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VOLUME I

BASIC ASSESSMENT REPORT FOR NEW TRANSMISSION LINES, A SWITCHING STATION AND ROADS IN SUPPORT OF THE AUTHORISED DE AAR 2 SOUTH WIND ENERGY FACILITY, NORTHERN CAPE PROVINCE

On behalf of

MULILO DE AAR 2 SOUTH (PTY) LTD

JULY 2022

DRAFT FOR PUBLIC COMMENT



Prepared by:

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PROJECT DETAILS

DFFE Reference:	To be allocated upon submission		
Arcus Reference:	4675 De Aar 2 South Transmission Lines, Switching Station and Roads		
Title:	Basic Assessment Report for the Two New Transmission Lines, a Switching Station and Roads in support of the Authorised De Aar 2 South Wind Energy Facility, Northern Cape Province		
EAP:	Ashlin Bodasing	- Arcus Consultancy Services South Africa (Pty) Ltd	
EAP Assistant:	Aneesah Alwie	- Arcus Consultancy Services South Africa (Pty) Ltd	
Specialist Team	Specialist	Specialist Study	Organisation
	Johann Lanz	Soil and Agriculture	Independent Consultant
	Dr Brian Colloty	Freshwater and Wetlands (Aquatics)	Enviro Sci. (Pty) Ltd
	Dr Owen Davies	Avifauna and Animal	Arcus Consultancy Services South Africa (Pty) Ltd
	Craig Campbell	Biodiversity and Plant	Arcus Consultancy Services South Africa (Pty) Ltd
	John Gribble	Heritage, Archaeology and Palaeontology	ACO Associates (Pty) Ltd
Project Applicant:	Mulilo De Aar 2 South (Pty) Ltd		
Report Status:	Basic Assessment Report – DRAFT FOR PUBLIC COMMENT		

PUBLIC PARTICIPATION DETAILS

The Draft Basic Assessment Report, with the required application form, has been submitted to the Department of Forestry, Fisheries and the Environment (DFFE), acting as the Competent Authority (CA).

Members of the public, local communities, and stakeholders are invited to comment on the Draft Basic Assessment Report available for public review and comment at the following locations.

Location	Physical Address	Contact person
Hard Copy Location		
Hennie Liebenberg Library	Alida Street, De Aar, 7000	Liso Thomas
Electronic Copy Locations		
Arcus Website	https://arcusconsulting.co.za/projects/	Aneesah Alwie
Electronic Transfer	I&APs can request for copies to be shared via a One Drive folder.	
Comment Submission		
Contact Person	Aneesah Alwie	
Company	Arcus Consultancy Services South Africa (Pty) Ltd	
Via Email	deaar@arcusconsulting.co.za	
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Notification of public review and comment period will be sent to all registered interested and affected parties.

ABBREVIATIONS, ACRONYMS AND UNITS

BAR	Basic Assessment Report	NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
BESS	Battery Energy Storage System		
CA	Competent Authority	NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
CARA	Conservation of Agricultural Resources, 1983 (Act No. 43 of 1983)	NFEPA	National Freshwater Ecosystem Priority Area
CBA	Critical Biodiversity Area	NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
dB	Decibel	NPAES	National Protected Area Expansion Strategy
DFFE	Department of Forestry, Fisheries and the Environment (National)	NSD	Noise-sensitive Development
DMRE	Department of Mineral Resources and Energy	NWA	National Water Act, 1998 (Act No. 36 of 1998)
DoE	Department of Energy	OES	Ostrich Eggshell
DHSWS	Department of Human Settlement, Water and Sanitation	PES	Present Ecological State
EAP	Environmental Assessment Practitioner	PGDS	Provincial Growth and Development Strategy
ECA	Environment Conservation Act, 1989 No. 73 of 1989)	PPA	Power Purchase Agreement
EGI	Electricity Grid Infrastructure	PPP	Public Participation Process
EIA Assessment	Environmental Impact Assessment	PV	Solar photovoltaic
EMPr	Environmental Management Programme	REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
ESA	Ecological Support Area	RMPPP	Risk Mitigation Power Procurement Programme
ESA	Early Stone Age	SAHRA	South African Heritage Resources Agency
ESKOM	Eskom Holdings SOC Limited	SANBI	South African National Biodiversity Institute
EWT	Endangered Wildlife Trust	SANRAL	South African National Roads Agency Limited
GNR	Government Notice Regulation	SANS	South African National Standards
HIA	Heritage Impact Assessment	SAWS	South African Weather Service
I&AP	Interested and Affected Party	SCADA	Supervisory Control and Data Acquisition
IDP	Integrated Development Plan	SDF	Spatial Development Framework
IEM	Integrated Environmental Management	SEA	Strategic Environmental Assessment
IPP	Independent Power Producer	SIA	Social Impact Assessment
IRP	Integrated Resource Plan	SPV	Special Purpose Vehicle
kV	Kilovolt	WEF	Wind Energy Facility
kWh	Kilowatt Hours	WULA	Water Use License Application
LSA	Late Stone Age		
MSA	Middle Stone Age		
MW	Megawatt		
NCR	Noise Control Regulations		
NDP	National Development Plan		

EXECUTIVE SUMMARY

Mulilo De Aar 2 South (Pty) Ltd (the Applicant) is proposing the construction of transmission lines and a switching station for the evacuation of power generated from the authorised De Aar 2 South Wind Energy Facility (DA2S WEF). The Applicant is also applying for the development of site access and internal roads. Hereafter, the components requiring authorisation will be referred to as the 'proposed development'.

The proposed development is located approximately 15 km – 26 km east of the town of De Aar and falls within the Emthanjeni Local Municipality and Pixley ka Seme District Municipality, Northern Cape Province. The most significant road surrounding the area is the N10, located between 2 km and 25 km of the development area.

The applicant is seeking authorisation for all the Infrastructure as part of the proposed development. The approval of all infrastructure will provide Eskom with the opportunity to decide which transmission route and associated infrastructure will be best suited, upon construction, to connect to the either the proposed Vetlaagte Main Transmission Substation or the proposed Wag 'n Bietjie Main Transmission Substation.

DFFE: Information Requirements

The Department of Forestry, Fisheries and the Environment (DFFE) information requirements for all applications for the proposed development is included in this section of the report. Where this information is not provided in the tables below, the location of where it is located in the application and reports are indicated.

Table 0-1: Details of the Affected Farm Properties and SG 21 Codes

Farm Name	Portion Number	Farm Number	SG 21 Code
Wag 'n Bietjie	RE	5	C03000000000000500000
Wag 'n Bietjie	RE	137	C030000000000013700000
Carolus Poort	3	3	C03000000000000300003
Carolus Poort	4	3	C03000000000000300004
Carolus Poort	2	3	C03000000000000300002
Slingers Hoek	RE	2	C03000000000000200000
Slingers Hoek	2	2	C03000000000000200002
Vetlaagte	RE	4	C03000000000000400000
Slingers Hoek	4	2	C03000000000000200004
Knapdaar	1	8	C03000000000000800001

Landowner consent of the affected properties is provided in the application form.

Table 0-2: Transmission Lines Technical Details

Component	Description / Dimensions
Height of pylons	Maximum of 31 m high as understood per CAA requirements.
Length of transmission lines	Route 1: Approximately 23 km
	Route 2: Approximately 20 km
Type of poles used	Steel monopole or steel lattice tower structures
Corridor within which to construct the transmission lines	300 m corridor (i.e., 150 m on either side of the proposed transmission lines)

Area occupied by pylon servitude	The pylon servitude width will be 31 m wide (132 kV)
Transmission capacity	132 kV
Area occupied by both permanent and construction laydown areas	Approximately 1 Hectare (ha)
Area occupied by O&M buildings	Approximately 1 Hectare (ha)
Length of service road	Approximately 20 - 25 km
Width of service road	Approximately 6 m
Height of fencing	No fencing for Transmission Lines
Type of fencing	No fencing for Transmission Lines
MTS upgrade works	132 kV feeder bay, 132 kV busbar extension

Table 0-3: Switching Station Technical Details

Component	Description / Dimensions
Area occupied by switching station	Maximum 100 m x 100 m footprint
Capacity of switching station	132 kV
Area occupied by both permanent and construction laydown areas	Approximately 2.8 ha (i.e., ~200 m x 140 m)
Area occupied by buildings	Approximately 1 ha (i.e., ~100 m x 100 m)

Table 0-4: Roads Technical Details

Component	Description / Dimensions
Length of service road (for transmission lines)	Approximately 20 - 25 km
Width of service road (for transmission lines)	Approximately 6 m
Length of access road (to switching station)	Approximately 12 km
Width of access road (to switching station)	Approximately 10 m during construction, rehabilitated back to 8 m wide with up to 2 m v-drains on either side, for operations.

Table 0-5: Geographical Co-ordinates of the Proposed Development

Feature	Location	Geographical Co-ordinates (within assessed corridors)	
		Longitude	Latitude
Vetlaagte Route	Start	30°35'28.20"S	24°16'50.25"E
Vetlaagte Route	Bend Point	30°35'46.11"S	24°16'16.14"E
Vetlaagte Route	Middle	30°39'8.00"S	24°11'1.66"E
Vetlaagte Route	Bend Point	30°41'35.83"S	24° 6'52.48"E
Vetlaagte Route	Bend Point	30°41'35.40"S	24° 5'32.10"E
Vetlaagte Route	Bend Point	30°41'18.78"S	24° 5'30.93"E
Vetlaagte Route	End	30°41'20.90"S	24° 5'39.49"E
Wag 'n Bietjie Route	Start	30°35'28.20"S	24°16'50.25"E
Wag 'n Bietjie Route	Bend Point	30°35'46.11"S	24°16'16.14"E

Feature	Location	Geographical Co-ordinates (within assessed corridors)	
		Longitude	Latitude
Wag 'n Bietjie Route	Middle	30°38'29.30"S	24°12'4.00"E
Wag 'n Bietjie Route	Bend Point	30°40'52.81"S	24° 8'4.98"E
Wag 'n Bietjie Route	Bend Point	30°40'32.02"S	24° 7'22.02"E
Wag 'n Bietjie Route	Bend Point	30°40'36.48"S	24° 7'18.11"E
Wag 'n Bietjie Route	End	30°40'40.09"S	24° 7'22.96"E
Switching Station	North West Corner	30°35'22.26"S	24°16'52.04"E
Switching Station	North East Corner	30°35'24.79"S	24°16'56.07"E
Switching Station	South East Corner	30°35'30.55"S	24°16'51.55"E
Switching Station	South West Corner	30°35'28.06"S	24°16'47.65"E
Road	Start	30°39'14.25"S	24°22'28.86"E
Road	End	30°35'30.19"S	24°16'51.18"E

See Figure 1 for the proposed geographical co-ordinates of the proposed development.

Table 0-6: Details of the Applicant

Name of the Applicant:	Mulilo De Aar 2 South (Pty) Ltd		
Name of contact person for applicant (if other):	Constantin Hatzilambros		
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BBBEE status:	Level 4		
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E-mail:	constantin@mulilo.com		

Table 0-7: Details of the Environmental Assessment Practitioner

Name of the EAP organisation:	Arcus Consultancy Services South Africa (Pty) Ltd		
Environmental Assessment Practitioner	Ashlin Bodasing		
Contact Person (related to Public Participation)	Aneesah Alwie		
Postal address:	240 Main Road, Great Westerford Building, 1 st Floor, Rondebosch, Cape Town, 7700		
Telephone:	021 412 1529	Postal Code:	7700
Cellular:	076 340 8914	Fax:	-
E-mail:	Ashlin.Bodasing@arcusconsulting.co.za / deaar@arcusconsulting.co.za		

Please See Appendix A for EAP Declaration of Independence and Curriculum Vitae (CV).

Table 0-8: NEMA Listed Activities in Relation to the Proposed Development

Listing Notices 1, 2 and 3 07 April 2017	Listed Activity	Description of project activity that triggers listed activity
Listing Notice 1 GN R 327 Activity 11	<i>The development of facilities or infrastructure for the transmission and distribution of electricity (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts</i>	Authorisation is required for two 132 kV transmission lines and a 132 kV switching station.
Listing Notice 1 GN R 327 Activity 12	<i>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 m of a watercourse, measured from the edge of a watercourse.</i>	Infrastructure, such as roads, is proposed within 32 m of a watercourse. The cumulative footprint of all proposed development within 32 m of a watercourse will exceed 100 square metres. Roads proposed for the development include: (1) an approximate 20 – 25 km long and 6 m wide service road, (2) potential upgrades to access roads (existing farm roads), (3) an approximate 12 km long and 8 m wide access road to the switching station. The specific width and length can only be determined during planning and design phase of the facility.
Listing Notice 1 GN R 327 Activity 19	<i>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 meters from a watercourse.</i>	The construction of the transmission lines and roads will traverse watercourses. The construction will 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.
Listing Notice 1 GN R 327 Activity 24	<i>The development of a road (ii) with a road reserve wider than 13,5 meters or where no reserve exists where the road is wider than 8 meters</i>	The construction of the transmission lines will require roads wider than 10 meters during construction phase and will be rehabilitated to up to 8 m wide post construction.
Listing Notice 1 GN R 327 Activity 27	<i>The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation for (i) the undertaking of a linear activity</i>	The development of the switching station, roads and the infrastructure associated with the transmission lines, that is non-linear (including power line tower structures), will require clearing of more than 1 hectare of indigenous vegetation but less than 20 hectares.
Listing Notice 1 GN R 327 Activity 28	<i>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.</i>	Construction of the development will change the land use from agriculture to mixed - agriculture and electricity transmission. The development is outside an urban area and has a footprint that will exceed 1 ha.

Listing Notices 1, 2 and 3 07 April 2017	Listed Activity	Description of project activity that triggers listed activity
Listing Notice 1 GN R 327 Activity 48	<i>The expansion of- 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.</i>	Existing infrastructure such as roads and bridges within 32 m of a watercourse will require expansion. This can only be determined during planning and design phase of the facility and not before. The cumulative footprint of all proposed development expansion within 32 m of a watercourse will exceed 100 square metres.
Listing Notice 1 GN R 327 Activity 56	<i>The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre- (i) where the existing reserve is wider than 13.5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 metres; excluding where widening or lengthening occur inside urban areas.</i>	Existing farm access roads will need to be widened or lengthened. Parts of these roads have no road reserve and will be wider than 10 m in parts of it during construction.
Listing Notice 3 GN R 324 Activity 4	<i>The development of a road wider than 4 metres with a reserve less than 13,5 metres (g) Northern Cape (ii) Areas outside urban areas; (bb) National Protected Area Expansion Strategy Focus areas; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans</i>	Internal and external access roads will be constructed, which are wider than 4 m. The site falls outside of an urban area and part of it falls within a ESAs, CBA 1 and CBA 2.
Listing Notice 3 GN R324 Activity 10	<i>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 (ii) Outside urban areas; (ee) Critical Biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</i>	The proposed switching station will require the use of transformer oils / diesel fuel / other hazardous substances during the operational phase. Oils / fuels / other hazardous substances will be kept on site and housed within a bunded facility. These substances will be used for the switching station / transformer during operation, as well as diesel for generators or vehicles. The facility earmarked for the storage of such substances will be demarked on the approximately 1 Hectare (ha) area marked for control buildings and the capacity will be approximately 30 – 80 m ³ . This will be required for the construction and operation phase.
Listing Notice 3 GN R324 Activity 12	<i>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</i>	The proposed development will require the clearance of natural vegetation in excess of 300 m ² in areas of natural vegetation. Parts of the site fall within ESAs, CBA 1 and CBA 2.

Listing Notices 1, 2 and 3 07 April 2017	Listed Activity	Description of project activity that triggers listed activity
	<p><i>maintenance management plan.</i></p> <p><i>(g) Northern Cape</i></p> <p><i>(l) All areas outside of urban areas;</i></p>	
<p>Listing Notice 3 GN R324 Activity 14</p>	<p><i>The development of –</i></p> <p><i>(ii) infrastructure or structures with a physical footprint of 10 square metres or more;</i></p> <p><i>where such development occurs—</i></p> <p><i>(a) within a watercourse;</i></p> <p><i>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</i></p> <p><i>(g) Northern Cape</i></p> <p><i>ii. Outside urban areas:</i></p> <p><i>(bb) National Protected Area Expansion Strategy Focus areas;</i></p> <p><i>(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans</i></p>	<p>Infrastructure associated with the transmission lines and roads will be constructed within 32 m of a watercourse. The proposed site lies outside of an urban area and the transmission lines traverses ESAs and CBAs.</p>
<p>Listing Notice 3 GN R324 Activity 18</p>	<p><i>The widening of a road by more than 4 metres or the lengthening of a road by more than 1 kilometre</i></p> <p><i>(g) Northern Cape</i></p> <p><i>(bb) National Protected Area Expansion Strategy Focus areas:</i></p> <p><i>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans</i></p>	<p>Existing roads will be widened or lengthened within ESAs and CBAs, during construction of the access and servitude roads. Roads proposed for the development include: (1) an approximate 20 – 25 km long and 6 m wide service road, (2) potential upgrades to access roads (existing farm roads), (3) an approximate 12 km long and 8 m wide access road to the switching station. The specific width and length can only be determined during planning and design phase of the facility.</p>
<p>Listing Notice 3 GN R324 Activity 23</p>	<p><i>The expansion of—</i></p> <p><i>(ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more;</i></p> <p><i>where such expansion occurs—</i></p> <p><i>(a) within a watercourse;</i></p> <p><i>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</i></p> <p><i>(g) Northern Cape</i></p> <p><i>i. Outside urban areas:</i></p> <p><i>(bb) National Protected Area Expansion Strategy Focus areas;</i></p> <p><i>(ee) Critical biodiversity areas as identified in systematic biodiversity</i></p>	<p>The construction of the transmission lines will include the expansion of existing infrastructure such as roads that are located within 32 m of a watercourse, ESAs and CBAs. Roads proposed for the development include: (1) an approximate 20 – 25 km long and 6 m wide service road, (2) potential upgrades to access roads (existing farm roads), (3) an approximate 12 km long and 8 m wide access road to the switching station. The specific width and length can only be determined during planning and design phase of the facility.</p>

Listing Notices 1, 2 and 3 07 April 2017	Listed Activity	Description of project activity that triggers listed activity
	<i>plans adopted by the competent authority or in bioregional plans;</i>	

Table 0-9: Validity Period Requirements

Validity Period of EA	10 years
The date on which the activity will be concluded and post-construction monitoring requirements	Commencement of construction will occur within 10 years of authorisation and conclude within 5 years of commencement. Post-construction monitoring requirements will be finalised within this period.

Summary of Findings

The impact assessment of the proposed development, located within the Electricity Grid Infrastructure Central Strategic Transmission Corridor as per Government Notice 113, National Environmental Management Act, 1998 (Act No. 107 of 1998), has found that there will be little impact on any arable land. In the study area, construction activities will generally have low negative impacts and medium positive impacts on the overall environment. The study area within which the development is proposed has been altered by similar developments, such as existing transmission lines and access road developments, and so the cumulative effect of this development will be negligible.

The development will be a social and economic benefit to the towns within the vicinity of the development. For construction of the proposed development, the existing Eskom servitude roads will be used as much as possible, and a new proposed access road is being applied for to limit the use of main roads and impact on privately owned land. As such, it is anticipated that noise and dust levels during construction will be reduced.

In terms of the National Freshwater Ecosystems Priority Areas (NFEPA) assessment, all the watercourses within the site have been assigned a condition score of B (Nel et al. 2011), indicating that they are largely intact and of biological significance. The development would have limited impact on the aquatic environment as for the most part the final placement of the towers could avoid the delineated wetlands and potentially span watercourses. It has however been assumed that due to the width of some of the broader alluvial systems, some towers will need to be placed within these systems, but this would have little impact on these systems especially if no new permanent access tracks are created within these areas. The access road will, however, need to cross a broad alluvial watercourse which could impact on the hydrology of the system if poorly designed. However, the proposed crossings site is located between several existing hydrological impacts on the river systems, which include diversion channels, weirs and dams. Thus, it is unlikely that the access road will add any additional impact on the regional flows, if required it should be ensured that no further inundation / diversion results from the watercourse crossings structures, and should be of a low level design if possible. No listed or protected aquatic species were observed during the site assessment.

Three broad vegetation types occur in the study area¹, namely the Northern Upper Karoo (NKu3), Besemkaree Koppies Shrubland (Gh4) and the Southern Karoo Riviere (Azi 6) - which occur in the study area at a scale too small to map. The first of these units (Northern Upper Karoo) occurs in the lowland areas of the study site while the second (Besemkaree Koppies Shrubland) occurs on the slopes of koppies and covering the tops of tafelbergs. The Southern Karoo Riviere unit occur predominantly as narrow riverine

¹ <http://redlist.sanbi.org/species.php?species=574-126>.

flats between koppies of the Besemkaree Koppies Shrubland sections of the study area. All of the broad vegetation types present in the study area described above are listed as Least Threatened. These vegetation types represent the Nama-Karoo and Grassland biomes. Both of these biomes are fairly structurally homogenous, with few notable different habitat categories.

The low overall impact footprint of the proposed development within the Ecological Support Areas (ESAs), Critical Biodiversity Areas (CBAs) and National Protected Area Expansion Strategy (NPAES) Focus Areas means that the proposed development would not compromise the ecological functioning or the long-term conservation value of the area. In addition, the proposed route/s runs adjacent to existing power lines within an approved reserve, further minimising any potential impacts. The vegetation types are largely intact with very little prospect of long-term transformation through agricultural practices, the species and habitats found within them are therefore fairly widespread and not unique to the project site. The power lines and associated infrastructure is unlikely to generate significant impacts after mitigation. No highly significant negative impacts that cannot be adequately mitigated against were observed, therefore from a terrestrial flora perspective the proposed development can be supported in terms of its low potential impact to terrestrial ecology.

The areas of avifaunal habitat destruction associated with the footprint of the power line infrastructure, temporary construction facilities and the switching station are relatively small in extent compared to the proportion of untransformed habitat available in the area. A number of Red Data species, and species vulnerable to collisions with power lines exist in the area of the proposed power line route and the impact of collisions to birds has a medium significance even with the implementation of mitigation measures. As the majority of the proposed power line route is adjacent to an existing power line, which is unmarked in terms of bird flight diverters, the impact significance of collision associated with the proposed power line is unlikely to increase beyond that which already exists. Appropriate bird flight diverters, or flappers must be attached to the full length of the proposed power line, and pylons/towers should be staggered as much as possible in relation to the adjacent, existing power lines. The motivation for this requirement is due to the route being within an Important Bird Area (IBA), crossing near cliffs, over drainage lines and farm dams and being in an area important for collision prone species such as **Ludwig's Bustard, Blue Crane and Secretarybird**. The other potential impacts assessed are of low significance following the implementation of mitigation measures.

A single 300 m High Sensitivity 'no-go' buffer was identified surrounding an active Verreaux's Eagle Nest. This no-go area applies throughout the year. Construction activities in the vicinity of the active Verreaux's Eagle nest should be timed to not occur within the breeding periods of these birds (May, June, July and August), a 500 m buffer around the nests represents a minimum area within which construction activities should not occur during these months. Areas within 200 m of National Freshwater Ecosystem Priority Areas (NFEPA) rivers were identified as Medium Sensitivity and construction of pylons or additional access roads in these areas should be avoided to reduce the potential impact on wetland habitats which are important to birds in arid areas.

The transmission lines cross a variety of terrains, from large flat mountain plateau on the eastern side (where the authorised DA2S WEF is located) to flat rocky outcrops, this means that it is visible from any direction within its immediate surrounds. As there are existing electric infrastructure traversing the proposed development site, view from homesteads of these sites has already been impacted by the existing electric infrastructure in the area. Furthermore, dwellings are located further than 500 m from the proposed routes and any transmission line route impacts are negligible for noise assessment, and are thus considered acceptable and will not be investigated further.

Previous research, including fieldwork carried out for previous developments, showed that fossils in the area are rare. There is a very small chance of fossils being encountered during the construction of the grid connection and switching station. A large number of archaeological occurrences which include Middle and Late Stone Age archaeological material, possible historic period stone structures, Khoikhoi stone kraal complexes, some rock engravings and scattered occurrences of historical period archaeological material were identified on site. The volume of and ubiquitous nature of the Middle Stone Age artefacts scattered across the landscape, and the fact that much of this material was found to be in secondary, or disturbed context, means that the combined overall impact of activities associated with this project on Middle Stone Age material will be relatively low. The context of much of the Late Stone Age artefacts noted, appeared to be better preserved than the Middle Stone Age material, and is thus of greater archaeological significance. More occurrences that could be called "sites" were noted with the Late Stone Age material, and the assessment found that if these sites were to be lost or damaged as a result of the construction phase, the impact would be high, although this could be reduced to low through the application of measures.

The most sensitive road may be the N10, which is a national road connecting from the Northern Cape Namibian border at Nakop, via Cradock, De Aar and Upington to Port Elizabeth on the Eastern Cape coast. Although the transmission lines will be seen from the N10, the visual and traffic impacts are considered to be low as the character views from the road has already been impacted by the existing electric transmission infrastructure.

The R389 crosses the site in the east, and is more than 6 km from the top of the plateau. This provincial road carries traffic during the day yet is relatively quiet during the night. There are a number of gravel roads traversing the proposed site, mainly used by the farmers in the area. Access to the proposed development will be via the proposed new access road and may, to a lesser degree with approval of the access road be between 2 km and 25 km via the national road, N10 and the town of De Aar is located to the north-west of the proposed development.

Conclusion

The proposed development will have limited impact on the surrounding environment. **Identified impacts can be mitigated to acceptable levels and are generally of low significance.** The proposed lines are within a previously assessed and approved corridor for most part and follows the existing grid connection transmission route of the Longyuan Mulilo De Aar 2 North WEF (existing Hydra Ndhlovu 132 kV Line) and the existing Eskom Hydra Roodekuil 220 kV Transmission Line.

The majority of potential impacts identified to be associated with the construction and operation of the proposed development infrastructure are anticipated to be localised and restricted to the proposed site.

The potentially sensitive areas / environmental features that have been identified include:

- Drainage lines, wetlands and watercourses;
- Sensitive vegetation (such as that associated with the Rivers);
- Critical Biodiversity and Ecological Support Areas;
- Heritage sites of significance (Grade II and Grade III sites) in the study area; and
- Bird species of conservation concern.

The applicant is proposing two transmission line alternatives, **both of which require environmental authorisation**, including the switching station and access road. It is the opinion of the EAP that the proposed De Aar 2 South Transmission Lines, Switching Station, and Access Road be authorised, subject to the implementation of the required mitigation measures and subject to conditions contained in the generic Environmental Management Programmes.

Summary of Construction Phase Impacts

Construction Phase	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Geology, Soils and Agricultural Potential Impact							
Soil Degradation	L	M	M	Negative	M	M	H
<i>With Mitigation</i>	<i>L</i>	<i>M</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Freshwater & Wetlands (Aquatics)							
Loss of riparian system, wetlands and disturbance of the alluvial watercourses	M	M	M	Negative	M	M	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Increase in Sedimentation & Erosion	M	M	M	Negative	M	M	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Localised surface water quality	M	M	M	Negative	M	L	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Terrestrial Ecology							
Loss of fragmentation of indigenous natural vegetation	L	H	H	Negative	M	L	H
<i>With Mitigation</i>	<i>L</i>	<i>H</i>	<i>M</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Loss of individuals of threatened or protected plant species	L	H	H	Negative	M	L	H
<i>With Mitigation</i>	<i>L</i>	<i>H</i>	<i>M</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Soil Erosion Risk	L	H	M	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>

Construction Phase	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Animals							
Loss of faunal habitat and refugia	L	H	H	Negative	M	L	H
<i>With Mitigation</i>	<i>L</i>	<i>H</i>	<i>M</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Direct impact to fauna	L	L	H	Negative	L	L	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>M</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Displacement or disturbance of fauna	L	L	L	Negative	L	L	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Soil Erosion Risk	L	H	M	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Avifauna							
Destruction of habitat	M	L	M	Negative	L	L	H
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Destruction of habitat – access roads	M	L	M	Negative	M	L	H
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	M	<i>L</i>	<i>H</i>
Disturbance / Displacement	L	L	M	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Disturbance / Displacement – access roads	L	L	M	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Heritage, Archaeology & Palaeontology							

Construction Phase	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
On paleontological resources	L	H	L	Negative	L	L	H
<i>With Mitigation</i>	<i>L</i>	<i>H</i>	<i>L</i>	<i>Neutral / Positive</i>	L	<i>L</i>	<i>H</i>
On archaeological resources	L	H	L	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>H</i>	<i>L</i>	<i>Neutral / Positive</i>	L	<i>L</i>	<i>H</i>
Visual							
Construction of Infrastructure	M	L	M	Negative	M	M	M
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>M</i>
Social							
Job Creation	M	L	M	Positive	M	M	M
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	Positive	M	<i>M</i>	<i>M</i>
Influx of job seekers	M	L	L	Negative	M	M	M
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>M</i>
Safety risk for farmers and farming infrastructure	M	L	M	Negative	M	M	M
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>M</i>
Impacts of heavy vehicles	M	L	M	Negative	M	M	M
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	M	<i>M</i>	<i>M</i>
Risk of potential veld fires	M	L	M	Negative	M	M	M
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>M</i>
Traffic							

Construction Phase	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Additional Traffic on major and minor roads	L	M	M	Negative	M	M	M
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>M</i>
Minor road degradation	L	L	M	Negative	M	M	M
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>M</i>

Summary of Operational Phase Impacts

Operational Phase	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Freshwater & Wetlands (Aquatics)							
Impact on riparian systems	M	M	M	Negative	M	M	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Impact on aquatic systems	M	M	M	Negative	M	M	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Increase in Sedimentation & Erosion	M	M	M	Negative	M	M	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Localised surface water quality	M	M	M	Negative	M	L	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Terrestrial Ecology							
Alien plant invasion	L	H	M	Negative	M	M	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Animals							

Operational Phase	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Direct faunal impacts	L	M	H	Negative	L	L	H
<i>With Mitigation</i>	<i>L</i>	<i>M</i>	<i>M</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Alien plant invasion	L	H	M	Negative	M	M	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Avifauna							
Disturbance / Displacement	L	M	M	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>M</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Disturbance / Displacement – access roads	L	M	M	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>M</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Bird mortality from power line collision	M	M	H	Negative	M	H	H
<i>With Mitigation</i>	<i>M</i>	<i>M</i>	<i>H</i>	<i>Negative</i>	M	<i>M</i>	<i>M</i>
Electrocution of avifauna by powered infrastructure	M	M	H	Negative	L	L	H
<i>With Mitigation</i>	<i>M</i>	<i>M</i>	<i>H</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Heritage, Archaeology & Palaeontology							
On paleontological resources	L	H	L	Negative	L	L	H
<i>With Mitigation</i>	<i>L</i>	<i>H</i>	<i>L</i>	<i>Neutral / Positive</i>	L	<i>L</i>	<i>H</i>
On archaeological resources	L	H	L	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>H</i>	<i>L</i>	<i>Neutral / Positive</i>	L	<i>L</i>	<i>H</i>

Summary of Decommission Phase Impacts

Decommission Phase	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Geology, Soils and Agricultural Potential Impact							
Soil Degradation	L	M	M	Negative	M	M	H
<i>With Mitigation</i>	<i>L</i>	<i>M</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Freshwater & Wetlands (Aquatics)							
Loss of riparian system, wetlands and disturbance of the alluvial watercourses	M	M	M	Negative	M	M	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Impact on aquatic systems	M	M	M	Negative	M	M	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Increase in Sedimentation & Erosion	M	M	M	Negative	M	M	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Localised surface water quality	M	M	M	Negative	M	L	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Avifauna							
Destruction of habitat	M	L	M	Negative	L	L	H
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Destruction of habitat – access roads	M	L	M	Negative	M	L	H
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	M	<i>L</i>	<i>H</i>
Disturbance / Displacement	L	L	M	Negative	M	H	H

Decommission Phase	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
<i>With Mitigation</i>	L	L	L	Negative	L	L	H
Disturbance / Displacement – access roads	L	L	M	Negative	M	H	H
<i>With Mitigation</i>	L	L	L	Negative	L	L	H
Heritage, Archaeology & Palaeontology							
On paleontological resources	L	H	L	Negative	L	L	H
<i>With Mitigation</i>	L	H	L	Neutral / Positive	L	L	H
On archaeological resources	L	H	L	Negative	M	H	H
<i>With Mitigation</i>	L	H	L	Neutral / Positive	L	L	H
Visual							
Construction of Infrastructure	M	L	M	Negative	M	M	M
<i>With Mitigation</i>	M	L	L	Negative	L	L	M
Social							
Loss of employment opportunities	M	M	M	Negative	M	M	M
<i>With Mitigation</i>	M	L	L	Negative	M	M	M
Traffic							
Minor road degradation	L	L	M	Negative	M	M	M
<i>With Mitigation</i>	L	L	L	Negative	L	L	M

Summary of Cumulative Phase Impacts

Cumulative Phase	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
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Cumulative Phase	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Freshwater & Wetlands (Aquatics)							
Hydrological conditions	M	M	M	Negative	M	M	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>L</i>
Ecology, including Plants and Animals							
Broad-scale processes	L	H	L	Negative	L	L	H
<i>With Mitigation</i>	<i>L</i>	<i>H</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Conservation Objectives	L	H	L	Negative	L	L	H
<i>With Mitigation</i>	<i>L</i>	<i>H</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Avifauna							
All impacts on avifauna	M	M	H	Negative	M	M	M
<i>With Mitigation</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>Negative</i>	M	<i>M</i>	<i>M</i>
Visual							
Cumulative visual impact	L	M	L	Negative	M	M	M
<i>With Mitigation</i>	<i>L</i>	<i>M</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>M</i>
Social							
Cumulative social impact	M	H	M	Positive	M	M	M
<i>With Mitigation</i>	<i>M</i>	<i>M</i>	<i>M</i>	Positive	M	<i>M</i>	<i>M</i>

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1 INTRODUCTION

Mulilo De Aar 2 South (Pty) Ltd (the Applicant), is proposing the construction of transmission lines and a switching station for the evacuation of power generated from the authorised De Aar 2 South Wind Energy Facility (DA2S WEF). The Applicant is also applying for the development of site access and internal roads. Hereafter, the **components requiring authorisation will be referred to as the 'proposed development'**.

The applicant is proposing two transmission line alternatives, **both of which require environmental authorisation**. Both lines require authorisation due to Eskom technical issues and capacity constraints in the De Aar area, specifically at the Eskom Hydra Substation. During discussions with Eskom, the best technical and environmentally feasible transmission line will be secured and constructed to evacuate the power from the authorised DA2S WEF. The proposed lines are intended to be 132 kV and will therefore follow the Basic Assessment Application Process. The grid connection will connect the line from the authorised DA2S WEF to either the Vetlaagte Main Transmission Substation (MTS) or the Wag n Bietjie MTS located approximately 20 km – 23 km from the proposed Switching Station. **Both MTS's are currently undergoing separate EA application processes.**

The proposed development is located approximately 15 km – 26 km east of the town of De Aar and falls within the Emthanjeni Local Municipality and Pixley ka Seme District Municipality, Northern Cape Province. The most significant road surrounding the area is the N10, located between 2 km and 25 km of the development area. Figure 2 shows the locality as well as the proposed routes being applied for environmental authorisation.

1.1 Purpose and Structure of this Report

This report is intended to provide information to potential and registered Interested and Affected Parties (I&APs), relevant stakeholders, as well the competent authority (CA) regarding the proposed development and the potential environmental impacts associated with various phases of the development. The structure of the report is provided in Table 1.1 below.

Table 1-1: Structure of this Report

Section	Title	Containing
1	Introduction	Project Introduction, Applicant Details, EAP Details, Purpose and Structure of the BA Report and the Assumptions and Limitations of the Study.
2	The Proposed Development	Overview of the Proposed Development
3	Environmental Legislative Context	National Environmental Legislation, Applicable Acts, International Conventions and Treaties, Policies and Guidelines.
4	Basic Assessment Methodology	NEMA Requirements, Overview of the BA Process, DFFE Screening Tool, Specialists Studies Methodology, Assessment Techniques for the BA.
5	Need and Desirability	Description of the Need and Desirability of the Proposed Development.
6	Assessment of Alternatives	Route, Location and Layout, Grid Connection Technology, and No-Go Alternatives.
7	The Preferred Alternative	Description of the Preferred Proposed Development.
8	Description of the Baseline Environment	A Description of the Affected Environment.

Section	Title	Containing
9	Public Participation Process	Initial Notification, BA Phase Public Participation Process, Summary of Issues.
10	Assessment of Potential Impacts	A Detailed Assessment of the Potential Impacts during the Construction, Operational and Decommissioning Phases.
11	Assessment of Cumulative Impacts	A Detailed Assessment of the Potential Cumulative Impacts.
12	Summary of Findings	A Summary of the Findings.
13	Impact Statement and Conclusion	Conclusion of the assessment and Conditions to be included in the EA.
Appendix A	EAP Declaration of Independence and CV	EAP Commissioner of Oaths Declaration of Independence and CV.
Appendix B	Environmental Management Programme	Generic EMPr for Grid Infrastructure and Generic EMPr for Substation and Associated Infrastructure.
Appendix C	Public Participation Report	Public Participation Processes to date.

1.2 Project Team Details

Table 1-2: Details of the Applicant

Name of the Applicant:	Mulilo De Aar 2 South (Pty) Ltd		
Name of contact person for applicant (if other):	Constantin Hatzilambros		
Company Registration Number:	2012/041424/07		
BBBEE status:	Level 4		
Physical address:	Top Floor Golf Park 4, Raapenberg Rd, Mowbray		
Postal address:	PostNet Suite #53 Private Bag X21 Howard Place		
Postal code:	7450	Cell:	-
Telephone:	021 685 3240	Fax:	-
E-mail:	constantin@mullilo.com		

Table 1-3: Details of the Environmental Assessment Practitioner

Name of the EAP organisation:	Arcus Consultancy Services South Africa (Pty) Ltd		
Environmental Assessment Practitioner	Ashlin Bodasing		
Contact Person (related to Public Participation)	Aneesah Alwie		
Postal address:	240 Main Road, Great Westerford Building, 1 st Floor, Rondebosch, Cape Town, 7700		
Telephone:	021 412 1529	Postal Code:	7700
Cellular:	076 340 8914	Fax:	(-) -
E-mail:	Ashlin.Bodasing@arcusconsulting.co.za / deaar@arcusconsulting.co.za		
EAP Qualifications:	Bachelor of Social Science: Geography and Environmental Management Registered EAP (EAPASA 2020/780)		

Details of EAP Expertise	<p>Ashlin Bodasing is the Technical Director at Arcus, located in Cape Town. Having obtained her Bachelor of Social Science Degree from the University of Kwa-Zulu Natal; she has over 18 years’ experience in the environmental consulting industry in southern Africa. She has gained extensive experience in the field of Integrated Environmental Management, environmental impact assessments and public participation. She has also been actively involved in a number of industrial and infrastructural projects, including electricity power lines and substations; road and water infrastructure upgrades and the installation of telecommunication equipment and as well green field coal mines, as well as renewable energy facilities, both wind and solar. Ashlin has major project experience in the development of Environmental Impact Assessments, Basic Assessments, Environmental Management Plans and the monitoring of construction activities. Her areas of expertise include project management, environmental scoping and impact assessments, environmental management plans, environmental compliance monitoring and environmental feasibility studies. Experience also includes International Finance Corporation Performance Standards and World Bank Environmental Guidelines environmental reviews. She has worked in Mozambique, Botswana, Lesotho and Zimbabwe.</p>
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Table 1-4: BA Project Team

Name	Organisation	Role
Aneesah Alwie	Arcus	EAP Assistant
Johann Lanz	Independent	Geology, Soils and Agriculture Impact Assessment
Dr Brian Colloty	Enviro Sci. (Pty) Ltd	Freshwater and Wetlands (Aquatics) Impact Assessment
Dr Owen Davies	Arcus	Avifauna and Animal Species Impact Assessment
Jon Smallie	WildSkies	External Review of Avifauna Impact Assessment
Craig Campbell	Arcus	Terrestrial Ecological and Plant Species Impact Assessment
Dr Marianne Strohbach	Environmental Resource Management	Terrestrial Ecological and Plant Species Impact Assessment
John Gribble	ACO Associates	Cultural Heritage, Archaeology and Palaeontological Impact Assessment

1.3 Assumptions and Limitation of this Report

The following assumptions and limitations are applicable:

- The assumption is made that the information on which this report is based (baseline studies and project information, as well as existing information) is accurate and correct.
- It is assumed that the information contained in the Screening Reports generated are accurate and correct and valid at the time of preparing this report.
- It should be emphasised that information, as presented in this report, only has reference to the study area as indicated on the accompanying figures. Therefore, this information cannot be applied to any other area without detailed investigation.

- The assumptions and limitations, presented in each specialist report, Volume II of this report, are noted for the BA Report.
- It is assumed that the corridors investigated and assessed for the proposed routes is technically suitable for such development.
- It is assumed that the connection to the national grid via either of the Proposed Main Transmission Substations are technically adequate, feasible and viable.
- The developments to be included in the cumulative assessment is based on available public information, the most current DFFE database of renewable applications (at the time of writing the report, REEA_OR_2022_Q1.shp²), and if the applicant has submitted an application for environmental authorisation.
- It is assumed that the recommendations derived from this study would be included in all tender documentation and the generic EMPs for implementation.

2 THE PROPOSED DEVELOPMENT

The Proposed Transmission Lines

The proposed transmission lines will be 132 kV, comprising of either steel monopole or steel lattice tower structures with a maximum height of 31 m. The line components will consist of:

- Concrete Foundations,
- Steel structures,
- Stays and stay wire supports,
- Composite insulators,
- ACSR phase conductors,
- OPGW shield wire,
- Bird diverters and Aviation spheres, if required,
- Service road following the line route,
- Existing access roads and jeep tracks,
- Line and servitude clearances to meet the statutory requirements, and
- 132 kV feeder bay, 132 kV busbar extension at the MTS.

Specialists assessed a 300 m corridor for both lines (i.e., 150 m on either side of the proposed transmission line alternatives)³. The two routes assessed by the specialists are described below:

Transmission Line Route 1 is approximately 23 km in length. This line will connect the authorised DA2S WEF to the proposed Vetlaagte MTS near De Aar, in the Northern Cape Province. The majority of the proposed route follows, and is adjacent to the existing Eskom Hydra Roodekuil 220 kV transmission line.

Transmission Line Route 2 is approximately 20 km in length. This line will connect the authorised DA2S WEF to the proposed Wag n Bietjie MTS near De Aar, in the Northern Cape Province.

The Proposed Switching Station

Authorisation of a 132 kV switching station is also required. The proposed switching station will be located on the plateau within the authorised DA2S WEF site, and alongside the authorised on site IPP substation. The switching station will have a maximum footprint of 1 ha (100 m x 100 m) and will be placed within an assessed area (referred to as the "Switching Station Assessment Area") of approximately 2.8 ha (i.e., approximately 200 m x 140 m).

The Proposed Internal and Site Access Roads

² South African Renewable Energy EIA Application Database (<http://egis.environment.gov.za/frontpage.aspx?m=27>).

³ The aquatic specialist assessed a corridor of 500 m (i.e., 250 m on either side of the proposed transmission lines).

The proposed internal and access roads which require authorisation are (1) an approximate 20 - 25 km long and 6 m wide service road, (2) potential upgrades to access roads (existing farm roads), and (3) an approximate 12 km long and 8 m wide access road, with up to 2 m v-drains running on each side, to the switching station. The final road specifications can only be determined during planning and design phase.

The tables below provide further technical details of the proposed development.

Table 2-1: Details of the Affected Farm Properties and SG 21 Codes

Farm Name	Portion Number	Farm Number	SG 21 Code
Wag 'n Bietje	RE	5	C03000000000000500000
Wag 'n Bietje	RE	137	C030000000000013700000
Carolus Poort	3	3	C030000000000003000003
Carolus Poort	4	3	C030000000000003000004
Carolus Poort	2	3	C030000000000003000002
Slingers Hoek	RE	2	C03000000000000200000
Slingers Hoek	2	2	C030000000000002000002
Vetlaagte	RE	4	C03000000000000400000
Slingers Hoek	4	2	C030000000000002000004
Knapdaar	1	8	C030000000000008000001

Table 2-2: Technical Details of the Transmission Lines

Component	Description / Dimensions
Height of pylons	Maximum of 31 m high in accordance with CAA requirements
Length of transmission lines	Route 1: Approximately 23 km
	Route 2: Approximately 20 km
Type of poles used	Steel monopole or steel lattice tower structures
Corridor within which to construct the transmission lines	300 m corridor (i.e., 150 m on either side of the proposed transmission lines)
Area occupied by pylon servitude	The pylon servitude width will be 31 m wide (132 kV)
Transmission capacity	132 kV
Area occupied by both permanent and construction laydown areas	Approximately 1 Hectare (ha)
Area occupied by O&M buildings	Approximately 1 Hectare (ha)
Length of service road	Approximately 20 - 25 km
Width of service road	Approximately 6 m
Height of fencing	No fencing for Transmission Lines
Type of fencing	No fencing for Transmission Lines
MTS upgrade works	132 kV feeder bay, 132 kV busbar extension

Table 2-3: Technical Details of the Switching Station

Component	Description / Dimensions
Area occupied by switching station	Maximum 100 m x 100 m footprint

Capacity of switching station	132 kV
Area occupied by both permanent and construction laydown areas	Approximately 2.8 ha (i.e., ~200 m x 140 m)
Area occupied by buildings	Approximately 1 ha (i.e., ~100 m x 100 m)

Table 2-4: Technical Details of the Internal and Access Roads

Component	Description / Dimensions
Length of Service Road (for transmission lines)	Approximately 20 - 25 km
Width of Service Road (for transmission lines)	Approximately 6 m
Length of Access Road (to switching station)	Approximately 12 km
Width of Access Road (to switching station)	Approximately 10 m during construction, rehabilitated back to 8 m wide with up to 2 m v-drains on either side, for operations.

Table 2-5: Geographical Co-ordinates of the Proposed Development

Feature	Location	Geographical Co-ordinates (within assessed corridors)	
		Longitude	Latitude
Vetlaagte Route	Start	30°35'28.20"S	24°16'50.25"E
Vetlaagte Route	Bend Point	30°35'46.11"S	24°16'16.14"E
Vetlaagte Route	Middle	30°39'8.00"S	24°11'1.66"E
Vetlaagte Route	Bend Point	30°41'35.83"S	24° 6'52.48"E
Vetlaagte Route	Bend Point	30°41'35.40"S	24° 5'32.10"E
Vetlaagte Route	Bend Point	30°41'18.78"S	24° 5'30.93"E
Vetlaagte Route	End	30°41'20.90"S	24° 5'39.49"E
Wag 'n Bietjie Route	Start	30°35'28.20"S	24°16'50.25"E
Wag 'n Bietjie Route	Bend Point	30°35'46.11"S	24°16'16.14"E
Wag 'n Bietjie Route	Middle	30°38'29.30"S	24°12'4.00"E
Wag 'n Bietjie Route	Bend Point	30°40'52.81"S	24° 8'4.98"E
Wag 'n Bietjie Route	Bend Point	30°40'32.02"S	24° 7'22.02"E
Wag 'n Bietjie Route	Bend Point	30°40'36.48"S	24° 7'18.11"E
Wag 'n Bietjie Route	End	30°40'40.09"S	24° 7'22.96"E
Switching Station	North West Corner	30°35'22.26"S	24°16'52.04"E
Switching Station	North East Corner	30°35'24.79"S	24°16'56.07"E
Switching Station	South East Corner	30°35'30.55"S	24°16'51.55"E
Switching Station	South West Corner	30°35'28.06"S	24°16'47.65"E
Road	Start	30°39'14.25"S	24°22'28.86"E
Road	End	30°35'30.19"S	24°16'51.18"E

3 ENVIRONMENTAL LEGISLATIVE CONTEXT

The proposed development requires environmental authorisation prior to being constructed. This section of the report highlights the important environmental legal considerations taken while undertaking this assessment. The proposed development, as described in Section 2 above, will follow a Basic Assessment Process due to the nature and potential impacts of the proposed development. The specific Listing Notices and related activities are provided in the sections below.

3.1 National Environment Management Act, 1998 (Act 107 of 1998 - NEMA), as amended

Section 2 of the National Environment Management Act, 1998 (NEMA), as amended, lists environmental principles that are to be applied by all organs of state regarding developments that may significantly affect the environment. Included amongst the key principles is the principle that all development must be socially, economically and environmentally sustainable, and environmental management must place people and their needs at the forefront of its concern, to serve their physical, psychological, developmental, cultural and social interests equitably.

NEMA, as amended, also provides for the participation of potential and registered I&APs, and it stipulates that decisions must take the interests, needs and values of all I&APs into account.

Chapter 5 of NEMA, as amended, outlines the general objectives and implementation of the Integrated Environmental Management (IEM), the IEM provides a framework for the integration of environmental issues into the planning, design, decision-making and implementation of plans and development proposals. Section 24 provides a framework for the granting of environmental authorisations.

To give effect to the general objectives of IEM, the potential impacts on the environment of listed activities must be considered, investigated, assessed and reported to the competent authority. Section 24(4) outlines the minimum requirements for procedures for the investigation, assessment and communication of the potential impact of activities.

3.2 Environmental Impact Assessment (EIA) Regulations, 2014 as amended

The EIA Regulations 2014 as amended by GNR 326 of 2017 provide for the control of certain Listed Activities. These activities are listed in Government Notice No. R327 (Listing Notice 1 – Basic Assessment), R325 (Listing Notice 2 – Scoping & EIA Process) and R324 (Listing Notice 3 – Basic Assessment) of 7 April 2017, and are prohibited to commence until environmental authorisation has been obtained from the competent authority, in this case, the Department of Forestry, Fisheries and the Environment (DFFE).

The DFFE is the competent authority for all renewable energy proposals which will be bid into the Renewable Independent Power Producer Programme (REIPPP), as NEMA, as amended, states that:

"24C. (2) The Minister must be identified as the competent authority in terms of subsection (1) if the activity- (a) has implications for international environmental commitments or Relations"

This project will be related to and have a connection with activities which have implications for international environmental commitments that South Africa has made in terms of climate change and will likely be bid into the REIPPPP.

The Listed Activities applicable to this proposed development are presented in **Error! Reference source not found.** below. All potential impacts associated with these Listed Activities has been considered and adequately assessed in this BA Report.

Table 3-1: NEMA Listed Activities in Relation to the Proposed Development

Listing Notices 1, 2 and 3 07 April 2017	Listed Activity	Description of project activity that triggers listed activity
Listing Notice 1 GN R 327 Activity 11	<i>The development of facilities or infrastructure for the transmission and distribution of electricity (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts</i>	Authorisation is required for two 132 kV transmission lines and a 132 kV switching station.
Listing Notice 1 GN R 327 Activity 12	<i>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 m of a watercourse, measured from the edge of a watercourse.</i>	Infrastructure, such as roads, is proposed within 32 m of a watercourse. The cumulative footprint of all proposed development within 32 m of a watercourse will exceed 100 square metres. Roads proposed for the development include: (1) an approximate 20 – 25 km long and 6 m wide service road, (2) potential upgrades to access roads (existing farm roads), (3) an approximate 12 km long and 8 m wide access road to the switching station. The specific width and length can only be determined during planning and design phase of the facility.
Listing Notice 1 GN R 327 Activity 19	<i>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 meters from a watercourse.</i>	The construction of the transmission lines and roads will traverse watercourses. The construction will 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.
Listing Notice 1 GN R 327 Activity 24	<i>The development of a road (ii) with a road reserve wider than 13,5 meters or where no reserve exists where the road is wider than 8 meters</i>	The construction of the transmission lines will require roads wider than 10 meters during construction phase and will be rehabilitated to up to 8 m wide post construction.
Listing Notice 1 GN R 327 Activity 27	<i>The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation for (i) the undertaking of a linear activity</i>	The development of the switching station, roads and the infrastructure associated with the transmission lines, that is non-linear (including power line tower structures), will require clearing of more than 1 hectare of indigenous vegetation but less than 20 hectares.
Listing Notice 1 GN R 327 Activity 28	<i>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.</i>	Construction of the development will change the land use from agriculture to mixed - agriculture and electricity transmission. The development is outside an urban area and has a footprint that will exceed 1 ha.

Listing Notices 1, 2 and 3 07 April 2017	Listed Activity	Description of project activity that triggers listed activity
Listing Notice 1 GN R 327 Activity 48	<i>The expansion of- 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.</i>	Existing infrastructure such as roads and bridges within 32 m of a watercourse will require expansion. This can only be determined during planning and design phase of the facility and not before. The cumulative footprint of all proposed development expansion within 32 m of a watercourse will exceed 100 square metres.
Listing Notice 1 GN R 327 Activity 56	<i>The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre- (i) where the existing reserve is wider than 13.5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 metres; excluding where widening or lengthening occur inside urban areas.</i>	Existing farm access roads will need to be widened or lengthened. Parts of these roads have no road reserve and will be wider than 10 m in parts of it during construction.
Listing Notice 3 GN R 324 Activity 4	<i>The development of a road wider than 4 metres with a reserve less than 13,5 metres (g) Northern Cape (ii) Areas outside urban areas: (bb) National Protected Area Expansion Strategy Focus areas; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans</i>	Internal and external access roads will be constructed, which are wider than 4 m. The site falls outside of an urban area and part of it falls within a ESAs, CBA 1 and CBA 2.
Listing Notice 3 GN R324 Activity 10	<i>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 (ii) Outside urban areas: (ee) Critical Biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</i>	The proposed switching station will require the use of transformer oils / diesel fuel / other hazardous substances during the operational phase. Oils / fuels / other hazardous substances will be kept on site and housed within a bunded facility. These substances will be used for the switching station / transformer during operation, as well as diesel for generators or vehicles. The facility earmarked for the storage of such substances will be demarked on the approximately 1 Hectare (ha) area marked for control buildings and the capacity will be approximately 30 – 80 m ³ . This will be required for the construction and operation phase.
Listing Notice 3 GN R324 Activity 12	<i>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</i>	The proposed development will require the clearance of natural vegetation in excess of 300 m ² in areas of natural vegetation. Parts of the site fall within ESAs, CBA 1 and CBA 2.

Listing Notices 1, 2 and 3 07 April 2017	Listed Activity	Description of project activity that triggers listed activity
	<p><i>undertaken in accordance with a maintenance management plan.</i></p> <p><i>(g) Northern Cape</i></p> <p><i>(l) All areas outside of urban areas;</i></p>	
Listing Notice 3 GN R324 Activity 14	<p><i>The development of –</i></p> <p><i>(ii) infrastructure or structures with a physical footprint of 10 square metres or more;</i></p> <p><i>where such development occurs—</i></p> <p><i>(a) within a watercourse;</i></p> <p><i>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</i></p> <p><i>(g) Northern Cape</i></p> <p><i>ii. Outside urban areas:</i></p> <p><i>(bb) National Protected Area Expansion Strategy Focus areas;</i></p> <p><i>(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans</i></p>	<p>Infrastructure associated with the transmission lines and roads will be constructed within 32 m of a watercourse. The proposed site lies outside of an urban area and the transmission lines traverses ESAs and CBAs.</p>
Listing Notice 3 GN R324 Activity 18	<p><i>The widening of a road by more than 4 metres or the lengthening of a road by more than 1 kilometre</i></p> <p><i>(g) Northern Cape</i></p> <p><i>(bb) National Protected Area Expansion Strategy Focus areas:</i></p> <p><i>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans</i></p>	<p>Existing roads will be widened or lengthened within ESAs and CBAs, during construction of the access and servitude roads. Roads proposed for the development include: (1) an approximate 20 – 25 km long and 6 m wide service road, (2) potential upgrades to access roads (existing farm roads), (3) an approximate 12 km long and 8 m wide access road to the switching station. The specific width and length can only be determined during planning and design phase of the facility.</p>
Listing Notice 3 GN R324 Activity 23	<p><i>The expansion of—</i></p> <p><i>(ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more;</i></p> <p><i>where such expansion occurs—</i></p> <p><i>(a) within a watercourse;</i></p> <p><i>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</i></p> <p><i>(g) Northern Cape</i></p> <p><i>i. Outside urban areas:</i></p> <p><i>(bb) National Protected Area Expansion Strategy Focus areas;</i></p>	<p>The construction of the transmission lines will include the expansion of existing infrastructure such as roads that are located within 32 m of a watercourse, ESAs and CBAs. Roads proposed for the development include: (1) an approximate 20 – 25 km long and 6 m wide service road, (2) potential upgrades to access roads (existing farm roads), (3) an approximate 12 km long and 8 m wide access road to the switching station. The specific width and length can only be determined during planning and design phase of the facility.</p>

Listing Notices 1, 2 and 3 07 April 2017	Listed Activity	Description of project activity that triggers listed activity
	<i>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</i>	

3.3 The National Heritage Resources Act, 1999 (Act No 25 of 1999 - NHRA)

Section 38 (1) of the National Heritage Resources Act, 1999 (NHRA) lists development activities that would require authorisation by the responsible heritage resources authority. Activities considered applicable to the proposed development include the following:

*“(a) The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
(c) any development or other activity which will change the character of a site; and
(i) exceeding 5000 m² in extent.”*

The NHRA, 1999, requires that a person intending to undertake such an activity must notify the relevant national and provincial heritage authorities at the earliest stages of initiating such a development. The relevant heritage authority would then in turn, notify the person whether a Heritage Impact Assessment Report should be submitted. According to Section 38(8) of the NHRA, 1999, a separate report would not be necessary if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act, 1989 (No. 73 of 1989) (ECA) (now replaced by NEMA, Act 107 of 1998) or any other applicable legislation. The decision-making authority must ensure that the heritage evaluation fulfils the requirements of the NHRA, 1999, and take into account any comments and recommendations made by the relevant heritage resources authority.

The Heritage Impact Assessment, which forms part of this Basic Assessment process will be submitted to the Northern Cape South African Heritage Resources Authority (SAHRA) for comment.

In South Africa, the law is directed towards the protection of human-made heritage, although places and objects of scientific importance are covered. The NHRA, 1999, also protects intangible heritage such as traditional activities, oral histories and places where significant events happened. While not specifically mentioned in the NHRA, scenic routes are recognised as a category of heritage resources which requires grading as the Act protects area of aesthetic significance.

3.4 Subdivision of Agricultural Land Act, 1970 (Act No. 70 of 1970 - SALA)

In terms of the Subdivision of Agricultural Land Act, 1970, any application for change of land use must be approved by the Minister of Agriculture. The registration of a power line servitude requires written consent of the Minister unless the servitude width does not exceed 15 metres; and / or Eskom is the applicant for the servitude. If one or both of these conditions apply, then no agricultural consent is required. The second condition is likely to apply, even if another entity gets Environmental Authorisation for and constructs the power line, but then hands it over to Eskom for its operation. Eskom is currently exempt from agricultural consent for power line servitudes.

3.5 Conservation of Agricultural Resources, 1983 (Act No. 43 of 1983 - CARA)

The Conservation of Agricultural Resources Act (CARA), 1983, states that no degradation of natural land is permitted. The Act requires the protection of land against soil erosion

and the prevention of water logging and salinization of soils by means of suitable soil conservation works to be constructed and maintained. The utilization of marshes, water sponges and watercourses are also addressed.

The construction and operation of the facility will not require consent from the Department of Agriculture, Land Reform and Rural Development in terms of this provision of CARA as the disturbance to the topsoil that results from the construction of a renewable energy facility and its associated infrastructure does not constitute cultivation as it is understood in CARA.

3.6 National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998)

The purpose of the National Veld and Forest Fire Act, as amended by the National Fire Laws Amendment Act (Act 12 of 2001), is to prevent and combat veld, forest and mountain fires throughout South Africa. The Act applies to the open countryside beyond the urban limit and puts in place a range of requirements. It also specifies the responsibilities of land owners. The term 'owners' includes lessees, people in control of land, the executive body of a community, the manager of State land, and the chief executive officer of any local authority. The requirements include, but are not limited to, the maintenance of firebreaks and availability of firefighting equipment to reasonably prevent the spread of fires to neighbouring properties.

3.7 The Environment Conservation Act, 1989 (Act No.73 of 1989), the National Noise Control Regulations: GN R154 of 1992

The Environment Conservation Act, 1989 (ECA) allows the Minister of Environmental Affairs and Tourism (now the "Minister of Forestry, Fisheries and the Environment") to make regulations regarding noise, amongst other concerns. The Minister has made noise control regulations under the ECA.

In terms of section 25 of the ECA, the national noise-control regulations (NCR) were promulgated (GN R154 in *Government Gazette* No. 13717 dated 10 January 1992). The NCRs were revised under Government Notice Number R. 55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations.

Subsequently, in terms of Schedule 5 of the Constitution of South Africa of 1996 legislative responsibility for administering the NCR was devolved to provincial and local authorities.

These regulations define "**disturbing noise**" as:

"Noise level which exceeds the zone sound level or, if no zone sound level has been designated, a noise level which exceeds the ambient sound level at the same measuring point by 7 dBA or more".

These Regulations prohibits anyone from causing a disturbing noise.

3.8 National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)

Section 34 of the Air Quality Act, 2004 (AQA) makes provision for:

- (1) The Minister to prescribe essential national noise standards –
 - a. For the control of noise, either in general or by specified machinery or activities or in specified places or areas; or
 - b. For determining –
 - i. a definition of noise; and
 - ii. the maximum levels of noise.

(2) When controlling noise, the provincial and local spheres of government are bound by any prescribed national standards.

This section of the Act is in force, but no such standards have yet been promulgated.

An atmospheric emission license issued in terms of Section 22 may contain conditions in respect of noise. This however will not be relevant to this proposed development.

3.8.1 National Dust Control Regulations, 2013

The National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004), makes provision for national dust control regulations. These regulations prescribe dust fall standards for residential and non-residential areas. These Regulations also provide for dust monitoring, control and reporting.

The acceptable dust fall rates are:

Restriction Area	Dust Fall (D) (mg/m ² /day, 30 day average)	Permitted Frequency of exceedance
Residential	D < 600	Two within a year, not sequential months
Non- Residential	600 < D < 1200	Two within a year, not sequential months

3.9 National Water Act, 1998 (Act No. 36 of 1998 - NWA)

The National Water Act, 1998 (NWA) provides for constitutional requirements including pollution prevention, ecological and resource conservation and sustainable utilisation. In terms of this Act, all water resources are the property of the State.

A water resource includes any watercourse, surface water, estuary or aquifer, and, where relevant, its bed and banks. A watercourse is interpreted as a river or spring; a natural channel in which water flows regularly or intermittently; a wetland lake or dam into which or from which water flows; and any collection of water that the Minister may declare to be a watercourse.

Relevant water uses, such as a borehole or extraction of water from water resources, for the proposed construction of the proposed development, which will require access roads over watercourses and drainage channels, in terms of Section 21 of the Act include, but are not limited to, the following:

Section 21(c): Impeding or diverting the flow of water in a watercourse; and
Section 21(i): Altering the bed, banks, course or characteristics of a watercourse.

GN 1199 of 18 December 2009 grants general authorisation (GA) for the above water uses based on certain conditions. It also stipulates that these water uses must be registered with the responsible authority.

Pollution of river water is a contravention of the NWA. Chapter 3, Part 4 of the NWA deals with pollution prevention and in particular the situation where pollution of a water resource occurs or might occur as a result of activities on land. The person who owns, controls, occupies or uses the land in question is responsible for taking measures to prevent pollution of water resources.

Chapter 3, Part 5 of the NWA deals with pollution of water resources following an emergency incident, such as an accident involving the spilling of a harmful substance that finds or may find its way into a water resource. The responsibility for remedying the situation rests with the person responsible for the incident or the substance involved.

3.9.1 Permit Requirements

A Water Use License Application (WULA) or a General Application (GA) may be required. This will be determined by the Department of Human Settlement, Water and Sanitation (DHSWS) during the WULA pre-application process.

This process will run separate to this environmental authorisation application process, and an application has already been initiated by applicant to DHSWS.

3.10 National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004 - NEMBA)

3.10.1 Threatened or Protected Species List, 2015

Amendments to the Threatened or Protected Species (TOPS) list were published on 31 March 2015 in Government Gazette No. 38600 and Notice 256 of 2015. Certain species that occur on the site may be threatened or protected.

3.10.2 Alien and Invasive Species Regulations, 2016

The Act and Regulations set out various degrees of Invasive species (Plants, Insects, Birds, Animals, Fish and Water Plants) and requires that certain of those invasive species are documented and, in some cases, removed from properties in South Africa.

The Regulations list 4 categories of invasive species that must be managed, controlled or eradicated from areas where they may cause harm to the environment, or that are prohibited to be brought into South Africa.

3.11 National Forests Act, 1998 (Act No. 84 of 1998 - NFA)

This act lists protected tree species and prohibits certain activities. The prohibitions provide that *"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"*.

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

These were developed to protect both animal and plant species within the various provinces of the country which warrant protection. These may be species which are under threat or which are already considered to be endangered and species are listed in the relevant documents. The provincial environmental authorities are responsible for the issuing of permits in terms of this legislation.

3.13 Astronomy Geographic Advantage Act, 2007 (Act. 21 of 2007)

The Act provides for the preservation and protection of areas within the Republic that are uniquely suited for optical and radio astronomy. The Square Kilometer Array radio telescope is located in the declared Karoo Central Advantage Array and as such it is protected against harmful interference from wireless communication and electromagnetic emissions from electrical equipment.

3.14 National Road Traffic Act, 1996 (Act No. 93 of 1996) (NRTA)

The technical recommendations for highways (TRH 11): *"Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads"* outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed.

Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts.

The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations.

The South African National Roads Authority (SANRAL) and the Provincial Department of Transport would act as a Competent/Commenting Authority.

3.15 Civil Aviation Act, 2009 (Act No. 13 of 2009) (CAA)

The Civil Aviation Act, 2009 (Act No. 13 of 2009) (CAA), governs civil aviation in the Republic. The Act provides for the establishment of a stand-alone authority mandated with the controlling, promoting, regulating, supporting, developing, enforcing and continuously improving levels of safety and security throughout the civil aviation industry. This mandate is fulfilled by the South African Civil Aviation Authority (SACAA), an agency of the Department of Transport (DoT).

The SACAA achieves the objectives of the Act by complying with the Standard and Recommended Practices (SARPs) of the International Civil Aviation Organisation (ICAO), while considering the local context when issuing the South African Civil Aviation Regulations (SA CARs). All proposed developments or activities in South Africa that potentially could affect civil aviation must be assessed by SACCAA in terms of the CARs and the South African Civil Aviation Technical Standards (SA CATs), in order to ensure civil aviation safety.

The SACAA and Air Traffic Navigation Services (ATNS) will receive project related information and/or notifications and be provided with the BAR for the proposed development for review and commenting purposes during the 30-day review and comment period.

3.16 Promotion of Access to Information Act, 2000 (Act No. 2 of 2002) (PAIA)

The PAIA gives effect to the constitutional right of access to any information held by the state and any information that is held by another person and that is required for the exercise or protection of any rights; and to provide for matters connected therewith.

3.17 National Environmental Management Act; National Appeal Regulations, 2014

The purpose of these regulations is to regulate the procedure contemplated in section 43(4) of the National environmental management act relating to the submission, processing and consideration of a decision on an appeal. This Act is used to help guide and understand the appeal process and the procedures may follow.

3.18 Renewable Energy Development Zones (REDZs) and Strategic Transmission Corridors (GNR 114 of February 2018, as amended)

The Strategic Environmental Assessment for Wind and Solar Photovoltaic Energy in South Africa, 2015, has identified 11 Renewable Energy Development Zones (REDZs) that are of strategic importance for large-scale wind and solar photovoltaic energy development, including the roll-out of its supporting transmission and distribution infrastructure, in terms of Strategic Integrated Project (SIP) 8: Green Energy in support of the South African Economy as well as the associated Strategic Transmission Corridors meant for the proposed project of grid connection infrastructure (namely powerlines and substation) in terms of SIP 10: Electricity Transmission and Distribution.

3.19 Additional Relevant Legislation

The applicant must also comply with the provisions of other relevant national legislation. Additional relevant legislation that has informed the scope and content of this BA Report includes the following:

- *Constitution of the Republic of South Africa, 1996 (Act No. 108, 1996);*
- *Aviation Act, 1962 (Act No. 74, 1962);*
- *National Environmental Management: Waste Act, 2008 (Act No. 59, 2008);*
- *National Environmental Management: Protected Areas Act, 2003 (Act No. 57, 2003);*
- *National Roads Act, 1998 (Act No. 7, 1998)*
- *Occupational Health and Safety Act, 1993 (Act No. 85 of 1993);*
- *Fertiliser, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947);*
- *Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002);*
- *Independent Communications Authority of South Africa Act, 2000 (Act No. 13 of 2000; as amended);*
- *Screening Report referred to in Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended;*
- *Birds and Wind Energy Best Practice Guidelines: Best-Practice Guidelines for assessing and monitoring the impact of wind-energy facilities on birds in southern Africa. Third Edition, 2015; and*
- *Bat Monitoring Guidelines: South African Best Practice Guidelines for Pre-Construction Monitoring of Bats at Wind Energy Facilities. 5th Edition. 2020.*

3.20 Conventions and Treaties

3.20.1 The Convention on Biological Diversity, 1993 (CBD)

This is a multilateral treaty for the international conservation of biodiversity, the sustainable use of its components and fair and equitable sharing of benefits arising from natural resources. Signatories have the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction. South Africa became a signatory to the CBD in 1993, which was ratified in 1995.

The convention prescribes that signatories identify components of biological diversity important for conservation and monitor these components in light of any activities that have been identified which are likely to have adverse impacts on biodiversity. The CBD is based on the precautionary principle which states that where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimise such a threat and that in the absence of scientific consensus the burden of proof that the action or policy is not harmful falls on those proposing or taking the action.

3.20.2 The Ramsar Convention, 1971

The Convention on Wetlands, called the Ramsar Convention, as it was adopted in the Iranian city of Ramsar in 1971 and came into force in 1975, is an intergovernmental treaty that provides the framework for the conservation and wise use of wetlands and their resources. Under the three pillars of the convention the Contracting Parties commit to work towards the wise use of all their wetlands through national plans, policies and legislation, management actions and public education; designate suitable wetlands for their list of **Wetlands of International Importance (the "Ramsar List")** and ensure their

effective management; and Cooperate internationally on transboundary wetlands, shared wetland systems, shared species, and development projects that may affect wetlands.

3.20.3 The Convention on the Conservation of Migratory Species of Wild Animals, 1983 (CMS or Bonn Convention)

An intergovernmental treaty, concluded under the sponsorship of the United Nations Environment Programme, concerned with the conservation of wildlife and habitats on a global scale. The fundamental principles listed in Article II of this treaty state that signatories acknowledge the importance of migratory species being conserved and agree to take action to this end "whenever possible and appropriate", "paying special attention to migratory species the conservation status of which is unfavourable and taking individually or in cooperation appropriate and necessary steps to conserve such species and their habitat".

3.20.4 The Agreement on the Conservation of African-Eurasian Migratory Waterbirds, 1999 (AEWA)

An intergovernmental treaty developed under the framework of the Convention on Migratory Species (CMS), concerned with the coordinated conservation and management of migratory waterbirds throughout their entire migratory range. Signatories of the Agreement have expressed their commitment to work towards the conservation and sustainable management of migratory waterbirds, paying special attention to endangered species as well as to those with an unfavourable conservation status. The assessment of the ecology and identification of sites and habitats for migratory waterbirds is required to coordinate efforts that ensure that networks of suitable habitats are maintained and investigate problems likely posed by human activities.

3.21 Policies and Guidelines

3.21.1 Environmental Impact Assessment Guidelines

Relevant guidelines and policies as applicable to the management of the EIA process and to this application have also been taken into account, as indicated below:

- *IEM Guideline Series (Series 3): Stakeholder engagement (2002);*
- *IEM Guideline Series (Series 4): Specialist studies (2002);*
- *IEM Guideline Series (Series 5): Impact Significance (2002);*
- *IEM Guideline Series (Guideline 5): Companion to the EIA Regulations 2010 (October 2012);*
- *IEM Guideline Series (Series 7): Cumulative Effects Assessment (2002);*
- *IEM Guideline Series (Guideline 7): Public Participation in the EIA process (October 2012);*
- *IEM Guideline Series (Series 7): Alternatives in the EIA process (2002);*
- *IEM Guideline Series (Guideline 9): Draft guideline on need and desirability in terms of the EIA Regulations 2010 (October 2012);*
- *DFFE (2017) Guideline on Need and Desirability, Department of Forestry, Fisheries and Environment (DFFE) Pretoria, South Africa (2017);*
- *IEM Guideline Series (Series 12): Environmental Management Plans (EMP) (2002); and*
- *IEM Guideline Series (Series 15): Environmental impact reporting (2002).*

3.21.2 IFC Performance Standards

The IFC's Performance Standards on Social and Environmental Sustainability (Referred to as Performance Standards hereinafter) is an environmental and social risk management

tool provided by the IFC for its investment and financing clients, and is also one of the major applicable standards of the Equator Principles. As the global influence of the Equator Principles has continued to rise, more and more Equator Principles Financial Institutions (EPFI) have been applying the Performance Standards in their assessments of environmental and social impacts. Under this backdrop, the Performance Standards have **become the world's leading system and tool for environmental and social risk management.**

The IFC Performance Standards encompass eight topics as described in Table 3.2 below. Given that South Africa has a complex and well-balance environmental regulatory system, the IFC Performance Standards are wholly addressed in the NEMA framework.

For reference purposes the Applicant, will be referred to as the 'Borrower' in Table 3.2.

The Project will not have adverse impacts on PS5: Land Acquisition and Involuntary Resettlement and PS7: Indigenous Peoples as there is no displacement or resettlement, and none such indigenous people are found in the Project area of influence.

Table 3-2: Description of the IFC Performance Standards

PS Description	Project Applicability
<p>Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts</p> <p>Objective: Underscores the importance of identifying E&S risks and impacts and managing E&S performance throughout the life of a project.</p>	
<p>Borrowers are required to manage the environmental and social performance of their business activity, which should also involve communication between the Borrower/investee, its workers and the local communities directly affected by the business activity. This requires the development of a good management system, appropriate to the size and nature of the business activity, to promote sound and sustainable environmental and social performance as well as lead to improved financial outcomes.</p>	<p>Section 2 of Chapter 1 of the NEMA provides details of the environmental management principles that should be adhered to during the entire project life. Chapter 6 of the NEMA EIA Regulations, 2014 (as amended) outlines the requirements for Public Participation in respect of a project.</p> <p>This document represents the Basic Assessment process (equitable to an ESIA) undertaken for the proposed development. Section 10 and 11 of the report comprehensively assesses the key environmental and social impacts and complies with the requirements of the NEMA EIA Regulations, 2014 (as amended). The proposed development will be managed in terms of environmental and social impacts through an approved EMPr which is drafted as part of this process. The following have been included as part of this BA Assessment:</p> <ul style="list-style-type: none"> • Description of relevant Policy; • Identification of Risks and Impacts; • Generic EMPrs; • Requirements for Monitoring and Review; • Stakeholder Engagement as part of PPP; • External Communication and Grievance Mechanism; and • Recommendation for ongoing Reporting to Affected Communities.
<p>Performance Standard 2: Labour and Working Conditions</p> <p>Objective: Recognizes that the pursuit of economic growth through employment creation and income generation should be balanced with protection of basic rights for workers.</p>	
<p>For any business, its workforce is a valuable asset and a sound worker-management relationship is a key component of the overall success of the enterprise. By protecting the basic rights of workers, treating workers fairly and providing them with safe and healthy working conditions, Borrowers</p>	<p>Whilst PS 2 is applicable to the proposed development, it will not be addressed in detail in this report as Labour and Working conditions are typically addressed prior to construction, once EA and preferred bidder status has been awarded. Recommendations are provided concerning development of a detailed Human Resources (HR) and Occupational Health and Safety (OHS) system by the Applicant.</p>

<p>can enhance the efficiency and productivity of their operations and strengthen worker commitment and retention.</p>	<p>In terms of the proposed development, construction will require the appointment of an EPC contractor (and others) for completion. The operational phase will have permanent employees for day-to-day activities as well as contractors who will all need a safe working environment and fair contractual agreements.</p> <p>Appointment of contactors and employees will be 'fair and equal', and workers will be provided with a safe, healthy and inclusive work environment.</p> <p>The generic EMPr will incorporate the requirements for compliance with local and international Labour and Working legislation and good practice on the part of the contractors.</p>
<p>Performance Standard 3: Resource Efficiency and Pollution Prevention Objective: Recognizes that increased industrial activity and urbanization often generate higher levels of air, water and land pollution, and that there are efficiency opportunities.</p>	
<p>Increased industrial activity and urbanization often generate increased levels of pollution to air, water and land that may threaten people and the environment at the local, regional and global level. Borrowers are required to integrate pollution prevention and control technologies and practices (as technically and financially feasible as well as cost-effective) into their business activities.</p>	<p>The Project is not likely to have many large-scale impacts related to pollution. This is a project related to renewable energy developments and thus strives to reduce the pollution footprint that may be caused by other energy producing processes such as Coal or Gas.</p> <p>Measures to address air, water and land pollution are contained in the generic EMPr. There are no material resource efficiency issues associated with the proposed development and the generic EMPr will include general resource efficiency measures.</p> <p>The project is not greenhouse gas (GHG) emissions intensive and the detailed assessment and reporting of emissions is not required. This project, however, seeks to facilitate resource efficiency and pollution prevention by contributing to the South African green economy.</p> <p>The project will not release industrial effluents and waste generation will be managed according to the EMPr. Hazardous materials are not a key issue; small quantities of construction materials (oil, grease, diesel fuel etc.) are the only wastes expected to be associated with the project.</p> <p>Land contamination of the site from previous land use is not a concern as the project area is mostly an agricultural area where low intensity agriculture / grazing is practiced.</p>
<p>Performance Standard 4: Community Health, Safety, and Security Objective: Recognizes that projects can bring benefits to communities but can also increase potential exposure to risks and impacts from incidents, structural failures, and hazardous materials.</p>	
<p>Business activities can increase the potential for community exposure to risks and impacts arising from equipment accidents, structural failures and releases of hazardous materials as well as impacts on a community's natural resources, exposure to diseases and the use of security personnel. Borrowers are responsible for avoiding or minimizing the risks and impacts to community health, safety and security that may arise from their business activities.</p>	<p>The requirements for PS 4 have been addressed in Section 10 and 11 of the BAR and will be managed in accordance with the generic EMPr.</p> <p>It is understood that the project infrastructure and equipment will be designed to good industry standards to minimise risks to communities, however a community health and safety plan should be compiled by the Applicant prior to construction to meet the requirements of IFC Performance Standard 4 (Community Health, Safety and Security).</p> <p>To ensure compliance with PS 4, Applicant will need to evaluate the risks and impacts to the health and safety of the affected community during the design, construction and operation of the proposed development and establish preventive measures to address them in a manner commensurate with the identified risks and impacts as contained in this BAR. Such measures need to adhere to the</p>

	precautionary principle for the prevention or avoidance of risks and impacts over minimization and reduction.
<p>Performance Standard 5: Land Acquisition and Involuntary Resettlement</p> <p>Objective: Applies to physical or economic displacement resulting from land transactions such as expropriation or negotiated settlements.</p>	
<p>Land acquisition due to the business activities of a Borrowers may result in the physical displacement (relocation or loss of shelter) and economic displacement (loss of access to resources necessary for income generation or as means of livelihood) of individuals or communities. Involuntary resettlement occurs when affected individuals or communities do not have the right to refuse land acquisition and are displaced, which may result in long-term hardship and impoverishment as well as environmental damage and social stress. Borrowers are required to avoid physical or economic displacement or minimize impacts on displaced individuals or communities through appropriate measures such as fair compensation and improving livelihoods and living conditions.</p>	Not Applicable
<p>Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources</p> <p>Objective: Promotes the protection of biodiversity and the sustainable management and use of natural resources.</p>	
<p>Protecting and conserving biodiversity (including genetic, species and ecosystem diversity) and its ability to change and evolve, is fundamental to sustainable development. Borrowers are required to avoid or mitigate threats to biodiversity arising from their business activities and to promote the use of renewable natural resources in their operations.</p>	<p>In terms of protecting and conserving biodiversity, specialists have assessed the impacts of the proposed development within the area of influence and have recommended measures to prevent/avoid/mitigate these potential impacts.</p> <p>The following studies have been commissioned as part of this BA process:</p> <ul style="list-style-type: none"> • Terrestrial Ecology • Botany • Avifauna • Aquatic/Freshwater Ecology <p>Specialist methods include a combination of literature review, stakeholder engagement and consultation, and in-field surveys. This substantively complies with the PS 6 general requirements for scoping and baseline assessment for determination of biodiversity and ecosystem services issues.</p> <p>The determination of habitat sensitivity was undertaken within the legal and best practice reference framework for South Africa.</p>
<p>Performance Standard 7: Indigenous Peoples</p> <p>Objective: Aims to ensure that the development process fosters full respect for Indigenous Peoples.</p>	
<p>Indigenous Peoples are recognized as social groups with identities that are distinct from other groups in national societies and are often among the marginalized and vulnerable. Their</p>	<p>Not Applicable. As per the international instruments under the United Nations (UN) Human Rights Conventions, no indigenous peoples are present within the study area. The Project does not involve displacement.</p>

<p>economic, social and legal status may limit their capacity to defend their interests and rights to lands and natural and cultural resources. Borrowers are required to ensure that their business activities respect the identity, culture and natural resource-based livelihoods of Indigenous Peoples and reduce exposure to impoverishment and disease.</p>	
<p>Performance Standard 8: Cultural Heritage Objective: Aims to protect cultural heritage from adverse impacts of project activities and support its preservation.</p>	
<p>Aims to protect cultural heritage from adverse impacts of project activities and support its preservation.</p>	<p>A cultural heritage impact assessment and paleontological impact assessment has been undertaken for the proposed development. A Chance Find Procedure has been included in the generic EMP. Consultation will also take with SAHRA.</p>

3.21.3 The Equator Principles (EPs) III, 2013

The principles applicable to the project are likely to include:

- *Principle 2: Environmental and Social Assessment;*
- *Principle 3: Applicable Environmental and Social Standards;*
- *Principle 4: Environmental and Social Management System and Equator Principles Action Plan;*
- *Principle 5: Stakeholder Engagement;*
- *Principle 6: Grievance Mechanism;*
- *Principle 7: Independent Review;*
- *Principle 9: Independent Monitoring and Reporting; and*
- *Principle 10: Reporting and Transparency.*

These principles, among various requirements, include a requirement for an assessment process and an Environmental and Social Management Plan (ESMP) to be prepared by the client to address issues raised in the assessment process and incorporate actions required to comply with the applicable standards, and the appointment of an independent environmental expert to verify monitoring information.

4 BASIC ASSESSMENT METHODOLOGY

4.1 NEMA Requirements

In terms of legal requirements, NEMA EIA Regulations 2014, as amended, regulate and prescribe the content of the BA Report and specify the type of supporting information that must accompany the submission of the report to the authorities. Table 4-1 shows how and where the legal requirements are addressed in this BA Report. Section 5 of this BA report provides a summary of the Public Participation Process (PPP) and Appendix C of this BA Report contains the Public Participation undertaken to date. As comments are received on the BA Report these will be collated and included in Appendix C of this BA Report.

As per the EIA Regulations 2014, as amended, "the objective of the basic assessment process is to, through a consultative process-

- a) *determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;*

- b) *identify the alternatives considered, including the activity, location and technology alternatives;*
- c) *describe the need and desirability of the proposed alternatives;*
- d) *through the undertaking of an impact and risk assessment process, inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine-*
 - i. *the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and*
 - ii. *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; and*
- e) *Through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to-*
 - i. *identify and motivate a preferred site, activity and technology alternative;*
 - ii. *identify suitable measures to avoid, manage or mitigate identified impacts; and*
 - iii. *identify residual risk that need to be managed or monitored.*

The above activities are completed through consultation with:

- The lead authorities involved in the decision-making for the BA application (in this case, the DFFE);
- The I&APs, provincial and local governments, and other relevant organisations to ensure that local issues are well understood; and
- The specialist team to ensure that technical issues are identified.

4.2 Overview of the BA Process

The application for environmental authorisation and assessment of impacts is ultimately a decision-making process with the specific aim of selecting an option that is technically feasible, practical, and will cause the least impact to the environment. The BA process identifies activities which may have a detrimental effect on the environment, and which would therefore require Environmental Authorisation prior to commencement. The existing environment within which a proposed development is to be located is investigated through a review of relevant background literature and ground-truthing.

A primary objective is to present key stakeholders with the findings of the assessments, obtain and document feedback, and address all issues raised.

The independent environmental assessment practitioner (EAP) and various specialists identified potential negative and positive impacts that could arise as a result of the proposed development. Mitigation measures were also recommended which would allow for the avoidance or reduction of negative impacts or which may enhance positive impacts. The appointment of specialists was made based on the list of specialists identified by the Screening Report (see Volume II) generated for the proposed development on the DFFE Screening Tool Portal.

The key phases of this BA process are described below:

- **Pre-Application Process:** The DFFE is consulted during a pre-application meeting to confirm the process which has been followed, including discussions based on the results of the Screening Tool, appointment of specialists, and the Public Participation Process which will be followed.

- **Initial Notification and Call to Register as I&APs through the following:** Placement of advertisements, site notices, posters and notification e-mails. The aim of this step is to inform potential interested and affected parties of the proposed activity and to encourage initial comment and feedback.
- **Basic Assessment Process: Collation of initial comments and specialist investigations into a concise report (this document) which provides feedback on the following:**
 - Nature of the activity;
 - Methodology used to conduct the assessment and derive an outcome;
 - The public participation process;
 - **The baseline environmental conditions including any specialists' studies** conducted;
 - The need and desirability;
 - Identification of potential feasible alternatives;
 - Identification of potential positive and negative impacts; and
 - Identification of knowledge gaps.

The identified impacts have been assessed and any specific management and mitigation measures has been included in the Generic Environmental Management Programmes (EMPr) (Appendix B). The findings are included in this Report.

- **Ongoing Public Consultation:** Interested and Affected Parties (I&APs) are consulted on an on-going basis throughout the BA Process. This involvement was initiated through the dissemination of information by means of advertisements, notification letters, posters and site notices. Opportunities will be provided for I&APs to review the Draft Basic Assessment Report.

Following the completion of the relevant processes described above and the submission of documentation to the competent authority, the DFFE will review the application and issue a decision on whether to grant the applicant Environmental Authorisation or not. I&APs will be informed of the decision and their rights to appeal.

Table 4-1: Legislative Requirements for Scope of Assessment and Content of Basic Assessment Reports

Appendix 1 Requirements NEMA, 1998 (Act No. 107 of 1998)	Location in BAR
<p><i>A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include-</i></p>	
<p><i>(a) details of-</i></p> <p><i>(i) the EAP who prepared the report; and</i></p> <p><i>(ii) the expertise of the EAP, including a curriculum vitae;</i></p>	<p>Section 1 Appendix A</p>
<p><i>(b) the location of the activity, including-</i></p> <p><i>(i) the 21 digit Surveyor General code of each cadastral land parcel;</i></p> <p><i>(ii) where available, the physical address and farm name;</i></p> <p><i>(iii) where the required information in items (i) and (ii) is not available, the co-ordinates of the boundary of the property or properties;</i></p>	<p>Section 2</p>
<p><i>(c) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is-</i></p> <p><i>(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or</i></p> <p><i>(ii) on land where the property has not been defined, the coordinates</i></p>	<p>Section 2 Figure 2</p>

Appendix 1 Requirements NEMA, 1998 (Act No. 107 of 1998)	Location in BAR
<i>within which the activity is to be undertaken;</i>	
<p><i>(d) a description of the scope of the proposed activity, including-</i></p> <p><i>(i) all listed and specified activities triggered and being applied for; and</i></p> <p><i>(ii) a description of the activities to be undertaken including associated structures and infrastructure;</i></p>	Section 3
<p><i>(e) a description of the policy and legislative context within which the development is proposed including-</i></p> <p><i>(i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and</i></p> <p><i>(ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools framework, and instruments;</i></p>	Section 3
<p><i>(f) 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;</i></p>	Section 4
<p><i>(g) a motivation for the preferred site, activity and technology alternative;</i></p>	Section 7
<p><i>(h) a full description of the process followed to reach the proposed preferred alternative within the site, including-</i></p> <p><i>(i) details of the alternatives considered;</i></p>	Section 6
<p><i>(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;</i></p>	Section 9 Appendix C
<p><i>(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;</i></p>	Section 9 Appendix C
<p><i>(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;</i></p>	Section 8
<p><i>(v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts-</i></p> <p><i>(aa) can be reversed;</i></p> <p><i>(bb) may cause irreplaceable loss of resources; and</i></p> <p><i>(cc) can be avoided, managed or mitigated;</i></p>	Section 10 Section 11
<p><i>(vi) 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;</i></p>	Section 4.5 – 4.6 Volume II
<p><i>(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;</i></p>	Section 10 Section 11
<p><i>(viii) the possible mitigation measures that could be applied and level of residual risk;</i></p>	Section 10 Section 11
<p><i>(ix) the outcome of the site selection matrix;</i></p>	Section 6
<p><i>(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and</i></p>	Section 6
<p><i>(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;</i></p>	Section 7
<p><i>(i) a full description of the process undertaken to identify, assess and rank</i></p>	Section 4

Appendix 1 Requirements NEMA, 1998 (Act No. 107 of 1998)	Location in BAR
<p><i>the impacts the activity will impose on the preferred location through the life of the activity, including -</i></p> <p>(i) <i>a description of all environmental issues and risks that were identified during the environmental impact assessment process; and</i></p> <p>(ii) <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;</i></p>	<p>Section 10 Section 11</p>
<p>(j) <i>an assessment of each identified potentially significant impact and risk, including-</i></p> <p>(i) <i>cumulative impacts;</i></p> <p>(ii) <i>the nature, significance and consequences of the impact and risk;</i></p> <p>(iii) <i>the extent and duration of the impact and risk;</i></p> <p>(iv) <i>the probability of the impact and risk occurring;</i></p> <p>(v) <i>the degree to which the impact and risk can be reversed;</i></p> <p>(vi) <i>the degree to which the impact and risk may cause irreplaceable loss of resources; and</i></p> <p>(vii) <i>the degree to which the impact and risk can be avoided, managed or mitigated;</i></p>	<p>Section 10 Section 11</p>
<p>(k) <i>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;</i></p>	<p>Section 12 Section 13 Volume II</p>
<p>(l) <i>an environmental impact statement which contains-</i></p> <p>(i) <i>a summary of the key findings of the environmental impact assessment;</i></p> <p>(ii) <i>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</i></p> <p>(iii) <i>a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;</i></p>	<p>Section 12 Section 13 Volume II Figure 2, 7 and 8</p>
<p>(m) <i>based on the assessment, and where applicable, impact management measures from specialist reports, the recording of proposed impact management outcomes, and the impact management outcomes for the development for inclusion in the EMPr;</i></p>	<p>Section 10 Section 11 Appendix B</p>
<p>(n) <i>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;</i></p>	<p>Section 13.1</p>
<p>(o) <i>a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;</i></p>	<p>Section 1.3</p>
<p>(p) <i>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;</i></p>	<p>Section 12 Section 13</p>
<p>(q) <i>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;</i></p>	<p>Commencement of construction will occur within 10 years of authorisation and conclude within 5 years of commencement. Post-construction monitoring requirements will be finalised within this period.</p>
<p>(r) <i>an undertaking under oath or affirmation by the EAP in relation to-</i></p> <p>(i) <i>the correctness of the information provided in the reports;</i></p>	<p>Appendix A</p>

Appendix 1 Requirements NEMA, 1998 (Act No. 107 of 1998)	Location in BAR
<p>(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 or affected parties; and</p>	
<p>(s) where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;</p>	n/a
<p>(t) any specific information that may be required by the competent authority; and</p>	n/a
<p>(u) any other matters required in terms of section 24(4)(a) and (b) of the Act.</p>	n/a

4.3 Environmental Screening Tool

In terms of GN R960 (promulgated on 5 July 2019) and Regulation 16 (1)(b)(v) of the EIA Regulations, 2014 (as amended), the submission of a Screening Report generated from the national web based environmental screening tool is compulsory for the submission of BA and EIA applications in terms of Regulation 19 and 21 of EIA Regulations, 2014 (as amended). The Screening Report generated for the proposed development is included in Volume II of this Report.

The screening report identified Solar PV / CSP Developments which received environmental authorisation within a 30 km radius of the proposed development. No intersections with Environmental Management Frameworks (EMF) areas were found. In terms of development incentives, restrictions, exclusions or prohibitions, the site falls within the Electricity Grid Infrastructure (EGI) Strategic Transmission Corridor – specifically the Central Corridor, however this will not change the application process as the lines are 132 kV instead of the required 400 kV, to benefit from the EGI.

Table 4.2 provides a summary of the specialist assessments identified by the screening report, and the response to each assessment in terms of the proposed development.

Table 4-2: Specialist assessments identified in terms of the national web-based screening tool for the proposed development

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	By Specialist / EAP
Agricultural Impact Assessment	Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Agricultural Resources, gazetted on 20 March 2020. This protocol replaces the requirements of Appendix 6 of the Environmental Impact Assessment Regulations.	Medium to Low Sensitivity	Medium to Low Sensitivity
	<p>Comment: The predominantly low agricultural sensitivity, as identified by the screening tool, is confirmed. The motivation for confirming the sensitivity is that the climate data (low rainfall of approximately 285 mm per annum and high evaporation of approximately 1,500 mm per annum) proves the area to be arid, and therefore of limited land capability. A land capability of 5 and consequent low agricultural sensitivity is entirely appropriate for this land which is totally unsuitable for dryland crop production. This site sensitivity verification verifies the entire site as being of less than high agricultural sensitivity and predominantly of low agricultural sensitivity. The required level of agricultural assessment is therefore confirmed as an Agricultural Compliance Statement. Refer to Chapter 10 – 12 as well as Volume II.</p>		
Landscape / Visual Impact Assessment	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	Not Determined	Low Sensitivity
	<p>Comment: Landscape / Visual Theme had no environmental sensitivity in the screening report to base the required level of assessment on. The EAP assessed applicable impacts of the proposed development. Refer to Chapter 10 – 12.</p>		
Archaeological and Cultural Heritage Impact Assessment	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	Very High Sensitivity	Low Sensitivity
	<p>Comment: The result of the screening report varies between low to very high sensitivity, although majority of the project is traversed by low sensitivity. Specialist assessment disputes the outcome of the screening report. An archaeology and cultural heritage assessment have been undertaken. Refer to Chapter 10 – 12 as well as Volume II.</p>		

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	By Specialist / EAP
Palaeontology Impact Assessment	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	Very High Sensitivity	Low Sensitivity
	<p>Comment: The result of the screening report varies between medium to very high sensitivity. Specialist assessment disputes the outcome of the screening report. A palaeontology assessment has been undertaken. Refer to Chapter 10 – 12 as well as Volume II.</p>		
Terrestrial Biodiversity Impact Assessment	Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity, gazetted on 20 March 2020 and new regulations (October 2020).	Very High Sensitivity	Low Sensitivity
	<p>Comment: The Screening Tool identified one sensitivity rating within the development footprint, namely, very high. Specialist assessment disputes the outcome of the screening report. Ecological sensitivity indicates that the project corridor assessed is mostly of low ecological sensitivity, with a few areas of medium sensitivity (mostly washes in drainage lines) and scattered areas of high sensitivity (wetlands, select ridges and other important habitat features). A terrestrial biodiversity, including plant species assessment has been undertaken. Refer to Chapter 10 – 12 as well as Volume II.</p>		
Aquatic Biodiversity Impact Assessment	Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity, gazetted on 20 March 2020.	Very High Sensitivity	Very High to Low Sensitivity
	<p>Comment: The Screening Tool identified one sensitivity rating within the development footprint, namely, very high. Based on the results, the specialist agrees with the outcomes identified. Although there is some overlap with the findings on site and the Screening Tool's outcome, the development footprint contains various sensitivities (very high and low) that were identified following the undertaking of several site visits and spatial input considerations. To further assess the site sensitivity an aquatic impact assessment was produced for the proposed development. Refer to Chapter 10 – 12 as well as Volume II.</p>		

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	By Specialist / EAP
Avian Impact Assessment	Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Avifaunal Species, gazetted on 20 March 2020.	Not Determined	Low Sensitivity
	<p>Comment: Avian Theme had no environmental sensitivity in the screening report to base the required level of assessment on. The EAP appointed an avifaunal specialist to undertake an avifauna impact assessment for the proposed development. Refer to Chapter 9 – 12 as well as Volume II.</p>		
Civil Aviation Assessment	Protocol for the specialist assessment and minimum report content requirements for Environmental Impacts on Civil Aviation Installations, gazetted on 20 March 2020.	High Sensitivity	Low Sensitivity
	<p>Comment: Site verification analysis disputes the high sensitivity. The sensitivity should be reduced to low for the proposed development as there is no impact to the airspace of the proposed development area and immediate surrounds. The South African Civil Aviation Authority (CAA) has been and will continue to be consulted during the project to obtain comments from a civil aviation perspective (see Appendix C). The Developer will also obtain the necessary CAA approvals (where necessary) once the design siting of the proposed development has been finalised. Initial comment has been provided by the EAP, refer to Volume II.</p>		
RFI Assessment	RFI Theme had no environmental sensitivity in the screening report to base the required level of assessment on.	Not Determined	Not Determined
	<p>Comment: As no potential red flags for RFI exists within the development area and no sensitivity has been identified by the screening tool report. The EAP has not included this assessment as part of the application process.</p>		
Geotechnical Assessment	Geotechnical Theme had no environmental sensitivity in the screening report to base the required level of assessment on.	Not Determined	Not Determined

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	By Specialist / EAP
	<p>Comment: As no potential red flags for RFI exists within the development area and no sensitivity has been identified by the screening tool report. The EAP has not included this assessment as part of the application process.</p>		
Plant Species Assessment	Protocol for the specialist assessment and minimum report content requirements for Environmental Impacts on Terrestrial Plant Species, gazetted on 20 March 2020 and 30 October 2020, respectively.	Low Sensitivity	Medium Sensitivity
	<p>Comment: An identification, ranking and assessment of the present state, and impact of the proposed development, on plant animal species has been provided in the terrestrial ecology report and confirms the identified sensitivity. An ecological impact assessment (including the assessment of plant species) which assesses the biophysical environment of the proposed development has been conducted. Refer to Chapter 10 – 12 as well as Volume II.</p>		
Animal Species Assessment	Protocol for the specialist assessment and minimum report content requirements for Environmental Impacts on Terrestrial Animal Species, gazetted on 20 March 2020 and 30 October 2020, respectively.	High Sensitivity	Medium Sensitivity
	<p>Comment: An identification, ranking and assessment of the present state, and impact of the proposed development, on plant and animal species has been provided in the terrestrial ecology report. Following the site verification, regulations make provision for linear activities such as the proposed development by stating that even the assessment and reporting requirements for areas identified as being of 'very high sensitivity' need not apply as impacts on terrestrial biodiversity are temporary in nature. The land disturbed by the power line development, can be returned to the current state within two years of the completion of the construction phase, and as such a Terrestrial Biodiversity Compliance Statement applies. An ecological impact assessment (including the assessment of plant and animal species) which assesses the biophysical environment of the proposed development has been conducted. Refer to Chapter 9 – 12 as well as Volume II.</p>		

4.4 Specialist Methodology

To evaluate the potential environmental impacts and verify the sensitivity of the screening report, information relating to the existing environmental conditions was collected through field and desktop research, this is known as the baseline. Where no specialist was appointed, the EAP conducted high level screening to confirm the significance ratings of the impacts the proposed development may have on the environment, by:

- Desk-top based reviews of literature available on the proposed site; and
- Reviewing the previous applications, submitted by the same applicant, within the affected area.

Based on the results of the DFFE screening report, referred to in Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended, soil and agriculture, aquatic, ecological, avifauna and heritage specialist studies were conducted for this proposed development.

Each of the specialist assessments followed a systematic approach to the assessment of impacts, with the principal steps being:

- Description of existing environment/baseline conditions;
- Site Sensitivity Verification;
- Prediction and Assessment of likely potential impacts, including cumulative impacts (both positive and negative);
- Identification of appropriate mitigation measures; and
- Assessment of residual (potential) environmental impacts.

It should be noted that all specialists have surveyed the area extensively over the last 5 years and are very familiar with the local environment. The specialists used for the application process were involved in similar applications in the area for the same applicant. Due to this, the specialists are confident in their assessments, without the need to conduct a specific site visit.

4.4.1 Soils and Agriculture

The level of agricultural assessment required in terms of the protocol for the proposed development is an Agricultural Compliance Statement because the site is of medium - low agricultural sensitivity on the screening tool. The assessment was based on a desktop analysis of existing soil and agricultural potential data and other data for the site, which is considered more than adequate for a thorough assessment of all the agricultural impacts of the proposed development. A field investigation was not considered necessary due to the low agricultural sensitivity of the site.

The ratings of impacts were based on the specialist's knowledge and experience of the field conditions of the environment in which the proposed development is located, and of the impact of disturbances on that agricultural environment.

4.4.2 Freshwater and Wetlands (Aquatics)

The assessment included delineating any natural waterbodies, and assessing the potential consequences of the proposed alignment (inclusive of a 500 m wide corridor – the study area) on the surrounding watercourses. This was based on information collected during various site visits conducted within the region (i.e., adjoining farms and or projects directly adjacent to study area) in August 2014, May 2016 and October 2019 for surrounding projects, and a site-specific assessment in July 2022. The 2014 and 2019 surveys coincided higher than normal rainfall, and thus presented an opportunity to view

the region with riverine flows. A short site visit was also conducted to inspect the proposed grid access road in July 2022.

4.4.3 Terrestrial Biodiversity including Plant and Animal Species

Following the protocol listed in National Gazette, No. 43110 of 20 March, 2020, when applying for Environmental Authorisation, the information presented by the DFFE online screening tool was consulted to determine the sensitivity of the project site prior to the field site visit and ground-truthing. Existing studies and various databases of distribution records were also consulted to determine the potential species that could occur on the site. In addition to the desktop study, an initial five-day site walkthrough was conducted to assess the proposed area for the transmission routes and switching station following a good amount of rainfall between 10 and 14 February 2020. An additional four-day walkthrough (30 June – 3 July 2022) was conducted to account for the later addition for the proposed access road. The site had recently received rain and the vegetation, mostly grasses and shrubs, was dense but not flowering as this visit was conducted in winter.

The assessment was conducted to align with the Terrestrial Biodiversity Protocol prescribed therein to assist the Competent Authority in the decision making process as the protocol was largely materially unchanged from the minimum assessment and reporting requirements described in The National Gazette No. 42451 of 10 May 2019 and the specialist assessment was concluded prior to the publication of The National Gazette, No 43855 of 30 October 2020.

4.4.4 Avifauna

While no specific protocols for the avifaunal assessment of linear infrastructure are listed in the National Gazette, No. 43110 of 20 March, 2020, the information presented by the online screening tool was consulted to determine the sensitivity of the project site prior to the field site visit and ground-truthing. A five-day site walkthrough covering the power line corridor and switching station was conducted between 10 and 14 February 2020. An additional four-day walkthrough (between 30 June and 3 July 2022) was conducted to account for the later addition for the proposed access road. Databases were also studied to gain an understanding of the project baseline for avifauna. Available bird micro-habitats were assessed and a list of all bird species was recorded.

4.4.5 Heritage, Archaeology and Palaeontology

The assessment comprised an archaeological walkover survey between 11 - 13 February 2020 and further fieldwork conducted by the same team between 30 June 2022 and 2 July 2022, and impact assessment of the proposed development site, a desktop palaeontological impact assessment (PIA) and the production of an integrated heritage impact assessment (HIA) which addresses the impacts of the project on heritage resources.

4.5 Identification of Potential Impacts

The identification of potential impacts covers the three phases of the proposed development: construction, operation and decommissioning. During each phase, the potential environmental impacts may be different.

The project team has experience from environmental studies for other projects in the locality of the proposed development as well as other WEF, Grid Connection, Substation, and Battery Energy Storage System (BESS) applications. The team is, therefore, able to identify potential impacts addressed in the BA based on their experience and knowledge of the type of development proposed and the local area. Their inputs informed the scope for the BA.

Each specialist assessment considered:

- The extent of the impact (local, regional or (inter) national);
- The intensity of the impact (low, medium or high);
- The duration of the impact and its reversibility;
- The probability of the impact occurring (improbable, possible, probable or definite);
- The confidence in the assessment; and
- Cumulative impacts.

Following identification of potential environmental impacts, the baseline information was used to predict changes to existing conditions and undertake an assessment of the impacts associated with these changes.

4.5.1 Assessment of Potential Effects

The potential impact that the proposed development may have on each environmental receptor could be influenced by a combination of the sensitivity and importance of the receptor and the predicted degree of alteration from the baseline state (either beneficial or adverse).

Environmental sensitivity (and importance) may be categorised by a multitude of factors, such as the rarity of the species; transformation of natural landscapes or changes to soil quality and land use.

The overall significance of a potential environmental impact is determined by the interaction of the above two factors (i.e., sensitivity/importance and predicted degree of alteration from the baseline).

Specialists, in their terms of references, were supplied with a standard method with which to determine the significance of impacts to ensure objective assessment and evaluation, while enabling easier multidisciplinary decision-making. The methodology⁴ as outlined below indicates the categories for the rating of impact magnitude and significance.

The assessment methodology that was used is in accordance with the EIA Regulations, 2014 (as amended). The significance of environmental impacts is a function of the environmental aspects that are present and to be impacted on, the probability of an impact occurring and the consequence of such an impact occurring before and after implementation of proposed mitigation measures.

4.5.1.1 Extent (spatial scale)

L	M	H
Impact is localised within site boundary	Widespread impact beyond site boundary; Local	Impact widespread far beyond site boundary; Regional/national

4.5.1.2 Duration

L	M	H
Quickly reversible, less than project life, short term	Reversible over time; medium-term to life of project	Long term; beyond closure; permanent; irreplaceable or irretrievable commitment of resources

⁴ Adapted from T Hacking, AATS – Envirolink, 1998: An innovative approach to structuring environmental impact assessment reports. In: IAIA SA 1998 Conference Papers and Notes.

4.5.1.3 Intensity (severity)

Type of Criteria	Negative			Positive		
	H-	M-	L-	L+	M+	H+
Qualitative	Substantial deterioration death, illness or injury, loss of habitat /diversity or resource, severe alteration or disturbance of important processes.	Moderate deterioration, discomfort, Partial loss of habitat /biodiversity /resource or slight or alteration	Minor deterioration, nuisance or irritation, minor change in species/habitat/diversity or resource, no or very little quality deterioration.	Minor improvement, restoration, improved management	Moderate improvement, restoration, improved management, substitution	Substantial improvement, substitution
Quantitative	Measurable deterioration Recommended level will often be violated (e.g., pollution)	Measurable deterioration Recommended level will occasionally be violated	No measurable change; Recommended level will never be violated	No measurable change; Within or better than recommended level.	Measurable improvement	Measurable improvement

4.5.1.4 Probability of Occurrence

L	M	H
Unlikely; low likelihood; Seldom No known risk or vulnerability to natural or induced hazards.	Possible, distinct possibility, frequent Low to medium risk or vulnerability to natural or induced hazards.	Definite (regardless of prevention measures), highly likely, continuous High risk or vulnerability to natural or induced hazards.

4.5.1.5 Status of the Impact

The specialist should describe whether the impact is positive, negative or neutral for each parameter. The ranking criteria are described in negative terms. Where positive impacts are identified, use the opposite, positive descriptions for criteria.

4.5.1.6 Degree of Confidence in Predictions:

The degree of confidence in the predictions, based on the availability of information and specialist knowledge, is to be stated.

4.5.1.7 Consequence: (Duration x Extent x Intensity)

Having ranked the severity, duration and spatial extent, the overall consequence of impacts is determined using the following qualitative guidelines:

Intensity = L				
Duration	H			
	M			Medium
	L	Low		
Intensity = M				
Duration	H			High
	M		Medium	

	L	Low		
Intensity = H				
Duration	H			
	M			High
	L	Medium		
	L		M	H
Extent				

Positive impacts are ranked in the same way as negative impacts but result in high, medium or low positive consequence.

4.5.1.8 Overall Significance of Impacts

Combining the consequence of the impact and the probability of occurrence provides the overall significance (risk) of impacts.

PROBABILITY	Definite Continuous	H	MEDIUM		HIGH
	Possible Frequent	M		MEDIUM	
	Unlikely Seldom	L	LOW		
			L	M	H
CONSEQUENCE					

4.5.1.9 Mitigation Measures

Measures to avoid, reduce or remedy significant adverse impacts identified, are termed mitigation measures. Where the assessment process identifies any significant adverse impacts, mitigation measures are proposed to reduce those impacts where practicable. Such measures include the physical design and operational measures. Design alterations such as the route of the servitude to avoid certain sensitive receptors are mitigation embedded into the design of the proposed development, i.e., embedded mitigation.

This strategy of avoidance, reduction and remediation is a hierarchical one which seeks:

- First to avoid potential impacts;
- Then to reduce those which remain; and
- Lastly, where no other measures are possible, to propose compensatory measures.

Each specialist consultant identified appropriate mitigation measures (where relevant).

4.6 Cumulative Impact Assessment

In accordance with the EIA Regulations, 2014 (as amended), consideration should also be given to 'cumulative impacts'.

By definition, cumulative impacts are those that result from incremental changes caused by past, present or reasonably foreseeable future actions together with the proposed development. Cumulative impacts are the combined impacts of several developments that are different to the impacts from the developments on an individual basis.

For the purpose of this assessment, cumulative impacts are defined and have been assessed in the future baseline scenario, i.e., cumulative impact of the proposed development = change caused by the proposed development when added to the

cumulative baseline (which includes all other identified relevant developments). In the cumulative assessment, the effect of adding the proposed development to the cumulative baseline is assessed.

The selection of projects to be included in the assessment of cumulative impacts, was based on the knowledge and status of the surrounding areas at the time of writing the BA Report (Figure 4), and the applicable renewable energy projects and existing transmission lines are given in Tables 4.3 and 4.4 respectively.

Each of the specialists used existing publicly available information for the relevant developments that occur within an up to 35 km radius of the proposed development, in order to assess the cumulative impacts. Cumulative impacts that have been considered are those residual impacts that remain medium to high post-mitigation and are highly qualitative and based on specialists' and EAPs knowledge.

Table 4-3: List of Renewable Energy Projects within up to 35 km of the Proposed Development

No.	DFFE Reference No.	Classification	Status of Project
1	12/12/20/2250/5	Solar PV	Approved
2	14/12/16/3/3/2/382/7	Solar PV	Approved
3	12/12/20/2048/4	Solar PV	Approved
4	14/12/16/3/3/2/382/3	Solar PV	Approved
5	12/12/20/2048/1	Solar PV	Approved
6	12/12/20/2250/4/AM4	Solar PV	Approved
7	14/12/16/3/3/2/382/2	Solar PV	Approved
8	12/12/20/2025/1	Solar CSP	Approved
9	14/12/16/3/3/2/382/5	Solar PV	Approved
10	12/12/20/2500	Solar PV	Approved
11	12/12/20/2250/5	Solar PV	Approved
12	12/12/20/2177	Solar PV	Approved
13	12/12/20/2025	Solar CSP	Approved
14	12/12/20/2048/3	Solar PV	Approved
15	14/12/16/3/3/2/740	Solar PV	Approved
16	14/12/16/3/3/2/382/4	Solar PV	Approved
17	12/12/20/2048/4	Solar PV	Approved
18	12/12/20/2250	Solar PV	Approved
19	12/12/20/2250/2	Solar PV	Approved
20	14/12/16/3/3/2/403	Solar PV	Approved
21	12/12/20/2250/1	Solar PV	Approved
22	12/12/20/2250/4	Solar PV	Approved
23	12/12/20/2498/AM3	Solar PV	Approved
24	12/12/20/2025/2/A	Solar PV	Approved
25	14/12/16/3/3/2/382/1	Solar PV	Approved
26	12/12/20/1673	Solar PV	Approved
27	14/12/16/3/3/2/382/7	Solar PV	Approved

28	12/12/20/2025/2	Solar PV	Approved
29	12/12/20/2463/1/AM7	WEF	Approved

Although majority of these projects are Solar Energy Facilities, the impacts of these developments are relevant as the majority also include associated power line and electrical infrastructure as they influence the various specialist cumulative impact assessments for the proposed development. It should be noted however, that it is highly unlikely (primarily due to grid capacity constraints) that all of these proposed projects would be built in the medium or even long-term.

Table 4-4: List of Existing Electrical Grid Infrastructure within up to 35 km of the Proposed Development

Name	Line Start	Line End	Line Status	Line kV
Hydra Kronos 1	Hydra	Kronos	Existing	400 kV Line
Hydra Poseidon 1	Hydra	Poseidon	Existing	400 kV Line
Hydra Poseidon 2	Hydra	Poseidon	Existing	400 kV Line
Beta Hydra 1	Beta	Hydra	Existing	400 kV Line
Hydra Perseus 2	Hydra	Perseus	Existing	400 kV Line
Beta Hydra 2	Beta	Hydra	Existing	765 kV Line
Hydra Roodekuil 2	Hydra	Roodekuil	Existing	220 kV Line
Hydra Roodekuil 1	Hydra	Roodekuil	Existing	132 kV Line
Hydra Ruigtevallei 1	Hydra	Ruigtevallei	Existing	220 kV Line
Hydra Ruigtevallei 2	Hydra	Ruigtevallei	Existing	220 kV Line
Droerivier Hydra 1	Droerivier	Hydra	Existing	400 kV Line
Droerivier Hydra 3	Droerivier	Hydra	Existing	400 kV Line
Hydra Perseus 3	Hydra	Perseus	Existing	400 kV Line
Droerivier Hydra 2	Droerivier	Hydra	Existing	400 kV Line
Gamma Perseus 1	Gamma	Perseus	Existing	765 kV Line
Gamma Hydra 1	Gamma	Hydra	Existing	765 kV Line
Hydra Ndhlovu	Hydra	Ndhlovu	Existing	132 kV Line

5 NEED AND DESIRABILITY OF THE PROPOSED DEVELOPMENT

The authorised DA2S WEF requires a new and technically suitable grid connection route, in order to export clean renewable energy in to the Eskom National Grid.

The Strategic Environmental Assessment for Electricity Grid Infrastructure (EGI) in South Africa identified five Strategic Transmission Corridors, which are considered important to support the large scale electricity transmission and distribution infrastructure. The entire site of the proposed development falls within the Central Strategic Transmission Corridor, however this will not change the application process as the lines are 132 kV instead of the required 400 kV, to benefit from the EGI.

Renewable energy is supported in terms of meeting the country's climate change goals, and in terms of reducing the country's dependence on fossil fuels as the main source of meeting the country's electricity requirements. The National Climate Change Adaptation Strategy⁵ (NCCAS) for The Republic of South Africa Version UE10, 13 November 2019,

⁵ https://www.environment.gov.za/sites/default/files/docs/nationalclimatechange_adaptationstrategy_ue10november2019.pdf

explains that the South African primary sectors, such as agriculture and mining, which are natural resource dependent are high consumption uses of energy. The NCCAS is adopting a cluster approach to assist with the changing climate conditions and the affect it has on various sectors. An action in support of this proposed development is the approach to **“create a more adaptive energy system to reduce dependence on a centralised system and increase distributed generation, especially in rural areas”**. **“This will involve encouraging the development of an adaptive and decentralised energy system so that the system is more resilient to climate disruptions”**.

Both national and provincial policies and planning documents support the development of renewable energy facilities, and the authorised DA2S WEF cannot be developed without authorisation of a suitable grid connection (contained in this application). The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan. At a provincial level, the development of renewable energy is supported by the Northern Cape Provincial Growth and Development Strategy and Northern Cape Provincial Spatial Development Framework. At a more localised level, in 2010 an investment and renewable **energy conference declared the Pixley ka Seme District a ‘Renewable Energy Hub’**. The hub is aimed at providing cleaner energy and rural industrialisation in line with the **IRP (2016) and IDP’s of the municipality**. Renewable energy generation is one of the key investment opportunities identified for the district. In addition to this, the Northern Cape Department of Transport, Safety and Liaison (NCDTSL) sought approval and funding for the De Aar Logistics Hub, which serves as a long-term strategy to optimise the freight and logistics functions of the province.

The need and desirability for these types of developments, and within the recommended Central Strategic Transmission Corridor, play a role in South Africa meeting its energy and climate change targets and also provides a socio-economic boost at the local level in areas that are in need of it.

The establishment of the transmission lines and construction of the switching station and site access road in the area may place pressure on local services, specifically medical, education and accommodation, associated with the *potential influx of people to the area in seek of employment opportunities*. The potential impact or pressures on local services can be mitigated by employing local community members and should also be viewed within the context of the potential positive cumulative impacts for the local economy associated with the establishment of such infrastructure, within a Strategic Transmission Corridor, as an economic driver in the area. A current requirement of the REIPPPP is that in the development of any WEF and associated infrastructure, the local economy must benefit through employment opportunities, skills development, and the development or enhancement of community infrastructure. The cumulative effect of the proposed development and other developments in the area has the potential to result in high significance positive socio-economic opportunities for the region, including creation of employment, training opportunities which enhances skills development, and the creation of downstream business opportunities.

South Africa faces serious electricity and water shortages due to its heavy dependency on fossil fuels and increases in demand. There is, therefore, a strong need for additional electricity generation options to be developed and to diversify the sources of energy that feed into the national grid.

The purpose of the proposed development, situated within a Strategic Infrastructure Corridor, is to export the renewable energy, generated by the authorised DA2S WEF, to the national grid. Aside from the positive socio-economic benefits, there are other benefits could be realised should the project be authorised, these include (but are not limited to):

- Reduced air pollution emissions - burning fossil fuels generates CO₂ emissions which contribute to global warming. In addition, burning fossil fuels produces emissions of sulphurous and nitrous oxides which are hazardous to human health and impact on ecosystem stability;
- Water resource-saving - conventional coal-fired power stations use large quantities of water during their cooling processes. WEFs require limited amounts of water during construction and almost no water during operation. As a water-stressed country, South Africa should be conserving such resources wherever possible;
- Improved energy security - renewables can often be deployed in a decentralised way close to consumers improving grid strength while reducing expensive transmission and distribution losses. They also contribute to a diverse energy portfolio;
- Exploit significant natural renewable energy resources - biomass, solar and wind resources remain largely unexploited;
- Sustainable energy solution - the uptake of renewable energy technology addresses **the country's energy needs in a sustainable manner, generating electricity** to meet growing demands in a manner which is sustainable for future generations; and
- Employment creation and other local economic benefits associated with support for a new industry in the South African economy.

The development of the access road will also be a benefit to the directly affected landowners as this will create new access to their properties.

The proposed development site surrounding land is currently used for low-intensity grazing which could continue on the site during the construction of the development. The fauna and flora found on the site will not be at significant risk from the development on the vegetation types, namely the Northern Upper Karoo (NKu3) and Besemkaree Koppies Shrubland, and the Southern Karoo Riviere (Azi 6) which occur in the study area at a scale too small to map. Neither vegetation type, all listed as *Least Threatened*, is listed in the National List of Ecosystems that are Threatened and in Need of Protection (GN 1002,2012) published under the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA). Furthermore, according to the National Protected Area Expansion Strategy (NPAES), there is only a small area in the northeast of the study area that has been identified as priority areas for inclusion in future protected areas. Multiple existing power lines already cross this area and as medium to long term lease agreements are in place between land owners and developers, it is unlikely that this area will be incorporated into National Protected Areas in the foreseeable future. The low overall footprint of the development within the ESAs, CBAs and NPAES Focus Areas, combined with the fact that the proposed route runs adjacent to existing power lines for most of the route, the proposed development would not compromise the ecological functioning or the long-term conservation value of the area.

The Applicant has an existing EA for a power line grid connection from the De Aar 2 South WEF to the existing Eskom Hydra Substation. This route was thoroughly assessed, and EA was granted previously (DFFE Ref.: 14/12/16/3/3/1/2330). Due to capacity constraints and after confirmation from Eskom, this point of connection is no longer available to the Applicant. Therefore, this application is for a slightly amended grid route to a new proposed MTS. The majority of this route follows the same corridor as previously assessed and authorised. However, during the pre-application meeting with the DFFE, the Applicant was advised that a new and separate BAR process was required, specifically to assess the small lengths of deviation from the previously authorised route.

For the DA2S WEF to transfer electricity generated to the national grid, authorisation of the proposed transmission lines, switching station, and site internal and access roads are required.

6 ALTERNATIVES ASSESSMENT

In accordance with the requirements of Appendix 1 of the 2014 EIA Regulations (as amended), a BA report must contain a consideration of all alternatives, which can include **activity alternatives, site alternatives, location alternatives and the "No Development" alternative**. At a minimum, this chapter must address:

- The consideration of the No Development alternative as a baseline scenario;
- A comparison of reasonable and feasible selected alternatives; and
- The provision of reasons for the elimination of an alternative.

Alternatives are required to be assessed in terms of social, biophysical, economic and technical factors. For applications submitted to the DFFE for environmental authorisation in terms of the NEMA, (Act 107 of 1998) and National Environmental Management: Waste Act (NEM:WA, No. 59 of 2008), in respect of listed activities that have been triggered, this project is expected to assess alternative route options, locations, the **design and layout of the development, technologies, operational aspects and the "do-nothing" / "no-go" alternative**.

When assessing alternatives, they should be "practical", "feasible", "relevant", "reasonable" and "viable", and that I&APs should be provided with an opportunity to provide input into the process of formulating alternatives. In this instance, this chapter provides an overview of the alternatives that have been considered for this development.

6.1 Route Alternatives

There are two proposed route alternatives that have been assessed in this report, **both of which require environmental authorisation**.

Transmission Line Route 1 is approximately 23 km in length. This line will connect the authorised DA2S WEF to the proposed Vetlaagte Main Transmission Substation (MTS) near De Aar, in the Northern Cape Province. The majority of the proposed route follows, and is adjacent to the existing Eskom Hydra Roodekuil 220 kV transmission line.

Transmission Line Route 2 is approximately 20 km in length. This line will connect the authorised DA2S WEF to the proposed Wag n Bietjie MTS.

The specific characteristics of the study area described below, confirms feasibility and motivates that either Alternative is acceptable:

Land Availability and Land Use: In order to develop the transmission line and associated infrastructure, sufficient land is required. Land capability evaluation values range from 1 to 7 across the project area, with the majority of the site falling within the 5 and 6 class range. Agricultural limitations include climatic moisture availability and shallow, stony soils. These factors render the site unsuitable for any kind of mainstream cultivation without irrigation, and limit it to low density grazing only. The proposed development will not affect potential of agriculture in the area; thus, land use is available.

Geographical considerations: The plateau is generally flat rocky outcrops and is covered in typical Karoo scrub and grasses. The eastern end of the proposed transmission line routes climbs steeply to the top of a plateau above the plains at an altitude of 1,500 metres, where the proposed switching station is located within the DA2S WEF site boundary. Below the plateau, the grid connection routes traverse a series of flat valley bottoms divided by intrusive dolerite koppies. These are considered good conditions for the construction of transmission lines.

Sensitive environmental features considerations: Specialist assessed a corridor which was 300 m⁶ (i.e., 150 m on either side of the proposed transmission lines). The assessment of

⁶ The aquatic specialist assessed a corridor of 500 m (i.e., 250 m on either side of the proposed transmission lines).

specialists and review of public data of the study area assisted in buffering and avoiding any potential sensitive areas. The EMPr includes mitigation measures, if any specific, for the development.

Although two route alternatives were assessed, the Applicant is seeking authorisation of both proposed transmission line alternatives to connect to either the proposed Vetlaagte MTS or the proposed Wag n Bietjie MTS. The reason for this specific request is to ensure that during discussions with Eskom, the best technical and environmentally feasible transmission line is secured and constructed to evacuate the power from the authorised DA2S WEF.

6.2 Location and Layout Alternatives

The location and layout of the proposed development is considered feasible as the site falls within the Central Strategic Transmission Corridor. Furthermore, the switching station will be located in an area authorised for such infrastructure and the proposed transmission lines will follow the existing grid connection transmission routes (of the operational Longyuan Mulilo De Aar 2 North WEF and the existing Eskom Hydra Roodekuil 220 kV transmission line), thus minimising additional impacts as far as possible.

The proposed development is located in an area which has previously been transformed for electrification and infrastructural projects of a similar nature. The placement of similar infrastructure parallel to the existing infrastructure provides an opportunity to consolidate these and creates a cluster of the same infrastructure within an area rather than having it dispersed randomly in the surrounds. This reduces the significance ratings, with mitigation, of the negative impacts to the baseline environment and in some instances creates a positive impact, especially in terms of potential avifaunal impacts, with the installation of bird flight diverters, thereby reducing the potential collision impacts.

Furthermore, no alternative road route locations were assessed for the ~ 12 km road from an existing gravel road to the proposed switching station. Specialists assessed a corridor of 300 m (i.e., 150 m on either side of the proposed road route). The assessment of specialists assisted in buffering and avoiding any potential sensitive areas. The generic EMPr includes mitigation measures specific to the construction of the ~12 km road, including consideration to the upgrades of existing gravel roads and the roads which will be constructed along the transmission line routes to be developed.

The applicant is seeking authorisation for all the Infrastructure as part of the proposed development. The approval of all infrastructure will provide Eskom with the opportunity to decide which transmission route and associated infrastructure will be best suited, upon construction, to connect to the either the proposed Vetlaagte Main Transmission Substation or the proposed Wag 'n Bietjie Main Transmission Substation. The grid connection corridors and routes of all other applications in the area must also be considered.

6.3 Grid Connection Technology Alternatives

The main purpose of the proposed development is to connect the authorised DA2S WEF to the national grid. Note that technologies change on a regular basis and the most reliable, safest and cost-effective technology that is available and that meets industry and Eskom standards will be used. The Grid Infrastructure was provided to the specialists for their impact assessment. Alternatives are proposed for the type of structures which will support the overhead lines. These may include:

- Concrete or steel monopoles (**preferred**);
- Guy line supported steel structures (small footprint);

- Freestanding metal lattice towers; or
- Multi-pole structures such as H-towers or K-towers.

Refer to **Plates 6-1 to 6-4** for typical examples of these tower types. All aspects of the grid connection, including powerline and supporting structures, would need to adhere to industry and Eskom standards.

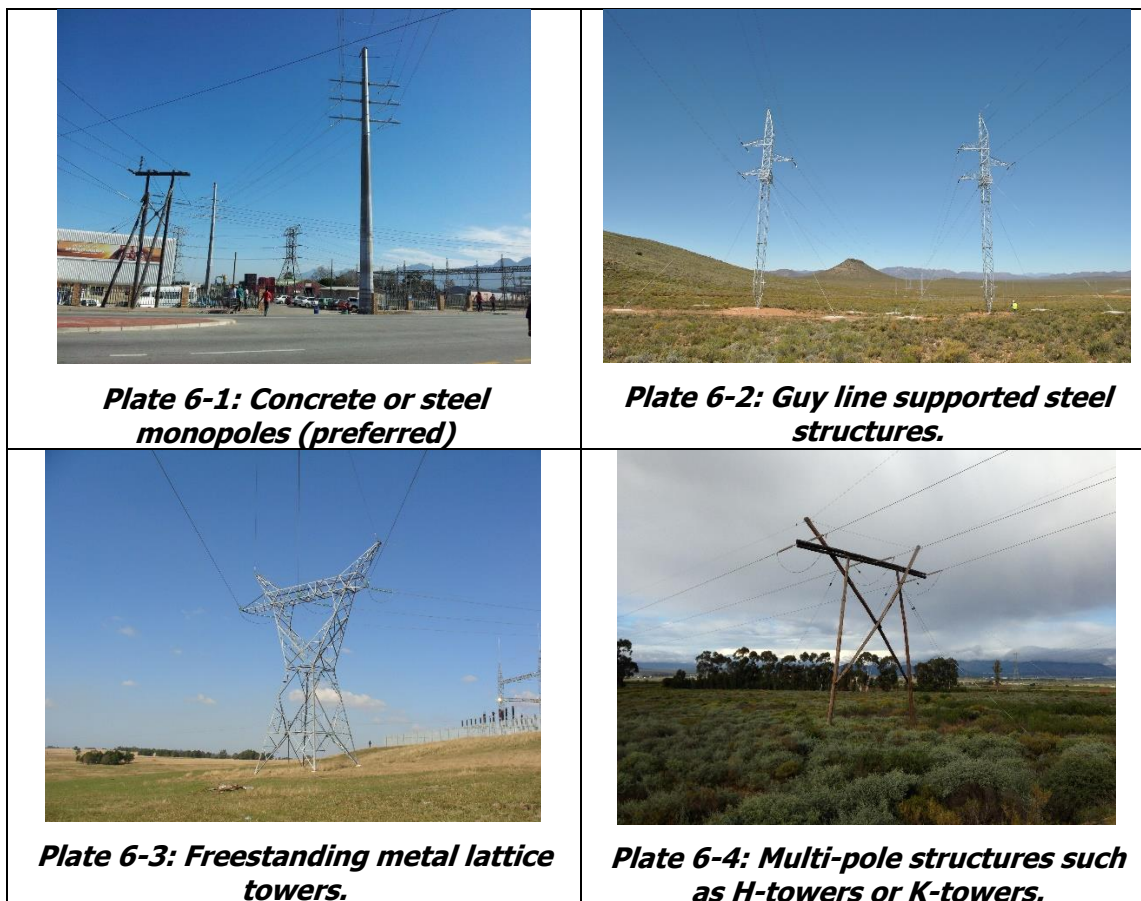


Table 6-1: Advantages and Disadvantages of the Grid Connection Alternatives

No.	Alternatives	Advantages / Disadvantages
1	<u>Concrete, steel monopoles structures (preferred)</u>	<ul style="list-style-type: none"> • These are the Eskom standard towers • Cost-effective • Steel monopole is the preferred structure from an avifaunal perspective, and acceptable from a visual perspective
2	<u>Guy line supported steel structures</u>	<ul style="list-style-type: none"> • Small footprint • Not considered preferable for the proposed application due to theft of members and agricultural aversion due to stay wires
3	<u>Self-Supporting steel lattice towers</u>	<ul style="list-style-type: none"> • Not preferred from an avifaunal perspective • Not considered preferable for the proposed application due to possible theft of members and cost
4	<u>Multi-pole structures such as H-towers or K-towers</u>	<ul style="list-style-type: none"> • Not preferred from an avifaunal perspective • Wooden structures are fire hazard and degrade faster • Not considered reasonable or feasible for the

	proposed application
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6.4 The No Development Alternative

The 'No Development' scenario assumes that the proposed development does not proceed, implying a continuation of the *status quo*. It is equivalent to the future baseline scenario in the absence of the proposed development.

Relative to this authorisation, the main implication of the 'No Development' scenario is that the proposed development will not be constructed and the authorised DA2S WEF will not have a suitable route to transfer the electricity generated into the national grid. The result will also include the following:

- There is no change in the current landscape or environmental baseline;
- Would prevent the proposed development from contributing to the environmental, social and economic benefits associated with the development of renewable energy in South Africa;
- The authorised DA2S WEF will not have the authorised infrastructure to transfer the electricity generated to the national grid;
- There is less opportunity for additional employment (albeit temporary) in the local area where job creation is identified as a key priority;
- The local Economic Development benefits associated with the development of the DA2S WEF **and its associated infrastructure's REIPPPP commitments will not be realised**, such as securing local energy production;
- The potential to mitigate climate change impacts on the environment and local species will be limited; and
- The establishment of renewable energy targets on a provincial and national scale will not be realised from this proposed development.

Furthermore, the no-go alternative, as assessed by the avifaunal specialist, is not necessarily the most ecologically attractive alternative with respect to avifauna in the area, as opportunities exist to improve the visibility of existing infrastructure to birds with this proposed development. The no-go alternative is therefore not the preferred alternative from an avifaunal perspective.

Although the no development option is feasible and reasonable considering the already operational wind farm, this is not the preferred option.

6.5 Summary of Alternatives Considered

The 'no-go' alternative is not considered acceptable. The proposed development is located within the Central Strategic Transmission Corridor, Northern Cape Province. The proposed routes are the shortest, most direct and technically feasible route to connect the authorised De Aar 2 South WEF to the national grid. In this landscape, one way of minimising impacts to the environment is to reduce the development footprint and size of the development. This has been done by putting forward the shortest feasible route/s for assessment. Furthermore, the switching station will be in an area within the authorised DA2S WEF site, alongside the authorised collector substation.

The Final Assessed Layout, if approved by the DFFE, will be further developed, through micro siting of pylons and road routes, with the assistance from the relevant specialists.

The applicant is seeking authorisation for all the Infrastructure to provide Eskom with the opportunity to decide which transmission routes and associated infrastructure will be best suited, upon construction, to connect to the either proposed MTS. The grid connection corridors and routes of all other applications in the area must also be considered.

7 DESCRIPTION OF THE PREFERRED ALTERNATIVE SUBMITTED FOR AUTHORISATION

The preferred alternative will consist of a 132 kV transmission line which will connect from the proposed **132 kV switching station to the proposed Vetlaagte or Wag 'n Bietjie MTS**. No alternative road routes are included in this assessment, therefore the assessed road routes are the preferred alternative which is required for access to the switching station and along the transmission line route (Figure 3).

7.1 Construction Phase

7.1.1 Construction of Transmission Line Tower Structures

The type of structures which will support the transmission lines is yet to be determined. The preferred will have a capacity of 132 kV, with a design specification of either steel monopole or steel lattice tower structures with maximum heights of 31 m, and will consist of:

- Concrete Foundations;
- Steel structures;
- Stays and stay wire supports;
- Composite insulators;
- ACSR phase conductors;
- OPGW shield wire;
- Bird diverters and Aviation spheres, if required;
- Service road following the line route;
- Existing access roads and jeep tracks;
- Line and servitude clearances to meet the statutory requirements; and
- 132 kV feeder bay and 132 kV busbar extension at the MTS.

The preferred type of tower is dependent on a variety of factors, including the terrain, cost, conductor size, live line compatibility and required electrical characteristics. Tower type selection will therefore be based on additional on-site investigations during the detailed design phase of the project. Similarly, the foundation size and type will depend on the type of tower selected as well as conditions of the local terrain. Tower steel is typically delivered on a 24-ton truck, or on smaller vehicles in difficult terrain. The tower structures are assembled on the ground and erected on the constructed foundations using an 8-ton crane truck. Following this the transmission lines and conductors are strung from tower to tower. The average span between two 132 kV towers is 200 m but can vary between 150 m and 375 m depending on the terrain and ground profile.

7.1.2 Construction of the Switching Station

The transmission line routes are approximately 20 km – 23 km from the proposed Switching Station. The proposed switching station will have a capacity of 132 kV and will be located on the plateau within the authorised DA2S WEF site, and alongside the authorised on site IPP substation. The switching station will have a maximum footprint of 1 ha (100 m x 100 m) and will be placed within an assessed area (referred to as the “Switching Station Assessment Area”) of approximately 2.8 ha (i.e., approximately 200 m x 140 m).

7.1.3 Establishment of a Servitude

A servitude is by definition “the right to use someone else’s land for a specified purpose”, in this case the right to erect, operate and maintain a transmission line, as well as access rights to carry out these activities. Ownership of the land remains with the original landowner who signs a servitude agreement and keeps overall responsibility for the land.

A topographical survey will be conducted along the preferred alternative to inform the final route, location and design of the tower foundations, pylons and structures. Once the final servitude route has been confirmed construction of the transmission line begins. The servitude is generally cleared of wooded plant species and any protruding alien vegetation to reduce fire risk and prevent shortages with vegetation, in line with the generic Environmental Management Programmes (EMPrs) and Eskom requirements and guidelines.

Although existing roads and tracks will be used as much as possible, access roads for minor vehicles may be created for the construction phase as well as for periodic maintenance, in negotiation with the relevant landowner. Vegetation will be cleared beneath the transmission line to create a two-track servitude "service" road of approximately 5 m in width and 25 km in length for 4x4 vehicles to be able to access and monitor the servitude.

7.1.4 Establishment of Access and Service (Internal) Roads

Access to the servitude will be along existing gravel roads and a proposed road, which will connect from the existing gravel roads to the proposed switching station and then along the transmission line route.

The proposed roads which require authorisation are (1) an approximate 20 - 25 km long and 6 m wide service road, (2) potential upgrades to access roads (existing farm roads), and (3) an approximate 12 km long and 8 m wide access road, with up to 2 m v-drains running on each side, to the switching station. The final road specifications can only be determined during planning and design phase.

7.1.5 Rehabilitation Post Construction

Following the construction of the transmission line, switching station and roads, all areas outside of the servitude and other areas required for maintenance will be rehabilitated in accordance with the EMPr.

7.2 Operational and Decommissioning Phase

The life span of the power line is 50+ years, during which time ongoing maintenance is required. Eskom will be responsible for the operational phase and decommissioning phase of the transmission line and will undertake maintenance in accordance with the EMPr and Eskom Standard for Bush Clearance and Maintenance within Overhead Powerline Servitudes (Eskom 2003) and the Transmission Vegetation Management Guideline (Eskom 2009). The guideline promotes minimising the removal of vegetation other than alien vegetation unless it poses a fire hazard.

The Developer of the DA2S WEF will be responsible for the operational and decommissioning phase of the switching station, access and service roads. Maintenance of these associated infrastructure will be in accordance with the generic EMPrs.

8 DESCRIPTION OF THE BASELINE ENVIRONMENT

This section provides a brief description of the physical, biological, ecological, social, economic and cultural setting in which the proposed development is to be located. The information provided is based on actual studies conducted by specialist consultants and from existing literature and sources which was available for the study area and its surrounds. This baseline will provide the context in which the proposed development will be constructed.

8.1 Regional and Local Context

The Northern Cape is the largest province in South Africa, taking up nearly a third of the **country's land area**. From the **2011 South African Census**⁷, the geographical land area of Northern Cape was presented as 372 889 km² and population calculated a sum of 1 193 780 people. Although the largest province of South Africa, the Northern Cape is the least populous. De Aar, approximately 84.23 km², is the largest town in the Emthanjeni Local Municipality and is the seat of the greater Pixley ka Seme District Municipality. This district is one of five districts in the Northern Cape Province of South Africa. De Aar has an estimated population of around 42,000 inhabitants and is said to be the second-most important railway junction in the country, situated between Cape Town and Kimberley. De Aar is also a primary commercial distribution center for a large area of the central Great Karoo. The majority of the population in this district, 77 % of its 186,351 people speak Afrikaans as first language (2011 Census).

The Northern Cape is home to nearly 50 % of the renewable energy developments in South Africa, especially around the town of De Aar. The proposed development requires authorisation to contribute to the increased social, economic and employment benefits to the local community and enable the DA2S WEF to contribute to the positive increase in **'green energy' in this province (and town)**. The De Aar town is also located within the Renewable Energy Strategic Transmission Corridor, approved by Cabinet on the 17 February 2016, which has been identified as areas where long term electricity grid infrastructure be developed and where an integrated decision-making process for applications for environmental authorisation in terms of NEMA, 1998, will be followed.

The identification of the location of the proposed development was informed by the shortest and most feasible route and location between the authorised DA2S WEF and the proposed substations, and the importance of social and economic development in the town of De Aar. Further consideration was the location of similar infrastructure and least environmental impact, with the proposed routes primarily following existing infrastructure routes where feasible.

The most sensitive receptor may be the N10, which is a national route in South Africa connecting from the Northern Cape Namibian border at Nakop, via Cradock, De Aar and Upington to Port Elizabeth on the Eastern Cape coast. The closest viewpoint to the N10 for the proposed development is the end points towards the proposed substation. The R389 runs parallel with the site in the east, and is more than 6 km from the top of the plateau. This provincial road carries traffic during the day yet is relatively quiet during the night. There are a number of gravel roads traversing the proposed site, mainly used by the farmers in the area. Access to the proposed development will be via the R389 and the proposed access road and via the N10, and the town of De Aar is located to the north-west of the proposed development. View from homesteads in the area has already been impacted by the existing electric infrastructure in the area.

8.2 Climatic Conditions

Climate change is expected to affect the proposed development site over the lifetime of the development; however, the nature, scale and severity of climate change effects are uncertain. Given this uncertainty, the existing environment is assumed to remain constant throughout the lifetime of the development, and forms the current and future baseline for the impact assessments.

Rainfall in the De Aar area peaks in autumn (March) and the mean annual precipitation for De Aar is about 300 mm. Mean maximum and minimum monthly temperatures for De Aar are 37.1°C and -4.8°C for January and July, respectively. Rainfall for South Africa is

⁷ http://www.statssa.gov.za/census/census_2011/census_products/Census_2011_Census_in_brief.pdf

given as 337 mm per annum (The World Bank Climate Change Knowledge Portal, undated).

8.3 Biophysical Characteristics

The proposed development site is currently used for low-intensity grazing and has little potential for other types of land use. Grazing can continue on the site during the construction and operation of the development.

The proposed development is located on level Karoo plains, with low slope gradients, at an altitude of between 1,260 and 1,350 metres (Figure 5 reflects land use within the proposed development area). The dominant soils are shallow, calcareous, sandy loam soils on underlying rock, of the Mispah, Glenrosa and Swartland soil forms. The shallow soil depth, low rainfall and high evapotranspiration limits the agricultural and grazing potential of the site. The underlying geology is comprised of shales, mudstone and sandstone of the Beaufort Group and the Karoo Supergroup, and Dolerite intrusions are frequent. The proposed grid connection routes cross a variety of terrains. The route starts on a large flat mountain plateau which is where the authorised DA2S WEF is located. The plateau rises at least 100 m above the surrounding plains at an altitude of 1,500 metres and is generally flat rocky outcrops and is covered in typical Karoo scrub and grasses. Below the plateau, the grid connection routes traverse a series of flat valley bottoms divided by intrusive dolerite koppies. These flat valley bottoms are almost without exception seasonal river and stream drainages, the largest of which is the Brak River on Carolus Poort 3/3 and here the land is low-lying. There are several non-perennial water courses, typical of arid areas that drain the project area to the north-west.

Land capability is defined as the combination of soil, climate and terrain suitability factors for supporting rain-fed agricultural production. It is an indication of what level and type of agricultural production can sustainably be achieved on any land. The higher land capability classes are suitable as arable land for the production of cultivated crops, while the lower suitability classes are only suitable as non-arable grazing land, or at the lowest extreme, not even suitable for grazing. Values below 8 are generally not suitable for production of any cultivated crop.

Land capability evaluation values range from 1 to 7 across the project area, with the majority of the site falling within the 5 and 6 class range. Agricultural limitations include climatic moisture availability and shallow, stony soils. These factors render the site unsuitable for any kind of mainstream cultivation without irrigation, and limit it to low density grazing only.

The long-term grazing capacity of the site is fairly low at 20 hectares per large stock unit. The development is located within a sheep farming agricultural region and is currently used only for grazing. There is no cultivation across the project area. The only agricultural infrastructure is fencing of grazing camps, wind pumps and stock watering points.

Three broad vegetation types occur in the study area⁸, namely the Northern Upper Karoo (NKu3), Besemkaree Koppies Shrubland (Gh4) and the Southern Karoo Riviere (Azi 6) - which occur in the study area at a scale too small to map. These areas represent the Nama-Karoo and Grassland biomes. Both of these biomes are fairly structurally homogenous, with few notable different habitat categories, such as lowland plains, plateau, rocky ridges and outcrops, and washes and drainage lines vegetation. The Northern Upper Karoo occurs in the lowland areas of the study site while the Besemkaree Koppies Shrubland occurs on the slopes of koppies and covering the tops of tafelbergs.

⁸ <http://redlist.sanbi.org/species.php?species=574-126>.

The Southern Karoo Riviere unit occur predominantly as narrow riverine flats between koppies of the Besemkaree Koppies Shrubland sections of the study area. All of the broad vegetation types present in the study area described above are listed as *Least Threatened* and neither are listed in the National List of Ecosystems that are Threatened and in Need of Protection (GN 1002 2012) published under National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) which lists national vegetation types that are afforded protection based on transformation rates.

The species and habitats found within them are fairly widespread and not unique to the project site. In many of these areas, vegetation is sparser and there are large open eroded and deflated surfaces where archaeological material is often exposed.

The Northern Cape Critical Biodiversity Area (CBA) Map was published in 2016⁹ and it “updates, revises and replaces all older systematic biodiversity plans and associated products for the province”. The Northern Cape CBA map classifies the natural vegetation of the province according to conservation value in decreasing value, as follows:

- Protected Areas;
- Critical Biodiversity Area 1 (Irreplaceable Areas);
- Critical Biodiversity Area 2 (Important Areas);
- Ecological Support Areas; and
- Other Natural Area.

Features within the study area falls within three of these classes (Figure 6), as follows:

- Critical Biodiversity Area 1 and 2 (CBA): The study area crosses a small section of CBA2 area and a small patch of CBA1 area;
- Ecological Support Area (ESA): The whole study area falls within an ESA mostly due to the presence of the large IBA surrounding De Aar.

All vegetation types are largely intact with very little prospect of long-term transformation through agricultural practices, the species and habitats found within them are therefore fairly widespread and not unique to the project site.

8.4 Ecological Characteristics

Fifty plant species that were listed on the Database of Southern Africa (BODATSA) database¹⁰ on the SANBI website¹¹ for the study area and could potentially occur in the study site are protected under the Northern Cape Nature Conservation Act, 2009. From the field surveys, the following species were particularly abundant on the project site: Steekvy (*Ruschia intricata*), Eastern Candelabra (*Brunsvigia radulosa*), Narrow-leaf Cotton Bush (*Gomphocarpus fruticosus*¹²), Krimpsiektebos (*Lessertia annularis*), Sorrel (*Oxalis depressa*) and Cape Saffron (*Jamesbrittenia aurantiaca*). Despite not being threatened, any impacts on these species will require a permit from the relevant authorities. Many of these species are widespread and not of any conservation concern, but protected due to the fact that the Northern Cape Nature Conservation Act, 2009, protects entire families of flowering plants irrespective of whether some members are rare or common.

An area of roughly 50 km around the project site was queried during the desktop study for potential red list plant species of concern. Despite this broad search, there are very few species that were evaluated to be of conservation concern that could potentially occur in the project area. Only a single species, *Euphorbia flanaganii*, which is classified

⁹ Oosthuysen, E. & Holness, S. 2016. Northern Cape Critical Biodiversity Areas (CBA) Map. Department of Environment and Nature Conservation & Nelson Mandela Metropolitan University.

¹⁰ South African National Biodiversity Institute. 2016. Botanical Database of Southern Africa (BODATSA) [dataset]. doi: to be assigned.

¹¹ <http://newposa.sanbi.org/> accessed January 20 2020.

¹² *Gomphocarpus fruticosus* is considered a weed in disturbed habitats and is afforded Provincial Protection because it is a member of the Apocynaceae family.

as Vulnerable was evaluated to be of conservation concern on the BODATSA database search for the area. However, it is the opinion of the specialist that this record may have been a mis-identification of the similar looking *Euphorbia arida*, which is classified as *Least Concern*, given the known distribution of the former species. The potentially endemic *Chasmatophyllum maninum* was listed as Data Deficient. None of the plant species observed on site were listed in any threat category. Similarly, none of the plant species listed on the BODATSA database for the study area or recorded on site were listed as protected by NEMBA. And one tree species, the Shepherd's Tree (*Boscia albitrunca*) is listed to occur in the habitat types present on the study site and is protected under the National Forest Act, 1998. However, this species was not recorded to be present on the study site during the ecological survey.

The overall sensitivity of the vertebrate species that could potentially occur in the project area is considered to be high, based on all threatened (*Critically Endangered*, *Endangered* or *Vulnerable*), near threatened¹³ or important vertebrate species that could occur in the study area and that may have habitat preferences that include habitats available in the study area. However, these species are not likely to be uniformly distributed across the project site and the sensitivity of the majority of the site for vertebrates is considered to be low when the project site is taken into context of the broader area and surrounds. The habitats and microhabitats present on the project site are largely widespread. Active burrows were seen in close proximity to existing power line infrastructure during the site visit, indicating that the presence of these structures did not deter burrowing animals from the site. The overall invertebrate sensitivity of the project area is considered to be low.

8.5 Avifaunal Characteristics

Avifaunal microhabitats occur at a smaller spatial scale than vegetation types and are shaped by factors including vegetation type, topography, land use, food sources and man-made factors (e.g., the introduction of livestock and alien vegetation as well as the construction of infrastructure). Investigation of the project site revealed lowland plains; cultivated vegetation; rivers; drainage lines; dams; rocky ridges; slopes and outcrops; plateaux; and powerlines as bird micro habitats, either on or within approximately 2 km of the project site.

South African Bird Atlas Project 2 (SABAP2) data was examined for the pentads (which are approximately 8 km x 8 km squares) in the study area. A total of 195 species were recorded by SABAP2 which includes 13 species classified as *Endangered*, *Near Threatened* or *Vulnerable* and 25 endemic or near-endemic species (Table 9.1). Due to the relatively few surveys conducted in some of the pentads (indicated by the number of cards submitted) several species which are likely to occur in the area have not been recorded by SABAP, Kori Bustard (*Near Threatened*) which was observed on site during the walk-through is notably absent from the data.

Table 8-1: Red-data and endemic or near-endemic species listed by SABAP2 and as per the Screening Tool's Animal Species Theme

Scientific Name	Common Name	Red List Status	Endemic/Near-Endemic	Source
<i>Aquila rapax</i>	Tawny Eagle	EN		Screening Tool, SABAP2
<i>Neotis ludwigii</i>	Ludwig's Bustard	EN		Screening

¹³ As listed in Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-Mostert HT, editors. The 2016 Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

Scientific Name	Common Name	Red List Status	Endemic/Near-Endemic	Source
				Tool, SABAP2
<i>Polemaetus bellicosus</i>	Martial Eagle	EN		SABAP2
<i>Anthropoides paradelseus</i>	Blue Crane	NT		SABAP2
<i>Anthus crenatus</i>	African Rock Pipit	NT	*	SABAP2
<i>Eupodotis vigorsii</i>	Karoo Korhaan	NT		SABAP2
<i>Phoenicopterus roseus</i>	Greater Flamingo	NT		SABAP2
<i>Rhinoptilus/Smutsornis africanus</i>	Double-Banded Courser	NT		SABAP2
<i>Aquila verreauxii</i>	Verreaux's Eagle	VU		Screening Tool, SABAP2
<i>Ciconia nigra</i>	Black Stork	VU		SABAP2
<i>Cursorius rufus</i>	Burchell's Courser	VU		SABAP2
<i>Falco biarmicus</i>	Lanner Falcon	VU		Screening Tool, SABAP2
<i>Hydroprogne/Sterna caspia</i>	Caspian Tern	VU		Screening Tool
<i>Sagittarius serpentarius</i>	Secretarybird	VU		SABAP2
<i>Buteo rufofuscus</i>	Jackal Buzzard	LC	*	SABAP2
<i>Calendulauda albescens</i>	Karoo Lark	LC	*	SABAP2
<i>Cercomela sinuata</i>	Sickle-Winged Chat	LC	*	SABAP2
<i>Certhilauda semitorquata</i>	Eastern Long-Billed Lark	LC	*	SABAP2
<i>Cinnyris chalybeus</i>	Southern Double-Collared Sunbird	LC	*	SABAP2
<i>Eremomela gregalis</i>	Karoo Eremomela	LC	*	SABAP2
<i>Eremopterix australis</i>	Black-Eared Sparrowlark	LC	*	SABAP2
<i>Eupodotis caerulescens</i>	Blue Korhaan	LC	*	SABAP2
<i>Euryptila subcinnamomea</i>	Cinnamon-Breasted Warbler	LC	*	SABAP2
<i>Galerida magnirostris</i>	Large-Billed Lark	LC	*	SABAP2
<i>Lamprotomis bicolor</i>	Pied Starling	LC	*	SABAP2

Scientific Name	Common Name	Red List Status	Endemic/Near-Endemic	Source
<i>Mirafraga cheniana</i>	Melodious Lark	LC	*	SABAP2
<i>Parus afer</i>	Grey Tit	LC	*	SABAP2
<i>Petrochelidon spilodera</i>	South African Cliff Swallow	LC	*	SABAP2
<i>Ploceus capensis</i>	Cape Weaver	LC	*	SABAP2
<i>Prhragmacia substriata</i>	Namaqua Warbler	LC	*	SABAP2
<i>Prinia maculosa</i>	Karoo Prinia	LC	*	SABAP2
<i>Scleroptila afra</i>	Grey-Winged Francolin	LC	*	SABAP2
<i>Serinus alario</i>	Black-Headed Canary	LC	*	SABAP2
<i>Sigelus silens</i>	Fiscal Flycatcher	LC	*	SABAP2
<i>Stenostira scita</i>	Fairy Flycatcher	LC	*	SABAP2
<i>Sylvia layardi</i>	Layard's Tit-Babbler	LC	*	SABAP2
<i>Turdus smithi</i>	Karoo Thrush	LC	*	SABAP2
<i>Zosterops capensis</i>	Cape White-Eye	LC	*	SABAP2

The entire project site falls within the large Platberg-Karoo Conservancy (ZA028). The conservancy covers the entire districts of De Aar, Philipstown and Hanover in the south-eastern portion of the Northern Cape Province. Although the land in the Important Bird Areas is primarily used for grazing and agriculture, it includes the suburban towns of De Aar, Philipstown, Petrusville and Hanover. This huge area lies in the plains of the central Great Karoo, forming part of the South African plateau and holds important populations of two globally threatened species (Blue Crane and Lesser Kestrel), several biome-restricted species and important populations of other arid-zone birds. Lesser Kestrel have roosts throughout the area, including large roosts (5 000 – 10 000 individuals) in the towns of De Aar, Hanover and Philipstown; they are frequently seen foraging in the conservancy in summer, when close to 10% of the global population of Lesser Kestrels roost in this IBA. Some of the dams are important roosts; during summer 1996/97, more than 850 Blue Crane were counted on a dam in the IBA¹⁴.

The lowland karroid plains are particularly good for Ludwig's Bustard, Kori Bustard and large numbers of Karoo Korhaan, Karoo Lark, Karoo Chat, Tractrac Chat, Sickle-winged Chat, Lark-like Bunting and Karoo Long-billed Lark. In the grassier areas Blue Korhaan are common. Black Harrier are occasionally seen quartering the plains, where huge numbers of Blue Crane regularly congregate. Tawny Eagle and Martian Eagle breed on the power lines in the area. The belts of riverine *Vachellia* (Acacia) woodland support **Namaqua Warbler, Layard's Tit-babbler** and Grey Tit. Pale-winged Starling and African Rock Pipit occur in rocky gorges and kloofs. Other arid-zone species occurring within the conservancy are Pale Chanting Goshawk, Pirit Batis, Fairy Flycatcher and White-throated Canary.

Collision (and electrocution) impacts with the existing power lines in the district have been identified as a high threat to large terrestrial birds such as cranes, bustards, and

¹⁴ <http://datazone.birdlife.org/site/factsheet/platberg-karoo-conservancy-iba-south-africa/text>

raptors. Power lines can, however, also be beneficial to large raptors such as Martial Eagle which prefer to breed on pylons in areas where large trees are uncommon.

Chris van Rooyen Consulting conducted an Avifaunal Impact Assessment Study in 2014 on the Longyuan Mulilo De Aar 2 North (Pty) Ltd 132 kV overhead power line to connect the Longyuan Mulilo De Aar 2 North Wind Energy Facility (DFFE Ref. No. 12/12/20/2463/2) to the national transmission grid via Hydra Substation. This proposed power line routes assessed in this study runs adjacent to the power line assessed by van Rooyen (2014) for approximately 12 km. van Rooyen (2014) identified 11 Red Data species that could potentially occur in the area, and concluded that mitigation risks **associated with collisions and habitat destruction would be low. A number of Verreaux's Eagle nests that occur in the study area were mapped by van Rooyen (2014) including a nest on a cliff within 500 m of the proposed power line route assessed in this study (Figure 7).** WildSkies Ecological Services conducted an Avifaunal Impact Assessment Study on the Castle Wind Energy Facility directly adjacent to the land portions relevant to this study. Smallie (2014) scored the risk of the WEF for 15 target species (including Egyptian Goose) but also observed several notable species on site including Lanner Falcon, Amur Falcon, Secretarybird, Booted Eagle and Black-chested Snake Eagle. In discussing the mitigation of the grid connection, Smallie (2014) recommended that power line infrastructure be built to the east of the existing Eskom Hydra Roodekuil 220kV power line, and that the line will need to conform to all Eskom standards in terms of bird friendly pole monopole structures with Bird Perches on every pole-top (to mitigate for bird electrocution), and anti-bird collision line marking devices (to mitigate for bird collision) on the earth wires of high risk sections. Applicable mitigation measures included in these studies have been included in the avifauna assessment.

Powerline mortality data from around De Aar were obtained from the EWT to determine which species have suffered mortalities as a result of electrical distribution infrastructure in the area. The data received was collected between 2001 and 2018 and included **collision mortality incidents of Ludwig's Bustard, Kori Bustard, Blue Crane, Verreaux's Eagle and an Unknown Flamingo. Electrocution mortalities included Verreaux's Eagle, Cape Eagle-owl, Lanner Falcon and Pale-chanting Goshawk.**

Records of mortalities associated with the expansive stretches of transmission lines from the Hydra substation between 2008 and 2016 revealed that the top ten affected species by transmission lines in the larger area included Ludwig's Bustard, Blue Crane, Northern Black Korhaan, unidentified sp., White Stork, Pied Crow, Secretarybird, Kori Bustard, Karoo Korhaan and Blue Korhaan. No calculations regarding mortalities per km or per year were performed as the data covers a number of years include power lines which cross areas that may pose a greater risk to birds and the numbers may therefore be misleading. These data were nevertheless useful to assist in the identification of species, including the **Ludwig's Bustard, Kori Bustard, Karoo Korhaan, Northern Black Korhaan, Secretarybird and Verreaux's Eagle**, shown to be at risk in the area.

A single 300 m **High Sensitivity 'no-go' buffer was identified surrounding an active Verreaux's Eagle Nest. The nest was observed on the cliffs (-30.595564, 24.265331) near the existing transmission line during the site visit, and is assumed to still be in use as an adult pair of Verreaux's Eagle was seen perched on the pylon nearest the nest,** however, successful breeding at the nest site during the previous season (i.e., winter 2019) could not be confirmed.

Focal species were earmarked for this study by identifying species most likely to be negatively affected by the proposed development. In general, large, heavy flying birds are more vulnerable to collision with overhead power lines, while perching raptors and storks are more vulnerable to electrocution. Smaller passerines are more likely to be impacted upon through habitat destruction and disturbance. Focal species likely to be

impacted is: **Ludwig’s Bustard** (*Endangered*), Martial Eagle (*Endangered*), Tawny Eagle (*Endangered*), **Verreaux’s Eagle** (*Vulnerable*), Lanner Falcon (*Vulnerable*), Black Stork (*Vulnerable*), Secretarybird (*Vulnerable*), Great White Pelican (*Vulnerable*), **Burchell’s Courser** (*Vulnerable*), Blue Crane (*Near Threatened*), Kori Bustard (*Near Threatened*), Karoo Korhaan (*Near Threatened*), Greater Flamingo (*Near Threatened*), African Rock Pipit (*Near Threatened*), Double-banded Courser (*Near Threatened*), White Stork (*Bonn Convention*) and South African Shelduck. In some cases, these species serve as surrogates for other similar species (as mitigation will be effective for both) such as the Greater Flamingo for Lesser Flamingo, Lanner Falcon for Amur Falcon, South African Shelduck for other geese and ducks and the various eagles for Osprey (*Bonn Convention*).

8.6 Rivers, Watercourses and National Freshwater Ecosystems Priority Areas

The proposed development occurs within the D62D quaternary catchment of the Brak River, in the Nama Karoo Ecoregion. Thus, permanent rivers and wetlands are limited mostly to mainstem rivers that typically only flow during extended periods of rainfall. The geology is mostly Dwyka / Ecca shales overlaid with shallow sandy soils that drain well. This typically allows for the development of broad alluvial floodplains, interspersed by rocky inselbergs and small mountain ranges. These features concentrate flows into the lower portions of the catchment, and have allowed for the development of *Juncus rigidus* dominated wetlands in some areas. Both channelled and unchannelled valley bottom wetland types occur within the region, but only one such area is located within 500 m of the proposed alignment. No wetlands were observed along the proposed access road or near the substation, the proposed access road will however, cross 21 small watercourses.

The National Wetland Inventory v5.2 spatial data (NWI), also indicated a Pan / depression, located more than 2 km from the edge of the study area. However, the large scale riverine floodplain was confirmed to be alluvial systems, and not wetlands as indicated in the NWI.

The Present Ecological State (PES) of a river represents the extent to which it has changed from near pristine condition (Category A) towards a highly impacted system where there has been an extensive loss of natural habit and biota, as well as ecosystem functioning (Category E). The PES scores have been revised for the country and based on the current models, aspects of functional importance as well as direct and indirect impacts have been included (DHSWS, 2014). The current PES system also incorporates Ecological Importance (EI) and Ecological Sensitivity (ES) separately as opposed to Ecological Importance and Sensitivity (EIS) in the old model, although the new model is still heavily centered on rating rivers using broad fish, invertebrate, riparian vegetation and water quality indicators. The Recommended Ecological Category (REC) is still contained within the updated models, with the default REC being B, when little or no information is available to assess the system or when only one of the above-mentioned parameters are assessed or the overall PES is rated between a C or D.

The Present Ecological State scores (PES) for the main watercourses in the study area were rated as follows (DHSWS, 2014 – where B = Largely Natural and C = Moderately Modified):

Subquaternary Catchment Number	Present Ecological State	Ecological Importance	Ecological Sensitivity
5332	B	Low	Low
5391	C	Moderate	Low

In terms of the National Freshwater Ecosystems Priority Areas (NFEPA) assessment, all the watercourses within the site (Figure 7) have been assigned a condition score of B (Nel et al. 2011), indicating that they are largely intact and have biological significance. These scores were substantiated by observations made in the field within the study area, and due to the overall lack of impacts or disturbance these scores for each of the watercourses within the site should be upheld. The National Freshwater Ecosystems Priority Areas (NFEPA) (Nel *et al.*, 2011), also earmarked sub-quaternaries, based either on the presence of important biota (e.g. rare or endemic fish species) or conversely the degree of riverine degradation, i.e. the greater the catchment degradation the lower the priority to conserve the catchment. The important catchments areas are then classified as Freshwater Ecosystems Priority Areas (FEPAs).

The survey area falls within an Upstream FEPA, associated with the Brak River, although no permanent fish habitat occurs within the proposed site, this catchment is important for the provision and maintenance of flows within the lower catchments, that do contain important, fish, amphibian and invertebrate habitats with permanent water. This was further substantiated by the inclusion of study area catchments into Critical Biodiversity Areas (Type 1 and 2), i.e., the wetland areas near the alignment crossing the Brak River in particular and Ecological Support Area. It should also be noted that the proposed access road will cross a CBA 1 watercourse, however during the field assessment it was determined that the actual crossing, will not occur near any wetlands, and is located within a disturbed area of the alluvial system, with limited riparian vegetation, as well as within an area with large scale hydrological disturbance.

8.7 Heritage, Archaeology, and Palaeontology

8.7.1 Palaeontology

The area traversed by the transmission line routes, access road and switching station, crosses a range of geological rock and sediment types and almost the full range of palaeontological sensitivities described on the SAHRIS¹⁵ palaeomap. The dolerite contains no fossils because they do not occur in intrusive, volcanic rock. Furthermore, when igneous dykes intrude through the overlying sediments, they tend to physically destroy any fossils in their paths and the heat they generate can destroy or alter fossils in the vicinity. The dolerites have a zero palaeontological sensitivity.

The Quaternary sands in the water courses are young enough to preserve fossils but having been washed down slopes and streams into rivers, any fossils would have been transported from their sites of origin and their context and associations with other fossil material in the assemblage will have been lost. These sediments are indicated as moderately sensitive by SAHRIS.

In contrast, the Ecca and Beaufort shales are much more likely to preserve fossils and many years of research by geologists and palaeontologists in the Karoo (for example, Rubidge, 1995, 2005; Johnson et al., 2006; Rubidge et al., 2016) has produced a detailed lithology and described the terrestrial flora and vertebrate fauna of these rocks. From this and other parts of the Karoo the Tierberg Formation has produced a number of trace fossils of worm burrows, root casts and invertebrate trackways (van Dijk et al., 2002; Almond, 2013). Fossil plants are rare in this part of the Karoo basin but there are records of fragments of silicified wood from east of De Aar (Almond, 2013).

The Adelaide Subgroup, undifferentiated in this area, can be divided into the Abrahamskraal or Koonap Formations and the Teekloof or Middleton and Balfour Formations. Expected vertebrate fossils are a variety of dinocephaleans, gorgons and

¹⁵ Online heritage management tool provided by SAHRA

therocephaleans and some fish but according to Almond's site surveys (Almond 2012a, 2012b, 2012c), vertebrate fossils are rare as there is little exposure.

Potential fossil plants are typical Permian impressions of *Glossopteris* leaves, lycopods, sphenophytes and ferns, and silicified wood (Anderson and Anderson, 1085). Only fossil wood has been seen in the Adelaide Subgroup in this area (Almond, 2012a). The samples have not been collected or identified.

8.7.2 Heritage and Archaeology

No Early Stone Age (ESA) was identified during site visits or in desk-top study surveys. A large number of pre-colonial archaeological sites and lithic scatters were documented within the proposed development area, but only a handful of occurrences of colonial period archaeological material or structures. No historical buildings were recorded. The closest farm werf to the proposed transmission line routes is Slingshoek, which is a little less than a kilometre distant, on the far side of an existing powerline. The archaeological finds include Middle and Late Stone Age archaeological material, possible historic period stone structures and Khoikhoi stone kraal complexes. The Late Stone Age (LSA) artefact assemblages encountered are all made on hornfels, with occasional isolated pieces of other raw materials such as agate, a yellow mudstone, and a banded, indurated shale noted on a few sites

8.8 Cultural Landscape

The proposed development traverses a cultural landscape of clear significance to a succession of pre-colonial and, to a lesser degree, colonial people, as demonstrated by the presence of the widespread archaeological sites and materials described in detail in the Heritage Impact Assessment Report (HIA – Volume II). This cultural landscape is essentially a series of layers of occupation and use by our ancestors that have become superimposed on the land surface. And the land surface itself, while not cultural, is nevertheless of heritage value as a vast palaeontological repository.

Early, Middle and Later Stone age people left cultural debris on the land surface – stone tool scatters, engravings, kraals, etc., – spanning at least half a million years. More recently, the landscape received the imprint of the European colonisation of the region as it was used and then settled by colonial Trekboers who imposed their structure on the land in the form of farm buildings, dams and fence alignments. Most recently, has been the introduction of modern industrial elements such as railway tracks and electrical infrastructure into the landscape.

8.9 Social Context

The proposed development is located within the Emthanjeni Local Municipality Non-Urban Area, and is situated approximately 15 - 26 km east of the town of De Aar. The demographic data pertaining to the local municipality from Census 2011, is indicated in Table 9.2 below.

Table 8-2: Demographic data of the Emathanjeni Local Municipality Non-Urban Area

Geographic area	13,471.96 km ²
Population	42,356 people
Population density	3.14 per km ²
Households	10,457
Household density	0.78 per km ²

Gender	People	Percentage
Male	20,722	48.92%
Female	21,634	51.08%
Population	People	Percentage
Coloured	24,436	57.69%
Black African	14,059	33.19%
White	3,388	8.00%
Other	237	0.56%
Indian or Asian	236	0.56%

The dependency ratio is calculated by adding together the percentage of children (aged under 15 years) and the older population (aged 65+), dividing the percentage by the working-age population (aged 15 - 64 years) and multiplying that percentage by 100. For the Emthanjeni Local Municipality the dependency ratio in 2011 was 47.3, and was higher in 2001 at 60.1. Between 2001 and 2011 the population of the Pixley Ka Seme District Municipality increased from 186 351 to 195 595, of that, the Emthanjeni Local Municipality contributed an increase with 45 404 in 2011 compared to a total population of 42 356 in 2001.

The main economic sectors of the municipality are community services (36%), transport (24%), finance (13%), trade (11%), agriculture (7%), electricity (4%), manufacturing (3%), and construction (2%).

9 PUBLIC PARTICIPATION PROCESS

Public participation is an essential part of the EIA process. Community involvement and participation during the process assists the applicant and the EAP to consider alternative layouts, specific environmental sensitivities that may have been overlooked or not considered during the assessment process. To this end the EAP has ensured that the prescribed legislative requirements have been taken into consideration and applied.

The Public Participation Process (PPP) follows the requirements of Section 24 (5) and Chapter 6 (41, 42, 43, and 44) of GN R. 326 of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) Environmental Impact Assessment (EIA) Regulations, 2014 (as amended), as well as the Public Participation Guidelines in terms of NEMA, 1998 EIA Regulations, 2014.

The primary aims and the focus of this public participation process is:

- To inform Interested and Affected Parties (I&APs) of the proposed development;
- To identify issues, comments and concerns as raised by I&APs;
- To promote transparency and an understanding of the project and its potential consequences;
- To facilitate open dialogue and liaise with all I&APs;
- To assist in identifying potential environmental (biophysical and socio-economic) impacts associated with the proposed development; and
- To ensure that all I&AP issues and comments are accurately recorded, addressed and documented in a Comments & Response Report.

The latest I&AP database of the authorised DA2S WEF and the De Aar 2 South Grid Connection was used as the baseline for this BA report. This database is extensive and has been compiled and revised over a number of years since 2011, and most recently

updated and revised as part of this Basic Assessment Public Participation Process. As part of the Initial Notification, notices were placed in the Echo and Northern Cape Bulletin newspapers; site and posters notices were erected in the town of De Aar and e-mail notifications were sent to pre-identified I&APs (Appendix C).

Notification letters via email and registered mail will be sent to all I&APs informing them of the availability of the Draft BA Report for review and comment. The report will be made available for public viewing at the De Aar Public Library in the town of De Aar as a hard copy. Additionally, the report will be made available digitally on the Arcus website (www.arcusconsulting.co.za/projects). The draft BA Report will be made available for public review and comment for the required 30-day period.

Registration of I&APs will continue throughout the process, and the I&AP database will be updated accordingly based on comments received.

During the initial notification phase, no comments / queries / questions / concerns were received from I&APs. Responses to comments received during the PP period will be provided in a Table, with EAP / specialist / applicant responses and appended to the PP report which will be submitted with the Final BAR for DFFE decision.

10 ASSESSMENT OF POTENTIAL IMPACTS

The focus and defining question of each potential impact assessment is to determine to what extent a proposed development will compromise (negative impacts) or enhance (positive impacts) current and/or future production of the baseline environment. The significance of an impact is therefore a direct function of the degree to which that impact will affect current or future production of the baseline environment.

This chapter describes the potential impacts assessed during each phase of the development. A table which shows the potential impacts which specialists assessed for each phase is included in the Executive Summary.

10.1 Agriculture and Soil

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. Further to the assessment of this impact, the proposed infrastructure has insignificant agricultural impact for the following 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, including a service track below the lines, is insignificantly small within an agricultural environment of large farms with low density grazing;
- The area of land affected by the switching station (1 hectare) and road (9.6 hectares) are entirely insignificant in the agricultural environment of large farms with low intensity grazing; and
- The affected land was assessed to have very limited agricultural production potential.

10.1.1 Construction, Operation and Decommission

Impact Phase: All Phases
Potential impact description: Change to the future agricultural production potential of the land The only sources of impact are minimal occupation of the land and minimal disturbance to the land

(erosion and topsoil loss) during construction (and decommissioning).							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	L	Negative	L	L	H
With Mitigation	L	H	L	Negative	L	L	H
Can the impact be reversed?			n/a				
Will impact cause irreplaceable loss or resources?			No				
Can impact be avoided, managed or mitigated?			Yes – refer to mitigations below				
Mitigation measures to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> Follow mitigation measures as stipulated in the generic EMPr. Storm water management plan (included in the generic EMPr) must be in place to prevent erosion during all phases of the development. 							

10.2 Freshwater and Wetlands (Aquatics)

The following direct impacts were assessed with regard to the riparian areas and watercourses based on the proposed development:

- Impact 1: Loss of riparian systems and disturbance of the alluvial watercourses
- Impact 2: Impact on aquatic systems through the possible increase in surface water runoff on riparian/wetland form and function
- Impact 3: Increase in sedimentation and erosion
- Impact 4: Potential impact on localised surface water quality
- Impact 5: Cumulative impacts for the overall project due to the high number of projects surrounding this application

The following impacts were not assessed as these were found not applicable:

- Loss of species of special concern
- Loss of any wetlands

The potential impact on aquatic species of special concern was not assessed, as no listed or protected species were observed during the assessment. Similarly, the loss of any natural wetlands did not require assessment as the only system observed could be avoided by the strategic placement of towers and no new road crossing must be allowed inclusive of the buffer – access can be gained from access roads to the upstream dam.

10.2.1 Construction and Decommissioning Phases

Impact Phase: Construction and Decommissioning Phases
<p>Potential impact description: Loss of riparian system, wetlands and disturbance of the alluvial watercourses</p> <p>Should any of the proposed structures associated with the transmission lines be placed within the delineated watercourse, a physical loss of associated vegetation as well damage to the bed and banks of the observed systems could occur. Although true aquatic obligate vegetation was seldom seen, any disturbance of these areas could result in disturbance of the systems resulting in erosion / sedimentation, loss of habitat and corridor (Critical Biodiversity Areas & Ecological Support Area) fragmentation. This is particular true for the proposed access road, that will need to cross several small watercourses and a broader alluvial system (CBA 1).</p> <p>These disturbances will be the greatest during the construction and again in the decommissioning phases as the related disturbances could result in loss and/or damaged vegetation, while to a lesser degree in the operation phase (i.e., as and when maintenance occurs).</p>

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	M	Negative	M	M	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?	Yes, through removal of hard surfaces and careful reinstatement of natural ground levels coupled to revegetation.						
Will impact cause irreplaceable loss or resources?	No, significant water courses remain within the greater catchment.						
Can impact be avoided, managed or mitigated?	Yes, refer to mitigations below.						
<p>Mitigation measures to reduce residual risk or enhance opportunities:</p> <ul style="list-style-type: none"> • A pre-construction walkthrough or desk assessment by an aquatic specialist is recommended and they can assist with the development of the Stormwater Management Plan and Aquatic Rehabilitation and Monitoring plan (included in the generic EMPr), coupled with micro-siting of the final tower layout and access road as required. • The planning of the final layout should consider the aquatic sensitivity areas, to avoid these areas or where access is required, cross such areas using existing tracks / roads or where the impacts would be low or can easily be mitigated. If possible, the access road should be adjusted to follow one of the several existing tracks, to minimize the impacts, but is located in an area with a number of existing hydrological disturbances. • Due to the broad nature of the alluvial systems, towers would need to be placed in some of these areas, but it is recommended that no new permanent tracks to access these areas are created. • Vegetation clearing, where required, should occur in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment. • It is advised that an Environmental Control Officer (ECO), with a good understanding of the local flora be appointed during the construction phase. The ECO should be able to make clear recommendations with regards to the re-vegetation of the newly completed / disturbed areas within aquatic environment, using selected species detailed in this report. • All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints and especially in areas near the proposed crossings. Prosopis (alien invasive riparian tree) is prevalent in areas to the north of the site, thus care in transporting any material, while ensuring that such materials is free of alien seed, coupled with pre and post alien clearing must be stipulated in the generic EMPrs. 							

10.2.2 Operation and Decommissioning Phases

Impact Phase: Operation and Decommissioning							
<p>Potential impact description: Impact on aquatic systems through the possible increase in surface water runoff on downstream riparian form and function, due to impacts to the hydrological regime such as alteration of surface run-off patterns.</p> <p>When any of the hard or compacted surfaces (roads or substation areas) increase the volume and velocity of the surface runoff increases. This could impact the hydrological regime through the increase in flows that are concentrated in area, and as most plants are drought tolerant an increase in water will allow for other species to develop and outcompete typical plant species found within the region. This then affects the structure (i.e. larger taller grasses / shrubs / trees) and function (greater attenuation of flows, restricting any runoff from reaching downstream areas). The opposite can also happen. If flows are too concentrated with high velocities, scour and erosion results, with a complete reduction or disturbance of riparian habitat.</p>							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	M	Negative	M	M	H

With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?		Yes, through removal of hard surfaces and careful reinstatement of natural ground levels coupled to revegetation.					
Will impact cause irreplaceable loss or resources?		No, significant water courses remain within the greater catchment.					
Can impact be avoided, managed or mitigated?		Yes, refer to mitigations below.					
Mitigation measures to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> Any stormwater within the site must be handled in a suitable manner, i.e., trap sediments, and reduce flow velocities. No stormwater runoff must be allowed to discharge directly into any water course along roads, and flows should thus be allowed to dissipate over a broad area covered by natural vegetation. Stormwater in the switching station must be managed using appropriate channels and swales when located within steep areas or have steep embankments. 							

10.2.3 Construction, Operation and Decommissioning Phase

Impact Phase: All Phases							
Potential impact description: Increase in sedimentation and erosion within the development footprint							
Impacts include changes to the hydrological regime such as alteration of surface run-off patterns, runoff velocities and or volumes which could occur during the construction, operational and decommissioning phases.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	M	Negative	M	M	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?		Yes, through removal of hard surfaces and careful reinstatement of natural ground levels coupled to revegetation.					
Will impact cause irreplaceable loss or resources?		No, significant water courses remain within the greater catchment.					
Can impact be avoided, managed or mitigated?		Yes, refer to mitigations below.					
Mitigation measures to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> Any stormwater within the site must be handled in a suitable manner, i.e., trap sediments and reduce flow velocities. Any management actions must be dealt with in the Stormwater Management Plan (SWMP), forming part of any Water Use License Application, to the Department of Human Settlement, Water and Sanitation (DHSWS). 							

Impact Phase: All Phases							
Potential impact description: Impact on localised surface water quality							
During construction / decommissioning and to a limited degree the operational activities, chemical pollutants (hydrocarbons from equipment and vehicles, cleaning fluids, cement powder, wet cement, shutter-oil, etc.) associated with site-clearing machinery and construction or maintenance activities could be washed downslope via the ephemeral systems.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence

Without Mitigation	M	M	M	Negative	M	L	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?		Yes, through typical measures associated with the cleanup of spills.					
Will impact cause irreplaceable loss or resources?		No, due to limited flows within these systems.					
Can impact be avoided, managed or mitigated?		Yes, see mitigations below.					
<p>Mitigation measures to reduce residual risk or enhance opportunities:</p> <ul style="list-style-type: none"> • Strict use and management of all hazardous materials used on site in line with the specific material safety data sheets, e.g., fuels must be stored within a contained / bunded site with the necessary and spill kits available. • Strict management of potential sources of pollution (e.g., litter, hydrocarbons from vehicles & machinery, cement during construction, etc.). • Containment of all contaminated water by means of careful run-off management on the development site. • Appropriate ablation facilities should be provided for construction workers during construction and on-site staff during the operation of the facility. • Strict control over the behaviour of construction workers, with regard littering, use and storage of chemicals. • Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the generic EMPs for the project and strictly enforced. 							

10.3 Terrestrial Biodiversity and Plants

Potential impacts on the terrestrial plant species of the study area include the following (impacts assessed by other specialists, e.g. on birds and on hydrological function are not included here):

- Impacts on biodiversity: Any impacts on populations of species of concern and on overall species richness, genetic variability, population dynamics and habitats important for species of concern;
- Impacts on sensitive habitats: Impacts on any sensitive or protected habitats, including indigenous grassland and wetland vegetation that leads to direct or indirect loss of such habitat;
- Impacts on threatened ecosystems: Any impacts on threatened or protected ecosystems, critical biodiversity areas, areas of high biodiversity and centres of endemism;
- Impacts on ecosystem functions: Any impacts on processes or factors that maintain ecosystem health and character, including the following:
 - Habitat fragmentation;
 - Disruption to ecological corridors;
 - Changes to abiotic environmental conditions, including accelerated erosion and associated loss of topsoil nutrients, - soil seed banks and -permeability;
 - Changes to disturbance regimes, e.g., increased or decreased incidence of fire;
 - Disruption to nutrient-flow dynamics;
 - Impedance of movement of material or water;
 - Changes to successional processes; and
 - Increased invasion by alien plants.
- Cumulative impacts: this includes an assessment of the impacts of the proposed project taken in combination with the impacts of other known projects for the area or

secondary impacts that may arise from changes in the social, economic or ecological environment.

10.3.1 Construction Phase

Construction phase impacts for this project will include the following:

- Loss and/or fragmentation of indigenous natural vegetation due to clearing;
- Loss of individuals of plant species of conservation concern and/or protected plants;
- Contamination of the environment by construction vehicles and machinery; and
- With the current access road route, impact on niche habitats more than the alternative of aligning it with existing roads; and
- Runoff and erosion due to the presence of hard surfaces that change the infiltration and runoff properties of the landscape.

All three vegetation types on the project site are classified nationally as *Least Threatened*. Two of the three (Northern Upper Karoo and Besemkaree Koppies Shrubland), are largely contiguous and cover extensive areas, the probability that the clearing associated with the proposed development will contribute to fragmentation or have a negative impact on the long-term viability and persistence in these areas is low. Therefore, the impact significance is low following mitigation measures such as the avoidance of areas of elevated sensitivity and maximized utilisation of existing servitudes. The smaller azonal vegetation unit (Southern Karoo Riviere) represent a niche habitat that contributes significantly to biodiversity. To ensure a relatively low impact of the proposed access road, sensitive areas should be avoided through mitigation measures. The proposed access road will fragment habitats and impact the long term viability and persistence of plant diversity, if avoidance is not possible it is encouraged that existing roads be upgraded and maintained to avoid/reduce impact to habitats.

Impact Phase: Construction Phase							
Potential impact description: Loss of fragmentation of indigenous natural vegetation.							
Impact on vegetation through the destruction of plants from construction activities, some areas cleared for permanent infrastructure will persist for the long-term. Power line tower structures will affect relatively small, localised areas of vegetation. Access roads may affect slightly larger areas, however as the proposed route is immediately adjacent to an existing powerline and the existing access road infrastructure can be utilised to reduce this impact. The switching station will result in the clearing of an area of up to 100mx100m.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	H	Negative	M	L	H
With Mitigation	L	H	M	Negative	L	L	H
Can the impact be reversed?		No. Some long-term loss of vegetation is likely.					
Will impact cause irreplaceable loss or resources?		No. The vegetation is widespread in the area and the size of the project footprint is comparatively low.					
Can impact be avoided, managed or mitigated?		Partly. Some residual impact is likely, however the intensity of the impact can be reduced through mitigation.					
Mitigation measures to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> • Avoid clearing of any riparian vegetation as far as possible. • Stay clear of any indigenous trees. • Pylon tower footprints (including construction and maintenance tracks) to be constructed outside of HIGH sensitivity areas (although the line spans may cross these areas); • Preconstruction walk-through or desk assessment of the power line development footprints (pylon bases, new servitudes, lay-down areas and temporary infrastructure) and access road once 							

- finalised for micro-siting to ensure that sensitive habitats are avoided where possible;
- Ensure that lay-down and other temporary infrastructure are within LOW sensitivity areas;
 - Minimise the development footprint as far as possible and rehabilitate disturbed areas that are not required by the operational phase of the development;
 - Utilize existing servitudes and access roads wherever possible, any new roads or the upgrading of roads should be minimized as far as possible and not be larger than required;
 - All construction vehicles should adhere to clearly defined and demarcated roads, no off-road driving should be allowed;
 - Ensure that sufficient erosion control measures are constructed on all servitudes and access roads in the project area, including where such crosses seasonal drainages;
 - Rehabilitate existing servitude and access roads in the project area with sufficient erosion control measures to prevent the loss of soil and the degradation of vegetation;
 - An environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes topics such as avoiding fire hazards, no littering, appropriate handling of pollution and chemical spills, minimizing wildlife interactions, remaining within demarcated construction areas, avoidance of no-go areas and sensitive habitats (i.e. wetlands);
 - Demarcate sensitive areas in close proximity to the development footprint as no-go areas with construction tape or similar and clearly marked as no-go areas;
 - No open fires should be permitted outside of designated areas; and
 - Construction activities in or near drainage lines, washes or temporary inundated depressions (as indicated by MEDIUM sensitivity areas on the map) must only take place during the dry season.

None of the plant species recorded on site were listed as protected by NEMBA. However, several species identified on the project site are protected under the Northern Cape Nature Conservation Act 9 of 2009. **One tree species, the Shepherd's Tree is protected** under the National Forest Act, 1998. However, this species was not recorded to be present on the study site during the ecological survey. While the loss of some individuals of protected plants is possible, the probability that the loss of some individuals will have a significant negative impact on the viability or persistence of species in the area is low. This is because many of the species are locally common and widespread, with vegetation types in the area largely intact. As such, this impact is considered to be of low significance following the implementation of mitigation measures such as maximizing the utilisation of existing servitudes.

Impact Phase: Construction Phase							
Potential impact description: Loss of individuals of threatened or protected plant species.							
Loss or damage of threatened or protected plant species through construction activities. The illegal collecting of plant species may increase if access to the site is increased during construction activities.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	H	Negative	M	L	H
With Mitigation	L	H	M	Negative	L	L	H
Can the impact be reversed?			No. Some permanent loss of plants is likely.				
Will impact cause irreplaceable loss or resources?			No. The species are widespread in the area and the size of the project footprint is comparatively low.				
Can impact be avoided, managed or mitigated?			Yes.				
Mitigation measures to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> • Preconstruction walk-through or desk assessment of the power line development footprints (pylon bases, new servitudes, lay-down areas and temporary infrastructure) once finalised for micro-siting to ensure that protected species are avoided where possible; • A qualified specialist must compile a comprehensive species list of plants that may be cut, chopped, 							

- uprooted, broken, damaged or destroyed and obtain relevant permits for these restricted activities;
- Utilize existing servitudes and access roads wherever possible, any new roads or the upgrading of roads should be minimized as far as possible and not be larger than required;
- All construction vehicles should adhere to clearly defined and demarcated roads, no off-road driving should be allowed;
- Site access should be controlled and no unauthorised persons should be allowed onto the site;
- The collection or harvesting of any plants at the site should be strictly forbidden;
- Personnel should not be allowed to wander off the demarcated construction site; and
- An environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to.

Disturbance created during construction would leave the disturbed areas vulnerable to soil erosion. Consequently, specific measures such as erosion berms and water dispersion features will be required along the power line access roads and servitudes. Although this impact has a moderate significance before mitigation, it can be effectively mitigated against through the maximum use of existing access roads and servitudes and the implementation of erosion control measures. The significance of this impact after the implementation of mitigation measures is therefore considered to be low.

Impact Phase: Construction Phase							
Potential impact description: Soil Erosion Risk. Following construction, the site will be vulnerable to soil erosion.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	M	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?			No. Once erosion takes place some irreversible damage occurs.				
Will impact cause irreplaceable loss or resources?			Yes. Without mitigation the loss of topsoil would result in an irreversible loss of resources.				
Can impact be avoided, managed or mitigated?			Yes. Erosion control measures can be very effective.				
Mitigation measures to reduce residual risk or enhance opportunities: <ul style="list-style-type: none"> • Erosion management at the site should take place according to the Erosion Management Plan included in the generic EMPr; • All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate energy in the water stream which may pose an erosion risk; • At all drainage line/river crossing, erosion control (reno mattresses) need to be installed downstream of the crossing to prevent back-cutting. In the case where the road surface needs to be elevated above the flood line, box culverts should be installed, being wider than the actual drainage line. Other types of culvert (e.g. round pipe culverts) <u>that could potentially concentrate flows may not be installed.</u> • Existing servitudes and access roads along the existing, adjacent power line must be utilised wherever possible; • Existing servitudes and access roads along the existing, adjacent power line must be upgraded with appropriate and effective erosion control measures; and • Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance. 							

Impact Phase: Construction
Potential impact description: Impact on the proposed access road Impact on vegetation through the destruction of plants from construction activities, some areas cleared for permanent infrastructure will persist for the long-term. The illegal collecting of plant species may increase if access to the site is increased during construction activities. As the road crosses several

niche habitats it could compromise site biodiversity and impacting on SCC with restricted habitat distributions.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	H	Negative	H	L	H
With Mitigation	L	H	M	Negative	L	L	H
Can the impact be reversed?		No. Some long-term loss of vegetation is likely.					
Will impact cause irreplaceable loss or resources?		Potentially yes as the proposed routes crosses over several niche habitats that contribute to the overall biodiversity of the site, and represents microhabitats for SCC.					
Can impact be avoided, managed or mitigated?		Partly. Some residual impact is likely, however the intensity of the impact can be reduced through mitigation.					
Mitigation measures to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> • Avoid clearing of any riparian vegetation as far as possible. • Stay clear of any indigenous trees. • Preconstruction walk-through or desk assessment of the access road once finalised for micro-siting to ensure that sensitive habitats are avoided where possible; • Minimise the development footprint as far as possible and rehabilitate disturbed areas that are not required by the operational phase of the development; • All construction vehicles should adhere to clearly defined and demarcated roads, no off-road driving should be allowed; • Ensure that sufficient erosion control measures are constructed on the access road including where it crosses seasonal drainages; • An environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes topics such as avoiding fire hazards, no littering, appropriate handling of pollution and chemical spills, minimizing wildlife interactions, remaining within demarcated construction areas, avoidance of no-go areas and sensitive habitats (i.e. wetlands); • Demarcate sensitive areas in close proximity to the development footprint as no-go areas with construction tape or similar and clearly marked as no-go areas; • No open fires should be permitted outside of designated areas; • Construction activities in or near drainage lines, washes or temporary inundated depressions (as indicated by MEDIUM sensitivity areas on the map) must only take place during the dry season; • An environmental management programme (EMPr) must be implemented, and must provide a detailed description of how construction activities must be conducted to reduce unnecessary destruction of habitat. • Compile a comprehensive species list of plants that may be cut, chopped, uprooted, broken, damaged or destroyed and obtain relevant permits for these restricted activities; • Utilize existing servitudes and access roads wherever possible, any new roads or the upgrading of roads should be minimized as far as possible and not be larger than required; • Site access should be controlled and no unauthorised persons should be allowed onto the site; • The collection or harvesting of any plants at the site should be strictly forbidden; • Personnel should not be allowed to wander off the demarcated construction site; and • Disturbed areas such as road verges, lay-down areas and areas utilised by temporary construction facilities must be regularly monitored to detect the establishment of alien species and those species should be eradicated before they spread; 							

10.3.2 Operational Phase

Ongoing operational impacts for this project will include the following:

- Establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance.

The clearing and disturbance of areas during the construction phase of the project can result in an increased and ongoing risk of invasion of alien plant species, particularly pioneer species, along the power line route and underneath pylon towers during the

operational phase. Regular alien clearing activities would be required, particularly during the initial stages of the operational phase to limit the spread of alien species. Once the natural vegetation has re-established in previously disturbed areas then the level of alien control required would likely be reduced.

Impact Phase: Operational Phase							
Potential impact description: Alien Plant Invasion. Clearing and disturbance from construction activities leaves areas along the power line route susceptible to invasion by alien plant species.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	M	Negative	M	M	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?			Yes.				
Will impact cause irreplaceable loss or resources?			No.				
Can impact be avoided, managed or mitigated?			Yes.				
Mitigation measures to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> Disturbed areas such as road verges, lay-down areas and areas utilised by temporary construction facilities must be regularly monitored to detect the establishment of alien species and those species should be eradicated before they spread; Regular alien clearing should be conducted, as needed, using the best-practice methods for the species concerned, the use of herbicides should be avoided as far as possible; and The use of herbicides (if absolutely required) for the control and eradication of alien grasses should be done in accordance with the alien eradication programme in the generic EMPr to reduce unintended ecological impacts. 							

10.4 Animals

Potential impacts on the ecology of the study area include the following (issues assessed by other specialists, e.g. on birds and on hydrological function are not included here):

- Impacts on biodiversity: Any impacts on populations of species of concern (animal) and on overall species richness, genetic variability, population dynamics and habitats important for species of concern;
- Impacts on sensitive habitats: Impacts on any sensitive or protected habitats, including indigenous grassland and wetland vegetation that leads to direct or indirect loss of such habitat;
- Impacts on threatened ecosystems: Any impacts on threatened or protected ecosystems, critical biodiversity areas, areas of high biodiversity and centres of endemism;
- Impacts on ecosystem functions: Any impacts on processes or factors that maintain ecosystem health and character, including the following:
 - Habitat fragmentation;
 - Disruption to ecological corridors;
 - Changes to abiotic environmental conditions;
 - Changes to disturbance regimes, e.g. increased or decreased incidence of fire;
 - Disruption to nutrient-flow dynamics;
 - Impedance of movement of material or water;
 - Changes to successional processes;

- Effects on pollinators; and
- Increased invasion by alien plants.
- Cumulative impacts: this includes an assessment of the impacts of the proposed project taken in combination with the impacts of other known projects for the area or secondary impacts that may arise from changes in the social, economic or ecological environment.

10.4.1 Construction Phase

Construction phase impacts for this project will include the following:

- Loss of faunal habitat and refugia;
- Direct mortality of fauna due to machinery, construction and increased traffic;
- Displacement and/or disturbance of fauna due to increased activity and noise levels;
- Increased poaching and/or illegal collecting due to increased access to the area;
- Runoff and erosion due to the presence of hard surfaces that change the infiltration and runoff properties of the landscape; and
- Contamination of the environment by construction vehicles and machinery.

This impact includes the temporary loss of faunal habitat and refugia associated with **laydown areas and temporary contractor's facilities as well as the permanent loss** associated with the construction of permanent structures such as the switching station. The risk to habitats also includes pollution and contamination, particularly wetland and aquatic environments, from construction activities (e.g. oil leaks or chemical spills). While the loss of some habitat during construction is inevitable, the probability that the clearing associated with the proposed development will have a negative impact on the faunal populations in terms of their long-term viability and persistence in the area is low, and therefore the impact significance is low. These impacts can be further reduced following the implementation of mitigation measures.

Impact Phase: Construction							
Potential impact description: Loss of faunal habitat and refugia							
Loss or damage of faunal habitat and refugia such as burrow systems and temporary vleis/wetlands due to construction activities. The damage to faunal habitat (especially aquatic environments) due to increased erosion and contamination from chemical leaks/spills. Some of these potential impacts can persist into the long-term if not appropriately mitigated against.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	H	Negative	M	L	H
With Mitigation	L	H	M	Negative	L	L	H
Can the impact be reversed?		Partially. Some habitats such as temporary vleis can be artificially constructed, however loss due to contamination is more difficult to reverse.					
Will impact cause irreplaceable loss or resources?		No. Habitats available on the project site are widespread in the area.					
Can impact be avoided, managed or mitigated?		Yes. The probability and intensity of this impact can be reduced through mitigation.					
Mitigation measures to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> • Preconstruction walk-through or desk assessment of the power line development footprints (pylon bases, new servitudes, lay-down areas and temporary infrastructure) once finalised for micro-siting to ensure that temporary vleis/wetlands and burrow systems are avoided where possible; • No construction of pylon towers in HIGH sensitivity areas; • Ensure that lay-down and other temporary infrastructure are within MEDIUM or LOW sensitivity areas; 							

- No-go areas around sensitive habitats such as wetlands or burrow systems should be clearly marked;
- All construction vehicles should adhere to clearly defined and demarcated roads, no off-road driving should be allowed;
- Ensure that sufficient erosion control measures are constructed on all servitudes and proposed access roads in the project area;
- Rehabilitate existing servitude and roads in the project area with sufficient erosion control measures to prevent the loss of soil and the degradation of vegetation;
- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill;
- Utilize existing servitudes and roads wherever possible, any new roads or the upgrading of roads should be minimized as far as possible and not be larger than required; and
- All construction vehicles should adhere to clearly defined and demarcated roads, no off-road driving should be allowed.

Sensitive and shy fauna are likely to move away from the affected areas during construction, while some slow-moving species would not be able to avoid the construction activities and might be killed. Increased traffic during construction will pose a risk of collisions with susceptible fauna. Tortoises, snakes and amphibians are particularly susceptible to collisions, however many other species are also at risk such as Aardwolf, Bat-eared Foxes, rabbits/hares, steenbok and porcupine, particularly at night. Black-footed Cats, African Striped Weasel, Riverine Rabbits and South African Hedgehog may also potentially be at risk to nocturnal vehicle collisions. Some mammals and reptiles would be vulnerable to illegal collection or poaching during the construction phase as a result of the large number of construction personnel that are likely to be present. Many of these impacts can however be effectively managed or mitigated against.

The probability of direct faunal mortalities associated with construction activities having a negative impact on the viability of terrestrial animal populations persisting in the area over the long term is low given the small scale of the development footprint relative to the largely undisturbed habitat available in the surrounding area, therefore this impact is considered to be of low significance. The impact can be further reduced following the implementation of mitigation measures.

Impact Phase: Construction							
Potential impact description: Direct impact to fauna due to construction							
Direct impact to fauna caused by construction activities, such as increased risk of injury or mortality from collision with vehicles due to increased traffic, the increased possibility of illegal hunting, poaching, persecution or harvesting of fauna.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	H	Negative	L	L	H
With Mitigation	L	L	M	Negative	L	L	H
Can the impact be reversed?		No.					
Will impact cause irreplaceable loss or resources?		Potentially. If rare or threatened species suffer direct mortality.					
Can impact be avoided, managed or mitigated?		Yes. The probability and intensity of this impact can be reduced through mitigation.					
Mitigation measures to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> • Construction of infrastructure in or near aquatic environments (as indicated by MEDIUM sensitivity on the map) must be conducted during the dry season; • All construction vehicles should adhere to clearly defined and demarcated roads, no off-road driving should be allowed; • All construction vehicles should adhere to a low speed limit (30km/h) to avoid collisions with 							

- susceptible species;
- Speed limits must apply within the project site as well as on the public gravel and proposed access roads to the site;
 - Night driving must be avoided where possible;
 - Any holes dug e.g. for foundations of pylons should not be left open for extended periods of time to prevent entrapment of ground dwelling fauna and only be dug when required and filled in soon thereafter;
 - Site access should be controlled and no unauthorised persons should be allowed onto the site;
 - All personnel should undergo an initial environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes or tortoises;
 - The illegal collection, hunting or harvesting of animals at the site should be strictly forbidden;
 - No animals such as dogs or cats to be allowed on site other than those of the landowners;
 - Personnel should not be allowed to wander off the construction site;
 - No open fires should be permitted outside of designated areas;
 - Any fauna directly threatened by the construction activities should be removed to a safe location by the environmental control officer or other suitably qualified person.

Increased levels of noise and disturbance by vehicles, machinery and human presence during construction will likely impact sensitive species causing them to move away from the project site potentially influencing movement, foraging activity, breeding and impacting energy budgets. As large areas of contiguous natural habitat are available, the displacement distance would not be excessively far and as the impact is only for a relatively short period of time. Therefore, the probability that disturbance or displacement of fauna associated with the construction of the proposed development will have a negative impact on the faunal populations in terms of their long-term persistence and viability in the area is low, and therefore the impact significance is low. These impacts can be further reduced following the implementation of mitigation measures.

Impact Phase: Construction							
Potential impact description: Displacement or disturbance of fauna due to increased activity and noise levels							
The displacement or disturbance of fauna due to construction activities. Species sensitive to human activity such as Reedbuck would likely move away from construction activities.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	L	Negative	L	L	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?			Yes. The disturbance resulting from construction activities will be transient in nature.				
Will impact cause irreplaceable loss or resources?			No. Most species would be able to move away from disturbance, large areas of natural habitat available means displacement distance would not be excessively far.				
Can impact be avoided, managed or mitigated?			Partly, noise and activity cannot be entirely avoided or mitigated against.				
Mitigation measures to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> • Construction camps should be lit with as little light as practically possible, with the lights directed downwards where appropriate to reduce the disturbance and foraging activities of nocturnal species; • The movement of construction personnel should be restricted to the construction areas on the project site; • Speed limits should be strictly enforced to reduce unnecessary noise and dust; and • No dogs or cats other than those of the landowners should be allowed on site as these animals cause unnecessary disturbance such as chasing fauna. 							

Disturbance created during construction would leave the disturbed areas vulnerable to soil erosion. Consequently, specific measures such as erosion berms and water dispersion features will be required along the power line access roads and servitudes. Although this impact has a moderate significance before mitigation, it can be effectively mitigated against through the maximum use of existing access roads and servitudes and the implementation of erosion control measures. The significance of this impact after the implementation of mitigation measures is therefore considered to be low.

Impact Phase: Construction Phase							
Potential impact description: Soil Erosion Risk. Following construction, the site will be vulnerable to soil erosion.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	M	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?		No. Once erosion takes place some irreversible damage occurs.					
Will impact cause irreplaceable loss or resources?		Yes. Without mitigation the loss of topsoil would result in an irreversible loss of resources.					
Can impact be avoided, managed or mitigated?		Yes. Erosion control measures can be very effective.					
Mitigation measures to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> Erosion management at the site should take place according to the Erosion Management Plan and Rehabilitation Plan included in the generic EMP; All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate energy in the water stream which may pose an erosion risk; At all drainage line/river crossing, erosion control (reno mattresses) need to be installed downstream of the crossing to prevent back-cutting. In the case where the road surface needs to be elevated above the flood line, box culverts should be installed, being wider than the actual drainage line. Other types of culvert (e.g. round pipe culverts) <u>that could potentially concentrate flows may not be installed.</u> Existing servitudes and access roads along the existing, adjacent power line must be utilised wherever possible; Existing servitudes and access roads along the existing, adjacent power line must be upgraded with appropriate and effective erosion control measures; and Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance. 							

10.4.2 Operational Phase

Ongoing operational impacts for this project will include the following:

- Direct impact of fauna through traffic, illegal collecting, poaching and collisions and/or entanglement with infrastructure; and
- Establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance.

Direct mortality through road fatalities is a risk to many animal species during routine operational activities. The position of the proposed grid connection adjacent to existing power lines makes it unlikely that the proposed development will significantly increase the probability of collisions for species of conservation concern beyond that which already exists on the site. Following the implementation of mitigation measures the impacts of direct mortality from the proposed development during the operation phase can be reduced to acceptable levels and the development is unlikely to threaten the long-term

viability or persistence of species in the area. The post-mitigation impact significance is therefore likely to be low.

Impact Phase: Operational							
Potential impact description: Disturbance, direct mortality through collision and illegal collecting or poaching of fauna.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	H	Negative	L	L	H
With Mitigation	L	M	M	Negative	L	L	H
Can the impact be reversed?		No.					
Will impact cause irreplaceable loss or resources?		Potentially. If rare or threatened species suffer direct mortality.					
Can impact be avoided, managed or mitigated?		Yes. The probability and intensity of this impact can be reduced through mitigation.					
Mitigation measures to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> • All vehicles should adhere to a low speed limit (30km/h) to avoid collisions with susceptible species; • General maintenance should be conducted during the dry season where possible; • Speed limits must apply within the project site as well as on the public gravel and proposed access roads to the site; • Night driving must be avoided where possible; • Site access should be controlled and no unauthorised persons should be allowed onto the site; • All personnel should undergo an initial environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes or tortoises; • The illegal collection, hunting or harvesting of animals at the site should be strictly forbidden; and • No animals such as dogs or cats to be allowed on site other than those of the landowners. 							

The clearing and disturbance of areas during the construction phase of the project can result in an increased and ongoing risk of invasion of alien plant species, particularly pioneer species, along the power line route and underneath pylon towers during the operational phase. Regular alien clearing activities would be required, particularly during the initial stages of the operational phase to limit the spread of alien species. Once the natural vegetation has re-established in previously disturbed areas then the level of alien control required would likely be reduced.

Impact Phase: Operational							
Potential impact description: Alien Plant Invasion							
Clearing and disturbance from construction activities leaves areas along the power line route susceptible to invasion by alien plant species.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	M	Negative	M	M	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?		Yes.					
Will impact cause irreplaceable loss or resources?		No.					
Can impact be avoided, managed or mitigated?		Yes.					
Mitigation measures to reduce residual risk or enhance opportunities:							

- Disturbed areas such as road verges, lay-down areas and areas utilised by temporary construction facilities must be regularly monitored to detect the establishment of alien species and those species should be eradicated before they spread;
- Regular alien clearing should be conducted, as needed, using the best-practice methods for the species concerned, the use of herbicides should be avoided as far as possible; and
- The use of herbicides (if absolutely required) for the control and eradication of alien grasses should be done in accordance with the alien eradication programme in the generic EMPr to reduce unintended ecological impacts.

10.5 Avifauna

Many existing power lines traverse the area and therefore most of the potential impacts already exist in and around the project site. The majority of the proposed power line routes are adjacent to existing power lines.

The proposed power line routes traverse or pass near several important habitats for avifauna, including grassy plains (important for cranes, bustards and korhaans), rocky ridges (important for raptors) as well as various wetlands, rivers and dams (important for waterbirds and cranes). Particular attention has been given to the potential impact on **Ludwig's Bustard** in this assessment as some areas around the project site are known to be important breeding and 'lekking' grounds. 'Lekking' is a mating system where males congregate in an area to display to females. Ludwig's Bustards exhibit an 'exploded' or 'dispersed' lekking system in which the displaying males are more widely spread over an area than typical of more conventional lekking arenas observed in other species¹⁶. While the project site is not directly within these areas, the species may be impacted upon while traversing the project site to and from these areas.

The key potential impacts on avifauna associated with power lines and associated grid connection infrastructure (e.g. switching station), as well as the access road include:

- Displacement of avifaunal SCCs due to habitat destruction and transformation;
- Displacement of avifauna due to disturbance;
- Mortality of avifaunal SCCs due to collisions; and
- Mortality of avifaunal SCCs due to electrocution.

10.5.1 Construction and Decommissioning Phase

Sections of natural habitat will be destroyed during the construction phase for clearing of servitudes, creation of access roads and for clearing of pylon bases, lay-down areas and temporary construction facilities. Clearing these areas will have an impact in terms of loss of habitat for avifauna. Approximately 1 ha of land associated with the proposed switching station will be cleared, as the vegetation type associated with the switching station assessment area is largely intact, the impact is considered to be of low significance. Pylon bases have a relatively small footprint and therefore do not pose a significant impact of habitat loss. It is recommended for existing access roads and servitudes associated with adjacent, existing power infrastructure to be used, as this will significantly reduce the impacts associated with the proposed development, as the total area of natural habitat that needs to be cleared will be relatively small. Most of the novel clearing will therefore be transient in nature and for a short duration, as recovery will take place once the construction phase is completed.

Similar outcomes will be resultant from the development of the access road, where natural habitat will be destroyed along the route during construction phase. This will particularly occur along the 8 m width of the road and cumulative 4 m drainage structures but will also extend out to the surrounding vegetation along the route. The

¹⁶ Allan DG: Ludwig's Bustard. In Roberts Birds of Southern Africa. 7th edition. Edited by: Hockey PAR, Dean WJR, Ryan PG. Trustees of the John Voelcker Bird Book Fund, Cape Town; 2005:293–294.

removal of natural habitat along the route, particularly as it is situated on a plateau in natural vegetation, will result in a decrease in both food and nesting resources for the avifaunal community.

While the clearing of some habitat during construction is inevitable, the probability that the clearing associated with the proposed development will have a negative impact on the avifaunal populations in terms of their long-term viability and persistence in the area is low. This is supported by the fact that the project site is widespread, contiguous, and largely untransformed natural habitat. The impact can be further reduced following the implementation of mitigation measures.

Impact Phase: Construction							
Potential impact description: Habitat destruction associated with the transmission line and switching station							
Habitat loss associated with the clearing of vegetation for lay-down areas, switching station, temporary construction facilities and pylon bases.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	L	M	Negative	L	L	H
With Mitigation	M	L	L	Negative	L	L	H
Can the impact be reversed?		Mostly. Destruction of habitat will largely be transient in nature.					
Will impact cause irreplaceable loss of resources?		No. The habitats on site are widespread and the development footprint is relatively small.					
Can impact be avoided, managed or mitigated?		Mostly. The use of existing servitudes will mitigate most of the residual impact.					
Mitigation measures (for inclusion in the EMPr) to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> Existing roads and servitudes to be used wherever possible; Minimise the development footprint as far as possible and rehabilitate disturbed areas that are not required by the operational phase of the development such as lay-down areas and temporary construction facilities; No construction activity must occur within seasonally inundated areas during the peak rainfall period in summer to reduce the potential impact on wetland habitats; All construction vehicles should adhere to clearly defined and demarcated roads, no off-road driving should be allowed; and No open fires should be permitted outside of designated areas. 							

Impact Phase: Construction							
Potential impact description: Habitat destruction associated with access roads							
Habitat loss associated with the clearing of vegetation for the new access road.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	L	M	Negative	M	H	H
With Mitigation	M	L	M	Negative	M	H	H
Can the impact be reversed?		No. Complete removal of vegetation along route.					
Will impact cause irreplaceable loss of resources?		No. The habitats on site are widespread and the development footprint is relatively small.					
Can impact be avoided, managed or mitigated?		Mitigated if recommendations are followed.					
Mitigation measures (for inclusion in the EMPr) to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> Minimise the development footprint as far as possible and rehabilitate disturbed areas that are not 							

- required by the operational phase of the development such as temporary construction facilities;
- No construction activity must occur within seasonally inundated areas during the peak rainfall period in summer to reduce the potential impact on wetland habitats;
- Clearance of vegetation should occur in gradual manner to allow avifaunal species to move ahead;
- All construction vehicles should adhere to clearly defined and demarcated route, no off-road driving should be allowed; and
- No open fires should be permitted outside of designated areas.

Disturbances and noise from staff and construction activities can impact certain sensitive species particularly whilst feeding and breeding, resulting in effective habitat loss through a perceived increase in predation risk. There are various potentially sensitive species **occurring on the project site including Ludwig’s Bustard, Kori Bustard, Verreaux’s Eagle, Northern Black Korhaan, Karoo Korhaan and Blue Crane.** Disturbance can cause these species to be displaced, either temporarily (i.e. for some period during the construction activity) or permanently (i.e. they do not return), into less suitable habitat which may reduce their ability to survive and reproduce. Disturbance of raptor species at nest sites, may result in failed breeding attempts. The disturbance and displacement impacts associated with the construction phase are generally temporary in nature. The area surrounding the project site is largely untransformed, contiguous, suitable natural habitat and therefore displacement distances should not incur a great energetic cost and should allow for rapid return to the site once the disturbance concludes. The probability of significant disturbance and displacement occurring is reduced by adhering to mitigation measures such as appropriate timing of construction activities near sensitive sites, such as **Verreaux’s Eagle nests. The displacement of avifauna by construction activities** associated with the proposed development is therefore considered to be of low significance if mitigation measures are adhered to.

Impact Phase: Construction							
Potential impact description: Disturbance and Displacement associated with all infrastructure Displacement of priority species, particularly Red Data species, due to disturbance associated with construction activities.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	M	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?		Yes. Disturbance associated with construction is transient in nature and the impact will cease once construction has been completed.					
Will impact cause irreplaceable loss of resources?		No. Avifaunal communities will recolonize the area once construction has been completed.					
Can impact be avoided, managed or mitigated?		Yes. The probability and intensity of disturbance can be reduced with mitigation measures.					
Mitigation measures (for inclusion in the EMP) to reduce residual risk or enhance opportunities: <ul style="list-style-type: none"> • No construction activities within 500 m of the identified Verreaux’s Eagle nest (-30.595564, 24.265331) should proceed during the breeding season (i.e. May, June, July and August); • No construction activities or personnel should be permitted to enter the 300 m no-go nest buffer around the identified Verreaux’s Eagle nest at any time; • Maximum use of existing access road and servitudes; • No off-road driving; • Speed limits (30 km/h) should be strictly enforced to reduce unnecessary noise; • Construction camps should be lit with as little light as practically possible, with the lights directed downwards where appropriate; • The movement of construction personnel should be restricted to the construction areas on the project site; • No dogs or cats other than those of the landowners should be allowed on site; 							

- Any holes dug e.g. for foundations of pylons should not be left open for extended periods of time to prevent entrapment by ground dwelling avifauna or their young and only be dug when required and filled in soon thereafter;
- An appointed Environmental Control Officer (ECO) must be trained by an avifaunal specialist to identify the potential priority species as well as the signs that indicate possible breeding by these species, particularly within Medium sensitivity areas;
- The ECO must make a concerted effort to look out for such breeding activities especially of Red Data species;
- If any Red Data species are confirmed to be breeding (e.g. if a nest site is found), construction activities within 500 m of the breeding site must cease, and an avifaunal specialist is to be contacted immediately for further assessment of the situation and instruction on how to proceed.

10.5.2 Operational Phase

Periodic maintenance is required of the servitude, power line infrastructure and new access road, including the regular clearing of excess vegetation to allow for unrestricted movement along the service and access roads and to minimize the risk of fires. The power lines may also require aerial inspection or maintenance, as well as maintenance on the new access road. The disturbance of avifauna during the operational phase, while ongoing, is not continuous and is therefore considered to be of low significance if mitigation measures are adhered to.

Impact Phase: Operation							
Potential impact description: Disturbance and Displacement associated with the transmission line and switching station							
Displacement of priority species or Red Data species, due to disturbance associated with operational activities such as line assessment and maintenance.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	M	Negative	M	H	High
With Mitigation	L	M	L	Negative	L	L	High
Can the impact be reversed?			Yes. Birds will move back into the area after a disturbance event.				
Will impact cause irreplaceable loss of resources?			No.				
Can impact be avoided, managed or mitigated?			Yes. The probability and intensity of disturbance can be reduced with mitigation measures.				
Mitigation measures (for inclusion in the EMP) to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> • All new power lines should be installed as close to existing power lines as possible, to reduce potential impacts during the operational phase; • Aerial assessment or maintenance of the power line (e.g. by helicopter) should not be conducted around the Verreaux's Eagle nest during the breeding season (May, June, July and August) where possible; • All vehicles should adhere to clearly defined and demarcated roads, no off-road driving should be allowed; • Speed limits (30 km/h) should be strictly enforced to reduce unnecessary noise; • The movement of personnel should be restricted to the servitudes and access roads on the project site; • No dogs or cats other than those of the landowners should be allowed on site; and • No-go areas should be adhered to. 							

Impact Phase: Operation							
Potential impact description: Disturbance and Displacement associated with access roads							
Displacement of priority species or Red Data species, due to disturbance associated with operational activities such as line assessment and maintenance on the new access road.							

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	M	Negative	M	H	High
With Mitigation	L	M	L	Negative	L	L	High
Can the impact be reversed?	Yes. Birds will move back into the area after a disturbance event.						
Will impact cause irreplaceable loss of resources?	No.						
Can impact be avoided, managed or mitigated?	Yes. The probability and intensity of disturbance can be reduced with mitigation measures.						
Mitigation measures (for inclusion in the EMP) to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> All vehicles should adhere to clearly defined and demarcated roads, no off-road driving should be allowed; Speed limits (30 km/h) should be strictly enforced to reduce unnecessary noise as well as the possibility of vehicle strikes; A qualified ECO should remove any dead animals off the road to reduce the likelihood of scavenging birds being hit; The movement of personnel should be restricted to the servitudes and access roads on the project site; No dogs or cats other than those of the landowners should be allowed on site; and No-go areas should be adhered to. 							

The proposed power line route largely runs adjacent to an existing power line. The existing power line is not marked by flappers or bird flight diverters. The proposed power line presents an opportunity to increase the visibility of the existing power line and potentially reduce collisions of heavy-bodied birds such as bustards. The installation of flappers and bird flight diverters (BFDs) may therefore effectively increase the visibility of both the proposed and the existing power lines. Similarly, should it be feasible to stagger the pylons of the proposed power line in relation to the existing power line this may also increase the visibility to birds susceptible to power line collision.

The pair of Verreaux's Eagle associated with the nest in the north-east of the power line corridor are presumably at a low risk of collision with the existing power line due to their familiarity with it. They would, however, potentially be at risk of collision with the new power line as it will be unfamiliar to them. The fledglings of each season would potentially be at risk while learning to fly if the proposed power line was placed too close to the nest. It is therefore recommended that the proposed power line be placed to the east of the existing power line as a mitigation measure to reduce the risk of collision.

The collision of avifauna with power lines is considered to be of moderate significance, even with the implementation of mitigation measures which reduces the probability of the impact.

Impact Phase: Operation							
Potential impact description: Collision of birds with power lines.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	H	Negative	M	H	H
With Mitigation	M	M	H	Negative	M	M	M
Can the impact be reversed?	No. Some collisions by Red Data species is possible.						
Will impact cause irreplaceable loss of resources?	Potentially. The wider area is important for the conservation of some Red Data species.						

Can impact be avoided, managed or mitigated?	Partially. Flappers and other bird flight diverters are not 100% effective at preventing collisions.
<p>Mitigation measures (for inclusion in the EMPr) to reduce residual risk or enhance opportunities:</p> <ul style="list-style-type: none"> The proposed power lines are to be constructed along the eastern side of the existing power line (opposite to the Verreaux's Eagle nest) to reduce the risk of collision by the breeding pair of Verreaux's Eagle and their fledglings; There is opportunity to potentially reduce the risk of collision associated with the both the existing line and the new line by attaching flappers and bird flight diverters (BFDs) to the proposed line, as the existing line does not have any attached to it; The most appropriate and up-to-date marking devices (such as flappers and BFDs) must be selected in consultation with the Endangered Wildlife Trust (EWT); Attach appropriate marking devices on all spans of all new power lines in accordance with installation guidelines to increase visibility; Flappers and BFDs must be maintained and replaced where necessary, for the life span of the project; An operational monitoring programme must be implemented and include regular monitoring (i.e. quarterly) of the entire length of the power lines for collision incidents for the lifespan of the project; Collision incidents must be recorded and reported to the Endangered Wildlife Trust (EWT); and All pylon towers should be staggered in relation to existing pylon towers, in order to increase visibility of all powerlines – so as to reduce potential impacts from heavy-bodied flying birds such as cranes and bustards. 	

Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components **Error! Bookmark not defined.** Overhead power line infrastructure with a capacity of 132 kV or more do not generally pose a risk of electrocution due to the large size of the clearances between the electrical infrastructure components. Electrocutions are therefore more likely for larger species whose wingspan is able to bridge the gap such as eagles or vultures. Various **large raptors (such as Martial Eagle, Verreaux's Eagle and potentially vultures)**, susceptible to electrocution (particularly in the absence of safe and mitigated structures) may occur in the broader project area. Electrocutions within the proposed switching station are possible but should not affect the more sensitive Red Data species, as these species are unlikely to use the infrastructure within the switching station yard for perching, nesting or roosting. The electrocution risk is considered to be of low probability and therefore low significance, the impact can be further reduced if mitigation measures are adhered to.

Impact Phase: Operation							
Potential impact description: Electrocution of avifauna by powered infrastructure, such as the power lines and switching station.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	H	Negative	L	L	H
With Mitigation	M	M	H	Negative	L	L	H
Can the impact be reversed?	No. Some electrocution of priority or Red Data species is possible.						
Will impact cause irreplaceable loss of resources?	Potentially. Electrocution of Red Data species is possible.						
Can impact be avoided, managed or mitigated?	Yes. The probability and intensity of electrocution can be reduced with mitigation measures.						
Mitigation measures (for inclusion in the EMPr) to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> The pylons to be constructed must be 'bird friendly' and provide a safe and suitable perch; 							

- The pylons to be constructed must have bird deterrent devices mounted on relevant parts of the structure where necessary to reduce the chances of electrocution;
- The pylons **to be constructed must be approved by the EWT's** Wildlife and Energy Programme;
- An operational monitoring programme must be implemented and include regular monitoring (i.e. quarterly) of the power lines for electrocution incidents (this can be done simultaneously with the collision monitoring); and
- Any mortalities must be reported to the EWT.

10.6 Heritage, Archaeology and Palaeontology

Heritage resources are highly context sensitive and the main cause of impacts to such sites is physical disturbance of the material itself and its context. During the construction of the transmission lines, switching station and access road, the following physical impacts to the landscape and any heritage resources that lie in or on it can be expected:

- Excavations of foundations for pylons and for elements of the switching station;
- Levelling of the ground for the switching station and for pylons located on hillsides;
- Levelling of ground to for the construction of the access road and the roads or tracks to service both the installation of the powerline and its longer-term maintenance;
- Introduction of vehicles, machinery and people into environment; and
- Lastly, the introduction of a substantial industrial feature can have an impact on the cultural landscape.

The best method for managing impacts to heritage resources is avoidance or exclusion of the site from activities associated with the project. If this is not possible, then some form of mitigation will be required to manage the impacts. This is generally considered a second best approach as *in situ* preservation, wherever possible is always the preferred option.

10.6.1 Palaeontology: Construction, Operation and Decommissioning Phases

Impact Phase: All Phases							
Potential impact description: Possibility of encountering fossils during groundworks. Given the nature of the proposed project, activities may impact upon fossils if they are present close to the ground surface in the development footprint. The geological mapping indicates that both transmission line options and access road will cross an area where the bedrock is the correct age to contain fossils, particularly trace fossils and silicified wood fragments within the Tierberg Formation. However, site visits and PIAs conducted in the area (for example Almond, 2012b) and a palaeontological site survey for the De Aar South 2 WEF (Almond, 2012c) have recorded very few fossils.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	L	Negative	L	L	H
With Mitigation	L	H	L	Neutral/ Positive	L	L	H
Can the impact be reversed?				No, palaeontological heritage resources are non-renewable and key contextual data for fossils (sedimentology, taphonomy) is difficult to reconstruct following disturbance.			
Will impact cause irreplaceable loss or resources?				Possible but Unlikely, well-preserved, scientifically valuable fossils are scarce within the project area and those that do occur probably occur widely across the region.			
Can impact be avoided, managed or mitigated?				Yes, refer to mitigations below.			
Mitigation measures to reduce residual risk or enhance opportunities:							

- Implementation of a Chance Fossil Find Protocol;
- Reporting by the ECO of any chance fossil finds to SAHRA and their conservation (*preferably in situ*);
- Recording and judicious sampling of significant chance fossil finds by a qualified palaeontologist, together with pertinent contextual data (stratigraphy, sedimentology, taphonomy) within the final footprint; and
- Curation of any recovered fossil material within an approved repository (museum / university fossil collection) by a qualified palaeontologist.

10.6.2 Archaeology: Construction, Operation and Decommissioning Phases

Impact Phase: All Phases							
<p>Potential impact description: Possible impacts to archaeological sites and materials.</p> <p>The fieldwork undertaken to inform this assessment identified MSA, LSA lithic material and Khoi and colonial era stone structures of a generally relatively low, local archaeological significance, widely distributed across the landscape. The impacts to archaeological material in the area of the construction of the transmission lines, switching station and access road will be relatively small and localized, although where individual sites or structures are affected, the impact will be high.</p>							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	L	Negative	M	H	H
With Mitigation	L	H	L	Neutral/ Positive	L	L	H
Can the impact be reversed?			No, impacts to archaeological resources cannot be reversed, but can be mitigated.				
Will impact cause irreplaceable loss or resources?			No, the archaeological occurrences recorded are well represented in other areas and provided the recommended mitigation measures are implemented, there should be no irreplaceable loss of resources.				
Can impact be avoided, managed or mitigated?			Yes, refer to mitigations below.				
<p>Mitigation measures to reduce residual risk or enhance opportunities:</p> <p>General:</p> <ul style="list-style-type: none"> • Do not disturb any old stone kraals or ruins and do not remove stone from walls, or artefacts from the earth. If such disturbance is required for construction of the project, then ensure that appropriate permits are obtained from SAHRA or the authority at the time of construction. • Report any chance discoveries of human remains to the project archaeologist and SAHRA. Remains must be made safe, and left in situ until a decision about their mitigation is made by the archaeologist and SAHRA <p>Specific:</p> <ul style="list-style-type: none"> • The project archaeologist must review pylon positions, once these have been determined, to ensure that they will not impact on any recorded heritage resources. The micro-siting of pylon positions may be required, which should also be done in consultation with the archaeologist. • In the event of any new heritage resources being encountered, SAHRA must be consulted immediately so that mitigatory action can be determined and be implemented if necessary. • One site of archaeological sites require mitigation, in the form of artefact mapping, recording and collection by the project archaeologist prior to the commencement of construction of the transmission line. This is JG050-JG052 / GEB013-GEB014. • The following sites, each with the buffer described below, must be considered no-go areas during construction activities and those nearest the route alignments must be clearly marked as out of bounds: <ul style="list-style-type: none"> ▪ A 50 m buffer must be implemented around the outer limits of these cluster sites (JG067–JG072 / GEB025); ▪ A 40 m buffer must be implemented around each possible Khoi kraals and shepherds’ huts (JG040; JG064; JG066); ▪ A 20 m buffer must be implemented around the possible “wolwehok” (JG036); 							

- A 20 m buffer must be implemented around the possible rock engraving (JG044);
- A 30 m buffer must be implemented around each of the two deflated stone clusters (JG122 and JG123); and
- A 40 m buffer must be implemented around the waypoint (GEB105).

10.7 Visual

The transmission line routes cross a variety of terrains, from large flat mountain plateau on the eastern side (where the authorised DA2S WEF is located) to flat rocky outcrops, this means that it is visible from any direction within its immediate surrounds. Both routes proposed traverses along the same line for about 17 km in the direction of the existing Eskom Hydra substation, and is also adjacent to the existing Eskom Hydra Roodekuil 220 kV transmission line for most of its length. Both routes also follow an existing grid connection transmission route of the operational Longyuan Mulilo De Aar 2 North WEF, for much of their lengths. The proposed project is therefore likely to have a low impact in terms of the visual influence on the receiving environment.

Although the transmission lines will be seen from the N10, the visual impacts are considered to be low as the character views from the road has already been impacted by the existing electric transmission infrastructure, such as the existing Eskom Hydra Substation and various other transmission lines. The proposed switching station is unlikely to have a contribution to the visual impacts on the N10 as it is located further away and will be located on top of a plateau above the plains at an altitude of 1,500 metres.

The development of the road will be from private access roads which will lead onto the DA2S WEF site and to the proposed switching station. Given the small scale of the proposed road and relatively flat nature of the landscape, the project would have a limited zone of visual influence. Furthermore, the heavy vehicles making use of the road would hardly be visible from surrounding farmsteads and the N10, located far south of the proposed road location.

It is assumed that the construction and decommissioning of the transmission line will occur at the same time as that of the DA2S WEF. The following potential visual impacts was considered for the proposed development.

10.7.1 Construction and Decommissioning

Impact Phase: Construction and Decommissioning Phases							
Potential impact description: Development of the Grid Connection and Switching Station							
<ul style="list-style-type: none"> • Large construction vehicles and equipment will alter the natural character of the study area and expose visual receptors to impacts associated with construction. • Dust emissions and dust plumes from increased traffic on gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. • Surface disturbance during construction would expose bare soil which could visually contrast with the surrounding environment. • Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact 							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	L	M	Negative	M	M	M
With Mitigation	M	L	L	Negative	L	L	M
Can the impact be reversed?			Yes – once construction and / or decommission is complete.				
Will impact cause irreplaceable			Yes – there may be slight change to the receiving environment.				

loss or resources?	
Can impact be avoided, managed or mitigated?	Yes – refer to mitigations below.
Mitigation measures to reduce residual risk or enhance opportunities:	
<ul style="list-style-type: none"> • Grid Connection should be constructed / decommissioned at approximately the same time as the authorised DA2S WEF. • Management plans must be put in place to ensure most suitable construction period is recommended and to avoid delays in construction, especially with using the N10 to the proposed new road for delivery of loads. • Any loose material should be removed or covered regularly to maintain a neat site and avoid dust and litter. • Dust suppression techniques are recommended on all access roads; and on all soil stockpiles. 	

Impact Phase: Construction and Decommissioning Phases							
Potential impact description: Development of the proposed road							
<ul style="list-style-type: none"> • Possible noise and dust. • Moving of traffic from the national route. 							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	L	M	Negative	M	M	M
With Mitigation	M	L	L	Negative	L	L	M
Can the impact be reversed?	Yes – once construction and / or decommission is complete.						
Will impact cause irreplaceable loss or resources?	Yes – there may be slight change to the receiving environment.						
Can impact be avoided, managed or mitigated?	Yes – refer to mitigations below.						
Mitigation measures to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> • Grid Connection should be constructed / decommissioned at approximately the same time as the authorised DA2S WEF. • Management plans must be put in place to ensure most suitable construction period is recommended and to avoid delays in construction, especially with using the N10 to the proposed new road for delivery of loads. • Any loose material should be removed or covered regularly to maintain a neat site and avoid dust and litter. • Dust suppression techniques are recommended on all access roads; and on all soil stockpiles. 							

10.8 Social

The development of the transmission lines, switching station and access road will have short-term positive and negative social impacts which can be mitigated to acceptable levels.

As the sense of place of the area has already been impacted by the existing electric infrastructure, the construction of the development will have a low impact on the sense of place after mitigation. The development will also have benefits to the economic development of the area. The supply of renewable energy to the national grid, within the Central Strategic Infrastructure Corridor, will form part of a provincial and national effort to reduce the carbon emissions in South Africa.

10.8.1 Construction Phase

Impact Phase: Construction Phase							
Potential impact description: Influx of job seekers							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	L	L	Negative	M	M	M
With Mitigation	M	L	L	Negative	L	L	M
Can the impact be reversed?		Yes, by not proceeding with the development or the implementation of the project.					
Will impact cause irreplaceable loss or resources?		No, not at a community level.					
Can impact be avoided, managed or mitigated?		Yes.					
Mitigation measures to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> To avoid the influx of job seekers to the area, the local community should be approached to employ low to semi-skilled workers. Limit the availability of allowing employment opportunities on-site. Although the significance of this impact is low, the influx of job seekers cannot be avoided or prevented. 							

Impact Phase: Construction Phase							
Potential impact description: Potential safety risk for farmers and farming infrastructure							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	L	M	Negative	M	M	M
With Mitigation	M	L	L	Negative	L	L	M
Can the impact be reversed?		Yes, by compensating potential losses or damages to farmers.					
Will impact cause irreplaceable loss or resources?		No.					
Can impact be avoided, managed or mitigated?		Yes.					
Mitigation measures to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> The proposed site should be clearly demarcated to effectively monitor and contain the movement of construction workers to the vicinity of the project site as best possible. Transportation for the construction workers need to be arranged by the applicable contractor on a daily basis, to effectively manage the movement of construction workers to and from the project site. This will reduce the potential risk regarding the trespassing of construction workers on farmers' properties. Where necessary arrangements need to be made to enable construction workers to return to their hometowns over weekends at least. No staff should be accommodated over-night on the construction site, except for the presence of security staff throughout the night on site due to security reasons for the landowners and their workers. A code of conduct which must be signed by construction workers prior to the construction phase, should clearly outline the acceptable behaviour and activities of construction workers. The applicable contractor should enter into an agreement with the farmers prior to the construction phase, whereby if damages / losses to farming property / infrastructure is proved to be associated with the development activities, farmers will be compensated for. 							

- The applicable contractor should hold staff liable for the compensation to farmers for any damages or losses that can be associated with the construction phase of the proposed development. It is important that dismissals or fines must comply with the South African labour legislation.

Impact Phase: Construction Phase							
Potential impact description: The potential impacts of heavy vehicles and construction related activities, damage to roads, and dust pollution							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	L	M	Negative	M	M	M
With Mitigation	M	L	L	Negative	M	M	M
Can the impact be reversed?		Yes, through the rehabilitation of affected areas.					
Will impact cause irreplaceable loss or resources?		No.					
Can impact be avoided, managed or mitigated?		Yes.					
Mitigation measures to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> Transportation of construction material on the N10 national road to the site should be planned to avoid weekends as well as holiday periods. Key stakeholders, landowners and municipal representatives of the affected area should be notified in advance of the dates and times for when the roads will be used for the transportation of any abnormal loads. Measures for dust suppressions should be implemented on a regular basis to minimise potential dust pollution, such as wetting of gravel roads. All vehicles related to the construction related activities should adhere to the speed limits. Vehicles that are used for the transportation of loose building materials, for example sand, should be fitted with covers to avoid any spillage. The appointed contractors should ensure that all vehicles are road-worthy and that the drivers of all vehicles have the relevant licensing documents. Appropriate waste management strategies need to be implemented on a regular basis by the contractor for any waste generated during the construction phase and should also be included in the generic EMPrs. The generic EMPrs should include measures to be implemented, to ensure that speed limits are adhered to at all times and that gates are closed at all times. 							

Impact Phase: Construction Phase							
Potential impact description: The increased risk of potential veld fires associated with the construction phase to farmers property and infrastructure							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	L	M	Negative	M	M	M
With Mitigation	M	L	L	Negative	L	L	M
Can the impact be reversed?		Yes, by compensating potential property / infrastructure farming losses that were caused during the fires, and repairing any damages caused.					
Will impact cause irreplaceable loss or resources?		No.					

Can impact be avoided, managed or mitigated?	Yes.
<p>Mitigation measures to reduce residual risk or enhance opportunities:</p> <ul style="list-style-type: none"> • Firebreaks must be implemented by the contractor around the perimeters of the construction site. • No construction staff should be accommodated on the site over-night except for the presence of security personnel. • No smoking should be permitted on the site. • The appointed contractor should ensure that no open fires for the use of cooking or heating should be allowed, except for designated areas and if necessary. • Adequate fire-fighting equipment should be provided by the contractors and should be readily available and serviced on a regular basis. • An on-site fire marshal should be assigned to the development. • The appointed contractors should ensure that any construction related activities that might pose potential fire risks, for example welding and grinding, are confined to the designated areas and that it is properly managed. • The necessary precautionary measures need to be taken during high wind conditions and dry months. • In the event of a fire due to construction related activities, the contractor must repair any damages caused to the farmers. The farmers need to be compensated for any damages caused due to fires borne during construction related activities. The costs with regards to firefighting should also be borne by the contractor. 	

Impact Phase: Construction Phase							
Potential impact description: Job creation, skills development and business opportunities to local and regional Small, Medium and Micro-sized Enterprises (SMMEs) and other businesses for service delivery							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	L	M	Positive	M	M	M
With Mitigation	H	L	H	Positive	M	M	M
Can the impact be reversed?	No.						
Will impact cause irreplaceable loss or resources?	No.						
Can impact be avoided, managed or mitigated?	Yes, but it would be undesirable to avoid, as it is a positive impact.						
<p>Mitigation measures to reduce residual risk or enhance opportunities:</p> <ul style="list-style-type: none"> • A local skills database should be established for the associated areas. The existence of such a skills database should be made available to the contractors before the commencement of the construction phase to establish the extent of the available service providers in the local municipalities. • The potential employment opportunities and the employment procedure that the developer intends to follow should be clearly communicated to key stakeholders, local authorities and the community before the commencement of the construction phase. • Efforts should be made to employ local contractors first, where low to semi-skilled workers are required, and gender equality and BBEEE compliant contractors should be considered when recruiting such employees / contractors. 							

10.8.2 Decommissioning Phase

Impact Phase: Decommissioning Phase
Potential impact description: Potential loss of employment opportunities and associated income

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	M	Negative	M	M	M
With Mitigation	M	L	L	Negative	M	M	M
Can the impact be reversed?			No.				
Will impact cause irreplaceable loss or resources?			No.				
Can impact be avoided, managed or mitigated?			Yes.				
Mitigation measures to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> None. 							

10.9 Traffic

Traffic impacts are related to the affect the proposed development will have on the N10 and minor roads during construction and decommissioning phases.

10.9.1 Construction and Decommissioning Phases

Impact Phase: Construction and Decommissioning Phases							
Potential impact description: Additional Traffic on major and minor roads							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	M	Negative	M	M	M
With Mitigation	L	L	L	Negative	L	M	M
Can the impact be reversed?			Yes, if the N10 is avoided.				
Will impact cause irreplaceable loss or resources?			No.				
Can impact be avoided, managed or mitigated?			Yes, impacts can be managed and mitigated.				
Mitigation measures to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> Transportation of construction material should be planned in such a way that delivery occurs at the same time as that of the WEF material; Use of proposed access road will provide less impact to the N10 when used for all phases of the development; and A Traffic Management Plan (TMP) should be designed before construction by a transport and traffic specialist. This plan should document important details pertaining to transporting of goods and movement of vehicles on site, such as the estimation of abnormal load trips, if required, will be made to site; approved routes for access to site; areas to erect signage along major and minor roads; etc. 							

Impact Phase: Construction and Decommissioning Phases							
Potential impact description: Additional Traffic on major and minor roads							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without	L	M	M	Negative	M	M	M

Mitigation							
With Mitigation	L	L	L	Negative	L	M	M
Can the impact be reversed?	Yes, if the N10 is avoided.						
Will impact cause irreplaceable loss or resources?	No.						
Can impact be avoided, managed or mitigated?	Yes, impacts can be managed and mitigated.						
Mitigation measures to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> • Transportation of construction material should be planned in such a way that delivery occurs at the same time as that of the WEF material; • Use of proposed access road will provide less impact to the N10 when used for all phases of the development; and • A Traffic Management Plan (TMP) should be designed before construction by a transport and traffic specialist. This plan should document important details pertaining to transporting of goods and movement of vehicles on site, such as the estimation of abnormal load trips, if required, will be made to site; approved routes for access to site; areas to erect signage along major and minor roads; etc. 							

Impact Phase: Construction and Decommissioning Phases							
Potential impact description: Minor road degradation							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	M	Negative	M	M	M
With Mitigation	L	L	L	Negative	L	M	M
Can the impact be reversed?	Yes.						
Will impact cause irreplaceable loss or resources?	No.						
Can impact be avoided, managed or mitigated?	Yes, impacts can be managed and mitigated.						
Mitigation measures to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> • As the development will construct new access and minor roads, best practice would be to carry out regular maintenance of the new roads to ensure that its condition is maintained or improved. • If any existing gravel roads will be used, document the condition of the existing roads prior to construction. This will provide support if held liable to repair or upgrade roads claimed to be damaged during construction of the proposed development. • If any existing roads will be used, these roads, if necessary, should be upgraded to accommodate the use by proposed construction vehicles. • If any damage is caused to existing roads used by construction vehicles, these roads should be repaired to the state it was pre-construction. 							

11 ASSESSMENT OF POTENTIAL CUMULATIVE IMPACTS

The cumulative impact of a development is the impact that development will have when its impact is added to the incremental impacts of other past, present or reasonably foreseeable future activities that will affect the same environment. The most important concept related to a cumulative impact is that of an acceptable level of change to an environment. A cumulative impact only becomes relevant when the impact of the proposed development will lead directly to the sum of impacts of all developments

causing an acceptable level of change to be exceeded in the surrounding area. If the impact of the development being assessed does not cause that level to be exceeded, then the cumulative impact associated with that development is not significant.

Specialists used existing publicly available information and their expertise during the production of their report to assess the cumulative impacts of the relevant developments that occur within an up to 35 km radius of the proposed development.

11.1 Agriculture and Soil

The potential cumulative agricultural impact of importance is a regional loss of future agricultural production potential. There are a number of renewable energy developments that are leading to loss of agricultural grazing land in the area. However, because this proposed development will not lead to significant agricultural land loss, its cumulative impact is considered insignificant. Far more electricity grid infrastructure than currently exists, or is currently proposed, can be accommodated before acceptable levels of change are exceeded. Acceptable levels of change in terms of other types of impact, for example visual impact, would be exceeded long before the levels for agricultural impact became an issue. For the above reasons, impact of loss of future agricultural production potential can confidently be assessed as not having an unacceptable negative impact on the area without entering into a more formal assessment.

11.2 Freshwater and Wetlands

In the cumulative assessment of the proposed development, several projects within a 35 km radius have been reviewed and or sites accessed during the course of travelling between the various projects. Of these potential projects, the aquatic specialist has been involved in the initial EIA aquatic assessments or has managed / assisted with the WUL process for several of them.

All of the projects have indicated that this is also their intention with regard to mitigation, i.e., selecting the best possible routes to minimise the local and regional impacts and improving the drainage or hydrological conditions, with these rivers the cumulative impact could be seen as a net benefit. However, the worse-case scenario has been assessed below, i.e., only the minimum of mitigation be implemented by the other projects, and that flows within these systems are sporadic. This is also coupled to fact the several existing transmission lines already occur within the region.

Impact Phase: Cumulative							
Potential impact description: Impact on Aquatic Systems							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	M	Negative	M	M	H
With Mitigation	L	L	L	Negative	L	L	L
Can the impact be reversed?		Yes, due to the nature of the projects and surrounding aquatic ecosystems.					
Will impact cause irreplaceable loss or resources?		No.					
Can impact be avoided, managed or mitigated?		Yes.					
Mitigation measures to reduce residual risk or enhance opportunities by local landowners and or Provincial / District Roads organizations within the study area:							
<ul style="list-style-type: none"> Improve the current stormwater and energy dissipation features not currently found along the 							

- tracks and roads within the region; and
- Install properly sized culverts with erosion protection measures at the present road / track crossings.

11.3 Terrestrial Biodiversity, including Plants and Animals

Impacts on broad-scale ecological processes and cumulative habitat loss, connectivity or potential for the area to meet long-term conservation objectives (such as CBAs, ESAs, IBAs and NPAES areas).

Multiple existing power lines traverse the broader area. As the proposed power lines considered in this assessment run adjacent to existing power lines for the large majority of their route the cumulative impact is considered to be lower than if they were following novel routes across undisturbed vegetation. Ecological corridors allow for the dispersal and movement of plants across the landscape. This is a vital ecosystem process as it allows for pollination and gene flow. At the large scale the connectivity of the site is excellent. The proposed development would not have a significant impact on gene flow of flora. The use of existing access roads and servitudes, combined with the use of erosion control measures and the position of the switching station footprint on the plateau, the proposed development is unlikely to significantly increase any negative impact on the De Aar Region SWSA or freshwater ecosystem priority areas. The cumulative impact on ecological processes such as moisture-, soil/sedimentation-, fire regimes and ecological corridors is considered to be of low significance if mitigation measures are adhered to.

Impact Phase: Cumulative							
Potential impact description: Impacts on Broad-Scale Ecological Processes. Disruption of dispersal and gene flow of flora and fauna across the landscape, disruption of moisture-, soil/sedimentation- and fire regimes.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	L	Negative	L	L	H
With Mitigation	L	H	L	Negative	L	L	H
Can the impact be reversed?			No.				
Will impact cause irreplaceable loss or resources?			No.				
Can impact be avoided, managed or mitigated?			Yes.				
Mitigation measures to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> • The various mitigation and management plans associated with the development should be followed and implemented effectively to reduce the cumulative contribution of the current development. 							

An additional line will not negatively impact the conservation objectives beyond what has already occurred from the placement of the existing power lines in the area if mitigation measures are adhered to. Most of the proposed power line route is within an ESA area, and crosses small sections of CBAs. The ESA area is largely due to the presence of a large IBA around De Aar and also effectively functions to buffer CBAs from development. The north-eastern portion of the line that crosses into a NPAES focus area will not significantly reduce the potential future conservation value of the area as the proposed route runs adjacent to an existing power line. The presence of existing infrastructure in this area, as well as medium to long term agreements with the landowners in this area and the Longyan Mulilo De Aar 2 North wind energy facility makes it unlikely that this area will be incorporated into National Protected Areas in the foreseeable future. The

vegetation types and habitats available on the project site are widespread and remain largely untransformed across their extent. The relatively low rainfall in the area, low agricultural potential and low grazing capacity (20 ha/large stock unit)¹⁷ associated with the vegetation units found on the project site suggest that they will not be under significant threat of wide-scale transformation in the foreseeable future. As the footprint area of the power line and switching station is relatively small, and the power line follows the route of existing power lines, the proposed development not likely to compromise future conservation objectives, ecological functioning or the biodiversity value of these areas if mitigation measures are adhered to.

Impact Phase: Cumulative							
Potential impact description: Impact on Conservation Objectives. Cumulative impact on CBAs and Conservation Objectives.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	L	Negative	L	L	H
With Mitigation	L	H	L	Negative	L	L	H
Can the impact be reversed?		No.					
Will impact cause irreplaceable loss or resources?		No.					
Can impact be avoided, managed or mitigated?		Yes.					
Mitigation measures to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> The final position of new servitudes and pylons should be identified in the field through a reconstruction walk-through to microsite these features and avoid impact on sensitive species and habitats. The various mitigation and management plans associated with the development should be followed and implemented effectively to reduce the cumulative contribution of the current development. 							

11.4 Avifauna

A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other nearby activities as a result of the proposed development. Two operational wind energy facilities occur in the vicinity, Longyuan Mulilo De Aar 1 Wind Energy Facility (100 MW), located approximately 20 km west of the project site, and Longyuan Mulilo De Aar 2 North Wind Energy Facility (140 MW) located approximately 3 km to the north of the project site. When assessed together with other proposed wind energy facilities nearby (e.g. Zingesele WEF) the risks of collisions of birds with infrastructure and electrocution increases the potential to have a cumulatively negative impact on the avifauna of the area. The addition of the proposed line, however, is unlikely to significantly increase the cumulative impact on birds if mitigation measures are adhered to. This is largely due to **the proximity of the study site to the existing Eskom's Hydra Substation** and the large number of existing associated transmission lines in the area.

The impact table identifies the significance of the cumulative risk as medium, however, as most of the proposed power lines follow existing power lines for most of the route, the cumulative impact of an additional line is considered to be of low significance by the

¹⁷ Gazette Notice Of The Long-Term Grazing Capacity Map For South Africa 2017, For Implementation As Guided By Regulation 10 Of The Conservation Of Agricultural Resources Act (Act43 Of 1983). National Gazette No. 41870, 31 August 2018.

specialist as much of the impact associated with the proposed power lines are already present.

The loss of direct nesting locations for ground-nesting **Ludwig's Bustard** is possible with the development of the proposed new access road route. From virtually no vehicles within the area (other than those on existing farms roads) to the increased presence of vehicles in the area increases the likelihood of vehicle strikes, particularly for nocturnal species such as nightjars and owls. The impact table identifies the significance of the cumulative risk of the new road as medium, however, the intensity of the impacts can be reduced if the correct mitigation measures are followed.

Indeed, some opportunity exists with the development of a new power line to reduce some of the residual risks associated with the current infrastructure on the site. This may seem counter-intuitive, however the existing lines traverse habitat features that increase the risk of collisions, such as aquatic environments, but are not fitted with flappers or bird flight diverters to reduce potential collisions. The proposed power lines running adjacent to the existing power line, if fitted with such mitigation measures and with a staggered pylon design (relative to the existing pylons), may increase the visibility of the existing power line to birds and reduce overall collisions along the route. Where the proposed power line runs alongside smaller, lower voltage transmission lines, the higher and larger lattice towers typical of higher voltage power lines (as proposed) are more likely to be used as perches than the smaller towers. As the larger towers used for higher voltage transmission have larger clearances between the electrical infrastructure components, preferential use of these towers as perches may reduce the overall likelihood of electrocution.

Impact Phase: Operation							
Potential impact description: Cumulative avifauna impacts							
Cumulative impact of habitat destruction, collisions and electrocution, in the context of existing power lines in the area.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	H	Negative	M	M	M
With Mitigation	M	M	M	Negative	M	M	M
Can the impact be reversed?			Unlikely. Reversal would require the decommissioning of all the transmission infrastructure in the area.				
Will impact cause irreplaceable loss of resources?			Potentially. The wider area is important for the conservation of some Red Data species and some habitat loss and mortality may occur.				
Can impact be avoided, managed or mitigated?			Partially. Much of the cumulative impact risk already exists along the route and it is unlikely that the proposed development will significantly increase the negative impact on birds. The intensity of the cumulative impact can be reduced if mitigation measures are adhered to.				
Mitigation measures (for inclusion in the EMPr) to reduce residual risk or enhance opportunities:							
<ul style="list-style-type: none"> The various mitigation and management plans associated with the development should be followed and implemented effectively to reduce the cumulative contribution of the current development and enhance opportunities. 							

11.5 Heritage, Archaeology, and Palaeontology

In respect of potential cumulative impacts on palaeontological resources of the proposed project, the mixed nature of the geology of the area and the low level of surface and

near surface exposure of fossil-bearing rocks where they do occur in the area suggests that the cumulative impact will be low.

Archaeological material and historical sites are potentially far more at risk from the cumulative impacts, given their widespread occurrence and exposure across the area. Multiple human activities in the landscape, of which the installation of the transmission lines and construction of the switching station and access road are the latest, can erode the integrity of these resources through their physical damage or destruction. While at an individual project level these impacts may not appear to be significant, the cumulative effects of multiple developments or activities on archaeological and historical heritage resources can be high. The implementation of measures to mitigate project level impacts can do much to reduce cumulative impacts.

11.6 Visual

In terms of the cultural landscape, the presence of existing infrastructure in the area - the railway system, the N10 and the electrical and linear infrastructure related to the existing Eskom Hydra substation and the various wind and solar energy facilities surrounding De Aar – suggests that the additional transmission lines are unlikely to be out of place in the local environment, although they will add to the cumulative effect of modern development on the cultural landscape.

As there are existing electric infrastructure within the development area, the significance of this cumulative impact will be low.

Impact Phase: Cumulative							
Potential impact description: Cumulative Visual Impact							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	L	Negative	M	M	M
With Mitigation	L	M	L	Negative	L	L	M
Can the impact be reversed?		Yes, if the infrastructure is decommissioned.					
Will impact cause irreplaceable loss or resources?		No					
Can impact be avoided, managed or mitigated?		Yes					
Mitigation measures to reduce residual risk or enhance opportunities by local land owners and or Provincial / District Roads organizations within the study area:							
<ul style="list-style-type: none"> None. 							

11.7 Social

The establishment of a number of renewable energy facilities and associated infrastructure in the region will create employment, skills development and training opportunities, and creation of downstream business opportunities for the local community.

Impact Phase: Cumulative							
Potential impact description: Cumulative Social Impact							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without	M	H	M	Positive	M	M	M

Mitigation							
With Mitigation	M	H	M	Positive	M	M	M
Can the impact be reversed?	n/a.						
Will impact cause irreplaceable loss or resources?	No.						
Can impact be avoided, managed or mitigated?	Yes.						
Mitigation measures to reduce residual risk or enhance opportunities by local land owners and or Provincial / District Roads organizations within the study area:							
<ul style="list-style-type: none"> Key stakeholders, the developers and local municipalities should work together to ensure development of renewable energy projects will provide a positive impact to the social and economic status of the local community. 							

11.8 Traffic

Cumulative Impacts for the transport and traffic associated with the proposed development can be considered negligible. The construction and decommissioning of the proposed development will have limited impact on the R389 and N10, which may be used, even during peak periods such as school vacations, and peak seasonal holiday periods. The development of the proposed access road should lessen impacts to the existing national and main routes. No mitigation measures are required.

12 SUMMARY OF FINDINGS

This BAR has provided a description of the proposed Two Transmission Lines, a Switching Station and Roads in support of the Authorised De Aar 2 South WEF. It has also discussed the need and desirability and the environmental legislation and planning contexts for the proposed project **has been documented, including the proposed site's** baseline environment. Specialist investigations and detailed assessments have been conducted for the following areas of study:

- Geology, soils and agriculture;
- Freshwater and wetlands;
- Biodiversity including plant species;
- Avifauna and Animal species; and
- Cultural Heritage, Archaeology and Palaeontology.

12.1 Agriculture and Soil

The agricultural protocol requires confirmation that all reasonable measures have been taken through micro-siting to minimise fragmentation and disturbance of agricultural activities. However, the agricultural uniformity and low agricultural potential of the environment, means that the exact positions of all infrastructure will make no material difference to agricultural impacts and disturbance. Furthermore, the protocol requires confirmation in the case of a linear activity, that the land can be returned to the current state within two years of completion of the construction phase. It is confirmed that the land under the transmission route can be returned to the current state within two years of construction. The switching station and the road will have a footprint that lasts for the project lifetime.

The only sources of impact are occupation of the 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 mitigation measures included in the generic EMPr. In conclusion of the soil assessment, the proposed

development will have an insignificant and therefore acceptable impact on the future agricultural production potential of the site. This is because:

- 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, including a service track below the lines, is insignificantly small within an agricultural environment of large farms with low density grazing;
- The area of land affected by the switching station (1 hectare) and road (9.6 hectares) are entirely insignificant in the agricultural environment of large farms with low intensity grazing; and
- The affected land has very limited agricultural production potential.

Therefore, from an agricultural impact point of view, there is **no objection to the authorisation of the development.**

12.2 Freshwater and Wetlands (Aquatic)

The proposed development is likely to have limited impact on the aquatic environment. As for the most part, the final placement of the towers could avoid the delineated wetlands and potentially span watercourses. It has however been assumed that due to the width of some of the broader alluvial systems, some towers will need to be placed within these systems, but this would have little impact on these systems, especially if no new permanent access tracks are created within these areas. The access road will however need to cross a broad alluvial watercourse, which could impact on the hydrology of the system if poorly designed. However, the proposed crossings site is located between several existing hydrological impacts on the river systems, which include diversion channels, weirs and dams. Thus, it is unlikely that the access road will add any additional impact on the regional flows, if required it should be ensured that no further inundation / diversion results from the watercourse crossings structures, and should be of a low level design if possible. It is recommended that if possible it is aligned with any existing crossings / tracks within the area. The proposed substation will not have any direct impact on any watercourse or hydrology related to these systems.

Thus, based on the findings of the specialist study, significance of the impacts assessed for the aquatic systems after mitigation would be **low**. The specialist has **no objection to the authorisation of any of the proposed activities for the proposed development.**

12.2.1 Aquatic Permit Requirements

The final number of actual water course crossings (i.e. towers within the alluvial water course and or within 500 m of the wetland, coupled to the creation of access tracks along the grid – only if required but not advocated) can be determined when micro-siting occurs, as these would trigger the need for a Water Use License application (WULA). The proposed access road will cross 21 small watercourses. A potential General Application (GA) in terms of Section 21 (c) and (i) of the National Water Act (Act 36 of 1998) (NWA), should any construction take place within these areas will be required. Should any of the present road crossings need to be upgraded then the opportunity exists to improve the current state (lack of habitat continuity) for example by replacing pipe culverts with box culverts. This opportunity to improve the hydrological conditions can be seen as a net benefit and was assessed as part of the cumulative impact statement. DHSWS will determine if a GA or WULA application will be required during the pre-application phase, and typically if one of the below identified water-uses requires a WULA then all applications will be treated as a WULA and not GA.

Based on an assessment of the proposed activities and past engagement with DHSWS, the following WULs / GA's could be required based on the following thresholds as listed in the following Government Notices:

- DHSWS Notice 538 of 2016, 2 September in GG 40243– Section 21 a & b, Abstraction and Storage of water.
- Government Notice 509 in GG 40229 of 26 August 2016 – Section 21 c & i, Impeding or diverting the flow of water in a watercourse and or altering the bed, banks, course or characteristics of a watercourse.

The application process will be initiated by the Applicant/Developer and will be separate to this basic assessment process.

	Water Use Activity	Applicable to this development proposal
S21(a)	Taking water from a water resource	Only water if water is abstracted from a local river or borehole.
S21(b)	Storing water	If the total volume stored is greater than 40 000 m ³ then a full Water Use License will be required. This is however unlikely due to the scale of the project and the need for such large volumes.
S21(c)	Impeding or diverting the flow of water in a watercourse	Yes – several new crossings of watercourses (i.e., activities within 500 m of a wetland or towers may be placed within the alluvial areas if they cannot span these wide systems) will be required. A GA process can potentially be followed as the draft Risk Assessment Matrix indicates all impacts are LOW, but this will be finalised once the response on the WUL application is received.
S21(d)	Engaging in a stream flow reduction activity	Not applicable
S21(e)	Engaging in a controlled activity	Not applicable
S21(f)	Discharging waste or water containing waste into a water resource through a pipe, canal, sewer or other conduit	Not applicable
S21(g)	Disposing of waste in a manner which may detrimentally impact on a water resource	Only portable toilets will be required, and assuming that there will not be conservancy tanks of more than 10 000m ³ per farm portion.
S21(h)	Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process	Not applicable
S21(i)	Altering the bed, banks, course or characteristics of a watercourse	Yes – several new crossings of watercourses (i.e., activities within 500 m of a wetland or towers may be placed within the alluvial areas if they cannot span these wide systems) will be required. A GA process can potentially be followed as the draft Risk Assessment Matrix indicates all impacts are LOW, but this will be finalised once the response on the WUL application is received.
S21(j)	Removing, discharging or disposing of water found underground for the	Not applicable

	Water Use Activity	Applicable to this development proposal
	continuation of an activity or for the safety of persons	
S21(k)	Using water for recreational purposes	Not applicable

12.3 Terrestrial Ecology, including Plants and Animals

It was found that the all vegetation types found within the study area are largely intact with very little prospect of long-term transformation through agricultural practices. The azonal vegetation however is small and patchy, but contributes to the overall diversity of habitats and species. Disturbance to this vegetation unit must be avoided wherever possible.

The low overall footprint of the transmission lines and switching station within the ESAs, CBAs and NPAES Focus Areas, combined with the fact that the proposed routes runs adjacent to existing power lines for most of the routes, means that the development would not compromise the ecological functioning or the long-term conservation value of the area. It is the opinion of the specialist that the impact of the proposed transmission lines and switching station is considered to be **low** and acceptable following mitigation.

The overall footprint of the proposed access road within the ESAs, CBAs and NPAES Focus Areas is Medium to High, however, can be considered Low with adherence to strict mitigation measures. If the pre-construction walkthrough does not permit for the specified mitigation measures to be adhered to, further recommendation would be to alter the proposed Access Road route to avoid intersection with the Azonal vegetation unit and other niche habitats within the CBA as far as possible. Similar to the transmission lines, if the alternative route and required mitigation practices are adhered to, the access road will not compromise the ecological functioning or long-term conservation value of the area.

The transmission lines, switching station, access roads are unlikely to generate significant impacts on flora and fauna after mitigation. No highly significant negative impacts that cannot be adequately mitigated against were observed, therefore from a terrestrial flora and fauna perspective **there are no reasons to oppose the development**. It is the specialist opinion that the proposed development will have a low potential impact to the terrestrial ecology of the area.

12.4 Avifauna

The area of habitat destruction associated with the footprint of the power lines infrastructure, temporary construction facilities, the switching station and new access road are relatively small in extent compared to the proportion of untransformed habitat available in the area, and do not represent a fatal flaw that would prevent the proposed development from proceeding.

A number of Red Data species, and species vulnerable to collisions with power lines exist in the area of the proposed power lines route and the impact of collisions to birds has a Medium significance even with the implementation of mitigation measures. However, significant opportunities exist to increase the visibility of the existing power line that runs adjacent to the proposed power lines as the existing power line is unmarked in terms of bird flight diverters or flappers. By attaching bird flight diverters or flappers to the proposed line and potentially staggering the pylon placement in relation to the existing power line the visibility of the lines may increase for those sections where they run parallel to each other. This has the potential to reduce the risk of collision by birds traversing the area as they are already at risk from existing infrastructure.

Construction activities should be timed to coincide with the local conditions and breeding **activity of Verreaux's Eagles to reduce the overall impact**. For example, construction activity in seasonally inundated areas should not occur during the peak rainfall period in summer to reduce the impact on wetland habitats, and construction activity near the **Verreaux's Eagle nest should not occur during peak breeding periods in winter**. This makes reference to the development of the new access road as well, where a qualified **ECO should be present to monitor any presence and breeding behaviour of Verreaux's Eagle, Ludwig's Bustard and Lanner Falcon along the new access road route**.

An external review of a previous assessment conducted for the proposed grid connection route, by Jon Smallie of WildSkies Ecological Services (Pty) Ltd, found that the recommendations were agreed with and incorporated into the report. The main recommendations included an increase of the no-go nest buffer from 200 m (now 300 m), an increase in the breeding season buffer duration (now including December 2020) and the addition of a clarification statement regarding the placement of the proposed power line to the east of the existing power line to reduce the risk of collision by the **resident pair of Verreaux's Eagle and their offspring**.

The proposed project is unlikely to generate significant impacts on avifauna after mitigation. No highly significant negative impacts were observed, therefore from an avifaunal perspective the **proposed project can be authorised if all recommendations and mitigation measures are implemented accordingly**.

12.5 Heritage, Archaeology and Palaeontology

The fieldwork undertaken to inform this assessment identified Middle Stone Age (MSA), Late Stone Age (LSA) lithic material and Khoi and colonial era stone structures of a generally relatively **low**, local archaeological significance, widely distributed across the landscape. The impacts to archaeological material in the area of the construction of the transmission line, switching station and access road will be relatively small and localised, although where individual sites or structures are affected the impact will be high, this could be reduced to low through the application of measures to mitigate potential loss or damage.

Based on the information that has been collected, indications are that impacts on heritage resources arising from the installation of the transmission lines and construction of the switching station and access road will be as follows:

- Palaeontological resources: Given the nature of the proposed project, activities may impact upon fossils if they are present close to the ground surface in the development footprint. Both transmission line options and the access road will cross areas where the bedrock is the correct age to contain fossils, particularly trace fossils and silicified wood fragments within the Tierberg Formation.
- If existing service roads and access points are used during the construction of the transmission lines, this will reduce the potential for impacts on fossil resources. The very small footprint of pylon foundations also means that the impact on the fossil heritage resources from the installation of the transmission lines is assessed to be very low. The construction of the access road may impact fossil resources along that portion of the route below the dolerite massifs. However, in this lower-lying portion of the route impacts from the road will be largely confined to Quaternary sands and, possibly, to Adelaide Subgroup rocks which are potentially fossiliferous (vertebrates and silicified wood). Impacts to fossil resources where the access road traverses the dolerite uplands and on the site of the switching station are not expected as the underlying bedrock is non-fossiliferous. Taking all of the above into account, the significance of potential impacts to fossil heritage resources is extremely low.

- MSA: The volume of and apparently ubiquitous nature of the MSA artefacts scattered across the landscape, and the fact that much of this material is in secondary, or disturbed context, means that the combined overall impact significance of activities associated with this project on MSA material will be relatively low;
- LSA: The context of much of the LSA material noted during the survey appears to be better preserved than the MSA material, and is thus of greater archaeological significance. More occurrences that could be called sites were noted with the LSA material, and the possible association of Ostrich Eggshell with some of the early Holocene material eroding out the banks of the Brak River, for example, makes some of these sites of particular interest and importance. Were these sites to be lost or damaged as a result of the construction of the transmission lines, the switching station or the access road, the impact significance would be medium. The application of measures to mitigate potential loss or damage, however, would reduce the impact significance to low;
- Kraals and Stone Structures: The possible Khoi kraals and other stone structures noted during the survey, represent a little known aspect of the history and archaeology of this area. Their damage or destruction would result in a loss of heritage, and the impact significance would be medium. The application of measures to mitigate potential loss or damage, however, would reduce the impact significance to low;
- Graves, cairns and stone features: No graves or cairns were encountered during either the 2020 or 2022 surveys. Damage to or the destruction of the possible ruined "wolwehok" would have a moderate impact significance. The application of measures to mitigate potential loss or damage, however, would reduce the impact significance to low;
- No impacts are expected to engravings and rock art, historical archaeological sites and materials or the built environment.

Provided that the mitigation measures are implemented, the **overall impact of the proposed installation of the De Aar 2 South WEF transmission lines, switching station and access road is tolerable and generally of low heritage significance and the proposed activity is considered acceptable.**

13 IMPACT STATEMENT AND CONCLUSION

Based on the assessments conducted, the construction of the transmission lines, switching station, and road within the assessed areas **are acceptable from an environmental perspective.**

No environmental fatal flaws have been identified, and should all the recommended mitigation measures be implemented, it is anticipated that, overall, impacts would remain of medium to low negative significance. Positive impacts were also identified, that would be realised if the project proceeded. Following mitigation, the cumulative impact of the proposed development would be medium / low. The low overall footprint of the development within the ESAs, CBAs and NPAES Focus Areas, combined with the fact that the proposed route runs adjacent to existing power lines for most of the route, the proposed development would not compromise the ecological functioning or the long-term conservation value of the area. The confidence in the assessment is regarded as acceptable.

The approval of the proposed development is required for the construction and operation of the authorised De Aar 2 South WEF (DFFE Ref. No.: 12/12/20/2463/1/AM8) to commence. The reason for this later application and separation of the project components in terms of the application process rests with the fact that the Environmental Authorisation for the proposed development may become the property of Eskom, and would not be controlled by the Applicant.

Taking into consideration the findings of the BA process for the proposed development, it is the opinion of the Environmental Assessment Practitioner (EAP) that the majority of negative impacts associated with the implementation of the proposed project can be mitigated to acceptable levels. While the residual impacts of the project will have a positive socio-economic impact on the local environment, the extent of the benefits associated with the implementation of the projects will benefit a much larger group of people and stakeholders, in terms of renewable energy supply.

The applicant is seeking authorisation for all the Infrastructure to provide Eskom with the opportunity to decide which transmission route and associated infrastructure will be best suited, upon construction, to connect to the either the proposed Vetlaagte or the proposed Wag 'n Bietjie MTS.

Overall, it is the opinion of the EAP that the proposed development **should be approved**, subject to implementation of the recommended mitigation measures and management actions contained in this BA report; generic EMPr and all the specialist reports.

13.1 Specific conditions to be included in the EA

Any specific conditions to be included in the Environmental Authorisation as advised by the specialist assessments are provided below:

Aquatic

- A pre-construction walkthrough or desk assessment by an aquatic specialist is recommended to micro-site the final tower layout as required.

Terrestrial Biodiversity

- A comprehensive list of species occurring within the footprint of the proposed infrastructure is required, conducted during the peak growing season, and a permit application submitted for any of those listed as protected.
- A walk-through survey or desk assessment is therefore recommended by a qualified specialist once the final pylon positions, access routes, and layout of temporary and permanent associated infrastructure have been finalised, in order to obtain the number of applicable plants for which permits are required for their destruction.

Avifauna

- The **Verreaux's Eagle nest observed on the cliffs (-30.595564, 24.265331)** must be considered a no-go area which should be applied throughout the year during the construction and operational phase.
- Construction **activities in the vicinity of the active Verreaux's Eagle nest should be** timed to not occur within the breeding periods of these birds (May, June, July and August), a 500 m buffer around the nests represents a minimum area within which construction activities should not occur during these months.
- Construction of pylons or additional access roads within 200 m of National Freshwater Ecosystem Priority Areas should be avoided to reduce the potential impact on wetland habitats which are important to birds and other species in arid areas.
- Appropriate bird flight diverters, or flappers should be attached to the full length of the proposed power lines, and pylons/towers should be staggered as much as possible in relation to the adjacent, existing power lines.
- An operational monitoring programme must be implemented and include regular monitoring (i.e., quarterly) of the entire length of the power lines for collision and electrocution incidents for the lifespan of the project.
- Collision incidents and mortalities must be recorded and reported to the Endangered Wildlife Trust (EWT).

Heritage, Archaeology and Palaeontology

- A Fossil Chance Find Protocol must be implemented at the commencement, and for the life of the proposed project.
- The environmental control officer (ECO) must look out for fossils and any fossil finds must be reported to SAHRA and conserved (preferably *in situ*). Significant chance fossil must be recorded and sampled by a qualified palaeontologist, together with pertinent contextual data (stratigraphy, sedimentology, taphonomy). Any recovered fossil material must be curated within an approved repository (museum/university fossil collection) by the palaeontologist.
- One cluster of archaeological sites requires mitigation, in the form of artefact mapping, recording and collection by the project archaeologist prior to the commencement of construction of the transmission lines. This is JG050-JG052 / GEB013-GEB014, a dense early Holocene LSA stone scatter with ostrich eggshell eroding out of the bank of a stream in the Brak River Valley.
- Other sites on or close to the development require mitigation by avoidance. Although not directly on the proposed cable or road alignments or switching station site, some of these sites are close enough to potentially be impacted or suffer damage as a direct, or indirect result of the installation of this infrastructure. These sites, each with the buffer described below, must be considered no-go areas during construction activities and those nearest the route alignments must be clearly marked as out of bounds. If any of these buffers cannot be implemented or maintained, then these sites will require mitigation, in the form of artefact mapping, recording and collection by the project archaeologist prior to the commencement of construction of the transmission lines or access road.
 - A 50 m buffer must be implemented around the outer limits of these cluster sites (JG067–JG072 / GEB025);
 - A 40 m buffer must be implemented around each possible Khoi kraals and **shepherds' huts (JG040; JG064; JG066)**;
 - **A 20 m buffer must be implemented around the possible "wolwehok" (JG036)**;
 - A 20 m buffer must be implemented around the possible rock engraving (JG044);
 - A 30 m buffer must be implemented around each of the two deflated stone clusters (JG122 and JG123); and
 - A 40 m buffer must be implemented around the waypoint (GEB105).
- The project archaeologist must review the positions of the individual pylons once these have been determined, to ensure that they will not impact on any recorded heritage resources. The micro-siting of pylon positions may be required, which should also be done in consultation with the archaeologist.
- Should any human remains be encountered at any stage during the construction or earthworks associated with the project, or any other archaeological or palaeontological material be encountered, work in the vicinity must cease, the remains must be left *in situ* but made secure and the project archaeologist and SAHRA must be notified immediately so that migratory action can be determined and be implemented.
- In the event of any new heritage resources being encountered during the installation of the transmission lines or the construction of the switching station or access road, SAHRA must be consulted immediately so that mitigatory action can be determined and be implemented if necessary. Such mitigation is at the cost of the developer, while time delays and diversion of machinery/plant may be necessary until mitigation in the form of conservation or archaeological sampling is completed.

FIGURES

Figure 1 : Proposed Development Geographical Co-ordinates

Figure 2 : Site Location

Figure 3 : Proposed Development Plan

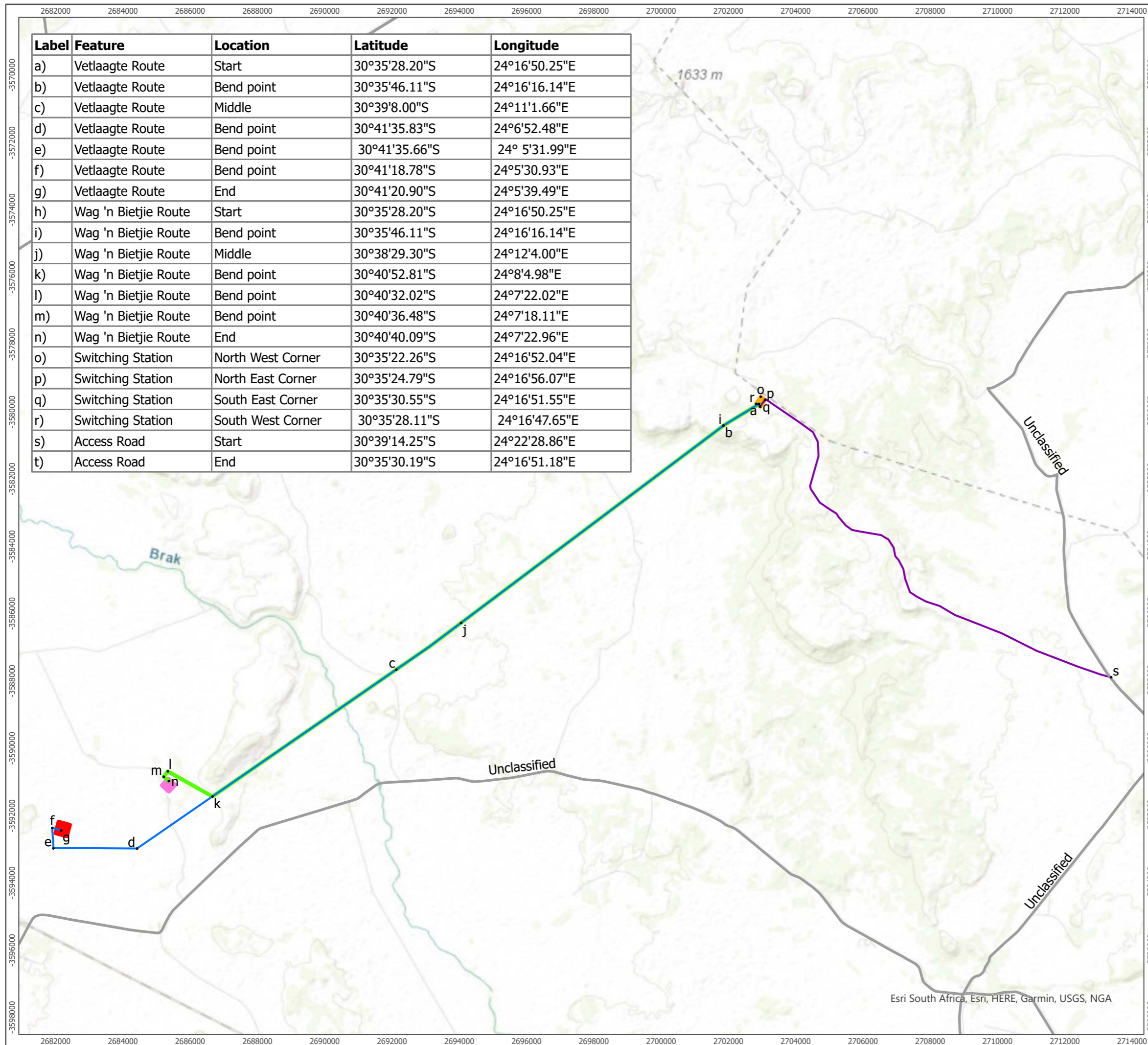
Figure 4 : Renewable Energy Projects within 35 km radius

Figure 5 : Land Use and Land Cover

Figure 6 : Critical Biodiversity Areas

Figure 7 : Environmental Sensitivity Map

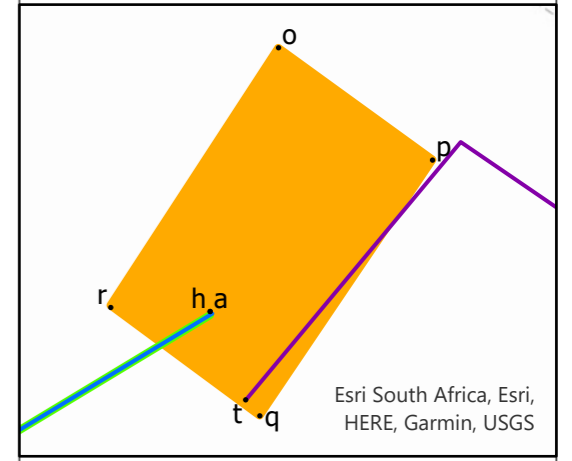
Figure 8 : Layout and Sensitivity Map



Label	Feature	Location	Latitude	Longitude
a)	Vetlaagte Route	Start	30°35'28.20"S	24°16'50.25"E
b)	Vetlaagte Route	Bend point	30°35'46.11"S	24°16'16.14"E
c)	Vetlaagte Route	Middle	30°39'8.00"S	24°11'1.66"E
d)	Vetlaagte Route	Bend point	30°41'35.83"S	24°6'52.48"E
e)	Vetlaagte Route	Bend point	30°41'35.66"S	24° 5'31.99"E
f)	Vetlaagte Route	Bend point	30°41'18.78"S	24°5'30.93"E
g)	Vetlaagte Route	End	30°41'20.90"S	24°5'39.49"E
h)	Wag 'n Bietjie Route	Start	30°35'28.20"S	24°16'50.25"E
i)	Wag 'n Bietjie Route	Bend point	30°35'46.11"S	24°16'16.14"E
j)	Wag 'n Bietjie Route	Middle	30°38'29.30"S	24°12'4.00"E
k)	Wag 'n Bietjie Route	Bend point	30°40'52.81"S	24°8'4.98"E
l)	Wag 'n Bietjie Route	Bend point	30°40'32.02"S	24°7'22.02"E
m)	Wag 'n Bietjie Route	Bend point	30°40'36.48"S	24°7'18.11"E
n)	Wag 'n Bietjie Route	End	30°40'40.09"S	24°7'22.96"E
o)	Switching Station	North West Corner	30°35'22.26"S	24°16'52.04"E
p)	Switching Station	North East Corner	30°35'24.79"S	24°16'56.07"E
q)	Switching Station	South East Corner	30°35'30.55"S	24°16'51.55"E
r)	Switching Station	South West Corner	30°35'28.11"S	24°16'47.65"E
s)	Access Road	Start	30°39'14.25"S	24°22'28.86"E
t)	Access Road	End	30°35'30.19"S	24°16'51.18"E



- Proposed Vetlaagte MT Substation
- Proposed Wag 'n Bietjie MT Substation
- Existing Roads
- Coordinate Points
- Proposed Development**
- Transmission Route Alternative 1 (to Vetlaagte MTS)
- Transmission Route Alternative 2 (to Wag 'n Bietjie MTS)
- Proposed Switching Station
- Proposed New Site Access Road

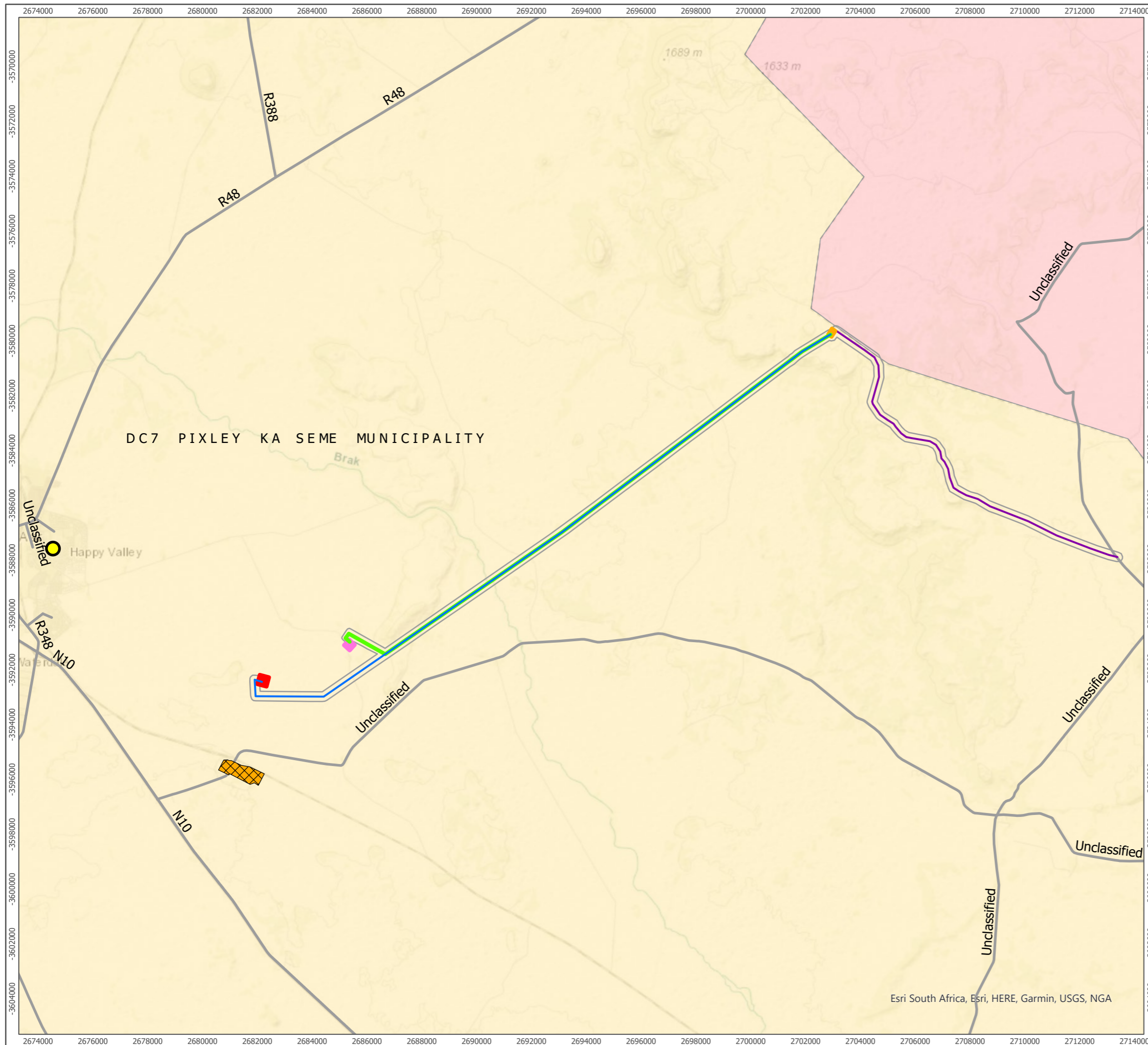


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 0 2 4 km
 NORTH

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Proposed Development Geographical Co-ordinates
 Figure 1

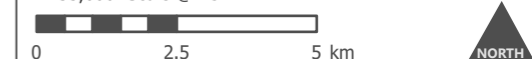
De Ar 2 South Transmission Lines and Associated Infrastructure Basic Assessment Report



- De Ar
- Existing Roads
- Eskom Hydra Substation
- Proposed Wag 'n Bietjie MT Substation
- Proposed Vetlaagte MT Substation
- Local Municipality**
- Emthanjeni Local Municipality
- Renosterberg Local Municipality
- Proposed Development**
- Transmission Route Alternative 1 (to Vetlaagte MTS)
- Transmission Route Alternative 2 (to Wag 'n Bietjie MTS)
- Proposed Switching Station
- Proposed New Site Access Road
- 300m Corridor Assessed



1:135,000 Scale @ A3



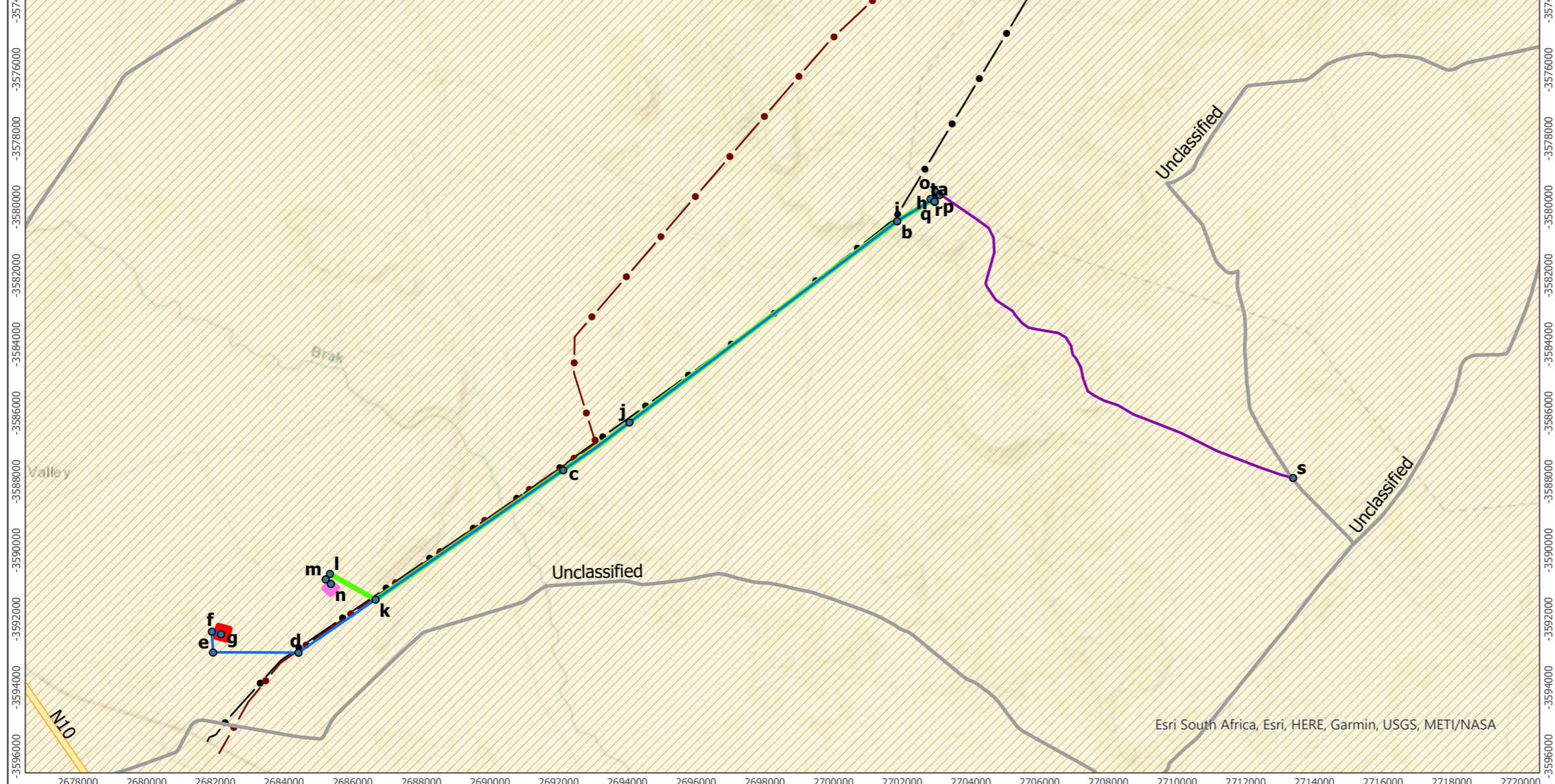
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Site Location
Figure 2

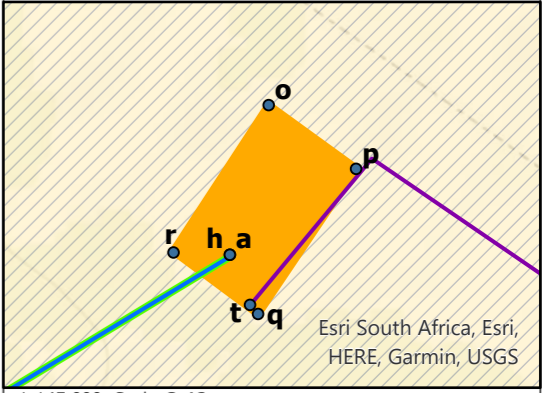
De Ar 2 South Transmission Lines and Associated Infrastructure Basic Assessment Report

Esri South Africa, Esri, HERE, Garmin, USGS, NGA

Label	Feature	Location	Latitude	Longitude
a)	Vetlaagte Route	Start	30°35'28.20"S	24°16'50.25"E
b)	Vetlaagte Route	Bend point	30°35'46.11"S	24°16'16.14"E
c)	Vetlaagte Route	Middle	30°39'8.00"S	24°11'1.66"E
d)	Vetlaagte Route	Bend point	30°41'35.83"S	24°6'52.48"E
e)	Vetlaagte Route	Bend point	30°41'35.66"S	24° 5'31.99"E
f)	Vetlaagte Route	Bend point	30°41'18.78"S	24°5'30.93"E
g)	Vetlaagte Route	End	30°41'20.90"S	24°5'39.49"E
h)	Wag 'n Bietjie	Start	30°35'28.20"S	24°16'50.25"E
i)	Wag 'n Bietjie	Bend point	30°35'46.11"S	24°16'16.14"E
j)	Wag 'n Bietjie	Middle	30°38'29.30"S	24°12'4.00"E
k)	Wag 'n Bietjie	Bend point	30°40'52.81"S	24°8'4.98"E
l)	Wag 'n Bietjie	Bend point	30°40'32.02"S	24°7'22.02"E
m)	Wag 'n Bietjie	Bend point	30°40'36.48"S	24°7'18.11"E
n)	Wag 'n Bietjie	End	30°40'40.09"S	24°7'22.96"E
o)	Switching Station	North West Corner	30°35'22.26"S	24°16'52.04"E
p)	Switching Station	North East Corner	30°35'24.79"S	24°16'56.07"E
q)	Switching Station	South East Corner	30°35'30.55"S	24°16'51.55"E
r)	Switching Station	South West	30°35'28.11"S	24°16'47.65"E
s)	Access Road	Start	30°39'14.25"S	24°22'28.86"E
t)	Access Road	End	30°35'30.19"S	24°16'51.18"E



- Central Strategic Transmission Corridor
- Existing Hydra Roodekuil 220kV Transmission Line
- Existing Longyan Mulilo De Aar 2 North WEF Transmission Line
- Proposed Wag 'n Bietjie MT Substation
- Proposed Vetlaagte MT Substation
- Existing Roads
- N10
- Feature Points**
- Transmission Route Alternative 1 (to Vetlaagte MTS)
- Transmission Route Alternative 2 (to Wag 'n Bietjie MTS)
- Proposed Switching Station
- Proposed New Site Access Road
- Co-ordinate Points

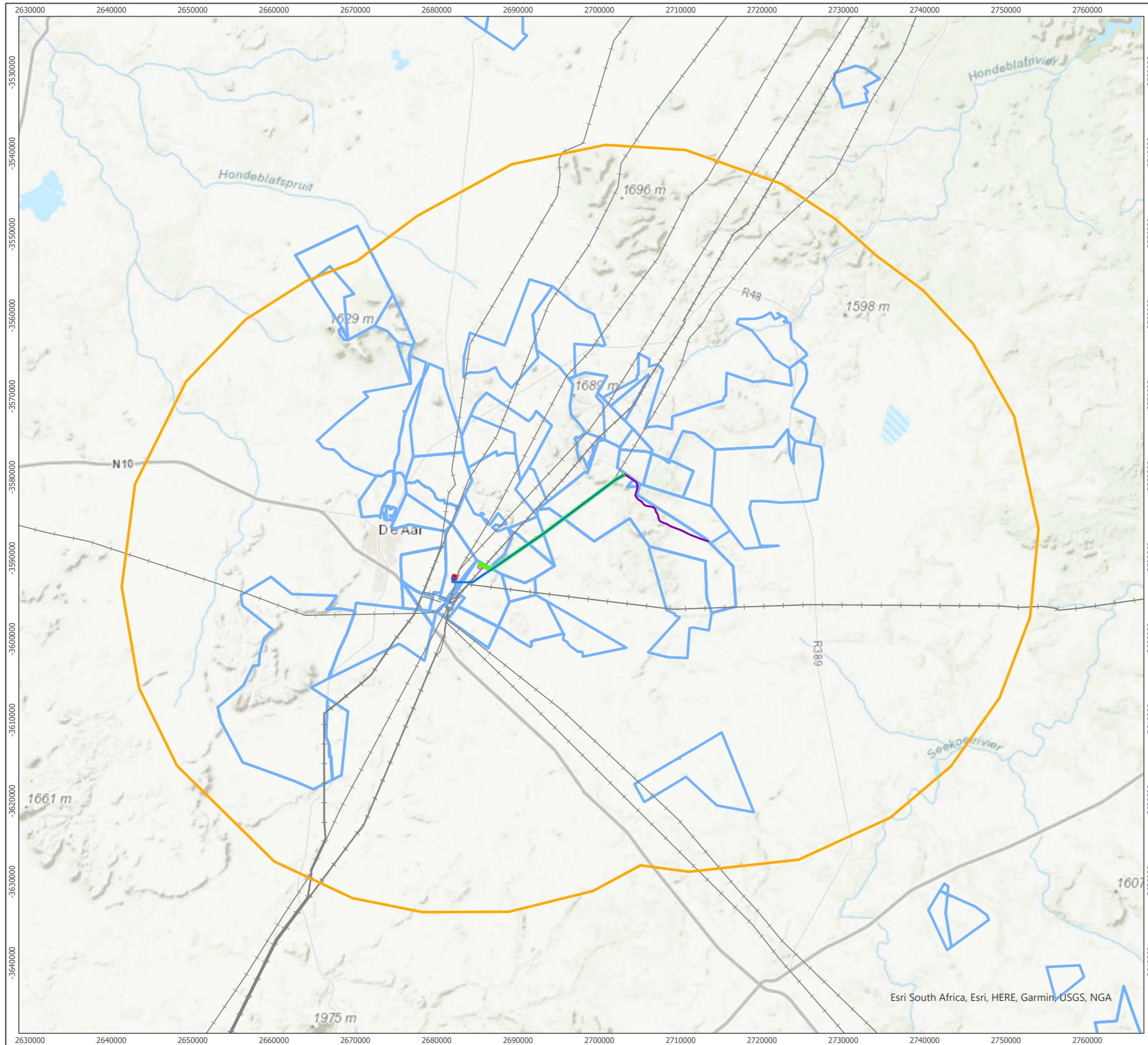


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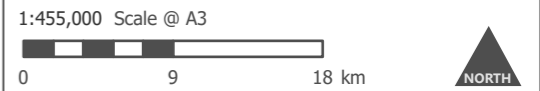
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Proposed Site Development Plan
Figure 3

De Aar 2 South Transmission Lines and Associated Infrastructure
Basic Assessment Report



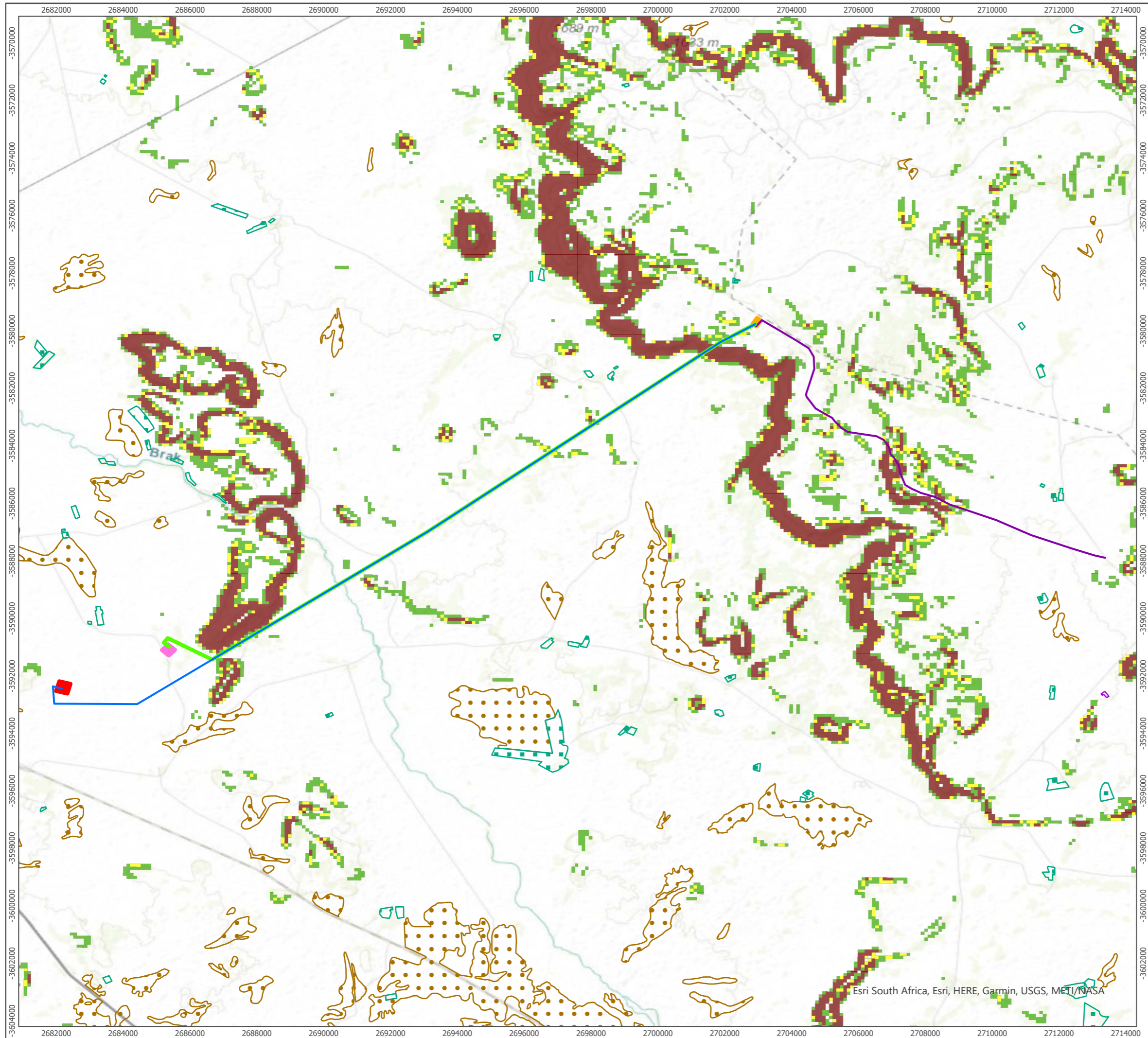
- REEA
- Existing Transmission Lines
- Proposed Wag 'n Bietjie MT Substation
- Proposed Vetlaagte MT Substation
- 35km Buffer for REEA and Transmission Lines
- Proposed Development**
- Transmission Route Alternative 1 (to Vetlaagte MTS)
- Transmission Route Alternative 2 (to Wag 'n Bietjie MTS)
- Proposed Switching Station
- Proposed New Site Access Road



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**Renewable Energy Projects
within 35 km radius**
Figure 4

**De Aar 2 South Transmission Lines
and Associated Infrastructure
Basic Assessment Report**



- Slope (%)**
- 8 - 12
 - 12 - 14
 - >14
- Land Use**
- Barren Lands
 - Cultivated Land
 - Orchard / Vineyard
- Proposed Development**
- Transmission Route Alternative 1 (to Vetlaagte MTS)
 - Transmission Route Alternative 2 (to Wag 'n Bietjie MTS)
 - Proposed New Site Access Road
 - Proposed Switching Station
 - Proposed Vetlaagte MT Substation
 - Proposed Wag 'n Bietjie MT Substation

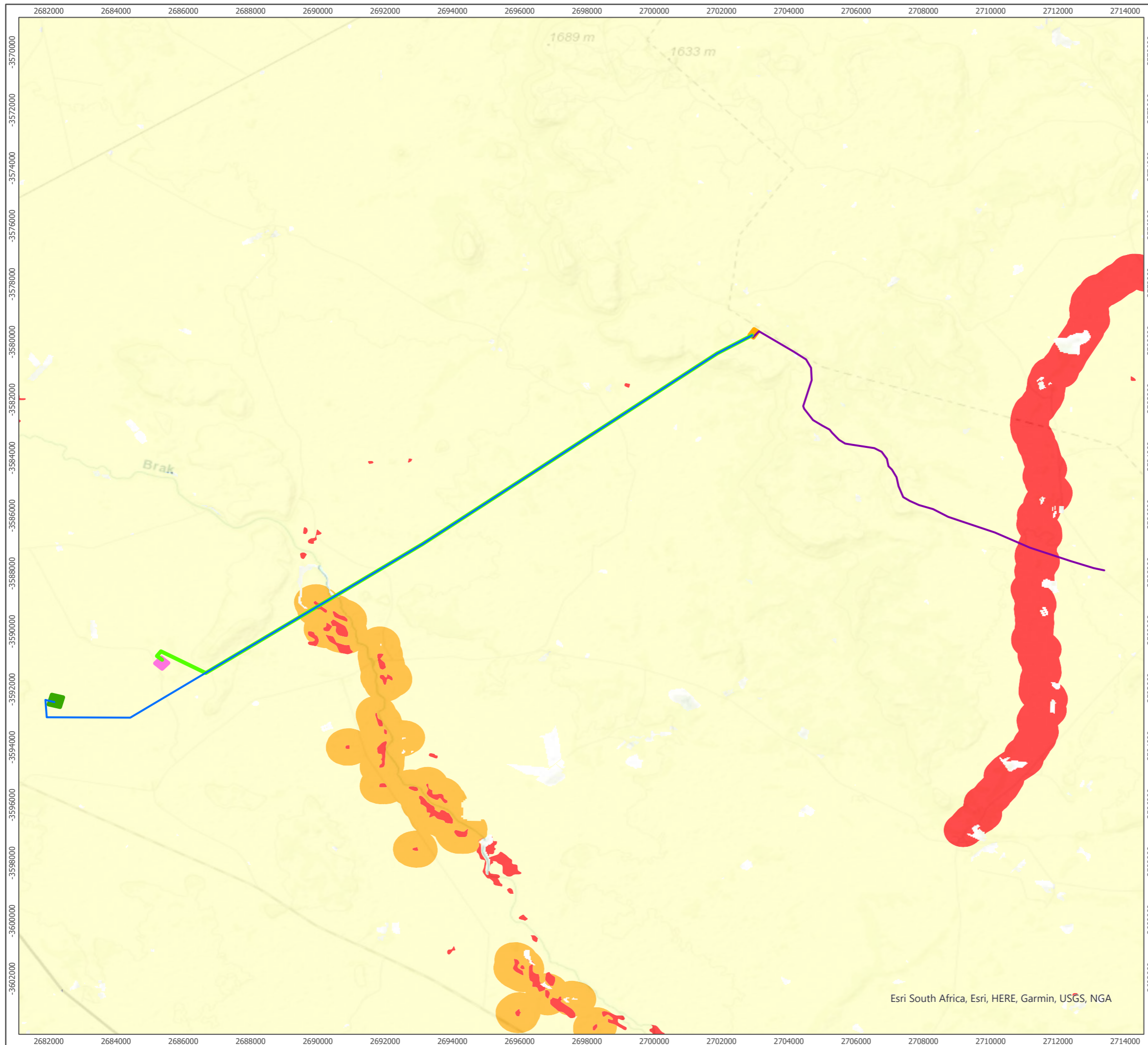
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Checked By: AA	Date: 7/20/2022

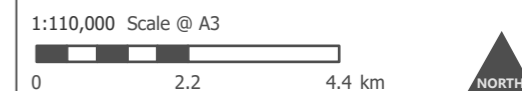
Land Use
Figure 5

De Aar 2 South Transmission Lines and Associated Infrastructure
Basic Assessment Report

Esri South Africa, Esri, HERE, Garmin, USGS, METI/NASA



- Critical Biodiversity Area One
- Critical Biodiversity Area Two
- Ecological Support Area
- Proposed Development**
- Transmission Route Alternative 1 (to Vetlaagte MTS)
- Transmission Route Alternative 2 (to Wag 'n Bietjie MTS)
- Proposed New Site Access Road
- Proposed Switching Station
- Proposed Vetlaagte MT Substation
- Proposed Wag 'n Bietjie MT Substation

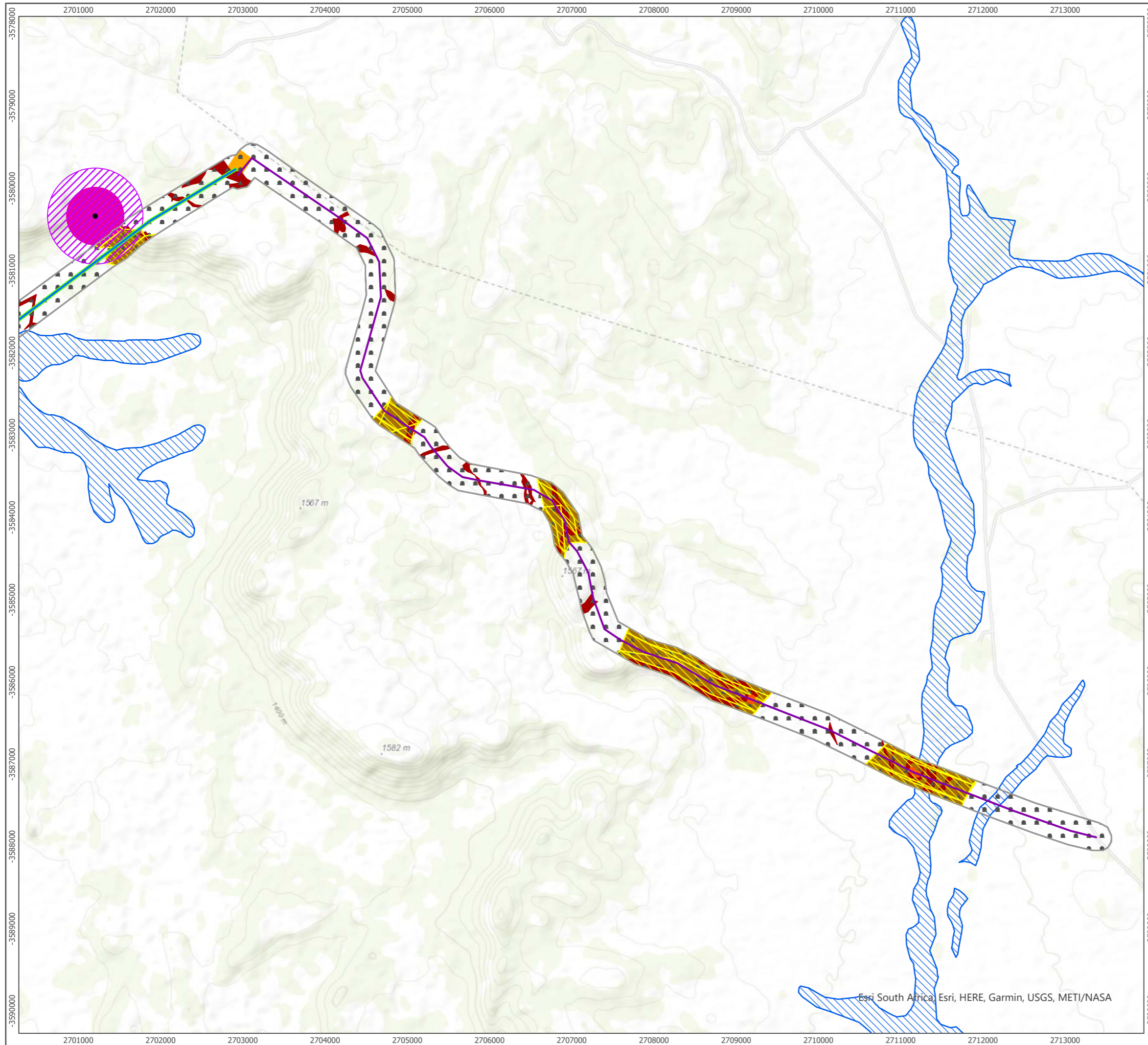


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Checked By: AA	Date: 7/20/2022

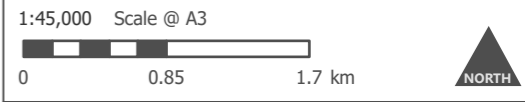
Critical Biodiversity Areas
Figure 6

De Aar 2 South Transmission Lines and Associated Infrastructure
Basic Assessment Report

Esri South Africa, Esri, HERE, Garmin, USGS, NGA



- 300m Corridor Assessed
- Proposed Development**
- Transmission Route Alternative 1 (to Vetlaagte MTS)
- Transmission Route Alternative 2 (to Wag 'n Bietjie MTS)
- Proposed New Site Access Road
- Proposed Switching Station
- No-Go Areas**
- Archaeological No-Go
- Verreaux's Eagle Nest
- 500m Nest Buffer
- High Sensitivity Birds (300m No-go Buffer)
- High Sensitivity Ecology
- Specialist Constraints**
- ▲▲▲ Low Sensitivity Birds
- Medium Sensitivity Birds
- Low Sensitivity Ecology
- Medium Sensitivity Ecology
- Alluvial watercourses incl 48m buffer

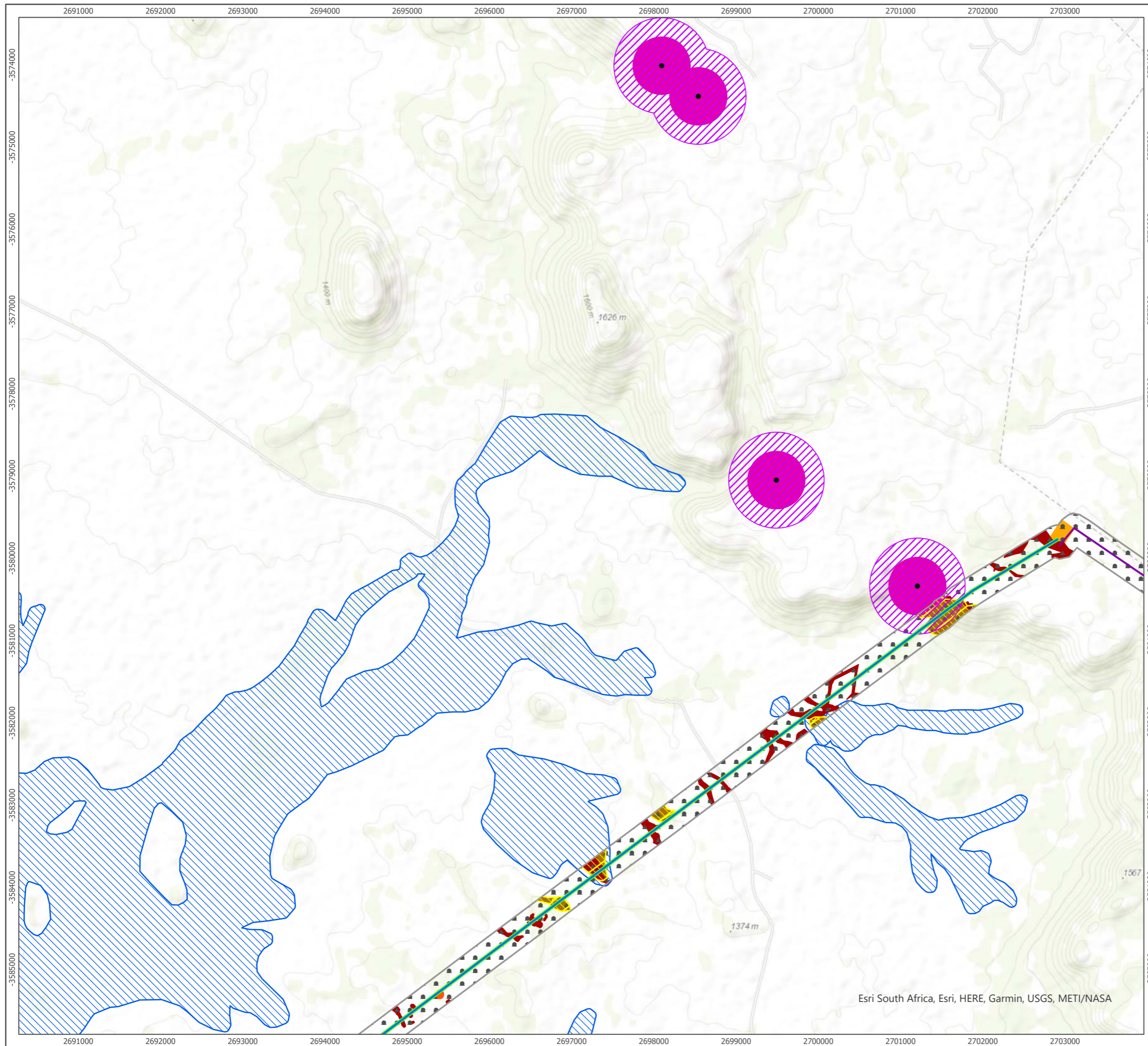


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Checked By: AA	Date: 7/20/2022

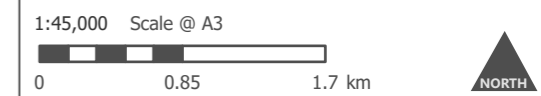
Environmental Sensitivity Map
Figure 7.1

De Aar 2 South Transmission Lines
Basic Assessment Report

Esri South Africa, Esri, HERE, Garmin, USGS, METI/NASA



- 300m Corridor Assessed
- Proposed Development**
- Transmission Route Alternative 1 (to Vetlaagte MTS)
- Transmission Route Alternative 2 (to Wag 'n Bietjie MTS)
- Proposed New Site Access Road
- Proposed Switching Station
- No-Go Areas**
- Archaeological No-Go
- Verreaux's Eagle Nest
- 500m Nest Buffer
- High Sensitivity Birds (300m No-go Buffer)
- High Sensitivity Ecology
- Specialist Constraints**
- ▲ ▲ ▲ Low Sensitivity Birds
- Medium Sensitivity Ecology
- ● ● Low Sensitivity Ecology
- Medium Sensitivity Birds
- Alluvial watercourses incl 48m buffer

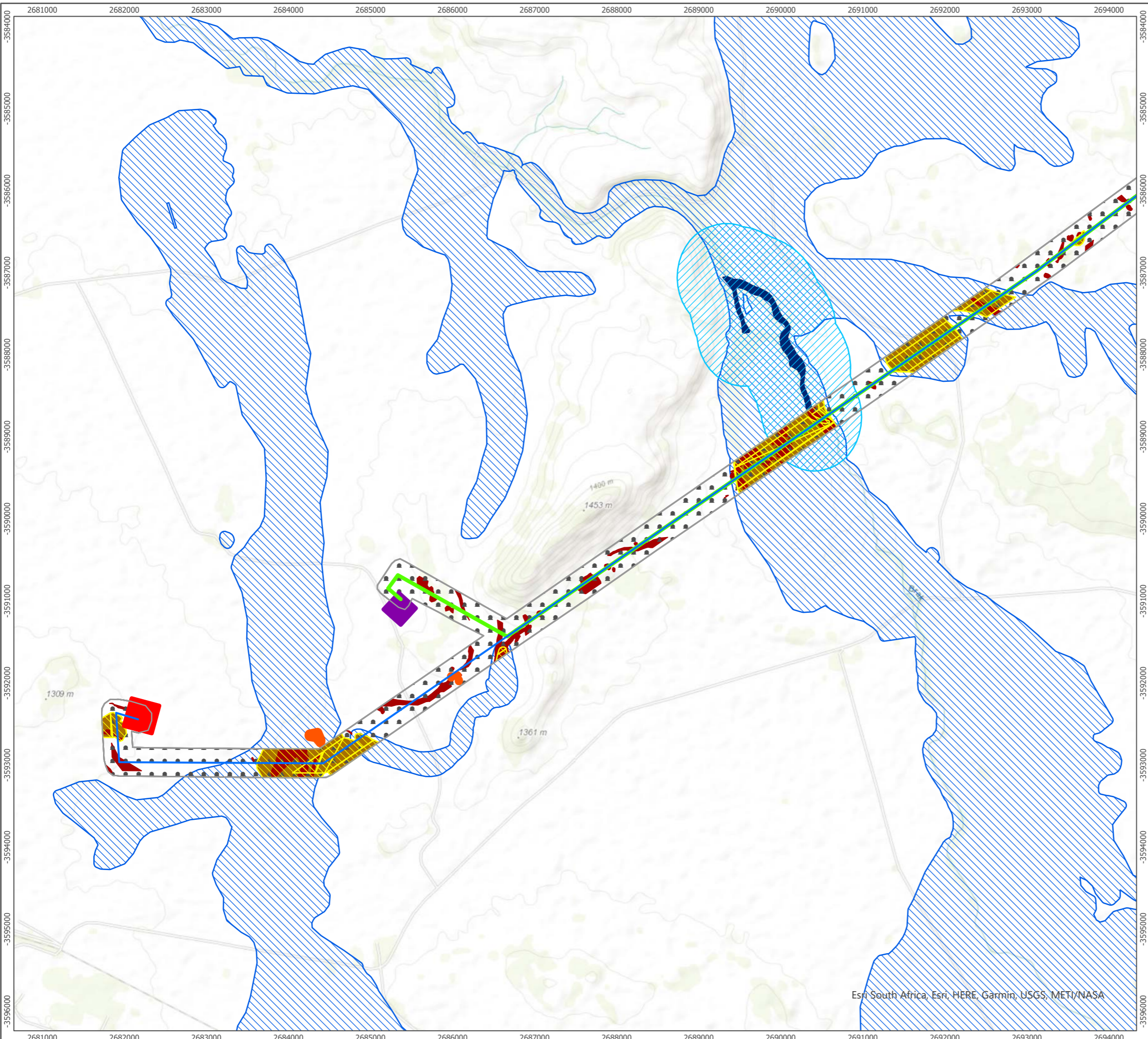


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Checked By: AA	Date: 7/20/2022

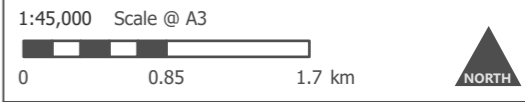
Environmental Sensitivity Map
Figure 7.2

De Aar 2 South Transmission Lines and Associated Infrastructure
Basic Assessment Report

Esri South Africa, Esri, HERE, Garmin, USGS, METI/NASA

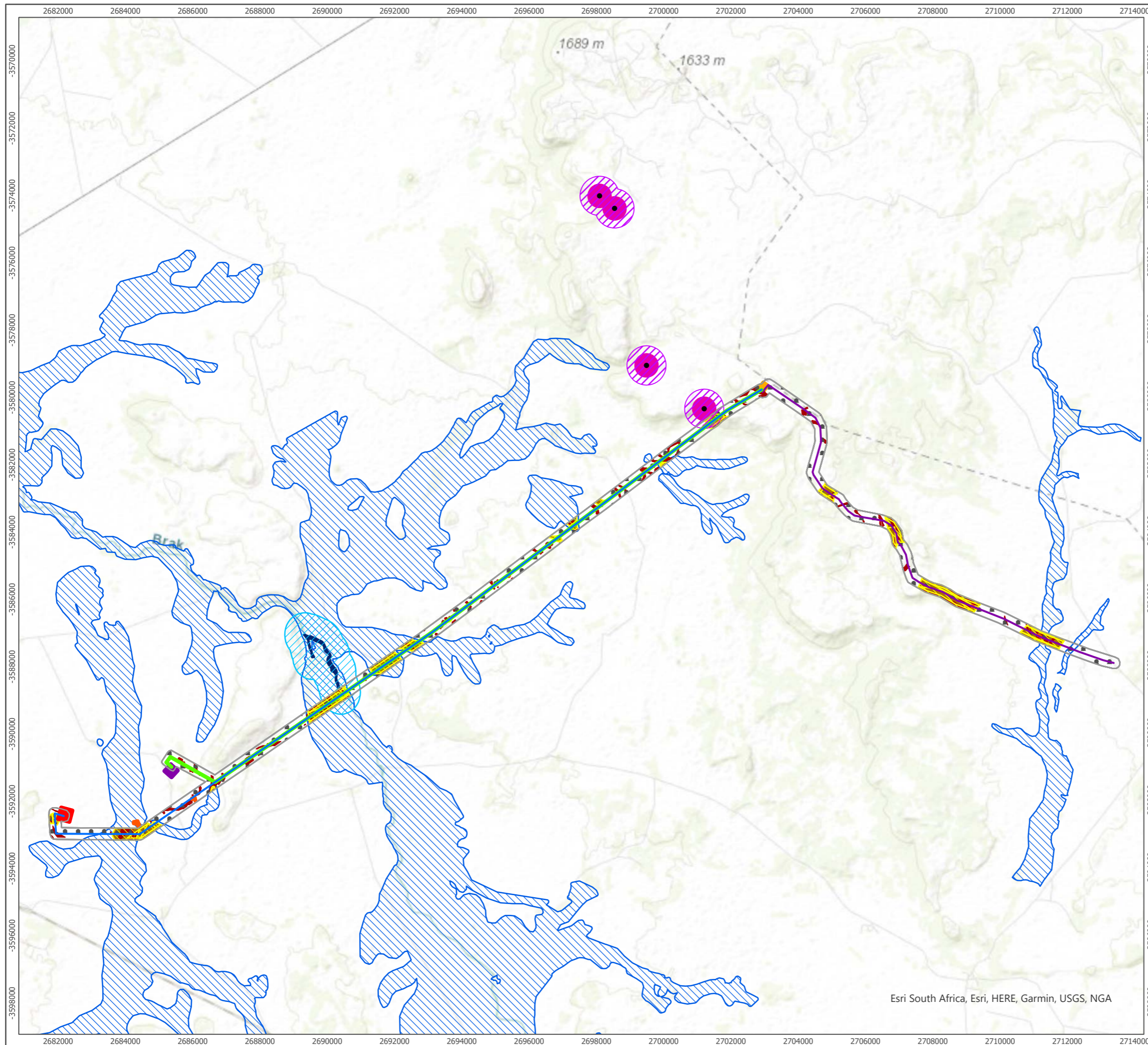


- 300m Corridor Assessed
- Proposed Development**
 - Transmission Route Alternative 1 (to Vetlaagte MTS)
 - Transmission Route Alternative 2 (to Wag 'n Bietjie MTS)
 - Proposed Vetlaagte MT Substation
 - Proposed Wag 'n Bietjie MT Substation
- No-Go Areas**
 - Archaeological No-Go
 - High Sensitivity Ecology
- Specialist Constraints**
 - Low Sensitivity Birds
 - Medium Sensitivity Birds
 - Low Sensitivity Ecology
 - Medium Sensitivity Ecology
 - 500m Regulated WUA zone
 - Wetland
 - Alluvial watercourses incl 48m buffer



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Checked By:	Date: 7/20/2022

Environmental Sensitivity Map
Figure 7.3



- 300m Corridor Assessed
- Proposed Development**
- Transmission Route Alternative 1 (to Vetlaagte MTS)
- Transmission Route Alternative 2 (to Wag 'n Bietjie MTS)
- Proposed New Site Access Road
- Proposed Switching Station
- Proposed Vetlaagte MT Substation
- Proposed Wag 'n Bietjie MT Substation
- No-Go Areas**
- Archaeological No-Go
- Verreaux's Eagle Nest
- 500m Nest Buffer
- High Sensitivity Birds (300m No-go Buffer)
- High Sensitivity Ecology
- Specialist Constraints**
- Low Sensitivity Birds
- Medium Sensitivity Birds
- Low Sensitivity Ecology
- Medium Sensitivity Ecology
- Wetland
- Dam
- Alluvial watercourses incl 48m buffer
- 500m Regulated WUA zone

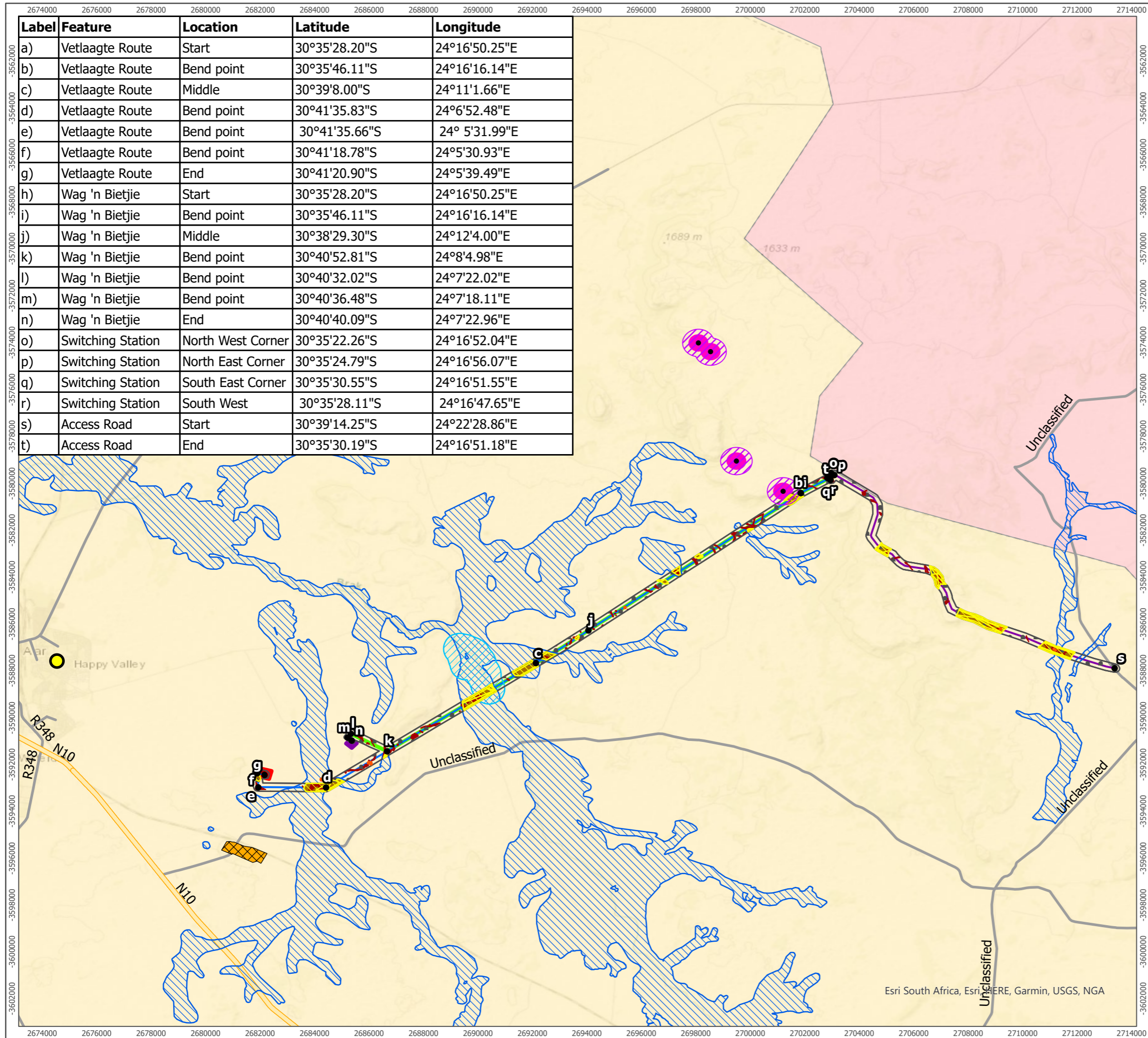
1:110,000 Scale @ A3
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Environmental Sensitivity Map
Figure 7

De Aar 2 South Transmission Lines and Associated Infrastructure
Basic Assessment Report

Esri South Africa, Esri, HERE, Garmin, USGS, NGA



Label	Feature	Location	Latitude	Longitude
a)	Vetlaagte Route	Start	30°35'28.20"S	24°16'50.25"E
b)	Vetlaagte Route	Bend point	30°35'46.11"S	24°16'16.14"E
c)	Vetlaagte Route	Middle	30°39'8.00"S	24°11'1.66"E
d)	Vetlaagte Route	Bend point	30°41'35.83"S	24°6'52.48"E
e)	Vetlaagte Route	Bend point	30°41'35.66"S	24° 5'31.99"E
f)	Vetlaagte Route	Bend point	30°41'18.78"S	24°5'30.93"E
g)	Vetlaagte Route	End	30°41'20.90"S	24°5'39.49"E
h)	Wag 'n Bietjie	Start	30°35'28.20"S	24°16'50.25"E
i)	Wag 'n Bietjie	Bend point	30°35'46.11"S	24°16'16.14"E
j)	Wag 'n Bietjie	Middle	30°38'29.30"S	24°12'4.00"E
k)	Wag 'n Bietjie	Bend point	30°40'52.81"S	24°8'4.98"E
l)	Wag 'n Bietjie	Bend point	30°40'32.02"S	24°7'22.02"E
m)	Wag 'n Bietjie	Bend point	30°40'36.48"S	24°7'18.11"E
n)	Wag 'n Bietjie	End	30°40'40.09"S	24°7'22.96"E
o)	Switching Station	North West Corner	30°35'22.26"S	24°16'52.04"E
p)	Switching Station	North East Corner	30°35'24.79"S	24°16'56.07"E
q)	Switching Station	South East Corner	30°35'30.55"S	24°16'51.55"E
r)	Switching Station	South West	30°35'28.11"S	24°16'47.65"E
s)	Access Road	Start	30°39'14.25"S	24°22'28.86"E
t)	Access Road	End	30°35'30.19"S	24°16'51.18"E



- 300m Corridor Assessed
- Existing Roads
- De Aar
- Eskom Hydra Substation
- Emthanjeni Local Municipality
- Renosterberg Local Municipality
- Proposed Development**
 - Transmission Route Alternative 1 (to Vetlaagte MTS)
 - Transmission Route Alternative 2 (to Wag 'n Bietjie MTS)
 - Proposed New Site Access Road
 - Proposed Vetlaagte MT Substation
 - Proposed Wag 'n Bietjie MT Substation
 - Proposed Switching Station
- Specialist Constraints**
 - Low Sensitivity Birds
 - Medium Sensitivity Birds
 - Low Sensitivity Ecology
 - Medium Sensitivity Ecology
 - 500m Regulated WUA zone
 - Alluvial watercourses incl 48m buffer
- No-Go Areas**
 - Archaeological No-Go
 - Verreaux's Eagle Nest
 - 500m Nest Buffer
 - High Sensitivity Birds (300m No-go Buffer)
 - High Sensitivity Ecology

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 Checked By: AA Date: 7/21/2022

Layout and Sensitivity Map
Figure 8

De Ar 2 South Transmission Lines and Associated Infrastructure
Basic Assessment Report