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Impact Assessments - Environmental Management Programs - Compliance Monitoring - Process Review

PROPOSED PAARDE VALLEY PV2 SWITCHING STATION, 132 KV OVERHEAD POWERLINE TO VETLAAGTE MAIN TRANSMISSION SUBSTATION (MTS), AND ASSOCIATED INFRASTRUCTURE, NEAR DE AAR, NORTHERN CAPE PROVINCE

(DFFE Ref No: TBC)

DRAFT BASIC ASSESSMENT REPORT

July 2022

Applicant:
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PROJECT DETAILS

DFFE Ref No: TBC

TITLE: Proposed Paarde Valley PV2 Switching Station, 132 kV Overhead Powerline to Vetlaagte Main Transmission Substation (MTS), and associated infrastructure, near De Aar, Northern Cape Province

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APPLICANT: Paarde Valley PV2 (Pty) Ltd

REPORT STATUS: Draft Basic Assessment Report

SUBMISSION DATE: July 2022

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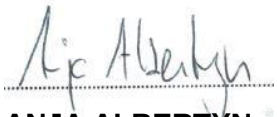

ANJA ALBERTYN

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EXECUTIVE SUMMARY

Background

Environmental Authorisation (EA) for the 75 - 150 MW Paarde Valley PV2 photovoltaic (PV) Solar Energy Facility near De Aar in the Northern Cape Province was granted to Paarde Valley PV2 (Pty) Ltd by the Department of Environmental Affairs (DEA) (now known as the Department of Forestry, Fisheries and the Environment (DFFE)) in 2012, in terms of the National Environmental Management ("NEMA") (Act No. 107 of 1998) Environmental Impact Assessment ("EIA") Regulations (2010).

The currently authorised 132 kV / 220 kV grid connection for the Paarde Valley PV2 Solar Energy Facility is routed from the Paarde Valley PV2 Solar Energy Facility to the De Aar substation. However, Eskom currently has grid capacity constraints in the Northern Cape, at certain lines and on certain substations, and currently does not have capacity for the authorised Paarde Valley PV2 Solar Energy Facility to connect at the De Aar substation. Accordingly, Paarde Valley PV2 (Pty) Ltd wishes to amend the authorised electrical grid connection (i.e. including re-alignment and termination point) and to create a separate Environmental Authorisation (EA) for ESKOM's self-build components (i.e. the switching station, 132 kV overhead powerline and associated infrastructure).

In light of the above, Paarde Valley PV2 (Pty) Ltd (hereafter referred to as the "Applicant") proposes the construction of a 132 kV, double circuit, overhead powerline (OHPL) grid connection from the authorised on-site substation and switching station at the Paarde Valley PV2 Solar Energy Facility to the Vetlaagte Main Transmission Station (MTS) (which is currently undergoing its own EA application process). The proposed OHPL would be approximately 12.7 km in length, and is located entirely within an Electricity Grid Infrastructure (EGI) Strategic Transmission Corridor, i.e. in the Central Corridor[1], connecting the authorised Paarde Valley PV2 Solar Energy Facility to the Vetlaagte Main Transmission Substation (MTS).

The infrastructure associated with the proposed electrical Grid Connection works for the Paarde Valley PV2 Solar Energy Facility (and to be handed to Eskom following construction), includes the following:

- A 132 kV, double circuit Overhead Power Line (OHPL) from the Switching Station connecting to the proposed Vetlaagte Main Transmission Substation (MTS). (Note: A 200 m corridor has been assessed and is being applied for).
- 132 kV Feeder bay at the Vetlaagte MTS
- On-site Switching Station (SwS), including access road, adjacent to the authorised IPP 132 kV substation.

The OHPL and Switching station are required to connect the authorised Paarde Valley PV2 Solar Energy Facility to the Eskom National Grid.

In terms of the NEMA (Act No. 107 of 1998), Environmental Impact Assessment (EIA) Regulations (2014), as amended, the proposed project triggers listed activities that require Environmental Authorisation from the competent environmental authority, namely Department of Forestry, Fisheries and the Environment (DFFE). The DFFE's decision regarding

[1]as per Government Notice (GN.) 113 of Government Gazette No. 41445 published 16 February 2018, in terms of the NEMA (Act No. 107 of 1998).

environmental authorisation will be based on the outcome of the Basic Assessment process for the proposed project, required in terms of the NEMA EIA Regulations (2014), as amended.

Project Location

The proposed development would be located on the periphery of the town of De Aar, in the Emthanjeni Local Municipality, within the Pixley Ka Seme District Municipality in the Northern Cape Province. The proposed switching station would be located approximately 3 km north of the town centre of De Aar, on the site of the authorised Paarde Valley PV2 Solar Energy Facility. The proposed switching station is currently authorised as a component of the Paarde Valley PV2 Solar Energy Facility's on-site substation (*Construction of 75-150MW PV2 Photovoltaic Solar Energy Facility and Associated Infrastructure*, EA reference number:*12/12/20/2500*) but is proposed to be removed from this EA to form part of the infrastructure to be handed over to Eskom. The proposed overhead powerline would run from the proposed switching station, north-east, east and south-east of the town periphery to the proposed Vetlaagte MTS Substation which is located approximately 8.5 km south-east of the centre of De Aar. A 132 kV feeder bay is proposed to be located at the Vetlaagte MTS.

The proposed project would be located on the following affected properties / farm portions:

Project Component	Farm Name/s	SG Code
Switching Station and Access Road	RE/2/145 Paarde Valley	C05700000000014500002
132 kV Feeder bay	RE/4 Vetlaagte	C05700030000026800000
Gridline to Vetlaagte MTS Substation	RE/2/145 Paarde Valley	C05700000000014500002
	6/145 Paarde Valley	C05700000000014500006
	29/145 Paarde Valley	C05700000000014500029
	30/145 Paarde Valley	C05700000000014500030
	31/145 Paarde Valley	C05700000000014500031
	43/145 Paarde Valley	C05700000000014500043
	RE/179 Du Plessis Dam	C05700000000017900000
	RE/4 Vetlaagte	C03000000000000400000
	Erf 266	C05700030000026600000
	Erf 268	C05700030000026800000
	Erf 5113	C05700030000511300000
	Erf 5114	C05700030000511400000
	Erf 5115	C05700030000511500000
	Erf 5122	C05700000000512200000
	Erf 5121	C05700030000512100000
	Erf 5123	C05700030000512300000
	Erf 5127	C05700030000512700000
	Erf 5315	C05700030000531500000
	Erf 5316	C05700030000531600000

The proposed project is located entirely within an Electricity Grid Infrastructure Strategic Transmission Corridor, i.e. in the Central Corridor[2].

[2]as per Government Notice (GN.) 113 of Government Gazette No. 41445 published 16 February 2018, in terms of the NEMA (Act No. 107 of 1998).

Project Description

The proposed project would include the construction of a 132 kV, double circuit, overhead powerline (OHPL) grid connection from the switching station component of the authorised Paarde Valley PV2 Solar Energy Facility on-site substation to the proposed Vetlaagte Main Transmission Station (MTS)(which is undergoing its own EA process. The OHPL is proposed to be approximately 12.7 km in length and would be located in the Strategic Transmission Central Corridor[3]. The final OHPL servitude will be registered as 31 m in width but during the design development process a corridor of 200 meters has been assessed to allow for minor tower position adjustments. The exact pylon locations will be determined by the outcome of the specialist's investigations, and engineering considerations during detailed design. On average there will be 4 - 5 towers per km, so that the route will consist of approximately 40 towers. The teams constructing the OHPL often use cranes and these will fit into an area with a maximum radius of approximately 30 m around the base of each tower, with the final footprint being relatively small. The line will have a capacity of 132 kV and will make use of either steel monopole or steel lattice structure in line with Eskom required specifications.

The project would also include the switching station component of the authorised Paarde Valley PV2 Solar Energy Facility on-site substation, with an approximate footprint area of 100 m x 100 m, and a feeder bay at the Vetlaagte MTS with a capacity of 132 kV, as this needs to be handed over to Eskom with the grid connection self-build works once constructed.

In summary, the infrastructure associated with the proposed development (and to be handed over to Eskom following construction), includes the following:

- A 132 kV, double circuit Overhead Power Line (OHPL) with a length of approximately 12.7 km from the Paarde Valley PV2 Solar Energy Facility Switching Station to the proposed Vetlaagte Main Transmission Substation (MTS);
- A 132 kV feeder bay at the Vetlaagte MTS to connect to the Vetlaagte MTS; and
- An on-site Switching Station (SwS), adjacent to the authorised Paarde Valley PV2 Solar Energy Facility 132 kV on-site substation (approximately 100 m x 100 m combined).

The technical details include:

<u>Overhead Powerline:</u>

- Height of pylons: Up to 32 m
- Type of poles/ pylons to be used: Double Circuit configuration. The alternatives under consideration and assessed are steel lattice or monopole structures in line with Eskom required specifications.
- Transmission line capacity 132kV
- Length of OHPL approximately 12.7 km
- OHPL Service Road (to lie within the OHPL servitude)
    - Length of OHPL service road(s): Twin-tracked service road following line route with a length of approximately 12.7 km, and
    - Width of OHPL service road(s): 6 m

[3]No. 113 of Government Gazette No. 41445 published 16 February 2018

Switching Station:

- Footprint of approximately 50 m – 100 m x 100 m adjacent to the Paarde Valley PV2 Substation, within the authorised substation footprint;
- Area occupied by buildings (Control building, relay room, generator, storage warehouse, water tanks, ablutions): +-1.0 Hectares
- Switching Station Access Road (separate access servitude from the nearest public road to the Switching Station yard)
    - Compacted gravel
    - Length of access road: +- 2.34 km
    - Width of access road: 8 m
- Security fencing height: 2.4 m
    - Type of fencing: Eskom palisade fencing + chainlink fencing for temporary works
- Capacity of on-site switching station 132 kV

The OHPL and Switching station are required to connect the Paarde Valley PV2 Solar Energy Facility to the Eskom National Grid. The route selected follows boundary lines and / or existing OHPL routes so as to limit disruption to current farming activities as much as possible.

Note: The proposed Vetlaagte MTS, as well as the proposed Wag n Bietjie MTS, are both currently undergoing a separate EA process. While this application is for the Paarde Valley PV2 project to connect to the Vetlaagte MTS, there is a possibility that it may need to connect to the Wag n Bietjie MTS. If that is the case, the applicant will utilise this EA to construct up until the location of the Vetlaagte MTS, and then utilise a separate and additional EA for construction of the remaining portion of the line to the Wag n Bietjie MTS.

Legislative Context

The EIA Regulations[4] (2014), as amended, promulgated in terms of the National Environmental Management Act (NEMA) (Act No. 107 of 1998), as amended, identify certain activities that require environmental authorisation from the competent environmental authority, in this case the Department of Forestry, Fisheries and the Environment (DFFE), before commencing. Activities listed in Government Notice (GN) No. 984, as amended, require Scoping and Environmental Impact Reporting (S&EIR) whilst those in GN No. 983 and 985, as amended, require Basic Assessment (unless they are being assessed as part of a S&EIR process). The EIA listed activities that are being applied for in this BA process are as follows:

- GN R.983, as amended (Listing Notice 1): Activities 11, 12, 19, 24, 27, 28, 48 and 56
- GN R. 985, as amended (Listing Notice 3): Activities 4, 10, 12,14,18 and 23

In terms of Section 38(1) of the National Heritage Resources Act (NHRA) (Act No. 25 of 1999), any person who intends to undertake "*any development … which will change the character of a site exceeding 5 000 m^2 in extent*", or *"the construction of a road,….pipeline, or other similar form of linear development or barrier exceeding 300m in length"* must at the very earliest stages of initiating the development notify the responsible heritage resources authority, *viz.* the South African Heritage Resources Agency ("SAHRA") or the relevant provincial heritage agency, *viz* Northern Cape Heritage Resources Authority ("NCHRA").

[4] Government Notice No. R 983, R 984 and R 985 in Government Gazette No. 38282 of 4 December 2014, as amended in GN 324, GN 325, GN 326 and GN 327 of 7 April 2017, on 13 July 2018 (GN 706), 29 May 2020 (GN 599) and 11 June 2021 (GN 517).

Section 21 of the National Water Act (NWA) (Act No. 36 of 1998) specifies a number of "water uses", including the abstraction of water from a water resource; the storing of water; impeding or diverting the flow of water in a watercourse; as well as altering the bed, banks, course or characteristics of a watercourse. Defined water use activities require the approval of the Department of Water and Sanitation (DWS) in the form of a General Authorisation (GA) or a Water Use Licence (WUL).

The GAs for Section 21 (c) and (i) water uses (impeding or diverting flow or changing the bed, banks or characteristics of a watercourse) as defined under the NWA were revised in 2016 (Government Notice R509 of 2016). Determining if a water use licence is required for these water uses is now associated with the risk of degrading the ecological status of a watercourse. A low risk of impact could be authorised in terms of a GA. The aquatic specialist has recommended that the proposed development falls within the ambit of the GA for Section 21(c) and (i) water use activities.

The ecological specialist for the proposed project confirmed that the vegetation type occurring of the site is Northern Upper Karoo, and that the conservation status of Northern Upeer Karoo is "Least Concern" (Hoare 2022). The vegetation type is not listed in The National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004) (Hoare, 2022).

The eastern section of the proposed development site (including the proposed access road) is located within 5 km of a Protected Area, i.e. a municipal nature reserve known as the De Aar Nature Reserve. Protected Areas should be maintained in a natural or near natural state with no loss or degradation of natural habitat (CapeNature, October 2020). The access road to the proposed switching station would be approximately 120 m from the edge of the De Aar Nature Reserve, at its closest. The proposed switching station would be approximately 750 m from the edge of the Nature Reserve and Vetlaagte MTS would be approximately 9.7 km from the Nature Reserve. The Emthanjeni Local Municipality and the DFFE: Protected Areas Directorate will be invited to comment on the proposed project as part of the Public Participation Process.

According to the National Web-based Screening Tool Report for the proposed project (dated 13 June 2022), the following protocols for the assessment of environmental impacts apply to the Basic Assessment Reporting process for the proposed project:

- Protocol for the Specialist Assessment and Minimum Report Content Requirements for the Environmental Impacts on Agricultural Resources (Government Notice No. 320 Published on 20 March 2020);
- Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity (Government Notice No. 320 Published on 20 March 2020);
- Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity (Government Notice No. 320 Published on 20 March 2020);
- Protocol for the Specialist Assessment and Minimum Report for Environmental Impacts on Terrestrial Plant Species (Government Notice No. 1150 Published on 30 October 2020);
- Protocol for the Specialist Assessment and Minimum Report for Environmental Impacts on Terrestrial Animal Species (Government Notice No. 1150 Published on 30 October 2020).

- General requirements for undertaking an initial site sensitivity verification where no specific assessment protocol has been identified (GN No. 648 Published on 10 May 2019), for Landscape/ Visual Impact Assessment; Archaeological and Cultural Heritage Impact Assessment; Palaeontology Impact Assessment; Geotechnical Assessment

A Site Sensitivity Verification Report was compiled which verified that of the twelve (12) specialist studies identified in the National web-based Screening Tool, nine full specialist assessments namely: Agriculture, Landscape / Visual, Archaeological and Cultural Heritage, Palaeontology, Terrestrial Biodiversity, Aquatic Biodiversity, Avian Impact Assessments are required. Compliance statements are required for the Animal Species theme (excluding the taxon Aves), the Plant Species theme, the Civil Aviation Theme and a specialist study was conducted for the RFI theme.

Assessment of Potential Environmental Impacts

The following impacts were assessed for the construction phase of the proposed development, with the impact significance ranging from medium positive to medium negative.

Construction Phase		
Potential Impact	**Impact Significance without mitigation**	**Impact Significance with mitigation**
Visual impacts	Low (-)	Low (-)
Impacts to archaeological resources	Very low (-)	Very low (-)
Impacts on graves	Very low (-)	Very low (-)
Impacts on cultural landscape	Very low (-)	Very low (-)
Damage or destruction of fossils on or below the surface	Very low (-)	Negligible (+)
Loss of natural habitat (powerline)	Low (-)	Low (-)
Loss of individuals of listed and protected plant species (gridline)	Very low (-)	Very low (-)
Loss of natural habitat (switching station)	Medium (-)	Medium (-)
Loss of individuals of protected trees, protected plants or other listed species (switching station)	Very low (-)	Negligible
Degradation of the ecological condition of aquatic ecosystems and water quality impacts	Negligible (-)	Negligible (-)
Displacement due to disturbance (gridline and switching station)	Low (-)	Very low (-)
Displacement due to habitat transformation (switching station)	Low (-)	Very low (-)
Displacement due to habitat transformation (gridline)	Very low (-)	Negligible (-)
Impact on traffic and transportation	Low (-)	Very low (-)
Impact on ambient noise levels in the area	Low (-)	Very low (-)
Impact on windblown dust	Low (-)	Very low (-)
Litter / Waste pollution	Very low (-)	Very low (-)
Job creation	Medium (+)	Medium (+)
Impacts on HIV and gender related concerns	Low (-)	Low (-)

The below impacts were assessed for the construction phase of the proposed development. All operational phase negative impacts can be mitigated to a medium, low, very low and negligible significance. One potentially high negative impact (mortality of avian priority species

due to collisions with the OHPL) could occur without mitigation, however, would be reduced to medium negative significance with the recommended mitigation.

Operational Phase		
Potential Impact	**Impact Significance without mitigation**	**Impact Significance with mitigation**
Visual impacts (OHPL)	Medium (-)	Medium (-)
Visual impacts (switching station)	Medium (-)	Medium (-)
Impacts on cultural landscape	Low (-)	Low (-)
Invasion by alien invasive plant species	Low (-)	Very low (-)
Degradation of the ecological condition of aquatic ecosystems, modification of surface water runoff, erosion and alien vegetation invasion in aquatic features	Negligible (-)	Negligible (-)
Mortality of priority species due to collisions with the OHPL powerline using either technology alternative (i.e. steel lattice or standard steel monopole tower structures)	High (-)	Medium (-)
Electrocutions on the proposed switching station infrastructure"	Low (-)	Very low (-)
Electrocutions on the proposed 132 kV powerline infrastructure using either technology alternative (i.e. steel lattice or standard steel monopole tower structures)	Medium (-)	Negligible (-)

Cumulative impacts have been rated as of very low to medium negative significance. This is due to the large number of existing and proposed developments in the area.

Cumulative Impact Significance Summary Table

Impact	**Cumulative impact without mitigation**	**Cumulative Impact with mitigation**
Construction Phase		
Visual impacts	Medium (-)	Medium (-)
Impacts to archaeological resources	Low (-)	Low (-)
Impacts on graves	Low (-)	Low (-)
Impacts on cultural landscape	Low (-)	Low (-)
Damage or destruction of fossils on or below the surface	Low (-)	Low (-)
Loss of natural habitat (gridline)	Medium (-)	Medium (-)
Loss of individuals of listed and protected plant species (gridline)	Medium (-)	Medium (-)
Loss of natural habitat (switching station)	Medium (-)	Medium (-)
Loss of individuals of protected trees, protected plants or other listed species (switching station)	Medium (-)	Medium (-)
Degradation of the ecological condition of aquatic ecosystems and water quality impacts	Medium (-)	Low (-)
Displacement due to disturbance (gridline and switching station)	Medium (-)	Low (-)
Displacement due to habitat transformation (switching station)	Medium (-)	Medium (-)
Displacement due to habitat transformation (gridline)	Medium (-)	Medium (-)
Operational Phase		
Visual impacts (grid line)	Medium (-)	Medium (-)

Visual impacts (switching station)	Medium (-)	Medium (-)
Impacts on cultural landscape	Low (-)	Low (-)
Invasion by alien invasive plant species as a result of disturbance (gridline)	Medium (-)	Medium (-)
Invasion by alien invasive plant species as a result of disturbance (switching station)	Medium (-)	Medium (-)
Degradation of the ecological condition of aquatic ecosystems; modification of surface water runoff; erosion; and alien vegetation invasion in aquatic features	Medium (-)	Low (-)
Collisions with the proposed gridline	High (-)	Medium (-)
Electrocutions at the proposed switching station	Low (-)	Low (-)
Electrocutions on the proposed gridline	High (-)	Low (-)

Public Participation

A public participation process (PPP), in accordance with Chapter 6 of the EIA Regulations (2014), as amended, has been undertaken to ensure that potential and registered I&APs have been given an opportunity to comment on the proposed project.

The Public Participation Process includes, amongst others, the following:

- Advertisements in English and Afrikaans, placed in the local newspaper, *The Echo* (De Aar) newspaper, as well as in the regional *NoordkaapBulletin* newspaper.
- Site Notices in English and Afrikaans, placed at visible locations within the proposed project site and/or at the boundary of the site, where the public have access.
- Notification posters (in English and Afrikaans) placed in the town of De Aar at venues such as the local municipal offices, the public library, the police station and the local supermarket.
- Written notifications (sent via email, post and/or sms) to registered I&APs notifying them of the EA Application and the availability of the associated Draft Basic Assessment Report for review and comment.
- All potential and registered I&AP's (including relevant Organs of State and State Departments) will be given an opportunity to review and comment on the Draft Basic Assessment Report for a 30 day comment period i.e. from 15 July 2022 – 15 August 2022.
- Copies of the Draft Basic Assessment Report will be available as follows during the 30 day I&AP comment period:
    - A hard copy of the Draft Basic Assessment Report will be lodged at the Hennie Liebenberg Public Library in De Aar for the 30 day I&AP comment period.
    - An electronic copy of the Draft Basic Assessment Report will be made available for download on the Holland & Associates Environmental Consultants website (www.hollandandassociates.net). Furthermore, a copy of the Executive Summary for the Basic Assessment Report will be made available for download as a separate document on the Holland & Associates website, in order to accommodate I&APs who may not want to download the full report.
    - Upon request, the report will be made available to I&APs via electronic file transfer or Dropbox link. (The Dropbox link will be provided in the cover

email for notifications sent to I&APs via email). Electronic copies of the report on CD or USB will be available on request.
    - An outline of the proposed project can be provided verbally (telephonically) to I&APs who are illiterate and/or those with disabilities and/or any other disadvantage, if necessary. Such I&APs may provide their comments via telephone and/or sms (if preferred), and such comments will be included in the Comments and Responses Report.
- Any additional I&APs who register during the Draft Basic Assessment process will be added to the registered I&AP database.
- All comments submitted by I&APs during the 30 day I&AP comment period will be collated and responded to in a Comments and Response Report (CRR), which will be submitted to the DFFE, together with the Final Basic Assessment Report, for decision-making.
- Registered I&APs will be notified, in writing, of DFFE's decision.

Conclusions and Recommendations

A number of alternatives were considered during the design process for the proposed development, and the Preferred Alternative was selected as the best practicable environmental option that minimises impacts as far as possible. A corridor has been assessed for the linear activities, to allow for the avoidance of sensitive ecological features, such as aquatic buffers, and for detailed engineering considerations.

Two generic Environmental Management Programmes (EMPrs) have been compiled for the proposed project, i.e. one for the overhead powerline (OHPL) component and the other for the switching substation component. These EMPrs also contain site specific impact management outcomes and the measures required to achieve these outcomes. These include the potential impacts on avifauna, ecology, freshwater, heritage, palaeontology, RFI and visual components.

In terms of the findings of the Basic Assessment (BA), the proposed development would result in no unacceptable biophysical and/or socio-economic impacts, provided that the mitigation measures as included in this BA Report are implemented. No impacts of High Negative significance would occur as a result of the implementation of the proposed activities during either the construction or operational phases. While some cumulative impacts are of medium negative significance, the contribution of the proposed development to the cumulative impacts is insignificant. The proposed development is necessary for the realisation of the authorised Paarde Valley PV2 Solar Energy Facility. The socio-economic benefits of the project therefore extend beyond the immediate impacts of the proposed development, and are considered to outweigh the residual negative impacts.

All specialists have recommended that the environmental authorisation can be granted, on the condition that the recommended mitigation measures included in the EMPr for the project are implemented.

In terms of the findings of the environmental assessment and specialist studies, there are no assessed potential negative environmental impacts associated with the proposed project that are of sufficient significance to justify the implementation of the "No-Go" Alternative.

In conclusion, it is the considered opinion of the EAP that the proposed project and listed activities should be authorised, given that the proposed project would result in no unacceptable biophysical and/or socio-economic impacts, provided that the mitigation measures as included in this BA Report are implemented.

In terms of the design alternatives for the poles/ pylons of the proposed overhead powerline (i.e. monopole or steel lattice), whilst monopole was preferred from a visual impact perspective, both design options are considered to be acceptable from an environmental perspective by the EAP and all of the specialists. The Applicant therefore wishes to be able to implement either design option both of which have been assessed as the worst case considered in the assessments (i.e. the Applicant would like to have free choice between the aforementioned design options, and the decision on which design to implement would happen at detailed design phase and in consultation with ESKOM).

Way Forward

The Draft Basic Assessment Report will be made available to I&APs for a 30 day comment period, i.e. from 15 July 2022 – 15 August 2022. Copies of the report will be available as follows during the 30 day I&AP comment period:

- A hard copy of the Draft Basic Assessment Report will be available for viewing at the Hennie Liebenberg Public Library in the town of De Aar.
- An electronic copy will be available for download on the Holland & Associates Environmental Consultants website (www.hollandandassociates.net). (Note: A copy of the Executive Summary for the Basic Assessment Report will be made available for download as a separate document on the Holland & Associates website, in order to accommodate I&APs who may not want to download the full report).
- Upon request, the report will be made available to I&APs via electronic file transfer or Dropbox link. A Dropbox link will also be provided in the cover email for notifications sent to I&APs via email. Electronic copies of the report on CD or USB will be available on request, if required.

I&APs are invited to review and comment on the abovementioned document during the 30-day comment period i.e. 15 July 2022 – 15 August 2022. Should you have any comments, issues or concerns regarding the proposed project, please submit your comments in writing via post, e-mail or fax to Ms Tilly Watermeyer of Holland & Associates Environmental Consultants (email: PaardeValleygridppp@gmail.com or post: P.O. Box 31108, Tokai, 7966, Fax: 0867626126, Tel: 060 319 1217) on or before **15 August 2022**.

All comments received during the 30 day I&AP comment period will be recorded and responded to in a Comments and Response Report, which will be included in the Final Basic Assessment Report that will be submitted to the DFFE for decision making. Once the DFFE issues their decision on the proposed environmental authorisation application, all registered I&APs will be notified in writing of the DFFE's decision.

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GLOSSARY OF TERMS

Basic Assessment Report	An environmental assessment report compiled in accordance with Appendix 1 of the NEMA EIA Regulations, 2014, as amended, as part of an Environmental Authorisation process.
Environment	The surroundings within which humans exist and that are made up of – (i) the land, water and atmosphere of the earth; (ii) micro-organisms, plants and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.
Environmental Impact	An environmental change caused by some human act.
Environmental Risk	The probability of certain hazard occurrences and the severity of impacts on the environment resulting from these occurrences.
Environmental Impact Assessment (EIA)	A systematic process of identifying, assessing and reporting environmental impacts associated with an activity and includes Basic Assessment and Scoping & Environmental Impact processes.

Grid connection	A powerline connecting an energy- generating facility to the national electricity grid
Kilovolt (kV)	A unit of electromotive force, equal to 1000 volts. (A volt is a unit used to measure the force of an electric current).
Person Year	Person year is defined as equivalent to the amount of work the average person should be expected to complete if working full-time for one year.
Public Participation Process	A process by which potential Interested and Affected Parties are given opportunity to comment on, or raise issues relevant to, the application.

ABBREVIATIONS

(-)	Negative
(+)	Positive
BA	Basic Assessment
BAR	Basic Assessment Report
C&R	Comments and Response Trail Report
CARA	Conservation of Agricultural Resources Act (No 43 of 1983)
CBA	Critical Biodiversity Area
CEMP	Construction Phase Environmental Management Programme
dB	Decibel
DEA	Department of Environmental Affairs
DEFF	Department of Environment Forestry and Fisheries
DFFE	Department of Forestry, Fisheries and the Environment
DoE	Department of Energy
EA	Environmental Authorisation

EAP	Environmental Assessment Practitioner
EGI	Electricity Grid Infrastructure
EIA	Environmental Impact Assessment
EIA Report	Environmental Impact Assessment Report
EMPr	Environmental Management Programme
ESA	Ecological Support Area
ESKOM	Eskom Holdings SOC Limited
GIS	Geographic Information Systems
GN	Government Notice
GN.R	Government Notice Regulation
Ha	Hectare
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IPP	Independent Power Producer
kV	Kilovolt
MW	Megawatt
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998)
NPAES	National Protected Areas Expansion Strategy
NHRA	National Heritage Resources Act, 1999 (Act 25 of 1999)
PV	Solar Photovoltaic
PPP	Public Participation Process
SAHRA	South African Heritage Resources Agency
SIP	Strategic Infrastructure Project

1 INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

Environmental Authorisation (EA) for the 75 - 150 MW Paarde Valley PV2 photovoltaic (PV) solar energy facility (the Paarde Valley PV2 Solar Energy Facility) on Remainder of Portion 2 of Farm 145 Paarde Valley near De Aar in the Northern Cape Province was granted to Paarde Valley PV2 (Pty) Ltd by the Department of Environmental Affairs (DEA) (now known as the Department of Forestry, Fisheries and the Environment (DFFE)) in 2012, in terms of the National Environmental Management ("NEMA") (Act No. 107 of 1998) Environmental Impact Assessment ("EIA") Regulations (2010). The currently authorised 132kV/ 220kV grid connection for Paarde Valley PV2 Solar Energy Facility is routed from the Paarde Valley PV2 Solar Energy Facility to the De Aar substation. However, Eskom currently has grid capacity constraints in the Northern Cape, at certain lines and on certain substations, and currently does not have capacity for the authorised Paarde Valley PV2 Solar Energy Facility to connect at the De Aar substation. Accordingly, Paarde Valley PV2 (Pty) Ltd wishes to amend the authorised electrical grid connection (i.e. including re-alignment and termination point) and to create a separate Environmental Authorisation (EA) for ESKOM's self-build components (i.e. the switching station and gridline).

In light of the above, Paarde Valley PV2 (Pty) Ltd (hereafter referred to as the "Applicant") proposes the construction of a 132 kV, double circuit, overhead powerline (OHPL) grid connection from the authorised on-site substation and switching station at the Paarde Valley PV2 Solar Energy Facility to the Vetlaagte Main Transmission Station (MTS) (which is currently undergoing its own EA application process). The proposed OHPL would be approximately 12.7 km in length, and is located entirely within an Electricity Grid Infrastructure (EGI) Strategic Transmission Corridor, i.e. in the Central Corridor[5]. The proposed infrastructure would be located on Portions 2, 6, 29, 30, 31 and 43 of Farm 145 Paarde Valley, the Remainder of Farm 179 Du Plessis Dam, the Remainder of Farm 4 Vetlaagte and erven 266, 268, 5113, 5114, 5115, 5121, 5122, 5123, 5127, 5315 and 5316 (refer to Figure 1).

The infrastructure associated with the proposed electrical Grid Connection works for the Paarde Valley PV2 Solar Energy Facility project (and to be handed to Eskom following construction), includes the following:

- A 132 kV, double circuit Overhead Power Line (OHPL) from the Switching Station connecting to the Vetlaagte Main Transmission Substation (MTS) (Note: A 200 m corridor has been assessed and is being applied for)
- A 132 kV Feeder bay at the Vetlaagte MTS
- An on-site Switching Station (SwS), including access road, adjacent to the authorised Paarde Valley PV2 Solar Energy Facility's 132 kV substation (approximately 100 m x 100 m combined).

The OHPL and Switching station are required to connect the authorised Paarde Valley PV2 Solar Energy Facility to the Eskom National Grid. Refer to Section 2 for a detailed description of the proposed project and associated infrastructure.

In terms of the National Environmental Management Act ("NEMA") (Act No. 107 of 1998), Environmental Impact Assessment (EIA) Regulations (2014), as amended, the proposed

[5]as per Government Notice (GN.) 113 of Government Gazette No. 41445 published 16 February 2018, in terms of the NEMA (Act No. 107 of 1998).

project triggers listed activities that require Environmental Authorisation from the competent environmental authority, namely the Department of Forestry, Fisheries and the Environment (DFFE). The DFFE's decision regarding environmental authorisation will be based on the outcome of the Basic Assessment process for the proposed project, required in terms of the NEMA EIA Regulations (2014), as amended.

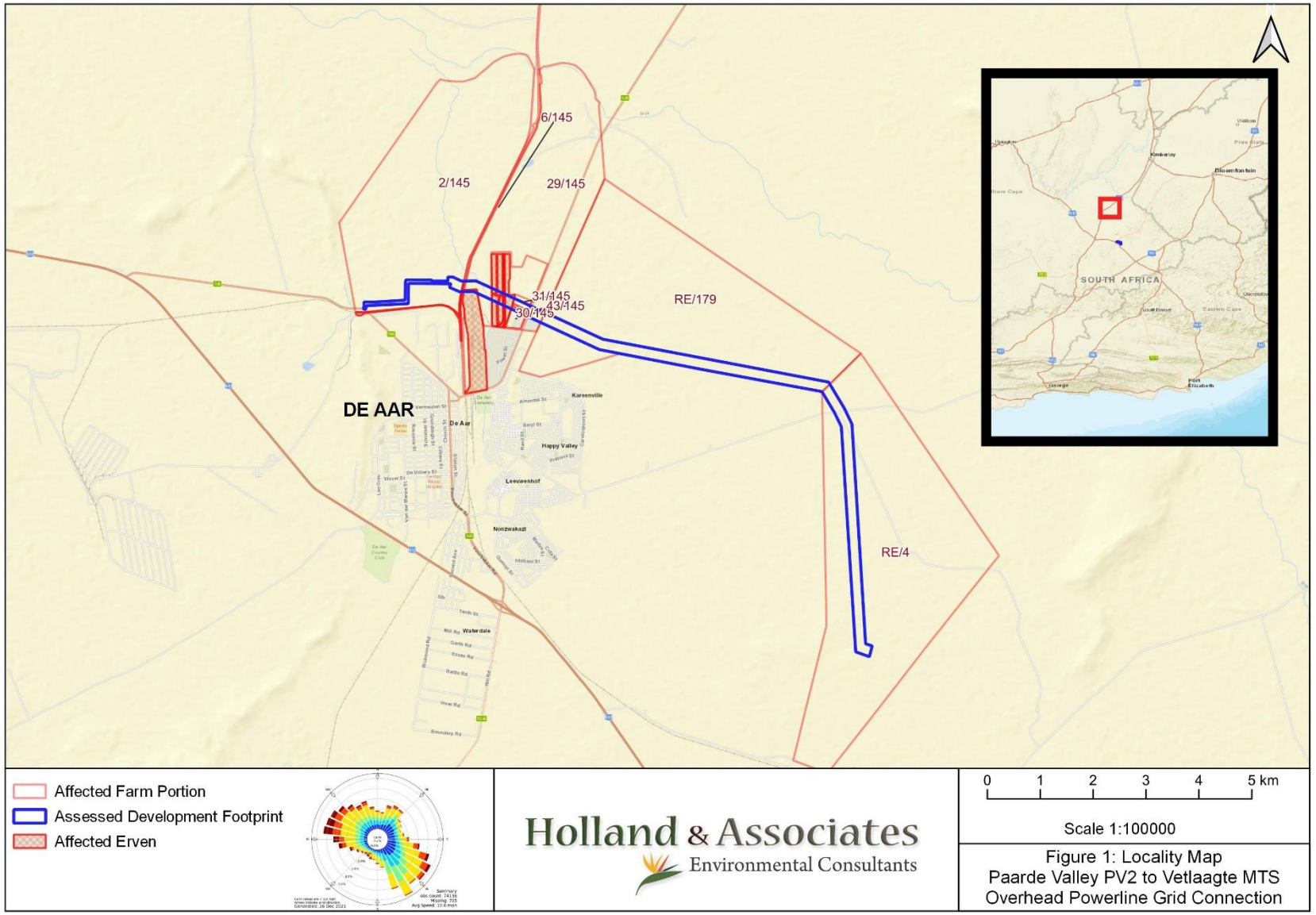
1.2 SCOPE OF THE BASIC ASSESSMENT PROCESS

Holland & Associates Environmental Consultants has been appointed by Paarde Valley PV2 (Pty) Ltd to undertake the requisite EIA process for the proposed project (in this case, a "Basic Assessment" process) in accordance with the NEMA (Act No. 107 of 1998) EIA Regulations (2014), as amended. The scope of work includes the following:

- Compilation and submission of the requisite *Application for Environmental Authorisation* form to DFFE in terms of the NEMA (No. 107 of 1998) 2014 EIA Regulations, as amended;
- Undertaking a Public Participation Process, as required in terms of Chapter 6 of the EIA Regulations, 2014, as amended;
- Compilation and submission of a Basic Assessment Report; and
- Compilation and submission of an Environmental Management Programme (EMPr) for the proposed project.

This Basic Assessment process therefore aims to meet the specific requirements of the NEMA EIA Regulations promulgated in 2014, as amended[6]. This Basic Assessment Report has been compiled in accordance with Appendix 1 ("Basic Assessment Process") and Regulations 19 to 20 of the NEMA EIA Regulations, 2014, as amended.

[6] Government Notice No. R 983, R 984 and R 985 in Government Gazette No. 38282 of 4 December 2014, as amended in GN 324, GN 325, GN 326 and GN 327 of 7 April 2017, on 13 July 2018 (GN 706), 29 May 2020 (GN 599) and 11 June 2021 (GN 517).



1.3 APPROACH TO THE BASIC ASSESSMENT

A Basic Assessment (BA) entails an environmental impact assessment that involves the compilation of a "Draft" Basic Assessment Report (BAR), which is subject to a public participation process (including a 30 day public comment period), and the compilation of the "Final" BAR, which is submitted to the Competent Authority for decision-making (after the 30 day public comment period). An "*Application Form for Environmental Authorisation"* is submitted to the Competent Authority shortly before the Draft BAR is made available for public comment.

The BA process is described below and diagrammatically represented in Figure 2 below.

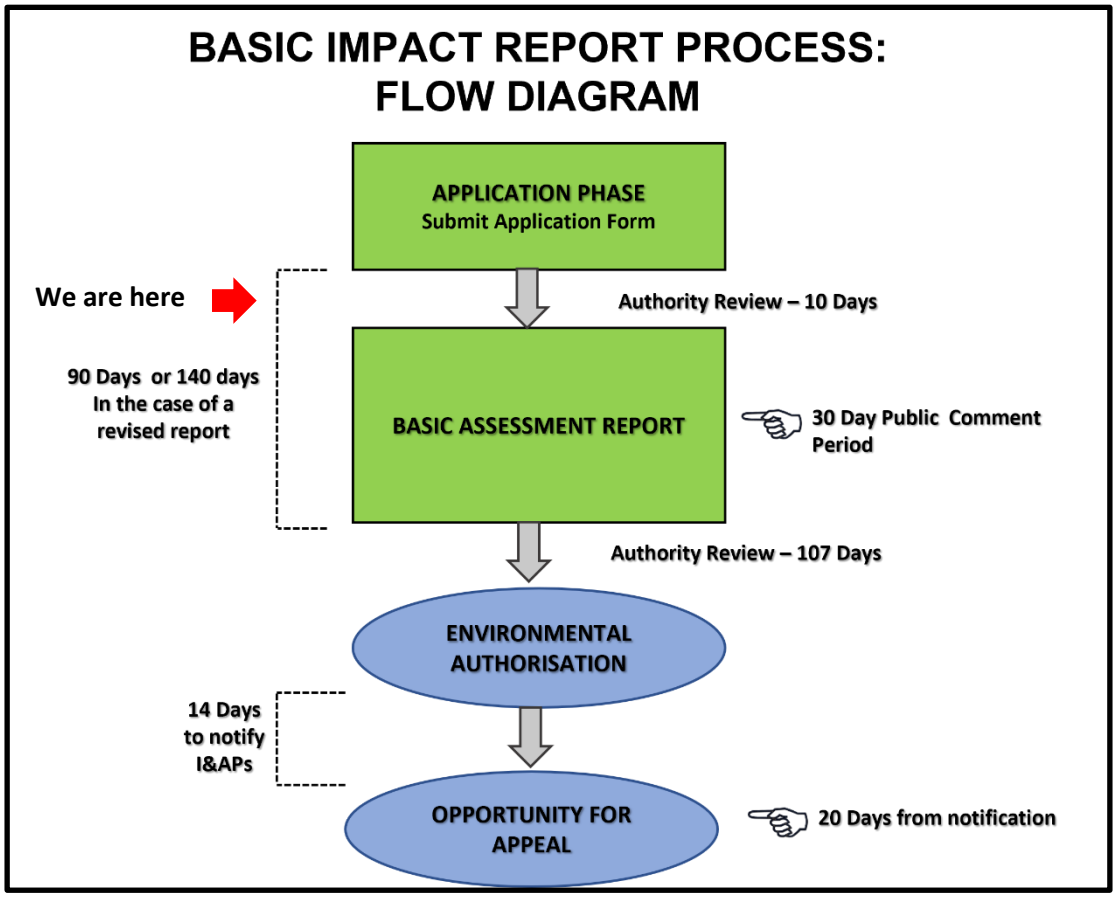


Figure 2: Flow diagram of the Basic Assessment process (EIA Regulations, 2014, as amended).

1.3.1 Basic Assessment Process

The initiation and pre-application phase of the Basic Assessment process comprised the following:

- The submission of a "*Pre-Application Meeting Request*" form in terms of the NEMA, 1998 (Act No. 107 of 1998), and the EIA Regulations, 2014, as amended, as required by the DFFE. A Pre-Application meeting was held with the DFFE on 14 December

2021 and a follow-up meeting was held on 27 January 2022. The DFFE approved the minutes of the meeting on 21 April 2022. Refer to **Appendix 1 of Annexure A.**

- A desktop review of relevant literature and planning documents was undertaken, including a review of previous relevant studies undertaken in the area. These included *inter alia* the following:
    - Pixley Ka Seme District Municipality Integrated Development Plan (IDP)
    - Pixley Ka Seme District Municipality Spatial Development Framework (SDF)
    - Emthanjeni Local Municipality Integrated Development Plan (IDP)
    - Emthanjeni Local Municipality Spatial Development Framework (SDF)
    - Northern Cape Department of Environment and Nature Conservation. Critical Biodiversity Areas of the Northern Cape: Technical Report. 2016.
    - Department of Forestry, Fisheries and the Environment. National Web-based Screening Tool Report. Accessed April 2022.
    - Fine scale biodiversity mapping (SANBI)
    - Aurecon South Africa. Final Environmental Impact Assessment Process Proposed Photovoltaic (Solar) Energy Facility on Paarde Valley Farm near De Aar, Northern Cape. April 2012
- A site visit to the proposed development site was carried out by the EAP on the 19th and 20th April 2022 to obtain an understanding of the local conditions in the study area, to undertake site sensitivity verification, and to identify potential key aspects for consideration and assessment during the Basic Assessment process.
- Potential construction and operational phase impacts.

1.3.1.1 Environmental site sensitivity verification and inputs

Specialists were appointed in March 2022 for the proposed project. The specialists that were appointed and their respective fields of expertise included:

- David Hoare of David Hoare Consulting (Terrestrial Biodiversity, Plant Species, Animal Species);
- Antonia Belcher (Aquatic biodiversity);
- Jayson Orton of ASHA Consulting (Archaeology & Cultural Heritage);
- Elize Butler of Banzai Environmental (Palaeontology);
- Quinton Lawson & Bernard Oberholzer (Landscape / Visual);
- Chris van Rooyen and Albert Froneman of Chris van Rooyen Consulting (Avifauna);
- Johann Lanz (Agriculture);
- Henk Goosen of Interference Testing And Consultancy Services (Radio Frequency Interference)

The information gathered from the specialist inputs referred to above, as well as the site visit and literature review undertaken, was used to undertake site sensitivity verification, to inform the level of assessment required for each field. The Site Sensitivity Verification Report has been compiled and can be found in Annexure D.

1.3.1.2 Specialist Studies

The specialists undertook their studies in line with the relevant protocols (GN 320 of 20 March 2020 and GN 1150 of 30 October 2020, where applicable), or in line with Appendix

6 of the EIA Regulations 2014, as amended, as applicable. Specialist studies were undertaken in the following fields:

- Agriculture
- Landscape/ Visual
- Archaeology and Cultural Heritage
- Palaeontology
- Terrestrial Biodiversity
- Plant Species
- Animal Species
- Aquatic Biodiversity
- Avifauna
- Civil Aviation
- Radio Frequency Interference (RFI)
- Geotechnical

The findings of the specialist studies are included in Annexure B of this Report and are also summarised in Sections 4, 7, 8 and 9 of this report.

1.3.1.3 Integration and Assessment

The findings of the specialists and the Environmental Assessment Practitioner (EAP) have been synthesised and documented in this Basic Assessment Report. The relevant technical and specialist studies have been included as annexures to this Basic Assessment Report (refer to Annexure B).

1.3.1.4 Public Consultation

Consultation with the public forms an integral component of the Basic Assessment process, and enables Interested and Affected Parties (I&APs) e.g. affected landowners and occupiers of land, neighbouring landowners and occupiers of land, provincial and local authorities, relevant State Departments and Organs of State, environmental groups, and communities, to raise their issues and concerns relating to the proposed activities, which they feel should be addressed in the Basic Assessment Report.

The public participation process is being informed by the DEA Guidelines for Public Participation (October 2017) and the 2014 EIA Regulations, as amended, and complies with the requirements of Government Notice No R. 982 of NEMA, as amended.

This Draft Basic Assessment Report is being made available to Interested and Affected Parties (I&APs) for a 30 day comment period (i.e. from 15 July 2022 - 15 August 2022). A newspaper advert was placed in the local *De Aar Echo* newspaper on the 15 July 2022 and in the regional NoordKaap Bulletin on the 14 July 2022. Site notices detailing the proposed project were placed at the entrance to the Paarde Valley PV2 solar facility site (Remainder of Portion 2 of Farm 145 Paarde Valley) as well as at other strategic locations along the proposed grid connection route accessible to the public. A letter of notification was sent to potential and registered I&APs to inform them of the lodging of the Draft BAR for public comment, as well as to inform I&APs of where the report could be viewed. I&APs comments received on the Draft BAR will be collated and the project team will provide responses to all comments received, in a Comments and Response (C&R) Trail Report. The C&R Trail Report will be submitted to the DFFE, together with the Final Basic Assessment Report, for decision-making. Registered I&APs will be notified of the DFFE's decision, and an appeal period will follow.

Refer to Section E for a detailed description of the Public Participation Process undertaken for this Basic Assessment process.

1.3.2 Authority Involvement

A Pre-Application meeting was undertaken with the DFFE (Integrated Environmental Authorisations) on 14 December 2021 and a follow-up meeting was held on 27 January 2022. The DFFE approved the minutes of the meeting on 21 April 2022 (refer to Appendix 1 in Annexure A).

Other authorities that are being consulted during the Basic Assessment process include:

- DFFE Directorate: Protected Areas Planning and Management Effectiveness;
- DFFE Directorate: Biodiversity Conservation;
- Department of Agriculture, Land Reform and Rural Development (DALRRD);
- Department of Energy: Northern Cape Regional Offices;
- Department of Water and Sanitation: Northern Cape Regional Offices;
- Department of Defence;
- Department of Public Works and Infrastructure
- Department of Science and Innovation
- Department of Transport
- Northern Cape Government: Department of Agricultural, Environmental Affairs, Land Reform and Rural Development;
- Northern Cape Government: Department of Roads and Public Works
- Northern Cape Government: Department of Transport, Safety and Liaison;
- Northern Cape Government: Department of Economic Development and Tourism
- Northern Cape Government: Department of Co-operative Governance, Human Settlements and Traditional Affairs;
- Northern Cape Provincial Heritage Resources Authority (Ngwao Boswa ya Kapa Bokone);
- South African Civil Aviation Authority (CAA);
- South African Heritage Resources Agency (SAHRA);
- Emthanjeni Local Municipality;
- Pixley Ka Seme District Municipality;
- Eskom;
- Transnet

1.3.3 Decision-making

At the end of the 30 day I&AP comment period for the Draft BAR, the BAR will be finalised to include and address I&APs comments received, and the Final BAR will then be submitted to the DFFE for decision-making. The competent authority (i.e. DFFE) must, within 107 days of receipt of the Final BAR, in writing;

- Grant environmental authorisation; or
- Refuse environmental authorisation.

Registered I&APs will be notified of the DFFE's decision within 14 days of the decision being issued to the Applicant.

1.4 ASSUMPTIONS & LIMITATIONS

1.4.1 Assumptions

In undertaking this investigation and compiling the Draft Basic Assessment Report, it has been assumed that-

- The information provided by the Applicant, consulting engineers and specialists is accurate and unbiased.
- The scope of this investigation is limited to assessing the environmental impacts associated with the proposed new gridline, switching station and associated infrastructure.
- Should the proposed project be authorised, Paarde Valley PV2 (Pty) Ltd will incorporate the recommendations and mitigation measures outlined in the BAR and Environmental Management Programme (EMPr) into the detailed design and construction contract specifications and operational management system for the proposed development.

1.4.2 Limitations and Gaps in Knowledge

There are limitations and uncertainties within the various techniques adopted by specialists to assess the impacts within their area of expertise. These are detailed in Sections 1.4.2.1 to 1.4.2.7 below.

1.4.2.1 Agriculture

There are no specific assumptions, uncertainties or gaps in knowledge or data that affect the findings of the agriculture study (Lanz 2022, Annexure B1).

1.4.2.2 Landscape / Visual

The actual pylons that may be used have not been determined at this stage, but a range of types is included in the project description .Assumptions were made regarding the footprint and height of the proposed switching station, as well as lighting and fencing relating to the proposed project (Lawson & Oberholzer 2022, Annexure B2).

1.4.2.3 Archaeology and Cultural Heritage

The field study was carried out at the surface only and hence any completely buried archaeological sites would not be readily located. Similarly, it is not always possible to determine the depth of archaeological material visible at the surface. Dense grass cover limited ground visibility with this problem being especially acute in the north (east of the R48 road). The access road was not surveyed since it lies within the already surveyed and authorised PV footprint and was also densely vegetated. Two areas could not be accessed for reasons unrelated to the fieldwork. Observations in the wider area suggest that significant precolonial heritage is associated with rivers, hills or ridges and that historical sites are more highly visible, even in grassy areas. These limitations are thus unlikely to have affected the overall assessment of impacts (ASHA Consulting 2022, Annexure B3).

1.4.2.4 Palaeontology

When conducting a PIA several factors can affect the accuracy of the assessment. The focal point of geological maps is the geology of the area, and the sheet explanations were not meant

to focus on palaeontological heritage. Many inaccessible regions of South Africa have not been reviewed by palaeontologists and data is generally based on aerial photographs. Locality and geological information of museums and universities databases have not been kept up to date or data collected in the past have not always been accurately documented. Comparable Assemblage Zones in other areas is used to provide information on the existence of fossils in an area which was not yet been documented. When similar Assemblage Zones and geological formations for Desktop studies is used it is generally assumed that exposed fossil heritage is present within the footprint (Banzai Environmental 2022, Annexure B4)**.**

1.4.2.5 Terrestrial Biodiversity

The vegetation on site was in relatively good condition in terms of the seasonal presence of perennial plant species, although grass cover had not recovered from the previous winter period. The overall condition of the vegetation was therefore possible to be determined with a moderately high degree of confidence (Hoare 2022, Annexure B5).

1.4.2.6 Aquatic Biodiversity

Limitations and uncertainties often exist within the various techniques adopted to assess the condition of ecosystems. The methodologies and techniques used in this assessment have been developed nationally and are typically of a rapid nature, as is required for this freshwater impact assessment.

Very limited aquatic features occur within the site and surrounding area. No baseline long-term monitoring was undertaken as part of this assessment. There is also very little existing information available for the aquatic features within the study area. Data was utilised for adjacent aquatic ecosystems where available. The nature of the proposed activities however also allows them to be placed some distance from any mapped aquatic features such that the likely impacts would be very low. It is usually the associated infrastructure that has the potential to have a greater impact on the aquatic features. The impacts of roads and powerlines on the aquatic features are however well understood and can be effectively mitigated to ensure the impacts remain low. The preferred mitigation measure is to limit the disturbance to aquatic features as far as possible by avoiding and minimising the number of crossings and providing adequate buffer areas. This will also ensure that the cumulative impacts will remain low.

The level of aquatic assessment undertaken was considered to be adequate for this study. No further fieldwork will be required. The ground-truthing of aquatic features was undertaken when the use of vegetation as an indicator was possible. As it was not possible to cover the entire site in a high level of detail, extrapolation of the areas ground-truthed to those not covered was done using the latest available aerial imagery for the site (Belcher 2022, Annexure B6).

1.4.2.7 Avifauna

The focus of the avifaunal assessment is primarily on the potential impacts of the Paarde Valley PV2 switching station and 132kV powerline grid connection on priority species. Priority species are defined as those species which could potentially be impacted by powerline collisions or electrocutions, based on specific morphological and/or behavioural characteristics. These include both Species of Conservation Concern (SCC) as defined by the Species Environmental Assessment Guideline: Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact

assessments in South Africa (2020) i.e. those species listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered, Vulnerable, Near Threatened and Data Deficient, as well as certain other species.

The assessment of impacts is based on the baseline environment as it currently exists in the study area.

Cumulative impacts include all wind energy facility (WEF) and SEF (PV) projects, grid connections and existing transmission and distribution powerline for which information could be sourced in the public domain, within a 35 km radius that currently have open applications or have been approved by the Competent Authority as per the 2021 Q4 database from the Department of Forest Fisheries and Environment (DFFE).

Conclusions in this study are based on experience of these and similar species in different parts of South Africa. Bird behaviour can never be entirely reduced to formulas that will be valid under all circumstances.

The primary Project Area Of Interest (PAOI) was defined as a 2 km zone around the proposed 132 kV switching station and 132 kV powerline grid connection. (Chris van Rooyen Consulting 2022, Annexure B7).

1.5 DETAILS OF APPLICANT

The Applicant's details are outlined in Table 1-1 below.

Table 1-1: Details of the Applicant

Applicant Name:	Paarde Valley PV2 (Pty) Ltd		
Contact Person	Mr Warren Morse		
Trading name (if any):	Paarde Valley PV2 (Pty) Ltd		
Postal address:	PostNet Suite #53, Howard Place		
	Cape Town	**Postal code:**	7450
Telephone:	(021) 685 3240	**Cell:**	083 760 9586
E-mail:	warren@mulilo.com	**Fax:**	086 635 6809

1.6 DETAILS AND EXPERTISE OF EAP WHO COMPILED THIS REPORT

Ms Nicole Holland of Holland & Associates Environmental Consultants is the EAP for the proposed project, assisted by Ms Anja Albertyn and Ms Tilly Watermeyer of Holland & Associates Environmental Consultants. The qualifications and expertise of the EAP and project staff are outlined in Table 1-2.

Table 1-2: Details of the EAP

Name	Academic Qualifications	Registration	Expertise
Nicole Holland	BSc (Hons) Environmental and Geographical Science	Registered with the South African Council for Natural Scientific Professions (Reg No.: 400306\06).	Nicole Holland has a Bachelor of Science (Hons) in Environmental and Geographical Science from the University of Cape Town, specializing in Environmental Management. She has 20 years of experience in the environmental management field and has compiled and managed numerous environmental investigations including

Name	Academic Qualifications	Registration	Expertise
		Registered Environmental Assessment Practitioner (EAP) with the Environmental Assessment Practitioners Association of South Africa (Reg No.: 2020/493). Member of the IAIAsa (International Association for Impact Assessment (Western Cape branch).	Environmental Impact Assessments (Basic Assessments and Scoping & Environmental Impact Assessment processes), Environmental Management Plans/ Programmes (EMP), waste management license application processes, as well as applications for amendments of Environmental Authorisations. Nicole has played a leading role in the development of a number of important strategic environmental planning policies including the development of an Integrated Environmental Programme for the West Coast District; the compilation of a water resource protection sub-strategy for the Olifants Doring Catchment Management Plan; as well as the development of an information document on environmental legislation and its associated implications, for the Drakenstein Municipalities' Civil Engineering Services Department. Nicole has extensive experience in managing environmental impact assessments including, amongst others, agricultural development projects, wastewater treatment works, renewable energy facilities, water supply dams, housing and resort developments, cemeteries, road upgrades, pipelines, waste sites, and a cement manufacturing plant. Nicole has also undertaken the independent review of a number of Scoping and Environmental Impact Reports and Basic Assessment Reports, and has been involved in a broad spectrum of other environmental work including Environmental Auditing, the drafting of Environmental Management Programs, and Environmental Control Officer Work.
Anja Albertyn	MSc (Zoology) BSc(hons) Zoology BSc Zoology & Botany	Registered with the South African Council for Natural Scientific Professions (Reg No.400037/16). Member of the IAIAsa (International Association for Impact Assessment)	Anja Albertyn holds a Master of Science in Zoology specialising in Ornithology from the Percy FitzPatrick Institute for African Ornithology at the University of Cape Town, a Bachelor of Science (Honours) in Zoology, and a Bachelor of Science in Botany and Zoology. She has 13 years of experience as an environmental consultant and has worked on a variety of projects including wind and solar energy facilities, transmission lines and other electrical infrastructure, housing developments, water use license applications, effluent treatment technology testing, and aquaculture management. She has compiled basic, scoping & environmental impact assessment reports, environmental management plans and environmental authorisation amendment applications, as well

Name	Academic Qualifications	Registration	Expertise
			as a large number of avifaunal specialist reports. Anja is a registered Professional Natural Scientist (Ecological Science: 400037/16) with the South African Council for Natural Scientific Professions, and is an active member of the South African affiliate of the International Association for Impact Assessment (IAIAsa). Anja is also a selected member of the BirdlifeSA Birds and Renewable Energy Specialist Group (BARESG). Anja will function as the Avian Species Specialist on this project.
Tilly Watermeyer	MSc (Botany)	Member of the IAIAsa (International Association for Impact Assessment)	Tilly Watermeyer has a Master of Science in Botany from Stellenbosch University. She has over 2 years of experience working in environmental management assisting with the compilation of numerous Environmental Impact Assessments, Environmental Management Programmes (EMPrs) and applications for, and Amendments of Environmental Authorisations. She has experience in renewable energy projects, agricultural development projects and residential housing. Tilly has also assisted with and undertaken Environmental Audits, independent environmental reviews and Environmental Compliance monitoring.

The *Curriculum Vitae* of the principal Environmental Assessment Practitioner is included in Annexure C.

1.7 DETAILS OF SPECIALISTS

The specialists listed in Table 1-3 have undertaken specialist investigations and/or studies for the Basic Assessment process, to inform the identification and assessment of potential environmental impacts associated with the proposed project.

Table 1-3: Details of the Specialists

Specialist field of study	Company	Specialist
Agriculture	Johann Lanz	Johann Lanz
Landscape / Visual	Quinton Lawson Architect & Bernard Oberholzer Landscape Architect	Quinton Lawson & Bernard Oberholzer
Archaeology and Cultural Heritage	ASHA Consulting	Jayson Orton
Palaeontology	Banzai Environmental	Elize Butler
Terrestrial Biodiversity	David Hoare	David Hoare
Aquatic Biodiversity	Antonia Belcher	Antonia Belcher
Avifauna	Chris van Rooyen Consulting	Chris van Rooyen, Albert Froneman & egan Diamond
Radio Frequency Interference	Interference Testing and Consultancy Services (Pty) Ltd	Henk Goosen & Callie Fouche
Plant Species	David Hoare	David Hoare

Animal Species (excluding avian species)	David Hoare	David Hoare

Refer to Annexure B for the specialists CVs, which includes the details and expertise of the specialists.

1.8 INDEPENDENCE

It should be noted that neither the EAP, Holland & Associates Environmental Consultants nor any of its sub-consultants have any interests in secondary or downstream developments that may arise out of the authorisation of the proposed project. Refer to Annexure C for the EAPs Declaration of Independence.

1.9 CONTENT OF THE BASIC ASSESSMENT REPORT

Appendix 1(3) of the NEMA EIA Regulations (2014) (GN R.982), as amended, specifies the information that is to be included in a Basic Assessment Report. Table 1-4 below presents the content of this Basic Assessment Report as well as the applicable sections in the report that address the required information in terms of the NEMA EIA Regulations, 2014, as amended.

Table 1-4: Location of Content prescribed by NEMA for Basic Assessment Reports

Regulation	Content as required by NEMA	Section/Annexure
Appendix 1 (3) (a)	Details of (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae	Section 1.6 Appendix C
Appendix 1 (3) (b)	The location of the activity, including (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties	Section 2.1 Table 2.1
Appendix 1 (3) (c)	A plan which locates the proposed activity or activities applied for as well as associated structures of infrastructure at an appropriate scale, or, if it is (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken	Figure 1 Figure 4
Appendix 1 (3) (d)	A description of the scope of the proposed activity, including (i) all listed and specified activities triggered and being applied for; (ii) a description of the activities to be undertaken, including associated structures and infrastructure	Section 2 Section 3.1
Appendix 1 (3) (e)	A description of the policy and legislative context within which the development is proposed including (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and (ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments	Section 3

Regulation	Content as required by NEMA	Section/Annexure
Appendix 1 (3) (f)	A motivation for the need and desirability for the proposed development including the need and disability of the activity in the context of the preferred location	Section 5
Appendix 1 (3) (g)	A motivation for the preferred site, activity and technology alternative	Section 2.4
Appendix 1 (3) (h)	A full description of the process followed to reach the proposed preferred alternative within the site, including- details of all the alternatives considered;	Section 2.4
Appendix 1 (3) (h) (ii)	details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 6 Annexure E
Appendix 1 (3) (h)	a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	To be included in Final BAR
Appendix 1 (3) (h)	the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 4
Appendix 1 (3) (h)	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;	Section 8
Appendix 1 (3) (h)	The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Section 7
Appendix 1 (3) (h)	Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social economic, heritage and cultural aspects;	Section 8
Appendix 1 (3) (h)	The possible mitigation measures that could be applied and level of residual risk;	Section 8 Annexure F
Appendix 1 (3) (h)	The outcome of the site selection matrix;	Section 2.4.5
Appendix 1 (3) (h)	If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	Section 2.4
Appendix 1 (3) (h)	A concluding statement indicating the preferred alternatives, including preferred location of the activity;	Section 2.4.5
Appendix 1 (3) (i)	A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including- a description of all environmental issues and risks that were identified during the environmental impact assessment process; and	Section 7 Section 8

Regulation	Content as required by NEMA	Section/Annexure
Appendix 1 (3) (i)	An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Section 8
Appendix 1 (3) (j)	An assessment of each identified potentially significant impact and risk, including- (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated;	Section 8
Appendix 1 (3) (k)	Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	Section 8
Appendix 1 (3) (l)	An environmental impact statement which contains- a summary of the key findings of the environmental impact assessment	Section 9
Appendix 1 (3) (l)	A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and	Section 9 Figure 6
Appendix 1 (3) (l)	A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives	Section 8
Appendix 1 (3) (m)	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr	Section 8 Annexure F
Appendix 1 (3) (n)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation	Section 9
Appendix 1 (3) (o)	A description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed	Section 1.4
Appendix 1 (3) (p)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation	Section 9
Appendix 1 (3) (q)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised	Not applicable

Regulation	Content as required by NEMA	Section/Annexure
Appendix 1 (3) (r)	An undertaking under oath or affirmation by the EAP in relation to (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties; and	Annexure C
Appendix 1 (3) (t)	Any specific information that may be required by the competent authority; and	Not Applicable
Appendix 1 (3) (u)	Any other matters required in terms of section 24(4)(a) and (b) of the Act	Not Applicable

2 PROPOSED PROJECT

2.1 LOCATION

The proposed development area is located on the periphery of the town of De Aar, in the Emthanjeni Local Municipality, within the Pixley Ka Seme District Municipality in the Northern Cape Province. The proposed switching station would be located approximately 3 km north of the town centre of De Aar, on the authorised Paarde Valley PV2 Solar Energy Facility site. The proposed switching station is currently authorised as a component of the Paarde Valley PV2 Solar Energy Facility (*Construction of 75-150MW PV2 Photovoltaic Solar Energy Facility and Associated Infrastructure*, EA reference number:*12/12/20/2500*) but is proposed to be removed from this EA to form part of the infrastructure to be handed over to Eskom. The proposed gridline would run from the proposed switching station, north-east, east and south-east of the town periphery to the Vetlaagte MTS Substation, approximately 8.5 km south-east of the centre of De Aar. The proposed 132 kV feeder bay would located at the Vetlaagte MTS. The proposed project would be located on the properties / farm portions listed in Table 2-1 below:

Table 2-1: Details of Affected Properties

Project Component	Project Alternative	Farm Name/s	SG Code
Switching Station and Access Road	N/A	RE/ 2/145 Paarde Valley	C05700000000014500002
132 kV Feeder Bay	N/A	RE/4 Vetlaagte	C03000000000000400000
Gridline to Vetlaagte MTS Substation	Only one alternative is proposed.	RE/2/145 Paarde Valley 6/145 Paarde Valley 29/145 Paarde Valley 30/145 Paarde Valley 31/145 Paarde Valley 43/145 Paarde Valley RE/179 Du Plessis Dam RE/4 Vetlaagte Erf 266 Erf 268 Erf 5113 Erf 5114 Erf 5115 Erf 5122 Erf 5121 Erf 5123 Erf 5127 Erf 5315 Erf 5316	C05700000000014500002 C05700000000014500006 C05700000000014500029 C05700000000014500030 C05700000000014500031 C05700000000014500043 C05700000000017900000 C03000000000000400000 C05700030000026600000 C05700030000026800000 C05700030000511300000 C05700030000511400000 C05700030000511500000 C05700000000512200000 C05700030000512100000 C05700030000512300000 C05700030000512700000 C05700030000531500000 C05700030000531600000

The proposed project is located entirely within an Electricity Grid Infrastructure Strategic Transmission Corridor, i.e. in the Central Corridor[7] (Figure 3 below).

[7]as per Government Notice (GN.) 113 of Government Gazette No. 41445 published 16 February 2018, in terms of the NEMA (Act No. 107 of 1998).

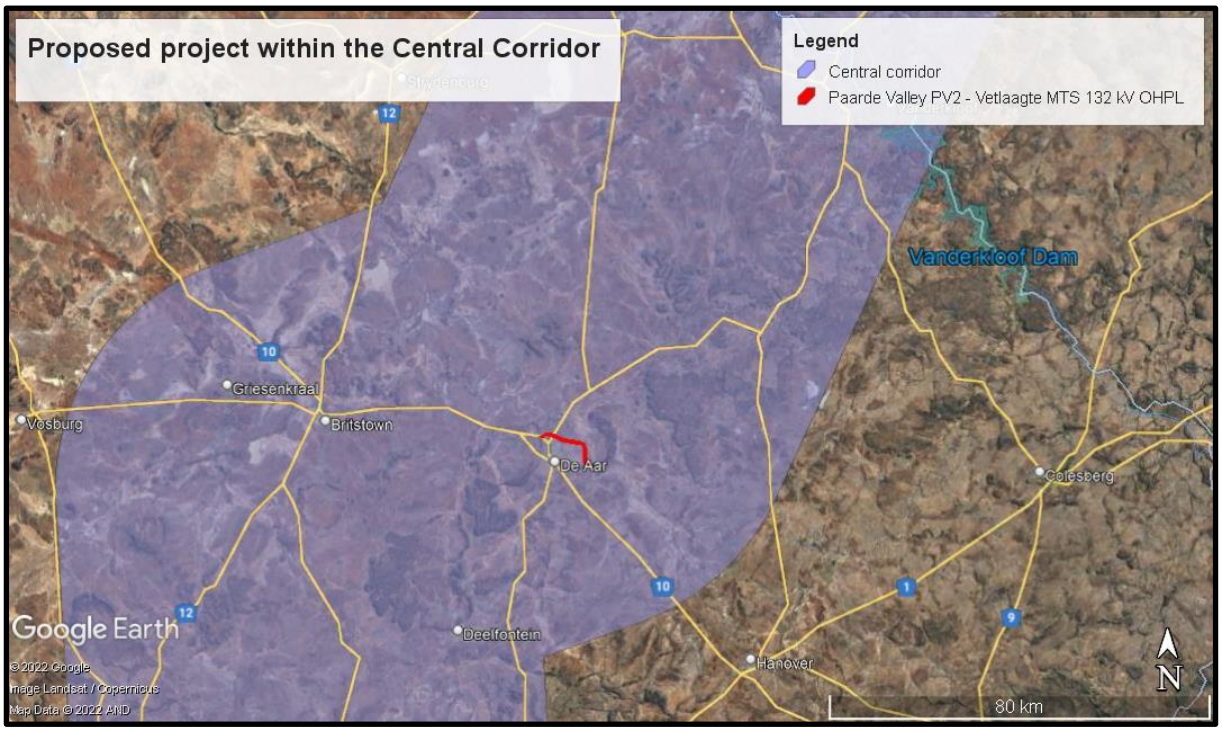


Figure 3: Image showing the proposed project (red line) located within the Central Corridor, an Electricity Grid Infrastructure Strategic Transmission Corridor (purple area).

2.2 DESCRIPTION OF THE PROPOSED PROJECT

The Applicant proposes the construction of a 132 kV, double circuit, overhead powerline (OHPL) grid connection from the authorised on-site substation and switching station at Paarde Valley PV2 to Vetlaagte Main Transmission Station (MTS) (which is currently undergoing its own EA application process). The OHPL is proposed to be approximately 12.7 km in length and is located in the Strategic Transmission Central Corridor[8]. A 200 m corridor (100 m of each side of the line) has been assessed by the EAP and the specialists. The final OHPL servitude will be registered as 31 m but during the design development process a corridor of 200 meters is required to allow for minor tower position adjustments. The exact pylon locations will be determined by the outcome of the specialist's investigations, and engineering considerations. On average there will be 4 - 5 towers per km, so that the route will consist of an approximately 40 towers. The teams constructing the OHPL often use cranes and these will fit into an area with a maximum radius of approximately 30 m around the base of each tower, with the final footprint being relatively small. The line will have a capacity of 132 kV and will make use of either steel monopole or steel lattice structure in line with Eskom required specifications.

A monopole self-supporting structure has a maximum base of 5 m in diameter above the ground. In some situations, the structures have stays. These would fall into the area with a maximum radius of 30 meters, but the stays themselves are hardly exposed at ground level, with only small steel rods protruding from the ground. Lattice towers have a bigger footprint as each has four legs that are a maximum of 15 m apart so that the final footprint would be approximately 15 m x 15 m. The height of either pylon structure will be up to 32 m.

[8]No. 113 of Government Gazette No. 41445 published 16 February 2018

The project would also include the switching station component of the authorised Paarde Valley PV2 on-site substation, with an approximate footprint area of 100 m x 100m, and a feeder bay at the Vetlaagte MTS with a capacity of 132 kV, as this needs to be handed over to Eskom with the grid connection self-build works once constructed.

In summary, the infrastructure associated with the proposed grid connection works for the Paarde Valley PV2 project (and to be handed back to Eskom following construction), includes the following:

- A 132 kV, double circuit Overhead Power Line (OHPL) from the Paarde Valley PV2 Solar Energy Facility to the proposed Vetlaagte Main Transmission Substation (MTS),
- A 132 kV feeder bay at the Vetlaagte MTS, and
- An on-site Switching Station (SwS), adjacent to the authorised Paarde Valley PV2 Solar Energy Facility 132 kV on-site substation. (approximately 100 m x 100 m combined)

The technical details include:

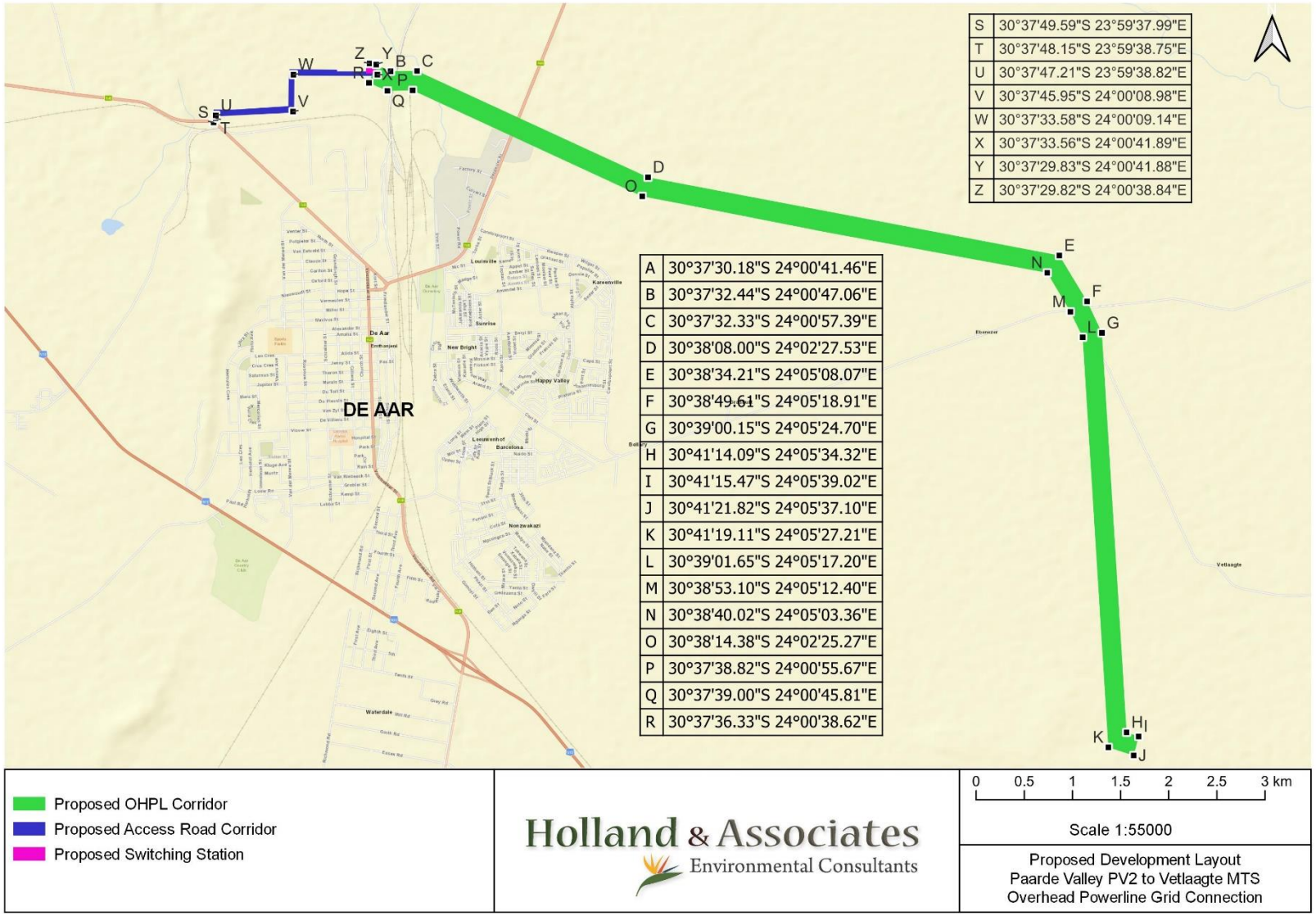
Overhead Powerline:

- Height of pylons: Up to 32m
- Type of poles/ pylons to be used: Double Circuit configuration. The alternatives under consideration and assessed are steel lattice or monopole structures in line with Eskom required specifications.
- Transmission line capacity 132 kV
- Length of OHPL approximately 12.7 km
- OHPL Service Road (to lie within the OHPL servitude)
    - Length of OHPL service road(s): Twin-tracked service road following line route with a length of approximately 12.7 km, and
    - Width of OHPL service road(s): 6 m

Switching Station:

- Footprint of approximately 50 m – 100 m x 100 m adjacent to IPP Substation
- Area occupied by buildings (Control building, relay room, generator, storage warehouse, water tanks, ablutions):+-1.0 Hectares
- Switching Station Access Road (separate access servitude from the nearest public road to the Switching Station yard)
    - Compacted gravel
    - Length of access road: +- 2.34 km
    - Width of access road: 8 m.
- Security fencing height: 2.4 m
    - Type of fencing: Eskom palisade fencing + chainlink fencing for temporary works
- Capacity of on-site switching station 132kv

The OHPL and Switching station are required to connect the Paarde Valley PV2 Solar Energy Facility to the Eskom National Grid. The route selected follows boundary lines and / or existing OHPL routes so as to limit disruption to current farming activities as much as possible



A	30°37'30.18"S 24°00'41.46"E
B	30°37'32.44"S 24°00'47.06"E
C	30°37'32.33"S 24°00'57.39"E
D	30°38'08.00"S 24°02'27.53"E
E	30°38'34.21"S 24°05'08.07"E
F	30°38'49.61"S 24°05'18.91"E
G	30°39'00.15"S 24°05'24.70"E
H	30°41'14.09"S 24°05'34.32"E
I	30°41'15.47"S 24°05'39.02"E
J	30°41'21.82"S 24°05'37.10"E
K	30°41'19.11"S 24°05'27.21"E
L	30°39'01.65"S 24°05'17.20"E
M	30°38'53.10"S 24°05'12.40"E
N	30°38'40.02"S 24°05'03.36"E
O	30°38'14.38"S 24°02'25.27"E
P	30°37'38.82"S 24°00'55.67"E
Q	30°37'39.00"S 24°00'45.81"E
R	30°37'36.33"S 24°00'38.62"E

S	30°37'49.59"S 23°59'37.99"E
T	30°37'48.15"S 23°59'38.75"E
U	30°37'47.21"S 23°59'38.82"E
V	30°37'45.95"S 24°00'08.98"E
W	30°37'33.58"S 24°00'09.14"E
X	30°37'33.56"S 24°00'41.89"E
Y	30°37'29.83"S 24°00'41.88"E
Z	30°37'29.82"S 24°00'38.84"E

2.2.1 Project implementation phases

The project activities can be divided into four phases, namely: pre-construction and design; construction; operation (including maintenance and repair); and decommissioning. A description of each phase (if applicable) and the associated activities is provided below.

2.2.1.1 Pre-construction and Design

The pre-construction phase includes the planning and design of the proposed project, as well as the necessary environmental (and other) authorisation processes. Whilst detailed design is undertaken as part of the pre-construction phase, it is generally only undertaken and costed for once all required authorisations have been obtained. This Basic Assessment (BA) process falls within the pre-construction phase.

An important component of the planning and design is the consideration of project alternatives (as outlined in Section 2.4 below). The final selection of the preferred alternative and design of the scheme is guided by the findings of the BA process, as well as the technical practicality and feasibility of the alternatives under consideration.

Should the proposed project be awarded environmental authorisation, any required site walk-throughs would be conducted by the relevant specialists, prior to construction in line with the Environmental Management Programmes (EMPr).

2.2.1.2 Construction Phase

The construction phase of the project would include:

- Site preparation, including subcontractor mobilisation, erection of fencing or suitable barriers, where required, to protect sensitive habitats and archaeological sites (if applicable), construction of site compound and lay down areas;
- Clearance of identified areas within the servitude for the positioning of pylon foundations and clearance of the switching station footprint;
- Excavation of pylon and anchor and busbar foundations;
- Foundation steelwork (reinforcing) and concrete pouring;
- Assembling of sections of pylon towers on-site and erecting all pylon tower sections
- Stringing of transmission line cables;
- Sag and tension of transmission line to ensure clearance heights are reached;
- Rehabilitation of disturbed areas;
- Testing of grid connection infrastructure; and
- Removal of equipment and disassembly of site camp.

Materials and equipment will be sourced from suppliers within the area, as far as possible.

The construction phase is anticipated to be approximately 12 - 18 months. Approximately 25 - 50 person years[9] of temporary employment would be created during construction spread over 12 - 18 months (for the preferred gridline route). These positions would be predominantly medium and lower skilled positions.

[9] Person year is defined as equivalent to the amount of work the average person should be expected to complete if working full-time for one year.

2.2.1.3 Operational Phase

The proposed switching station and associated powerline will be handed over to Eskom and become part of the National Grid. Therefore, Eskom would be become the holder of the EA and be responsible for the operational phase of the proposed development, as well as the implementation of the 'Generic Environmental Management Programme (EMPr) for the Development and Expansion of Substation Infrastructure for Transmission and Distribution of Electricity' and the 'Generic EMPr for the Development and Expansion of Overhead Electricity Transmission and Distribution Infrastructure[10] (refer to Annexure F), as well any conditions of the Environmental Authorisation, and audits thereof. The proposed development would be continuously operational (24 hrs, 7 days a week) once the Paarde Valley PV2 Solar Energy Facility is also operational. The operation of the proposed components will involve the following activities:

- Maintenance of the gridline infrastructure; and
- Brush-cutting of vegetation from within the gridline servitude to comply with Eskom's safety requirements.

The proposed development is not expected to result in any additional job opportunities being created once it is handed over to Eskom.

2.2.1.4 Decommissioning Phase

The proposed switching station and OHPL (and associated infrastructure) is expected to operate for a minimum of 20/25 years (ie for the lifespan of the authorised Paarde Valley PV2 Solar Energy Facility) yet as it will form part of the National Grid, decommissioning is not expected to occur and does not form part of this Environmental Authorisation process (i.e. listed activities relating to decommissioning activities are not being applied for). Should decommissioning be required, Environmental Authorisation may be required to be applied for under the legislation applicable at the time the decommissioning activities are to take place.

2.3 SUMMARY OF THE PROJECT & TECHNICAL INFORMATION

The Applicant proposes the construction of a 132 kV, double circuit OHPL from the Paarde Valley PV2 Solar Energy Facility to the proposed Vetlaagte MTS and a proposed switching station which is currently included as a component of the Paarde Valley PV2 Solar Energy Facility but is proposed to be removed from this EA to form part of the infrastructure to be handed over to Eskom. The project would also include a 132 kV feeder bay which would be located at the proposed Vetlaagte MTS. The proposed project is located close to the town of De Aar, in the Emthanjeni Local Municipality in the Northern Cape Province and lies entirely within an Electricity Grid Infrastructure Strategic Transmission Corridor, i.e. in the Central Corridor[11].

The OHPL is proposed to be approximately 12.7 km in length with approximately 40 towers, up to a height of 32 m. The tower type would be a Double Circuit connection and would either be a monopole structure or a steal lattice structure, in line with Eskom required specifications. A 6 m wide, twin-track service road would run within the 31 m servitude of the proposed OHPL route.

[10] published in Government Gazette 42323 of 22 March 2019 as Appendix 1 and Appendix 2.
[11] as per Government Notice (GN.) 113 of Government Gazette No. 41445 published 16 February 2018, in terms of the NEMA (Act No. 107 of 1998).

The proposed switching station would have a capacity of 132 kV and would lie within the authorised footprint of the Paarde Valley PV2 Solar Energy Facility site, adjacent to the Paarde Valley Solar Energy Facility's on-site substation. The switching station would have a footprint of approximately 50-100 m x 100m, and a compacted gravel access road, approximately 2.34 km in length and 8 m wide, would be constructed as a separate access servitude from the nearest public road to the Switching Station yard. The Switching Station would be surrounded by a 2.4 m high security fence.

A proposed 132 kV feeder bay at the Vetlaagte MTS would form part of the component to be handed over to Eskom.

2.4 CONSIDERATION OF ALTERNATIVES

2.4.1 Introduction

NEMA (Act No. 107 of 1998) requires that alternatives are considered during the Basic Assessment process.

"Alternatives", in relation to a proposed activity, means different means of meeting the general purposes and requirements of the activity, which may include alternatives to the–

- property on which, or location where the activity is proposed to be undertaken;
- type of activity to be undertaken;
- design or layout of the activity;
- technology to be used in the activity; or
- operational aspects of the activity;

and includes the option of not implementing the activity, i.e. the "No Go" alternative.

The following alternatives have been investigated for the proposed project:

2.4.2 Site / location alternatives

Two substation locations were initially considered as connection points for the Paarde Valley PV2 Solar Energy Facility to the National Grid: The Mulilo Cluster 1 Substation and the Vetlaagte Main Transmission Substation (MTS). Two route alignment locations were proposed for the connection to the Mulilo Cluster 1 substation from the authorised on-site substation at the Paarde Valley PV2 Solar Energy Facility, and one alignment location that follows existing powerlines and boundary lines was proposed to connect to the Vetlaagte MTS (refer to Pre-application Meeting Minutes for a map indicating the two locations alternatives and three corridor alignment alternatives in Appendix 1 of Annexure A). Since the Pre-application meeting, capacity has become unavailable at the Mulilo Cluster 1 Substation and therefore the Vetlaagte MTS remains the only practically viable grid connection point alternative.

No further location alternatives are therefore under consideration for the connection location to the National Grid, with the Vetlaagte MTS being the only practicable option. The Vetlaagte MTS is undergoing a separate environmental authorisation process.

As the position of the on-site switching station, which is a component of the authorised on-site substation of the Paarde Valley PV2 Solar Energy Facility, has already been authorised no further location alternatives are possible for the location of the switching station.

The proposed access road alignment was selected as the shortest route from the R48 public road that falls within the authorised footprint of the Paarde Valley Solar PV2 Facility. A 60 m wide corridor was proposed to be assessed within which the 8 m wide access road is to be

located, in order to allow for engineering requirements and avoidance of any environmentally sensitive areas.

A thorough investigative design process has been undertaken to determine alternatives for the proposed overhead powerline alignment to connect the Paarde Valley PV2 Solar Energy facility to the Vetlaagte MTS. Due to authorised developments in the vicinity that the alignment needs to avoid, and the necessity to obtain servitude agreements with the respective landowners, only one alignment was determined as the practically viable option, as it follows existing overhead powerlines and boundary fences, thereby minimising impacts, falls within farm portions that have agreements in place with the Applicant, and is the shortest possible route within these farm portions.

The preferred route alternative runs approximately 8 km east from the on-site switching station and then 4.4 km south, to the Vetlaagte MTS Substation. A corridor of 200 m in width (100 m on either side of the proposed route) was assessed for this route in relation to the “No-Go” alternative, to allow for the selection of the pylon locations to avoid environmentally sensitive areas, and to allow for detailed design and engineering requirements. The final locations of the pylons will therefore be the best practicable environmental option within the assessed corridor.

The proposed switching station, access road and overhead powerline alignment locations will allow for the transmission of electricity from the authorised Paarde Valley PV2 Solar Energy Facility, into the Eskom grid for distribution, and are considered the only practically realisable Preferred Site Alternative.

2.4.3 Design / layout alternatives

Two alternative design structures were considered for the proposed OHPL poles/pylons: steel lattice structures, or monopole structures (in line with Eskom required specifications). The types of poles / pylons to be used will ultimately be dependent on the outcome of the detailed geotechnical and pegging surveys of the grid connection corridor, which will be undertaken after the Basic Assessment process (i.e. if an Environmental Authorisation has been issued by DFFE). The environmental impacts associated with the monopole or steel lattice structure have been assessed comparatively by the specialists in their assessments. The final selection of the pylon design will therefore be influenced by the specialists assessments. All specialists found either alternative to be acceptable. Therefore, the selection of the alternative for the pylon type will be subject to the outcomes of the detailed technical studies that would be undertaken after the granting of the EA (if granted), and following the necessary agreements with ESKOM. From a visual impact perspective, it was found that the monopole is the preferred option, as it results in a more minimalist and less visually cluttered element in the landscape. However, the design of the connecting grid sometimes requires the use of a steel lattice in certain conditions and therefore the two types were not assessed separately. (Oberholzer & Lawson 2022). Although the two alternative pylon types do have a different visual appearance, the landscape is already so heavily compromised by powerlines and other electrical infrastructure that they are seen as equal in terms of their visual intrusion (Orton 2022). From an avifaunal perspective, the impact assessment is equal for both designs, as long as a minimum clearance distance of 1.8 m between the jumpers and/or insulators and the horizontal earthed component on the lattice/monopole structure are maintained (Chris van Rooyen Consulting 2022). From an aquatic biodiversity perspective, considering the potential aquatic ecosystem impact is negligible, and either of the proposed structures would have similar impacts (Belcher 2022).

2.4.4 The "No-Go" Alternative

The "No-Go" alternative is the alternative of the proposed project not being implemented i.e. the status quo remains. Should the "No-Go" Alternative be considered then the Paarde Valley PV2 Solar Energy Facility would likely not be realised. There would be no positive impact on the local economy and affected communities and the baseline of the environment would remain as it is. The transmission and distribution of the electricity generated by the authorised Paarde Valley PV2 Solar Energy Facility would not be possible. The impacts associated with the "No-Go" alternative for the proposed project have been addressed by each specialist and are discussed as follows:

2.4.4.1 Avifauna

The no-go alternative will result in the current status quo being maintained within the proposed development area as far as avifauna is concerned (neutral rating). The study area itself consists mostly of natural Karoo shrub and surface waterbodies. The no-go option would result in no additional impacts on priority avifauna which would be beneficial to the avifauna currently occurring there (Chris van Rooyen Consulting 2022, Annexure B7).

2.4.4.2 Terrestrial Biodiversity

The significance of the 'no-go' alternative for each potential impact on terrestrial biodiversity by the proposed project is considered to be negligible (Hoare 2022, Annexure B5).

2.4.4.3 Aquatic Biodiversity

The 'no-go' alternative would have potential aquatic ecosystem impacts of negligible significance (Belcher 2022, Annexure B6).

2.4.4.4 Heritage

During the construction phase, impacts on archaeological resources from the 'no-go' option would relate to trampling of artefacts by animals or vehicles, but this impact is minimal (magnitude rated zero) with the result that the significance is negligible negative. No mitigation is suggested for the 'no-go' option and the significance remains unchanged at negligible negative. For impacts on graves, the 'no-go' option would mean no anthropogenic changes to the land and impacts would only arise from natural causes. (e.g. a river in flood exposes a grave buried on its bank). These, however, are highly unlikely to happen (but are not impossible and do occur). Impacts are also rated as very low negative and, since no mitigation is proposed, they would remain at the very low negative level. The 'no-go' option for potential impacts on the cultural landscape, would mean that the landscape would remain unchanged, and no new impacts would occur.

During the operation phase, the 'no-go' option for potential impacts on the cultural landscape would mean that the landscape would remain unchanged, and no new impacts would occur.

If the project was not implemented then the site would stay as it currently is (impact significance of negligible negative for archaeology, very low negative for graves and medium negative for the cultural landscape). Although the heritage impacts with implementation would be greater than the existing impacts, the loss of socio-economic benefits is more significant and suggests that the no-go option is less desirable in heritage terms (Orton 2022, Annexure B3).

2.4.4.5 Palaeontology

The ‘no-go’ alternative for the potential palaeontological impacts during construction does not have any significance (Butler 2022, Annexure B4).

2.4.4.6 Visual

The ‘no-go’ alternative is the option of not constructing the grid connection, where the status quo of the current farming activities on the site would prevail. The ‘no-go’ alternative would mean that there would be no additional visual intrusion on the local area by overhead powerlines. The downside is that renewable energy cannot be fed into the grid.

The potential visual impact significance of the no-go alternative would be neutral as the status quo would likely continue and there would be no further visual impacts (Oberholzer and Lawson 2022, Annexure B2).

2.4.5 Concluding Statement

Two site alternatives for the connection point to the National Grid, and three alignment routes to these connection points were considered during the project design phase. It was found that only one connection point is feasible, and one route corridor that is expected to have the minimal impact, as it follows existing infrastructure as far as possible is proposed. Therefore, although three alternative routes for the OHPL were considered, only one was found to be feasible and assessed. Two alternative pole / pylon design alternatives were assessed by the specialists of which the “monopole” design was identified as the preferred alternative by the visual specialists, with the steel lattice being found acceptable. Either designs were found to be acceptable by all specialists.

The No-Go alternative was assessed in relation to all the project component’s location and design / route. Specialists found that the ‘no-go’ alternative for most potential impacts would have a negligible significance, no significance or would be neutral. The impact significance of the ‘no-go’ option for the potential impact on graves would be very low negative and would be of medium significance for the ’no-go’ option for the potential impact on cultural landscape. The No Go Alternative would result in the authorised Paarde Valley PV2 Solar Energy Facility, not being realised. No positive impacts of the ‘no-go’ alternative were identified.

3 POLICY AND LEGISLATIVE CONTEXT

The proposed project is subject to legislative and policy requirements at an international, national, provincial and municipal level. The legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and/or instruments applicable to the proposed activities, and that have been considered in the preparation of the Basic Assessment Report, are outlined below.

3.1 LEGISLATION CONTEXT

3.1.1 National Environmental Management Act (NEMA) and EIA Regulations 2014), as amended

The National Environmental Management Act (NEMA) (Act No. 107 of 1998), as amended, establishes the principles for decision-making on matters affecting the environment, and aims to encourage, promote and create parameters for legal enforcement for environmental protection, management and compliance.

The key principles of NEMA, which apply to the actions of all organs of state that may significantly affect the environment, are described in Chapter 1 of the Act and include, amongst others, the following:

- *Environmental management must place people and their needs at the forefront and serve their physical, psychological, developmental, cultural and social interests equitably;*
- *Development must be socially, environmentally and economically sustainable;*
- *Environmental management must be integrated;*
- *Decisions concerning the environment must take into account the needs, interests and values of all Interested and Affected Parties (I&APs);*
- *Decisions must be taken in an open and transparent manner; and access to information must be provided in accordance with law.*
- *The environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage.*

The Act also provides a framework for sustainable development that implies meeting the needs of the present generation without compromising the needs of the future generations.

Chapters 1 and 5 of NEMA provide a basis for consideration of potential impacts associated with a proposed development by the competent authority. These chapters provide the framework legislation for the more detailed Environmental Impact Assessment (EIA) Regulations (2014), as amended, which form the basis of Holland & Associates Environmental Consultant's approach to the EIA for the proposed project.

The EIA Regulations[12] (2014), as amended, promulgated in terms of NEMA identify certain activities that require environmental authorisation from the competent environmental authority, in this case DFFE, before commencing. Activities listed in Government Notice (GN) No. 984, as amended, require Scoping and Environmental Impact Reporting (S&EIR) whilst those in

[12] Government Notice No. R 983, R 984 and R 985 in Government Gazette No. 38282 of 4 December 2014, as amended in GN 324, GN 325, GN 326 and GN 327 of 7 April 2017, on 13 July 2018 (GN 706), 29 May 2020 (GN 599) and 11 June 2021 (GN 517).

GN No. 983 and 985, as amended, require Basic Assessment (unless they are being assessed as part of a S&EIR process). The EIA listed activities that are being applied for in this BA process are listed in Table 3.1.

Table 3-1: Listed activities in terms of NEMA GN No. R.983, R.984 and R.985, (2014), as amended, for which Environmental Authorisation is being applied for

Government Notice R.983 (as amended) Activity No(s):	The relevant Basic Assessment Activity(ies) as per Listing Notice 1 (GN No. R.983, as amended)	Description of the portion of the development as per the project description that relates to the applicable listed activity
11	The development of facilities or infrastructure for the transmission and distribution of electricity – (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts	The proposed project includes the development of a 132kV overhead powerline, 132kV switching station and 132kV Feeder Bay, and associated infrastructure.
12	The development of – (ii) infrastructure or structures with a physical footprint of 100 square metres or more, where such development occurs- (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse	The construction of a 132 kV overhead powerline and associated infrastructure (e.g. service roads), Switching Station and Feeder Bay, would have a combined footprint larger than 100 square meters. The proposed site consists of drainage lines and watercourses, which would be crossed by the powerline and service roads and/or be located within 32 m of a drainage line or watercourse.
19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;	The proposed grid connection and associated service road(s) would traverse watercourses on the site. The construction would require the infilling or depositing of more than 10 cubic meters or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse.
24	The development of a road— (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres	The proposed access road to the switching station yard would be approximately 8 m wide. (The service roads associated with the proposed OHPL would be 6 m (8 m if including V-drains) in width).
27	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	The construction of the proposed development would require the clearance of more than 1 ha of indigenous vegetation. (The majority of clearance of vegetation would be associated with the proposed linear activities (i.e. the proposed gridline and associated service road, and access road to the switching station).

28	Residential, mixed, retail, commercial, industrial, or institutional developments where such land was used for agriculture, game farming, equestrian purposes, or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare.	The development of the proposed project would change the land use from agriculture to mixed use, i.e. agriculture and electricity transmission. The proposed development site is located outside an urban area, and has a development footprint of more than 1 ha.
48	The expansion of— (i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; where such expansion occurs— (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;	The proposed project would result in the expansion of infrastructure (e.g. road(s)) or structures by more than 100 square metres which may be within a watercourse or within 32 m of a watercourse.
56	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre – where the existing reserve is wider than 13,5 meters; or where no road reserve exists, where the existing road is wider than 8 metres.	Existing farm access roads may need to be widened or lengthened. These roads may have no road reserve and may be wider than 8 m in some sections.
Government Notice R.984 (as amended) Activity No(s):	**The relevant Scoping and Environmental Impact Reporting Activity(ies) as per Listing Notice 2 (GN No. R.984, as amended)**	**Description of the portion of the development as per the project description that relates to the applicable listed activity**
N/A		
Government Notice R.985 (as amended) Activity No(s):	**The relevant Basic Assessment Activity(ies) as per Listing Notice 3 (GN No. R.985, as amended)**	**Description of the portion of the development as per the project description that relates to the applicable listed activity**
4	The development of a road wider than 4 metres with a reserve less than 13,5 metres in the (g) Northern Cape (ii) Outside urban areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere, excluding disturbed areas	The service roads associated with the proposed OHPL would be 6 m in width. The proposed switching station access road would be approximately 8 m wide. The site falls outside an urban area. Sections of the site comprise Critical Biodiversity Areas and/or are located within 5 km of the De Aar Nature Reserve.
10	The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres. (g) Northern Cape	The switching station, access road and northern sections of the powerline route alternatives fall within a Critical Biodiversity Area 2. There is a protected area, the De Aar Nature Reserve, approximately within 5 km of the proposed development site.

	ii. Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland; iii. Outside urban areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve;	The construction and operation of the switching station will require the handling and storage of dangerous substances. The storage facilities will have a combined capacity of less than 80 m^3. The substances required to be stored will include diesel, transformer oil, fuel, etc. Diesel storage for construction and operations will be required for the following: • During construction, diesel is required for construction vehicles as well as generators for the construction camp. • During operations, diesel is required for Operations and Maintenance vehicles as well as for backup diesel generators at the substation if required.
12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan in the (g) Northern Cape (ii) within critical biodiversity areas identified in bioregional plans.	The proposed project, including switching station, grid connection and associated infrastructure, would require the removal of more than 300 square metres of indigenous vegetation from areas identified as Critical Biodiversity Areas.
14	The development of— (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse; (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; (g) Northern Cape (ii) Outside urban areas: (ff) Critical biodiversity areas or ecosystem service areas as identified in the systematic biodiversity plans adopted by the competent authority or in bioregional plans; (hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve.	The proposed grid connection project and associated infrastructure (e.g. service roads) would entail the construction of infrastructure with a footprint greater than 10 square metres within a watercourse (i.e. at watercourse crossings) or within 32m of a watercourse. The site falls outside an urban area. Sections of the site comprise Critical Biodiversity Areas and/or are located within 5 km of the De Aar Nature Reserve.
18	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. (g) Northern Cape (ii) Outside urban areas:	Existing roads would be used as far as practically possible. Such existing roads would be widened and/or lengthened. The service road(s) associated with the proposed grid connection would

	(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve; (ii) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland;	entail the widening of sections of existing roads by potentially up to an additional 4 m, within Critical Biodiversity Areas, and /or within 5 kilometres of the De Aar Nature Reserve and / or within a watercourse or within 100 m from the edge of a watercourse or wetland.
23	The expansion of – (ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more; Where such expansion occurs – (a) Within a watercourse; (c) if no development setback exists, within 32 metres of watercourse, measured from the edge of a watercourse; (g) Northern Cape (ii) Outside urban areas; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve.	The expansion of existing infrastructure, such as roads, some of which are located within a watercourse, or within 32 m of a watercourse. The site falls outside an urban area. Sections of the site comprise Critical Biodiversity Areas and/or are located within 5 km of the De Aar Nature Reserve.

Further to the above, the proposed development falls entirely within an Electricity Grid Infrastructure (EGI) Strategic Transmission Corridor, i.e. in the Central Corridor, as per Government Notice (GN.) 113 of Government Gazette No. 41445 published on 16 February 2018, in terms of the NEMA (Act No. 107 of 1998).

3.1.2 National Heritage Resources Act (1999)

In terms of Section 38(1) of the National Heritage Resources Act (NHRA) (Act No. 25 of 1999), any person who intends to undertake "*any development … which will change the character of a site exceeding 5 000 m^2 in extent*", or "the *construction of a road,….pipeline, or other similar form of linear development or barrier exceeding 300m in length"* must at the very earliest stages of initiating the development notify the responsible heritage resources authority, *viz.* the South African Heritage Resources Agency ("SAHRA") or the relevant provincial heritage agency, *viz* Northern Cape Heritage Resources Authority ("NCHRA"). SAHRA/ NCHRA would in turn indicate whether or not a full Heritage Impact Assessment ("HIA") would need to be undertaken.

In terms of Section 38(8), the NHRA explicitly excludes the need for a separate HIA where the evaluation of the impact of a development on heritage resources is required in terms of other legislation, e.g. as part of an EIA process. Therefore, given that the impact on heritage resources would be assessed as part of the EIA process for the proposed project, no separate HIA would be required. SAHRA or NCHRA would review the Basic Assessment report and provide comments to the DFFE, who will then include these in their final environmental decision making. It should be noted however that, should a permit be required for the

damaging or removal of specific heritage resources, a separate application would have to be submitted to SAHRA or NCHRA for the approval of such an activity, if the Applicant is granted authorisation for the project and pursues the proposed project further.

Given that the proposed development would exceed 5 000 m^2 in extent and that the proposed gridline and access roads would exceed 300 m in length, the proposed development will require comment from SAHRA / NCHRA.

A specialist Heritage Impact Assessment for the proposed project has been undertaken by Dr Jayson Orton of ASHA Consulting, as well as a specialist Palaeontological Impact Assessment by Ms Elize Butler of Banzai Environmental (Pty) Ltd (refer to Annexures B3 and B4 respectively).

A case has been opened on the South African Heritage Resource Information System (SAHRIS) for the proposed project (Case number 18817) and SAHRA and the NCHRA will be invited to comment on the BAR during the 30 day I&AP comment period.

3.1.3 National Water Act (1998)

The National Water Act (NWA) (Act No. 36 of 1998) provides for the sustainable and equitable use and protection of water resources. It is founded on the principle that the National Government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use of water in the public interest, and that a person can only be entitled to use water if the use is permissible under the NWA.

Section 21 of the NWA specifies a number of "water uses", including the abstraction of water from a water resource; the storing of water; impeding or diverting the flow of water in a watercourse; as well as altering the bed, banks, course or characteristics of a watercourse. Defined water use activities require the approval of the Department of Water and Sanitation (DWS) in the form of a General Authorisation (GA) or a Water Use Licence (WUL).

The GAs for Section 21 (c) and (i) water uses (impeding or diverting flow or changing the bed, banks or characteristics of a watercourse) as defined under the NWA were revised in 2016 (Government Notice R509 of 2016). Determining if a water use licence is required for these water uses is now associated with the risk of degrading the ecological status of a watercourse. A low risk of impact could be authorised in terms of a GA (Belcher 2022).

The aquatic specialist for the proposed project undertook a risk assessment, summarised in Table 6 of Annexure 6, to inform the water use authorisation process, and concluded the following: "*Considering the scope of works proposed and the fact that there will be minimal works undertaken within the delineated aquatic features within the site, the risk of altering the ecological status of the adjacent aquatic features is considered to be low. It is thus recommended that the proposed activities fall within the ambit of the General Authorisations for Section 21(c) and (i) water use activities*" (Belcher 2022).

3.1.4 National Environmental Management: Biodiversity Act (2004)

The National Environmental Management Biodiversity Act (Act No. 10 of 2004), as amended, (NEMBA) seeks to provide for, amongst other things, the management and conservation of South Africa's biological diversity and the sustainable use of indigenous biological resources. A further objective of the Biodiversity Act is to provide for co-operative governance with regards to biodiversity management and conservation. Significantly, the Biodiversity Act provides for the protection of ecosystems and species that are threatened or in need of

protection, while also seeking to prevent the introduction and spread of alien or invasive species. As such, it controls and regulates:

- Certain threatening activities occurring in identified ecosystems;
- Certain activities which may negatively impact on the survival of identified threatened or protected species; and,
- Certain restricted activities involving alien or listed invasive species.

In accordance with the Biodiversity Act, an important function of an Environmental Impact Assessment and associated specialist studies is to ensure that sensitive vegetation is not detrimentally affected by the construction, operational and decommissioning activities associated with the proposed development scenarios and associated infrastructure.

The first national list of threatened terrestrial ecosystems for South Africa was gazetted on 9 December 2011 (National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (GG 34809, GN 1002), 9 December 2011). The gazetting of the list of threatened ecosystems has implications in terms of Activity 12 in Listing Notice 3 of the EIA Regulations, which relates to the clearance of 300m^2 or more of vegetation, as it triggers a Basic Assessment within any critically endangered or endangered ecosystem listed in terms of Section 52 of the Biodiversity Act. Consequently, any development that involves the loss of natural habitat in a listed critically endangered or endangered ecosystem would require a Basic Assessment in terms of the EIA Regulations.

Northern Upper Karoo is a vegetation type of “Least Concern” and the vegetation type is not listed in The National List of Ecosystems that are Threatened and in need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004).

The ecological specialist for the proposed project confirmed that the vegetation type occurring of the site is Northern Upper Karoo, and that the conservation status of Northern Upeer Karoo is “Least Concern” (Hoare 2022). The vegetation type is not listed in The National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004) (Hoare, 2022).

3.1.5 National Environmental Management: Protected Areas Act (2003)

The purpose of the National Environmental Management: Protected Areas Act (NEMPAA) (Act No. 57 of 2003) as amended by the National Environmental Management: Protected Areas Amendment Act (Act No. 31 of 2004) is to provide for the protection and conservation of ecologically viable areas representative of South Africa’s biological diversity and its natural landscapes and seascapes. The objectives of this Act include the following:

- To provide, within the framework of national legislation, including the National Environmental Management Act, for the declaration and management of protected areas;
- To provide for co-operative governance in the declaration and management of protected areas;
- To effect a national system of protected areas in South Africa as part of a strategy to manage and conserve its biodiversity;
- To provide for a representative network of protected areas on state land, private land and communal land;
- To promote sustainable utilisation of protected areas for the benefit of people, in a manner that would preserve the ecological character of such areas;

- To promote participation of local communities in the management of protected areas, where appropriate; and
- To provide for the continued existence of South African National Parks.

The eastern section of the proposed development site (including the proposed access road) is located within 5 km of a Protected Area, i.e. a municipal nature reserve known as the De Aar Nature Reserve. Protected Areas should be maintained in a natural or near natural state with no loss or degradation of natural habitat (CapeNature, October 2020). The access road to the proposed switching station would be approximately 120 m from the edge of the De Aar Nature Reserve, at its closest. The proposed switching station would be approximately 750 m from the edge of the Nature Reserve and Vetlaagte MTS would be approximately 9.7 km from the Nature Reserve.

The Emthanjeni Local Municipality and DFFE: Protected Areas Directorate will be invited to comment on the proposed project as part of the Public Participation Process.

3.1.6 National Environmental Management: Air Quality Act (2004)

The National Environment Management: Air Quality Act (NEMAQA) (Act No. 39 of 2004) regulates all aspects of air quality, and provides for the identification of priority pollutants and the setting of ambient standards with respect to these pollutants. The purpose of the Act is to set norms and standards that relate to:

- Institutional frameworks, roles and responsibilities;
- Air quality management planning;
- Air quality monitoring and information management;
- Air quality management measures; and
- General compliance and enforcement (DEA, 2015).

According to the Act, the DFFE, the provincial environmental departments and local authorities are separately and jointly responsible for the implementation and enforcement of various aspects of the Air Quality Act. Each of these spheres of government is obliged to appoint an air quality manager and to co-operate with each other and co-ordinate their activities through mechanisms provided for in the National Environmental Management Act (DEA, 2015).

No listed activities in terms of NEMAQA are triggered by the proposed 132kV powerline and associated infrastructure, accordingly no Atmospheric Emission License for the proposed project is required.

Cognisance must however be taken of the National Dust Control Regulations (GN R. 827) published under Section 32 of NEMAQA, which prescribes the general measures for the control of dust in all areas, and provides a standard for acceptable dustfall rates in both residential and non-residential areas. Appropriated dust control measures will therefore need to be applied (as outlined in the EMPr for the project) to minimise dust that may be temporarily generated during the construction phase of the project.

3.1.7 National Environmental Management: Waste Act (2008)

The National Environmental Management: Waste Act (NEMWA) (Act No. 59 of 2008) came into effect on 1 July 2009. Section 19 of the NEMWA provides for listed waste management activities and states in Section 19(1) that the Minister may publish a list of waste management activities that have, or are likely to have a detrimental effect on the environment. Such a list

was published in GN 718 of 03 July 2009 (GN 718), as amended, identifying those waste management activities that require a Waste Management Licence in terms of NEMWA.

No waste management listed activities are triggered by the proposed project, therefore no Waste Management License is required.

General and hazardous waste handling, storage and disposal would however likely be required during the construction and operational phases of the project. Accordingly, cognisance will need to be taken of the National Norms and Standards for the Storage of Waste (GN.R 926) published under Section 7(1)(c) of NEMWA.

3.1.8 Conservation of Agricultural Resources Act (1983)

The Conservation of Agricultural Resources Act (Act No. 43 of 1983) (CARA) provides for the control of the utilisation of the natural agricultural resources of South Africa, in order to promote the conservation of the soil, water sources and vegetation, as well as the combating of weeds and invaders plants. As such, as part of the Basic Assessment process, recommendations will be made to ensure that measures are implemented to prevent soil erosion and protect any water bodies and natural vegetation on site. The Applicant will need to implement these measures which should also ensure the control of any undesired aliens, declared weeds and plant invaders listed in the Regulation that may pose as a problem as a result of the proposed development.

3.1.9 The Constitution of the Republic of South Africa (1996)

The Constitution of the Republic of South Africa (No. 108 of 1996) is the supreme law of South Africa, and underpins all environmental legislation in the country. The Constitutional environmental right (Section 24 of the Constitution) states the following:

"*Everyone has the right –*

- *To an environment that is not harmful to their health or well-being, and*
- *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:*
    - *Prevent pollution and ecological degradation,*
    - *Promote conservation, and*
    - *Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development*."

The Constitution forms the foundation of all environmental principles and management in the country and it is enshrined in all legislation.

3.1.10 Mineral and Petroleum Resources Development Act (MPRDA) (2002)

The Mineral and Petroleum Resources Development Act (MPRDA) (Act No. 28 of 2002), as amended, makes provision for equitable access to and sustainable development of South Africa's mineral and petroleum resources, with the relevant authority being the Department of Mineral Resources and Energy (DMRE). In terms of the provisions of the MPRDA, a mining permit is required in accordance with Section 27(6) of the MPRDA where a particular mineral is to be mined, including the mining of materials from a borrow pit.

No borrow pits are required for the construction of the proposed project, accordingly a mining permit (or EA) in this regard is not required.

3.1.11 Subdivision of Agricultural Land Act (1970)

The Subdivision of Agricultural Land Act (SALA) (Act No. 70 of 1970) regulates the subdivision of all agricultural land in South Africa. The main purpose of the Act is to prevent the creation of uneconomic farming units and this purpose is achieved through the requirement that the Minister of the Department of Agriculture, Land Reform and Rural Development must consent to the proposed subdivision and/or rezoning of agricultural land, so as to prevent the degradation of prime agricultural land in South Africa.

Any portion of land associated with the proposed project that is zoned for agriculture and that will need to be leased for a period exceeding ten years is regulated by the Act (Section 3(d)).

3.1.12 National Forests Act (1998)

The main objective of the National Forests Act (NFA), (Act No. 84 of 1998) is to promote the sustainable management and development of forests and to provide protection for certain forests and trees (DEA, 2015). The NFA empowers the Minister of the DFFE to declare and list a tree, group of trees, woodland, or a species of trees as protected. GN 635 of 6 December 2019 includes a list of all protected tree species under Section 12 of the NFA. In terms of the NFA, "*no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister*".

The ecological specialist for the proposed project indicated that *Boscia albitrunca* (Protected Tree) occurs within the study area and accordingly may be impacted by the proposed development. Should the proposed development require the removal and/or damage of a protected tree, a tree clearing permit would be required from the competent authority (DFFE) prior to removal.

3.1.13 Civil Aviation Act (2009)

The Civil Aviation Act (Act No. 13 of 2009) governs civil aviation in South Africa, with the South African Civil Aviation Authority (SA CAA), an agency of the Department of Transport, being the mandated authority for the Act. All proposed developments in South Africa that may potentially impact civil aviation must be assessed by the SA CAA in terms of the South African Civil Aviation Regulations and South African Civil Aviation Technical Standards (SA CATs), in order to ensure civil aviation safety.

The Applicant has submitted the relevant application for approval to the CAA for the authorised Paarde Valley PV2 Solar Energy Facility and the proposed 132 kV grid connection. The CAA has indicated that the SACAA has no objection to the Paarde Valley PV2 Solar Energy Facility and associated infrastructure (including the proposed 132 kV grid connection and associated infrastructure), and has "conditionally approved" the projects. The SA CAA statement for the project is conditional to the developer providing the SACAA with the "as built" parameters of the facility, which includes the height of the pylon structures conveying power generated by the facility. The conditional approval is valid for 5 years from the date of the letter (9 March 2022). Refer to Annexure B8.

3.1.14 Astronomy Geographic Advantage Areas Act (2007)

In February 2010, the Minister of Science and Technology declared all land in the Northern Cape Province situated 250km from the centre of the South African Large Telescope dome as an astronomy advantage area for optical astronomy purposes, and the whole of the territory

of the Northern Cape Province, excluding Kimberly, as an astronomy advantage area for radio astronomy purposes (DEA, 2015).

In terms of the proximity of the proposed project to the Square Kilometer Array (SKA), De Aar falls over 100km outside the restricted Astronomy Geographic Advantage Areas Act (AGAA) Karoo Central Astronomy Advantage Areas (KCAAA) zones.

An RFI Assessment of the proposed project has been undertaken (refer to Annexure B9), and confirms that the proposed project poses a very low to no RFI or EMI risk to the surrounding environment.

The South African Radio Astronomy Observatory (SARAO) will be invited to comment on the proposed project during the 30-day IA&P comment period for the Draft BAR.

3.1.15 The Nature and Environmental Conservation Ordinance No. 19 of 1974; and Northern Cape Nature Conservation Act, 2009 (Act No. 9 of 2009)

Under the Nature and Environmental Conservation Ordinance No 19 of 1974 the Northern Cape Nature Conservation Act was promulgated to regulate management of nature and to ensure the sustainable utilisation of wild animals, aquatic biota and plants; to provide for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; to provide for offences and penalties for contravention of the Act; to provide for the appointment of nature conservators to implement the provisions of the Act; to provide for the issuing of permits and other authorisations; and to provide for matters connected therewith.

The ecological specialist for the proposed project indicated that *Boscia albitrunca* (Protected Tree) occurs within the study area and accordingly may be impacted by the proposed development. Should the proposed development require the removal and/or damage of a protected tree, a tree clearing permit would be required from the competent authority (DFFE) prior to removal.

An invasive alien management plan will be compiled and implemented to manage growth of alien vegetation at the proposed site.

3.1.16 National Roads Act (No. 93 of 1996)

The National Roads Act 93 of 1996 makes provision for regulating the transportation of dangerous goods and substances by road. Section 275 states that, no person shall operate on a public road any vehicle in or on which dangerous goods is transported, unless such dangerous goods are transported in accordance with Chapter VIII of the Act. Chapter VIII also incorporates the SABS standard specifications relating to the transportation of dangerous goods and substances. Section 279 indicates the availability of an authority for classification and certification of dangerous goods should there be any doubt as to the appropriate classification of dangerous goods (DEA, 2013)

Should the project require the transportation of any dangerous goods, they will be transported in accordance with Chapter VIII of the National Roads Act (No. 93 of 1996).

3.1.17 The Hazardous Substances Act (Act 15 of 1973)

The hazardous Substances Act (HAS, No. 15 of 1973) was promulgated to provide for the control of substances which may cause injury, ill-health or death. Substances are defined as hazardous if their inherent nature is: toxic, corrosive, irritant; strongly sensitising, flammable

and pressure generating (under certain circumstances) which may injure cause ill-health, or death in humans.

Any hazardous substances used during the lifetime of the proposed project will be classified (as defined by DWAF (2005)) and managed according to is classification under the South African National Standards (SANS).

3.2 RELEVANT ENVIRONMENTAL GUIDELINES

3.2.1 DEA Integrated Environmental Management Information Series & DEA Guidelines

The then Department of Environmental Affairs and Tourism (DEAT) Information Series, 2002, consists of twenty documents, which were drafted as sources of information on the principles and approaches to Integrated Environmental Management (IEM). IEM is a fundamental instrument of NEMA and provides the overarching framework for the integration of environmental assessment and management principles into environmental decision-making. The aim of the Information Series is to provide general information on techniques, tools and processes for environmental assessment and management. The Information Series has been referred to for information on the most suitable approach to the environmental assessment process for the proposed development.

Furthermore, the Integrated Environmental Management Guideline Series (2004) and applicable DEA guidelines were reviewed in conjunction with the applicable sections of the EIA Regulations R.982, as amended, to ensure that all legal requirements were adequately met and that principles of best practice were applied, where applicable. Such relevant Guidelines included:

- Companion Guideline on the Implementation of the Environmental Impact Assessment ("EIA") Regulations 2010. Notice No: 805 GG: 35769 Date: 10/10/2012
- Public Participation in the Environmental Impact Assessment ("EIA") Process Guideline 7. Notice No: 807 GG: 35769 Date: 10/10/2012
- Guidelines on Need and Desirability (2017)
- Public Participation Guidelines in terms of the NEMA EIA Regulations (2017)
- EIA Guidelines for Renewable Energy Projects (2015)

3.3 POLICY AND PLANNING DOCUMENTS

Various planning policy documents have bearing on the current application and are outlined below.

3.3.1 United Nations Framework Convention on Climate Change and Kyoto Protocol

Since the purpose of the proposed grid connection and associated infrastructure is to transmit energy generated by a renewable energy facility for its further distribution, this project aligns with the Kyoto Protocol which operates the United Nations Framework Convention on Climate Change by committing industrialized countries and economies in transition to limit and reduce greenhouse gases (GHG) emissions.

3.3.2 Paris Agreement

The Paris Agreement is an international treaty on climate change signed by 196 parties at the 2015 United Nations Climate Change Conference near Paris, France. The Agreement aims to

keep the rise in mean global temperature to well below 2 °C above pre-industrial levels, and preferably limit the increase to 1.5 °C, by reducing greenhouse gas emissions. The transition away from non-renewable energy resources is a means of climate change mitigation and adaptation through the reduction in greenhouse gas emissions. The proposed grid connection, switching station and associated infrastructure would be critical to the evacuation of energy generated by the authorised Paarde Valley PV2 Solar Energy Facility to the National Grid, and thus contribute towards the increasing use of renewal energy in South Africa.

3.3.3 White Paper on the Energy Policy of the Republic of South Africa (1998)

The White Paper on the Energy Policy of the Republic of South Africa 1998 replaced the White Paper on Energy Policy of 1986, aiming to align the energy sector with sustainable development. It laid out five policy objectives: increase access to affordable energy; improve energy governance; stimulate economic development; manage energy-related environmental impacts; and secure supply through diversity.

The proposed project aligns with the main objective of the White Paper on the Energy Policy of the Republic of South Africa 1998 which is to ensure that demand for energy will be met, in an optimal manner and in the long term, without placing unfair burdens on any sector of society, including future generations. By enabling the contribution of renewable energy to the ESKOM grid, the proposed project would support this objective.

3.3.4 White Paper on Renewable Energy (2003)

The Department of Energy (DoE) gazetted the White Paper on Renewable Energy in 2003, and introduced it as a "policy that envisages a range of measures to bring about integration of renewable energies into the mainstream energy economy." The White Paper proposed that the national target of renewable energy contribution to final energy consumption would be produced mainly from biomass, wind, solar and small-scale hydropower. Since the White Paper was gazetted, South Africa's primary and secondary energy requirements have remained heavily fossil-fuel dependant, both in terms of indigenous coal production and use, as well as the use of imported oil resources (DEA, 2013).

The proposed project aligns with the White Paper because it will ensure the transmission of electricity generated by a renewable energy facility (Paarde Valley PV2 Solar Energy Facility) to the ESKOM grid for distribution to end-users. The proposed project will enable a reduction in the demand on energy generated by fossil fuels.

3.3.5 National Climate Change Response Policy White Paper (2011)

The objective of the National Climate Change Response Policy is for South Africa to "build the climate resilience of the country, its economy and its people and manage the transition to a climate-resilient, equitable and internationally competitive lower-carbon economy and society in a manner that simultaneously addresses South Africa's over-riding national priorities for sustainable development, job creation, improved public and environmental health, poverty eradication, and social equality".

The development of renewable energy (and consequent dependency on fossil fuels) contributes to the global effort to stabilise greenhouse gas (GHG) concentrations in the atmosphere. As the proposed OHPL, switching station and associated infrastructure would enable the evacuation of energy generated by a renewable resource, the proposed project strongly aligns with the White Paper's objective.

3.3.6 National Integrated Energy Plan (IEP) (2016)

The purpose of the National Integrated Energy Plan (IEP) is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development. Eight objectives are specified within the Plan, as follows: Ensure security of supply; minimise the cost of energy; promote the creation of jobs and localisation; minimise negative environmental impacts from the energy sector; promote the conservation of water; diversify supply sources and primary sources of energy; promote energy efficiency in the economy; and increase access to modern energy.

The proposed project would enable the evacuation of the electricity produced by the Paarde Valley PV2 Solar Energy Facility to the ESKOM grid. As described in the IEP, solar energy production presents excellent opportunities to diversify the electricity mix, to produce distributed generation and to provide off-grid electricity. Solar technologies also present the greatest potential for job creation and localisation.

3.3.7 Integrated Resources Plan (IRP) (2019)

The promulgated IRP 2010–2030 identified the preferred generation technology required to meet expected demand growth up to 2030. It incorporated government objectives such as affordable electricity, reduced greenhouse gas (GHG) emissions, reduced water consumption, diversified electricity generation sources, localisation and regional development. The Plan clearly indicates the importance of renewable energy, including solar energy which presents an opportunity to diversify the electricity mix, to produce distributed generation and to provide off-grid electricity. Renewable technologies also present huge potential for the creation of new industries, job creation and localisation across the value chain. With this said, the proposed project, which would enable the successful transmission of renewable energy to the ESKOM grid, clearly aligns with the Plan.

3.3.8 National Infrastructure Plan (2050)

The goal of the National Infrastructure Plan 2050 (NIP 2050) is to create a foundation for achieving the National Development Plan's (NDP) vision of inclusive growth. The NIP 2050 offers a strategic vision and plan that link top NDP objectives to actionable steps and intermediate outcomes. The NIP2050 identifies the most critical actions needed for sustained improvement in public infrastructure delivery. The first phase of the NIP 2050 focuses on four critical network sectors that provide a platform: energy, freight transport, water and digital infrastructure.

To achieve the vision for energy infrastructure, there must be a transition away from fossil fuels in a measurable, just and sustained manner. New installed capacity should consist primarily of wind and solar, where South Africa has a comparative and competitive advantage. With this said, it is clear that the proposed project would play an important role in supporting the evolution towards this vision because it will evacuate the electricity generated by a renewable energy facility, to the ESKOM grid.

18 Strategic Integrated Projects (SIPs) were developed under the guidance of the Presidential Infrastructure Coordinating Committee (PICC) and work on all projects commenced in 2013. To work towards the energy infrastructure objectives of the Plan, SIPs 8 (includes green energy projects, including procurement of renewable energy under the Independent power Producer Procurement Programme (REIPPPP)), 10 (includes expanding electricity transmission and distribution network) and 20 (includes Emergency/Risk Mitigation Power Purchase Procurement Programme (2000MW), small IPP Power Purchase Procurement

Programme (100MW) and Embedded Generation Investment Programme (EGIP)-400MW) were assigned as top priority SIPs to assist in working towards the vision of the Plan.

3.3.9 Transmission Development Plan (2021 - 2030)

The Transmission Development Plan (TDP) for the period 2022 to 2031 aims to expand the transmission network to enable the integration of 30 GW of new, mostly renewable, generation capacity. Most of this capacity is expected to come largely from solar energy and onshore wind generators, built in areas where there is limited existing grid infrastructure. To implement this, the construction of facility and grid infrastructure needs to increase drastically. Since the proposed project consists of the establishment of an OHPL, switching station and associated infrastructure, it directly aligns with the objectives of the Transmission Development Plan (2021-2030).

3.3.10 Northern Cape Provincial Spatial Development Framework (SDF)

The Northern Cape Provincial Spatial Development Framework (PSDF) (2012) serves as a:

- Spatial land-use directive which aims to promote environmental, economic, and social sustainability through sustainable development;
- Guideline for instilling a developmental state;
- Basis for prioritising governmental programmes and projects;
- Premise for governmental performance management;
- Manual for integrated land-use planning;

The Northern Cape PSDF seeks to advance the establishment of renewable energy supply schemes within the Northern Cape Province, and indicates that the Northern Cape holds a potential comparative advantage due to the high solar irradiance which could be a source of renewable energy, specifically for sustainable electricity production.

3.3.11 Pixley Ka Seme District Municipality Integrated Development Plan (IDP)

The Municipal Systems Act (Act No. 32 of 2000) requires municipalities to develop IDPs, which should be single, inclusive and strategic in nature. In addition, the Act requires municipalities in South Africa to review their IDP's on an annual basis to remain relevant to the changing communities. The IDP of a municipality guides development within the council's area of jurisdiction and the priorities and actions identified in the IDP will inform the structure of the municipality, all financial planning and budgeting, the service delivery standards as well as performance reporting processes.

In the SWOT analysis carried out in the District Municipality's Fourth Generation IDP (2021 – 2022), development of renewable energy, specifically solar and wind energy facilities was identified as an opportunity for economic growth for the district.

The IDP clearly states that there is a major backlog of electricity supply to the municipal area. The proposed project will aid in relieving this backlog as it will enable distribution of electricity to the area from the Paarde Valley PV2 Facility.

Characterised by high levels of poverty and unemployment, the District Municipality would benefit from the employment opportunities afforded by the proposed project and the associated Paarde Valley PV2 Facility. Furthermore, this would align with the potential for the development of renewable energy within the area, which has also been identified as a characteristic of the District. Investment in renewable energy generation is seen as an opportunity to grow the area's economy.

The proposed project would assist with meeting three of the main objectives of the District Municipality's Local Economic Development (plan): reduce unemployment, alleviate poverty, and enhance the implementation of environmental sustainability, which is one of the main drivers of the Northern Cape Provincial Growth and Development Plan (vision 2040). It would also add to the overall socio-economic development and enterprise development brought to the area by existing renewable energy.

Since the components (switching station, gridline and associated infrastructure) of the proposed project will service the authorised Paarde Valley PV2 solar energy facility, it is considered to be aligned with the objectives of the Municipality's IDP.

3.3.12 Pixley Ka Seme District Municipality Spatial Development Framework (SDF)

The Spatial Development Framework version available on the Municipality's website is the "Pixley Ka Seme District Spatial Development Framework / Land Development Plan, 2013 – 2018". This version was used to inform the alignment of the proposed project with the District Municipality's Spatial Development Framework (SDF).

The principal of using renewable resources in preference to non-renewable resources is included within the province's spatial development framework and is emphasised as a principal of the District's spatial development framework. Furthermore, the potential for the development of renewable energy within the District is clearly seen as an opportunity for development and consequent alleviation of unemployment and electricity shortages, ensuring more households have electricity. With the abundance of sunshine, vast tracts of available land, and high solar index the suitability of the District for the development of solar energy facilities is stipulated within the SDF.

The District Municipality is planning to diversify their economy, away from their dependency on agriculture and mining. Renewable energy development is one of the major means of implementing this diversification. The District have declared themselves as a Renewable Energy Hub, seeking to attract foreign direct investments into renewable energy projects. The proposed project, which will allow for the effective distribution of electricity generated by the authorised Paarde Valley PV2 solar energy facility, aligns with the goal of diversification through renewable energy development.

3.3.13 Emthanjeni Local Municipality Integrated Development Plan (IDP)

The draft Integrated Development Plan 2021/2022 (Review 4 of the 4th Generation IDP) was used to inform the alignment of the proposed project with the local municipality's IDP.

The IDP clearly stipulates it being the central hub of renewable energy, especially the area around the town of De Aar. With the proposed project being associated with a renewable energy facility, it clearly fits in with this developing environment. It also states the promising impact that renewable energy developments are expected to have on the local economy, especially the high unemployment rate.

The IDP speaks about an influx of personnel to the town of De Aar, creating a demand for housing. The proposed project will allow for the supply and distribution of electricity to this housing expansion. The proposed project will further reduce the shortfall of electricity currently being experienced by the area.

With climate change predictions, the Karoo is expected to become drier and hotter. These conditions are expected to increase the reliance on pumping of groundwater for water supplies. An increase in pumping of water is expected to increase the demand for electricity,

a need which can be fulfilled by the development of energy through renewable resources, such as sun and wind.

Since the components of the proposed project will service the Paarde Valley PV2 solar energy facility, it is considered to be aligned with the objectives of the local Municipality's IDP.

3.3.14 Emthanjeni Local Municipality Spatial Development Framework (SDF)

The Emthanjeni Local Municipality Spatial Development Framework (SDF) has not been updated since 2007. The town of De Aar has been identified as a development node within the local municipality, where local economic growth is proposed to be promoted. It does not make mention of renewable energy.

3.3.15 National Web Based Screening Tool and Protocols for the Assessment and Minimum Report Content Requirements of Environmental Impacts for Environmental Themes

On 5 July 2019, a "Notice of the requirement to submit a report generated by the National Web based environmental screening tool in terms of Section 24(5)(h) of the NEMA (Act No. 107 of 1998) and Regulation 18(1)(b)(v) of the EIA Regulations, 2014, as amended", was gazetted in GN No. 960. The national web-based Environmental Screening Tool allows for the generation of a Screening Report referred to in Regulation 16(1)(v) of the EIA Regulations 2014, as amended, whereby a Screening Report is required to accompany any application for Environmental Authorisation from October 2019. Refer to Appendix 11 of Annexure A for the Screening Report for the proposed project.

Furthermore, on 20 March 2020, the Minister of Environment, Forestry and Fisheries (DEFF), in terms of sections 24(5)(a), (h) and 44 of the NEMA, (Act No. 107 of 1998), prescribed general requirements for undertaking site sensitivity verification and for protocols for the assessment and minimum report content requirements of environmental impacts for environmental themes for activities requiring environmental authorisation, as contained in the Schedule in GN No.320 of 20 March 2020. In this regard, when the requirements of a protocol apply, the requirements of Appendix 6 of the EIA Regulations, as amended, are replaced by the requirements in GN No. 320 of 20 March 2020. These procedures and requirements came into effect on 8 May 2020.

The National Web-based Screening Tool was run for the proposed project on 13 June 2022 (Appendix 11 of Annexure A). The Screening Tool identified the following sensitivities for the proposed development footprint (note that the Screening Tool assigns the highest mapped sensitivity within the development site to a particular theme, regardless of what proportion of the site is mapped at that sensitivity):

- Agriculture Theme: Medium Sensitivity
- Animal Species Theme: High Sensitivity
- Aquatic Biodiversity Theme: Very High Sensitivity
- Archaeological and Cultural Heritage Theme: Very High Sensitivity
- Civil Aviation Theme: High Sensitivity
- Defence Theme: Very High Sensitivity
- Palaeontology Theme: High Sensitivity
- Plant Species Theme: Medium Sensitivity
- Terrestrial Biodiversity Theme: Very High Sensitivity

According to the National Web-based Screening Tool Report for the proposed project (dated 13 June 2022), the following protocols for the assessment of environmental impacts apply to the Basic Assessment Reporting process for the proposed project:

- Protocol for the Specialist Assessment and Minimum Report Content Requirements for the Environmental Impacts on Agricultural Resources (Government Notice No. 320 Published on 20 March 2020);
- Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity (Government Notice No. 320 Published on 20 March 2020);
- Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity (Government Notice No. 320 Published on 20 March 2020);
- Protocol for the Specialist Assessment and Minimum Report for Environmental Impacts on Terrestrial Plant Species (Government Notice No. 1150 Published on 30 October 2020);
- Protocol for the Specialist Assessment and Minimum Report for Environmental Impacts on Terrestrial Animal Species (Government Notice No. 1150 Published on 30 October 2020);
- General requirements for undertaking an initial site sensitivity verification where no specific assessment protocol has been identified (GN No. 648 Published on 10 May 2019), for Landscape/ Visual Impact Assessment; Archaeological and Cultural Heritage Impact Assessment; Palaeontology Impact Assessment; Geotechnical Assessment

A Site Sensitivity Verification Report was compiled (Annexure D) which verified that of the twelve (12) specialist studies identified in the National web-based Screening Tool, nine full specialist assessments namely: Agriculture, Landscape / Visual, Archaeological and Cultural Heritage, Palaeontology, Terrestrial Biodiversity, Aquatic Biodiversity, Avian Impact Assessments are required. Compliance statements are required for the Animal Species theme (excluding the taxon Aves), the Plant Species theme, the Civil Aviation Theme and a specialist study was conducted for the RFI theme.

4 DESCRIPTION OF THE AFFECTED ENVIRONMENT

4.1 INTRODUCTION

This chapter provides a brief description of the existing biophysical and built/ social environment within the immediate vicinity of the proposed development. It draws on existing knowledge, discussions with various role-players, site visits, specialist investigations and the project team's knowledge of the affected environment. It serves to present the context against which the potential positive and negative impacts associated with the proposed project can be identified.

4.2 THE BIOPHYSICAL ENVIRONMENT

4.2.1 Climate, Hydrology and Geohydrology

At the site of the proposed project, the summers are hot; the winters are short, cold, and windy; and it is dry and mostly clear year-round. Average temperatures vary from 16 °C in June/July to 32 °C in January and February. The wet season occurs from mid-November to mid-April with February tending to be the wettest month and July the driest month with a mean annual rainfall for the area of 282 mm. The climate is classified as arid to semi-arid.

The site is not in a Strategic Water Source Area for surface water. Due to the climatic conditions of the area, the smaller watercourses and the wetland areas that occur in the area are ephemeral (non-perennial), only containing water for short periods, immediately following local rainfall events. A dominant feature of the larger rivers is the alluvial floodplains that are characterised by multiple channels that are interchangeably used during higher flow events. These sandy floodplains tend to have mostly bare beds, with vegetation occurring in clumps along the bed and more densely along the banks. The ephemeral watercourses are highly dependent on groundwater discharge.

The area has been mapped as a Strategic Water Source Area for groundwater (De Aar Region). A major fractured aquifer occurs within the area. The water table typically occurs at depths of about 8 m below ground level and the yield of the aquifer is less than 2 litres a second. Both the surface and groundwater quality tend to be slightly brackish with natural electrical conductivity concentrations of between 70 and 150 mS/m. The estimated groundwater recharge in the area is 12.3 mm/a. The aquifer is of medium susceptibility and vulnerability (Belcher 2022, Annexure B6).

It is predicted that the Karoo could experience more drought periods, couple with increased evaporation and temperatures having negative impacts on already restricted water supply. Regional predictions suggest a drying trend from west to east, as shift to more irregular rainfall of possible greater intensity, and rising temperature everywhere (Emthanjeni Municipality IDP 2021-2022).

4.2.2 Topography, Landscape, Geology and Soils

The majority of the landscape consists of flat to slightly undulating plains with shallow valleys that are drained by tributaries of the Brak River, a northward-flowing tributary of the Lower Orange River. A series of flat-topped dolerite koppies occur to the north-east of the study area, as well as to the west of the site of the authorised Paarde Valley PV2 Solar Energy Facility. The elevation of the study area ranges from approximately 1230 to 1300 m.a.s.l.

The geology of the study area can be described as being underlain by flat-lying sedimentary rocks of the Karoo Supergroup, which have been intruded by innumerable sills and dykes of dolerite. The overlying soils are variable from shallow to deep, red-yellow apedal, freely draining soils to very shallow Glenrosa and Mispah forms. The soils in the study site are primarily red soils of a restricted soil depth, excessive drainage, high erodibility and low fertility. Calcrete soils are also prevalent as a result of the climatic conditions and underlying parent material.

The land capability of the switching station and its access road site and power line corridor on the screening tool is predominantly 5, which translates to a low agricultural sensitivity. The agricultural production potential of the site is completely constrained by the aridity of the climate (low rainfall of approximately 285 mm per annum and high evaporation of approximately 1,500 mm per annum). As a result, the agricultural land use is limited to grazing. Grazing of both sheep and game is the dominant agricultural land use in the area. Grazing capacity of the site is fairly low at 20 hectares per large stock unit. There is no cultivation in the corridor proposed for the gridline. In the surrounding area the little cultivation that there is, is confined to small, isolated patches of pasture or fodder crops around farmsteads.

The proposed grid corridor has few significant features, most of the topographic or scenic features being on the periphery, further to the west, north and east of the site (Lawson & Oberholzer 2022, Annexure B2).

The integrity of the landscape and overall sense of place is no longer intact, as the surroundings to De Aar have been transformed by the growth of the town, the railway yards, and in more recent times by a number of high-tech solar energy facilities, along with related infrastructure of an industrial nature.

In addition, the large Eskom Hydra Substation is located only 3 km south of the proposed Vetlaagte substation, with several Eskom powerlines traversing the study area.

4.2.3 Terrestrial Biodiversity, Vegetation and Fauna

The proposed project would lie wholly within the Northern Upper Karoo vegetation type. This vegetation type is of Least Concern and is not listed in The National List of Ecosystems that are Threatened and in need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004).

Five different habitats were identified within the site, namely, Lowland plains, Raised plains, Low hills, Rock outcrops and Drainage (Hoare 2022, Annexure B5).

- **Lowland plains:** This is the widespread plains vegetation of the area around De Aar. It is generally found on loamy soils with relatively low rock cover. The vegetation consists mostly of low dwarf shrubs, along with various grasses. It is relatively species poor, and is uniform across wide areas.
- **Raised plains:** There some parts that are slightly raised relative to the general lowland plains, and have shallower and more rocky soils. They often occur on low rises, as well as forming a gradient to hills. The vegetation has many more dwarf shrubs and less grass than the lowland plains, and there is a higher species richness and more diverse local composition.
- **Low hills:** There are a small number of low hills in the study area that have a steeper topography than the surrounding plains, are more rocky, and include various amounts of scattered rock and outcrops. The vegetation is much more diverse than the

surrounding plains and includes a higher diversity of woody shrubs, including the protected tree *Boscia albitrunca*. The grass species composition is also different.

- **Riparian / drainage:** There is a small non-perennial stream running across the corridor close to the substation site. At the time of the field survey, it was flowing quite strongly, due to recent good rains. The vegetation is a combination of wetland plants and tall shrubs. This forms a relatively continuous broken woodland along the banks of the channel. Most of the recorded species are either exotic or alien invasive species.

According to the Northern Cape Critical Biodiversity Map, the proposed switching station and the north-eastern range of the proposed gridline lies within a CBA 2. The remainder of the proposed gridline lies within an Ecological Support Area (Figure 5).

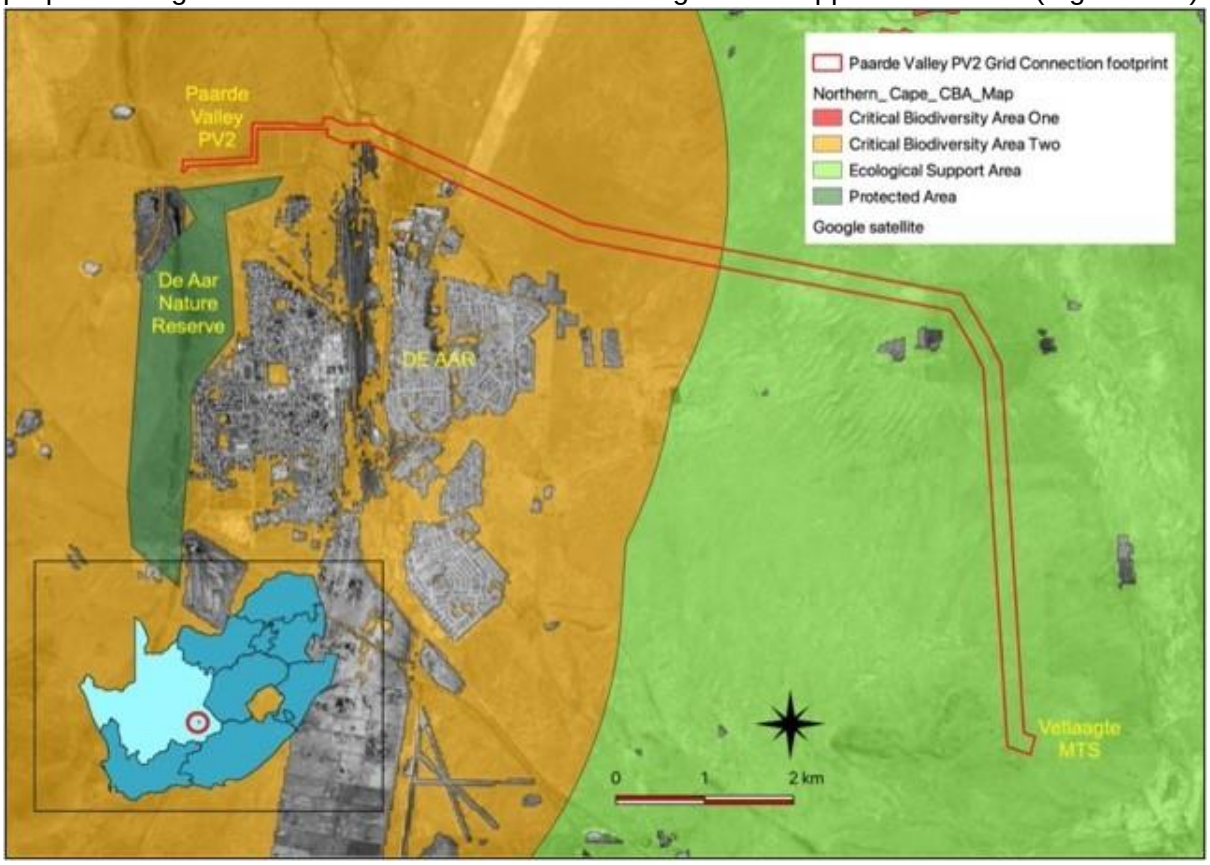


Figure 5: Northern Cape Biodiversity Conservation Plan for the site and surrounding areas

One Near Threatened reptile species was found on site, the Tent Tortoise (*Psammobates tentorius*). The individual tortoise was found near the north-eastern end of the study area under an existing power line. This species has a wide distribution in South Africa from south-east of Graaff-Reinett to southern Namibia. The current observation is near to the north-eastern edge of the known distribution range. The main general threats to the species include primarily general habitat degradation and loss.

Other listed animal species that could possibly occur in the study area (based on geographical distribution) are mostly small carnivores, including Black-footed Cat (Vulnerable) and Brown Hyaena (Near Threatened), both mobile species that will move away from any human disturbance. Neither of these species has been recently observed anywhere nearby and it is considered unlikely that they occur there (Hoare 2022, Annexure B5).

The ephemeral streams and floodplains provide aquatic habitat to a diverse array of faunal species that are adapted to the brief periods of inundation to carry out much of their life phases. Amphibians such as the Karoo Dainty Frog, *Cacosternum karooicum* and Karoo Toad, *Vandijkophrynus gariepensis* use the inundated pools to breed in. Other biota that use the temporary wet habitats comprise migratory birds and many invertebrates such as water fleas (*Daphnia* spp.) and tadpole shrimps (*Triops* spp.). Connectivity between aquatic ecosystems and the surrounding terrestrial landscape is essential for supporting the fauna of these ecosystems (Belcher 2022, Annexure B6).

The Southern African Bird Atlas Project (2) (SABAP2) data indicates that a total of 171 bird species could potentially occur within the study area and immediate surroundings. Of these, 50 species are classified as priority species and ten are South African Red List species. Of the priority species, 32 are likely to occur regularly at the study area and immediate surrounding area, with the remaining 18 occurring sporadically (Chris van Rooyen Consulting 2022, Annexure B7).

The site visit by the avifaunal specialist produced a combined list of 18 species covering both the study area and to a limited extent, the surrounding area. Four priority species were observed along the proposed powerline alignment, none of which are Red List species. All other observations were of small passerine and game bird species that are common to the area (Chris van Rooyen Consulting 2022, Annexure B7).

The project area falls within the Platberg-Karoo Conservancy IBA SA037 which contributes significantly to the conservation of large terrestrial birds and raptors. These include Blue Crane *Anthropoides paradiseus*, Ludwig's Bustard *N. ludwigii*, Kori Bustard *Ardeotis kori,* Blue *Korhaan Eupodotis caerulescens*, Black Stork *Ciconia nigra*, Secretarybird *Sagittarius serpentarius*, Martial Eagle *P. bellicosus*, Verreauxs' Eagle *A. verreauxii* and Tawny Eagle *A. rapax.* A total of 289 bird species are known to occur here. In summer, close to 10% of the global population of Lesser Kestrel Falco naumanni congregate and roost in this IBA. Amur Falcons *Falco amurensis* are also abundant and forage and roost with Lesser Kestrels *F. naumanni.* This IBA is seasonally important for White Stork *Ciconia ciconia,* and Coordinated Avifaunal Roadcounts indicate high numbers of this species during outbreaks of brown locusts *Locustana pardalina* and armoured ground crickets *Acanthoplus discoidalis.* The IBA also supports the following biome-restricted species: *Karoo Lark Calendulauda albescens,* Karoo Long-billed Lark *Certhilauda subcoronata,* Karoo Chat *Cercomela schlegelii,* Tractrac Chat *Cercomela tractrac,* Sickle-winged Chat *Cercomela sinuata,* Namaqua Warbler *Phragmacia substriata,* Layard's Tit-Babbler *Sylvia layardi,* Pale-winged Starling *Onychognathus nabouroup* and Black-headed Canary *Serinus alario.* With the exception of Namaqua Warbler *P. substriata* and Tractrac Chat *C. tractrac*, each of the remaining aforementioned species have been observed in the study area (Chris van Rooyen Consulting 2022, Annexure B7).

During the site visit 18 species were observed, covering both the study area and to a limited extent, the surrounding area. Four priority species were observed along the proposed powerline alignment, none of which are Red List species. All other observations were of small passerine and game bird species that are common to this area. (Chris van Rooyen Consulting 2022, Annexure B7).

4.2.4 Aquatic Biodiversity and Surface Water

The aquatic features within the wider study area comprise ephemeral unnamed tributaries of the Brak River. The Brak River is a seasonal tributary within the Lower Orange River System. The river flows approximately 3 km to the north of the study area with a larger tributary crossing the eastern extent of the study area, flowing in a northerly direction to join the Brak River. A

second, smaller tributary of the Brak River is the Sandsloot River which flows through the town of De Aar and transects the Paarde Valley farm. Several smaller ephemeral watercourses and drainage lines drain into these larger river corridors from the surrounding higher lying areas. Associated with the larger watercourses are wider floodplains wetlands. Small, shallow instream dams have been constructed within these watercourses in the area that tends to be dominated by *Typha capensis* bulrush or *Phragmites australis* reeds. There are also artificial wetland areas on the north-eastern portion of the Paarde Valley farm as a result of the overflow from the De Aar Wastewater Treatment Works (Belcher 2022, Annexure B6).

The area has been mapped as a Strategic Water Source Area for groundwater (De Aar Region). A major fractured aquifer occurs within the area. The water table typically occurs at depths of about 8 m below ground level and the yield of the aquifer is less than 2 litres a second. Both the surface and groundwater quality tend to be slightly brackish with natural electrical conductivity concentrations of between 70 and 150 mS/m. The estimated groundwater recharge in the area is 12.3 mm/a. The aquifer is of medium susceptibility and vulnerability (Belcher 2022, Annexure B6).

Impacts on the watercourses in the study area are associated with agricultural encroachment, livestock grazing, and road and powerline construction. The ephemeral aquatic ecosystems are particularly vulnerable to changes in hydrology as they are specifically adapted to the sporadic flow conditions that naturally occur. Contaminants and sediment are not regularly flushed from these streams (Belcher 2022, Annexure B6).

Table 4-1Table 4-1 provides an overview and summary of the water resource information for the study area.

Table 4-1: Key water resources information for the proposed project development area

Descriptor	Name / details	Notes
Water Management Area (WMA)	Lower Orange WMA	
Catchment Area	Brak River	Tributary of the Lower Orange River
Quaternary Catchment	D62D	
Present Ecological state	Largely natural (B Category)	DWS (2012) assessment for the Brak River
Ecological Importance and Sensitivity	Low	

The sub-catchment of the tributaries of the Brak River in which the eastern portion of the proposed Paarde Valley PV2 Grid Connection Project is located is mapped as an Upstream Management Area, while the western portion lies within a FEPA River sub-catchment associated with the larger Brak River and Sandsloot Tributary. Upstream Management Areas are sub-catchments in which human activities need to be managed to prevent the degradation of downstream Freshwater Ecosystem Priority Areas (FEPAs) and Fish Support Areas while FEPA River Catchments need to be maintained in a good ecological condition. There is one FEPA Wetland mapped to the southwest of the proposed grid connection route. This feature was determined during the field assessment as an off-channel farm dam/reservoir that is not considered of any aquatic biodiversity conservation significance. Some natural valley bottom and riverine wetland habitat have been mapped further to the north and east of the proposed route that is associated with the Brak River Tributary. The wetlands are located some distance from the proposed activities and are unlikely to be impacted by the proposed project (Belcher 2022, Annexure B6).

The Brak River, its larger tributaries and the associated floodplain through the area, are deemed to be of moderate aquatic ecological sensitivity, while the smaller watercourses and drainage lines are considered to be of low sensitivity (Belcher 2022, Annexure B6).

The aquatic biodiversity assessment has found the larger aquatic features on-site to be of moderate sensitivity and the smaller features to be of low sensitivity. The **Very high** Aquatic Biodiversity Combined Sensitivity mapping of the screening tool differs as it is linked to the SWSA for groundwater and with a larger FEPA River Sub-catchment for the Brak River (Belcher 2022, Annexure B6).

The river assessed lies within the Nama Karoo Ecoregion, with the characteristics as described in Table 4-2 and Table 4-3

Table 4-2: Characteristics of the Nama Karoo Ecoregion (Dominant Types In Bold)

Main Attributes	Description
Terrain Morphology: Broad division	Plains; Low Relief; Plains Moderate Relief; Lowlands; Hills and Mountains; Moderate and High Relief; Open Hills, Lowlands; Mountains; Moderate to High Relief; Closed Hills; Mountains; Moderate and High Relief
Vegetation types	Eastern Mixed Nama Karoo; Upper Nama Karoo; Bushmanland Nama Karoo; Orange River Nama Karoo
Altitude (m a.m.s.l)	300-1700
MAP (mm)	0 to 500
Rainfall seasonality	Late to very late summer to Winter
Mean annual temp. (°C)	12 to 20
Median annual simulated runoff (mm) for quaternary catchment	<5 to 60

Table 4-3: Geomorphological and Physical features of the Brak River and its tributaries

River	Brak	Sandsloot	Ephemeral tributaries
Geomorphological Zone	Foothill rivers in the Upper Karoo Geomorphic Province		
Lateral mobility	Unconfined		
Channel form	Simple		Complex
Channel pattern	Single thread: low sinuosity		Multiple thread: low sinuosity
Channel type	Mixed (alluvium with bedrock)		Silt/clayey with pebbles
Channel modification	Moderate to low modification (farming and some alien vegetation encroachment)	Moderate to high modification (farming activities and urban runoff)	Moderate modification (trampling and grazing, instream impoundments)
Hydrological type	Seasonal to ephemeral		ephemeral
Ecoregion	Nama Karoo		
DWA catchment	D62D		
Vegetation type	Northern Upper Karoo shrubland		
Rainfall region	Autumn		

The Brak River has a predominantly sandy/silty substrate. The river drains shrubland vegetation in an area with a very low rainfall. As a result, the river water is saline and turbid

and seasonally flowing. At the time of the field assessment, the river consisted of isolated pools and was not suited to an assessment of water quality or aquatic biota present.

The Brak River is relatively wide (more than 10 metres) with incised banks. Vegetation cover spanned the width of the channel comprising predominantly of common reed (*Phragmites australis*). The land adjacent to the Brak River consisted mainly of shrub species. A distinct riparian zone was not discernible. The habitat integrity of the Brak River was assessed during the site visit. The results from the assessment are shown in Table 4-4.

Table 4-4: Index of Habitat Integrity Assessment results and criteria assessed in the Brak River

Instream Criteria	Weight	Score	Riparian Zone Criteria		Score
Water abstraction	14	6	Water abstraction	13	6
Flow modification	13	7	Inundation	11	4
Bed modification	13	7	Flow modification	12	7
Channel modification	13	5	Water quality	13	10
Water quality	14	10	Indigenous vegetation removal	13	7
Inundation	10	4	Exotic vegetation encroachment	12	9
Exotic macrophytes	9	0	Bank erosion	14	11
Exotic fauna	8	0	Channel modification	12	5
Solid waste disposal	6	4			
Category		B/C	Category		C/D

The instream habitat of the Brak River is still largely natural to moderately modified while the riparian habitat is more impacted (moderately to largely modified) as a result of surrounding farming activities.

The Sandsloot River at Paarde Valley has a largely natural habitat with minimal habitat disturbance activities. Much of the impacts result from activities in the urban areas upstream. The results from the habitat integrity assessment are shown in Table 4-5

Table 4-5: Index of Habitat Integrity Assessment results and criteria assessed in the Sandsloot

Instream Criteria	Weight	Score	Riparian Zone Criteria	Weight	Score
Water abstraction	14	4	Water abstraction	13	4
Flow modification	13	8	Inundation	11	3
Bed modification	13	9	Flow modification	12	8
Channel modification	13	4	Water quality	13	14
Water quality	14	14	Indigenous vegetation removal	13	5
Inundation	10	3	Exotic vegetation encroachment	12	6
Exotic macrophytes	9	0	Bank erosion	14	7
Exotic fauna	8	0	Channel modification	12	4
Solid waste disposal	6	9			
Category		C	Category		C

Both the riparian and instream habitat integrity of the Sandsloot stream within Paarde Valley Farm are considered to be in a moderately modified state, mostly as a result of the upstream activities in De Aar.

The ephemeral streams at the site are largely natural to moderately modified with the modification of the habitat occurring as a result of the surrounding farming activities (livestock grazing). The results from the habitat integrity assessment are shown in Table 4-6.

Table 4-6: Index of Habitat Integrity Assessment results and criteria assessed of ephemeral tributaries

Instream Criteria	Weight	Score	Riparian Zone Criteria	Weight	Score
Water abstraction	14	5	Water abstraction	13	6
Flow modification	13	8	Inundations	11	5
Bed modification	13	8	Flow modification	12	8
Channel modification	13	6	Water quality	13	4
Water quality	14	4	Indigenous vegetation removal	13	7
Inundation	10	6	Exotic vegetation encroachment	12	3
Exotic macrophytes	9	0	Bank erosion	14	4
Exotic fauna	8	0	Channel modification	12	6
Solid waste disposal	6	1			
Category		B/C	Category		C

Table 4-7: Results of the EIS assessment for the Brak River and tributary the Sandsloot within the study area

Biotic Determinants	Brak River	Sandsloot	Ephemeral tributaries
Rare and endangered biota	1	1	0
Unique biota	1	0	0
Intolerant biota	1	1	0
Species/taxon richness	1	1.5	1
Aquatic Habitat Determinants			
Diversity of aquatic habitat types or features	1.5	1.5	1
Refuge value of habitat type	1.5	1.5	0
Sensitivity of habitat to flow changes	2	1.5	1
Sensitivity of flow related water quality changes	1.5	1	1
Migration route/corridor for instream and riparian biota	2	1.5	1
National parks, wilderness areas, Nature Reserves, Natural Heritage sites, Natural areas, PNEs	0	0	0
EIS CATEGORY	Moderate	Moderate/Low	Low

The rivers are all considered to be of a moderate to low Ecological Importance and Sensitivity (Table 4-7, Annexure B6).

4.3 THE SOCIAL ENVIRONMENT

4.3.1 The Landscape / Visual Environment

The town of De Aar lies about 1 km to the south of the proposed grid connection, and a few scattered farmsteads occur to the north and west. The De Aar Nature Reserve lies to the west of the town.

The Karoo is a generally scenic landscape but the area around De Aar is visually dominated by electrical infrastructure. There are large numbers of powerlines crossing the landscape, the

railway line has its overhead power supply, there are three solar facilities to the north and northeast of the town, while wind energy facilities stand on the skyline's hills to the east and west. The very large Hydra Substation is located approximately 9 km southeast of De Aar. The land is otherwise used only for grazing. There are small remnants of agriculture visible on aerial photography, but it is evident on the ground that this land use has not been practiced for many years. The cultural landscape is thus somewhat degraded and is dominated by its modern electrical layer (Lawson & Oberholzer 2022, Annexure B2).

The visual specialists identified the following landscape features of visual or scenic value, along with potential sensitive receptors in the surroundings (Table 4-8).

Table 4-8: Scenic Features and Sensitive Receptors

Topographic features	The study area consists of relatively flat grassy plains.
Water Features	There are a few minor drainage courses in the study area, which are not of visual or scenic significance.
Cultural landscapes	Besides De Aar, the study area contains a few modest farmsteads with tree copses, grazing pasture and minimal cultivation.
Receptors adjacent to the grid corridor or in the local surroundings.	
Protected Areas	There is a Municipal Nature Reserve, known as the De Aar Nature Reserve immediately to the west of the town boundary.
Human settlements	The nearest settlement is De Aar about 1 km away.
Scenic and arterial routes	The proposed grid connection crosses a railway line and the R48 between De Aar and Philipstown.

The sparse Karoo vegetation provides little screening effect to screen the proposed pylons from view. Although the corridor for the proposed grid corridor is in a rural setting, much of the area has been transformed by urban development, existing solar PV facilities and Eskom powerlines. The proposed grid corridor has few significant features, most of the topographic or scenic features being on the periphery, further to the west, north and east of the site (Lawson & Oberholzer 2022, Annexure B2).

4.3.2 Heritage / Cultural resources

4.3.2.1 Archaeology

The Karoo has a long pre-colonial history as testified by the many thousands of stone artefacts that can be found among surface gravels in many areas. Most of these artefacts are heavily weathered indicating great antiquity and relate to the Early Stone Age (ESA) and, more usually, the Middle Stone Age (MSA). Although ESA materials are not known from De Aar, local examples of MSA scatters have been recorded by Morris (2011), Kruger (2012) and Orton (2012). Because they are generally far better preserved, Later Stone Age (LSA) sites are more significant. Sites of this age are largely focused on landscape features such as rivers, pans, springs and hills (Orton 2022, Annexure B3).

Probably the most significant aspect of Karoo archaeology is the presence of many prehistoric stone kraals. The kraals are typically constructed on sloping ground against dolerite ridges and overlooking water sources. Domestic debris and stone artefacts are seldom associated with them, but when they are, they are taken to represent either the pastoralists camping

alongside their kraals or else later re-occupation of the kraals by hunter-gatherer people (Sampson 1985).

A number of ephemeral stone circular features have been recorded on dolerite dykes in the area with many likely to be from the LSA (Orton 2012). However, some show clear evidence of historical construction techniques (Orton & Webley 2013a).

Rock paintings are also said to be known from the area (De Aar, n.d.) but further details are unknown. Orton & Webley (2013a) found a rock gong that also had a faint fine-line animal engraving on it. Some historical engravings (names, initials and dates) are also known from the area (Orton 2012).

Historical archaeology is far less common but a few noteworthy sites are known. Of greatest importance is a long-abandoned farmstead on Du Plessis Dam which has a spectacular dump containing abundant 19th century domestic refuse associated with it. There are also several other features, including a small spring eye (Orton 2012; Orton & Webley 2013b). Alongside the Brak River on Paardevlei to the north of De Aar was an extensive, but low-density scatter of historical materials that may well represent an Anglo-Boer War camp. Another ephemeral scatter of such material was found by Orton (2021) on a very low hill to the north of and overlooking De Aar. Orton (2012) located a tumbled, rectangular kraal to the south of the present study area and which was thought to be older than any of the nearby structures on the farm (Orton 2022, Annexure B3).

Archaeological materials were seen in a number of areas at the proposed site but they were generally more common in the north in close proximity to the Brak River that passes through the proposed gridline corridor. They were largely associated with open mudflats and denuded areas; in the north these were part of the floodplain of the Brak River. All of the archaeological occurrences seen were of very low density. The majority are what could be described as background scatter – either artefacts that have been lying on the surface for a long time and do not have spatial integrity, or isolated artefacts that do not relate to any specific site (essentially precolonial litter). They have often been moved by erosion and sheetwash. All artefacts were made on hornfels. These artefacts were often well-patinated which indicates great age, but some artefacts were somewhat darker in colour with less patination. Rare, isolated artefacts had fresh edges and still retained the typical dark colour of freshly broken hornfels (Orton 2022, Annexure B3).

Two small, ephemeral scatters of LSA artefacts with only very light patination were noted in the southeast, near the location of the proposed Vetlaagte MTS, at the foot of a dolerite hill. These are likely related to people having actually camped in that area. Another site was found in a denuded area along the western bank of the Brak River and consisted of a light scatter of flaked hornfels artefacts and a lower grindstone displaying grinding on both faces, outside of the assessment corridor. A few more artefacts were seen to the southeast and these may have been another scatter or simply an extension of the first one. Another ephemeral scatter was seen to the east of the Brak River, within the assessment corridor at coordinates S30 37 36.9 E24 01 06.7 The scatter was unusual in that two of the four artefacts were large scrapers (Orton 2022, Annexure B3).

4.3.2.2 Graves

No Stone Age or historical graves are known from the area but can occasionally be found. No graves were seen during the site visit. Small farm graveyards can occur but these are normally located close to houses and protected from impacts (Orton 2022, Annexure B3).

4.3.2.3 Historical Aspects, the Built Environment and Cultural landscapes

The colonial period history of the area only dates back to the 19th century. The town only came into being after it was decided that the railway line to Beaufort West should be extended to Kimberly. The railway was constructed as far as De Aar by 1883. The railway junction was very important with lines from all over the subcontinent coming together there. Schoeman (2013) notes that by the 1960s there were around 110 km of railway within the vicinity of the town and some 92 trains passed through every day.

Farms were granted in the area during the 19th century. From its survey diagram, Vetlaagte dates to 1863 and, although diagrams for De Aar and Du Plessis Dam do not appear on the Surveyor General website, those farms are shown as bordering Vetlaagte on its diagram. Paarde Valley, immediately north of De Aar, was surveyed in 1830 and granted in 1837. De Aar town is later, having only been founded well after the railway junction was created.

The De Aar Junction was very important to the British during the Anglo-Boer War and was heavily garrisoned. De Aar became a military hospital and depot holding many medical and other supplies.

The only historical resources seen near the study area are two farmhouses. One lies along a road in the central part of the study area on Portion 5 of the farm De Aar 180, approximately 1.3 km south of the assessment corridor and looks to date to the early-mid-20th century. The other lies on the remainder of Vetlaagte 4 and, although not visited, appears to be an early 20th century house (Orton 2022, Annexure B3).

4.3.3 Palaeontology

The SAHRIS Palaeosensitivity Map shows the site to be of mostly high sensitivity, but small patches of zero, moderate and very high sensitivity also occur.

The proposed grid connection is underlain with quaternary alluvium, Jurassic dolerite while the largest portion is underlain by the Tierberg Formation (Ecca Group, Karoo Supergroup). The most southern tip of the development is underlain by the Adelaide Subgroup (Beaufort Group, Karoo Supergroup) while the termination site of the proposed gridline (the MTS substation) is located on Jurassic dolerite (Butler 2022, Annexure B4).

Scattered petrified wood fragments and oolites were uncovered in the south-eastern section of the proposed grid development. At the site proposed for development, the Karoo Supergroup is deeply weathered and in places is baked by Jurassic dolerite (Butler 2022, Annexure B4).

4.3.4 Current land use and zoning

The current land use of the properties affected by the proposed gridline route consists of livestock farming (grazing), solar energy facilities, overhead powerlines and other industrial infrastructure such as railway tracks.

4.3.5 Surrounding land use

The surrounding land use is similar to the land use of the affected properties, in that it consists mainly of grazing land (for livestock), renewable energy facilities (refer to Table 4-9) and industrial infrastructure. The town of De Aar is also located approximately 1 km south and west of the proposed project. The De Aar Nature Reserve is located approximately 750 m from proposed switching station and the Vetlaagte MTS would be approximately 9.7 km from the Nature Reserve. The Department of Defence Ammunition Sub Depot De Aar is situated

approximately 5 km west of the proposed switching station on Remainder of Portion 2 of Farm 149 Paarde Valley. The landing strip at the Depot is located approximately 6.5 km from the nearest point of the proposed project. Regarding Square Kilometre Array (SKA), the proposed project falls over 100 km outside of the restricted Astronomy Geographic Advantage Act Karoo Central Astronomy Advantage Areas (AGAA KCAAA) zones.

Numerous operational powerlines are located within the landscape. These lines range from 22 kV to 400 kV in size. Several substations occur in the area of which the Hydra Substation is the most significant (Table 4-10).

The De Aar Airport lies approximately 6.5 km from the nearest point of the proposed project (i.e. the termination point of the proposed grid line, at the Vetlaagte MTS). It should be noted that numerous powerlines, some of which are larger than the proposed 132 kV powerline, are located closer to the De Aar Airport, most of them connecting to Hydra Substation which is located approximately 2.5 km south of the proposed powerline's end point (at Vetlaagte MTS). Furthermore, the De Aar Airport appeared to not be in use at the time of the site assessment. A few derelict buildings were observed at the De Aar Airport, and the runway was unrecognizably overgrown. Domestic animals were also observed grazing on the runway.

Table 4-9: List of surrounding renewable energy applications (within a 35 km radius of the proposed development (DFFE database Q4-2021)

Project Name (as per DFFE REEA (REEA_OR_2021_Q4))	Type	DFFE Reference Number(s)	Status
Proposed establishment of a wind power generating facility near De Aar, Northern Cape	WEF	12/12/20/1651/A2 12/12/20/1651	Approved Approved
Proposed photovoltaic (solar) energy plant on Vetlaagte Farm near De Aar, Northern Cape	Solar PV	12/12/20/2499	In process
Proposed photovoltaic Solar energy facility (PV4) on Badenhost Dam Farm near De Aar in the Northern Cape	Solar PV	14/12/16/3/3/2/506	In process
Proposed photovoltaic Solar energy facility (PV2) on Badenhost Dam Farm near De Aar in the Northern cape	Solar PV	14/12/16/3/3/2/504	In process
Proposed photovoltaic solar energy facility PV5 on Badenhorst Dam Farm near De Aar, Emthanjeni Local Municipality, Northern Cape	Solar PV	14/12/16/3/3/2/485	In process
Proposed Badenhorst Dam solar PV3 plant near De Aar, Emthanjeni Local Municipality, Northern Cape	Solar PV	14/12/16/3/3/2/483 14/12/16/3/3/2/483/AM1	In process In process
Proposed Inca De Aar Solar Pty Ltd 30 MW Photovoltaic Solar Facility On A Site South-East Of De Aar, Northern Cape Province	Solar PV	12/12/20/2177 12/12/20/2177/AM1	Approved Approved
The Proposed Development Of A Photovoltaic Power Plant And Power Line Near De Aar, Northern Cape	Solar PV & Gridline	12/12/20/2313 12/12/20/2313/A1 12/12/20/2313/AM2	In process In process Approved
The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	Solar PV	12/12/20/2250/2 12/12/20/2250/2/A1 12/12/20/2250/2/AM2 12/12/20/2250/2/AM3	Approved Approved Approved Approved

Project Name (as per DFFE REEA (REEA_OR_2021_Q4))	Type	DFFE Reference Number(s)	Status
		12/12/20/2250/2/AM4 12/12/20/2250/2/AM5	Approved Approved
The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	Solar PV	12/12/20/2250/1 12/12/20/2250/1/AM1 12/12/20/2250/1/AM2	Approved Approved Approved
The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	Solar PV	12/12/20/2250	Approved
The Proposed Construction Of Seven Photovoltaic Solar Energy Facilities, Six Facilities Will Be Generating 75mw And The Other Facility 30mw On The Remaining Extent Of The Farm Vetlaagte 4 In De Aar, Northern Cape	Solar PV	14/12/16/3/3/2/382/3 14/12/16/3/3/2/382/3/A2 14/12/16/3/3/2/382/3/AM3 14/12/16/3/3/2/382/3/AM4	Approved Approved Approved Approved
The Proposed Construction Of Seven Photovoltaic Solar Energy Facilities, Six Facilities Will Be Generating 75mw And The Other Facility 30mw On The Remaining Extent Of The Farm Vetlaagte 4 In De Aar, Northern Cape Province	Solar PV	14/12/16/3/3/2/382/1 14/12/16/3/3/2/382/1/A1 14/12/16/3/3/2/382/1/AM2	Approved Approved In process
Proposed Solar Power Generation Facility in the remaining extent of the farm Vetlaagte 4, De Aar, Northern Cape Province	Solar PV	14/12/16/3/3/2/382/7	Approved
Proposed Solar Power Generation Facility in the remaining extent of the farm Vetlaagte 4, De Aar, Northern Cape Province	Solar PV	14/12/16/3/3/2/382/4 14/12/16/3/3/2/382/4/A1 14/12/16/3/3/2/382/4/A3	Approved Approved Approved
The Proposed Construction Of Seven Photovoltaic Solar Energy Facilities, Six Facilities Will Be Generating 75mw And The Other Facility 30mw On The Remaining Extent Of The Farm Vetlaagte 4 In De Aar, Northern Cape Province	Solar PV	14/12/16/3/3/2/382/4 14/12/16/3/3/2/382/4/A1 14/12/16/3/3/2/382/4/AM3	Approved Approved Approved
Proposed Solar Power Generation Facility in the remaining extent of the farm Vetlaagte 4, De Aar, Northern Cape Province	Solar PV	14/12/16/3/3/2/382/1 14/12/16/3/3/2/382/1/A1 14/12/16/3/3/2/382/1/AM2	Approved Approved In process
The Proposed Construction Of Seven Photovoltaic Solar Energy Facilities, Six Facilities Will Be Generating 75mw And The Other Facility 30mw On The Remaining Extent Of The Farm Vetlaagte 4 In De Aar, Northern Cape Province	Solar PV	14/12/16/3/3/2/382/A1 14/12/16/3/3/2/382/AM3 14/12/16/3/3/2/382/AM4	Approved Approved Approved
The proposed construction of a 30MW PV SEF on the Remaining Extent of the Farm Vetlaagte 4 in De Aar, Northern Cape Province	Solar PV	14/12/16/3/3/2/382/6 14/12/16/3/3/2/382/6/AM3	Approved Approved

Project Name (as per DFFE REEA (REEA_OR_2021_Q4))	Type	DFFE Reference Number(s)	Status
The Proposed Construction Of Seven Photovoltaic Solar Energy Facilities, Six Facilities Will Be Generating 75mw And The Other Facility 30mw On The Remaining Extent Of The Farm Vetlaagte 4 In De Aar, Northern Cape Province	Solar PV	14/12/16/3/3/2/382/5 14/12/16/3/3/2/382/5/A1 14/12/16/3/3/2/382/5/AM3	Approved Approved Approved
The construction of a 75MW PV SEF on the Remaining Extent of the Farm Vetlaagte 4 in De Aar, Northern Cape Province	Solar PV	14/12/16/3/3/2/382/2 14/12/16/3/3/2/382/2/AM1 14/12/16/3/3/2/382/2/AM2	Approved Approved Approved
The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	Solar PV	12/12/20/2252/2/AM4	Approved
Proposed Construction Of The Inyanga Energy Project 2, Farm Riet Fountain No 6, De Aar, Northern Cape	Solar PV	12/12/20/2497	Withdrawn/lapsed
The Proposed Establishment of an 86mw Solar Facility on Portion 4 of the Farm Riet Fountain No. 6 in the Emthanjeni Local Municipality, Northern Cape Province	Solar PV	14/12/16/3/3/2/663	Approved
The Proposed Establishment of an 86mw Photovoltaic Solar Facility on Portion 4 of The Farm Rooilyf No. 389, Registration Division, Zf Mcgawu Local Municipality, in the Northern Cape Province	Solar PV	14/12/16/3/3/2/640	In process
The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	Solar PV	12/12/20/2250/3 12/12/20/2250/3/AM3	Approved Approved
The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	Solar PV	12/12/20/2250/4 12/12/20/2250/4/A1 12/12/20/2250/4/AM2 12/12/20/2250/4/AM3 12/12/20/2250/4/AM4	Approved Approved Approved Approved Approved
Proposed PV facility on farm Caroluspoort near De Aar	Solar PV	14/12/16/3/3/2/741	In process
The Proposed Photovoltaic (Solar) Energy Facilities On Du Plessis Dam Farm Near De Aar, Emthanjeni Local Municipality, Northern Cape Province.	Solar PV	14/12/16/3/3/2/456	In process
The Proposed Photovoltaic (Solar) Energy Facilities On Du Plessis Dam Farm Near De Aar, Emthanjeni Local Municipality, Northern Cape Province.	Solar PV	14/12/16/3/3/2/455	In process
The Proposed Photovoltaic (Solar) Energy Facilities On Du Plessis Dam Farm Near De Aar, Emthanjeni Local Municipality, Northern Cape Province.	Solar PV	14/12/16/3/3/2/454	In process
Amendment to the proposed 19.9MW PV solar energy facility (PV4) on the	Solar PV	12/12/20/2498	In process

Project Name (as per DFFE REEA (REEA_OR_2021_Q4))	Type	DFFE Reference Number(s)	Status
Farm Annex Du Plessis dam near De Aar, Northern Cape		12/12/20/2498/A1 12/12/20/2498/AM3	Approved Approved
The Construction Of A Photovoltaic (PV) Plant On Portion 29 Of The Farm Paarde 145, De Aar Within Emthanjeni Local Municipality, Northern Cape Province	Solar PV	12/12/20/2025/1	Approved
The Construction Of A Photovoltaic (PV) Plant On Portion 29 Of The Farm Paarde 145, De Aar Within Emthanjeni Local Municipality, Northern Cape Province	Solar PV	12/12/20/2025	Approved
The Construction Of A Photovoltaic (PV) Plant On Portion 29 Of The Farm Paarde 145, De Aar Within Emthanjeni Local Municipality, Northern Cape Province	Solar PV	12/12/20/2025/2 12/12/20/2025/2/A 12/12/20/2025/2/AM3	Approved Approved Approved
The Construction Of A 75-150mw Photovoltaic Solar Energy Facility And Associated Infrastructure On Paarde Valley Farm Near De Aar Within The Emthanjeni Local Municipality, Northern Cape Province	Solar PV	12/12/20/2500 12/12/20/2500/AM2 12/12/20/2500/AM3	Approved Approved Approved
Proposed photovoltaic power generation facility near De Aar, Northern Cape	Solar PV	12/12/20/1673	Approved
Proposed PV facility on farm Blaauwkratz near De Aar	Solar PV	14/12/16/3/3/2/742	In process
Proposed PV facility on farm Loskop near De Aar	Solar PV	14/12/16/3/3/2/743	In process
Proposed construction of the Ilanga Lethemba 4 PV energy facility in De Aar, Northern Cape Province	Solar PV	12/12/20/2048/4	Approved
The Proposed Ilanga Lethemba 4 PV Solar Energy Facility Near De Aar, Northern Cape Province	Solar PV	12/12/20/2048/3	Approved
Proposed construction of the Ilanga Lethemba 2 PV energy facility in De Aar, Northern Cape Province	Solar PV	12/12/20/2048/2	Approved
The Proposed Construction Of Ilanga Lethemba PV Solar Energy Facility In De Aar, Northern Cape Province	Solar PV	12/12/20/2048/1	Approved
Proposed PV facility on farm Jakhalsfontein near De Aar	Solar PV	14/12/16/3/3/2/744	In process
The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	Solar PV	12/12/20/2250/5 12/12/20/2250/5/A1 12/12/20/2250/5/AM2	Approved Approved Approved
The Proposed Establishment Of Photovoltaic (Solar Power) Farms In The Northern Cape Province	Solar PV	12/12/20/2258/4	Approved
Proposed Oasis wind energy facility project located near De Aar, Northern Cape	WEF	14/12/16/3/3/2/311	Withdrawn/ lapsed
Longyuan Mulilo De Aar Maanhaarberg Wind Energy Facility	WEF	12/12/20/2463/1/2	Approved

Project Name (as per DFFE REEA (REEA_OR_2021_Q4))	Type	DFFE Reference Number(s)	Status
The Wind Energy Facility (North And South) Situated On The Plateau Near De Aar, Northern Cape Province	WEF	12/12/20/2463/1 12/12/20/2463/1/A2 12/12/20/2463/1/AM3 12/12/20/2463/1/AM4 12/12/20/2463/1/AM5	Approved Approved Approved Approved Approved
The Wind Energy Facility (North And South) Situated On The Plateau Near De Aar, Northern Cape Province	WEF	12/12/20/2463/2 12/12/20/2463/2/AM2	Approved Approved
Proposed Castle wind energy facility project, located near De Aar, Northern Cape	WEF	14/12/16/3/3/2/278	In process
Proposed Zingesele wind energy facility project, located near De Aar, Northern Cape	WEF	14/12/16/3/3/2/280	Withdrawn/ lapsed
Proposed Naumanni Wind Energy Facility project located near De Aar in Northern Cape	WEF	14/12/16/3/3/2/310	Withdrawn/ lapsed
Proposed Renosterberg PV power plant near De Aar	Solar PV	14/12/16/3/3/2/403	Approved
The Proposed Renosterberg Wind Energy Facility Near De Aar, Northern Cape	WEF	14/12/16/3/3/2/404	Approved

Table 4-10: Overhead Powerlines and substations within 35 km of the proposed development site (Eskom, 2022)

Project Name (as per ESKOM Database (April 2022))	Capacity (kV)
Transmission OHPL	
Hydra Substation	400
Hydra Kronos 1	400
Gamma Hydra 1	765
Gamma Perseus 1	765
Droerivier Hydra 2	400
Droerivier Hydra 1	400
Droerivier Hydra 3	400
Hydra Poseidon 1	400
Hydra Poseidon 2	400
Hydra Ruigtevallei 2	220
Hydra Ruigtevallei 1	220
Hydra Roodekuil 2	220
Beta Hydra 1	400
Hydra Roodekuil 1	132
Hydra Perseus 2	400
Hydra Perseus 3	400
Hydra Perseus 1	765
Distribution OHPL	
De Aar/Taaibos 1	22
Bushbuck/Chameleon 1	132
Hydra/Phiri 1	132
Cuprum/Hydra 1 (decommissioned)	132

Project Name (as per ESKOM Database (April 2022))	Capacity (kV)
Hydra/Britsville 1	132
Britsville/Joen 1	132
Bushbuck/Hydra 2	132
Chameleon/De Aar 1	132
Bushbuck/Hydra 1	132
Hydra/Ndhlovu 1	132
Bletterman/Hydra 1	132
Bletterman/Taaibos 1	132
De Aar/Britstown 1	22
De Aar/Mulilo PV 1	22
Bushbuck/Behrshoek 1	132
Antelope/Behrshoek 1	132
Joen/Laken 1	132
Britstown/Victoria West 1	22
Substations	
Joen S/Stn	Traction Substation
Phiri Sw/Stn	Switching Station
Maanhaarberg S/Stn	Substation
Bletterman S/Stn	Traction Substation
Britsville S/Stn	Traction Substation
De Aar S/Stn	Substation
Chameleon Sw/Stn	Switching Station
MRP De Aar Solar S/Stn	Substation
De Aar Solar 1 S/Stn	Substation
De Aar Solar 3 S/Stn	Substation
Bushbuck Sw/Stn	Switching Station
Ndhlovu Sw/Stn	Switching Station
De Aar 2 North S/Stn	Substation
Behrshoek S/Stn	Traction Substation
Taaibos S/Stn	Substation

4.3.6 Socio-economic context

The proposed project is situated approximately 1 km from the Northern Cape town of De Aar in the Emthanjeni local Municipality within the Pixley ka Seme District Municipality.

The Pixley ka Seme Municipality has an estimated population of 195 595 (StatsSA Community Survey 2016). Of the population the proportion earning less than R4500 per annum is 11%, with access to basic services at levels between 74.2% (refuse removal) to 89.9% (electricity). 5.4% of the population have completed higher education, and the unemployment rate in 2011 was 28.30%. Mining was traditionally the largest sector in 2011 making up 26.7% of the provincial economy.

According to the Pixley ka Seme Integrated Development Plan (2021/2022) the District is characterised by the following:

- High levels of poverty and low levels of education;
- It is a small to medium-town sub-region with a low level of development despite the strategic location in terms of the national transport corridors;

- Sparsely populated towns with a number of larger towns serving as “agricultural service centres”; spread evenly throughout the district as central places;
- High rate of unemployment, poverty and social grant dependence;
- Prone to significant environmental changes owing to long-term structural changes (such as climate change, energy crises and other shifts);
- Geographic similarity in economic sectors, growth factors and settlement patterns;
- Economies of scale not easily achieved owing to the relatively small size of towns;
- A diverse road network with national, trunk, main and divisional roads of varying quality;
- Potential and impact of renewable energy resource generation; and
- Potential and impact of radio telescope initiatives, e.g. Square Kilometre Array radio telescope project.

There is a high rate of unemployment within the District and approximately half of the population are in poverty (Profile & Analysis District Development Model, Pixley Ka Seme District Municipality, 2021). Employment within the local municipality rests heavily on a few industries, including renewable energy development. With economic growth stagnating due to a reduction in activities by Transnet, the municipality is heavily dependent on the development of renewable energy within the area (Emthanjeni Local Municipality Integrated Development Plan (IDP), March 2021 – 2022).

The Emthanjeni Local Municipality consists of three towns of which De Aar is the largest, and is the seat of the Pixley ka Seme district and local municipalities. De Aar was founded in 1904 around an important railway junction. De Aar has the largest abattoir in the southern hemisphere and supplies all major centres throughout the country with lamb and mutton (Emthanjeni Municipality IDP 2021/2022). Apart from meat production the sheep farms around De Aar are also major suppliers of wool. All the water in the town comes from boreholes, which is why the town is known for its large number of wind pumps. The monthly capacity of the fountains varies according to the rainfall. The water quality is hard and presents problems for bathing, washing and electrical appliances.

Increase in temperature over the next 10 years will drive the municipality to either find alternative sources of water supply or to increase boreholes. Energy consumption will potentially also increase by 10% and a similar strategy for alternative energy will have to be identified for both cooling in summer and heat in winter. The alternative of solar energy will be needed to relieve electricity.

The municipality does not yet have a climate change strategy, plans and/or budget to respond to these challenges. The major concern is the matter of mandate as the municipality does not necessarily regard climate change management as its responsibility, although it does indirectly fulfil a role by managing water sources and managing air and noise pollution (esp. with heavy transport activities in the area). Again, a major constraint in this regard is the lack of funding for these mandates.

The total number of indigent households within the local municipal area decreased from 3596 households in the 2017/18 financial year to a total of 3559 households. During 2018/19 with 3838 households in 2019/20 this indicates an increase on the total number of indigent households within the municipal area over the period. During the 2020/21 financial year the number of households was 3770 by the end of March 2021, which shows a decrease as compared to the previous year.

According to the local municipality's IDP, the local municipality has investment from renewable energy projects, manufacturing projects and warehouses hub and is a potential industrial growth point with ample industrial sites, reasonable tariffs and prices, affordable labour and the necessary infrastructure. Agriculture currently forms the backbone of the local municipality and accounts for the largest labour/employment contributor to date. As a result of Transnet scaling down its activities as well as smaller businesses closing down from time to time, economic activity in the area is stagnating. The municipality is therefore looking to renewable energy projects, a new district hospital and a new warehouse hub and manufacturing project for development opportunities.

5 NEED AND DESIRABILITY OF THE PROPOSED PROJECT

5.1 LEGISLATIVE BACKGROUND TO NEED & DESIRABILITY

The Competent Authority (in this case the Department of Forestry, Fisheries and the Environment (DFFE)) must in terms of Section 24O and 24(4) of the National Environmental Management Act No. 107 of 1996 (NEMA) take into account any guidelines published in terms of Section 24J of the act and any minimum information requirements for an application for Environmental Authorisation (EA). This includes the Guideline on Need and Desirability (DEA 2017) which *'sets out the strategic and statutory context for the consideration of the need and desirability of a proposed development involving any of the NEAM listed activities'*, in order to ensure that *'a development is ecologically sustainable and socially and economically justifiable.'*

Furthermore, Regulation 18 of the EIA Regulations 2014, (as amended)[13] states '*when considering an application the competent authority must have regard to section 24O and 24(4) of the Act, the need for and desirability of the undertaking of the proposed activity, the requirement of these Regulations, any protocol or minimum information requirements relevant to the application as identified and gazetted by the minster in a government notice or any relevant guideline published in terms of section 24J of the Act.'*

Appendix 1 of the EIA Regulations 2014, as amended sets out the objective of the Basic Assessment process which includes the objective to, through a consultative process, describe the need and desirability of the proposed alternatives. It further states that the scope of assessment and content of Basic Assessment Reports must include a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.

5.2 NEED & DESIRABILITY OF THE PROPOSED DEVELOPMENT

As described under Section 1, Paarde Valley PV2 (Pty) Ltd was granted EA for the 75 - 150 MW Paarde Valley PV2 photovoltaic (PV) solar energy facility near De Aar in the Northern Cape Province in 2012. The currently authorised 132kV/ 220kV grid connection for Paarde Valley PV2 is routed from the Paarde Valley PV2 facility to the De Aar substation. However, Eskom has grid capacity constraints in the Northern Cape, and at certain lines and on certain substations. Eskom currently does not have capacity for the Paarde Valley PV2 to connect at the De Aar substation. Accordingly, the Applicant wishes to amend the authorised grid connection (realignment and termination point) and create a separate EA for the ESKOM self-build components.

The proposed development is required to connect the authorised Paarde Valley PV2 Solar Energy Facility to the Eskom National Grid, and the need and desirability of the proposed development is thereby intrinsically linked to the need and desirability of the Paarde Valley PV2 Solar Energy Facility.

With regards to the need and desirability of the preferred location, the selection of the preferred location of the grid connection was limited to routes between the Paarde Valley PV2 Solar Energy Facility and a substation that has the capacity for this connection. Following investigations of different substations to connect to (please refer to Section 2.4: Consideration

[13] Regulation 18 of government Notice No. R. 982, as amended

of Alternatives) it was found that the proposed Vetlaagte Main Transmission Substation (MTS) (which is undergoing a separate environmental authorisation process) is the only practically possible option available in the area for the Paarde Valley PV2 Solar Energy Facility to connect to. The selected route alignment between the Paarde Valley PV2 Solar Energy Facility and the Vetlaagte MTS is located within the Central Strategic Transmission Corridor and follows existing overhead powerlines (OHPL) and boundary lines / fences, as much as possible to limit the disruption of farming activities.

The DEA Guideline on Need and Desirability (2017) sets out a list of questions that relate to ecological sustainability and justifiable economic and social development which should be addressed when considering need and desirability, as per regulatory requirements. These questions have been responded to below in Table 5-1

Table 5-1: Need & Desirability Questions as per DEA Guideline (2017) and Responses for the Proposed Development

Securing ecological sustainable development and use of natural resources			
Question		**Response**	**Reference**
How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?		The following specialist studies were undertaken as part of the Basic Assessment process that considered the ecological integrity of the area: • Terrestrial Biodiversity • Aquatic Biodiversity • Plant Species • Animal Species • Avian Species The above specialist studies were undertaken in line with the relevant gazetted protocols in GN 320 of 20 March 2020 and GN 1150 of October 2020. All studies concluded that the proposed development will not have unacceptable negative impacts on the ecological integrity of the area with the recommended mitigation measures applied.	Annexure B
How were the following ecological integrity considerations taken into account?	*Threatened Ecosystems*	The gazetted National List of Threatened Ecosystems (2011) was used by the biodiversity specialists to identify, and map listed ecosystems. The proposed development footprint consists of Northern Upper Karoo vegetation type, which is not listed as a threatened ecosystem, and listed as *Least Concern*. The proposed development footprint is also listed as Norther Upper Karoo (*Least Concern*) in the SANBI National Biodiversity Assessment (2018) which was also consulted constituting the latest available science.	Annexure B5
	Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in	The terrestrial biodiversity impact assessment conducted in line with the gazetted protocol for the terrestrial biodiversity theme found that the impacts associated with the proposed development can be mitigated to a negligible, very low and low negative significance level. The aquatic biodiversity impact assessment conducted in line with the gazetted protocol for the aquatic biodiversity theme found that the impacts associated with the proposed development on aquatic resources are expected to be negligible during construction and mitigation.	Annexure B5

Securing ecological sustainable development and use of natural resources			
Question		**Response**	**Reference**
	management and planning procedures, especially where they are subject to significant human resource usage and development pressure		
	Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs")	The Northern Cape Biodiversity Conservation Plan was considered by the terrestrial and aquatic biodiversity specialists. Approximately half of the OHPL corridor, as well as the entire area of the switching station and access road (within the authorised Paarde Valley Solar PV facility footprint) fall into a mapped Critical Biodiversity Area 2. The remainder of the corridor to the Vetlaagte MTS is located within a mapped Ecological Support Area.	Annexure B5 Appendix B6
	Conservation targets	Information from the National Protected Areas Expansion Strategy (NPAES) was consulted and the proposed development does not fall into a NPAES Focus Area.	Annexure B5
	Ecological drivers of the ecosystem	The terrestrial and aquatic biodiversity specialists investigated the ecosystem of the development area and found that the impacts on ecological processes and drivers will be negligible to low with mitigation.	Annexure B5 Appendix B6
	Environmental Management Framework	No specific Environmental Management Framework (EMF) exists for the proposed development site. However, the Provincial, District Municipality and Local Municipality Integrated Development Plans (IDP) and Spatial Development Frameworks (SDF) were consulted and the proposed development aligns with these frameworks.	Section 3
	Spatial Development Framework	The Pixley ka Seme District Municipality and Emthanjeni Local Municipality SDF that are applicable to the proposed development site were consulted and it was found that the proposed development fits into the planning context of both applicable SDFs.	Section 3.3
	Global and international	Global and international responsibilities to which South Africa is signatory or party to were considered in the assessment.	Section 3.3

Securing ecological sustainable development and use of natural resources			
Question		**Response**	**Reference**
	responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.)	• Applicable international treaties and conventions are: • United Nations Framework Convention on Climate Change and Kyoto Protocol; • Paris Agreement; • The Convention on Biological Diversity (CBD) (1993) • The Convention on the Conservation of Migratory Species of Wild Animals (CMS or Bonn Convention) (1983) • The Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) (1999) • The Convention on the International Trade in Endangered Species of Wild Flora and Fauna (CITES) (1973) • RAMSAR Convention on Wetlands of International Importance (1971) • Memorandum of Understanding on the Conservation of Migratory Birds of Prey in Africa and Eurasia	Annexure B7
How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?		The terrestrial ecology specialist study found that the proposed development has the potential to result in loss of natural habitat and loss of individuals of protected trees, protected plants or other listed species during the construction phase. The significance of these potential impacts is rated of negligible, very low and low negative with or without mitigation for the construction phase. Mitigation measures recommended by the specialist are included in the EMPr of the project, which include minimising vegetation clearing and disturbance to the development footprint only, rehabilitate disturbed areas, implement an Alien Invasive Management Plan, limiting access to sensitive areas during construction and undertake monitoring to evaluate whether further measures are required. The aquatic biodiversity specialist assessment found that the proposed development has the potential for degradation of the ecological condition of aquatic ecosystems and water quality impacts, during the construction phase, but that this impact is considered to be negligible with or without mitigation. Mitigation measures included in the EMPr to mitigate this potential impact include maintaining aquatic buffers of 30 -50 m between delineated aquatic ecosystems and all proposed development activities, and site management being undertaken during the construction phase to specifically address on-site stormwater management and prevention of pollution measures from any potential pollution sources. The operational phase could potentially lead to invasion by alien invasive plants species, the degradation of the ecological condition of aquatic ecosystems, modification of water runoff, erosion and alien vegetation invasion in aquatic features. These impacts are rated as of negligible for aquatic ecosystems with or without mitigation, and as of very low negative significance with mitigation for terrestrial	Annexure B5 Annexure B6 Annexure F: EMPr

Securing ecological sustainable development and use of natural resources		
Question	**Response**	**Reference**
	ecosystems. Measures to control alien invasive plants are included in the EMPr for the project as well as measures to rehabilitate disturbed areas to mitigate this impact from a low negative to a very low negative impact significance rating. Measures are included in the operational EMPr to mitigate the flow impacts of any stormwater leaving the developed areas, and erosion control. The avifaunal impact assessment found that the proposed development has the potential to cause displacement due to habitat transformation and disturbance and mortality through electrocutions and collisions of avian species. The significance of these impacts ranges from negligible to medium negative, with mitigation measures applied. Mitigation measures for the construction, operational and decommissioning phases of the development as recommended by the avifaunal specialist are included in the EMPr for the project.	
How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	On a national level the construction of the authorised Paarde Valley PV2 Solar Energy Facility, which requires the authorisation of the proposed development, will lessen the country's dependency on coal, and contribute to lowering of water consumption, pollution and environmental degradation per kW of electricity produced. Waste streams are expected to be highest during construction of the proposed development but be overall insignificant. The EMPr includes generic mitigation measures for avoidance and minimisation of pollution and degradation of the biophysical environment, as well as site-specific recommendations from the specialists.	Annexure F
What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	The generation of waste will largely be restricted to the construction phase of the project and consist of normal construction phase solid waste streams. The EMPr for the substation and the grid connection details generic mitigation measures that will be implemented for the appropriate management and minimisation of waste, during all phases of the project. Registered service providers will be utilised to transport solid waste to registered landfills.	Annexure F
How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage?	A Heritage Specialist Impact Assessment and a Visual Specialist Impact Assessment were conducted to assess the impacts of the proposed development on the landscape and heritage resources. The Heritage impact assessment found that the impact on archaeological resources, graves and the cultural landscape	Annexure B3 Annexure F

Securing ecological sustainable development and use of natural resources		
Question	**Response**	**Reference**
What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	would be of very low negative significance during the construction and decommissioning phases and the impact on the cultural landscape would be low during the operational phase, with and without mitigation. The Visual Impact Assessment found that the proposed development would have a negative impact of low significance during the construction phase, a medium negative significance during the operational phase, and a very low negative impact during the decommissioning phase. Comment from the Northern Cape Provincial Heritage Authority and the South African Heritage Resource Agency (SAHRA) are being requested. A case has been opened on the South African heritage Resource Information System (Case 18817) The following recommendations of the heritage specialists have been included as conditions of authorisation: • Surface clearance is to be kept to the minimum required for the project; and • If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution. The following mitigation measures recommended by the visual specialist have been included in the site-specific EMPr for the proposed development: • Locate temporary construction and stockpile areas in visually unobtrusive locations. • Use existing roads and tracks where possible, and keep access roads as narrow as practical. • Control dust and noise during construction activities. • Rehabilitate / revegetate disturbed areas as soon as possible during and after the construction phase • Use similar pylon types over the length of the proposed grid where possible. • Give preference to the use of monopoles, which have a cleaner visual silhouette. • Give switching station structures muted colours in the grey or green range, and avoid reflective surfaces. • Consider screening of the switching station by means of berms and/or vegetation, if necessary, to minimise visual intrusion. • Design signage and lighting at the switching station to avoid visual intrusion on the surroundings. • Maintain the area along the grid route including stormwater erosion gullies. • Maintain rehabilitated areas, and control all signage, lighting and wastes.	

Securing ecological sustainable development and use of natural resources			
Question		**Response**	**Reference**
		• Ensure that procedures for the removal of switching stations and powerlines / pylons are implemented after the life of the project. • Rip access roads no longer required and reinstate vegetation or grazing cover.	
How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?		Some non-renewable resources will be consumed during the construction and decommissioning phases and few non-renewable resources will be consumed during operation. Since the proposed development will allow the Paarde Valley PV 2 Solar Energy Facility to generate renewable energy, this will reduce the country's reliance on coal and other non-renewable resources for the generation of electricity and is expected to have a net benefit towards the impact on non-renewable resources.	Section 2
How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions,		Construction of the proposed development will require the use of approximately 200 kl of water. Operation of the proposed development will consume no water. The proposed development will allow the Paarde Valley PV 2 Solar Energy Facility to generate renewable energy, which will reduce the country's reliance on coal and other non-renewable resources for the generation of electricity.	Section 2
	Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic	The proposed development is expected to result in a reduction of the dependency of the country on coal and petroleum as an energy source, and will support the country to meet its decreased carbon emission goals.	Section 3.3

Securing ecological sustainable development and use of natural resources			
Question		**Response**	**Reference**
limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?	*growth or does it reduce resource dependency (i.e. de-materialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life)*		
	Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities	The current land use is low-intensity grazing and the land is not suitable for other agricultural uses. The proposed development will allow the authorised Paarde Valley PV2 Solar Energy Facility to be realised, which will result in an income for the landowner. This could increase other agricultural investments by the landowner in the area. The proposed development itself will not cause a significant change in land use, as the development footprint is primarily low intensity agriculture (grazing), which can still proceed once the proposed development is constructed. The opportunity cost of not proceeding with the proposed development is therefore considered to be high.	Annexure B1

Securing ecological sustainable development and use of natural resources			
Question		**Response**	**Reference**
	for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?)		
	Do the proposed location, type and scale of development promote a reduced dependency on resources?	The proposed development is predicted to allow for a reduced dependency on coal as an energy source, and assist in the country meetings its renewable energy generation and reduced carbon emission goals.	Section 3.3
How were a risk-averse and cautious approach applied in terms of ecological impacts?	*What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?*	Limitations and uncertainties often exist within the various techniques adopted to assess the condition of ecosystems. The methodologies and techniques used in the ecological assessments have been developed nationally and are typically of a rapid nature. No baseline long-term monitoring was undertaken as part of any of the assessments. There is also very little existing information available for the ecological features within the study area. Data was utilised for adjacent ecosystems where available. The ground-truthing of aquatic features was undertaken when the use of vegetation as an indicator was possible. As it was not possible to cover the entire site in a high level of detail, extrapolation of the areas ground-truthed to those not covered was done using the latest available aerial imagery for the site.	Section 1.4 Annexure B5 Annexure B6 Annexure B7
	What is the level of risk associated with the limits of current knowledge?	The nature of the proposed activities allows them to be placed some distance from any mapped aquatic features such that the likely impacts would be very low. It is usually the associated infrastructure that has the potential to have a greater impact on the aquatic features. The impacts of roads and powerlines on the aquatic features are well understood and can be effectively mitigated to ensure the impacts remain low. The preferred mitigation measure is to limit the disturbance to aquatic features as far as possible by	Annexure B5 Annexure B6

Securing ecological sustainable development and use of natural resources			
Question		**Response**	**Reference**
		avoiding and minimising the number of crossings and providing adequate buffer areas. This will also ensure that the cumulative impacts will remain low. The level of aquatic assessment undertaken was considered to be adequate. No further fieldwork is deemed to be required. The timing of the terrestrial biodiversity survey in early summer is acceptable in terms of assessing the flora and vegetation of the site. The vegetation on site was in relatively good condition in terms of the seasonal presence of perennial plant species, although grass cover had not recovered from the previous winter period. The overall condition of the vegetation was therefore possible to be determined with a moderately high degree of confidence. Therefore, the associated risk associated with limits of current knowledge is considered to be low.	
	Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	The ecological specialist studies were conducted in line with the gazetted protocols and associated guidelines, including the SANBI Species Impact Assessment Guidelines, and follow the precautionary principle.	Annexure B5 Annexure B6 Annexure B7
How will the ecological impacts resulting from this development impact on people's environmental right in terms following:	*Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What*	Specialists and the Environmental Assessment Practitioner (EAP) have assessed the potential negative impacts of the proposed development on people and have found that the proposed development would result in a net benefit to people. The proposed development's potential negative visual, health, noise and nuisance impacts are outweighed by the loss of opportunity cost of the proposed development not proceeding, and the authorised Paarde Valley PV2 Solar Energy Facility not being realised. Specialist site-specific recommendations have been added to the generic EMPrs for substations and grid connections for the project and ensure that negative impacts are first avoided, and if unavoidable, minimised, and managed.	Section 8 Annexure B Annexure F

Securing ecological sustainable development and use of natural resources			
Question		**Response**	**Reference**
	measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?		
	Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?	Specialists and the EAP have assessed the potential positive impacts of the proposed development on people and have found that the proposed development would result in a net benefit to people. The proposed development's potential positive impacts are enhanced by possible mitigation measures included in the EMPrs for the project. Specialist site-specific recommendations have been added to the generic EMPrs for substations and grid connections for the project and ensure that positive impacts are enhanced. The following positive impacts of the proposed development have been identified and are linked to the realisation of the authorised Paarde Valley PV2 Solar Energy Facility. • The proposed development will create jobs and contribute towards socio-economic development in the area. • The current land use is low-intensity grazing and the land is not suitable for other agricultural uses. • The opportunity cost of not proceeding with the proposed development is therefore likely to be high. The proposed development also represents an investment in clean, renewable energy infrastructure, which, given the negative environmental and socio-economic impacts associated with a coal based energy economy and the challenges created by climate change, represents a significant positive social benefit for society as a whole.	Section 8 Section 9 Annexure B Annexure F

Securing ecological sustainable development and use of natural resources		
Question	**Response**	**Reference**
Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?	Negative impacts on human wellbeing, livelihoods and ecosystem services have been mitigated to a low negative significance level and would be outweighed by the positive benefit of the proposed development allowing the authorised Paarde Valley PV2 Solar Energy Facility, to be constructed.	Section 8 Section 9 Annexure B Annexure F
Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?	Overall, the proposed development will not result in any unacceptable impacts on ecological integrity, and as a component of a renewable energy project, will benefit the ecological targets of the area and the country. Due to mitigation measures having been applied and specialist recommendations being taken into consideration the proposed development is considered the best practicable environmental option.	Section 8 Section 9 Annexure B Annexure F
Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?	The Preferred Alternative was identified through an iterative process, which identified practically possible options first, identifying the reasonable and feasible alternatives. The alternatives, which consist of design alternatives, as well as the no-go alternative, were then assessed by the specialists and the EAP resulting in the Preferred Alternative being selected as the best practicable environmental option.	Section 2.4 Section 8 Section 9 Annexure B Annexure F

Promoting justifiable economic social development			
Question		**Response**	**Reference**
What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?	*The IDP (and it's sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area,*	The project is in line with the Pixley ka Seme District Municipality Integrated Development Plan (IDP (2021-2022) which identifies renewable energy as an opportunity for economic growth and will assist in meeting the IDP's three main objectives of reducing unemployment, alleviating poverty, and enhancing the implementation of environmental sustainability.	Section 3.3

Promoting justifiable economic social development			
Question		**Response**	**Reference**
		The proposed development is also in line with the Emthanjeni Local Municipality IDP (2021/2022) which stipulates the area around the town of De Aar to be the central hub of renewable energy, creating a boost to the local economy, reducing unemployment, increasing revenue streams.	
	Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification etc)	The proposed development aligns with the Pixley ka Seme District Municipality's Spatial Development Framework which sees renewable energy as an opportunity for development in the District, and has declared itself as a renewable energy hub.	Section 3.3
	Spatial characteristics (e.g existing land uses, planned land uses, cultural landscapes etc) and	The existing land use is low density grazing, and the proposed development would largely allow this land use to continue as the footprint of the OHPL pylons would be relatively small during operation. The proposed development also aligns well with Spatial development Frameworks for the area.	Section 3.3 Annexure B1
	Municipal Economic Development Strategy ("LED Strategy")	The proposed development would support the municipality to achieve its goals as detailed in their IDP.	Section 3.3
Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?	*Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?*	The proposed development will allow for the realisation of the authorised Paarde Valley PV2 Solar Energy Facility which will be a boost to the local economy and include skills development programmes.	Annexure F
How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?		The authorisation of the proposed development will lead to a net benefit to the communities affected, as the realisation of the Paarde Valley PV2 Solar Energy Facility will lead to job creation, increased income streams, economic upliftment and an increase in electricity security, through sustainable energy generation. Unemployment and poverty in particular are major concerns in the affected communities.	Section 4.3 Section 8

Promoting justifiable economic social development			
Question		**Response**	**Reference**
Will the development result in equitable (intra- and inter-generational) impact distribution, in the short-and long-term? Will the impact be socially and economically sustainable in the short- and long-term?		The overall negative ecological impact of the proposed development is relatively low and acceptable when weighed against the positive economic benefits that will be realised if the proposed development is authorised. The project is to realise the use of a sustainable renewable resource for the generation of electricity which will benefit future generations combatting climate change, poverty and unemployment.	Section 8 Section 9
In terms of location, describe how the placement of the proposed development will	*result in the creation of residential and employment opportunities in close proximity to or integrated with each other,*	The proposed development is located close to the town of De Aar. It is expected that the labour for the proposed development as well as the Paarde Valley PV2 Solar Energy Facility which will be realised through the authorisation of the proposed development, will be sourced locally from De Aar and surrounding areas.	Section 8 Section 9
	reduce the need for transport of people and goods,	As the proposed development and associated solar energy facility are located within walking distance of the town of De Aar, the need for transport of goods and people will be reduced compared to further out-lying site locations.	Section 8 Section 9
	result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport),	The proposed development is not expected to impact on public transport.	Section 8 Section 9
	compliment other uses in the area,	The proposed development is required for the realisation of the authorised Paarde Valley PV2 Solar Energy Facility.	Section 9
	be in line with the planning for the area,	The proposed development is required for the realisation of the authorised Paarde Valley PV2 Solar Energy Facility, which is in line with planning for the area. Furthermore, the proposed grid connection and associated infrastructure is located entirely within an Electricity Grid Infrastructure (EGI) Strategic Transmission Corridor (as per GN 113), i.e. in the “Central Corridor”.	Section 3 Section 4 Section 8

Promoting justifiable economic social development			
Question		**Response**	**Reference**
	for urban related development, make use of underutilised land available with the urban edge,	The proposed development is required for the realisation of the authorised Paarde Valley PV2 Solar Energy Facility, which is located close to the town of De Aar and currently used for low intensity grazing, and would be considered as an improvement of land use in terms of diversification and revenue.	Section 4 Section 8 Annexure B1
	optimise the use of existing resources and infrastructure,	The proposed development is required for the realisation of the authorised Paarde Valley PV2 Solar Energy Facility.	Section 9
	opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),	There is no opportunity cost of the project proceeding as it lies within an area earmarked for renewable energy generation.	Section 3.3
	discourage "urban sprawl" and contribute to compaction/densification,	The proposed development is in line with spatial development plans for the area and would not contribute negatively to densification.	Section 3.3
	contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs,	The proposed development is in line with spatial development plans for the area and would allow for the authorised Paarde Valley PV2 Solar Energy facility to be realised.	Section 3.3 Section 9
	encourage environmentally sustainable land development practices and processes,	The proposed development would allow for the authorised Paarde Valley PV2 Solar Energy facility to be realised, which would increase environmentally sustainable land development practices and processes.	Section 3.3 Section 9
	take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.),	The proposed development would allow for the authorised Paarde Valley PV2 Solar Energy facility to be realised, in an area earmarked by spatial planning frameworks as a renewable energy hub, in an area with high and reliable solar resources. Furthermore, the proposed grid connection and associated infrastructure is located entirely within an Electricity Grid	Section 3.3 Section 9

Promoting justifiable economic social development			
Question		**Response**	**Reference**
		Infrastructure (EGI) Strategic Transmission Corridor (as per GN 113), i.e. in the "Central Corridor".	
	the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential),	The proposed development would allow for the authorised Paarde Valley PV2 Solar Energy facility to be realised, in an area highly suitable for solar energy projects.	Section 3.3 Section 9
	impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and	A Heritage Specialist Impact Assessment and a Visual Specialist Impact Assessment were conducted to assess the impacts of the proposed development on the landscape and heritage resources. The Heritage Impact Assessment found that the impact on archaeological resources, graves and the cultural landscape would be of very low negative significance during the construction and decommissioning phases and the impact on the cultural landscape would be low during the operational phase, with and without mitigation. The Visual Impact Assessment found that the proposed development would have a negative impact of low significance during the construction phase, a medium negative significance during the operational phase, and a very low negative impact during the decommissioning phase. Comments from the Northern Cape Provincial Heritage Authority and the South African Heritage Resource Agency (SAHRA) are being requested. A case has been opened on the South African Heritage Resource Information System (Case 18817)	Annexure B2 Annexure B3
	in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?	The proposed development would allow for the authorised Paarde Valley PV2 Solar Energy Facility to be realised, which would increase employment opportunities in the small town of De Aar.	Section 3.3 Section 4.3 Section 8 Section 9

Promoting justifiable economic social development			
Question		**Response**	**Reference**
How were a risk-averse and cautious approach applied in terms of socio-economic impacts?	*What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?*	The data the Local municipalities IDP is based on Census data from 2011. The local municipalities latest adopted SDF is outdated from 2007.	Section 3.3
	What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?	The risk is considered to be low, as the potential impact is net positive for communities.	Section 8
	Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	The precautionary principle was followed by the specialists and EAP throughout the BA process.	Section 7
How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following:	*Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?*	Negative Impacts on HIV and gender related issues, windblown dust and job creation were assessed by the EAP as part of the EIA process and were found to be of low significance with mitigation. The EMP includes generic measures specifically designed for the proposed development type which minimise and manage any negative impacts to acceptable levels.	Section 8 Annexure F
	Positive impacts. What measures were taken to enhance positive impacts?	Positive impacts on people's environmental rights were considered in the BA process. It is concluded that the benefits to people outweigh any potential negative impacts.	Section 8 Section 9
Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socio-economic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?		The proposed development would allow for the authorised Paarde Valley PV2 Solar Energy facility to be realised, with acceptable ecological negative impacts being outweighed by the benefits of renewable energy production, economic upliftment in an area unsuitable for most other major developments.	Section 8 Section 9
What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?		The proposed development would allow for the authorised Paarde Valley PV2 Solar Energy Facility to be realised, which was	

Promoting justifiable economic social development			
Question		**Response**	**Reference**
		assessed and authorised as the best practicable environmental option.	
What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)?34 *Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?*		The proposed development would allow for the authorised Paarde Valley PV2 Solar Energy Facility to be realised, which would benefit previously disadvantaged local communities in an area with few alternative large-scale development opportunities.	Section 8 Section 9
What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?		The impact of the proposed development on basic human needs and rights was considered in the BA process as well as in the EIA process of the authorised Paarde Valley PV2 Solar Energy Facility, which also includes measures to enhance benefits to previously disadvantaged communities in the EMPrs for the projects.	Section 8 Section 9 Annexure F
What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?		The gazetted generic EMPrs for the development type for all phases of the proposed development will be implemented.	Annexure F
What measures were taken to:	*ensure the participation of all interested and affected parties,*	Public Participation is being conducted in line with the EIA Regulations 2014, as amended, as detailed in Section: 6 Public Participation.	Section 6
	provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,	Public Participation is being conducted in line with the EIA Regulations 2014, as amended, as detailed in Section 6: Public Participation.	Section 6
	ensure participation by vulnerable and disadvantaged persons,	Public Participation is being conducted in line with the EIA Regulations 2014, as amended, as detailed in Section 6: Public Participation.	Section 6

Promoting justifiable economic social development			
Question		**Response**	**Reference**
	promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,	Public Participation is being conducted in line with the EIA Regulations 2014, as amended, as detailed in Section 6: Public Participation. The gazetted generic EMPrs for the development types for all phases of the proposed development will be implemented and include measures to raise awareness and sharing of knowledge.	Section 6 Annexure F
	ensure openness and transparency, and access to information in terms of the process,	Public Participation is being conducted in line with the EIA Regulations 2014, as amended, as detailed in Section 6: Public Participation.	Section 6
	ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge, and	Public Participation is being conducted in line with the EIA Regulations 2014, as amended, as detailed in Section 6: Public Participation.	Section 6
	ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were be promoted?	Public Participation is being conducted in line with the EIA Regulations 2014, as amended, as detailed in Section 6: Public Participation.	Section 6
Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g.. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?		The proposed development is expected to allow for opportunities for individuals from all segments of the community and aligns with priority needs of the area.	Section 3 Section 8
What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?		The gazetted generic EMPrs for the development types for all phases of the proposed development will be implemented and include measures to protect workers.	Annexure F

Promoting justifiable economic social development			
Question		**Response**	**Reference**
Describe how the development will impact on job creation in terms of, amongst other aspects:	*the number of temporary versus permanent jobs that will be created,*	The proposed development would allow for the authorised Paarde Valley PV2 Solar Energy facility to be realised, which would lead to the creation of 900 person months employment during the construction phase, and 70 permanent jobs will be created during the operational phase, according to the Final EIA Report from 2012 for the authorised facility. The proposed development would create 25-50 jobs during the construction phase.	Section 10
	whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area),	The proposed development would allow for the authorised Paarde Valley PV2 Solar Energy Facility to be realised, which would lead to the creation of 130 -150 unskilled and junior labour positions that will be sourced locally and trained during the construction phase, according to the Final EIA Report from 2012 for the authorised facility. For the proposed development 10% of the 25-50 jobs created would be skilled jobs.	Section 2.2
	the distance from where labourers will have to travel,	Labourers will be sourced from the town of De Aar, which is within walking distance from the Paarde Valley PV2 Solar Energy Facility and approximately 10 km from the Vetlaagte MTS.	Section 10
	the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits), and	The town of De Aar will benefit from job opportunities where the proposed development is also located.	Section 8 Section 10
	the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).	It is not expected that the proposed development will have a negative impact on any existing jobs, as the area is used for low intensity grazing, and this would largely be able to continue.	Section 8 Section 9
What measures were taken to ensure:	*that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment,*	Public Participation is being conducted in line with the EIA Regulations 2014, as amended, as detailed in Section 6: Public Participation.	Section 6

Promoting justifiable economic social development			
Question		**Response**	**Reference**
	that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	No conflicts of interest have been identified to date.	n/a
What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?		The NEMA EIA Regulations, 2014, as amended, were followed to ensure the protection of the environment.	Section 7
Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?		The gazetted generic EMPrs for the development types for all phases of the proposed development will be implemented which include generic mitigation as well as site-specific specialist mitigation measures that are legally binding.	Annexure F
What measures were taken to ensure that he costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?		The gazetted generic EMPrs for the development types for all phases of the proposed development will be implemented which include measures that address these potential issues.	Annexure F
Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations.		As the overall impact on ecological integrity of the proposed development is relatively low, and the socio-economic benefit of the authorised Paarde Valley PV2 Solar Energy Facility, being realised is high, the project is considered the best environmental practicable option in terms of socio-economic considerations.	Section 8 Section 9
Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area.		The cumulative socio-economic benefit is high positive for this region, which has become a renewable energy hub. The cumulative negative impacts associated with visual impacts, and negative impacts on health and safety, are minimised by the legally binding EMPrs for the project, and outweighed by the positive socio-economic impacts.	Section 8 Section 9

6 PUBLIC PARTICIPATION PROCESS

6.1 INTRODUCTION

Consultation with Interested and Affected Parties (I&APs) forms an integral component of an EIA process and enables *inter alia* directly affected landowners, neighbouring landowners, civic groups, stakeholders and the general community to raise and/or identify issues and concerns relating to the proposed activities, which they feel should be addressed in the Basic Assessment process.

Public participation, as required in terms of the NEMA EIA Regulations 2014, as amended, can, in general, be divided into the following phases for a Basic Assessment process:

6.1.1.1 Initiation of Public Participation Process:

This phase includes the compilation of an Interested and Affected Party (I&AP) database, and notifying potential I&APs of the Application for Environmental Authorisation and opportunity to comment on the Draft BAR. Notifications are in the form of newspaper advertisements, site notices, notification posters, and written notifications (via email, post and/or sms).

6.1.1.2 Comment on Draft Basic Assessment Report:

During this phase, potential I&APs are provided with an opportunity (i.e. 30 days) to register as I&APs for the BA process and to comment on the Draft BAR. This is enabled by the lodging of copies of the report at suitable locations and on the EAPs website (www.hollandandassociates.net).

6.1.1.3 Notification of Decision and Appeal period:

The decision and appeal period on the BAR is the final phase of the public participation process. Once the competent authority has made their decision to either grant or refuse Environmental Authorisation, the Applicant and registered I&APs are notified of the decision and are then provided with the opportunity to appeal the decision in terms of the National Appeal Regulations (2014), as amended.

Progress with respect to these various stages for the current Basic Assessment process is discussed in more detail below.

6.2 INITIATION OF PUBLIC PARTICIPATION PROCESS

The approach adopted for the current investigation was to identify as many I&APs as possible initially (i.e. potential I&AP's), through a suite of activities, as follows:

- Placing advertisements in a local and regional newspaper;
- Placing notice boards at places conspicuous to the public at the boundary of the proposed site, and/or on site, as well as at venues such as the local municipal offices, public library, and/or local supermarket in the town of De Aar;
- Providing a notification letter, including an Executive Summary of the Draft BAR, to potential I&APs, including affected landowners, surrounding landowners, occupiers of land, relevant organs of state, the relevant ward councillor(s) and relevant authorities.

Thereafter, the remainder of the communications will be focused on registered I&APs.

6.2.1.1 Compilation of I&AP database

An initial database of I&APs has been compiled, including affected and surrounding landowners, relevant Organs of State (including district and local municipal officials), relevant State Departments (national and provincial government officials), relevant ward councillors, as well as I&APs included in the registered I&AP database for the authorised Paarde Valley PV2 project. The I&AP database will be updated as new I&APs are identified and/or register as I&APs, during the BA process. The initial I&AP database is included in Annexure E1.

6.2.2 Advertising in newspapers

Advertisements (in English and Afrikaans) were placed in the local De Aar "*The Echo"* newspaper, and in the regional "*NoordKaap Bulletin"* newspaper (in Afrikaans and English) on 14 and 15 July 2022, notifying potential I&APs of the proposed project, the Application for Environmental Authorisation in terms of the NEMA EIA Regulations (2014), as amended, informing potential I&APs of the availability of the Draft BAR for comment, and inviting members of the public to register as I&APs and to submit comments. Copies of the advertisements are included in Annexure E3. (Note: Proof of placement of the advertisements will be included in the Final BAR).

6.2.3 Site notices

Site Notices (English and Afrikaans) were placed on the site at places conspicuous to the public at the boundary of the proposed site and/or within the site. Furthermore, notification posters (in English and Afrikaans) have been placed in the town of De Aar at venues such as the local municipal offices, public library, and/or local supermarket (refer to Annexure E4), at the commencement of the 30 day I&AP comment period. The notices notified potential I&APs of the proposed project, the Application for Environmental Authorisation in terms of the NEMA EIA Regulations (2014, as amended), informing potential I&APs of the availability of the Draft BAR for comment, and inviting members of the public to register as I&APs and to submit comments. The content of the site notices are included in Annexure E4 (Note: Proof of placement of the site notices will be included in the Final BAR).

6.2.4 Notifying I&APs, in writing, of application for Environmental Authorisation and availability of Draft BAR for comment

A notification letter, including the Executive Summary of the Draft BAR, has been distributed to the identified I&APs. The letter provides a background to the proposed project and alternatives under consideration, highlights the environmental legal requirements and Basic Assessment process to be followed for the proposed project, as well as outlining the potential environmental impacts associated with the project. I&APs have been invited to submit comments on the proposed project, and to register as I&APs for the Basic Assessment process. The notification was distributed via email, post and/or sms. A copy of the notification letter is included in Annexure E2.

6.3 COMMENT ON DRAFT BASIC ASSESSMENT REPORT

The Draft BAR (i.e. this report) has been made available to I&APs for a **30 day public comment period, i.e. from 15 July 2022 - 15 August 2022**, to elicit any issues of concerns and/or comment. In this regard, the following steps have been taken:

- Notification of I&APs has been undertaken, as outlined above, including advertisements, site notices, notification posters, and notification letters to identified I&APs. Copies of the Draft BAR have been made available as follows:
    - A hard copy of the Draft BAR has been lodged at the De Aar public Library (i.e. Hennie Liebenberg Library (Station Street, De Aar)) for the 30 day I&AP comment period.
    - An electronic copy of the Draft BAR has been made available for download on the Holland & Associates Environmental Consultants website (www.hollandandassociates.net) for the duration of the 30 day I&AP comment period.
    - The Draft BAR has been made available through email and electronic file transfer programmes and/or via a Dropbox link to all relevant State Departments, Organs of State and Municipal officials. Relevant State Departments, Organs of State and Municipal officials who would be affected by the activity have been requested to comment on the Draft BAR in terms of Section 24(O) of NEMA.
    - Upon request, the report will be made available to I&APs via electronic file transfer or Dropbox link. (The Dropbox link has also been provided in the cover email for notifications sent to I&APs via email).
    - Electronic copies of the report on CD or USB are available on request.

All comments received from I&APs during the 30 day comment period will be addressed in the Final BAR and will be recorded and responded to in a Comments and Response Report (CRR), which will be included in the Final BAR that will be submitted to DFFE for decision making.

6.4 NOTIFICATION OF DECISION AND APPEAL PERIOD

All registered I&APs will be notified, in writing, of the Environmental Authorisation decision (i.e. whether the DFFE have granted or refused the Environmental Authorisation for the proposed project) within 14 days of the decision being issued. Any I&AP wishing to appeal the DFFE's decision would be required to follow the appeal procedure as indicated in the National Appeal Regulations (2014), as amended.

The public participation phases are indicated in the flow diagram of the BA process in Figure 2.

7 METHODOLOGY FOR IDENTIFICATION AND ASSESSMENT OF POTENTIAL ENVIRONMENTAL IMPACTS AND RISKS ASSOCIATED WITH THE ALTERNATIVES

This section outlines the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives.

7.1 SITE SENSITIVITY VERIFICATION

A site sensitivity verification was undertaken by the EAP and specialists. The site sensitivity verification was undertaken through the use of:

- A desktop analysis, using satellite imagery;
- A preliminary on-site inspection; and
- Any other available and relevant information.

A Site Sensitivity Verification Report (including Screening Tool Report outcomes) (Appendix D) was compiled in compliance with Section 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, and in accordance with Government Gazette No. 43110 (GN 320) dated 20 March 2020, and:

- Confirms or disputes the current use of the land and the environmental sensitivity as identified by the screening tool;
- Contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity; and
- Will be submitted together with the Application Form for Environmental Authorisation and Basic Assessment Report, prepared in accordance with the requirements of the 2014 EIA Regulations, as promulgated.

The Site Sensitivity Verification Report identified that full impact assessments are to be conducted for the following specialist fields:

- Landscape / Visual
- Archaeological and Cultural Heritage
- Palaeontology
- Terrestrial Biodiversity
- Aquatic Biodiversity
- Avifauna

Compliance Statements or specialist studies are required for the following fields:

- Agriculture
- Civil Aviation
- Plant Species
- Animal Species (excluding the taxon Aves)

The specialist studies for the proposed development were commissioned and conducted in 2022, according to the identified specialist protocols in terms of Section 24(5)(a) and (h) and

44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation, in Government Gazette No. 43110 (GN 320) and Government Gazette No. 43855 (GN 1150).

Where a specialist assessment is required and no specific environmental theme protocol has been gazetted, the required level of assessment must be based on the findings of the site sensitivity verification and must comply with Appendix 6 of the EIA Regulations (2014), as amended.

Specialist input was sought for the following fields:

- Geotechnical
- Radio Frequency Interference

7.2 ASSESSMENT METHODOLOGY

For each impact, the **nature** (positive/ negative), **extent** (spatial scale), **magnitude/intensity** (intensity scale), **duration** (time scale), **consequence** (calculated numerically) and **probability** of occurrence is ranked and described. In addition, **the level of confidence in findings** relating to potential impacts, **the reversibility of potential impacts** (i.e. the degree to which the impact can be reversed) and **the degree to which the impact may cause irreplaceable loss of resources** is described. These criteria are used to ascertain the significance of the impact, firstly in the case of no mitigation and then with the most effective mitigation measure(s) in place.

Table 7-1 to 7-6 below show the rankings of these variables and defines each of the rating categories.

Table 7-1: Assessment criteria for the evaluation of impacts

CRITERIA	RANK	DESCRIPTION
Nature	Positive (+)	The environment will be positively affected.
	Negative (-)	The environment will be negatively affected.
Extent or spatial influence of impact	National (4)	Beyond provincial boundaries, but within national boundaries.
	Regional (3)	Beyond a 10 km radius of the proposed activities, but within provincial boundaries.
	Local (2)	Within a 10 km radius of the proposed activities.
	Site specific (1)	On site or within 100 m of the proposed activities.
	Zero (0)	Zero extent.
Magnitude/ intensity of impact (at the indicated spatial scale)	High (3)	Natural and/ or social functions and/ or processes are *severely* altered.
	Medium (2)	Natural and/ or social functions and/ or processes are *notably* altered.
	Low (1)	Natural and/ or social functions and/ or processes are *slightly* altered.
	Zero (0)	Natural and/ or social functions and/ or processes remain *unaltered.*

Duration of impact	Long Term (3)	More than 10 years, but impact ceases after the operational phase.
	Medium Term (2)	Between 3 – 10 years.
	Short Term (1)	Construction period (up to 3 years).
	None (0)	Zero duration.
Consequence (Nature x (Extent + Magnitude/ Intensity + Duration))	Extremely beneficial/ detrimental (10 – 11) (+/-)	The impact is *extremely* beneficial/ detrimental.
	Highly beneficial/ detrimental (8 – 9) (+/-)	The impact is *highly* beneficial/ detrimental.
	Moderately beneficial/ detrimental (6 – 7) (+/-)	The impact is *moderately* beneficial/ detrimental.
	Slightly beneficial/ detrimental (4 – 5) (+/-)	The impact is *slightly* beneficial/ detrimental.
	Negligibly beneficial/ detrimental (1 – 3) (+/-)	The impact is *negligibly* beneficial/ detrimental.
	Zero consequence (0) (+/-)	The impact has zero consequence.
Probability of occurrence	Definite (4)	Estimated at a greater than 95% chance of the impact occurring.
	Probable (3)	Estimated 50 – 95% chance of the impact occurring.
	Possible (2)	Estimated 6 – 49% chance of the impact occurring.
	Unlikely (1)	Estimated less than 5% chance of the impact occurring.
	None (0)	Estimated no chance of impact occurring.

The **significance** of an impact is derived by taking into account the **consequence** (nature of the impact and its extent, magnitude/intensity and duration) of the impact and the **probability** of this impact occurring through the use of the following formula:

Significance Score = Consequence x Probability

The means of arriving at a significance rating is explained in Table 7-2 below.

Table 7-2: Definition of significance ratings

SIGNIFICANCE SCORE	SIGNIFICANCE RATINGS	
32 – 40	High (+)	High (-)
25 – 31	Medium (+)	Medium (-)
19 – 24	Low (+)	Low (-)
10 – 18	Very-Low (+)	Very-Low (-)
1 – 9	Negligible	

Once the significance of an impact has been determined, the **confidence** in the assessment of the impact, as well as the degree of **reversibility** of the impact and **irreplaceable loss of resources** would be determined using the rating systems outlined in Table 7-3, Table

7-4Table 7-5, respectively. Lastly, the **cumulative impact** is ranked and described as outlined in Table 7-6 taking into consideration development applications and existing developments within a 35 km radius (Table 4-9).

Table 7-3: Definition of confidence ratings

CONFIDENCE RATINGS	CRITERIA
High	Wealth of information on and sound understanding of the environmental factors potentially influencing the impact.
Medium	Reasonable amount of useful information on and relatively sound understanding of the environmental factors potentially influencing the impact.
Low	Limited useful information on and understanding of the environmental factors potentially influencing this impact.

Table 7-4: Degree of reversibility

REVERSIBILITY OF IMPACT	CRITERIA
High	High potential for reversibility.
Medium	Medium potential for reversibility.
Low	Low potential for reversibility.
Zero	Zero potential for reversibility.

Table 7-5: Degree of irreplaceability

IRREPLACEABLE LOSS OF RESOURCES	CRITERIA
High	Definite loss of irreplaceable resources.
Medium	Medium potential for loss of irreplaceable resources.
Low	Low potential for loss of irreplaceable resources.
Zero	Zero potential for loss of irreplaceable resources.

Table 7-6: Cumulative Impacts on the environment

CUMULATIVE IMPACTS	CRITERIA
High	The activity is one of several similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the geographical, physical, biological, social, economic and cultural aspects of the environment.
Medium	The activity is one of a few similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the geographical, physical, biological, social, economic and cultural aspects of the environment.
Low	The activity is localised and might have a negligible cumulative impact.
Zero	No Cumulative impact on the environment.

7.3 SPECIALIST STUDIES

The specialist studies determined through the site sensitivity verification process were commissioned in 2022 to the specialists detailed in Section 1.7. The Specialists Terms of Reference (ToRs) and reports are included in Appendix 14 of Annexure A.

7.3.1 Agricultural Assessment Methodology

The '*Protocol for the Specialist Assessment and Minimum Report Content Requirements for the Environmental Impacts on Agricultural Resources* (Government Notice No. 320 Published on 20 March 2020)' was followed for the agricultural assessment.

Mr. Johann Lanz was appointed as the agricultural specialist to undertake a site sensitivity verification of the proposed project site to confirm or dispute the agricultural sensitivity identified by the National Screening Tool. A desktop analysis of existing soil and agricultural potential data for the site was undertaken using a variety of resources. These included, but were not limited to, soil data, land capability data and field crop boundary data from the National Department of Agriculture as well as grazing capacity data, and rainfall and evaporation data from Cape Farm Mapper.

Based on the findings of the site sensitivity verification, the specialist compiled an Agricultural Compliance Statement (refer to Annexure B1) in line with the relevant gazetted protocol for agriculture (*Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Agricultural Resources)*.

7.3.2 Landscape / Visual Assessment Methodology

Quinton Lawson and Bernard Oberholzer were appointed as the visual specialists for the proposed project, tasked with undertaking a site sensitivity verification report in line with the Gazetted General Requirement Assessment protocol (GN 320 of 20 March 2020 in Government Gazette 43110) which confirms or disputes the current use of the land.

Thereafter, the specialists undertook a Visual Impact Assessment Report (refer to Annexure B2) in line with Appendix 6 of the EIA Regulations, 2014, as amended, on the potential visual impacts of the proposed project, using the following methodology:

- A 3D digital terrain model of the study area was prepared in order to determine the viewshed of the grid connection;
- Potential sensitive receptors, such as farmsteads along the route, were identified using the viewshed map and Google Earth;
- Landscape features and sensitive receptors were mapped together with recommended buffers for the grid;
- A site visit of about 6 hours duration was carried out on 15 March 2022. The season was not a consideration for the visual survey, but clear visibility was required.
- Field work was used to verify the existence and significance of landscape features and receptors in order to refine the visual mapping layers;
- A photographic record was made with the emphasis on views from potential sensitive receptors of the proposed project at varying distances;
- The panoramic photographs, which included their GPS positions, were then used to create the post-mitigation photomontages;

- Potential visual impacts relating to the grid for construction, operational and decommissioning phases of the project were assessed along with their relative significance;
- Mitigation measures to avoid or minimise potential negative visual impacts were formulated;
- Cumulative visual impacts in relation to other existing and proposed renewable energy facilities and grids in the area were assessed;
- Impact significance ratings were determined based on the methodology provided in Section 7.1 above.
- The overall potential visual impact intensity is determined in the table below (Table 7-7) by combining visual exposure, visibility, visual absorption capacity, landscape integrity and visually sensitive resources. Visual impact intensity is in turn used to assess visual impact consequence of the proposed development.

Table 7-7: Visual Impact Intensity (Lawson & Oberholzer, 2022)

Visual Criteria	Comments	Grid corridor	Switching station
Visual exposure	Viewshed is related to the height of the pylons. Limited viewshed of switching station.	Medium	Low
Visibility	Visible mainly from the R48 Route, De Aar and nearby farmstead receptors.	Medium	Low
Visual absorption capacity (VAC)	Visually exposed plain, and therefore low VAC, but screened in places by other industrial activity.	Medium	Medium
Landscape integrity / intactness	Effect on landscape character / sense of place, which is partly transformed.	Medium	Medium
Landscape / scenic sensitivity	Effect on scenic resources, which tend to be 4 to 5 km away.	Low	Low
Impact intensity	Summary	Medium	Medium

7.3.3 Archaeological and Cultural Heritage Impact Assessment Methodology

Jayson Orton of ASHA Consulting (Pty) Ltd was appointed as the specialist to assess the potential impacts on archaeology and cultural heritage resources within the site proposed for development. He undertook a Site Sensitivity Verification in line with the gazetted General Requirement Assessment protocol (GN 320 of 20 March 2020 in Government Gazette 43110) which confirms or disputes the current use of the land. Thereafter, the specialist conducted a Heritage Impact Assessment Report in line with Appendix 6 of the EIA Regulations 2014, as amended (Annexure B3).

The specialist carried out a survey of available literature to assess the general heritage context in which the proposed development would be set. These included, *inter alia*, aerial photographs from the *Chief Directorate: National Geo-Spatial Information* and Google Earth and Background and Palaeontological sensitivity data from the *South African Heritage Resources Information System (SAHRIS)*. The specialist also undertook a detailed field survey on foot on 19 and 20 April 2022. During the survey the positions of finds and survey tracks were recorded and photographs were taken at times in order to capture representative samples of both the affected heritage and the landscape setting of the proposed development (Orton 2022, Annexure B3).

Section.7(1) of the National Heritage Resource Act (Act No. 25 of 1999) provides for the grading of heritage resources into those of National (Grade I), Provincial (Grade II) and Local (Grade III) significance. Grading is intended to allow for the identification of the appropriate level of management for any given heritage resource. Grade I and II resources are intended to be managed by the national and provincial heritage resources authorities respectively, while Grade III resources would be managed by the relevant local planning authority. These bodies are responsible for grading, but anyone may make recommendations for grading.

It is intended under Section.7(2) that the various provincial authorities formulate a system for the further detailed grading of heritage resources of local significance but this is generally yet to happen. SAHRA (2007) has formulated its own system for use in provinces where it has commenting authority. In this system sites of high local significance are given Grade IIIA (with the implication that the site should be preserved in its entirety) and Grade IIIB (with the implication that part of the site could be mitigated and part preserved as appropriate) while sites of lesser significance are referred to as having 'General Protection' (GP) and rated as GP A (high/medium significance, requires mitigation), GP B (medium significance, requires recording) or GP C (low significance, requires no further action) (Annexure B3).

7.3.4 Palaeontology Impact Assessment Methodology

Banzai Environmental (Pty) Ltd was appointed as the palaeontological specialist to undertake the palaeontological impact assessment of the proposed project. The specialist conducted a site sensitivity verification of the site of the proposed project to confirm or dispute the sensitivity identified in the National Web-based Screening Tool Report. Thereafter, and considering the findings of the Site Sensitivity Verification, the specialist undertook and compiled a palaeontological impact assessment report in line with Appendix 6 of the EIA Regulations 2014, as amended (Annexure B4).

An initial desktop study was undertaken using Palaeontological impact assessment (PIA) reports from the same area, aerial photographs, Google Earth images, as well as topographical and geological maps. A 2-day site-specific field survey of the development footprint was then conducted by the specialist on foot and by motor vehicle on 16 and 17 April 2022.

The aim of a desktop study is to evaluate the risk to palaeontological heritage in the proposed development. This includes all trace fossils and fossils. All available information is consulted to compile a desktop study and includes Palaeontological impact assessment reports in the same area, aerial photos, and Google Earth images, topographical as well as geological maps.

The "SAHRA APM Guidelines: Minimum Standards for the Archaeological and Palaeontological Components of Impact Assessment Reports" were followed. According to the Guidelines the purpose of the PIA is: 1) to identify the palaeontological importance of the rock formations in the footprint; 2) to evaluate the palaeontological magnitude of the formations; 3) to clarify the impact on fossil heritage; and 4) to suggest how the developer might protect and lessen possible damage to fossil heritage.

The palaeontological status of each rock section is calculated as well as the possible impact of the development on fossil heritage by a) the palaeontological importance of the rocks, b) the type of development and c) the quantity of bedrock removed.

When the development footprint has a moderate to high palaeontological sensitivity a field-based assessment is necessary. The desktop and the field survey of the exposed rock determine the impact significance of the planned development and recommendations for further studies or mitigation are made. Destructive impacts on palaeontological heritage

usually only occur during the construction phase while the excavations will change the current topography and destruct or permanently seal-in fossils at or below the ground surface. Fossil Heritage will then no longer be accessible for scientific research.

Mitigation usually precedes construction or may occur during construction when potentially fossiliferous bedrock is exposed. Mitigation comprises the collection and recording of fossils. Preceding excavation of any fossils a permit from SAHRA must be obtained and the material will have to be housed in a permitted institution. When mitigation is applied correctly, a positive impact is possible because our knowledge of local palaeontological heritage may be increased (Annexure B4).

7.3.5 Terrestrial Biodiversity Impact Assessment Methodology

The *'Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity (Government Notice No. 320 Published on 20 March 2020)'* was followed for the terrestrial biodiversity impact assessment.

David Hoare of David Hoare Consulting (Pty) Ltd was appointed as the specialist to undertake a site sensitivity verification report for the terrestrial biodiversity theme.

The specialist conducted a field survey on 4 and 5 March 2022. Resources used in the assessment included vegetation classifications and descriptions by Mucina and Rutherford (2006), with updates according to the SANBI BGIS website (http://bgis.sanbi.org), as well as information from the National Protected Areas Expansion Strategy (NPAES) database and the Northern Cape Biodiversity Conservation Plan maps which were consulted identifying Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) at the site.

During the field survey, the entire corridor was assessed on foot. A hand-held Garmin GPSMap 64s was used to record a track within which observations were made. Digital photographs were taken of features and habitats on site, as well as of all plant species that were seen. All plant species recorded were uploaded to the iNaturalist website and are accessible by viewing the observations for this site.

Aerial imagery from Google Earth was used to identify and assess habitats on site. Patterns identified from satellite imagery were verified on the ground. Digital photographs were taken at locations where features of interest were observed. During the field survey, particular attention was paid to ensuring that all habitat variability was covered physically on the ground.

Thereafter, and considering the findings of the site sensitivity verification, the specialist compiled a terrestrial biodiversity impact assessment (Annexure B5), in line with the *'Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity (Government Notice No. 320 Published on 20 March 2020)'*

7.3.6 Aquatic Biodiversity Impact Assessment Methodology

The *'Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity (Government Notice No. 320 Published on 20 March 2020)'* was followed for the aquatic biodiversity impact assessment.

Antonia Belcher was appointed as the aquatic biodiversity specialist and undertook a desktop assessment of existing freshwater ecosystem information for the proposed site and its surrounds, using a variety of resources such as the Northern Cape Biodiversity Sector Plan (NCBSP) (SANBI), the National Freshwater Ecosystem Priority Areas (FEPA) (CSIR) and the National Wetland Map 5 (CSIR & SANBI), *inter alia*.

The specialist then undertook a site inspection of the freshwater features during a site visit on 3 and 4 March 2022. The field visit comprised of delineation, characterisation and integrity assessments of the aquatic habitats within the site. Mapping of the freshwater features was undertaken using a GPS Tracker and mapped in PlanetGIS and Google Earth Professional.

Based on the outcome of the site inspection a full impact assessment in line with the *'Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity (Government Notice No. 320 Published on 20 March 2020)'* was conducted (Annexure B6).

In addition, a risk assessment was undertaken to inform the water use authorisation process. Considering the scope of works proposed and the fact that there will be minimal works undertaken within the delineated aquatic features within the site, the risk of altering the ecological status of the adjacent aquatic features is considered to be low. It is thus recommended that the proposed activities fall within the ambit of the General Authorisations for Section 21(c) and (i) water use activities.

The Index for Habitat Integrity (IHI) and a Site Characterisation were used to provide information on the ecological condition of the Brak River, its tributaries and the wetland areas within the study area.

In order to assess the condition and ecological importance and sensitivity of the rivers in the study area, it is necessary to understand how the rivers might have appeared under unimpacted conditions. This is achieved through classifying rivers according to their ecological characteristics, in order that it can be compared to ecologically similar rivers.

River typing or classification involves the hierarchical grouping of rivers into ecologically similar units so that inter- and intra-river variation in factors that influence water chemistry, channel type, substratum composition and hydrology are best accounted for. Any comparative assessment of river condition should only be done between rivers that share similar physical and biological characteristics under natural conditions. Thus, the classification of rivers provides the basis for assessing river condition to allow comparison between similar river types. The primary classification of rivers is a division into Ecoregions. Rivers within an ecoregion are further divided into sub-regions.

Ecoregions are groups of rivers within South Africa, which share similar physiography, climate, geology, soils and potential natural vegetation. For the purposes of this study, the eco-regional classification presented in Department of Water Affairs and Forestry in 1999, which divides the country's rivers into ecoregions, was used.

Sub-regions (or geomorphological zones) are groups of rivers, or segments of rivers, within an ecoregion, which share similar geomorphological features, of which gradient is the most important. The use of geomorphological features is based on the assumption that these are a major factor in the determination of the distribution of the biota. From the Site Characterisation assessments, the geomorphological and physical characteristics of the river and its tributaries can be classified.

The evaluation of Index of Habitat Integrity (IHI) provides a measure of the degree to which a river has been modified from its natural state. This assessment was undertaken for the Brak River and its tributaries. The methodology involves a qualitative assessment of the number and severity of anthropogenic perturbations on a river and the damage they potentially inflict upon the system. These disturbances include both abiotic and biotic factors, which are regarded as the primary causes of degradation of a river. The severity of each impact is ranked using a scale from 0 (no impact) to 25 (critical impact). The assessment includes evaluation

of the impacts of two components of the rivers, the riparian zone and the instream habitat. The total scores for the instream and riparian zone components are then used to place the habitat integrity of both in a specific habitat category (Annexure B6).

Ecological Importance and Sensitivity (EIS) (Table 7-8) considers a number of biotic and habitat determinants surmised to indicate either importance or sensitivity. The determinants are rated according to a four-point scale (Table 7-9). The median of the resultant score is calculated to derive the EIS category.

Table 7-8: Ecological importance and sensitivity categories (DWAF, 1999)

EISC	General description	Range of median
Very high	Quaternaries/delineations considered to be unique on a national and international level based on unique biodiversity (habitat diversity, species diversity, unique species, rare and endangered species). These rivers (in terms of biota and habitat) are usually very sensitive to flow modifications and have no or only a small capacity for use.	>3-4
High	Quaternaries/delineations considered to be unique on a national scale based on their biodiversity (habitat diversity, species diversity, unique species, rare and endangered species). These rivers (in terms of biota and habitat) may be sensitive to flow modifications but in some cases may have substantial capacity for use.	>2-≤3
Moderate	Quaternaries/delineations considered to be unique on a provincial or local scale due to biodiversity (habitat diversity, species diversity, unique species, rare and endangered species). These rivers (in terms of biota and habitat) are not usually very sensitive to flow modifications and often have substantial capacity for use.	>1-≤2
Low/ marginal	Quaternaries/delineations that are not unique on any scale. These rivers (in terms of biota and habitat) are generally not very sensitive to flow modifications and usually have substantial capacity for use.	≤1

Table 7-9: Definition of the four-point scale used to assess biotic and habitat determinants presumed to indicate either importance or sensitivity

Scale	Definition
1	One species/taxon judged as rare or endangered at a local scale.
2	More than one species/taxon judged to be rare or endangered on a local scale.
3	One or more species/taxon judged to be rare or endangered on a Provincial/regional scale.
4	One or more species/taxon judged as rare or endangered on a National scale (i.e. SA Red Data Books)

7.3.7 Avian Impact Assessment Methodology

Chris van Rooyen Consulting (Pty) Ltd was appointed to undertake an avifaunal site sensitivity verification of the proposed site to confirm or dispute the sensitivity identified in the National Web-based Screening Tool for the terrestrial animal species theme[14] (Aves taxon). Based on the specialist's findings, an avifaunal impact assessment was undertaken in line with the relevant gazetted protocol (*Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species*) (Annexure B7).

[14] GN 1150 of 30 October 2020

The specialist used a selection of resources to conduct the assessment including, *inter alia* the Southern African Bird Atlas Project 2 (SABAP2), the Red Data Book of Birds of South Africa, Lesotho and Swaziland, the IUCN Red List of Threatened Species, and the Important Bird and Biodiversity Areas of South Africa (Marnewick *et al.* 2015; http://www.birdlife.org.za/conservation/important-bird-areas). Primary avifaunal diversity and abundance data was collected during a single season, one-day site visit conducted on 28 March 2022 where data was collected by means of incidental counts.

7.3.8 Civil Aviation Assessment Methodology

The *'Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Civil Aviation Installations* (Government Gazette No. 43110 published on 20 March 2020) was followed for the civil aviation assessment, and a Compliance Statement was compiled.

The following information was used to conduct a desktop study of the proposed development site:

- The DFFE National Web-based Screening Tool;
- Publicly available satellite imagery, elevation, and topographical data.

A site visit of site and its surrounding areas was undertaken by the EAP and EAP's assistant (Ms Tilly Watermeyer of Holland & Associates Environmental Consultants) on 19 – 20 April 2022. The site was covered on foot and by motor vehicle. Other potential areas of influence, such as the De Aar Airport and the Ministry of Defence's Ammunition Depot, were also investigated. Observations pertaining to the potential impact of the proposed project were made and documented. Photographs of the areas for the proposed development, and surrounding landscapes and infrastructure were taken.

Comment on the proposed development was obtained from the South African Civil Aviation Authority, who indicated that they have no objection to the proposed development and have issued a conditional approval, with no further assessment being required (Annexure B8).

7.3.9 RFI Assessment Methodology

Interference Testing and Consultancy Services (Pty) Ltd were appointed as the Radio Frequency Interference (RFI) specialist. The specialist undertook a study of the potential impacts of the proposed project on Radio Frequency Interference (RFI) and Electromagnetic Interference (RFI) in the proposed project area (Annexure B9).

The specialist carried out a literature study and computer analysis using applicable resources and tools, to investigate potential RFI from the proposed project to services in the surrounding area. The specialist also investigated whether any mitigation would be required by the proposed project in order for it to be considered acceptable from an RFI perspective.

7.3.10 Geotechnical Assessment Methodology

A Screening tool report was generated for the proposed gridline which will connect the authorised Paarde Valley PV2 Solar Energy Facility to the proposed Vetlaagte Main Transmission Substation. In response to the required Geotechnical study identified by the Screening tool Report, a Site Sensitivity Verification Report was compiled and stated that a geotechnical study will be commissioned once the Applicant is awarded Preferred Bidder status.

Paarde Valley PV2 is in the process of finalising the required scope in order for a Geotechnical Scope and Requests for Proposals to be circulated to qualified service providers. Following which the responses will be reviewed and an appointment made. In addition, the Project is engaging with Eskom to ensure the design and data of the study is correctly captured in order to meet Eskoms Self Build design standards as the substations and powerline design and underlying studies must be conducted to Eskoms standards as it will be handed back to Eskom once commissioned (refer to Annexure B10).

A geotechnical Investigation Report was compiled for the associated Paarde Valley PV2 Solar Energy Facility, which includes the area of the access road and switching station (refer to Annexure B10). For this report the following methodology was used:

Fieldwork was undertaken and comprised the following:

- Locating the site in relation to surrounding access roads, railway and power lines, farm roads and boundary fences.
- Site walkover to record surface conditions and to confirm features recognised on the aerial photographs.
- Setting out of test pits.
- Soil profiling and photographing of the test pit exposures.

The test pits were excavated by hand and facilitated by the pneumatic action of a Cango-hammer. Descriptions of the soil profiles are based on standard terminology (Jennings et al 19193). The strata encountered and detailed soil profiles are depicted on photographs. Indicator samples have been taken of the dominant soil horizons; however, these will only be tested if required for the design and construction phase of the development.

7.3.11 Plant Species Assessment Methodology

The *'Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial plant species'* as promulgated in terms of Section 24 (5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), published in GN. No. 320 dated 20 March 2020, was followed.

David Hoare of David Hoare Consulting (Pty) Ltd was appointed as the specialist to undertake a site sensitivity verification report for the plant species theme). The specialist conducted a field survey on 4 and 5 March 2022. Based on the Specialist's findings, a compliance statement was therefore undertaken in line with the substantive content requirements of the *'Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial plant species'.* (Annexure B5)

7.3.12 Animal Species Assessment Methodology

The *'Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial animal species'* as promulgated in terms of Section 24 (5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), published in GN. No. 320 dated 20 March 2020, was followed.

David Hoare of David Hoare Consulting (Pty) Ltd was appointed as the specialist to undertake a site sensitivity verification report for the animal species theme (excluding the taxon *Aves*). The specialist conducted a field survey on 4 and 5 March 2022. The specialist found that the site has no habitat that is suitable for any of the flagged animal species (excluding the taxon Aves) and none of these species are likely to occur there. This verifies the low sensitivity for the Animal Species Theme (excluding the taxon Aves).

Based on the Specialist's findings, a compliance statement was undertaken in line with the substantive content requirements of the *'Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial animal species'.* (Annexure B5)

8 ASSESSMENT OF POTENTIAL ENVIRONMENTAL IMPACTS AND RISKS ON THE ENVIRONMENT

8.1 INTRODUCTION

The purpose of this section of the report is to describe the potential negative and positive impacts relating to the affected environment that may occur as a result of the proposed activities. Potential impacts have been subjected to detailed assessment, as per the methodology outlined in Section 7, and as per the results of the Screening Tool and Site Sensitivity Verification Report (Annexure D) and include potential biophysical and socio-economic impacts that may arise during all phases of the proposed project, i.e. the construction phase the operational phase and the decommissioning phase of the proposed development. The proposed alternatives, as well as the No-Go alternative are assessed within this section.

The Site Sensitivity verification confirmed that Compliance Statements or specialist studies instead of full specialist impact assessments are required for the following fields:

- Agriculture
- Civil Aviation
- Plant Species
- Animal Species (excluding the taxon Aves)
- Geotechnical
- RFI

The summary of the findings of these studies is provided in the following sections 8.1.1 – 8.1.6.

8.1.1 Impacts on Agriculture

An agricultural impact is a temporary or permanent change to the future production potential of land. The significance of the agricultural impact is directly proportional to the extent of the change in production potential. If a development will not change the future production potential of the land, then there is no agricultural impact.

The proposed electrical grid infrastructure has insignificant agricultural impact for three reasons:

- There is no loss of future agricultural production potential under transmission lines because all agricultural activities that are viable in this environment, can continue completely unhindered underneath transmission lines.
- The direct, permanent, physical footprint of the development that has any potential to interfere with agriculture (approximately 3 hectare footprint of the switching station and its access road), is insignificantly small within an agricultural environment of large farms with low density grazing. The track beneath the power line will have an insignificant effect on the grazing potential underneath the line.
- The affected land has very limited agricultural production potential, anyway (Lanz 2022, Annexure B1).

The only sources of impact are the loss of approximately 3 hectares of grazing land and minimal disturbance to the land (erosion and topsoil loss) during construction and

decommissioning. Land disturbance can be completely and fairly easily mitigated through generic mitigation measures.

The no-go alternative considers impacts that will occur to the agricultural environment in the absence of the proposed development. There is no agricultural impact of the no-go option. Therefore, the extent to which the development (insignificant impact) and the no-go alternative will impact agricultural production are more or less equal, which results in there being, from an agricultural impact perspective only, no preferred alternative between the development and the no-go. However, the no-go option would prevent the proposed development from contributing to the environmental, social and economic benefits associated with the development of renewable energy in South Africa (Lanz 2022, Annexure B1).

There are a number of renewable energy developments that are leading to loss of agricultural grazing land in the area. However, because this development itself leads to insignificant agricultural land loss, its cumulative impact must also logically be insignificant. It therefore does not make sense to conduct a more formal assessment of the development's cumulative impacts as per DFFE requirements for cumulative impacts. Many times more electricity grid infrastructure than currently exists, or is currently proposed, can be accommodated before acceptable levels of change in terms of loss of production potential are exceeded. In reality the landscape in this environment could be covered with power lines and agricultural production potential would not be affected.

Due to the considerations discussed above, the cumulative impact of loss of future agricultural production potential can confidently be assessed as not having an unacceptable negative impact on the area. In terms of cumulative impact, the proposed development is therefore acceptable and it is therefore recommended that it be approved (Lanz 2022, Annexure B1).

The conclusion of the agricultural specialist is that the proposed development will have insignificant agricultural impact and is therefore acceptable in terms of its impact on the agricultural production capability of the site. This is substantiated by the facts that the loss of agricultural production potential, resulting from the development, is insignificant because of the small amount of land excluded from agricultural production and because of the land's very limited production potential. The proposed development will have an insignificant and therefore acceptable impact on the future agricultural production potential of the site. Therefore, from an agricultural impact point of view, and subject to no conditions, it is recommended by the agricultural specialist that the development be approved (Lanz 2022, Annexure B1).

8.1.2 Geotechnical Considerations

A Geo-technical Investigation was conducted for the associated Paarde Valley PV2 Solar Energy Facility which covers the area of the access road and switching station components of the proposed development (refer to Annexure B10).

8.1.3 Impacts on Civil Aviation

The De Aar Airport lies approximately 6.5 km from the nearest point of the proposed project (i.e. the termination point of the proposed grid line, at the Vetlaagte MTS). There are however numerous powerlines, some of which are larger than the proposed 132 kV powerline, located in closer proximity to the De Aar Airport, most of them connecting to Hydra Substation which is located approximately 2.5 km south of the proposed powerline’s end point (at Vetlaagte MTS). The De Aar Airport appeared to not be in use at the time of the site assessment (i.e. derelict buildings were observed at the De Aar Airport, and the runway was overgrown). The

sensitivity is deemed to be 'low' by the EAP in terms of potential civil aviation potential impacts, and the proposed project is not expected to have an unacceptable impact on Civil Aviation..

The South African Civil Aviation Authority (SACAA) have indicated that they have no objection to the proposed project and have issued a conditional approval (correspondence from SACAA dated 9 March 2022, CAA Ref. CA8/2/De Aar CAA_2021_11_332). No further assessment is required (refer to Annexure B8).

8.1.4 Radio Frequency Interference (RFI) Impacts

RFI and electromagnetic interference (EMI) can influence sensitive facilities such as airport communications, RF high sites, railway line control equipment, cell phone towers, EMI sensitive equipment in the area, etc. If calculations show a PV plant's switching station or PV plant grid connection might influence existing infrastructure, EMI mitigation will have to be implemented (refer to Annexure B9).

In a high voltage environment, the RFI sources are generally arcing and sparking related. Corona from the lines are generally not associated with high frequency (above 30MHz) interference. Gap-type corona interference can extend to beyond 1GHz. Typical causes of RFI from grid connections are listed below.

- Corona discharge at the surface of the conductors, insulators, and fittings.
- Sparking at the insulators.
- Sparking at mounting hardware and contacts.
- Control equipment in the substation.
- Micro arcing.

Weather conditions has a 10 to 20 dB impact on the noise source with corona being worst during wet weather conditions and sparking/ arcing being worst during dry weather conditions.

8.1.4.1 Corona discharge

Corona discharge occurs when the electrical field close to a conductor is higher than the electrical withstand capability of the air, resulting in an electrical break down. The breakdown occurs at a local level, hence no flash over will occur. The discharge energy will be fairly low and the frequency band of concern is also low. Any equipment, fittings and insulators energised to high voltage may generate corona. Corona is a normal effect and is worst during wet weather conditions.

8.1.4.2 Sparking

Sparking occurs when there is sufficient voltage (> withstand capability of air) to cause electrical breakdown of the air between two metallic objects (avalanche ionisation) and the development of an arc. At least one of the metallic components is electrically floating. This is not necessarily a single event as the components can be charged again after the discharge. The discharge energy is much higher than for corona and the frequency range extends into the GHz domain. Sparking (gap discharge) is mostly associated with bad contacts and inferior installation practises. Sparking is worst during dry weather conditions.

8.1.4.3 Arcing

Arcing is when ionised air forms a conductive current path between an earthed component and component at line potential. Arcing is associated with a fault condition, of short duration and the arc will normally be interrupted by the protection circuits.

8.1.4.4 Switching events

Switching events such as capacitor bank switching will cause voltage and current transients with frequency components into the GHz band due to steep dV/dt and dI/dt gradients.

8.1.4.5 Clearance Zone

The clearance zone around a switching station and grid connection is the separation distance required between the edge of the project infrastructure (source) to a specific EMI sensitive location or infrastructure (victim), for the project infrastructure to have no RFI on existing electrical infrastructure. The recommended clearance zones are listed below in Table 8-1.

Table 8-1: The recommended clearance zone / distance between the infrastructure of the proposed project and potential EMI sensitive sources (ITC Services, April 2022).

EMI sensitive location/ service	Distance Between the Edge of the switching station / grid connection and an EMI sensitive location in meters
Existing Radar equipment ex. Weather radar	152.4 m
Navigational and communication equipment	45.72 m
Equipment sensitive to EMI	45.72 m
Airfield/Airport Radar system	76.20 m

The RF signals emitted from the proposed switching station and grid connection (starting point) have a sharp decrease in power versus distance. The average receiver sensitivity is around -107dBm, thus if the clearance zone around the proposed switching station and the entire grid connection as per Table 8-1 is adhered to, it will not cause unwanted RFI to equipment in the area. The specialist found that there will be no interference from the switching station or the grid connection to the surrounding areas assuming that the switching station equipment comply to CISPR 11 class A specifications, and the grid connection cabling and connections adhere to general best practise installation methods.

Provided the recommended measures are adhered to, no potential impacts on RFI by the proposed project are expected to occur. With this said, there are some steps that can be considered when designing a new PV plant switching station and grid connections to minimise the amount of RFI or EMI. These are considered general best installation practises:

- Properly ground the switching modules and grid connection points to reduce common mode impedance.
- Ensure that there is proper electrical bonding on the grid connection cables as well as the cable trays, should they be installed.
- Avoid pigtail connections when installing the grid connections.
- Ensure all grid related connections are according to specification (no gaps between connections).
- Use approved grid cable connectors to avoid unwanted corona and/or sparking.
- Avoid sharp edges at the end of cable connections (ITC Services, April 2022).

The DFFE report did not flag any RFI sensitive areas close to the proposed switching station, and proposed OHPL. If the 700 m theoretical worst-case clearance zone is adhered to, then the proposed switching station and associated OHPL will have no RFI impact on equipment in the surrounding area.

At 150 m the received power level is at -111.5 dBm if no cumulative effect is considered. When the cumulative effect of the nearby renewable energy plants is considered, the clearance zone is extended to 700 m where the receive power level is at -110.3 dBm. CISPR 11 Class A +

16.4 dB radiated power level was used as the proposed switching station and grid connection transmission power level. This is an assumed value as no technology partner has been selected yet. The 16.4 dB is the theoretical maximum level increase in power for a worst-case scenario. The theoretical worst-case scenario is highly unlikely to occur in practise.

The proposed switching station and OHPL grid connection pose a very low to no RFI or EMI risk to the surrounding equipment.

When looking at the cumulative effect of the proposed project and considering there are approximately 44 renewable energy facilities within a 35 km radius, as the theoretical worst-case scenario, the (theoretical) increase in radiated emission levels will be 16.4 dB. This results in the clearance zone requirement to be extended from 152.4 m to 700 m. Thus, a new clearance zone of 700 m should be adhered to around the proposed grid connection and switching station where receivers with sensitivities of less than 107dBm should not be used (ITC Services 2022, Annexure B9).

8.1.5 Impacts on Plant Species

No SCC were found on site or are likely to occur there. A small number of declared alien invasive species were found on site. One protected tree species occurs near to the southern end of the corridor, namely *Boscia albitrunca*, but is unlikely to be affected by the proposed project. Refer to **Annexure B5.**

8.1.6 Impacts on Animal Species

The following two species were found on site but are unlikely to be significantly negatively affected by construction of the proposed powerline, switching station, access road and associated infrastructure:

One Near Threatened tortoise species, the Tent Tortoise (*Psammobates tentorius*) was found on site, as a single individual. The loss of habitat due to the proposed project will not have a significant impact on the overall availability of habitat for this species.

One small depression was found just to the south of the current alignment, in which the protected Giant Bullfrog was found. It is outside of the corridor and will not be affected by the project (Hoare 2022, Annexure B5).

8.2 CONSTRUCTION PHASE IMPACT ASSESSMENT ON TE BIOPHYSICAL & SOCIAL ENVIRONMENTS

Construction phase impacts are those impacts on the biophysical and socio-economic environment that may occur during the construction phase of the proposed project (anticipated to be approximately 12 - 18 months). Construction phase impacts are inherently temporary in duration, however, may have longer lasting effects. The construction phase for the proposed project may result in a number of potential impacts on the biophysical and social environments.

These could potentially include the following impacts:

- Impact on landscape/ visual impact;
- Impact on archaeological and cultural heritage resources;
- Impact on paleontological resources;
- Impact on terrestrial biodiversity;
- Impact on aquatic biodiversity;
- Impact on avian species;

- Impact on traffic and transportation;
- Impact on ambient noise levels in the area;
- Windblown dust;
- Litter/ waste pollution;
- Job creation; and
- Impacts on HIV and Gender Related Concerns

The significance of many of the construction phase impacts would be curtailed by their relatively short duration. Furthermore, many of the construction phase impacts would be mitigated through the implementation of an appropriate Environmental Management Programme (EMPr). As required in terms of the EIA Regulations (2014), as amended, and GN No. 435[15] generic EMPrs have been compiled for the proposed project (refer to Annexure F) and will be submitted to the DFFE as part of the Basic Assessment Report, to provide mitigation and ascribe responsibilities for the construction phase impacts. The EMPr must be incorporated into the construction contract and an Environmental Control Officer (ECO) must be appointed to oversee compliance with the EMPr during the construction phase.

8.2.1 Landscape / Visual Impacts

Potential visual impacts identified for the construction phase are as follows:

- Visual intrusion of cranes, heavy vehicles and construction activities resulting from the erection of pylons and switching stations;
- Visual intrusion of access / haul roads; and
- Noise and dust from construction activity affecting sense of place.

Visual impacts were assessed in Table 8-2 and were found to be of low negative significance with and without mitigation.

Table 8-2: Impact assessment table of *"visual impacts"* during the construction phase of the proposed grid line and switching station.

	Proposed project		**"No go"**	
	Without Mitigation	**With mitigation**	**Without Mitigation**	**With mitigation**
Nature	Negative	Negative	Neutral	Neutral
Extent	Local	Local	Local	Local
Magnitude / Intensity	Medium	Medium	Neutral	Neutral
Duration	Short term	Short term	n/a	n/a
Consequence	Slight	Slight	Neutral	Neutral
Significance	Low (-)	Low (-)	Neutral	Neutral
Probability	Definite	Definite	Neutral	Neutral
Confidence	High	High	Medium	Medium
Reversibility	High	High	Neutral	Neutral

[15] Government Gazette No. 42323 of 22 March 2019

Irreplaceable loss of resources	Low	Low	Neutral	Neutral
Cumulative Impact	Medium	Medium	Neutral	Neutral
Degree to which the impact can be avoided	Low		n/a	
Degree to which the impact can be managed	Medium		n/a	
Degree to which the impact can be mitigated	Low		n/a	

8.2.1.1 Proposed mitigation for the construction phase:

- Temporary construction and stockpile areas must be located in visually unobtrusive locations, away from the R48, De Aar residential areas and farmsteads;
- Existing roads and tracks must be used where possible, and access roads kept as narrow as practical;
- Dust and noise control measures must conform with the EMPr;
- Disturbed areas must be rehabilitated / revegetated as soon as possible during and after the construction phase;
- Similar pylon types must be used for the length of the proposed grid;
- Preference is given to the use of monopoles, which have a cleaner visual silhouette; and
- Switching station structures must have muted colours in the grey or green range, and reflective surfaces must be avoided.

8.2.2 Impacts on Archaeology and Cultural Heritage

Three aspects of heritage are relevant in terms of being potentially impacted by the proposed project:

- Impacts on archaeological resources;
- Impacts on graves; and
- Impacts on the cultural landscape.

8.2.2.1 Potential impacts to archaeological resources during the Construction Phase

Direct impacts to archaeological resources would occur during the construction phase when equipment is brought onto site and the surface is grubbed prior to any excavations and/or road building. Because the archaeology found on site has very low cultural significance, the extent and magnitude are low which leads to a significance of very low negative (Table 8-3). There are no fatal flaws in terms of construction phase impacts to archaeology.

Impacts from the No-Go option would relate to trampling of artefacts by animals or vehicles, but this impact is minimal (magnitude rated zero) with the result that the significance is negligibly negative.

Table 8-3: Impact assessment table of *"Impacts to archaeological resources"* during the construction phase

	Proposed project		**"No go"**	
	Without Mitigation	**With mitigation**	**Without Mitigation**	**With mitigation**

Nature	Negative	Negative	Negative	Negative
Extent	Site-specific	Site-specific	Site-specific	Site-specific
Magnitude	Low	Low	Zero	Zero
Duration	Long term	Long term	Long term	Long term
Consequence	Slightly detrimental	Slightly detrimental	Slightly detrimental	Slightly detrimental
Significance	Very low	Very loW	Negligibl	Negligible
Probability	Possible	Possible	Unlikely	Unlikely
Confidence	High	High	High	High
Reversibility	Zero	Zero	Zero	Zero
Irreplaceable loss of resources	Low	Low	Low	Low
Cumulative Impact	Low	Low	Zero	Zero
Degree to which the impact can be avoided	Low		Low	
Degree to which the impact can be managed	High		Low	
Degree to which the impact can be mitigated	Low		Low	

Considering the low cultural significance, no mitigation is suggested and the significance with mitigation is thus also very low negative.

8.2.2.2 Potential impacts on graves during the construction phase

Direct impacts to graves would occur during the construction phase when excavations and/or road building takes place. Although graves have high cultural significance, the chances of impacts occurring are minimal, which leads to a significance of very low negative (Table 8-4).

With the No-Go option, there would be no anthropogenic changes to the land and impacts could only arise from natural causes (e.g. a river in flood exposes a grave buried on its bank). These, however, are highly unlikely to happen (but are not impossible and do occur). Impacts are also rated as very low negative and, since no mitigation is proposed, they would remain at the very low negative level.

Table 8-4:"*Impacts to graves"* during the construction phase

	Proposed project		**"No go"**	
	Without Mitigation	**With mitigation**	**Without Mitigation**	**With mitigation**
Nature	Negative	Negative	Negative	Negative
Extent	Site-specific	Site-specific	Site-specific	Site-specific
Magnitude	High	High	High	High
Duration	Long term	Long term	Long term	Long term
Consequence	Moderately detrimental	Moderately detrimental	Moderately detrimental	Moderately detrimental
Significance	Very low	Very low	Very low	Very low
Probability	Unlikely	Unlikely	Unlikely	Unlikely
Confidence	High	High	High	High
Reversibility	Zero	Zero	Zero	Zero
Irreplaceable loss of resources	High	High	Low	Low
Cumulative Impact	Low	Low	Zero	Zero

Degree to which the impact can be avoided	Low	Low
Degree to which the impact can be managed	High	Low
Degree to which the impact can be mitigated	Low	Low

As there are no known locations of graves, no mitigation is suggested and the significance with mitigation is thus also very low negative.

8.2.2.3 Impacts on "Cultural Landscape" during the construction phase

Direct impacts to the cultural landscape would occur during the construction phase when equipment is brought onto site and construction activities commence. However, the landscape is already heavily compromised by powerlines and other electrical infrastructure that the erection of another powerline would make very little difference. The extent and magnitude are thus local and low with a significance of very low negative. No mitigation measures are suggested other than the best practice measures of keeping the construction duration as short as possible and minimising surface disturbance. These will make no difference to the significance rating which remains very low negative. There are no fatal flaws in terms of construction phase impacts to the cultural landscape.

With the no-go option, the landscape would remain unchanged, and no new impacts would occur.

Table 8-5: Impact assessment table of *"Impacts on the cultural landscape"* during the construction phase of the proposed grid line and switching station.

	Proposed project		**"No go"**	
	Without Mitigation	**With mitigation**	**Without Mitigation**	**With mitigation**
Nature	Negative	Negative	Neutral	Neutral
Extent	Local	Local	Zero	Zero
Magnitude	Low	Low	Zero	Zero
Duration	Short Term	Short Term	None	None
Consequence	Slightly detrimental	Slightly detrimental	Zero	Zerto
Significance	Very low	Very low	Zero	Zero
Probability	Definite	Definite	None	None
Confidence	High	High	High	High
Reversibility	High	High	n/a	n/a
Irreplaceable loss of resources	Low	Low	n/a	n/a
Cumulative Impact	Low	Low	n/a	n/a
Degree to which the impact can be avoided	Low		n/a	
Degree to which the impact can be managed	Low		n/a	
Degree to which the impact can be mitigated	Low		n/a	

8.2.2.4 Proposed mitigation for the construction phase:

- Keep the construction duration as short as possible and minimise surface disturbance.

8.2.3 Impacts on Palaeontology

Impact on fossil heritage will include damage or destruction of fossils on or below the surface. Impacts will only occur during the construction phase at or below the ground surface (Table 8-6).

Table 8-6: Damage or destruction of fossils on or below the surface

	Proposed project		"No go"	
	Without Mitigation	**With mitigation**	**Without Mitigation**	**With mitigation**
Nature	Negative	Positive	Neutral	Neutral
Extent	Site specific	Site specific	Zero	Zero
Magnitude	High	Low	Zero	Zero
Duration	Long Term	Long Term	None	None
Consequence	Moderately beneficial/ detrimental	Slightly beneficial/ detrimental	Zero	Zero
Significance	Very-Low	Negligible	Zero	Zero
Probability	Probable	Unlikely	None	None
Confidence	Medium	Medium	None	None
Reversibility	Zero	Zero	n/a	n/a
Irreplaceable loss of resources	High	High	n/a	n/a
Cumulative Impact	Low	Low	Zero	Zero
Degree to which the impact can be avoided	High		Neutral	
Degree to which the impact can be managed	High		Neutral	
Degree to which the impact can be mitigated	High		Neutral	

8.2.3.1 Proposed Mitigation measures for the construction phase:

- The Environmental Control Officer (ECO), responsible for the development, should be aware of the possibility of finding fossils in the Adelaide Subgroup as well as in the Tierberg Formation (Ecca Group Karoo Supergroup). Quaternary fossil assemblages are normally rare and low in diversity and occur over a wide-ranging geographic area.
- If Palaeontological Heritage is uncovered during surface clearing and excavations the Chance Find Protocol attached should be implemented immediately. These discoveries ought to be protected (if possible, in situ) and the ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that correct mitigation (recording and collection) can be carried out by a paleontologist.
- Before any fossil material can be collected from the development site, the specialist involved would need to apply for a collection permit from SAHRA. Fossil material must be housed in an official collection (museum or university), while all reports and fieldwork should meet the minimum standards for palaeontological impact studies proposed by SAHRA (2012). It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils.

8.2.4 Impacts on Terrestrial Biodiversity

The following potential ecological impacts were identified by the specialist for the construction phase:

- Loss of natural habitat,
- Loss of individuals of protected trees, protected plants or other listed species (no specific concerns seen on site),
- Loss of faunal habitat, and
- Invasion by alien invasive plant species as a result of disturbance.

The impact significance of loss of natural habitat during the construction phase was assessed as of low negative significance, with or without mitigation (Table 8-7).

Table 8-7:Impact assessment table of "Loss of natural habitat" during the construction phase of the proposed gridline (both alternatives).

	Proposed project		"No go"	
	Without Mitigation	**With mitigation**	**Without Mitigation**	**With mitigation**
Nature	Negative	Negative		
Extent	Site specific	Site specific	Site specific	Site specific
Magnitude	Low	Low	Zero	Zero
Duration	Long-term	Long-term	Long Term	Long Term
Consequence	Slight	Slight	Zero	Zero
Significance	Low	Low	Negligible	Negligible
Probability	Definite	Definite	Possible	Possible
Confidence	High	High	High	High
Reversibility	Medium	Medium	High	High
Irreplaceable loss of resources	Low	Low	Low	Low
Cumulative Impact	Medium	Medium	Zero	Zero
Degree to which the impact can be avoided	Low		Medium	
Degree to which the impact can be managed	Medium		Medium	
Degree to which the impact can be mitigated	Medium		Medium	

The impact significance of loss of individual listed and protected plant species during the construction phase by the proposed OHPL was assessed as of very low negative with and without mitigation (Table 8-8).

Table 8-8: Impact assessment table of "Loss of individuals of listed and protected plant species" during the construction phase of the proposed gridline for both pylon design alternatives.

	Proposed project		"No go"	
	Without Mitigation	**With mitigation**	**Without Mitigation**	**With mitigation**
Nature	Negative	Negative	Neutral	Neutral
Extent	Site specific	Site specific	Site specific	Site specific
Magnitude	Low	Low	Zero	Zero
Duration	Long-term	Long-term	Long Term	Long Term
Consequence	Slight	Slight	Zero	Zero
Significance	Very Low	Very Low	Negligible	Negligible

Probability	Possible	Unlikely	None	None
Confidence	High	High	High	High
Reversibility	Low	Low	Low	Low
Irreplaceable loss of resources	Low	Low	Low	Low
Cumulative Impact	Medium	Medium	Zero	Zero
Degree to which the impact can be avoided	Low		Medium	
Degree to which the impact can be managed	Medium		Medium	
Degree to which the impact can be mitigated	Medium		Medium	

The extent of the impact of loss of natural habitat during the construction phase by the proposed switching station is "site specific" since it takes place on site or within 100 m of the proposed activity. At this scale, the construction will cause localised loss of habitat that will overall lead to severe alteration in natural functions and processes within the assessment area (switching station site). The duration of the impact is permanent, but there is no assessment category for this, so it is scored as "long-term".

The impact significance was assessed as of medium negative with and without mitigation (Table 8-9).

Table 8-9: Impact assessment table of "Loss of natural habitat" during the construction phase of the proposed switching station.

	Proposed project		**"No go"**	
	Without Mitigation	**With mitigation**	**Without Mitigation**	**With mitigation**
Nature	Negative	Negative	Neutral	Neutral
Extent	Site specific	Site specific	Site specific	Site specific
Magnitude	Severe	Severe	Zero	Zero
Duration	Long Term	Long Term	Long Term	Long Term
Consequence	Moderate	Moderate	Zero	Zero
Significance	Medium	Medium	Negligible	Negligible
Probability	Definite	Definite	Possible	Possible
Confidence	High	High	High	High
Reversibility	Zero	Zero	High	High
Irreplaceable loss of resources	Low	Low	Low	Low
Cumulative Impact	Medium	Medium	Zero	Zero
Degree to which the impact can be avoided	Low		Medium	
Degree to which the impact can be managed	Medium		Medium	
Degree to which the impact can be mitigated	Medium		Medium	

The impact significance of loss of individual protected trees, protected plants or other listed species during the construction phase by the proposed switching station was assessed as of very low negative without mitigation and negligible with mitigation.

Table 8-10: Impact assessment table of "Loss of individuals of protected trees, protected plants or other listed species" during the construction phase of the proposed switching station.

	Proposed project		"No go"	
	Without Mitigation	**With mitigation**	**Without Mitigation**	**With mitigation**
Nature	Negative	Negative	Neutral	Neutral
Extent	Site specific	Site specific	Site specific	Site specific
Magnitude	Low	Low	Zero	Zero
Duration	Long Term	Long Term	Long Term	Long Term
Consequence	Slight	Slight	Zero	Zero
Significance	Very Low	Negligible	Negligible	Negligible
Probability	Possible	Unlikely	None	None
Confidence	High	High	High	High
Reversibility	Low	Low	Low	Low
Irreplaceable loss of resources	Low	Low	Low	Low
Cumulative Impact	Medium	Medium	Zero	Zero
Degree to which the impact can be avoided	Low		Medium	
Degree to which the impact can be managed	Medium		Medium	
Degree to which the impact can be mitigated	Medium		Medium	

8.2.4.1 Proposed Mitigation measures for the construction phase:

- Minimise vegetation clearing and disturbance to footprint areas only by clearly demarcating the working area.
- Rehabilitate disturbed areas according to the Environmental Management Programme (EMPr).
- Implement alien invasive plant management in line with the EMPr.
- It is a legal requirement to obtain a flora permit for any protected plants that will be lost due to construction of the project, as per the Northern Cape Nature Conservation Act No. 9 of 2009 (listed in Appendix 1 of Annexure B5), the National Environmental Management: Biodiversity Act, Act 10 of 2004 (listed in Appendix 2 of Annexure B5), and the National Forests Act, No. 84 of 1998 (listed in Appendix 3 of Annexure B5).
- A detailed pre-construction walk-through survey by an ecological / botanical specialist will be required during a favourable season to locate any individuals of protected plants, as well as for any populations of threatened plant species. This survey must cover the footprint of all approved infrastructure, including internal access roads (final infrastructure layout). The best season is early to late Summer, but dependent on recent rainfall and vegetation growth.
- Implement plant rescue according to the EMPr.

8.2.5 Impacts on Aquatic Biodiversity

Most of the potential aquatic ecosystem impacts of the proposed activities are likely to take place during the construction phase. These potential impacts and the associated issues identified include:

- Construction activities could result in the disturbance of aquatic habitats and biota. The proposed activities are however placed far from any aquatic habitats. The construction

activities would thus be unlikely to modify aquatic habitat and biota to such an extent that the present or future desired state of the watercourses would be compromised.

- During construction, the earthworks expose and mobilise soil while construction materials and chemicals may contaminate water resources. Given the low rainfall in the area and the distance of the works from watercourses, this impact would be unlikely, particularly if undertaken in the dry season

Construction of the switching station, access road and the powerline connection with the servitude road, for Paarde Valley PV2 will require disturbance of the surface area and removal of vegetation cover for clearing and preparation of the various project component footprints. Only a limited amount of water is utilised during construction for the batching of cement for the construction activities. Concrete foundations will need to be constructed. A construction camp with a temporary laydown area and the concrete batching plant would likely need to be placed within the site for the construction works. There is thus also the potential for some water quality impacts associated with construction activities on the site. The location of the proposed works is located sufficiently far from the delineated aquatic features that they do not pose any significant risk to the aquatic features. The impact was assessed as of negligible significance (Table 8-11)

Table 8-11: Impact assessment table of "Degradation of the ecological condition of aquatic ecosystems and water quality impacts" during the construction phase of the proposed grid line and switching station.

	Proposed project		**"No go"**	
	Without Mitigation	**With mitigation**	**Without Mitigation**	**With mitigation**
Nature	Negative	Negative	Neutral	-
Extent	Site	Site	Zero	-
Magnitude	Low	Low	Zero	-
Duration	Short term	Short term	Zero	-
Consequence	Negligibly detrimental	Negligibly detrimental	Zero	-
Significance	Negligible	Negligible	Zero	-
Probability	Probable	Possible	Zero	-
Confidence	High	High	High	-
Reversibility	Medium	High	High	-
Irreplaceable loss of resources	Low	Zero	Zero	-
Cumulative Impact	Medium	Low	Zero	-
Degree impact can be avoided	High		High	
Degree impact can be managed	High		High	
Degree impact can be mitigated	High		High	

8.2.5.1 Proposed mitigation measures for the construction phase:

- The recommended buffers of at least 30 and 50 m between the delineated aquatic ecosystems and proposed development the proposed project activities should be maintained. That is with the exception of the servitude road that will make use of an existing farm road.

- During the construction phase, site management must be undertaken at the laydown and construction sites, as per the EMPr to address on-site stormwater management and prevention of pollution measures from any potential pollution sources during construction activities.
- Invasive alien plant growth and signs of erosion should be monitored on an ongoing basis to ensure that the disturbed areas do not become infested with invasive alien plants. It is recommended that the alien invasive management measures in the EMPr for the project are followed.
- Stormwater runoff from the project infrastructure and access roads (both the servitude and access roads) must be designed to mitigate the flow impacts of any stormwater leaving the developed areas. The runoff should rather be dissipated over a broad area covered by natural vegetation or managed using appropriate shaping of the servitude and access roads with berms or channels and swales adjacent to hardened surfaces where necessary.
- Should any erosion features develop, they should be stabilised as soon as possible.

8.2.6 Impacts on Avifauna

The following potential impacts were identified for the construction phase:

- Displacement due to disturbance associated with the construction of the proposed switching station and 132kV powerline; and
- Displacement due to habitat transformation associated with the construction of the proposed 132kV switching station and to a limited extent the 132kV powerline.

Each of the avian species mentioned in Section 4.2.3 has the potential to be displaced by the proposed Paarde Valley PV2 switching station and 132 kV powerline grid connection as a result of habitat transformation and disturbance. However, these species have persisted despite existing disturbance i.e. pastoral, industrial, residential activities and vehicle disturbance within the study area. This resilience, coupled with the fact that similar habitat is available throughout the broader area, means that the displacement impact will not be of regional or national significance. In addition, no raptor nests or other possible Red List breeding sites were noted during the site survey (Chris van Rooyen Consulting, 2022).

During the construction of powerlines, service roads (jeep tracks), substations and other associated infrastructure, habitat destruction/transformation inevitably takes place. The construction activities could impact on birds breeding, foraging and roosting in or in close proximity of the proposed switching station and the 132 kV OHPL through transformation of habitat, which could result in temporary or permanent displacement. Unfortunately, very little mitigation can be applied to reduce the significance of this impact as the total permanent transformation of the natural habitat within the construction footprint of the central collector substation is unavoidable. In the case of the 132 kV OHPL, the direct habitat transformation is limited to the pole footprints and the narrow access road/track under the powerline. The habitat in the study area is highly uniform from a bird impact perspective. The loss of habitat a relatively small quantity of the habitat for priority species due to direct habitat transformation associated with the construction of the proposed 132 kV OHPL is likely to be fairly minimal (Chris van Rooyen Consulting, 2022).

Apart from direct habitat destruction, the above-mentioned activities also impact on birds through disturbance; this could lead to breeding failure if the disturbance happens during a critical part of the breeding cycle. Construction activities in close proximity to breeding

locations could be a source of disturbance and could lead to temporary breeding failure or even permanent abandonment of nests. A potential mitigation measure is the timeous identification of nests and the timing of the construction activities to avoid disturbance during a critical phase of the breeding cycle. Terrestrial species and raptors potentially breeding on the existing powerline infrastructure within the PAOI are most likely to be affected by displacement due to disturbance.

The impact significance of displacement of priority species due to disturbance associated with construction of the proposed development using either technology alternative (i.e. steel lattice or standard steel monopole tower structures) was assessed as of low negative without mitigation and very low negative with mitigation (Table 8 12)

Table 8-12: Displacement of priority species due to disturbance associated with construction of the proposed development using either technology alternative (i.e. steel lattice or standard steel monopole tower structures)

	Without mitigation	With mitigation	No Go
Nature	Negative -	Negative-	Neutral. The no-go alternative will result in the current status quo being maintained within the proposed development area as far as the avifauna is concerned. The study area itself consists mostly of natural Karoo shrub and surface waterbodies. The no-go option would result in no additional impacts on priority avifauna which would be beneficial to the avifauna currently occurring there.
Extent	Local	Local	
Magnitude	Medium	Medium	
Duration	Short	Short	
Consequence	Slightly detrimental	Slightly detrimental	
Significance	Low	Very Low	
Probability	Probable	Possible	
Confidence	High	High	
Reversibility	Medium	High	
Irreplaceable loss of resources?	Low	Low	
Cumulative Impact	Medium	Low	
Degree to which the impact can be avoided	Low. The impact will occur regardless of mitigation.		
Degree to which the impact can be managed	Low.		
Degree to which the impact can be mitigated	Low. There will still be a high potential for disturbance, regardless of mitigation.		

The impact significance of displacement of priority species due to habitat transformation associated with construction of the proposed switching station was assessed as of low negative without mitigation and very low negative with mitigation (Table 8-13)

Table 8-13: Impact table for the 'Displacement of priority species due to habitat transformation associated with construction of the switching station'

	Without mitigation	With mitigation	No Go
Nature	Negative -	Negative -	Neutral. The no-go alternative will result in the current status quo being maintained within the proposed development area as far as the avifauna is concerned. The study area itself consists mostly of
Extent	Site Specific	Site Specific	
Magnitude	Medium	Low	
Duration	Long	Long	
Consequence	Moderately detrimental	Slightly detrimental	
Significance	Low	Very Low	

Probability	Definite	Probable	natural Karoo shrub and surface waterbodies. The no-go option would result in no additional impacts on priority avifauna which would be beneficial to the avifauna currently occurring there.
Confidence	High	High	
Reversibility	Low	Medium	
Irreplaceable loss of resources?	Medium	Low	
Cumulative Impact	Medium	Medium	
Degree to which the impact can be avoided	Low. The construction of the switching station will result in the complete transformation of the footprint.		
Degree to which the impact can be managed	Low		
Degree to which the impact can be mitigated	Low		

The impact significance of displacement of priority species due to habitat transformation associated with the construction of the OHPL was assessed as of very low negative without mitigation and negligible negative with mitigation (Table 8-14)

Table 8-14: Impact table for the 'Displacement of priority species due to habitat transformation associated with construction of the 132kV OHPL using either technology alternative (i.e. steel lattice or standard steel monopole tower structures)'

	Without mitigation	**With mitigation**	**No Go**
Nature	Negative -	Negative -	Neutral. The no-go alternative will result in the current status quo being maintained within the proposed development area as far as the avifauna is concerned. The study area itself consists mostly of natural Karoo shrub and surface waterbodies. The no-go option would result in no additional impacts on priority avifauna which would be beneficial to the avifauna currently occurring there.
Extent	Site Specific 1	Site Specific 1	
Magnitude	Low 1	Low 1	
Duration	Medium 2	Medium 2	
Consequence	Slightly detrimental	Slightly detrimental	
Significance	Very Low	Negligible	
Probability	Probable 3	Possible 2	
Confidence	High	High	
Reversibility	Medium	Medium	
Irreplaceable loss of resources?	Low	Low	
Cumulative Impact	Medium	Medium	
Degree to which the impact can be avoided	High. Very little vegetation clearance will be required for the powerline.		
Degree to which the impact can be managed	Medium		
Degree to which the impact can be mitigated	Medium		

8.2.6.1 Proposed Mitigation measures for the construction phase:

- Construction of the double circuit OHPL using a minimum clearance distance of 1.8 m between the jumpers and/or insulators and the horizontal earthed component on the lattice/monopole structure.

- An avifaunal specialist must conduct a pre-construction inspection (avifaunal walk-through) of the final switching station layout and powerline alignment to identify priority species that may be breeding within the final footprint. If a SSC nest is occupied, the avifaunal specialist must consult with the contractor to find ways of minimizing the potential disturbance to the breeding birds during the construction period. This could include measures such as delaying some of the activities until after the breeding season.
- A site-specific EMPr must be implemented, which gives appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the EMPr and should apply good environmental practice during construction. The EMPr must specifically include the following:
- No off-road driving;
- Maximum use of existing roads, where possible;
- Measures to control noise and dust according to latest best practice;
- Restricted access to the rest of the property;
- Strict application of all recommendations in the biodiversity specialist report pertaining to the limitation of the footprint.
- Inclusion of operational measures to be followed with Environmental Awareness Training.
- Bird Flight Diverters must be fitted to the entire OHPL according to the applicable Eskom Engineering Instruction (Eskom Unique Identifier 240 – 93563150: The utilisation of Bird Flight Diverters on Eskom Overhead Lines).
- Appointment of rehabilitation specialist to develop Habitat Rehabilitation Plan (HRP).
- Site inspections to monitor progress of HRP.
- Adaptive management to ensure HRP goals are met.

8.2.7 Impact on traffic and transportation;

Construction vehicles would have to make use of the local road network in the vicinity of the proposed development. This could impact negatively on traffic flow and pedestrians in the area and may result in wear and tear on the access roads, and generation of dust from gravel roads. It is estimated that two crane trucks will be required travelling from the site camp to the site daily during the construction phase. A total of 50 truck delivery trips are estimated to be required during the construction phase. The significance of the impact was assessed as of low negative significance without mitigation and very low negative with mitigation (Table 8-15).

Table 8-15: Impact table for impacts on traffic and transportation.

	The Proposed Development		**"No Go" Alternative**	
	Without Mitigation	**With mitigation**	**Without Mitigation**	**With mitigation**
Nature	(-)	(-)	N/A	N/A
Extent	Local	Local	N/A	N/A
Magnitude	Low	Very Low	N/A	N/A
Duration	Short Term	Short Term	N/A	N/A
Consequence	Slightly Detrimental	Negligibly Detrimental	N/A	N/A
Significance	Low	Very Low	N/A	N/A
Probability	Probable	Possible	N/A	N/A
Confidence	High	High	N/A	N/A

Reversibility	High	High	N/A	N/A
Irreplaceable loss of resources	Low	Low	N/A	N/A
Cumulative Impact	Low	Low	N/A	N/A
Degree to which the impact can be avoided	Medium		N/A	
Degree to which the impact can be managed	High		N/A	
Degree to which the impact can be mitigated	Medium		N/A	

8.2.7.1 Proposed mitigation measures for the construction phase:

- Ensure that existing roads are used by the construction vehicles, and that these roads are maintained in accordance with the EMPr.
- Traffic control measures specified in the EMPr must be implemented, including specifications relating to dust control measures.

8.2.8 Impact on ambient noise levels in the area

Construction activities, construction vehicles and construction personnel on site may cause an increase in noise in the area, which may impact negatively on adjoining landowners and users.

The significance of this potential impact is limited by the remoteness of the majority of the site to the surrounding land users, as well as that all relevant noise regulations would need to be adhered to during construction.

The significance of the impact was assessed as of low negative significance without mitigation and very low negative with mitigation (Table 8-16).

Table 8-16: Impact on ambient noise levels in the area: Construction Phase

	The Proposed Development		**"No Go" Alternative**	
	Without Mitigation	**With mitigation**	**Without Mitigation**	**With mitigation**
Nature	(-)	(-)	N/A	N/A
Extent	Local	Local	N/A	N/A
Magnitude	Low	Very Low	N/A	N/A
Duration	Short Term	Short Term	N/A	N/A
Consequence	Slightly Detrimental	Negligibly Detrimental	N/A	N/A
Significance	Low	Very Low	N/A	N/A
Probability	Probable	Possible	N/A	N/A
Confidence	High	High	N/A	N/A
Reversibility	High	High	N/A	N/A
Irreplaceable loss of resources	Zero	Zero	N/A	N/A
Cumulative Impact	Very Low	Very Low	N/A	N/A
Degree to which the impact can be avoided	Low		N/A	
Degree to which the impact can be managed	Medium		N/A	

Degree to which the impact can be mitigated	Medium	N/A

8.2.8.1 Proposed mitigation measures for the construction phase:

Impacts of noise generation during construction, in general, could be mitigated by ensuring that all regulations to noise generation are observed. This potential impact could readily be managed by the effective implementation of the EMPr (refer to Annexure F), including amongst others, the following:

- Noise sensitive operations to be scheduled for daytime, whenever possible.
- Where activities are likely to produce undue noise disturbance to adjacent landowners (viz. noise levels in excess of 85 decibels) these activities shall be restricted to normal working hours (07h30 – 17h30 on weekdays and Saturdays). Where this is not possible, affected parties shall be consulted.

8.2.9 Impact of Windblown dust

Construction activities may result in increased generation of windblown dust in the area, particularly in the dry summer months. This is primarily due to the excavation of materials, material stockpiles, movement of additional vehicles (particularly on gravel roads) and removal of ground cover (natural vegetation) in preparation for the proposed activities. The additional dust could have an impact on adjacent farming activities and other potential sensitive receptors, such as the town of De Aar, in the vicinity of the proposed activities and access roads during the construction period, if not managed appropriately.

The significance of the impact was assessed as of low negative significance without mitigation and very low negative with mitigation (Table 8-17).

Table 8-17: Impact table for 'Windblown Dust: Construction Phase'

	The Proposed Development		**"No Go" Alternative**	
	Without Mitigation	**With mitigation**	**Without Mitigation**	**With mitigation**
Nature	(-)	(-)	N/A	N/A
Extent	Local	Local	N/A	N/A
Magnitude	Low	Very Low	N/A	N/A
Duration	Short Term	Short Term	N/A	N/A
Consequence	Slightly Detrimental	Negligibly Detrimental	N/A	N/A
Significance	Low	Very Low	N/A	N/A
Probability	Probable	Possible	N/A	N/A
Confidence	Medium	Medium	N/A	N/A
Reversibility	Medium	Medium	N/A	N/A
Irreplaceable loss of resources	Low	Low	N/A	N/A
Cumulative Impact	Low	Low	N/A	N/A
Degree to which the impact can be avoided	Medium		N/A	
Degree to which the impact can be managed	Medium - High		N/A	
Degree to which the impact can be mitigated	Medium - High		N/A	

8.2.9.1 Proposed mitigation measures for the construction phase

The potential dust impact would be managed via the implementation of the EMPr for the project (refer to Annexure F), which includes procedures for managing dust pollution including, for example, watering of roads, etc. Provided that normal dust control measures (e.g. wetting of gravel roads or exposed surfaces, suspending dust generating activities during high wind conditions, re-vegetating/ stabilising disturbed surfaces as soon as possible) are implemented, it is unlikely that windblown dust will be a significant issue.

8.2.10 Impact of litter/ waste pollution

During the construction phase of developments, waste is generated, including general waste (e.g. food and packaging, cardboard, plastic, paper, bottles, tins, wood, metal etc) and hazardous waste (e.g. oily rags, used oil, cement bags etc.). If waste is not managed and disposed of appropriately, litter/ water pollution may impact on the biophysical environment (e.g. contamination of soils), and could be more significant for the aesthetics of the area if not properly controlled.

The presence of people and the operation of machinery on the development site may result in pollution of soils through accidental spills of oil and fuel, the air through vehicle emissions, and the surrounding area due to litter and inappropriate disposal of waste. Provided mitigation measures are implemented, this potential negative impact can be avoided. The significance of this potential impact therefore is anticipated to be Very Low (Negative) before and after mitigation (Table 8-18).

Table 8-18: Impact table for 'Litter / Waste pollution: Construction Phase'

	The Proposed Development		**"No Go" Alternative**	
	Without Mitigation	**With mitigation**	**Without Mitigation**	**With mitigation**
Nature	(-)	(-)	N/A	N/A
Extent	Site Specific	Site Specific	N/A	N/A
Magnitude	Low	Very Low	N/A	N/A
Duration	Short Term	Short Term	N/A	N/A
Consequence	Slightly Detrimental	Negligibly Detrimental	N/A	N/A
Significance	Very Low	Very Low	N/A	N/A
Probability	Possible	Possible	N/A	N/A
Confidence	High	High	N/A	N/A
Reversibility	High	High	N/A	N/A
Irreplaceable loss of resources	Low	Low	N/A	N/A
Cumulative Impact	Low	Low	N/A	N/A
Degree to which the impact can be avoided	High		N/A	
Degree to which the impact can be managed	High		N/A	
Degree to which the impact can be mitigated	High		N/A	

8.2.10.1 Proposed mitigation measures for the construction phase

The prevention of waste pollution would be achieved through the implementation of the EMPr for the project, including measures such as the provision of sufficient (animal proof) bins on

site, and the prohibition of any on-site burying, burning or dumping of any waste materials, vegetation, litter or refuse, provision of ablution facilities, amongst others. Refer to the draft EMPr included in Annexure F for the proposed specifications regarding water management for the project (including, for example, sections on "Solid Waste Management" and "Pollution").

8.2.11 Impact on job creation

The proposed development could provide a number of direct and indirect job opportunities during the construction phase, which would have a localised positive impact on the local economy and in turn on the social conditions of those involved (Table 8-19).

The proposed construction phase activities may also generate numerous downstream job opportunities (i.e. indirect) in the fields of engineering, accommodation, transport, hospitality etc. for the duration of the construction phase, which is anticipated to last for approximately 12 – 18 months.

Table 8-19: Impact table for 'Job Creation: Construction phase'

	The Proposed Development		**"No Go" Alternative**	
	Without Mitigation	**With mitigation**	**Without Mitigation**	**With mitigation**
Nature	(+)	(+)	(-)	N/A
Extent	Regional	Regional	Regional	N/A
Magnitude	Medium	Medium	Medium	N/A
Duration	Short Term	Short Term	Short Term	N/A
Consequence	Moderately Beneficial	Moderately Beneficial	Moderately detrimental	N/A
Significance	Medium	Medium	Medium (-)	N/A
Probability	Definite	Definite	Definite	N/A
Confidence	High	High	Certain	N/A
Reversibility	High	High	N/A	N/A
Irreplaceable loss of resources	N/A	N/A	N/A	N/A
Cumulative Impact	Medium - High	Medium - High	Medium - High (-)	N/A
Degree to which the impact can be avoided	N/A		N/A	
Degree to which the impact can be managed	High		N/A	
Degree to which the impact can be mitigated	N/A		N/A	

8.2.11.1 Proposed mitigation measures for the construction phase:

- Ensure that local and previously disadvantaged people are used for the construction activities, as far as possible.
- Local sub-contractors should be used where possible and contractors from outside the local area that tender for work should also be required to meet targets for how many locals are given employment.
- Where feasible, a training and skills development programme for local workers should be initiated prior to the initiation of the construction phase.

8.2.12 Impacts on HIV and Gender Related Concerns

The presence of workers (construction and operational phase) can pose a potential risk to family structures and social networks in the area. While the presences of workers does not in itself constitute a social impact, the manner in which the workers conduct themselves can affect the local community.

The execution of large capital projects is known to cause population movements and changes to sexual networks, raising HIV risks for construction workers, miners, truck drivers and sex workers, among others. Although the construction phase of the project is anticipated to generate approximately 25 -50 employment opportunities, the nature of the required skills is such that the majority of employment opportunities are likely to be filled by local labour (i.e. from the immediate local communities). It is therefore anticipated that the project would not lead to an influx of migrant labour.

The impacts significance was assessed as low negative with and without mitigation (Table 8-20).

Table 8-20: Impacts on HIV and Gender Related Concerns: Construction Phase

	The Proposed Development		"No Go" Alternative	
	Without Mitigation	**With mitigation**	**Without Mitigation**	**With mitigation**
Nature	(-)	(-)	N/A	N/A
Extent	Local	Local	N/A	N/A
Magnitude	Low	Low	N/A	N/A
Duration	Short Term	Short Term	N/A	N/A
Consequence	Slightly Detrimental	Slightly Detrimental	N/A	N/A
Significance	Low	Low	N/A	N/A
Probability	Possible	Possible	N/A	N/A
Confidence	Medium	Medium	N/A	N/A
Reversibility	Low	Low	N/A	N/A
Irreplaceable loss of resources	N/A	N/A	N/A	N/A
Cumulative Impact	Very Low	Very Low	N/A	N/A
Degree to which the impact can be avoided	Medium - High		N/A	
Degree to which the impact can be managed	Medium - High		N/A	
Degree to which the impact can be mitigated	Medium - High		N/A	

8.2.12.1 Proposed mitigation measures for the construction phase:

- The contractor shall ensure that the standard site safety induction for all personnel shall also include basic HIV awareness information.

8.3 OPERATIONAL PHASE IMPACT ASSESSMENT ON TE BIOPHYSICAL & SOCIAL ENVIRONMENTS

Operational phase impacts are those impacts on the biophysical and socio-economic environment that may occur during the operational phase of the proposed project. The

operational phase for the proposed project may result in a number of potential impacts on the biophysical and social environments.

These could potentially include the following impacts:

- Impact on landscape/ visual impact;
- Impact on archaeological and cultural heritage resources;
- Impact on paleontological resources;
- Impact on terrestrial biodiversity;
- Impact on aquatic biodiversity; and
- Impact on avian species.

Many of the operational phase impacts would be mitigated through the implementation of an appropriate Environmental Management Programme (EMPr). As required in terms of the EIA Regulations (2014), as amended, and GN No. 435[16] generic EMPrs have been compiled for the proposed project (refer to Annexure G) and will be submitted to the DFFE as part of the Basic Assessment Report, to provide mitigation and ascribe responsibilities for the operational phase impacts. The EMPr must be incorporated into the operational contract and an Environmental Control Officer (ECO) must be appointed to oversee compliance with the EMPr during the operational phase.

8.3.1 Landscape / Visual Impacts

The viewshed, or zone of visual influence of the proposed grid connection potentially extends for some 4 to 5 km, but is restricted by low hills to the west, where the surrounding area is in a view shadow. The viewshed of the proposed switching station would be fairly localised.

Visibility of lights at night would not be significant because of the localised need for lighting and the distance of receptors. Visibility of the proposed grid connection would be greatest where it crosses the R48, and less so from the northern part of De Aar because of railway infrastructure in the foreground. To the east, a number of existing Eskom powerlines already impose visual clutter in the landscape.

The visual impact of the proposed OHPL during the operational phase has been assessed as of medium negative significance with and without mitigation (Table 8-21).

Table 8-21: Impact assessment table of *"visual impacts"* during the operational phase of the proposed grid line.

	Proposed project		**"No go"**	
	Without Mitigation	**With mitigation**	**Without Mitigation**	**With mitigation**
Nature	Negative	Negative	Neutral	Neutral
Extent	Local	Local	Local	Local
Magnitude / Intensity	Medium	Medium	Neutral	Neutral
Duration	Long term	Long term	n/a	n/a
Consequence	Moderate	Moderate	Neutral	Neutral

[16] Government Gazette No. 42323 of 22 March 2019

Significance	Medium	Medium	Neutral	Neutral
Probability	Definite	Definite	Neutral	Neutral
Confidence	High	High	Medium	Medium
Reversibility	High	High	Neutral	Neutral
Irreplaceable loss of resources	Low	Low	Neutral	Neutral
Cumulative Impact	Medium	Medium	Neutral	Neutral
Degree to which the impact can be avoided	Low		n/a	
Degree to which the impact can be managed	Medium		n/a	
Degree to which the impact can be mitigated	Low		n/a	

The visual impact of the proposed development during the operational phase has been assessed as of medium negative significance with and without mitigation (Table 8-22).

Table 8-22: Impact assessment table of *"visual impacts"* during the operational phase of the proposed switching station.

	Proposed project		**"No go"**	
	Without Mitigation	**With mitigation**	**Without Mitigation**	**With mitigation**
Nature	Negative	Negative	Neutral	Neutral
Extent	Local	Local	Local	Local
Magnitude / Intensity	Medium	Medium	Neutral	Neutral
Duration	Long term	Long term	n/a	n/a
Consequence	Moderate	Moderate	Neutral	Neutral
Significance	Medium	Medium	Neutral	Neutral
Probability	Definite	Definite	Neutral	Neutral
Confidence	High	High	Medium	Medium
Reversibility	High	High	Neutral	Neutral
Irreplaceable loss of resources	Low	Low	Neutral	Neutral
Cumulative Impact	Medium	Medium	Neutral	Neutral
Degree to which the impact can be avoided	Low		n/a	
Degree to which the impact can be managed	Medium		n/a	
Degree to which the impact can be mitigated	Low		n/a	

8.3.1.1 Proposed mitigation measures for the operational phase:

- There is little or no scope for visual screening of pylons;
- Area along the grid route must be maintained and stormwater gullies repaired where necessary;
- Consideration must be given to screening of switching station by means of berms and/or vegetation; and
- Signage and lighting at the switching station must be controlled to avoid visual intrusion on the surroundings. Reflectors to be used on light fittings to avoid light spillage.

8.3.2 Impacts on Archaeology and Cultural Heritage

Direct impacts to the cultural landscape would occur during the operation phase through the intrusive presence of the powerline and switching station on the landscape. The road would only be very minimally visible. The impacts are very similar to those from the construction phase except that the duration is longer (being equal to the lifespan of the powerline). The significance calculates to low negative (Table 8-23).

With the no-go option, the landscape would remain unchanged, and no new impacts would occur**.**

Table 8-23: Impact assessment table of *"Impacts on the cultural landscape"* during the operational phase of the proposed grid line and switching station.

	Proposed project		**"No go"**	
	Without Mitigation	**With mitigation**	**Without Mitigation**	**With mitigation**
Nature	Negative	Negative	Neutral	Neutral
Extent	Local	Local	Zero	Zero
Magnitude	Low	Low	Zero	Zero
Duration	Long Term	Long Term	None	None
Consequence	Moderately detrimental	Moderately detrimental	Zero	Zerto
Significance	Low	Low	Zero	Zero
Probability	Definite	Definite	None	None
Confidence	High	High	High	High
Reversibility	High	High	n/a	n/a
Irreplaceable loss of resources	Low	Low	n/a	n/a
Cumulative Impact	Low	Low	n/a	n/a
Degree to which the impact can be avoided	Low		n/a	
Degree to which the impact can be managed	Low		n/a	
Degree to which the impact can be mitigated	Low		n/a	

No mitigation is suggested, and the post-mitigation significance thus remains low negative. There are no fatal flaws in terms of operation phase impacts to the cultural landscape.

8.3.3 Impacts on Palaeontology

Only the construction phase of the proposed development will affect the destruction of fossil heritage and there will be no impact on the operational and decommissioning phases.

8.3.4 Impacts on Terrestrial Biodiversity

Invasion by alien invasive plant species as a result of disturbance during the operational phase was assessed as of very low negative significance with and without mitigation (Table 8-24).

Table 8-24: Impact assessment table of "Invasion by alien invasive plant species" during the operational phase of the proposed switching station and grid connection.

	Proposed project		"No go"	
	Without Mitigation	**With mitigation**	**Without Mitigation**	**With mitigation**
Nature	Negative	Negative	Negative	Negative
Extent	Site specific	Site specific	Site specific	Site specific
Magnitude	High	Low	Low	Low
Duration	Long Term	Long Term	Long Term	Long Term
Consequence	Moderate	Slight	Slight	Slight
Significance	Low	Very Low	Very Low	Very Low
Probability	Probable	Possible	Possible	Possible
Confidence	High	High	High	High
Reversibility	Medium	High	High	High
Irreplaceable loss of resources	Medium	Medium	Medium	Medium
Cumulative Impact	Medium	Medium	Zero	Zero
Degree to which the impact can be avoided	Medium		Medium	
Degree to which the impact can be managed	Medium		Medium	
Degree to which the impact can be mitigated	Medium		Medium	

8.3.4.1 Proposed mitigation measures for the operational phase:

- Implement an alien invasive management according to the EMPr.
- Rehabilitate disturbed areas, as per the EMPr.

8.3.5 Impacts on Aquatic Biodiversity

During the operation phase, change to the runoff characteristics along the access and servitude roads and in the developed areas may lead to increased erosion and sedimentation of the adjacent areas. An impact of very low to negligible significance post-mitigation may occur in terms of its impact on aquatic ecosystems in the area.

- Ongoing disturbance of aquatic features and associated vegetation along access roads or adjacent to infrastructure that needs to be maintained.
- Modified runoff characteristics particularly along the access roads have the potential to result in erosion.
- Increase in the presence of alien vegetation on site.

Table 8-25: Impact assessment table of "Degradation of the ecological condition of aquatic ecosystems; modification of surface water runoff; erosion; and alien vegetation invasion in aquatic features" during the operational phase of the proposed grid line and switching station for both design / technology alternatives.

	Proposed project		"No go"	
	Without Mitigation	**With mitigation**	**Without Mitigation**	**With mitigation**
Nature	Negative	Negative	Negative	Negative
Extent	Site	Site	Site	Site
Magnitude	Low	Low	Low	Low
Duration	Short term	Short term	Short term	Short term
Consequence	Negligibly detrimental	Negligibly detrimental	Negligibly detrimental	Negligibly detrimental
Significance	Negligible	Negligible	Negligible	Negligible
Probability	Possible	Unlikely	Possible	Possible
Confidence	High	High	High	High
Reversibility	Medium	High	High	High
Irreplaceable loss of resources	Low	Zero	Low	Low
Cumulative Impact	Medium	Low	Medium	Low
Degree impact can be avoided	High			
Degree impact can be managed	High			
Degree impact can be mitigated	High			

8.3.5.1 Recommended mitigation for the operational phase

- Invasive alien plant growth and signs of erosion should be monitored on an ongoing basis to ensure that the disturbed areas do not become infested with invasive alien plants.
- Stormwater runoff from the project infrastructure and access roads must be designed to mitigate the flow impacts of any stormwater leaving the developed areas. The runoff should rather be dissipated over a broad area covered by natural vegetation or managed using appropriate shaping of the road with berms or channels and swales adjacent to hardened surfaces where necessary. Should any erosion features develop, they should be stabilised as soon as possible.

8.3.6 Impacts on Avifauna

The following potential impacts were identified for the operational phase:

1. Collisions with the proposed 132kV powerline;
2. Electrocutions on the proposed switching station infrastructure; and
3. Electrocution of vultures on the proposed 132kV powerline infrastructure.

The impact from mortality of priority species due to collisions was assessed as of high negative significance without mitigation and medium negative significance with mitigation (Table 8-26).

Table 8-26: Impact assessment table of Mortality of priority species due to collisions with the Paarde Valley PV2 132kV powerline using either technology alternative (i.e. steel lattice or standard steel monopole tower structures)

	Without mitigation	With mitigation	No Go
Nature	Negative -	Negative -	Neutral. The no-go alternative will result in the current status quo being maintained within the proposed development area as far as the avifauna is concerned. The study area itself consists mostly of natural Karoo shrub and surface waterbodies. The no-go option would result in no additional impacts on priority avifauna which would be beneficial to the avifauna currently occurring there.
Extent	Regional	Regional	
Magnitude	High	Medium	
Duration	Long	Medium	
Consequence	Highly detrimental	Moderately detrimental	
Significance	High	Medium	
Probability	Definite	Probable	
Confidence	High	High	
Reversibility	Medium	Medium	
Irreplaceable loss of resources?	High	Medium	
Cumulative Impact	High	High	
Degree to which the impact can be avoided	Low. The impact will almost definitely happen in the course of the lifetime of the powerline.		
Degree to which the impact can be managed	Medium		
Degree to which the impact can be mitigated	Medium. The marking of powerlines is very effective for most large terrestrial species, but not for the bustard family.		

The impact from mortality of priority species due to electrocutions during the operational phase of the switching station was assessed as of low negative significance without mitigation and very low negative significance with mitigation (Table 8-27).

Table 8-27: Impact assessment table of *"Electrocutions on the proposed switching station infrastructure"* during the operational phase of the proposed switching station.

	Without mitigation	With mitigation	No Go
Nature	Negative -	Negative -	Neutral. The no-go alternative will result in the current status quo being maintained within the proposed development area as far as the avifauna is concerned. The study area itself consists mostly of natural Karoo shrub and surface waterbodies. The no-go option would result in no additional impacts on priority avifauna which would be beneficial to the avifauna currently occurring there.
Extent	Regional	Local	
Magnitude	Low	Low	
Duration	Long	Medium	
Consequence	Moderately detrimental	Slightly detrimental	
Significance	Low	Very Low	
Probability	Probable	Possible	
Confidence	High	High	
Reversibility	Medium	High	
Irreplaceable loss of resources?	High	Low	
Cumulative Impact	Low	Low	
Degree to which the impact can be avoided	Low. Pro-active insulation is not a practical option.		

Degree to which the impact can be managed	High	
Degree to which the impact can be mitigated	High	

The impact from mortality of priority species due to electrocutions during the operational phase of the OHPL was assessed as of medium negative significance without mitigation and negligible negative significance with mitigation for either design alternative (Table 8-28).

Table 8-28: Impact assessment table of *"Electrocutions on the proposed 132 kV powerline* infrastructure using either technology alternative (i.e. steel lattice or standard steel monopole tower structures)*"* during the operational phase of the proposed 132 kV powerline.

	Without mitigation	**With mitigation**	**No Go**
Nature	Negative -	Negative -	Neutral. The no-go alternative will result in the current status quo being maintained within the proposed development area as far as the avifauna is concerned. The study area itself consists mostly of natural Karoo shrub and surface waterbodies. The no-go option would result in no additional impacts on priority avifauna which would be beneficial to the avifauna currently occurring there.
Extent	Regional	Regional	
Magnitude	High	High	
Duration	Long	Long	
Consequence	Highly detrimental	Highly detrimental	
Significance	Medium	Negligible	
Probability	Probable	Unlikely	
Confidence	High	High	
Reversibility	Low	High	
Irreplaceable loss of resources?	High	Low	
Cumulative Impact	High	Low	
Degree to which the impact can be avoided	High. Construction of the double circuit OHPL using a minimum clearance distance of 1.8 m between the jumpers and/or insulators and the horizontal earthed component on the lattice/monopole structure should practically eliminate the risk of electrocutions.		
Degree to which the impact can be managed	High		
Degree to which the impact can be mitigated	High		

8.3.6.1 Recommended mitigation for the operational phase

- Construction of the double circuit OHPL using a minimum clearance distance of 1.8m between the jumpers and/or insulators and the horizontal earthed component on the lattice/monopole structure.
- Bird Flight Diverters must be fitted to the entire OHPL according to the applicable Eskom Engineering Instruction (Eskom Unique Identifier 240 – 93563150: The utilisation of Bird Flight Diverters on Eskom Overhead Lines).
- Appointment of rehabilitation specialist to develop Habitat Rehabilitation Plan (HRP).
- Site inspections to monitor progress of HRP.
- Adaptive management to ensure HRP goals are met.

- Monitor the electrocution mortality within the switching station.
- Apply mitigation if electrocution affects SCC.

8.4 CUMULATIVE ASSESSMENT

Cumulative impacts were assessed per potential impact identified by the specialists and EAP. All projects within a 35 km radius of the proposed project were taken in consideration in the assessments. According to the official renewable energy database of DFFE (Table 4-9), there are at least 51 renewable energy projects, approximately 1273 km^2 in area, within a 35 km radius around the proposed development as at the fourth quarter (Q4) of 2021.

According to data obtained from Eskom (April 2022) there are a total of fifteen substations and switching stations, 16 transmission powerlines and 19 distribution powerlines totalling hundreds of kilometres of existing medium and high voltage lines within a 35 km radius around the proposed development (Table 4-10). The proposed development will thus increase the total number of existing high voltage lines and substations by a very small percentage.

8.4.1 Cumulative Impacts on Landscape / Visual Impacts

The cumulative visual impact would be the collective impact of the proposed grid and switching station, seen along with the existing Eskom powerlines in the area, which, if developed would result in a moderate change to the local area and its sense of place as indicated in the assessment tables above. The following factors were taken into account:

- There are a number of existing Eskom powerlines leading to the main Eskom Hydra Substation, and several other solar PV and wind energy projects, both existing and proposed, within 35km.
- The grid connection has a limited viewshed with few farmsteads nearby, within a radius of about 5km.
- The proposed grid connection falls within the Central Electricity Grid Infrastructure (EGI) Strategic Corridor, which has been earmarked for current and future grid infrastructure.

8.4.2 Cumulative Impacts on Archaeology and Cultural Heritage

Despite the very large number of other electrical developments in the area, the cumulative impacts in all instances are rated as low or even very low. This is because of the following:

- The amount of significant archaeology likely to have been disturbed in the area is negligible;
- The chances of graves having been disturbed by construction activities are negligible; and
- The addition of another powerline, switching station and access road to a landscape already dominated by electrical infrastructure will make almost no noticeable difference to the landscape**.**

8.4.3 Cumulative Impacts on Terrestrial Biodiversity

The cumulative impact of the proposed development was assessed as of medium significance with or without mitigation for the construction and operational phases (Annexure B5).

8.4.4 Cumulative Impacts on Aquatic Biodiversity

The cumulative impact of the project activities together with the existing activities in the area could have the potential to reduce the integrity of the watercourses if not properly mitigated and managed. By implementing suitable buffers (50 m for the larger streams and 30 m for the smaller watercourses is recommended for the placement of pylons associated with the overhead powerline) along the watercourses and minimising the works within the river/stream corridors, the impact of the proposed project activities would be low and unlikely to impact the integrity of the aquatic ecosystems. The overall impact significance for cumulative impacts during both the construction and operational phases is expected to be Low.

8.4.5 Cumulative Impacts on Avifauna

The following potential cumulative impacts on avifauna have been identified:

- Displacement due to disturbance associated with the construction and decommissioning of the proposed switching station and 132kV powerline;
- Displacement due to habitat transformation associated with the proposed switching station and to a limited extent the 132kV powerline;
- Collisions with the proposed 132kV powerline;
- Electrocutions within the switching station; and
- Electrocution of vultures on the proposed 132kV powerline infrastructure.

The Paarde Valley PV2 project will increase the total number of existing high voltage lines by a very small percentage. The contribution of the proposed Paarde Valley PV2 132kV powerline to the cumulative impact of all the high voltage lines is thus LOW. However, the combined cumulative impact of the existing and proposed powerlines on avifauna within a 35 km radius is considered to be moderate to high.

The cumulative impact of displacement due to disturbance and habitat transformation at the 132 kV switching station within the Paarde Valley PV2 switching station is considered to be LOW, due to the small size of the switching station footprint and the availability of similar habitat within the 35 km radius area. The cumulative impact of potential electrocutions within the switching station yard is also likely to be LOW as it is expected to be a rare event (Chris van Rooyen Consulting, 2022).

8.5 SUMMARY OF IMPACT SIGNIFICANCE

All construction phase negative impacts were found to be all of negligible, low or very low significance with and without mitigation, with one impact being assessed as of medium negative significance (Loss of natural habitat due to the switching station component). One impact of positive medium significance (job creation) could occur (Table 8-29). All impacts were found to be acceptable by the specialists.

Table 8-29: Construction Phase Impact Significance Summary Table

Construction Phase		
Potential Impact	**Impact Significance without mitigation**	**Impact Significance with mitigation**
Visual impacts	Low (-)	Low (-)
Impacts to archaeological resources	Very low (-)	Very low (-)
Impacts on graves	Very low (-)	Very low (-)
Impacts on cultural landscape	Very low (-)	Very low (-)

Construction Phase		
Potential Impact	**Impact Significance without mitigation**	**Impact Significance with mitigation**
Damage or destruction of fossils on or below the surface	Very low (-)	Negligible (+)
Loss of natural habitat (powerline)	Low (-)	Low (-)
Loss of individuals of listed and protected plant species (gridline)	Very low (-)	Very low (-)
Loss of natural habitat (switching station)	Medium (-)	Medium (-)
Loss of individuals of protected trees, protected plants or other listed species (switching station)	Very low (-)	Negligible
Degradation of the ecological condition of aquatic ecosystems and water quality impacts	Negligible (-)	Negligible (-)
Displacement due to disturbance (gridline and switching station)	Low (-)	Very low (-)
Displacement due to habitat transformation (switching station)	Low (-)	Very low (-)
Displacement due to habitat transformation (gridline)	Very low (-)	Negligible (-)
Impact on traffic and transportation	Low (-)	Very low (-)
Impact on ambient noise levels in the area	Low (-)	Very low (-)
Impact on windblown dust	Low (-)	Very low (-)
Litter / Waste pollution	Very low (-)	Very low (-)
Job creation	Medium (+)	Medium (+)
Impacts on HIV and gender related concerns	Low (-)	Low (-)

All operational phase negative impacts can be mitigated to a medium, low, very low and negligible significance. One potentially high negative impact (mortality of avian priority species due to collisions with the OHPL) could occur without mitigation, however would be reduced to medium negative significance with the recommended mitigation (Table 8-30).

Table 8-30: Operational Phase Impact Significance Summary Table

Operational Phase		
Potential Impact	**Impact Significance without mitigation**	**Impact Significance with mitigation**
Visual impacts (OHPL)	Medium (-)	Medium (-)
Visual impacts (switching station)	Medium (-)	Medium (-)
Impacts on cultural landscape	Low (-)	Low (-)
Invasion by alien invasive plant species	Low (-)	Very low (-)
Degradation of the ecological condition of aquatic ecosystems, modification of surface water runoff, erosion and alien vegetation invasion in aquatic features	Negligible (-)	Negligible (-)
Mortality of priority species due to collisions with the OHPL powerline using either technology alternative (i.e. steel lattice or standard steel monopole tower structures)	High (-)	Medium (-)
Electrocutions on the proposed switching station infrastructure”	Low (-)	Very low (-)
Electrocutions on the proposed 132 kV powerline infrastructure using either technology alternative (i.e. steel lattice or standard steel monopole tower structures)	Medium (-)	Negligible (-)

Cumulative impacts have been rated as of very low to medium negative significance. This is due to the large number of existing and proposed developments in the area.

Table 8-31: Cumulative Impact Significance Summary Table

Impact	Cumulative impact without mitigation	Cumulative Impact with mitigation
Construction Phase		
Visual impacts	Medium (-)	Medium (-)
Impacts to archaeological resources	Low (-)	Low (-)
Impacts on graves	Low (-)	Low (-)
Impacts on cultural landscape	Low (-)	Low (-)
Damage or destruction of fossils on or below the surface	Low (-)	Low (-)
Loss of natural habitat (gridline)	Medium (-)	Medium (-)
Loss of individuals of listed and protected plant species (gridline)	Medium (-)	Medium (-)
Loss of natural habitat (switching station)	Medium (-)	Medium (-)
Loss of individuals of protected trees, protected plants or other listed species (switching station)	Medium (-)	Medium (-)
Degradation of the ecological condition of aquatic ecosystems and water quality impacts	Medium (-)	Low (-)
Displacement due to disturbance (gridline and switching station)	Medium (-)	Low (-)
Displacement due to habitat transformation (switching station)	Medium (-)	Medium (-)
Displacement due to habitat transformation (gridline)	Medium (-)	Medium (-)
Operational Phase		
Visual impacts (grid line)	Medium (-)	Medium (-)
Visual impacts (switching station)	Medium (-)	Medium (-)
Impacts on cultural landscape	Low (-)	Low (-)
Invasion by alien invasive plant species as a result of disturbance (gridline)	Medium (-)	Medium (-)
Invasion by alien invasive plant species as a result of disturbance (switching station)	Medium (-)	Medium (-)
Degradation of the ecological condition of aquatic ecosystems; modification of surface water runoff; erosion; and alien vegetation invasion in aquatic features	Medium (-)	Low (-)
Collisions with the proposed gridline	High (-)	Medium (-)
Electrocutions at the proposed switching station	Low (-)	Low (-)
Electrocutions on the proposed gridline	High (-)	Low (-)

9 CONCLUSIONS & RECOMMENDATIONS

The conclusions of the specialist impact assessments are outlined below.

9.1 LANDSCAPE / VISUAL ASSESSMENT

The currently proposed grid corridor route succeeds in largely avoiding visually sensitive areas and the proposed switching station is generally located in a visually unobtrusive area with few

visual constraints. Other renewable energy facilities or grid connections, either planned or approved, would not significantly increase cumulative visual impacts, mainly because of distance.

It is the opinion of the Visual Specialists that the layouts of the grid corridor and switching station have largely avoided scenic resources and visual receptors of the area. Provided the mitigation measures are implemented, the project would not present a potential fatal flaw in visual terms (Lawson & Oberholzer 2022, Annexure B2).

9.2 ARCHAEOLOGY & CULTURAL HERITAGE

The assessment has found that although archaeological materials occur in various places, they are always at a density that is far too low to be academically meaningful, including at the two landscape features initially identified as potentially sensitive (banks of the Brak River and a dolerite hill in the south). All occurrences were rated as of very low significance. Note that one of the MSA scatters referred to as SA03 in Kruger (2012) and graded GPB by him is within the current corridor. CTS Heritage (2021) subsequently renamed it Vetlaagte 3 and recommended recording of this locality. Once this mitigation was done, it yielded only 6 artefacts (CTS Heritage 2022)[17]. Although denser scatters of such artefacts occur in the same general area, none are worthy of any mitigation.

Two historical structures occur in the area but, considering the number of other powerlines in the area, no new or significant impacts to them would occur. Similarly, the cultural landscape is strongly dominated by electrical infrastructure in the form of powerlines, wind and solar facilities, the railway line and substations that no new or significant impacts would occur. The access road and switching station are adjacent to an already authorised Solar Energy Facility (SEF) and the powerline would be adjacent to existing powerlines and another authorised SEF which means the electrical land use is well-established and acceptable.

It is recommended that the proposed powerline, switching station and access road be authorised, but subject to the following recommendations which should be included as conditions of authorisation:

- Surface clearance is to be kept to the minimum required for the project; and
- If any archaeological material or human burials are uncovered during the course of development, then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

Given that impacts to heritage resources would be minimal and of low significance, it is the opinion of the heritage specialist that the proposed powerline, switching station and access road may be authorised in full (Orton 2022, Annexure B3).

9.3 PALAEONTOLOGY

Extensive excavations into deep bedrock during the construction phase is not anticipated and it is thus considered that the proposed development is deemed appropriate and feasible and

[17] It appears from the photograph in Kruger (2012) and CTS (2022) and the mention by Kruger (2012) of mixed age artefacts disturbed by riverbank erosion that this occurrence may have been incorrectly described or located by Kruger.

will not lead to detrimental impacts on the palaeontological reserves of the area. The construction of the development may be authorised in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources. Two technology alternatives are under consideration for this project, but from a palaeontological point of view there will be no difference between the impacts of these structures on the palaeontological resources of the area (Annexure B4).

9.4 TERRESTRIAL BIODIVERSITY

The regional vegetation type (Northern Upper Karoo) that occurs on site and in surrounding areas is not listed or of conservation concern. The proposed gridline route is partially within a Critical Biodiversity Area 2 and partially within an Ecological Support Area (ESA), the latter of which extends across vast distances in all areas close to De Aar. There are therefore no options outside of this ESA for the project, and the CBA2 area is the location of the associated solar PV project, which has already been authorised. Impacts of the proposed project components are relatively insignificant in comparison to the variety of approved solar PV projects within the immediate surroundings and is deemed acceptable from an ecological impact perspective.

An impact assessment identified the following impacts as potentially of concern for the project:

- Loss and/or fragmentation of indigenous natural vegetation (low significance after mitigation for all infrastructure components/alternatives);
- Loss of individuals of listed or protected plant species (medium significance after mitigation);
- Establishment and spread of declared weeds and invader plants (low significance after mitigation).
- There are two technology alternatives for the powerline, monopole self-supporting structure and lattice towers. The lattice towers will have a larger overall footprint per tower, but the overall difference is not much relative to the overall project. Either option is therefore feasible.
- The grid connection project, including the switching station, is deemed to be acceptable from a Terrestrial Ecology perspective, as no fatal flaws or highly sensitive / ‘no-go’ areas were identified which would prevent construction in this area.
- Various mitigation measures are proposed to minimise identified impacts. This includes pre-construction walk-through surveys for specific flora and fauna species of concern that may occur on site. (Hoare 2022, Annexure B5).

9.5 AQUATIC BIODIVERSITY

The proposed activities are unlikely to have any impact on the aquatic features and will also be able to easily be spanned by the powerline.

Considering the scope of works proposed and the fact that there will be minimal works undertaken within the delineated aquatic features within the site, the risk of altering the ecological status of the adjacent aquatic features is considered to be low. It is thus recommended that the proposed activities fall within the ambit of the General Authorisations for Section 21(c) and (i) water use activities.

There is thus, for an aquatic ecological perspective, no reason why the proposed activities cannot be approved (Belcher 2022, Annexure B6).

9.6 AVIFAUNA

The expected impacts of the proposed Paarde Valley PV2 switching station and 132 kV overhead powerline range from very low to high significance and negative status pre-mitigation. However, with appropriate mitigation, the post-mitigation significance of the identified impacts should be reduced to medium and low negative. No fatal flaws were discovered in the course of the investigation. It is therefore recommended that the activity is authorised, on condition that the proposed mitigation measures as detailed in the Impact Tables and the EMPr are strictly implemented (Chris van Rooyen Consulting 2022, Annexure B7).

9.7 IMPACT STATEMENT

A number of alternatives were considered during the design process for the proposed development, and the Preferred Alternative (as described in Section 2) was selected as the best practicable environmental option that minimises impacts as far as possible. A corridor has been assessed for the linear activities, to allow for the avoidance of sensitive ecological features, such as aquatic buffers, and for detailed engineering considerations. Figure 7 shows the proposed development footprint in relation to environmentally sensitive visual, and ecological features.

Two generic Environmental Management Programmes (EMPrs) have been compiled for the proposed project, i.e. one for the overhead powerline (OHPL) component and the other for the switching substation component. These EMPrs also contain site specific impact management outcomes and the measures required to achieve these outcomes. These include the potential impacts on avifauna, ecology, freshwater, heritage, palaeontology, RFI and visual components (Annexure F).

In terms of the findings of the Basic Assessment (BA), the proposed development would result in no unacceptable biophysical and/or socio-economic impacts, provided that the mitigation measures as included in this BA Report are implemented. No impacts of High Negative significance would occur as a result of the implementation of the proposed activities during either the construction or operational phases. While some cumulative impacts are of medium negative significance, the contribution of the proposed development to the cumulative impacts is insignificant. The proposed development is necessary for the realisation of the authorised Paarde Valley PV2 Solar Energy Facility. The socio-economic benefits of the project therefore extend beyond the immediate impacts of the proposed development, and are considered to outweigh the residual negative impacts.

All specialists have recommended that the environmental authorisation can be granted, on the condition that the recommended mitigation measures included in the EMPr for the project are implemented.

In terms of the findings of the environmental assessment and specialist studies, there are no assessed potential negative environmental impacts associated with the proposed project that are of sufficient significance to justify the implementation of the “No-Go” Alternative.

In conclusion, it is the considered opinion of the EAP that the proposed project (as described in Section 2) and listed activities (as outlined in Table 3-1) should be authorised, given that the proposed project would result in no unacceptable biophysical and/or socio-economic impacts, provided that the mitigation measures as included in this BA Report are implemented.

In terms of the design alternatives for the poles/ pylons of the proposed overhead powerline (i.e. monopole or steel lattice), whilst monopole was preferred from a visual impact perspective, both design options are considered to be acceptable from an environmental perspective by the EAP and all of the specialists. The Applicant therefore wishes to be able to implement either design option both of which have been assessed as the worst case considered in the assessments (i.e. the Applicant would like to have free choice between the aforementioned design options, and the decision on which design to implement would happen at detailed design phase and in consultation with ESKOM). The following conditions of authorisation should be included in the environmental authorisation, if it is granted:

- The generic EMPrs, including the site specific impact management outcomes and the measures required to achieve these outcomes for the project, must be implemented.
- All specialist recommendations included in this Basic Assessment Report must be implemented and adhered to.
- Surface clearance is to be kept to the minimum required for the project.
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

The following periods are recommended for inclusion in the environmental authorisation:

- The period within which commencement must occur – within 10 years of date of environmental authorisation;
- The period for which the environmental authorisation should be granted and the date by which the activity must have been concluded, where the environmental authorisation does not include operational aspects – 10 years;
- The period that should be granted for the non-operational aspects of the environmental authorisation - 10 years; and
- The period that should be granted for the operational aspects of the environmental authorisation – Life of project.

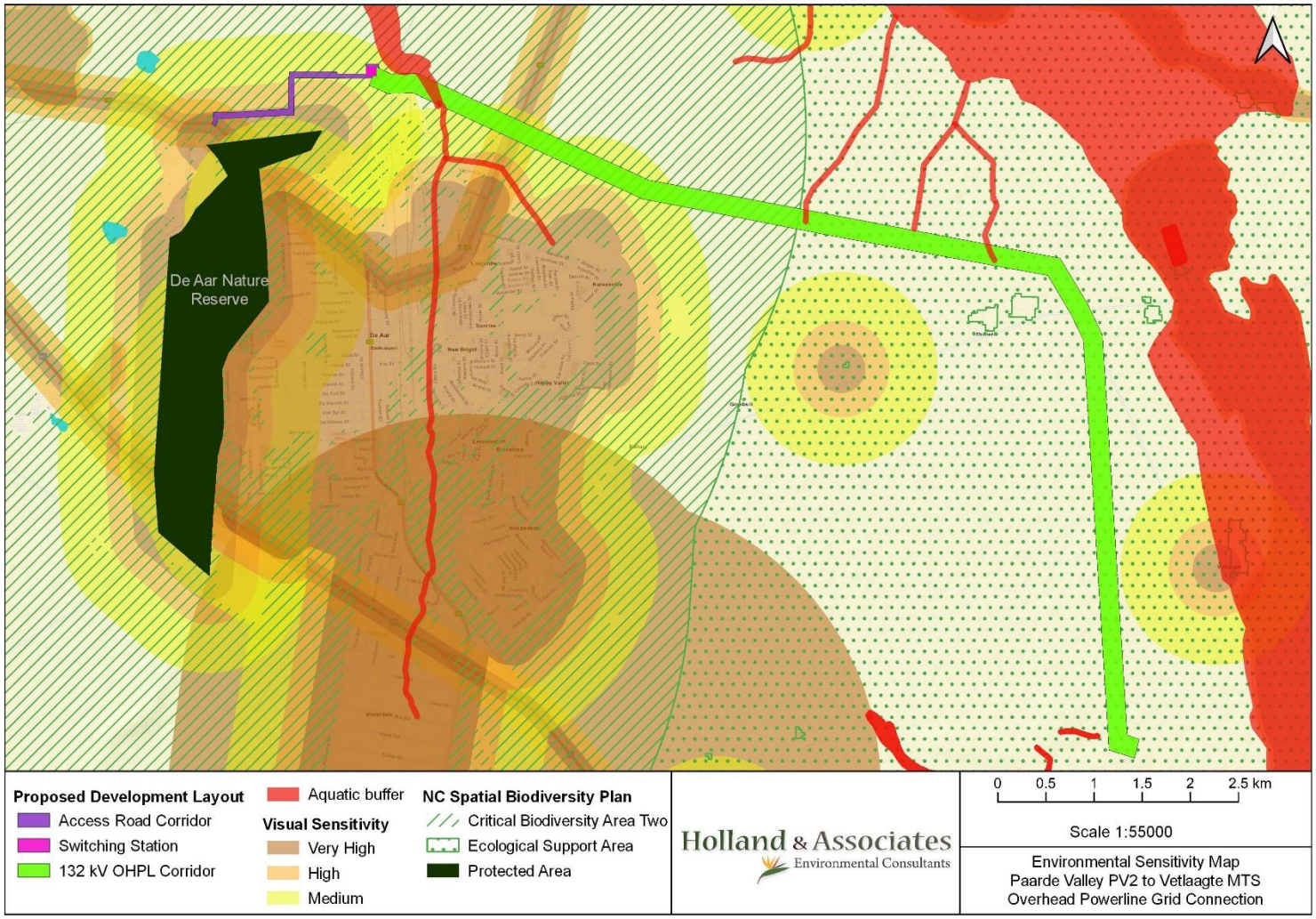


Figure 7: Environmental Sensitivity Map of the Proposed Development

9.8 THE WAY FORWARD

The Draft Basic Assessment Report will be made available to I&APs for a 30 day comment period, i.e. from 15 July 2022 – 15 August 2022. Copies of the report will be available as follows during the 30 day I&AP comment period:

- A hard copy of the Draft Basic Assessment Report will be available for viewing at the Hennie Liebenberg Public Library in the town of De Aar.
- An electronic copy will be available for download on the Holland & Associates Environmental Consultants website (www.hollandandassociates.net). (Note: A copy of the Executive Summary for the Basic Assessment Report will be made available for download as a separate document on the Holland & Associates website, in order to accommodate I&APs who may not want to download the full report).
- Upon request, the report will be made available to I&APs via electronic file transfer or Dropbox link. A Dropbox link will also be provided in the cover email for notifications sent to I&APs via email. Electronic copies of the report on CD or USB will be available on request, if required.

I&APs are invited to review and comment on this Basic Assessment Report during the 30-day comment period i.e. 15 July 2022 – 15 August 2022. Should you have any comments, issues or concerns regarding the proposed project, please submit your comments in writing via post, e-mail or fax to Ms Tilly Watermeyer of Holland & Associates Environmental Consultants (email: PaardeValleygridppp@gmail.com or post: P.O. Box 31108, Tokai, 7966, Fax: 0867626126, Tel: 060 319 1217) on or before 15August 2022.

All comments received during the 30 day I&AP comment period will be recorded and responded to in a Comments and Response Report, which will be included in the Final Basic Assessment Report that will be submitted to DFFE for decision making. Once DFFE issues their decision on the proposed environmental authorisation application, all registered I&APs will be notified in writing of DFFE's decision.

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