a protected, specially protected or indigenous* plant without the applicable permits and/or license constitutes an offence. * within an area bordering a natural water course, whether wet or dry, up to and within a distance of 100 metres from the middle of a river on either side of the natural water course.	Lawful activities involving any threatened or protected flora.	A license under the NFA, 1998, a permit under NCNCA, 2009 and/or a permit under NEMBA, 2004.	Vegetation clearance may not commence without the applicable permit(s) and/or license to carry out a restricted activity involving, or cutting, disturbing, damaging or destroying any protected or specially protected plants, as well as picking indigenous plants on a public road, on land next to a public road within 100 m from the centre of the road, and within 100 m from the middle of a natural watercourse, whether wet or dry, on either side of the natural water course.	SEO or ECO	Prior to commencement of clearing and grubbing.	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
04	Contractor Readiness	Picking a protected, specially protected or indigenous* plant without the applicable permits and/or license constitutes an offence. * within an area bordering a natural water course, whether wet or dry, up to and within a distance of 100 metres from the middle of a river on either side of the natural water course.	Lawful activities involving any threatened or protected flora.	A license under the NFA, 1998, a permit under NCNCA, 2009 and/or a permit under NEMBA, 2004.	Only apply for permit(s) and/or a license to "pick" a threatened or protected plant if it is not possible to relocate the footprint.	Holder Landowner	Continuous	Compliance to be verified by ECO and IEA.
04	Contractor Readiness	Direct loss of terrestrial plants from construction activities on land.	Preserve protected plant species that may not have been identified during the EIA Phase	Signed register of attendance, and content of induction.	The contractor's staff must be made aware of the prohibition on harvesting any plant or plant part.	Contractor, ECO.	Continuous	Compliance to be verified by ECO and IEA.
04	Site Establishment (Layout)	Direct loss of terrestrial plants from construction camp footprint.	Compliance	Preservation of Species of Conservation Concern (SCC)	Preconstruction walk-through of the access road, pipeline routes and other construction	Contractor, ECO.	Prior to site establishment.	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
				Protected plant permits (if applicable)	footprints (e.g., camp and staging areas) in order to locate species of conservation concern (e.g., endemic, threatened and/or protected flora) that can be translocated.			
04	Site Establishment (Layout)	Direct loss of terrestrial plants from construction camp footprint.	Compliance	Preservation of Species of Conservation Concern (SCC) Protected plant permits (if applicable)	High visibility flags must be placed near endemic, threatened or protected plants that will not be translocated to avoid any damage or destruction of these species.	Contractor, ECO.	Prior to site establishment.	Compliance to be verified by ECO and IEA.
04	Site Establishment (Layout)	Direct loss of terrestrial plants from construction camp footprint.	Compliance	Preservation of Species of Conservation Concern (SCC) Protected plant permits (if applicable)	Apply for the applicable permit(s) and or license to translocate any protected, specially protected or indigenous plants within 100 m from the middle of a river on either side of the natural water course.	Holder, ECO.	Prior to site establishment.	Compliance to be verified by ECO and IEA.
04	Site Establishment (Layout)	Direct loss of terrestrial plants from construction camp footprint.	Compliance	Preservation of Species of Conservation Concern (SCC) Protected plant permits (if applicable)	Only apply for permit(s) and/or a license to "pick" a threatened or protected plant if it is not possible to relocate the footprint.	Holder, ECO.	Prior to site establishment.	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
04	Site Establishment (Layout)	Direct loss of terrestrial plants from construction camp footprint.	Compliance	Preservation of Species of Conservation Concern (SCC) Protected plant permits (if applicable)	Any subsequent restricted activity involving, or picking, or cutting, disturbing, damaging or destroying any protected, specially protected or indigenous plants within 100 m from the middle of a river on either side of the natural water courses, must comply with the applicable permit and/or license conditions.	Holder, Contractor	Prior to site establishment.	Compliance to be verified by ECO and IEA.
04	Site Establishment (Layout)	Direct loss of terrestrial plants from construction camp footprint.	Compliance	Preservation of Species of Conservation Concern (SCC) Protected plant permits (if applicable)	Vegetation clearing to commence only after walk through has been conducted, the necessary permits and/or license have been obtained, and the visibility flags have been erected and/or applicable plants have been safely translocated.	Contractor	Prior to site establishment.	Compliance to be verified by ECO and IEA.
04	Site Establishment (Layout)	Direct loss of terrestrial plants from construction camp footprint.	Compliance	Preservation of Species of Conservation Concern (SCC) Protected plant permits (if applicable)	ECO to provide supervision and oversight of vegetation clearing activities within sensitive areas such as near drainage areas.	ECO.	Prior to site establishment.	Compliance to be verified by ECO and IEA.

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Assessment with mitigation:

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
04	L	M	L	-I	M	L	0	L	L	0

Residual Risk (feeds back into "Mitigations"):

- None.

Receiving Environment: Soil and Rock

Description of potential impacts:

Management Category No.	Sub-activity	Environmental Aspect	Impact-Consequence	Change	Impact No.
Contractor Readiness	Development of Method Statements	NA	**Impact:** Spills from vehicles undergoing maintenance can contaminate the topsoil. **Consequence:** - sterile habitat for fauna and flora (indirect).	quality	05
Site Establishment (Layout)	Site Selection	NA	**Impacts:** Construction plant can contaminate the topsoil in the construction camp and staging area. **Consequences:** sterile habitat for fauna and flora.	quantity	05
Site Establishment (Layout)	Construction Camp	Flammable and other hazardous substance stores	**Impact:** Leaks or spills from the hazardous substance store can contaminate the topsoil. **Consequence:** - sterile habitat for fauna and flora (indirect).	quality	05

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Site Establishment (Layout)	Construction Camp	Maintenance and workshop areas	**Impact:** (1) Vehicles in poor condition are more prone to breakdowns and/or leaks (Risk). (2) Spills from vehicles undergoing maintenance can contaminate the topsoil. **Consequence:** - sterile habitat for fauna and flora (indirect).	quality	05
Site Establishment (Layout)	Construction Camp	Waste storage	**Impact:** Rain accumulation on waste storage areas can cause leaching. **Consequence:** Contaminate soil	quality	05
Site Establishment (Layout)	Construction Camp	Generators	**Impact:** Spills or leaks from the generators can contaminate the topsoil. Contaminated rainwater may be released from the bund into the environment. **Consequence:** Sterile habitat for fauna and flora (indirect).	quality	05
Site Establishment (Layout)	Construction Camp	Fuel storage and refuelling area	**Impact:** Spills from fuel storage and refuelling in camp can contaminate the topsoil: Contaminated rainwater may be released from the bund into the environment. **Consequence:** Sterile habitat for fauna and flora (indirect).	quality	05
Site Establishment (Layout)	Batching plant/Cement-mixing area	Washing Facility	**Impact:** Concrete slurry from the batching plant or RMC trucks can contaminate the ground. **Consequence:** Decrease in water/land quality due to batching plant.	quality	05

*The source of information used in identifying the impact is either the Leipold Matrix (Matrix), Interested and Affected Parties (I&APs) and/or Specialist studies (Specialist)

Any assumptions, uncertainties & limitations, or gaps in knowledge with predicting the impacts

Impact 05 (Soil contamination)

- During the rainy season terrain mobility on high clay soils in low lying areas with drainage lines will be difficult and might increase soil erosion when drainage lines are disturbed.
- The soil profile is generally thin, less than 1m within the area and the nature of the bedrock is consistent across the footprint.

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- Electricity for the construction camp will be sourced from two (2) 50 kVA (minimum) mobile generators with an integrated diesel tank (fuel capacity ± 200 litres), e.g., one will be used as backup during service periods and allow the other to rest. The integrated diesel tanks will be supplied fuel from a bunded 5 to 10 m3 aboveground diesel tank. A filling station alongside the aboveground diesel tank and/or a mobile fuel bowser will supply plant on site for general use. The generators, aboveground fuel tank and filling station will be located at the construction camp.
- The concrete batching plant, which may or may not be in the construction camp, shall contain a washing facility for containing only the waste concrete slurry cleaned out of the discharge chute(s) and rotating mixing drums of concrete mixer trucks. This washing facility shall contain two adjacent wash bays to allow for continuous operations and minimise the risk of overflow or work stoppage when a bay has reached its capacity and must be emptied.

Assessment without mitigation:

Legend					
Criteria		**Reversibility, Irreplaceability, & Mitigatory Potential**		**Significance (Impact Magnitude & Impact Importance**	
Abbreviation	**Description**	**Abbreviation**	**Description**	**Abbreviation**	**Description**
H	High	L	Low	0	Non-significant
M	Medium	M	Moderate	1	Significant
L	Low	H	High		
-I/R	Negative Impact/Risk				
+I/R	Positive Impact/Risk				

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
05	H	L	M	-I	H	M	1	H	M	1
Reversibility	M	**Irreplaceability**	M	**Mitigatory Potential**	H					

Any aspects which were conditional to the findings of the assessment (to be included as conditions of authorisation):

- None

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References (legal, scientific, social, or other criteria) used for the assessment and mitigations:

- Geotechnical Investigation Report for Sun Central PV project near De Aar, Northern Cape Province – BRC/RP/31/2022 prepared by Bare Rock Consulting (Pty) Ltd dated December 2022.

Mitigations:

Impact Management Outcome(s):

- Control or contain soil pollution
- Preserve Topsoil
- Responsible storage of hazardous substances
- Avoid contamination of soil from leaking machinery
- To reduce the amount of soil pollution
- Responsible storage of fuel and concrete slurry waste for re-use or disposal.

Targets:

- Emergency protocol in place
- Topsoil stockpiles
- No hazardous substances within 100m of watercourse
- Bund capacities displayed.
- Bund with locked valve and sump
- Bund wall is protected.
- Maintenance area is bunded and roofed.
- A designated waste storage area is contained – waste is not in direct contact with the ground, bunded and roofed.
- Generators with diesel tanks stored correctly.
- Fuel tank is bunded to 110%

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- Refuelling station is bunded.
- Mobile fuel bowser parking area is bunded to 110%
- No contamination of land (with waste concrete slurry)

Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
05	Contractor Readiness	Spills from vehicles undergoing maintenance can contaminate the topsoil.	Control or contain soil pollution	Emergency protocol in place	An emergency protocol must be developed that deals with accidents and spills. This must include methods for absorbing chemical spills, as well as the transport and on-site bioremediation or disposal of all contaminated material at a licensed hazardous waste site.	Holder, Contractor	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.
05	Site Establishment (Layout)	Construction plant can contaminate the topsoil in the construction camp and staging area.	Preserve Topsoil	Topsoil stockpiles	Topsoil must be removed from the construction camp and staging area footprints and stockpiled separately within the respective areas for reinstatement during rehabilitation of both sites.	Contractor	Pre-construction	Compliance to be verified by ECO and IEA.
05	Site Establishment (Layout)	Leaks or spills from the hazardous substance store can contaminate the topsoil.	Responsible storage of hazardous substances	No hazardous substances within 100m of watercourse	No storage of hazardous substances (e.g., fuel, oil, etc.) is permitted within 100 m of the edge of any wetlands or watercourses.	Contractor	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
05	Site Establishment (Layout)	Leaks or spills from the hazardous substance store can contaminate the topsoil.	Responsible storage of hazardous substances	Bund capacities displayed	The total bund capacities will be displayed on bund wall.	Contractor	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.
05	Site Establishment (Layout)	Leaks or spills from the hazardous substance store can contaminate the topsoil.	Responsible storage of hazardous substances	Bund with locked valve and sump	The bund must have a draining valve and a sump at the lowest point of the bund area; the draining valve must be closed and locked at all times.	Contractor	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.
05	Site Establishment (Layout)	Leaks or spills from the hazardous substance store can contaminate the topsoil.	Responsible storage of hazardous substances	Bund wall is protected	Where practical/ necessary the bund wall must have protective barriers to prevent mobile equipment and vehicles from colliding with the walls and damaging it	Contractor	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.
05	Site Establishment (Layout)	Vehicles in poor condition are more prone to breakdowns and/or leaks (Risk).	Avoid contamination of soil from leaking machinery	Maintenance area is bunded and roofed	If a maintenance/service/repair facility for construction plant (vehicles, machines, or equipment) is required, then it will be in the construction camp. The maintenance/service/repair bay shall be bunded, roofed to prevent ingress of rain, include a stormwater diversion system to prevent the	Contractor	Pre-construction	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
					ingress of surface water run-off (e.g., a 'speed bump' at the entrance to the bunded service bay), and designed with an oil-water separator to remove hydrocarbons (oil, grease, fuel, hydraulic fluid, etc.).			
05	Site establishment (Layout)	Rain accumulation on waste storage areas can cause leaching.	To reduce the amount of soil pollution	A designated waste storage area is contained – waste is not in direct contact with the ground.	Designate and contain a temporary waste storage area within the construction camp (e.g., covered skips, scavenger proof bins, etc.)	Contractor	Pre-construction and Continuous	Compliance to be verified by Compliance to be verified by ECO and IEA
05	Site establishment (Layout)	Rain accumulation on waste storage areas can cause leaching.	To reduce the amount of soil pollution	A designated waste storage area is contained – bunded and roofed	The hazardous waste storage bay shall be fenced, bunded, roofed to prevent ingress of rain and include a stormwater diversion system to prevent the ingress of surface water run-off (e.g., a 'speed bump' at the entrance to the bunded storage bay).	Contractor	Pre-construction and Continuous	Compliance to be verified by Compliance to be verified by ECO and IEA
05	Site establishment (Layout)	Spills or leaks from the generators can contaminate the topsoil. Contaminated rainwater may be released	Avoid contamination of soil from leaking machinery	Generators with diesel tanks stored correctly	Generators with integrated diesel tanks must be located on an impervious bund capable of containing 110% of the volume of the integrated fuel storage tanks. The generators and bund shall be roofed to prevent ingress of rain.	Contractor	Pre-construction and Continuous	Compliance to be verified by Compliance to be verified by ECO and IEA

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
		from the bund into the environment						
05	Site establishment (Layout)	Spills from fuel storage and refuelling in camp can contaminate the topsoil: Contaminated rainwater may be released from the bund into the environment	Responsible storage of fuel	Fuel tank is bunded to 110%	The above ground fuel storage tank must be located on an impervious bund capable of containing 110% of the volume of the fuel storage tank. The fuel tank and bund shall be roofed to prevent ingress of rain.	Engineer, Contractor	Pre-construction	Compliance to be verified by Compliance to be verified by ECO and IEA
05	Site establishment (Layout)	Spills from fuel storage and refuelling in camp can contaminate the topsoil: Contaminated rainwater may be released from the bund into the environment	Responsible storage of fuel	Refuelling station is bunded	The refuelling station alongside the aboveground diesel tank shall be bunded, include a stormwater diversion system to prevent the ingress of surface water run-off (e.g., a 'speed bump' at the entrance and exit) and designed with an oil-water separator to remove hydrocarbons (oil, grease, fuel, hydraulic fluid, etc.). If practical, the refuelling station should be roofed to prevent ingress of rain.	Engineer, Contractor	Pre-construction	Compliance to be verified by Compliance to be verified by ECO and IEA
05	Site establishment (Layout)	Spills from fuel storage and refuelling in camp can	Responsible storage of fuel	Mobile fuel bowser parking area	A mobile fuel bowser must be parked (when not being used) on an impervious bund capable of containing	Engineer, Contractor	Pre-construction	Compliance to be verified by Compliance

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
		contaminate the topsoil: Contaminated rainwater may be released from the bund into the environment		is bunded to 110%	110% of the volume of the fuel bowser. The bund for parking the bowser shall be roofed to prevent ingress of rain and include a stormwater diversion system to prevent the ingress of surface water run-off (e.g., a 'speed bump' at the entrance to the bunded bay).			to be verified by ECO and IEA
05	Site establishment (Layout)	Concrete slurry from the batching plant or RMC trucks can contaminate the ground.	Responsible storage of concrete slurry waste for re-use or disposal.	No contamination of land (with waste concrete slurry)	The concrete batching plant shall have a washing facility, which shall only be used for washing the waste concrete slurry from the discharge chute(s) and rotating mixing drums of concrete mixer trucks.	Engineer, Contractor	Pre-construction	Compliance to be verified by Compliance to be verified by ECO and IEA
05	Site establishment (Layout)	Concrete slurry from the batching plant or RMC trucks can contaminate the ground.	Responsible storage of concrete slurry waste for re-use or disposal.	No contamination of land (with waste concrete slurry)	This washing facility shall contain two adjacent bays to allow for continuous operations and minimise the risk of overflow or work stoppage when a bay has reached its capacity and must be emptied. The wash bays shall be bunded and include a stormwater diversion system to prevent the ingress of surface water run-off (e.g., a 'speed bump' at the entrance to the bunded wash bay).	Engineer, Contractor	Pre-construction	Compliance to be verified by Compliance to be verified by ECO and IEA

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Assessment with mitigation:

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
05	L	L	L	neutral	L	L	0	L	L	0

Residual Risk (feeds back into "Mitigations"):

- None.

Receiving Environment: Ground and Surface Water

Description of potential impacts:

Management Category No.	Sub-activity	Environmental Aspect	Impact-Consequence	Change	Impact No.
Site Establishment (Layout)	Site Selection	NA	**Impact:** Potential pollution due to effluent from infrastructure, e.g., Concrete slurry from the batching plant can contaminate surface water flows. **Consequence:** Seepage from development areas will influence wetlands adversely: the composition and structure of the drainage vegetation (more nutrients and increased ground water seepage) and the quality of the water will deteriorate (dissolved nutrients).	quality	06
Site Establishment (Layout)	Construction Camp	Vehicle wash bays	**Impact:** Hydrocarbons from washing plant can contaminate the ground. **Consequence:** Decrease in water/land quality due to washing plant.	quality	06

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Site Establishment (Layout)	Construction Camp	Sanitation/Ablutions	**Impact:** Groundwater is vulnerable to pollution from on-site effluent disposal facilities **Consequences:** - Abstraction of polluted groundwater is harmful to human health.	quality	06
Site Establishment (Layout)	Construction Camp	Sanitation/Ablutions	**Impact:** Unsafe disposal - soil contamination and water pollution. **Consequence:** Health risks	quality	06
Site Establishment (Layout)	Batching plant/Cement-mixing area	Washing Facility	**Impact:** Potential pollution due to effluent from infrastructure, e.g., Concrete slurry from the batching plant can contaminate surface water flows. **Consequence:** Seepage from development areas will influence wetlands adversely: the composition and structure of the drainage vegetation (more nutrients and increased ground water seepage) and the quality of the water will deteriorate (dissolved nutrients).	quality	06
Planning	Surface Water Monitoring Plan	NA	**Impact:** Increase in surface water runoff causing erosion. **Consequence:** Erosion, sedimentation, and pollution of a watercourse.	Behaviour	07
Planning	Stormwater Mgt Plan	NA	**Impact:** Two ephemeral drainage line crossings, associated with the proposed road development can be considered critical stormwater management areas, where there will be an activity that could alter the natural conditions of the rivers/streams, which could lead to sedimentation and erosion if storm events occur during the construction phase. **Consequence:** Alteration of natural drainage lines may lead to ponding or increased runoff patterns (i.e., may cause stagnant water levels or increase erosion).	Behaviour	07

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Contractor Readiness	Commencement & Construction times	NA	**Impact:** Construction of linear infrastructure across the ephemeral drainage system will involve temporary diversion works, changing the surface water hydrology or flow patterns. **Consequence:** - Altered flow patterns can slow down the stream flow, causing deposition of sediment or increase the velocity and turbulence of the water, causing erosion (direct).	Behaviour	07

*The source of information used in identifying the impact is either the Leipold Matrix (Matrix), Interested and Affected Parties (I&APs) and/or Specialist studies (Specialist).

Any assumptions, uncertainties & limitations, or gaps in knowledge with predicting the impacts

Impact 06 (Water Quality)

- Ephemeral rivers are particularly vulnerable to changes in hydrology, as they are specifically adapted to brief periods of inundation and flow. Consequently, pollutants and sediments entering these watercourses are not regularly diluted or flushed out of the catchment, leading to a lack of resilience to pollution, erosion, and sedimentation (Aquatic Biodiversity Impact Assessment, January 2023).
- The natural hardness of water is influenced by the geology of the catchment and the presence of soluble calcium and magnesium minerals. Water hardness depends on whether it is caused by bicarbonate salts or non-bicarbonate salts, such as chloride, sulphate and nitrate. Bicarbonate salts of calcium and magnesium precipitate on heating and cause scaling in hot water systems and appliances, whereas the non-bicarbonate salts do not precipitate on heating. Excessive hardness in water forms scale on heat exchange surfaces such as cooking utensils, hot water pipes, kettles and geysers, and results in an increase in soap required to produce a lather when bathing and in household cleaning. The resulting scums are unesthetic, leading in the long term to the marking of enamel surfaces of baths and handbasins. Total hardness for domestic use should be limited to between 50 - 100 mg/• as $CaCO_3$, where possible. (DWAF Water Quality Guidelines).
- According to the DWAF 1996 Target Water Quality Range (TWQR) for potable use, the groundwater from BH13 is suitable for domestic use, having a pH of 6.9. Only the EC of 75.5 mS/m and dissolved Calcium of 89 mg Ca/l exceed the DWAF TWQR (0 – 70 mS/m and 0 – 32 mg Ca/l, respectively).
- Similarly, the groundwater abstracted from Solar Borehole No. 5 is suitable for domestic use with a pH of 6.7. Four water quality parameters exceeded the DWAF TWQR, specifically EC (82.7 mS/m > 70 mS/m DWAF TWQR), TDS (466 mg/l > 450 mg/l DWAF TWQR), Dissolved Ca (94 mg Ca/l > 32 mg Ca/l DWAF TWQR) and Dissolved Mg (37 mg Ca/l > 30 mg Ca/l DWAF TWQR).
- Groundwater boreholes are generally situated within and downstream of the development areas, hence are potential receptors to pollution.

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- "Domestic wastewater" means wastewater arising from domestic and commercial activities and premises, and may contain sewage (GA for Section 21(g), 2013).

Impact 07 (Surface Water Hydrology)

- The project area is located within a Strategic Water Source Area (Screening Report).
- The project area falls within quaternary catchment D62D and the Orange Water Management Area.
- Available rainfall data suggest a MAP ranging from 112.4 (30th percentile) to 738.9 (90th percentile) mm/yr, based on a historical record of 69 years (e.g., 1920 to 1989). The average rainfall is in the order of 320 mm/yr.
- The site falls within evaporation zone 17A, of which Mean Annual Evaporation (MAE) ranges from 2 000 to 2 150 mm/yr. The MAE far exceeds the MAP for the site, which implies greater evaporative losses when compared to incident rainfall. Due to evaporation being about 85% more than local rainfall, non-perennial streams and rivers will only have water when there are flooding events (e.g., 1:2, 1:5, 1:50 and 1:100 year flood events). Lowest average rainfall (mm) is from May to September and lowest estimated monthly run-off (mm) is from May to November.

Assessment without mitigation:

Legend					
Criteria		**Reversibility, Irreplaceability, & Mitigatory Potential**		**Significance (Impact Magnitude & Impact Importance**	
Abbreviation	**Description**	**Abbreviation**	**Description**	**Abbreviation**	**Description**
H	High	L	Low	0	Non-significant
M	Medium	M	Moderate	1	Significant
L	Low	H	High		
-I/R	Negative Impact/Risk				
+I/R	Positive Impact/Risk				

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
06	L	M	L	-I	M	M	1	M	M	1
Reversibility	H	**Irreplaceability**	H	**Mitigatory Potential**	H					

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Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
07	H	M	M	-I	H	M	1	H	M	1
Reversibility	H		**Irreplaceability**	H		**Mitigatory Potential**	H			

Any aspects which were conditional to the findings of the assessment (to be included as conditions of authorisation):

- None

References (legal, scientific, social, or other criteria) used for the assessment and mitigations:

- Hydrological Assessment for additional listed activities and water uses relating to the development of the Sun Central Cluster 1 300 MW Solar PV facility (previously known as Phase 1) in the Northern Cape, Version – Final 1, prepared by Hendrik Botha and dated 09 January 2023 (GCS Ref – 22 - 1054).
- Aquatic Biodiversity Impact Assessment, Section 21(c) & (i) Risk Assessment and Wetland Delineation Verification, prepared by Dr Andrew Deacon and dated January 2023.
- General Authorisation for Section 21(g) Disposing of waste in a manner which may detrimentally impact on a water resource published in GN No. 665 of Government Gazette No. 36820 on 06th September 2013.

Mitigations:

Impact Management Outcome(s):

- Responsible storage of effluent for re-use or disposal.
- Safe drinking water.
- Responsible disposal of domestic wastewater.
- Avoid soil contamination and water pollution from the handling and disposal of domestic wastewater.
- Maintain the Present Ecological State of the Brak River drainage system, large and small ephemeral tributaries, alluvial floodplains, and headwater drainage lines.
- Minimise ponding, erosion, and sedimentation of watercourses.

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- Quick response to and remediation of any disturbance to watercourses in the area.

Targets:

- No potential or actual effluent contamination of ground and vadose zone.
- No contamination of land (with effluent)
- Wastewater treatment works monitoring results.
- Complaint wastewater treatment works.
- Suitable wastewater treatment works operator appointed.
- Location of Wastewater treatment works including conservancy tanks.
- Construction during dry months.
- Preserve aquatic ecosystem structure and function.
- Stormwater Management Plan

Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
06	Site Establishment (Layout)	Potential pollution due to effluent from infrastructure, e.g., Concrete slurry from the batching plant can contaminate surface water flows.	Maintain the Present Ecological State of the Brak River drainage system, large and small ephemeral tributaries, alluvial floodplains, and headwater drainage lines.	No potential or actual effluent contamination of ground and vadose zone.	Ensure correct placing of concrete batching plants and vehicle servicing areas etc. to avoid areas susceptible to soil and water pollution. The seasonal drainage line should be protected from an increased inflow of poor-quality water.	Engineer, Contractor	Pre-construction	Compliance to be verified by ECO and IEA.
06	Site Establishment (Layout)	Hydrocarbons from washing plant can contaminate the ground.	Responsible storage of effluent for re-use or disposal.	No contamination of land (with effluent)	If a washing facility for construction plant (vehicles, machines, or equipment) is required, then it will be in the construction camp. The wash bay	Engineer, Contractor	Pre-construction	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
					shall be bunded, roofed to prevent ingress of rain, include a stormwater diversion system to prevent the ingress of surface water run-off (e.g., a 'speed bump' at the entrance to the bunded wash bay), and designed with an oil-water separator to remove hydrocarbons (oil, grease, fuel, hydraulic fluid, etc.). If detergents are used, then they must be biodegradable.			
06	Site Establishment (Layout)	Groundwater is vulnerable to pollution from on-site effluent disposal facilities	Safe drinking water.	Complaint wastewater treatment works	If a wastewater treatment package plant is installed at the construction camp, then: Comply with the National Standards on septic tank systems provided in SANS 10252-2 Water Supply and Drainage for Buildings: Part 2 Drainage installations for buildings (relevant information is included in Annexure A of SANS 10252-2)	Engineer, Contractor	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
06	Site Establishment (Layout)	Groundwater is vulnerable to pollution from on-site effluent disposal facilities	Safe drinking water.	Complaint wastewater treatment works	If a wastewater treatment package plant is installed at the construction camp, then: Sludge from septic tanks will be disposed of in accordance with the "Guidelines for the Utilisation and Disposal of Wastewater Sludge: Volume 3: Requirements for the on-site and off-site disposal of sludge."	Engineer, Contractor	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.
06	Site Establishment (Layout)	Groundwater is vulnerable to pollution from on-site effluent disposal facilities	Safe drinking water.	Complaint wastewater treatment works	If a wastewater treatment package plant is installed at the construction camp, then: The design of a soakaway must comply with the guidelines given in the National Building Regulations SANS 10400.	Engineer, Contractor	Pre-construction	Compliance to be verified by ECO and IEA.
06	Site Establishment (Layout)	Groundwater is vulnerable to pollution from on-site effluent disposal facilities	Safe drinking water.	Wastewater treatment works monitoring results	If a wastewater treatment package plant is installed at the construction camp, then: Treated effluent must be sampled and monitored at the points of ingress to	Holder, Contractor	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
					the effluent plants and at the points of reuse or discharge.			
06	Site Establishment (Layout)	Groundwater is vulnerable to pollution from on-site effluent disposal facilities	Safe drinking water.	Complaint wastewater treatment works	If a wastewater treatment package plant is installed at the construction camp, then: Fats, oils and greases (FOG's) should be treated at the source with fat traps and shall be no more than 10 mg/L before entering the effluent plant.	Holder, Engineer, Contractor	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.
06	Site Establishment (Layout)	Groundwater is vulnerable to pollution from on-site effluent disposal facilities	Safe drinking water.	Suitable wastewater treatment works operator appointed	If a wastewater treatment package plant is installed at the construction camp, then: The success of a wastewater treatment package plant is dependent on correct operation and maintenance. Therefore, a suitably qualified operator should be trained and/or appointed prior to commissioning.	Holder, Contractor	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.
06	Site Establishment (Layout)	Unsafe disposal - soil contamination and water pollution.	Responsible disposal of domestic wastewater. Avoid soil	Location of Wastewater treatment works including	Wastewater disposal sites, including conservancy tanks, must be located- (a) outside of a watercourse;	Holder, Engineer	Pre-construction	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
			contamination and water pollution from the handling and disposal of domestic wastewater.	conservancy tanks.	(b) above the 1:100-year flood line or riparian habitat whichever is the greatest, or alternatively at least 100 m from a water resource whichever is the greatest or at least further than a 500 m radius from a borehole that is utilised for drinking water or stock watering; (c) at least outside a 500 m radius from the boundary of a wetland; and (d) on land that is not, or does not, overlie, a major aquifer (identification of a major aquifer will be provided by the responsible authority upon written request).			
06	Site Establishment (Layout)	Potential pollution due to effluent from infrastructure, e.g., Concrete slurry from the batching plant can contaminate surface water	Maintain the Present Ecological State of the Brak River drainage system, large and small ephemeral tributaries,	No potential or actual effluent contamination of ground and vadose zone	Ensure correct placing of concrete batching plants and vehicle servicing areas etc. to avoid areas susceptible to soil and water pollution. Water runoff from the sites should be controlled as far as possible to	Engineer	Pre-construction	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
		flows.	alluvial floodplains, and headwater drainage lines.		prevent adverse effects. The seasonal drainage line should be protected from an increased inflow of poor-quality water.			
06	Site Establishment (Layout)	Potential pollution due to effluent from infrastructure, e.g., Concrete slurry from the batching plant can contaminate surface water flows.	Maintain the Present Ecological State of the Brak River drainage system, large and small ephemeral tributaries, alluvial floodplains, and headwater drainage lines.	No potential or actual effluent contamination of ground and vadose zone	Contain the concrete batching plant by deflecting surface water runoff on the up-and down-slope side using, for example, sandbags.	Engineer	Pre-construction	Compliance to be verified by ECO and IEA.
07	Contractor Readiness	Construction of linear infrastructure across the ephemeral drainage system will involve temporary diversion works, changing the surface water hydrology or flow patterns.	Minimise ponding, erosion, and sedimentation of watercourses.	Construction during dry months.	Construction should to the extent possible take place during dry months, with a decreased probability of storm events.	Holder, Contractor	Pre-construction Phase	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
07	Planning	Increase in surface water runoff causing erosion.	Quick response to and remediation of any disturbance to watercourses in the area.	Preserve aquatic ecosystem structure and function.	Implement the Surface Water Monitoring Plan (Appendix D of EMP) during the construction phase only for both the proposed stormwater systems and surface water resources identified in the area.	Contractor	Construction Phase	Compliance to be verified by ECO and IEA.
07	Planning	Two ephemeral drainage line crossings, associated with the proposed road development can be considered critical stormwater management areas, where there will be an activity that could alter the natural conditions of the rivers/streams, which could lead to sedimentation and erosion if storm events occur during	Minimise ponding, erosion, and sedimentation of watercourses.	Stormwater Management Plan	Create a Stormwater Management Plan by taking the following stormwater considerations into account: 1. Assess the site constraints and any site-specific concerns, including: • Specific vegetation that may need to be identified and/or isolated from the site disturbance. • Highly erodible soils may require additional erosion control measures. • The type of construction should consider landform. Avoid slab-on-ground construction on steep site.	Holder, Engineer	Pre-construction	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
		the construction phase.			• Up-slope drainage catchments that may need to be diverted around the work site. • Workspace limitations may require site-specific sediment control measures and/or the extensive use of skips or bins for material storage and waste management. • Expected rainfall intensity during the period of disturbance (wet season vs dry season). 2. Stabilise the site entry/exit points • A stabilised site access must be established and if possible, limited to one point only. The access allows for the construction vehicles to enter the work area of goods while preventing the unnecessary tracking of sediment onto the nearby environment from multiple locations. A stabilised entry/exit point normally consists of a			

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
					stabilised rock pad. 3. Prevent erosion and manage stockpiles • Suitable material storage areas must be located up-slope of the main sediment barrier (e.g., sediment fence). • Stockpiles kept on site for more than two weeks will require an impervious cover (e.g., builder's plastic or geofabric) to protect against raindrop impact. Stockpiles of sandy material located behind a sediment fence will only need a protective cover if the stockpiles are likely to be exposed to strong winds. • On steep sites and sites with limited available space, erodible materials may need to be stored in commercial-sized bins or mini skips before use. 4. Manage Site Waste • Adequate waste receptacles must be			

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
					provided on-site and maintained in a way that potential and actual environmental harm resulting from such material waste is minimised.			

Assessment with mitigation:

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
05	L	L	L	neutral	L	L	0	L	M	0

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
06	L	M	L	-I	M	L	0	L	L	0

Residual Risk (feeds back into "Mitigations"):

- None.

Receiving Environment: Atmosphere

Description of potential impacts:

Management Category	Sub-activity	Environmental Aspect	Impact-Consequence	Change	Impact No.

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Planning	Dust Monitoring	NA	**Impact:** Increase in ambient PM10 concentrations and dust fallout from construction activities. **Consequence:** Respiratory problems. Nuisance effects of PM, e.g., settling on houses, deposition on and discolouration of buildings, and reduction in visibility.	quality	08

*The source of information used in identifying the impact is either the Leipold Matrix (Matrix), Interested and Affected Parties (I&APs) and/or Specialist studies (Specialist).

Any assumptions, uncertainties & limitations, or gaps in knowledge with predicting the impacts

Impact 08 (Dust generation)

- The predicted dust fallout is low and well below the limit value for acceptable dust fallout in non-residential areas. Consequently, the significance of the impact of dust fallout resulting during construction of the Access Road is also low. This assessment considers the current dust control measures, e.g., spraying the Access Road once a day with water. It is however recommended that these are expanded to reduce the emission and ensure that the significance of the impact remains low (Air Quality Impact Assessment, January 2023).
- For the uncontrolled scenario the predicted ambient PM10 concentrations exceed the annual average and 24-hour NAAQS for PM10 up to 1 500 m from the Access Road. For the controlled scenario the predicted ambient PM10 concentrations are below the annual average NAAQS for PM10 but exceed the 24-hour NAAQS for PM10 up to 300 m from the Access Road. Sensitive receptors have been noted within these zones. The significance of the impact of construction activities on air quality is therefore medium. This assessment considers the dust control measures of watering once per day. These however need to be expanded to reduce the emission and lower the impact significance to low with mitigation (Air Quality Impact Assessment, January 2023).
- The generation of excessive wind-blown dust could 'choke' the ecologically sensitive ephemeral drainage line system (pers. comm. Sam Laurence). The recovery of a stream from sediment deposition is dependent on the elimination of the sediment source and the potential for the deposited material to be flushed out by stream flow.

Assessment without mitigation:

Legend		
Criteria	**Reversibility, Irreplaceability, & Mitigatory Potential**	**Significance (Impact Magnitude & Impact Importance**

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Abbreviation	Description	Abbreviation	Description	Abbreviation	Description
H	High	L	Low	0	Non-significant
M	Medium	M	Moderate	1	Significant
L	Low	H	High		
-I/R	Negative Impact/Risk				
+I/R	Positive Impact/Risk				

Alternative Route No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
08	L	L	L	-I	L	M	0	M	M	1

Reversibility	H	Irreplaceability	H	Mitigatory Potential	H

Any aspects which were conditional to the findings of the assessment (to be included as conditions of authorisation):

- None

References (legal, scientific, social, or other criteria) used for the assessment and mitigations:

- Air Quality Impact Assessment for the Proposed Development of the Sun Central Cluster 300 MW Solar PV Facility between De Aar & Hanover, Emthanjeni Local Municipality, Pixley Ka Seme District Municipality, Northern Cape Province", Version – Final, prepared by Mark Zunckel of uMoya-NILU and dated January 2023 (Report number: uMN192-22).

Mitigations:

Impact Management Outcome(s):

- Minimise dust generation.

Targets:

- Avoid exceeding NAAQS annual ambient PM10 concentrations (40 µg/m3) and 24-hour ambient PM10 concentrations (75 µg/m3). Avoid exceeding the National Dust Standard for non-residential (1 200 mg/m2/da) and residential (600 mg/m2/day) areas.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
08	Planning	Increase in ambient PM10 concentrations and dust fallout from construction activities.	Minimise dust generation.	Avoid exceeding NAAQS annual ambient PM10 concentrations (40 µg/m3) and 24-hour ambient PM10 concentrations (75 µg/m3). Avoid exceeding the National Dust Standard for non-residential (1 200 mg/m2/da) and residential (600 mg/m2/day) areas.	Implement a dust monitoring programme for the access road and construction sites. Dust Monitoring Units are recommended to be installed.	Holder, Contractor	Planning and Design Phase and Continuous	Compliance to be verified by ECO and IEA.

Assessment with mitigation:

Alternative Route No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
08	L	L	L	-I	L	L	0	L	M	0

Residual Risk (feeds back into "Mitigations"):

- None.

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Receiving Environment: Terrestrial and Avian Ecosystem

Description of potential impacts:

Management Category	Sub-activity	Environmental Aspect	Impact-Consequence	Change	Impact No.
Contractor Readiness	Employment of labour	Training	**Impact:** Clearance of vegetation near watercourses increases risk of erosion. **Consequence:** Erosion and sedimentation.	Transformation	09
Contractor Readiness	Commencement & Construction times	NA	**Impact:** Disturbed or exposed sites are vulnerable to erosion. **Consequence:** Erosion can cause terrestrial and aquatic ecosystem degradation/dysfunction.	Transformation	09
Contractor Readiness	Development of Method Statements	NA	**Impact:** Transformation of ecosystems and construction camp creep **Consequence:** Disturbance.	Transformation	10
Planning	Waste Management Plan	NA	**Impact:** Pollution due to accidental releases of contaminated liquids. **Consequence:** Loss of faunal species.	Transformation	10
Site Establishment (Layout)	Site Selection	NA	**Impact:** Disturbance of terrestrial habitat **Consequence:** Disturbance	Transformation	10
Site Establishment (Layout)	Site Area (size)	NA	**Impact:** The physical footprint of certain construction activities will result in a loss of local terrestrial habitat. **Consequence:** - reduced habitat for terrestrial fauna and Aves (direct). - reduced productivity and carrying capacity (direct).	quantity	10
Site Establishment (Layout)	Access Restricted Areas	NA	**Impact:** Environmentally sensitive areas are disturbed due to uncontrolled access. **Consequence:** Disturbance and loss of habitat.	Transformation	10

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Site Establishment (Layout)	Construction Camp	Lighting	**Impact:** Artificial lighting threatens biodiversity by disrupting the night behaviour of organisms affecting survivorship and or reproduction, e.g., by attracting insects and their predators from frogs to bats. **Consequences:** - Altered ecological processes could cause insect population declines, a change in biodiversity pattern, and reduced ecosystem regulating services such as pollination (indirect)	Transformation	10
Site Establishment (Layout)	Construction Camp	Laydown areas	**Impact:** The physical footprint of certain construction activities will result in a loss of local terrestrial habitat. **Consequence:** - reduced habitat for terrestrial fauna and Aves (direct). - reduced productivity and carrying capacity (direct).	Transformation	10
Site Establishment (Layout)	Construction Camp	Machinery Parking Area	**Impact:** The physical footprint of certain construction activities will result in a loss of local terrestrial habitat. **Consequence:** - reduced habitat for terrestrial fauna and Aves (direct). - reduced productivity and carrying capacity (direct).	Transformation	10
Site Establishment (Layout)	Staging Area	NA	**Impact:** Random or uncontrolled location of construction activities will result in the excessive loss of terrestrial habitat. **Consequence:** - reduced habitat for terrestrial fauna and Aves (direct). - reduced productivity and carrying capacity (direct).	quantity	10

*The source of information used in identifying the impact is either the Leipold Matrix (Matrix), Interested and Affected Parties (I&APs) and/or Specialist studies (Specialist).

Any assumptions, uncertainties & limitations, or gaps in knowledge with predicting the impacts

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Impact 09 (Surface Water Hydrology)

- The project area falls within quaternary catchment D62D and the Orange Water Management Area.
- The average rainfall is in the order of 320 mm/yr. Due to evaporation being about 85% more than local rainfall, non-perennial streams and rivers will only have water when there are flooding events (i.e., 1:2, 1:5, 1:50 and 1:100-year flood events). Average monthly rainfall peaks from October (23 mm) to April (39.4 mm). Alternatively, the least rainfall falls between May (18.9 mm) and September (11.6 mm). Runoff from natural (unmodified) catchments in Catchment D62D is equivalent to 3.1 mm/yr over the surface area. This is equal to approximately 0.9% of the MAP and amounts to approximately 7.4 Mm^3/yr over the surface of the quaternary catchment. Runoff is directly related to rainfall intensity, and longer precipitation events. Peak runoff is from December (0.2 mm) to April (0.4 mm). Alternatively, the least runoff occurs between May (0.1 mm) and November (0.1 mm) (Hydrological Assessment prepared by Hendrik Botha and dated 10 January 2023).
- Although the presence of the buffer zone seems futile as the upgrading of the access road is permissible linear infrastructure activities that will take place in in a broad strip (or corridor) through the watercourses and associated buffers, the intention of the buffer is to emphasize the importance and sensitivity of the applicable drainage systems. That is why the area included between the buffer zones should have explicit and very strict biodiversity conservation management measures and the operating teams should be aware of this. A level of best practices will be imposed in the riverine environment when the proposed construction gets under way and the process will be overseen by the project management (Aquatic Biodiversity Impact Assessment, January 2023).

Impact 10 (Terrestrial Biodiversity)

- The access road occurs within Ecological Support Areas while the eastern section of the road lies within CBA 1 and CBA 2 areas associated with the Brak Rivier. In terms of other broad-scale planning studies, the site does not fall within a National Protected Areas Expansion Strategy Focus Area (NPAES), indicating that the area has not been identified as an area of exceptional biodiversity or of significance for the long-term maintenance of broad-scale ecological processes and climate change buffering within the region.
- The combination of rocky hills and plains creates a diversity of habitats that is important for fauna and the diversity of these areas is higher than areas without open plains. There is a low ridge with runs through the area in the vicinity of the Main Transmission Station (MTS) of the site and which is not considered suitable for development as the hills are significant for biodiversity and ecological functioning.

Impact 10 (Ecosystem/Vegetation Type)

- The vegetation consists of shrubland dominated by dwarf Karoo shrubs, grasses and Acacia mellifera subsp. detinens, and other low trees particularly on the sandy soils. The vegetation is flat to gently sloping with isolated hills of Upper Karoo Hardeveld in the south and Vaalbos Rocky Shrubland in the northeast and with many interspersed pans (Mucina & Rutherford 2006).
- The access road will be rebuilt and built to a width of 8 m, allowing for the roadbed preparation including the surface of the road and its shoulders, and excluding up to 3 m for the side/cut-off drain, with 1 m on either side of the road for the verge to a fence line. However,

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temporary 30 m passing lanes will increase the 19 m wide servitude from 19 m to 22 m to allow for passing should this be required during construction. The contractor will need an adjacent and parallel servitude width of 3 m for the movement of construction vehicles and/or providing a diversion lane for farm traffic.

- Ideally, SAE will be working with one fully wrapped EPC tender, in which case the construction camp will be used for all construction fronts, including the MTS, Dx, solar field and access road.

Impact 10 (Lighting)

- Animals perceive light differently from humans. Most animals are sensitive to ultra-violet (UV)/violet/blue light. Understanding the sensitivity of wildlife to different light wavelengths is critical to assessing the potential effects of artificial light on wildlife.(National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds, Commonwealth of Australia 2020)
  Under low light conditions (dark adapted vision), light is detected by cells in the eye called rods. Rods only perceive light in shades of grey (no colour). This is known as scotopic vision and it is more sensitive to shorter wavelengths of light (blue/violet) than photopic vision. (National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds, Commonwealth of Australia 2020).
  Consequently, keeping the light LONG wavelength (ambers and reds) actually makes the light that is visible seem dimmer to nocturnal animals that primarily use rod vision. (https://myfwc.com/conservation/you-conserve/lighting/pollution/).
  White LEDs generally contain short wavelength blue light. Short wavelength light scatters more readily than long wavelength light, contributing more to sky glow. Also, most wildlife is sensitive to blue light. However, LEDs can be smart controlled, are highly adaptable in terms of wavelength and intensity, and can be instantly turned on and off. (National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds, Commonwealth of Australia 2020)
  Lamps that have a warm yellowish colour have low colour temperatures between 1000K and 3000K while lamps characterised by a cool bluish colour have a colour temperature, or CCT, over 5000K. Correlated colour temperature does not provide information about the blue content of a lamp. However, all LEDs contain blue light and the blue content generally increases with increased CCT. (National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds, Commonwealth of Australia 2020)

Assessment without mitigation:

Legend					
Criteria		**Reversibility, Irreplaceability, & Mitigatory Potential**		**Significance (Impact Magnitude & Impact Importance**	
Abbreviation	**Description**	**Abbreviation**	**Description**	**Abbreviation**	**Description**

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H	High	L	Low	0	Non-significant
M	Medium	M	Moderate	1	Significant
L	Low	H	High		
-I/R	Negative Impact/Risk				
+I/R	Positive Impact/Risk				

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
09	M	L	M	-I	M	H	1	M	H	1
Reversibility	M	**Irreplaceability**	H	**Mitigatory Potential**	H					

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
10	L	M	L	-I	M	M	1	M	M	1
Reversibility	H	**Irreplaceability**	H	**Mitigatory Potential**	H					

Any aspects which were conditional to the findings of the assessment (to be included as conditions of authorisation):

- The construction of linear infrastructure across parts of the ephemeral drainage system, should be restricted to the dry winter months (e.g., May to September) when there is a decreased probability of storm events. Civils works should as far as is practical be completed before the next rainfall season.

References (legal, scientific, social, or other criteria) used for the assessment and mitigations:

- Aquatic Biodiversity Impact Assessment, Section 21(c) & (i) Risk Assessment and Wetland Delineation Verification Report prepared by Dr Andrew Deacon dated August 2022.
- Aquatic Biodiversity Impact Assessment, Section 21(c) & (i) Risk Assessment and Wetland Delineation Verification, prepared by Dr Andrew Deacon and dated January 2023.
- Hydrological Assessment, Version – Final 1, prepared by Hendrik Botha and dated 10 January 2023 (GCS Ref – 22 - 1054).
- Environmental Impact Assessment for the proposed Soventix Solar PV Project, De Aar, Northern Cape: Fauna & Flora Specialist EIA Report prepared by Simon Todd Consulting dated May 2017.

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- Generic EMPrs published in GN No. 435 of 22 March 2019 in terms of Section 24(5) of NEMA, 1998.

Mitigations:

Impact Management Outcome(s):

- Maintain the Present Ecological State of the Brak River drainage system and large ephemeral tributaries.
- Minimise erosion of disturbed sites from storm water run-off.
- Minimize habitat loss.
- Ensure legal compliance with the prevailing and pertinent legislation.
- Avoid pollution.
- Reduce the amount of waste disposed to landfill.
- Adequate construction camp
- Maintain the Present Ecological State of the Brak River drainage system, large and small ephemeral tributaries, alluvial floodplains, and headwater drainage lines.
- Minimise the effects of artificial light on wildlife (and humans).

Targets:

- Sensitivity of watercourse crossings included in inductions.
- Construction during dry months
- Mining during wet summer season
- Method statement
- Integrated Waste Management Plan
- Sun Central Cluster 1 Solar PV facility construction camp and staging area used.
- Construction camp location as per EA reference: 14/12/16/3/3/2/998 dated 16th April 2018 as amended.
- Construction camp is operational.
- Construction camp is 4ha and Staging area is 1ha.
- Servitude and buffers are clearly fenced off or demarcated. No activities in no-go areas
- No activities in no-go areas
- Laydown area within construction camp/staging area
- No overnight parking outside of the construction camp/staging area
- Staging area location as per EA reference: 14/12/16/3/3/2/998/AM4 dated 25th November 2022

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- Lighting is minimized.
- No fluorescent or mercury lighting
- LEDs and smart control lighting
- Best practise lighting
- Watercourses are not lit up.

Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
09	Contractor Readiness	Clearance of vegetation near watercourses increases risk of erosion.	Maintain the Present Ecological State of the Brak River drainage system and large ephemeral tributaries.	Sensitivity of watercourse crossings included in inductions.	The operating teams responsible for construction within the watercourse crossings and 15 m buffers on both sides of the large ephemeral drainage systems must be (in their induction) exposed to the importance and sensitivity of the drainage systems they will be working in. All construction activities should be conducted with care inside the buffered drainage area.	Contractor	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.
09	Contractor Readiness	Clearance of vegetation near watercourses increases risk of erosion.	Maintain the Present Ecological State of the Brak River drainage system and large ephemeral tributaries.	Sensitivity of watercourse crossings included in inductions.	Construction within the watercourse crossings and buffers must be overseen by project management.	Contractor, SEO	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.
09	Contractor Readiness	Disturbed or exposed sites are vulnerable to erosion.	Minimise erosion of disturbed sites from storm water run-off.	Construction during dry months	Construction, particularly of linear infrastructure across parts of the ephemeral drainage system, should to the	Holder, Contractor	Pre-construction	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
					extent possible be restricted to the dry winter months (e.g., May to September), that is commence with such activities as clearing or grading, excavating and importing material at the end of the wet season/beginning of the dry season whilst the soil is still moist to reduce dust and as far as is practical, be completed in, the dry winter months with a decreased probability of storm events.			
10	Contractor Readiness	Transformation of ecosystems and construction camp creep	Minimize habitat loss.	Method statement	A method statement must be provided by the contractor prior to any onsite activity that includes the layout of the construction camp in the form of a plan showing the location of key infrastructure and services (where applicable), including but not limited to offices, overnight vehicle parking areas, stores, stockpile and lay down areas, hazardous materials storage areas (including fuels), the batching plant (if one is	Contractor	Pre-construction	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
					located at the construction camp), designated access routes, equipment cleaning areas, cooking and ablution facilities, waste and wastewater management			
10	Planning	Pollution due to accidental releases of contaminated liquids.	Ensure legal compliance with the prevailing and pertinent legislation. Avoid pollution. Reduce the amount of waste disposed to landfill.	Integrated Waste Management Plan	Develop and implement an integrated waste management plan that: (a) adopts the cradle-to-grave approach extending from waste prevention and minimization to generation, storage, collection, transportation, treatment, and final disposal of waste, (b) incorporates all aspects of the waste management hierarchy, and (c) is aligned with the Waste Classification and Management Regulations (GN No. 634 of 23rd August 2013).	Holder, Contractor	Pre-construction	Compliance to be verified by ECO and IEA.
10	Site Establishment (Layout)	Disturbance of terrestrial habitat	Minimize habitat loss	Sun Central Cluster 1 Solar PV facility construction camp and	The contractor(s) appointed to rebuild and build the access road will use the same construction camp as set aside for the	Holder, Contractor	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
				staging area used.	authorised Sun Central Cluster 1 Solar PV facility.			
10	Site Establishment (Layout)	Disturbance of terrestrial habitat	Minimize habitat loss	Construction camp location as per EA reference: 14/12/16/3/3/2/998 dated 16th April 2018 as amended.	The construction camp footprint will be in the 'open' area(s) not earmarked for the solar field, around and between the Switching Station (Dx) and Main Transmission Substation (MTS), but within the low ecologically sensitive footprint of the authorised Sun Central Cluster 1 Solar PV facility (EA reference: 14/12/16/3/3/2/998 dated 16th April 2018 as amended), above the 1:100-year flood line or further than 100 m from the edge of a watercourse (buffer zone), whichever is greatest.	Holder, Contractor	Pre-construction	Compliance to be verified by ECO and IEA.
10	Site Establishment (Layout)	Disturbance of terrestrial habitat	Adequate construction camp	Construction camp is operational	The construction camp shall include such facilities as: • Sanitation system(s) (except for portable toilets following the work front), • Waste storage (except for dustbins following the work front), • Fuel storage tanks,	Holder, Contractor	Pre-construction	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
					• Hazardous substance storage, • Wash bay (except the wash bay for concrete slurry), •Maintenance/service/repair bay, and • Parking (overnight or outside business hours).			
10	Site Establishment (Layout)	The physical footprint of certain construction activities will result in a loss of local terrestrial habitat.	Minimize habitat loss.	Construction camp is 4ha and Staging area is 1ha	The construction camp and staging area shall not exceed 4 ha and 1 ha in size, respectively.	Contractor	Pre-construction	Compliance to be verified by ECO and IEA.
10	Site Establishment (Layout)	Environmentally sensitive areas are disturbed due to uncontrolled access.	Maintain the Present Ecological State of the Brak River drainage system, large and small ephemeral tributaries, alluvial floodplains, and headwater drainage lines.	Servitude and buffers are clearly fenced off or demarcated. No activities in no-go areas	Install fences along the boundary of the road servitude before working on the access road. Areas outside the fence line are access restricted (no-go) areas.	Contractor, SEO	Pre-construction	Compliance to be verified by ECO and IEA.
10	Site Establishment (Layout)	Environmentally sensitive areas are disturbed due to uncontrolled access.	Maintain the Present Ecological State of the Brak River drainage system, large and small ephemeral tributaries, alluvial floodplains, and	Servitude and buffers are clearly fenced off or demarcated. No activities in no-go areas	Erect and maintain a temporary barrier on either side of the pipeline corridors where they intersect a floodplain, ephemeral tributary and wetland. Areas outside the barrier	Contractor	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
			headwater drainage lines.		are access restricted (no-go) areas.			
10	Site Establishment (Layout)	Environmentally sensitive areas are disturbed due to uncontrolled access.	Maintain the Present Ecological State of the Brak River drainage system, large and small ephemeral tributaries, alluvial floodplains, and headwater drainage lines.	No activities in no-go areas	Unauthorised access and development related activity inside access restricted areas is prohibited.	Contractor, SEO	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.
10	Site Establishment (Layout)	The physical footprint of certain construction activities will result in a loss of local terrestrial habitat.	Minimize habitat loss.	Laydown area within construction camp/staging area	Laydown areas are restricted to the construction camp and/or staging area.	Contractor	Pre-construction	Compliance to be verified by ECO and IEA.
10	Site Establishment (Layout)	The physical footprint of certain construction activities will result in a loss of local terrestrial habitat.	Minimize habitat loss.	No overnight parking outside of the construction camp/staging area	Overnight parking areas are restricted to the construction camp and/or staging area.	Contractor	Pre-construction	Compliance to be verified by ECO and IEA.
10	Site Establishment (Layout)	The construction equipment and materials needed to repair and rebuild the	Minimize habitat loss	Staging area location as per EA reference: 14/12/16/3/3/2/998/AM4 dated 25th November 2022	The authorised ± 1 ha staging area (EA reference: 14/12/16/3/3/2/998/AM4 dated 25th November 2022), adjoining the district road, but inside	Contractor	Planning and Design Phase and continuous	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
		access road will require a substantial area for parking and storing resulting in a loss of habitat.			the farm boundary of Portion 1 of Farm Riet Fountain No. 39C (30°51'13,89"S & 24°15'57,88"E) may be used as an access control point as well as for parking plant, material/aggregate stockpiles and as a laydown area.			
10	Site Establishment (Layout)	Artificial lighting threatens biodiversity by disrupting the night behaviour of organisms affecting survivorship and or reproduction, e.g., by attracting insects and their predators from frogs to bats.	Minimise the effects of artificial light on wildlife (and humans).	Lighting is minimized	Any outside lighting should be minimised, positioned at or below roof height and directed away from highly sensitive areas, e.g., downwards.	Engineer, Contractor	Planning and Design Phase and continuous	Compliance to be verified by ECO and IEA.
10	Site Establishment (Layout)	Artificial lighting threatens biodiversity by disrupting the night behaviour of	Minimise the effects of artificial light on wildlife (and humans).	No fluorescent or mercury lighting	Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights should be used wherever possible.	Engineer, Contractor	Planning and Design Phase and continuous	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
		organisms affecting survivorship and or reproduction, e.g., by attracting insects and their predators from frogs to bats.						
10	Site Establishment (Layout)	Artificial lighting threatens biodiversity by disrupting the night behaviour of organisms affecting survivorship and or reproduction, e.g., by attracting insects and their predators from frogs to bats.	Minimise the effects of artificial light on wildlife (and humans).	LEDs and smart control lighting	Adopt LEDs and smart control technologies (such as motion sensors and timers) to control and manage the effects of artificial light on wildlife and 'sense of place'.	Engineer, Contractor	Planning and Design Phase and continuous	Compliance to be verified by ECO and IEA.
10	Site Establishment (Layout)	Artificial lighting threatens biodiversity by disrupting the night	Minimise the effects of artificial light on wildlife (and humans).	Best practise lighting	Incorporate the following best practice lighting design principles into the design of lighting: (a) Start with natural darkness and only add	Engineer	Planning and Design Phase	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
		behaviour of organisms affecting survivorship and or reproduction, e.g., by attracting insects and their predators from frogs to bats.			light for specific purposes, (b) Use adaptive light controls to manage light timing, intensity and colour, (c) Light only the object or area intended – keep lights close to the ground/mounting fixtures as low as possible, directed and shielded to avoid light spill, (d) Use the lowest intensity lighting appropriate for the task, (e) Use non-reflective, dark-coloured surfaces, and (f) Use lights with reduced or filtered blue, violet and ultra-violet wavelengths/Use lights with longer wavelengths, e.g., a white 2 700 K LED light (as apposed to a 5 000 K LED light) (National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds, Commonwealth of Australia 2020)			
10	Site Establishment (Layout)	Artificial lighting threatens biodiversity by disrupting the	Minimise the effects of artificial light on wildlife (and humans).	Watercourses are not lit up	Watercourses shall not be lit up or affected by light spillage where practical.	Engineer, Contractor	Planning and Design Phase and continuous	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible Person(s)	Timeframe / Frequency	Monitoring
		night behaviour of organisms affecting survivorship and or reproduction, e.g., by attracting insects and their predators from frogs to bats.						

Assessment with mitigation:

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
09	L	L	M	-I	M	L	0	L	L	0

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
10	L	L	L	-I	L	L	0	L	M	0

Residual Risk (feeds back into "Mitigations"):

- None

Receiving Environment: Aquatic Ecosystem

Description of potential impacts:

Management Category	Sub-activity	Environmental Aspect	Impact-Consequence	Change	Impact No.

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Planning	Rehabilitation Plan	NA	**Impact:** Habitat loss and fragmentation of watercourse areas because of infrastructure installation (roads, fences and sub surface pipelines). **Consequences:** Destroy existing habitat but also displace bird species from large areas of natural habitat. This specifically has a greater impact on bird species restricted to a specific habitat and its requirements.	Fragmentation	11
Contractor Readiness	Commencement & Construction times	NA	**Impact:** Habitat loss and fragmentation of watercourse areas due to displacement because of infrastructure installation (underground pipelines). **Consequences:** Destroy existing habitat but also displace bird species from large areas of natural habitat. This specifically has a greater impact on bird species restricted to a specific habitat and its requirements.	Fragmentation	11
Site Establishment (Layout)	Construction Camp	Fuel storage and refuelling area	**Impact:** Fuel spillage can contaminate a watercourse **Consequence:** degradation of aquatic ecosystem incl. loss of aquatic species	Transformation	11
Site Establishment (Layout)	Access Restricted Areas	NA	**Impact:** Environmentally sensitive areas are disturbed due to uncontrolled access. **Consequence:** Disturbance can cause erosion and loss of habitat.	Transformation	11
Site Establishment (Layout)	Access Restricted Areas	NA	**Impact**: Construction activities in or near to ephemeral drainage systems can alter surface water flow patterns, e.g., changing sheet flow (natural open system) to concentrated flows leads to erosion. **Consequence**: Erosion and sedimentation.	Transformation	12
Contractor Readiness	Development of Method Statements	NA	**Impact:** Vegetation clearance of the project footprint for the access road and underground pipelines close to watercourses will be subject to erosion. **Consequence:** Erosion will lead to sedimentation or siltation and an increase in turbidity of watercourses.	Transformation	12

*The source of information used in identifying the impact is either the Leipold Matrix (Matrix), Interested and Affected Parties (I&APs) and/or Specialist studies (Specialist).

Any assumptions, uncertainties & limitations, or gaps in knowledge with predicting the impacts

Impact 11 (Aquatic Ecosystem Loss)

- The drainage systems are predominantly classified as ephemeral drainage lines and not wetlands.

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- The project area contains National Freshwater Ecosystem Priority Areas (NFEPA) "Wetlands and Estuaries" and "Rivers", including the floodplain areas of the Brak River and its tributaries (non-perennial drainage streams).
- The Brak River and a tributary (unnamed FEPA drainage line D62D – 05610 SQ bounding the Sun Central 1 development) are the only recognised water courses impacted by Alternative Route No. 1 (Hydrology Assessment, 2023)
- The study area falls within a CBA1 because the Brak River has been identified as having FEPA River Ecosystem Type status according to the Freshwater Ecosystem Protected Areas (FEPA) map for the area (Phase 1 Aquatic Report October 2017) and all FEPA prioritised rivers and wetlands have a minimum category of CBA1. All FEPA prioritised wetland clusters have minimum category of CBA2, and natural non-FEPA wetlands and larger rivers have minimum category of ESA (Avifauna Final EIA Report prepared by Sam Laurence of Enviro-Insight cc, dated October 2022).
- Five distinct water resource types were recognised in the project area. Not all water resource types, specifically the alluvial floodplains, are technically a 'watercourse':
    - Brak River drainage system.
    - Large ephemeral tributaries.
    - Smaller ephemeral tributaries.
    - Alluvial floodplains:
        - Alluvial fans.
        - Braided channel: bar and swale topography.
        - Floodplain flats.
    - Headwater drainage lines
- The common reed Phragmites australis dominates the instream habitat along the Brak River, while there is very little discernible riparian vegetation. The ephemeral streams have no visible aquatic vegetation. Phragmites australis reeds grow in the beds of several of the ephemeral rivers.
- The more seasonal and ephemeral ecosystems provide aquatic habitat to a diverse array of faunal species that depend on brief periods of inundation for hatching, mating, feeding and refuge.
- A great number of other organisms are not confined to these temporary systems, but derive crucial benefits from them, like migratory birds and many invertebrates that migrate from permanent to temporary habitats on a regular basis.
- Erosion and sedimentation are important ecological processes in the Karoo. Loss and fragmentation of habitat disrupt these processes. Erosion is a particularly high risk on steep slopes, and in drainage lines that lack channel features and are naturally adapted to lower energy runoff with dispersed surface flows, and naturally less turbid freshwater systems (Aquatic Biodiversity Impact Assessment, January 2023).
- The access road will be rebuilt and built to a width of 8 m, allowing for the roadbed preparation including the surface of the road and its shoulders, and excluding up to 3 m for the side/cut-off drain, with 1 m on either side of the road for the verge to a fence line. However, temporary 30 m passing lanes will increase the servitude width from 19 m to 22 m to allow for passing should this be required during

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construction. The contractor will need an adjacent and parallel servitude width of 3 m for the movement of construction vehicles and/or providing a diversion lane for farm traffic.

Impact 12 (Surface Water Hydrology)

- The project area is located within a Strategic Water Source Area (Screening Report).
- The average rainfall is in the order of 320 mm/yr. Due to evaporation being about 85% more than local rainfall, non-perennial streams and rivers will only have water when there are flooding events (i.e., 1:2, 1:5, 1:50 and 1:100-year flood events). Average monthly rainfall peaks from October (23 mm) to April (39.4 mm). Alternatively, the least rainfall falls between May (18.9 mm) and September (11.6 mm).
- Runoff from natural (unmodified) catchments in Catchment D62D is equivalent to 3.1 mm/yr over the surface area. This is equal to approximately 0.9% of the MAP and amounts to approximately 7.4 Mm^3/yr over the surface of the quaternary catchment. Runoff is directly related to rainfall intensity, and longer precipitation events. Peak runoff is from December (0.2 mm) to April (0.4 mm). Alternatively, the least runoff occurs between May (0.1 mm) and November (0.1 mm) (Hydrological Assessment prepared by Hendrik Botha and dated 10 January 2023).
- The Ecological Importance and Sensitivity Category (EISC) of the Brak River drainage system and large ephemeral tributaries was classified as "High" (Aquatic Biodiversity Impact Assessment, January 2023).
- Erosion and sedimentation are important ecological processes in the Karoo. Loss and fragmentation of habitat disrupt these processes. Erosion is a particularly high risk on steep slopes, and in drainage lines that lack channel features and are naturally adapted to lower energy runoff with dispersed surface flows, and naturally less turbid freshwater systems (Aquatic Biodiversity Impact Assessment, January 2023). During the rainy season terrain mobility on high clay soils in low lying areas with drainage lines will be difficult and might increase soil erosion when drainage lines are disturbed. However, it is important to note that rainfall is highly unpredictable with frequent droughts for the project areas (Aquatic Biodiversity Impact Assessment, January 2023).

Assessment without mitigation:

Legend					
Criteria		**Reversibility, Irreplaceability, & Mitigatory Potential**		**Significance (Impact Magnitude & Impact Importance**	
Abbreviation	**Description**	**Abbreviation**	**Description**	**Abbreviation**	**Description**
H	High	L	Low	0	Non-significant
M	Medium	M	Moderate	1	Significant
L	Low	H	High		
-I/R	Negative Impact/Risk				
+I/R	Positive Impact/Risk				

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Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
11	M	L	M	-I	M	M	1	H	M	1
Reversibility	M	**Irreplaceability**	H	**Mitigatory Potential**	H					

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
12	M	M	H	-I	H	M	1	H	M	1
Reversibility	H	**Irreplaceability**	H	**Mitigatory Potential**	H					

Any aspects which were conditional to the findings of the assessment (to be included as conditions of authorisation):

- The construction of linear infrastructure across parts of the ephemeral drainage system, should be restricted to the dry winter months (e.g., May to September) when there is a decreased probability of storm events. Civils works should as far as is practical be completed before the next rainfall season.

References (legal, scientific, social, or other criteria) used for the assessment and mitigations:

- Avifauna Final EIA Report prepared by Enviro-Insight CC (Sam Laurence and A.E. van Wyk) dated October 2022.
- Aquatic Biodiversity Impact Assessment, Section 21(c) & (i) Risk Assessment and Wetland Delineation Verification Report prepared by Dr Andrew Deacon dated August 2022.
- Aquatic Biodiversity Impact Assessment, Section 21(c) & (i) Risk Assessment and Wetland Delineation Verification, prepared by Dr Andrew Deacon and dated January 2023.
- Environmental Impact Assessment for the proposed Soventix Solar Pv Project, De Aar, Northern Cape: Fauna & Flora Specialist EIA Report prepared by Simon Todd Consulting dated May 2017.
- Hydrological Assessment for additional listed activities and water uses relating to the development of the Sun Central Cluster 1 300 MW Solar PV facility (previously known as Phase 1) in the Northern Cape", Version – Final 1, prepared by Hendrik Botha and dated 09 January 2023 (GCS Ref – 22 - 1054).

Mitigations:

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Impact Management Outcome(s):

- Sensitive avifauna habitats are restored, protected and maintained.
- Preserve aquatic ecosystem structure and function.
- Preserve ephemeral drainage systems.
- Maintain the Present Ecological State of the Brak River drainage system, large and small ephemeral tributaries, alluvial floodplains, and headwater drainage lines.

Targets:

- Rehabilitation Plan for watercourse crossings
- Rehabilitation of watercourse crossings
- Road and pipeline construction during dry season
- Fuel storage tanks outside 100m from watercourse
- Servitude and buffers are clearly fenced off or demarcated.
- No construction activities in no-go areas/15 m buffer outside designated servitudes
- Construction Method Statements for crossings.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
11	Planning	Habitat loss and fragmentation of watercourse areas because of infrastructure installation (roads, fences and sub surface pipelines).	Sensitive avifauna habitats are restored.	Rehabilitation Plan for watercourse crossings	A rehabilitation plan for all watercourse crossings (roads and pipelines) must be commissioned before construction commences.	Holder	Pre-construction	Compliance to be verified by ECO and IEA.
11	Planning	Habitat loss and fragmentation of watercourse areas because of infrastructure installation (roads, fences and sub surface pipelines).	Sensitive avifauna habitats are restored.	Rehabilitation of watercourse crossings	All topsoil harvesting must take place in the dry season. regenerate within two growing seasons.	Contractor	Continuous	Compliance to be verified by ECO and IEA.
11	Planning	Habitat loss and fragmentation of watercourse areas because of infrastructure installation (roads, fences and sub surface pipelines).	Sensitive avifauna habitats are restored.	Rehabilitation of watercourse crossings	Returning the wetlands to their original grade must take place as minor differences in the final surface elevation can produce significant impacts on the type of vegetation that re-establishes itself (alien invasive species).	Contractor	Continuous	Compliance to be verified by ECO and IEA.

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11	Planning	Habitat loss and fragmentation of watercourse areas because of infrastructure installation (roads, fences and sub surface pipelines).	Sensitive avifauna habitats are restored.	Rehabilitation of watercourse crossings	When topsoil is salvaged and returned, it is anticipated without reseeding so that dense vegetative communities of native species can regenerate within two growing seasons.	Contractor	Continuous	Compliance to be verified by ECO and IEA.
11	Planning	Habitat loss and fragmentation of watercourse areas because of infrastructure installation (roads, fences and sub surface pipelines).	Sensitive avifauna habitats are restored.	Rehabilitation of watercourse crossings	As emergent wetlands will recover more quickly than others, artificial seeding is not advised as it creates competition for reestablishment of native facultative and obligate wetland vegetation.	Contractor	Continuous	Compliance to be verified by ECO and IEA.
11	Contractor Readiness	Habitat loss and fragmentation of watercourse areas due to displacement because of infrastructure installation (underground pipelines).	Sensitive avifauna habitats are protected and maintained.	Road and pipeline construction during dry season	To the extent possible, schedule the road and pipeline construction during the season least damaging to the stream or wetland system (e.g., dry season).	Holder, Contractor	Pre-construction	Compliance to be verified by ECO and IEA.
11	Site Establishment (Layout)	Fuel spillage can contaminate a watercourse	Preserve aquatic ecosystem structure and function.	Fuel storage tanks outside 100m from watercourse	Fuel storage tanks shall be placed more than 100 m from the edge of a watercourse	Engineer, Contractor	Pre-construction	Compliance to be verified by ECO and IEA.

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11	Site Establishment (Layout)	Environmentally sensitive areas are disturbed due to uncontrolled access.	Maintain the Present Ecological State of the Brak River drainage system, large and small ephemeral tributaries, alluvial floodplains, and headwater drainage lines.	Servitude and buffers are clearly fenced off or demarcated.	No temporary structures, such as camps, water treatment facilities, portable toilets, stores or stockpiles should be established inside the 15 m buffered area on both sides of the large ephemeral drainage systems. stored and the actual footprint of the development to prevent access to sensitive areas.	Contractor	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.
12	Site Establishment (Layout)	Construction activities in or near to ephemeral drainage systems can alter surface water flow patterns, e.g., changing sheet flow (natural open system) to concentrated flows leads to erosion.	Preserve ephemeral drainage systems.	No construction activities in no-go areas/15 m buffer outside the servitude	Disturbance near to drainage lines should be avoided and any drainage areas near to the access roads and construction activities should demarcated as no-go areas (excluding areas within the designated servitude).	Contractor	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.

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12	Site Establishment (Layout)	Vegetation clearance of the project footprint for the access road and underground pipelines close to watercourses will be subject to erosion.	Maintain the Present Ecological State of the Brak River drainage system, large and small ephemeral tributaries, alluvial floodplains, and headwater drainage lines.	Construction Method Statements for crossings.	A construction method statement should be compiled and approved prior to the commencement of construction activities within all water resource types and where applicable their buffers.	Contractor	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.

Assessment with mitigation:

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
11	L	L	L	neutral	L	L	0	L	L	0

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
12	L	L	H	neutral	H	L	0	L	M	0

Residual Risk (feeds back into "Mitigations"):

- Despite the mitigations to avoid significant suspended sediment in the river, strong flows or a flash flood during summer would render any river diversion works futile.

Receiving Environment: Economical

Description of potential impacts:

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Management Category	Sub-activity	Environmental Aspect	Impact-Consequence	Change	Impact No.
Planning	Stakeholder Engagement	Grievance Mechanism	**Impact:** Damage to farm infrastructure **Consequence:** Economic costs in replacing damaged infrastructure.	NA	13
Planning	Stakeholder Engagement	Compensation and Claims	**Impact:** Damage to farm infrastructure **Consequence:** Economic costs in replacing damaged infrastructure.	NA	13
Contractor Readiness	Employment of labour	Training	**Impact:** Damage to farm infrastructure **Consequence:** Economic costs in replacing damaged infrastructure.	NA	13
Planning	Traffic Management Plan	Traffic	**Impact:** Transport of abnormal roads could be delayed. **Consequence:** Delays in construction	NA	14
Site Establishment (Layout)	Construction Camp	Lighting	**Impact:** Energy wastage. **Consequences: I**ncreased running cost.	NA	15
Site Establishment (Layout)	Quarry & Crushing Plant	Quarry & Crushing Plant	**Impact:** Haulage of imported materials incur a cost relating to distance travelled and time. The usage of mudstone from the Karoo Supergroup for use as concrete aggregate or road layers may reduce the quality of concrete and/or roads due to its instability. **Consequence:** Financial feasibility of project. The usage of poor-quality aggregate is unsafe and will increase the costs of maintenance.	NA	15
Site Establishment (Layout)	Quarry & Crushing Plant	Quarry & Crushing Plant	**Impact:** The usage of mudstone from the Karoo Supergroup for use as concrete aggregate or road layers may reduce the quality of concrete and/or roads due to its instability. **Consequence:** The usage of poor-quality aggregate is unsafe and will increase the costs of maintenance.	NA	15

*The source of information used in identifying the impact is either the Leipold Matrix (Matrix), Interested and Affected Parties (I&APs) and/or Specialist studies (Specialist).

Any assumptions, uncertainties & limitations, or gaps in knowledge with predicting the impacts

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Impact 13 (Damage to Property/Vehicles

- A concern is the waterflow around the wetland and the potential impact on the road.
- The movement of workers and vehicles on the site could cause damage to farm infrastructure (e.g., fencing, water troughs and gates), during construction and operation.
- Farm owners are concerned about the impact of fences on water flow during heavy rain. If fences are not kept clear of debris, there is a risk that it can affect the waterflow into dams in the area, which is critical in a dry area like the Karoo.
- The flood lines suggest a low flooding risk associated with the project area, as no clearly defined drainage lines occur. Micro-sub catchment sheet flow towards lower laying areas within the non-perennial river flood plains is likely to dominate flood propagation, and isolated flooded areas are predicted to occur. As such, no clearly defined exclusion zones/protection buffer areas could be mapped.

Impact 14 (Lighting costs, Transport costs and Roads)

- There are low-lying areas where water ponding occurs and has softened the layer works to the point where deep rutting occurs due to wheel tracks from traffic on the roads (Traffic Impact Assessment prepared by Sturgeon Consulting (Pty) Ltd dated February 2023).
- The existing road network has sufficient capacity to accommodate the additional trips during the construction and operational stages. A two-lane road such as the N10 in the vicinity of the site can accommodate approximately 2000 vehicles per hour. Once construction is completed, the day-to-day operation of the proposed substation will generate no to very little traffic which can easily be accommodated by the current road surface. It is anticipated that the proposed Main Transmission Substation and associated Eskom grid (network) integration infrastructure will add an additional 28 vehicles a day (±3 vehicles per hour) during the construction stage and 0 vehicles during the operational stage which is far less than the current capacity of the two-lane road (2 000 vehicles per hour).

Impact 15 (Quarry – Sourcing material)

- **Road material or aggregate will be purchased from a licensed commercial source.**
- The potential construction materials available on the farm and in the area consists of sandy transported soils, weathered siltstone, sandstone and dolerite. The gravelly siltstone occurs generally in thin beds overlying or underlying a sandstone member and are relative thin, generally less than 1.0m in thickness. It is however quite expansive with the gravel beds that can cover an area of a 200 to 300 square meters. Considering the construction materials required for the project it will consist of different classes of coarse aggregate for pioneer layer, yard stone as well as course and fine aggregate for concrete production. In the Karoo the best available hard aggregate that can be used for yard stone and concrete aggregate is fresh dolerite (G1 material) of which there are no significant deposits on the farm or in the immediate surrounding areas concrete. The closest commercial supplier is De Aar Stone Crushers which is located approximately 32km from the N10 turnoff. There is a second dolerite quarry along the N1 towards Richmond (44km) from the N10 turn-off. This quarry is currently dormant, but it

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may be re-opened soon depending on SANRAL upgrades along the N1 in the area (Geotechnical Investigation Report prepared by Bare Rock Consulting (Pty) Ltd dated December 2022).

- The borrow areas close to the property consist of two types of material: weathered siltstone and weathered dolerite. The dolerite borrow pit is located on the eastern slope of the hill close to the N10 turn-off (Borrow Area E in Figure 16 of the Geotechnical Investigation Report for Sun Central PV Project Near De Aar, Northern Cape Province – BRC/RP/31/2022 prepared by Bare Rock Consulting (Pty) Ltd dated December 2022.). Borrow Area F on the other side of the hill facing the N10 is a weathered siltstone borrow area. The other siltstone borrow areas (Borrow areas B to D) are all constrained by a upper and lower competent layer resulting in a large area that have to be disturbed to gain sufficient material for aggregate. None of these areas are currently licensed as borrow areas.
- Brink (1983) cautions against the use of mudstone from the Karoo Supergroup for use as construction materials – particularly for use as concrete aggregate and to a limited extent also for road layer materials (Geotechnical Investigation Report prepared by Bare Rock Consulting (Pty) Ltd dated December 2022).

Assessment without mitigation:

Legend					
Criteria		**Reversibility, Irreplaceability, & Mitigatory Potential**		**Significance (Impact Magnitude & Impact Importance**	
Abbreviation	**Description**	**Abbreviation**	**Description**	**Abbreviation**	**Description**
H	High	L	Low	0	Non-significant
M	Medium	M	Moderate	1	Significant
L	Low	H	High		
-I/R	Negative Impact/Risk				
+I/R	Positive Impact/Risk				

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
13	M	L	M	-I	M	H	1	M	H	1
Reversibility	H	**Irreplaceability**	H	**Mitigatory Potential**	H					

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Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
14	L	L	L	-I	L	L	0	M	M	1
Reversibility	L	**Irreplaceability**	L	**Mitigatory Potential**	M					

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
15	M	L	M	-I	M	H	1	M	H	1
Reversibility	H	**Irreplaceability**	H	**Mitigatory Potential**	H					

Any aspects which were conditional to the findings of the assessment (to be included as conditions of authorisation):

- Road material or aggregate will be purchased from a licensed commercial source.

References (legal, scientific, social, or other criteria) used for the assessment and mitigations:

- Access Road and Part 2 Amendment Addendum to Social Impact Assessment Report prepared by Equispectives Research & Consulting Services dated January 2023.
- Hydrological Assessment, Version – Final 1, prepared by Hendrik Botha and dated 10 January 2023 (GCS Ref – 22 - 1054).
- Traffic Impact Assessment for the upgrading & development of an access road from the N10/'Burgerville' district road (2448) turn-off to the Main Transmission Substation (MTS) as well as the construction of a loop-in loop-out from the MTS to the 400 kV Hydraposeidon Tx overhead line (line 1), and other projects on the Sun Central Cluster 1 (300 MW) solar PV footprint between De Aar and Hanover, Northern Cape province (project No.: STUR0375) prepared by Sturgeon Consulting (Pty) Ltd dated February 2023.
- Geotechnical Investigation Report for Sun Central PV Project Near De Aar, Northern Cape Province – BRC/RP/31/2022 prepared by Bare Rock Consulting (Pty) Ltd dated December 2022.
- SolarAfrica Sun Central – Access Road Study Rev 0.1 (Document Reference: SAE-PD-DA-Access Road Study 0.1 FS

Mitigations:

Impact Management Outcome(s):

- Minimize damage to farm infrastructure.
- Safe (unobstructed) delivery of abnormal loads to site.

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- Energy efficiency.
- Maintain financial feasibility of the project.
- Good quality aggregate material

Targets:

- A grievance mechanism.
- Fences are clear of debris
- Toolbox talks include damage to farm infrastructure.
- Investigation
- HPS or LED/MH bulbs
- Never replace candescent bulbs with alternatives that use the same or more watts.
- Supplement commercial sources with local borrow pits if possible.
- G5 is sourced from external suppliers.
- Dolerite rock and/or sandstones and mudstone/shale which have been baked by dolerite intrusions are used as construction

Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
13	Planning	Damage to farm infrastructure	Minimize damage to farm infrastructure	A grievance mechanism.	SolarAfrica Energy must develop a grievance mechanism using the Grievance Mechanism Protocol.	Holder	Pre-construction	Compliance to be verified by ECO and IEA.
13	Planning	Damage to farm infrastructure	Minimize damage to farm infrastructure	A grievance mechanism.	Appoint a contact person that can deal with enquiries from local residents.	Holder	Pre-construction	Compliance to be verified by ECO and IEA.
13	Planning	Damage to farm infrastructure	Minimize damage to farm infrastructure	A grievance mechanism.	The grievance mechanism must be in place and shared with all the stakeholders before the construction commences.	Holder	Pre-construction	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
13	Planning	Damage to farm infrastructure	Minimize damage to farm infrastructure	A grievance mechanism.	The grievance mechanism must include a complaints procedure that allows the landowners to log their grievance and submit a claim for damages.	Holder	Pre-construction	Compliance to be verified by ECO and IEA.
13	Planning	Damage to farm infrastructure	Minimize damage to farm infrastructure.	Fences are clear of debris	Affected landowners must be compensated for losses resulting from any damage to farm infrastructure when caused by Project personnel or as a result of the Project.	Holder	Pre-construction and continuous	Compliance to be verified by ECO and IEA.
13	Contractor Readiness	Damage to farm infrastructure	Minimize damage to farm infrastructure.	Toolbox talks include damage to farm infrastructure.	The construction teams must be educated about the impact of damages to fences, water troughs and farm gates, through toolbox talks.	Contractor, ECO	Pre-construction	Compliance to be verified by ECO and IEA.
14	Planning	Transport of abnormal roads could be delayed.	Safe (unobstructed) delivery of abnormal loads to site.	Investigation	The appointed engineers should investigate the route to the site to ensure that the abnormal loads are not obstructed at any point by geometric, height and width limitations along the route.	Engineer	Pre-construction	Compliance to be verified by ECO and IEA.
15	Site Establishment (Layout)	Energy wastage.	Energy efficiency	HPS or LED/MH bulbs	If colour discrimination is not important, choose energy-	Engineer, Contractor	Pre-construction	Compliance to be verified by

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
					efficient fixtures utilising yellowish high-pressure sodium (HPS) bulbs. If "white" light is needed, fixtures using LEDs, compact fluorescent or metal-halide (MH) bulbs are more energy-efficient than those using incandescent, halogen, or mercury-vapour bulbs.		and Continuous	ECO and IEA.
15	Site Establishment (Layout)	Energy wastage.	Energy efficiency	Never replace candescent bulbs with alternatives that use the same or more watts.	When purchasing energy efficient alternatives to traditional energy consumptive lighting, remember that they use less watts to produce the same amount of light (measured in lumens). So, never replace candescent bulbs with alternatives that use the same or more watts.	Holder, Contractor	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.
15	Site Establishment (Layout)	Haulage of imported materials incur a cost relating to distance travelled and time. The usage of mudstone from the Karoo Supergroup	Maintain financial feasibility of the project. Good quality aggregate material	Supplement commercial sources with local borrow pits if possible	On the farm De Bad (See Figure 15 of the Geotechnical Investigation Report for Sun Central PV Project Near De Aar, Northern Cape Province – BRC/RP/31/2022 prepared by Bare Rock	Engineer, Contractor, Landowner	Pre-construction and continuous	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
		for use as concrete aggregate or road layers may reduce the quality of concrete and/or roads due to its instability.			Consulting (Pty) Ltd dated December 2022.) there is a quarry where material for the construction of the N10 were sourced. The rock is a competent sandstone, but the flakiness index makes it less suitable for use as concrete aggregate than the dolerite. It can however be suitable for pioneering layers and as well as G2 and G3 material. This quarry can be used to upgrade and repair roads that intersects the same property. Sections of road that does not intersect properties where existing quarries with suitable material, will need to be repaired/upgraded with material sourced from commercial suppliers.			
15	Site Establishment (Layout)	Haulage of imported materials incur a cost relating to distance travelled and time. The usage of mudstone from the	Maintain financial feasibility of the project. Good quality aggregate material	Supplement commercial sources with local borrow pits if possible	The aggregates available in the area is suitable for construction. The fresh dolerite (borrow pit is located on the eastern slope of the hill close to the N10 turn-off – see	Contractor	Pre-construction and continuous	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
		Karoo Supergroup for use as concrete aggregate or road layers may reduce the quality of concrete and/or roads due to its instability.			Borrow Area E in Figure 16 of the Geotechnical Investigation Report for Sun Central PV Project Near De Aar, Northern Cape Province – BRC/RP/31/2022 prepared by Bare Rock Consulting (Pty) Ltd dated December 2022.) can be used for coarse and fine aggregate for concrete production as well as yard stone. The weathered dolerite as exposed in borrow area E is suitable for wearing course material. The volumes of material remaining at this borrow pit will not be sufficient and the borrow area is currently not licensed. These borrow pits can be used to upgrade and repair roads that intersects the same property. Sections of road that does not intersect properties where existing borrow pits with suitable material, will need to be repaired/upgraded			

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
					with material sourced from commercial suppliers.			
15	Site Establishment (Layout)	The usage of mudstone from the Karoo Supergroup for use as concrete aggregate or road layers may reduce the quality of concrete and/or roads due to its instability.	Good quality aggregate material.	G5 is sourced from external suppliers.	It is recommended that the material (G5) for the wearing course be sourced from commercial suppliers.	Holder, Contractor	Pre-construction and continuous	Compliance to be verified by ECO and IEA.
15	Site Establishment (Layout)	The usage of mudstone from the Karoo Supergroup for use as concrete aggregate or road layers may reduce the quality of concrete and/or roads due to its instability.	Good quality aggregate material.	Dolerite rock and/or sandstones and mudstone/shale which have been baked by dolerite intrusions are used as construction	Preference should be given to the use of dolerite rock as construction material; however, sedimentary rock may be used with caution for the lower road layers – especially the sandstones and mudstone/shale which have been baked by dolerite intrusions. material.	Holder, Contractor	Pre-construction and continuous	Compliance to be verified by ECO and IEA.

Assessment with mitigation:

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
13	L	L	L	+I	L	L	0	L	L	0

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Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
14	L	L	L	neutral	L	L	0	L	M	0

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
15	L	L	L	neutral	L	L	0	L	L	0

Residual Risk (feeds back into "Mitigations"):

- Despite the mitigations to avoid damage to property during floods, strong flows or a flash flood during summer could still result in some damage to property.

Receiving Environment: Social

Description of potential impacts:

Management Category	Sub-activity	Environmental Aspect	Impact-Consequence	Change	Impact No.
Planning	Social Impact Management Plan	Social Impact Management Plan	**Impact:** Cumulative social impacts as it relates to social ills such as increases in crimes, theft, HIV rates, unemployment levels etc. **Consequences:** Increases in HIV rates, crimes.	NA	16
Planning	Stakeholder Engagement	Grievance Mechanism	**Impact:** Damage to farm infrastructure **Consequence:** Economic costs in replacing damaged infrastructure.	NA	16
Planning	Recruitment	Recruitment	**Impact:** The proposed project will create positive economic impacts in the area. The most direct impact on a community level is job creation. **Consequence:** The increase in disposable income (via the project workers) will result in increased demand for goods and services, and greater spending within the local community.	NA	16
Planning	Procurement	Procurement	**Impact:** The proposed project will create positive economic impacts in the area. The most direct impact on a community level is job creation. **Consequence:** The increase in disposable income (via the project	NA	16

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			workers) will result in increased demand for goods and services, and greater spending within the local community.		
Planning	Traffic Management Plan	Traffic	**Impact:** Potential congestion and delays on the surrounding road network. **Consequence:** Disruptions and delays to local farmers in the area due to increase traffic volumes.	NA	16
Contractor Readiness	Employment of labour	Appointment	**Impact:** Vulnerable group's susceptible to negative influences in society such as prostitution, relationships with minors, alcohol and drug abuse, gambling and fighting due to the presence of people from outside the area. **Consequence:** Higher rates of crimes, HIV rates.	NA	16
Contractor Readiness	Employment of labour	Training	**Impact:** Vulnerable group's susceptible to negative influences in society such as prostitution, relationships with minors, alcohol and drug abuse, gambling and fighting due to the presence of people from outside the area. **Consequence:** Higher rates of crimes, HIV rates.	NA	16
Contractor Readiness	Commencement & Construction times	NA	**Impact:** Noise increase at the boundary of the project footprint and at the abutting houses during construction activities. **Consequence:** Decrease in sense of place. Disturbance to local farmsteads.	NA	16
Site Establishment (Layout)	Construction Camp	Lighting	**Impact:** Decrease in the "sense of place" as it relates to noise, visual and light pollution. **Consequence:** Lower aesthetic values enjoyed by the community.	NA	16

*The source of information used in identifying the impact is either the Leipold Matrix (Matrix), Interested and Affected Parties (I&APs) and/or Specialist studies (Specialist).

Any assumptions, uncertainties & limitations, or gaps in knowledge with predicting the impacts

Impact 16 (Social aspect)

- The social impacts do not occur on the sites, but in the communities around the sites and in the towns closest to the sites. Although municipal services are not currently under pressure, the development of a few renewable facilities within a short period of each other may cause pressure on these services in future. The municipalities depend on borehole water, which may run out and is only available when there is electricity available to run the water pumps. There is a current shortage of housing which will get worse should the area are exposed to a boom cycle of development. It must be acknowledged that it is almost impossible for the proponent to control the cumulative social impacts in

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the neighbouring towns. Therefore, it is important that the proponent have a good working relationship with the local authorities, and that they mitigate the impacts that they can control, as suggested in the Social Impact Management Plan (SIMP).

- The proposed project will create positive economic impacts in the area, which will increase with the addition of the construction of an access road. The most direct impact on a community level is job creation. Although the road construction phase jobs are temporary and will not contribute to the unemployment levels in the long term, it would have a significant positive impact on the short term. The increase in disposable income (via the project workers) will result in increased demand for goods and services, and greater spending within the local community.
- It can be anticipated that there are semi-skilled and unskilled labour present in the area that has experience of road construction work during the establishment of the existing solar farms in the area. The municipality noted that they feel that the skills transfer from renewable energy companies up to now has been limited, and they would like to see more skills transfer programmes on a local level.
  Apart from the direct employment opportunities, there. will also be significant indirect economic opportunities for local entrepreneurs. Opportunities include transport, fencing, road maintenance, accommodation, meals, and laundry services. Several people reported that they established businesses that provide services to the renewable sector and has benefitted from the presence of these facilities in the area. The highly skilled technical people will need accommodation and other hospitality services while they reside in the area during the construction period. Some of the adjacent farms offer accommodation, which may be a viable option for some of the workers. Whilst some of the technical jobs need highly skilled people that are not available locally.
- A concern is the waterflow around the wetland and the potential impact on the road.
- The movement of workers and vehicles on the site could cause damage to farm infrastructure (e.g., fencing, water troughs and gates), during construction and operation (Access Road and Part 2 Amendment Addendum to Social Impact Assessment Report prepared by Equispectives Research & Consulting Services dated January 2023).
- Farm owners are concerned about the impact of fences on water flow during heavy rain. If fences are not kept clear of debris, there is a risk that it can affect the waterflow into dams in the area, which is critical in a dry area like the Karoo.
- Safety concerns mentioned by people from Hanover and De Aar include social ills such as prostitution, relationships with minors, alcohol and drug abuse, gambling and fighting due to the presence of people from outside the area.
  The municipality indicated that people coming from outside the area to work in the existing solar projects had a definite impact on the community. Different value systems lead to changes in behaviour, such as taverns being open on Sundays, sexual assaults, and an increase in the HIV rates. This may be a perception, as these aspects has been present in the community for a long time, but it must be acknowledged that these social ills are typically associated with an influx of people because of development. A massive influx of people is not expected, since there should be some skilled labour in the area as a result of the other solar projects that have been established in the last few years. However, if the number of solar developments in a 30 km radius of the proposed development are all constructed at the same time, there may be cumulative impacts.

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- Existing traffic information for 2022 indicates that the N10 carries an ADT of 1018 vehicles per day (two-way). The N10 operates well below the capacity of 2000 vehicles per hour for a Class 1 principal arterial with two lanes. Traffic generated during the Operational phase will have an insignificant traffic impact on the surrounding road network. Only the workforce during the construction of the Main Transmission Substation and associated Eskom grid (network) integration infrastructure will be considered as this will be the worst-case scenario. It is not anticipated that the two projects will run simultaneously, since the access and road upgrades need to be in place before the construction of the Main Transmission Substation and associated Eskom grid (network) integration infrastructure can commence.
  A total of 56 vehicles will move to/from the construction site on a daily basis. Should all the trips fall within the peak hours of the road, this will relate to approximately an additional 28 trips on the road network during the peak hours for the construction phase.
  The substation is expected to generate a maximum of 10 heavy vehicle trips per day two-way, assuming that the transport operations occur every day of the week and for 10 hours a day (i.e. 30 days per month) (Traffic Impact Assessment, prepared by Sturgeon Consulting (Pty) Ltd dated February 2023).
- The large variations in the meteorological conditions and the geographical relations between the traffic noise and the noise sensitive receptors allow for the decrease in the noise as it propagates from the gravel road.
- The potential noise impact from the proposed gravel road will be low.
- Although lights are used as a security measure on farms, one of the things people values is the absence of bright lights and that they can see the stars. Lights for any other use than lighting up their direct environment is seen as invasive and disturbs the sense of place. Visual aspects are an important consideration in the experience of sense of place. If people are used to unspoiled vistas, or seeing open fields, the establishment of any buildings or infrastructure that they feel do not belong there can alter their sense of place (Access Road and Part 2 Amendment Addendum to Social Impact Assessment Report prepared by Equispectives Research & Consulting Services dated January 2023).

Assessment without mitigation:

Legend					
Criteria		**Reversibility, Irreplaceability, & Mitigatory Potential**		**Significance (Impact Magnitude & Impact Importance**	
Abbreviation	**Description**	**Abbreviation**	**Description**	**Abbreviation**	**Description**
H	High	L	Low	0	Non-significant
M	Medium	M	Moderate	1	Significant
L	Low	H	High		
-I/R	Negative Impact/Risk				
+I/R	Positive Impact/Risk				

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Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
16	L	L	L	-I	L	M	0	M	M	1
Reversibility	H	**Irreplaceability**	H	**Mitigatory Potential**	H					

Any aspects which were conditional to the findings of the assessment (to be included as conditions of authorisation):

- None

References (legal, scientific, social, or other criteria) used for the assessment and mitigations:

- Environmental Basic Assessment for the proposed Gravel Road Construction to the approved Phase 1 Project prepared by dBAcoustics dated 21 January 2023.
- Access Road and Part 2 Amendment Addendum to Social Impact Assessment Report prepared by Equispectives Research & Consulting Services dated January 2023.
- Traffic Impact Assessment for the upgrading & development of an access road from the N10/'Burgerville' district road (2448) turn-off to the Main Transmission Substation (MTS) as well as the construction of a loop-in loop-out from the MTS to the 400 kV Hydraposeidon Tx overhead line (line 1), and other projects on the Sun Central Cluster 1 (300 MW) solar PV footprint between De Aar and Hanover, Northern Cape province (project No.: STUR0375) prepared by Sturgeon Consulting (Pty) Ltd dated February 2023.

Mitigations:

Impact Management Outcome(s):

- Minimize social impacts.
- Minimize damage to farm infrastructure.
- Maximize benefits to the local community.
- Minimise risk of congestion and delays to local farmers.
- Community protection
- Minimize noise disturbance to noise receptors/farmhouses.
- Minimize change in sense of place.

Targets:

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- Social Impact Management Plan
- A grievance mechanism.
- A recruitment policy.
- Delivery trips outside peak traffic periods.
- Code of Conduct
- Induction Programme
- Construction during daytime only.
- Night lighting at construction camp kept to a minimum.

Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
16	Planning	Cumulative social impacts as it relates to social ills such as increases in crimes, theft, HIV rates, unemployment levels etc.	Minimize social impacts.	Social Impact Management Plan	Implement the Social Impact Management Plan during all phases of the project (Appendix F). The social impact management plan does not replace the social mitigation measures but must be implemented in addition to the suggested mitigation measures.	Holder	Pre-construction	Compliance to be verified by ECO and IEA.
16	Planning	Cumulative social impacts as it relates to social ills such as increases in crimes, theft, HIV rates, unemployment levels etc.	Minimize social impacts.	Social Impact Management Plan	A community liaison officer that is trusted by the community and has the necessary skills must be appointed before construction commences to interface and build	Holder	Pre-construction	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
					trust between the contractor(s) and the landowners.			
16	Planning	Cumulative social impacts as it relates to social ills such as increases in crimes, theft, HIV rates, unemployment levels etc.	Minimize social impacts.	Social Impact Management Plan	The community liaison officer must be bilingual with a solid knowledge of Afrikaans, as it is the language that most stakeholders are comfortable with (excluding the local government, where English would be sufficient).	Holder	Pre-construction	Compliance to be verified by ECO and IEA.
16	Planning	Damage to farm infrastructure	Minimize damage to farm infrastructure.	A grievance mechanism.	The grievance mechanism must be communicated to the affected communities.	Holder, SEO	Pre-construction	Compliance to be verified by ECO and IEA.
16	Planning	Damage to farm infrastructure	Minimize damage to farm infrastructure.	A grievance mechanism.	SAE should check in with the direct neighbours once a month to ensure all grievances are dealt with and that the different parties remain informed about any planned activities.	Holder, SEO	Once a month	Compliance to be verified by ECO and IEA.
16	Planning	The proposed project will create positive economic impacts in the	Maximize benefits to the local community.	A recruitment policy.	As far as possible local labour must be used for the road construction.	Holder, Contractor	Pre-construction	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
		area. The most direct impact on a community level is job creation.						
16	Planning	The proposed project will create positive economic impacts in the area. The most direct impact on a community level is job creation.	Maximize benefits to the local community.	A recruitment policy.	SolarAfrica Energy must develop a recruitment policy and liaise with the Local Economic Development section of the municipality, local leaders, and NGOs during its development to ensure it is in line with the local practices and taps into existing knowledge.	Holder	Pre-construction	Compliance to be verified by ECO and IEA.
16	Planning	The proposed project will create positive economic impacts in the area. The most direct impact on a community level is job creation.	Maximize benefits to the local community.	A recruitment policy.	The recruitment policy must set reasonable targets for the employment of local people and women.	Holder.	Pre-construction	Compliance to be verified by ECO and IEA.
16	Planning	The proposed project will create positive	Maximize benefits to the local community.	A procurement policy.	Workers from outside the area must be provided	Holder, Contractor, Landowner	Pre-construction,	Compliance to be verified by

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
		economic impacts in the area. The most direct impact on a community level is job creation.			with a list of local service providers for their accommodation and other social needs.		and Continuous	ECO and IEA.
16	Planning	The proposed project will create positive economic impacts in the area. The most direct impact on a community level is job creation.	Maximize benefits to the local community.	A procurement policy.	As far as possible materials must be procured locally.	Contractor	Pre-construction, and Continuous	Compliance to be verified by ECO and IEA.
16	Planning	Potential congestion and delays on the surrounding road network.	Minimise risk of congestion and delays to local farmers.	Delivery trips outside peak traffic periods.	Stagger delivery trips and schedule deliveries outside of the peak traffic periods. (2) Staff trips should also occur outside of the peak hours where possible.	Contractor	Pre-construction, and Continuous	Compliance to be verified by ECO and IEA.
16	Planning	Potential congestion and delays on the surrounding road network.	Minimise risk of congestion and delays to local farmers.	Delivery trips outside peak traffic periods.	Staff trips should also occur outside of the peak hours where possible.	Contractor	Pre-construction, and Continuous	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
16	Contractor Readiness	Vulnerable group's susceptible to negative influences in society such as prostitution, relationships with minors, alcohol and drug abuse, gambling and fighting due to the presence of people from outside the area.	Community protection	Signed Code of Conduct	Any person that does any work on site must sign the Code of Conduct and presented with a copy.	Contractor, SEO	Pre-construction, and Continuous	Compliance to be verified by ECO and IEA.
16	Contractor Readiness	Vulnerable group's susceptible to negative influences in society such as prostitution, relationships with minors, alcohol and drug abuse, gambling and fighting due to the presence of people from outside the area.	Community protection	Code of Conduct	The Code of Conduct must include the following aspects: • Respect for local residents, their customs and property. • Respect for farm infrastructure and agricultural activities. • No hunting or un-authorised taking of products or livestock. • Zero tolerance of illegal activities by construction	Contractor	Pre-construction	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
					personnel including: prostitution; illegal sale or purchase of alcohol; sale, purchase or consumption of drugs; illegal gambling or fighting. • Compliance with the Traffic Management Plan and all road regulations; and • Description of disciplinary measures for violation of the Code of Conduct and company rules.			
16	Contractor Readiness	Vulnerable group's susceptible to negative influences in society such as prostitution, relationships with minors, alcohol and drug abuse, gambling and fighting due to the presence of people from	Community protection	Signed Code of Conduct	If workers are found to be in contravention of the Code of Conduct, which they will be required to sign at the beginning of their contract, they will face disciplinary procedures that could result in dismissal. Stock theft should be noted as a dismissible offence.	Contractor	Pre-construction, and Continuous	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
		outside the area.						
16	Contractor Readiness	Vulnerable group's susceptible to negative influences in society such as prostitution, relationships with minors, alcohol and drug abuse, gambling and fighting due to the presence of people from outside the area.	Community protection	Induction Programme	Develop an induction programme that includes a Code of Conduct for all workers (including sub-contractors). The induction programme must include HIV/AIDS awareness, substance abuse programmes and education about alcohol abuse and gender-based violence.	Contractor, SEO, ECO	Pre-construction, and Continuous	Compliance to be verified by ECO and IEA.
16	Contractor Readiness	Noise increase at the boundary of the project footprint and at the abutting houses during construction activities.	Minimize noise disturbance to noise receptors/farmhouses.	Construction during daytime only.	Topsoil stripping and construction activities should be limited to daytime only.	Contractor	Pre-construction and Construction	Compliance to be verified by ECO and IEA.
16	Site Establishment (Layout)	Decrease in the "sense of place" as it relates to noise, visual and light pollution.	Minimize change in sense of place.	Night lighting at construction camp kept to a minimum	Night lighting of the construction sites should be minimised within requirements of safety and efficiency.	Contractor	Pre-construction	Compliance to be verified by ECO and IEA.

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Assessment with mitigation:

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
16	L	L	L	neutral	L	L	0	L	L	0

Residual Risk (feeds back into "Mitigations"):

- None.

Receiving Environment: Land Use

Description of potential impacts:

Management Category	Sub-activity	Environmental Aspect	Impact-Consequence	Change	Impact No.
Planning	Stakeholder Engagement	Compensation and Claims	**Impact:** The construction of an access road will lead to a change of land use and livelihoods. **Consequence:** Change of land use can potentially impact negatively on the livelihood of the affected farmer, which is sheep farming.	NA	17
Planning	Procurement	Procurement	**Impact:** The construction of a solar electricity generating facility and its associated infrastructure will lead to a change of land use and livelihoods. **Consequence:** Change of land use can potentially impact negatively on the livelihood of the affected farmer, which is sheep farming.	NA	17

*The source of information used in identifying the impact is either the Leipold Matrix (Matrix), Interested and Affected Parties (I&APs) and/or Specialist studies (Specialist).

Any assumptions, uncertainties & limitations, or gaps in knowledge with predicting the impacts

Impact 17 (Land use change)

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat.) & S.D. MacGregor (M.Sc., Pr.Sci.Nat.)
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- In some cases, the neighbouring farmers will benefit from the construction of the facility since they can offer accommodation or other related services that can supplement their income (Access Road and Part 2 Amendment Addendum to Social Impact Assessment Report prepared by Equispectives Research & Consulting Services dated January 2023).
- Construction traffic may impact on the movement of the livestock around the farm (Access Road and Part 2 Amendment Addendum to Social Impact Assessment Report prepared by Equispectives Research & Consulting Services dated January 2023).

Assessment without mitigation:

Legend					
Criteria		**Reversibility, Irreplaceability, & Mitigatory Potential**		**Significance (Impact Magnitude & Impact Importance**	
Abbreviation	**Description**	**Abbreviation**	**Description**	**Abbreviation**	**Description**
H	High	L	Low	0	Non-significant
M	Medium	M	Moderate	1	Significant
L	Low	H	High		
-I/R	Negative Impact/Risk				
+I/R	Positive Impact/Risk				

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
17	L	M	L	-I	M	M	1	M	M	1
Reversibility	H	**Irreplaceability**	H	**Mitigatory Potential**	H					

Any aspects which were conditional to the findings of the assessment (to be included as conditions of authorisation):

- None.

References (legal, scientific, social, or other criteria) used for the assessment and mitigations:

- Access Road and Part 2 Amendment Addendum to Social Impact Assessment Report prepared by Equispectives Research & Consulting Services dated January 2023.

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Mitigations:

Impact Management Outcome(s):

- Minimize change in livelihoods of surrounding communities.

Targets:

- No harm to livestock
- In the case of harm to or loss of livestock, the farmer is compensated according to accepted protocols and procedures.
- Locals including neighbouring landowners are used for services where possible.

Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
17	Planning	The construction of an access road will lead to a change of land use and livelihoods.	Minimize change in livelihoods of surrounding communities.	No harm to livestock	Livestock must have right of way. commences.	Contractor	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.
17	Planning	The construction of an access road will lead to a change of land use and livelihoods.	Minimize change in livelihoods of surrounding communities.	No harm to livestock	Construction vehicles must wait for the animals to cross before they continue with their journey.	Contractor	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.
17	Planning	The construction of an access road will lead to a change of land use and livelihoods.	Minimize change in livelihoods of surrounding communities.	In the case of harm to or loss of livestock, the farmer is compensated according to accepted protocols and procedures.	The contractor must compensate the farmer for any losses of livestock due to irresponsible behaviour by the construction teams.	Contractor	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.
17	Planning	The construction of	Minimize change in	In the case of harm to or loss	A protocol on compensation must be	Holder, Contractor	Pre-construction	Compliance to be verified

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
		an access road will lead to a change of land use and livelihoods.	livelihoods of surrounding communities.	of livestock, the farmer is compensated according to accepted protocols and procedures.	agreed upon and be in place before construction commences.			by ECO and IEA.
17	Planning	The construction of an access road will lead to a change of land use and livelihoods.	Minimize change in livelihoods of surrounding communities.	In the case of harm to or loss of livestock, the farmer is compensated according to accepted protocols and procedures.	A claims procedure must be in place and shared with all the stakeholders before the construction commences.	Holder, Contractor	Pre-construction	Compliance to be verified by ECO and IEA.
17	Planning	The construction of a solar electricity generating facility and its associated infrastructure will lead to a change of land use and livelihoods.	Minimize change in livelihoods of surrounding communities.	Locals including neighbouring landowners are used for services where possible.	The principle of "locals first" should where practical be used to ensure that neighbouring landowners benefit from requirements for accommodation or any other services that they can deliver, e.g., road maintenance and dust suppression activities.	Holder, Contractor	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.
17	Planning	The construction of a solar electricity generating facility and its associated infrastructure will lead to a	Minimize change in livelihoods of surrounding communities.	Locals including neighbouring landowners are used for services where possible.	If possible, local service providers must be used for road construction, maintenance and dust suppression activities.	Holder, Contractor	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
		change of land use and livelihoods.						

Assessment with mitigation:

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
17	L	M	L	-I	M	L	0	L	L	0

Residual Risk (feeds back into "Mitigations"):

- None.

Receiving Environment: Health and Safety

Description of potential impacts:

Management Category	Sub-activity	Environmental Aspect	Impact-Consequence	Change	Impact No.
Planning	Traffic Management Plan	Traffic	**Impact:** Traffic accidents at primary access location off the N10. **Consequence**: Injury or loss of life.	NA	18
Contractor Readiness	Employment of labour	Appointment	**Impact:** Lack on environmental and OHS awareness **Consequence:** injury/death to personnel.	NA	18
Contractor Readiness	Employment of labour	Training	**Impact:** During the clearing of the site this may pose a risk to the workers and during the operation there may also be snake encounters. **Consequence:** Loss/injury to personnel.	NA	19

*The source of information used in identifying the impact is either the Leipold Matrix (Matrix), Interested and Affected Parties (I&APs) and/or Specialist studies (Specialist).

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Any assumptions, uncertainties & limitations, or gaps in knowledge with predicting the impacts

Impact 18 (Traffic Safety)

- The site visit and photos taken at the existing access location indicated that shoulder sight distance to the left will be sufficient. Sight distance to the right was measured as approximately 320m which is sufficient for Passenger vehicles (P).

Impact 19 (Dangerous animals – snakes)

- There are venomous snakes, and during the clearing of the site this may pose a risk to the workers. There is always a risk of snakes in the area and during the operation there may also be snake encounters.

Assessment without mitigation:

Legend					
Criteria		**Reversibility, Irreplaceability, & Mitigatory Potential**		**Significance (Impact Magnitude & Impact Importance**	
Abbreviation	**Description**	**Abbreviation**	**Description**	**Abbreviation**	**Description**
H	High	L	Low	0	Non-significant
M	Medium	M	Moderate	1	Significant
L	Low	H	High		
-I/R	Negative Impact/Risk				
+I/R	Positive Impact/Risk				

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
18	L	M	L	-I	M	M	1	M	M	1
Reversibility	H	**Irreplaceability**	H	**Mitigatory Potential**	H					

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
19	L	M	L	-I	M	M	1	M	M	1

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Reversibility	H	Irreplaceability	H	Mitigatory Potential	H

Any aspects which were conditional to the findings of the assessment (to be included as conditions of authorisation):

- None.

References (legal, scientific, social, or other criteria) used for the assessment and mitigations:

- Traffic Impact Assessment for the upgrading & development of an access road from the N10/'Burgerville' district road (2448) turn-off to the Main Transmission Substation (MTS) as well as the construction of a loop-in loop-out from the MTS to the 400 kV Hydraposeidon Tx overhead line (line 1), and other projects on the Sun Central Cluster 1 (300 MW) solar PV footprint between De Aar and Hanover, Northern Cape province (project No.: STUR0375) prepared by Sturgeon Consulting (Pty) Ltd dated February 2023.
- Environmental Impact Assessment for the proposed Soventix Solar PV Project, De Aar, Northern Cape: Fauna & Flora Specialist EIA Report prepared by Simon Todd Consulting dated May 2017.

Mitigations:

Impact Management Outcome(s):

- To ensure the safe exit of Single-Unit Trucks (SU) and especially Single-Unit Truck plus Trailers (SU+T) at the junction of the N10 with the existing Burgerville (District) Road.
- To ensure effective Health and Safety implementation.
- Safe working environment.

Targets:

- Traffic accommodation on eastern approach of N10 and flagman.
- CV of appointed HSO.
- Toolbox talks.
- One trained person on site to deal with snakes.

Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
18	Planning	Traffic accidents at	To ensure the safe exit of	Traffic accommodation	Place appropriate traffic accommodation	Contractor	Pre-construction	Compliance to be verified

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
		primary access location off the N10.	Single-Unit Trucks (SU) and especially Single-Unit Truck plus Trailers (SU+T) at the junction of the N10 with the existing Burgerville (District) Road.	on eastern approach of N10 and flagman	on the eastern approach of the N10, indicating a construction access ahead with a possible flagman to alert drivers and slow them down.		and Continuous	by ECO and IEA.
18	Contractor Readiness	Lack on environmental and OHS awareness	To ensure effective Health and Safety implementation	CV of appointed HSO	Appoint a suitably qualified Health and Safety Officer (HSO) to implement OHSA (Act 85 of 1993)	Contractor	Pre-Construction	Compliance to be verified by ECO and IEA.
19		During the clearing of the site this may pose a risk to the workers and during the operation there may also be snake encounters.	Safe working environment	Toolbox talks	Workers and contractors must be educated about safety aspects in areas where there are wild animals. This could be done through toolbox talks.	Contractor, SEO, ECO	Pre-Construction	Compliance to be verified by ECO and IEA.
19		During the clearing of the site this may pose a risk to the workers and during the operation there may also be snake encounters.	Safe working environment	One trained person on site to deal with snakes	At least one person on site needs to be trained to relocate venomous snakes.	Contractor	Pre-Construction	Compliance to be verified by ECO and IEA.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat.) & S.D. MacGregor (M.Sc., Pr.Sci.Nat.)
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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
19		During the clearing of the site this may pose a risk to the workers and during the operation there may also be snake encounters.	Safe working environment	One trained person on site to deal with snakes	The person responsible for first aid must be trained in dealing with snake bites.	Contractor	Pre-Construction	Compliance to be verified by ECO and IEA.

Assessment with mitigation:

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
18	L	L	L	neutral	M	L	0	L	L	0

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
19	L	L	L	neutral	L	L	0	L	L	0

Residual Risk (feeds back into "Mitigations"):

- None.

Receiving Environment: Security

Description of potential impacts:

Management Category	Sub-activity	Environmental Aspect	Impact-Consequence	Change	Impact No.

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Contractor Readiness	Employment of labour	Training	**Impact:** Increases in stock theft and other crimes. **Consequence:** Economic losses due to loss of livestock/game/property.	NA	20
Site Establishment (Layout)	Perimeter/boundary fence	NA	**Impact:** Increased potential for criminal activity, including stock theft, game poaching, property theft, emotional and/or physical harm to victims, etc. **Consequences:** - Loss of farming revenue - Injury or loss of life	NA	20
Site Establishment (Layout)	Construction Camp	Accommodation	**Impact:** Increased potential for criminal activity, including stock theft, game poaching, property theft, emotional and/or physical harm to victims, etc. **Consequences:** - Loss of farming revenue - Injury or loss of life	NA	20

*The source of information used in identifying the impact is either the Leipold Matrix (Matrix), Interested and Affected Parties (I&APs) and/or Specialist studies (Specialist).

Any assumptions, uncertainties & limitations, or gaps in knowledge with predicting the impacts

Impact 20 (Crime and Security)

- Farm safety is a concern in the rural areas of South Africa. Although there is a low incidence of farm attacks in the Karoo, farmers and farm workers are soft targets due to the isolation on farms and distance from emergency services. More people moving around in the area will make it easier for opportunistic criminals to enter the area without being noticed. Stock theft is a problem in the area, and one farmer reported that during the times that Transnet contractors work in the area they lose up to ten sheep a week. Farmers are concerned that the presence of the construction workers in the area will cause an increase in stock theft, due to people becoming aware of where the stock are kept. There is also a possibility that petty theft or opportunistic crimes can take place. The municipality indicated that general crime levels increased during the construction phases of the renewable developments around the town. The municipality reported that once the construction teams left, they perceive that there is an increase in local petty crimes such as housebreaking which they attribute to loss of income amongst some community members. There will be less people in the area during the operational phase and fewer permanent workers onsite.

Assessment without mitigation:

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat.) & S.D. MacGregor (M.Sc., Pr.Sci.Nat.)
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Legend					
Criteria		**Reversibility, Irreplaceability, & Mitigatory Potential**		**Significance (Impact Magnitude & Impact Importance**	
Abbreviation	**Description**	**Abbreviation**	**Description**	**Abbreviation**	**Description**
H	High	L	Low	0	Non-significant
M	Medium	M	Moderate	1	Significant
L	Low	H	High		
-I/R	Negative Impact/Risk				
+I/R	Positive Impact/Risk				

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
20	M	M	L	-I	M	M	1	H	M	1
Reversibility	H	**Irreplaceability**	H	**Mitigatory Potential**	H					

Any aspects which were conditional to the findings of the assessment (to be included as conditions of authorisation):

- None.

References (legal, scientific, social, or other criteria) used for the assessment and mitigations:

- Social Impact Assessment Report prepared by Ilse Aucamp of Equispectives Research & Consulting Services dated August 2022.
- Access Road and Part 2 Amendment Addendum to Social Impact Assessment Report prepared by Equispectives Research & Consulting Services dated January 2023.

Mitigations:

Impact Management Outcome(s):

- A safe local farming community
- A secure construction area

Targets:

- Induction Programme and Code of Conduct
- Reduce risk of criminal activity

Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
20	Contractor Readiness	Increases in stock theft and other crimes.	A safe local farming community	Induction Programme and Code of Conduct	SAE and its contractors must develop an induction programme that includes a Code of Conduct for all workers (including sub-contractors).	Holder, Contractor	Pre-Construction	Compliance to be verified by ECO and IEA.
20	Site Establishment (Layout)	Increased potential for criminal activity, including stock theft, game poaching, property theft, emotional and/or physical harm to victims, etc.	A secure construction area.	Reduce risk of criminal activity	Security during construction will be mitigated by erecting the servitude fence at the onset of construction to prevent any movement out of the development footprint.	Contractor	Pre-Construction	Compliance to be verified by ECO and IEA.
20	Site Establishment (Layout)	Impact: Increased potential for criminal activity, including stock theft, game poaching, property theft, emotional and/or physical	A safe local farming community	Reduce risk of criminal activity	No accommodation shall be provided for contractors, sub-contractors, and their workers on the construction site.	Holder, Contractor	Pre-construction and Continuous	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
		harm to victims, etc.						

Assessment with mitigation:

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
20	L	L	L	-R	L	L	0	L	L	0

Residual Risk (feeds back into "Mitigations"):

- None.

Receiving Environment: Public Services

Description of potential impacts:

Management Category	Sub-activity	Environmental Aspect	Impact-Consequence	Change	Impact No.
Planning	Traffic Management Plan	Traffic	**Impact:** Stakeholders are concerned about the quality of the roads, increases in traffic and traffic safety. **Consequence:** Increase in accidents, longer time periods in transportation of goods.	NA	21
Contractor Readiness	NA	Other approvals	**Impact:** Transport of abnormal roads could be delayed. **Consequence:** Delays in construction	NA	21
Contractor Readiness	Employment of labour	Training	**Impact:** Stakeholders are concerned about the quality of the roads, increases in traffic and traffic safety. **Consequence:** Increase in accidents, longer time periods in transportation of goods.	NA	21

*The source of information used in identifying the impact is either the Leipold Matrix (Matrix), Interested and Affected Parties (I&APs) and/or Specialist studies (Specialist).

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Any assumptions, uncertainties & limitations, or gaps in knowledge with predicting the impacts

Impact 21 (Transport and Traffic)

- The main access is off the N10 between De Aar and Hanover, which enters the site from the west. The provincial unsurfaced road (Burgersville District Road) and the existing farm access road will also be used. Once on the farm, an Eskom servitude road will be used to access the main gate to the operational area and on-site substation. During the dry season the area is very dry and dusty. During the wet season, the roads can become muddy, and vehicles can get stuck easily. The district road is used by a number of farmers in the area to access their properties. It also traverses or is adjacent to some of the neighbouring properties. The construction of an access road of a high quality will be a positive impact. Currently, stakeholders are concerned about the quality of the roads, especially if heavy construction vehicles are used. They are also concerned about the increase in traffic on their fence lines and how more traffic and strangers in the area will impact on their properties. The construction phase will generate significant additional traffic on the roads – just the transport of the workers will mean two trips per day, and then the delivery of construction material and management activities must also be considered. Neighbours are concerned about the generation of dust. Although the proposed site is far from any communities, it is relatively close to some of the farmers, but the biggest concern is the impact that the dust will have on the quality of the grazing. Farmers acknowledge that the dust will be washed of by rain, but it is an arid area with relatively low rainfall in general (Access Road and Part 2 Amendment Addendum to Social Impact Assessment Report prepared by Equispectives Research & Consulting Services dated January 2023).
- Transformers will be transported by abnormal load trucks for which a permit will need to be applied for in terms of Section 81 of the National Road Traffic Act and authorisation needs to be obtained from the relevant road authorities to modify the road reserve to accommodate turning movements at intersections.
- Depending on the type, weight and length of the load an abnormal load permit may be required with a transport management plan indicating the route and possible limitations on travel.

Assessment without mitigation:

Legend					
Criteria		**Reversibility, Irreplaceability, & Mitigatory Potential**		**Significance (Impact Magnitude & Impact Importance**	
Abbreviation	**Description**	**Abbreviation**	**Description**	**Abbreviation**	**Description**
H	High	L	Low	0	Non-significant
M	Medium	M	Moderate	1	Significant
L	Low	H	High		
-I/R	Negative Impact/Risk				

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+I/R	Positive Impact/Risk				

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
21	M	M	L	-I	M	M	1	H	M	1
Reversibility	H	**Irreplaceability**	H	**Mitigatory Potential**	H					

Any aspects which were conditional to the findings of the assessment (to be included as conditions of authorisation):

- None.

References (legal, scientific, social, or other criteria) used for the assessment and mitigations:

- Access Road and Part 2 Amendment Addendum to Social Impact Assessment Report prepared by Equispectives Research & Consulting Services dated January 2023.
- Social Impact Assessment Report prepared by Ilse Aucamp of Equispectives Research & Consulting Services dated August 2022.
- Traffic Impact Assessment for the upgrading & development of an access road from the N10/'Burgerville' district road (2448) turn-off to the Main Transmission Substation (MTS) as well as the construction of a loop-in loop-out from the MTS to the 400 kV Hydraposeidon Tx overhead line (line 1), and other projects on the Sun Central Cluster 1 (300 MW) solar PV footprint between De Aar and Hanover, Northern Cape province (project No.: STUR0375) prepared by Sturgeon Consulting (Pty) Ltd dated February 2023.

Mitigations:

Impact Management Outcome(s):

- Good traffic and road management.
- Safe (unobstructed) delivery of abnormal loads to site.

Targets:

- A Traffic Management Plan.
- Permit(s).

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
21	Planning	Stakeholders are concerned about the quality of the roads, increases in traffic and traffic safety. **Consequence:** Increase in accidents, longer time periods in transportation of goods.	Good traffic and road management.	A Traffic Management Plan	SolarAfrica Energy and/or other responsible authorities (e.g., IPPs, Eskom, Northern Cape Department of Roads and Public Works) must maintain the access road for the life of the project.	Holder and/or other responsible authorities	Continuous	Compliance to be verified by ECO and IEA.
21	Planning	Stakeholders are concerned about the quality of the roads, increases in traffic and traffic safety.	Good traffic and road management.	A Traffic Management Plan	SolarAfrica Energy must have a Traffic Management Plan to address the flow of traffic and road safety. Aspects such as speeding, driving while tired, transport of passengers, driving on un-tarred roads and general road safety must be included in the plan and in the induction of workers.	Holder	Pre-construction	Compliance to be verified by ECO and IEA.
21	Contractor Readiness	Transport of abnormal roads could be delayed.	Safe (unobstructed) delivery of abnormal loads to site.	Permit(s)	The applicable permits to transport the abnormal loads should be obtained.	Holder	Pre-construction	Compliance to be verified by ECO and IEA.

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Assessment with mitigation:

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
21	L	L	L	-R	L	L	0	L	L	0

Residual Risk (feeds back into "Mitigations"):

- None.

Receiving Environment: Visual Aesthetics

Description of potential impacts:

Management Category	Sub-activity	Environmental Aspect	Impact-Consequence	Change	Impact No.
Planning	Stakeholder Engagement	Communication	**Impact:** Decrease in the "sense of place" as it relates to noise, visual and light pollution. **Consequence:** Lower aesthetic values enjoyed by the community.	NA	22
Planning	Stakeholder Engagement	Grievance Mechanism	**Impact:** Decrease in the "sense of place" as it relates to noise, visual and light pollution. **Consequence:** Lower aesthetic values enjoyed by the community.	NA	22
Site Establishment (Layout)	Site Selection	NA	**Impact:** Excessive signage on the District gravel road can be visually obtrusive to local receptors (farmers). **Consequences:** Excessive signage can degrade local landscape resources in this rural landscape. Degraded (ecosystem) cultural services, specifically areas of importance for recreation and aesthetic enjoyment, will negatively impact on human well-being.	NA	22

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Site Establishment (Layout)	Construction Camp	Lighting	**Impact:** Short-term landscape change from the current rural agricultural sense of place to the semi-industrial RE landscape - Loss of site landscape character due to the operation of the PV structures and associated infrastructure - Lights at night have the potential to significantly increase the visual exposure of the proposed project. **Consequences:** - Light spillage into neighbouring properties is intrusive and gives the area an unattractive, trashy look. - Light pollution washes out our view of the stars, degrading ecosystem services, specifically cultural services (e.g., a remote 'sense of place'). - Distracting glare (light that beams directly from a bulb into your eye) hampers the vision of local receptors.	NA	22

*The source of information used in identifying the impact is either the Leipold Matrix (Matrix), Interested and Affected Parties (I&APs) and/or Specialist studies (Specialist).

Any assumptions, uncertainties & limitations, or gaps in knowledge with predicting the impacts

Impact 22 (Visual)

- The spirit of place associated with an area is an important factor in tourism and hunting and the marketing of these activities. Spirit of place refers to the unique, distinctive, and cherished aspects of a place. Aspects that will impact on the sense and spirit of place include an increase in noise and activity levels from construction activities, but this will be a temporary impact during the construction phase. The construction phase will see a total transformation from the current setting and landscape of the proposed site. It is inevitable that the visual impact during the construction phase will be affected by dust, increase in vehicle traffic and other construction activities (Access Road and Part 2 Amendment Addendum to Social Impact Assessment Report prepared by Equispectives Research & Consulting Services dated January 2023).
- It is inevitable that the visual impact during the construction phase will be affected by dust, increase in vehicle traffic and other construction activities. Potential visual impacts caused by construction activities will include the visual changes brought about by clearance of vegetation for the solar arrays, ancillary buildings, and laydown areas; visual disturbance caused by construction of roads, buildings, energy collectors, power lines, increased traffic (and number of large vehicles), worker presence and activity, and dust emissions. Other visual disturbances may include soil stockpiles (from excavation for building foundations and other structures), soil scars, as well as potential for invasive plant species to develop

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on disturbed soils and soil stockpiles, which may contrast with existing vegetation (Access Road and Part 2 Amendment Addendum to Social Impact Assessment Report prepared by Equispectives Research & Consulting Services dated January 2023).

- Moderate Zone of Visual Influence with no tourism activities or tourist view-corridors.
- The area is remote, and few receptors were identified.

Assessment without mitigation:

Legend					
Criteria		**Reversibility, Irreplaceability, & Mitigatory Potential**		**Significance (Impact Magnitude & Impact Importance**	
Abbreviation	**Description**	**Abbreviation**	**Description**	**Abbreviation**	**Description**
H	High	L	Low	0	Non-significant
M	Medium	M	Moderate	1	Significant
L	Low	H	High		
-I/R	Negative Impact/Risk				
+I/R	Positive Impact/Risk				

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
22	M	M	M	-I	M	M	1	M	M	1
Reversibility	H	**Irreplaceability**	H	**Mitigatory Potential**	H					

Any aspects which were conditional to the findings of the assessment (to be included as conditions of authorisation):

- None.

References (legal, scientific, social, or other criteria) used for the assessment and mitigations:

- Access Road and Part 2 Amendment Addendum to Social Impact Assessment Report prepared by Equispectives Research & Consulting Services dated January 2023.

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- The Proposed Sun Central Solar Photovoltaic Facility - Associated Infrastructure, Northern Cape Province, South Africa Visual Impact Assessment (Final V_2) dated 7 February 2023 prepared by Visual Resource Management Africa cc.

Mitigations:

Impact Management Outcome(s):

- Minimize change in sense of place.
- Retain aesthetic values and sense of place.
- Minimise the effects of artificial light on humans (and wildlife).

Targets:

- Residents are notified when applicable.
- Contact person appointed to deal with grievances.
- Road signage is not excessive or visually overwhelming.
- Low light spillage
- No overhead lighting

Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
22	Planning	Decrease in the "sense of place" as it relates to noise, visual and light pollution.	Minimize change in sense of place.	Residents are notified when applicable	Residents near the development site should be notified 24 hours prior to any planned activities that will be visible.	Holder, Contractor	24 hours prior to any planned activities that will be visible.	Compliance to be verified by ECO and IEA.
22	Planning	Decrease in the "sense of place" as it relates to noise, visual and light pollution.	Minimize change in sense of place.	Contact person appointed to deal with grievances.	Develop a grievance mechanism and appoint a contact person that can deal with enquiries from local residents.	Holder, Contractor	Pre-construction	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
22	Site Establishment (Layout)	Excessive signage on the District gravel road can be visually obtrusive to local receptors (farmers).	Retain aesthetic values and sense of place.	Road signage is not excessive or visually overwhelming.	Signage on the main access and local farm roads should be moderated.	Contractor	Pre-constriction and Continuous	Compliance to be verified by ECO and IEA.
22	Site Establishment (Layout)	Short-term landscape change from the current rural agricultural sense of place to the semi-industrial RE landscape - Loss of site landscape character due to the operation of the PV structures and associated infrastructure - Lights at night have the potential to significantly increase the visual exposure of the proposed project.	Minimise the effects of artificial light on humans (and wildlife).	Low light spillage	Implement measures to reduce light spillage (e.g., choose "full-cut-off shielded" fixtures that keep light from going up or sideways, locate the light source closer to the operation, use directed LED technology, and aim fixtures either down or to maximise their impact on the targeted area whilst minimizing their impact elsewhere).	Engineer, Contractor	Pre-constriction and Continuous	Compliance to be verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsible person(s)	Timeframe / Frequency	Monitoring
22	Site Establishment (Layout)	Short-term landscape change from the current rural agricultural sense of place to the semi-industrial RE landscape - Loss of site landscape character due to the operation of the PV structures and associated infrastructure - Lights at night have the potential to significantly increase the visual exposure of the proposed project.	Minimise the effects of artificial light on humans (and wildlife).	No overhead lighting	No overhead lighting to be used for security purposes.	Holder, Contractor	Pre-constriction and Continuous	Compliance to be verified by ECO and IEA.

Assessment with mitigation:

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
22	L	L	L	-I	L	L	0	L	L	0

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Residual Risk (feeds back into "Mitigations"):

- None.

Receiving Environment: Heritage and Culture

Description of potential impacts:

Management Category	Sub-activity	Environmental Aspect	Impact-Consequence	Change	Impact No.
Planning	Heritage Management Plan	NA	**Impact:** Damage to heritage site 36, as well as stone-walled enclosures (kraals) and homesteads at GPS Coordinates S30 51 25.58 E24 14 33.51 (stone-walled enclosure/kraal; S30 51 25.58 E24 14 33.51 (homestead remains) along the public access road route. **Consequence:** Loss/damage of heritage resource.	NA	23
Site Establishment (Layout)	Access Restricted Areas	NA	**Impact:** Disturbance to or destruction of a scatter of low-density stone tools at heritage site 18. Disturbance to or destruction of sites 19, 20 and 21 during construction. Damage to heritage site 36, as well as stone-walled enclosures (kraals) and homesteads at GPS Coordinates S30 51 25.58 E24 14 33.51 (stone-walled enclosure/kraal; S30 51 25.58 E24 14 33.51 (homestead remains) along the public access road route. **Consequence:** Loss/damage of heritage resource.	NA	23

*The source of information used in identifying the impact is either the Leipold Matrix (Matrix), Interested and Affected Parties (I&APs) and/or Specialist studies (Specialist).

Any assumptions, uncertainties & limitations, or gaps in knowledge with predicting the impacts

Impact 23 (Heritage)

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat.) & S.D. MacGregor (M.Sc., Pr.Sci.Nat.)
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- Site 18 (S30.89070 E24.31404) is a scatter of low-density stone tools, as well as some ostrich eggshell fragments. The site was given a Medium Heritage Significance rating, and it was recommended that the site be mitigated before destruction. This site is included under SAHRA Permit for Phase 2 Mitigation (A Heritage Scoping Report Impact Assessment prepared by APelser Archaeological Consulting cc (APAC) dated February 2023). Site 18 (GPS Coordinates of site 18: S30.89070 E24.31404) is located approximately 70 m south of the proposed access road.
- Sites 19 (S30.89076 E24.31306); 20 (S30.89010 E24.31322) & 21 (S30.88885 E24.31347) were given a Medium Significance Rating as these stone-packed enclosures were identified as redoubts associated with the Anglo-Boer War. Cultural material in the form of cartridges, porcelains, glass and metal objects were recorded in association with these sites. It was recommended that they should be recorded in detail before destruction. The sites are on the banks of watercourse and development exclusion zone and a 30 m no-go buffer zone was therefore recommended. These sites are also included under a SAHRA Permit for archaeological mitigation (A Heritage Scoping Report Impact Assessment prepared by APelser Archaeological Consulting cc (APAC) dated February 2023).
- Site 36 (S30.85412 E24.27465) was given a Medium Heritage Significance Rating for 3 shallow "excavations", circular in shape, into the bedrock. These features were identified as possible dried-up dams or water reservoirs at the time. The site. No further mitigation measures were recommended in the 2017 report (A Heritage Scoping Report Impact Assessment prepared by APelser Archaeological Consulting cc (APAC) dated February 2023).
- Stone Age material, similar to those found on other sites during previous assessments, also occur within the area around the new section of the proposed access road route. It is envisaged that more of these scatters of material (individual and denser concentrations of tools) will be present in the area as well. These finds and sites will be given a Low to Medium Heritage Significance rating. As many similar sites in the area are already forming the focus of detailed archaeological mitigation work, no further mitigation is required (A Heritage Scoping Report Impact Assessment prepared by APelser Archaeological Consulting cc (APAC) dated February 2023).
- Site 1 (S30 51 32.10 E24 18 43.00) was given a Medium to High Heritage Significance Rating as there are several rocks containing possible engravings in the form of various striations and lines, which could be related to proto-historic pastoralists that moved through the area. Stone Age material (tools/flakes) was also identified in the general proximity of the site. Should the site be negatively impacted by the proposed development activities it was recommended that Phase 2 Archaeological mitigation work be undertaken. This will entail the detailed mapping, photographic recording and drawing of the site and the individual engravings (through detailed rubbings) to ensure the capturing of the information contained on the site before destruction.
- Site 1 (GPS Coordinates of site 1: S30 51 32.10 E24 18 43.00) is located approximately 230 m north of the proposed pipeline route.
- The remains of recent historical farming-related settlement are close to and around the district access road, including stone-walled enclosure/kraal (S30 51 25.58 E24 14 33.51) and homestead remains (S30 51 25.58 E24 14 33.51). Cultural material associated with these remains were found that included fragments of decorated ceramics dating the sites to between the late 19th and early 20th centuries. These sites are given a Medium to High Heritage Significance Rating and should they be impacted directly be the development activities should be

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mitigated through archaeological measures that will include detailed mapping and drawing, as well as limited excavations. If they can be avoided, then these sites should be included in the Cultural Heritage Management Plan for the Solar PV development.

Assessment without mitigation:

Legend					
Criteria		**Reversibility, Irreplaceability, & Mitigatory Potential**		**Significance (Impact Magnitude & Impact Importance**	
Abbreviation	**Description**	**Abbreviation**	**Description**	**Abbreviation**	**Description**
H	High	L	Low	0	Non-significant
M	Medium	M	Moderate	1	Significant
L	Low	H	High		
-I/R	Negative Impact/Risk				
+I/R	Positive Impact/Risk				

Alternative Site No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
23	L	L	L	neutral	L	L	0	M	H	1
Reversibility	L	**Irreplaceability**	L	**Mitigatory Potential**	H					

Any aspects which were conditional to the findings of the assessment (to be included as conditions of authorisation):

- None.

References (legal, scientific, social, or other criteria) used for the assessment and mitigations:

- A Heritage Scoping Report Impact Assessment related to the Development of the Sun Central Cluster 1, 300 MW, Solar PV Facility additional activities on various Farm Portions between De Aar & Hanover, Emthanjeni Local Municipality, Pixley Ka Seme District Municipality, Northern Cape Province, South Africa (Report: APAC023/12) prepared by APelser Archaeological Consulting cc (APAC) dated February 2023.

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- Palaeontological Heritage Comment, Access Road Basic Assessment and Transmission Line Part 2 Amendment for the Sun Central Cluster 1 between De Aar & Hanover, Pixley Ka Seme District Municipality, Northern Cape Province, prepared by John E. Almond (PhD) of Natura Viva cc, and dated January 2023.
- National Heritage Resources Act, 1999 (Act No. 25 of 1999)
    - *Structures*
        - No person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the HRA (Section 34(1) of NHRA).
    - *Archaeological Sites and Remains*
        - In terms of Section 35(3) of the NHRA, any person who discovers archaeological or palaeontological objects or material or a meteorite during development or an agricultural activity must **immediately report the find** to the HRA.
        - In terms of Section 35(4) of the NHRA, **no person may without a permit** issued by the HRA destroy, damage, excavate, alter, deface, or otherwise disturb any archaeological or palaeontological site or any meteorite, or remove from its original position any archaeological, or palaeontological material or object or any meteorite.
    - *Graves*
        - In terms of Section 36(6) any person who during development discovers the location of a grave **must immediately cease such activity and report the discovery** to the HRA. The HRA must then, in co-operation with the SAPS, carry out an investigation.
        - In terms of Section 36(3) of the NHRA, **no person may, without a permit** issued by HRA, destroy, damage, alter, exhume, or remove from its original position or otherwise disturb the grave of a victim of conflict, any burial ground or part thereof which contains such graves, or any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority (Section 36(3) of NHRA).

Mitigations:

Impact Management Outcome(s):

- Preservation of cultural heritage resources

Targets:

- Cultural Management Plan
- 19 m-wide servitude
- No-go areas

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- 5 m-wide working corridors for pipelines

Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
23	Planning	Damage to heritage site 36, as well as stone-walled enclosures (kraals) and homesteads at GPS Coordinates S30 51 25.58 E24 14 33.51 (stone-walled enclosure/kraal; S30 51 25.58 E24 14 33.51 (homestead remains) along the public access road route.	Preservation of cultural heritage resources.	Cultural Management Plan	The stone-walled enclosure/kraal (S30 51 25.58 E24 14 33.51) and homestead remains (S30 51 25.58 E24 14 33.51) should be included in the Cultural Heritage Management Plan for the Sun Central Cluster 1 Solar PV Facility.	Holder	Pre-construction	Compliance to be monitored by the SEO and verified by ECO and IEA.
23	Site Establishment (Layout)	Disturbance to or destruction of a scatter of low-density stone tools at heritage site 18. Disturbance to or destruction of sites 19, 20 and 21 during construction. Damage to heritage site	Preservation of heritage resources.	19 m-wide servitude	Construction activities on the access road to the MTS shall be restricted to the 19 m-wide servitude	Contractor	Pre-construction and Continuous	Compliance to be monitored by the SEO and verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
		36, as well as stone-walled enclosures (kraals) and homesteads at GPS Coordinates S30 51 25.58 E24 14 33.51 (stone-walled enclosure/kraal; S30 51 25.58 E24 14 33.51 (homestead remains) along the public access road route.						

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
23	Site Establishment (Layout)	Disturbance to or destruction of a scatter of low-density stone tools at heritage site 18. Disturbance to or destruction of sites 19, 20 and 21 during construction. Damage to heritage site 36, as well as stone-walled enclosures (kraals) and homesteads at GPS Coordinates S30 51 25.58 E24 14 33.51 (stone-walled enclosure/kraal; S30 51 25.58 E24 14 33.51 (homestead remains) along the public access road route.	Preservation of heritage resources.	No-go areas	Those heritage sites alongside the district road, including Site 36 (S30.85412 E24.27465), the stone-walled enclosure/kraal (S30 51 25.58 E24 14 33.51) and homestead remains (S30 51 25.58 E24 14 33.51), heritage site 18 (S30.89070 E24.31404), located approximately 70 m south of the proposed access road, as well as sites 19 (S30.89076 E24.31306), 20 (S30.89010 E24.31322) & 21 (S30.88885 E24.31347) and their 30 m buffers are no-go areas for the purposes of this project.	Contractor, SEO	Pre-construction and Continuous	Compliance to be monitored by the SEO and verified by ECO and IEA.
23	Site Establishment (Layout)	Disturbance to or destruction of a scatter of low-density stone tools at	Preservation of heritage resources.	5 m-wide working corridors for pipelines	Construction activities on the water pipeline between borehole No. 13	Contractor	Pre-construction and Continuous	Compliance to be monitored by the SEO and verified by

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
		heritage site 18. Disturbance to or destruction of sites 19, 20 and 21 during construction. Damage to heritage site 36, as well as stone-walled enclosures (kraals) and homesteads at GPS Coordinates S30 51 25.58 E24 14 33.51 (stone-walled enclosure/kraal; S30 51 25.58 E24 14 33.51 (homestead remains) along the public access road route.			(and/or 14) and the OH water storage tank on the solar field (Cluster 1) footprint shall be restricted to a 5 m-wide working corridor.			ECO and IEA.
23	Site Establishment (Layout)	Disturbance to or destruction of a scatter of low-density stone tools at heritage site 18. Disturbance to or destruction of sites 19, 20	Preservation of heritage resources.	No go area	Heritage site 1 (GPS Coordinates of site 1: S30 51 32.10 E24 18 43.00), located approximately 230 m north of the proposed pipeline route, is a no-go area for the	Contractor, SEO	Pre-construction and Continuous	Compliance to be monitored by the SEO and verified by ECO and IEA.

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Impact No.	Mgt Category	Identified Impacts and Risks	Impact Management Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
		and 21 during construction. Damage to heritage site 36, as well as stone-walled enclosures (kraals) and homesteads at GPS Coordinates S30 51 25.58 E24 14 33.51 (stone-walled enclosure/kraal; S30 51 25.58 E24 14 33.51 (homestead remains) along the public access road route.			purposes of this project.			

Assessment with mitigation:

Alternative Route No. 1 (preferred)

Impact	Intensity	Spatial	Duration	Status	Nature	Prob.	MAGNITUDE	Accept.	Prob.	IMPORTANCE
23	L	L	L	neutral	L	L	0	L	H	0

Residual Risk (feeds back into "Mitigations"):

- Previous archaeological and heritage assessments for Cluster 1 (preferred Alternative Route No. 1) recorded a fairly large number of cultural heritage (archaeological & historical) resources of varying extent and significance in the area. These include scatters of open-air surface Stone

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Age sites, rock engravings, later agro-pastoralist stone-walled sites, as well as historical Anglo-Boer War (18990-1902) sites. These findings are clear evidence of the intrinsic heritage value of the area (A Heritage Scoping Report Impact Assessment prepared by APelser Archaeological Consulting cc (APAC) dated February 2023).

- The potential for rare, largely unpredictable fossil sites of High Palaeosensitivity within the Permian bedrocks or associated with older alluvial and pan deposits hidden in the subsurface cannot be entirely discounted. Consequently, **a Chance Fossil Finds Protocol shall be included within the EMPr** in case any fossiliferous deposits are exposed by surface clearance or excavations during the construction phase of the development (Palaeontological Heritage Comment prepared by John E. Almond (PhD) of Natura Viva cc and dated January 2023).

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