SEPTEMBER 2023

DRAFT BASIC ASSESSMENT REPORT FOR THE PROPOSED HYDRA–KRONOS 2ND 400KV POWERLINE AND ASSOCIATED SUBSTATION UPGRADES WITHIN EMTHANJENI, KAREEBERG AND SIYATHEMBA LOCAL MUNICIPALITIES UNDER THE PIXLEY KA SEME DISTRICT MUNICIPALITY IN THE NORTHERN CAPE PROVINCE

DFFE REF: 14/12/16/3/3/1/2848

DOCUMENT PREPARED BY:
DIGES GROUP
546, 16th Road, Midrand, 1685

DOCUMENT CONTROL

Report Name:	**Draft Basic Assessment Report for the proposed Hydra–Kronos 2nd 400kv powerline and associated substation upgrades within Emthanjeni, Kareeberg And Siyathemba Local Municipalities under the Pixley Ka Seme District Municipality in the Northern Cape Province**
EAP	**DIGES Group cc** Building 2, Constantia Park 546, 16th Road Midrand 1685 **Contact Person** Brenda Makanza Tel: 011 3122878 Email: brendam@diges.co.za
Applicant:	**Eskom Holdings SOC Ltd** Megawatt Park, Maxwell Drive, Sunninghill, Sandton P.O. Box 1091, Johannesburg, 2001 **Contact Person** Grace Mashabela Tel: 011 516 7585 E: mashabgt@eskom.co.za
Report compiled by:	Masala Mahumela Brenda Makanza
Report Date:	28 September 2023
Status:	**Draft Report**

DISCLAIMER

DIGES Group has prepared this report in fulfillment of Section 24 (5) of NEMA and its associated Regulations, showing reasonable skill and care, for the intended purposes as stated in the agreement under which this work was completed. The report may not be relied upon by any other party without the express agreement of the client, Eskom. No other warranty expressed or implied is made as to the professional advice included in this report. Where any data supplied by the client or from other sources have been used it has been assumed that the information is correct. No responsibility can be accepted by DIGES Group for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report assume that all relevant information has been supplied by those bodies from whom it was requested. Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. This work has been undertaken in accordance with the EIA Regulations, GNR982 of 2014.

APPROVAL SCHEDULE		
REV	DIGES GROUP	
	Compiler	Reviewer
00	Masala Mahumela 21.09.2023 Date	Brenda Makanza 28.09.2023 Date

EXECUTIVE SUMMARY

A. BACKGROUND

Eskom Holdings SOC Ltd (Eskom) is required to respond to the aggressive plans for the country to achieve a diversified energy mix. This entails strengthening of the Transmission infrastructure network to evacuate the existing and expected renewable power out of the Northern Cape Province to other load centres in the country. Aries – Kronos – Hydra 400kV is one of the three major backbone corridors that move power to and from the Northern Cape. Furthermore, with the current generation allocation, the existing Hydra-Kronos 400kV line will experience thermal overload by this year thus requiring the need for a second (2nd) Hydra-Kronos 400kV line. Eskom has therefore appointed DIGES Group (hereinafter DIGES) to lodge an application with the Department of Forestry, Fisheries, and the Environment (DFFE) for an Environmental Authorisation for the 2nd Hydra-Kronos 400 kV power line within Emthanjeni, Kareeberg and Siyathemba Local Municipalities, under the Pixley ka Seme District Municipality, Northern Cape Province. The scope of this application entails the following:

Hydra – Kronos 2nd 400 kV line

- Construct a second ±187 km 400kV line from Hydra to Kronos Substation.
- Bypass series compensation on the 1st Hydra – Kronos 400 kV line.
- The power line corridor assessed is 300m wide.

Kronos Substation

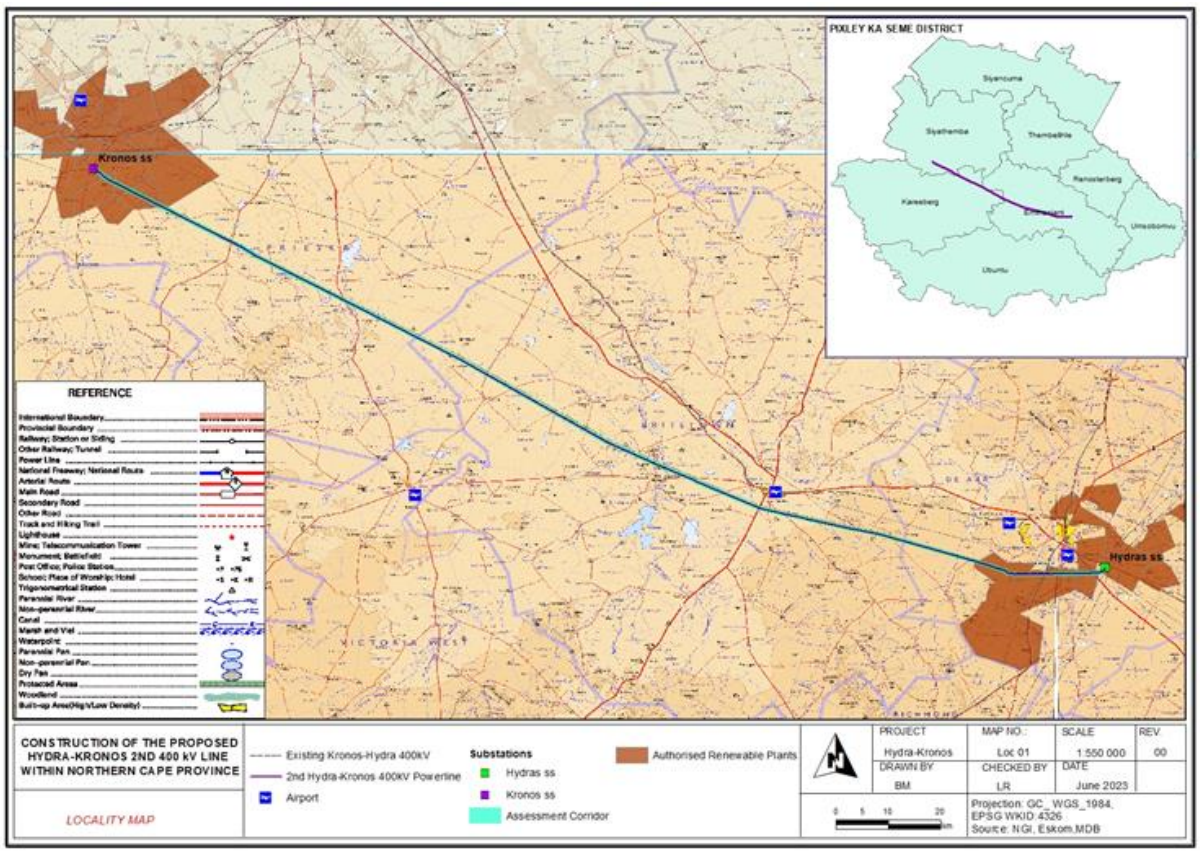
- Extend 400kV busbar at Kronos Substation.
- Establish and equip a new 400kV feeder bay at Kronos Substation.

Hydra Substation

- Equip existing 400kV feeder bay at Hydra Substation.

B. LOCATION

The project area for the proposed 2nd Hydra – Kronos Transmission Line is extensive due to the linear nature of the project and includes two operation and maintenance substations. The proposed transmission line traverses approximately ±187 km of land from De Aar to Copperton in the Northern Cape. The proposed transmission line is aligned with an existing transmission line between the Hydra and Kronos Substations and, therefore, has an existing service road along the transmission line, which can be accessed at multiple points from main roads such as the N10 in De Aar. The proposed transmission line begins at the Hydra Substation heading in a north-westerly direction towards the Kronos Substation. Reference is made to the map overleaf.



Project Location

C. THE PROCESS

The proposed activities to be undertaken together with the infrastructure to be provided are listed as having negative impacts on the environment and as such requires that a Scoping and Environmental Impact Assessment be undertaken. However, NEMA Government Notice 113 of 16 February 2018, as amended, indicates that where the greater part of the proposed powerline is to occur in one or more Strategic Transmission Corridors, a Basic Assessment (BA) procedure contemplated in Regulation 19 and 20 of the Environmental Impact Assessment Regulations, Government Notice R982 of 2014, as amended (hereinafter EIA Regulations, 2014 (as amended)) must be followed in order to obtain EA, as required in terms of the Act. Approximately 60% of the 2nd Hydra-Kronos 400 kV powerline falls within the Central Strategic Transmission Infrastructure Zone hence a Basic Assessment (BA) is being undertaken for this project. In addition, the proposed powerline falls with the National Water Act, Act 36 of 1998 (NWA), 500m regulated area hence a General Authorization is also required in terms of Government Notice 509 of 2016: General Authorization in terms of section 39 of the Act for water uses as defined in section 21 (c) or section 21 (i) of the Act.

D. ASSUMPTIONS AND LIMITATIONS

In undertaking this Basic Assessment (BA), the Environmental Assessment Practitioner (EAP) has considered the following assumptions:

i. The EAP compiled the Draft BAR using many sources including specialist reports. The EAP assumes that the information from the specialist reports is correct.
ii. The EAP assumes that the information provided by Eskom is correct.

E. SPECIALIST STUDIES

Considering the powerline corridor and the nature of the environment, potential environmental impacts were identified through an internal process based on similar developments, site visits and the Screening Report. Specialist studies were therefore commissioned to gain an in-depth understanding of the status quo of various aspects of the environment and how the development will have an impact on these environmental aspects. The results of these studies serve as a basis to identify the potentially significant impacts expected should the development be undertaken. This report includes the specialist impact assessment reports commissioned as part of the environmental process and summaries of the Avifauna, Archaeological, Paleontology, Terrestrial Biodiversity (inclusive of flora and fauna), Riverine, Social and Visual Assessments are given below:

i. **Animal:** The site survey was done to determine the presence or likely presence of Chersobius boulengeri and other possible rare or red data species not listed in the Screening Tool Report (STR). The site sensitivity verification confirmed the likely presence of *Chersobius boulengeri*, as suitable habitat in the rocky areas was observed. There was however no evidence of any of the Species of Conservation Concern (SCC) i.e., a sighting or shells observed during the assessment.

ii. **Avifauna:** the habitat within which the Project Area of Influence (PAOI) is located is considered to have a **moderate – high** sensitivity. The construction of the Hydra-Kronos 2nd 400kV power line and MTS infrastructure will result in impacts of **moderate to moderate-low** significance to birds occurring in the vicinity of the new infrastructure, which can be reduced further through the application of mitigation measures. It is anticipated that the Hydra-Kronos 2nd 400kV power line and MTS infrastructure can be constructed with acceptable levels of impact on the resident avifauna.

iii. **Archaeology and Cultural Heritage:** The construction of the proposed powerline and the substation upgrades may result in various threats to archaeological and grave sites in the vicinity of the new infrastructure (s), with impacts ranging from **moderate to low**. The impact of the proposed development on archaeological, and cultural heritage remains is rated as being **moderate to low.** The probability of locating any important archaeological remains dating to the Stone or Iron Age during the construction of the project is always a probability. Nevertheless, no grave sites are expected, though chance finds cannot be ruled out. Possibility of exposing graves (or its content) are thus very **low.** Noteworthy that the linear nature of the proposed project area will cause minimal impact to the ground, i.e., tower positions can be moved to avoid direct impacts on identified heritage resources.

iv. **Paleontology:** Based on the fossil record and previous surveys in the area, fossils are very rare in this area which is already disturbed. It is extremely unlikely that any fossils would be preserved in the overlying soils and sands of the Quaternary. There is a very small chance that fossils may occur below the ground surface in the shales of the Ecca Group and the Abrahamskraal Formation so a Fossil Chance Find Protocol should be added to the EMPr.

v. **Plants:** One Near Threatened species occurs on site (Hoodia officinalis subsp. officinalis), one rare species occurs on site (*Gethyllis longistyla*), and one nationally protected species occurs on site (*Hoodia gordonii*). It is also possible that *Tridentea virescens* (listed as Rare) may occur on site. Several sensitive species occur on site, as well as several species protected under the Northern Cape Nature Conservation Act (Act 9 of 2009). However, no threatened plant species were found on site and the site therefore has "**low**" sensitivity for terrestrial plant species

(as per the published Species Protocols). The proposed project will not have any impact on any threatened SCC, but there are several species of lower conservation concern or protected species that may be affected by the project.

vi. **Riverine Assessment:** The baseline survey observed isolated pools of water in certain watercourses the resultant of a rainfall event the previous week and was not representative of the true ecological state of these systems. As a result, the ecological integrity of these systems should be conserved through habitat delineation and conservation. This was achieved through the delineation of the total sensitivities which should be avoided by any aspect of the proposed development, unless authorized by the Competent Authority.

vii. **Social Impact Assessment:** No fatal flaws have been identified, and the negative impacts noted can be mitigated apart from the powerline's intrusion on the landscape's panoramic views. In addition, the project will create jobs, uplift SMMEs' within the area, and transmit electricity from the Northern Cape to various provinces. These positive impacts outweigh the negative as they also contribute to eradicating poverty, a Millennium Development Goal. It is therefore recommended that the project be approved from a social perspective.

viii. **Soil Potential and land capability:** The assessment along the powerline compared to the desktop study shows similar details hence the land is categorized as very low to low moderate. That is the land has a low potential yield to produce crops due to its capability, climate associated with it, and soil capability the soil has limited capacity to allow crops to grow due to limited soil depth. According to the general soil distribution pattern, the desktop shows that the soil along the proposed powerline route has limited pedological development, within the rocky areas and strongly saline soils.

ix. **Visual Assessment:** The impact of the proposed activities on visual receptors varies between residents, tourists, and motorists. The proposed new power line traverses the mundane landscape with little ability to absorb the visual impact. The landscape has very few residents that will be impacted as most of the line follows through agricultural land and open, unpopulated areas. Very few tourists visit the area and motorists mainly pass through. Both substations already exist and there is an existing power line. Viewers are accustomed to their presence and the visual impact.

The recommendation by the avifauna, animal, plant and heritage specialists to undertake a walkdown once the servitude and tower positions have been finalized is being implemented during this Basic Assessment process hence the Final Basic Assessment Report and Environmental Management Programme will include tower specific mitigation measures.

PUBLIC PARTICIPATION PROCESS (PPP)

A reconnaissance site visit was undertaken to develop an understanding of the social context (representative structures; language; communication media, etc.). The outcome of this site visit was that information to the communities in the receiving environment would be first distributed via the municipal officials and in the farms, notifications were submitted to all the affected landowners. The community structure and farmers associations will also assist in setting up public meetings. Interested and Affected Parties (IAPs) were identified, and these are currently registered on the database. The database submitted with this report includes stakeholders from:

- National, Provincial and Local Government.
- Landowners.
- Non-Governmental Organizations.

The Background Information Document and notifications were sent to stakeholders indicating via emails and site notices were placed in conspicuous places such as the municipal, district offices, police stations and community centers. An advert was also placed in the Noordkaap Bulletin newspaper notifying the public about the project. This report will be submitted to all stakeholders for a 30-day review period. All comments will be recorded and responded to accordingly.

PROCEDURE FOR THE REMAINDER OF THE STUDY

The following activities will be carried out during the finalization of the application:

- The pre-construction walkdown for avifauna, flora, fauna and heritage will be undertaken and tower specific measures will be incorporated into the Final Basic Assessment Report and Environmental Management Programme.
- Comments from IAPs (public, Stakeholder Departments and Department of Forestry, Fisheries, and the Environment (DFFE)) will be incorporated into the final BAR.
- Submission of the final report to DFFE for review and decision-making.
- Stakeholders will get written notice of DFFE's decision and instructions on how to appeal it within the specified deadlines.

ENVIRONMENTAL IMPACT STATEMENT AND RECOMMENDATIONS

The proposed project will pose various positive and negative impacts to the environment. Specialists' studies have been undertaken and based on their findings; the specialists have recommended that the project proceeds on condition that all the mitigation measures recommended are implemented. Notifications and Background Information Document (BID) has been submitted to the Interested and Affected Parties and landowners and to date, none has objected on the proposed project. There are no fatal flaws that have been identified on the proposed project. Therefore, the EAP is of the opinion that the proposed project should be approved. All the specialists' recommendations included in this report and the attached EMPr should be implemented accordingly.

TABLE OF CONTENTS

FIGURES

TABLES

ABBREVIATIONS

BA	Basic Assessment
BAR	Basic Assessment Report
CAR	Coordinated Avifaunal Roadcount
CBA	Critical Biodiversity Area
DFFE	Department of Forestry, Fisheries, and the Environment
DMRE	Department of Mineral Resources
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EIS	Environmental Importance and Sensitivity
EMPR	Environmental Management Programme
ESA	Ecological Support Area
GA	General Authorisation
GW	Giga watts
I&APs	Interested and Affected Parties
IEA	Integrated Environmental Authorisations
IRP 2019	Integrated Resource Plan
NFEPA	National Freshwater Ecosystem Priority Area
MTS	Main Transmission Substation
NEMA	National Environmental Management Act, 107 of 1998 (as amended)
NEMBA	National Environmental Management: Biodiversity Act 10 of 2004
NWA	National Water Act No. 36 of 1998
PAOI	Project Area of Influence
PES	Present Ecological Status
POPIA	Protection of Personal Information Act (No. 4 of 2013),
PPP	Public Participation Process
PV	Photovoltaic
SABAP 2	South African Bird Atlas 2 (SABAP 2)
SCC	Species of Conservation Concern
SIA	Social Impact Assessment
SOC	State Owned Company
SQR	Sub-Quaternary Reaches
STR	Screening Tool Report
TDP	Transmission Development Plan
TOPS	Threatened and Protected Species
TWQR	Target Water Quality Range
WUL	Water Use Licence Application
WULA	Water Use Licence Application

APPENDICES

1 INTRODUCTION

This section of the report details the information required as per Section 3(1)(a) to (c) of Appendix 1 of Environmental Impact Assessment (EIA) Regulations, Government Notice R982 of 2014 (as amended)

(a) details of—
(i) the EAP who prepared the report; and
(ii) the expertise of the EAP, including a curriculum vitae.
(b) the location of the activity, including:
(i) the 21-digit Surveyor General code of each cadastral land parcel.
(ii) where available, the physical address and farm name.
(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.
(c) a plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale; or, if it is—
(i) a linear activity, a description, and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or
(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;

The Department of Mineral Resources and Energy (DMRE) released the 2019 Integrated Resource Plan (IRP 2019) in October 2019. The IRP 2019 will see around 6-Gigawatt (GW) of new solar Photovoltaic (PV) capacity and 14.4 GW of new wind power capacity commissioned by 2030. The 2020 Transmission Development Plan (TDP) Generation Assumptions allocated generation capacity across the country in line with the IRP 2019. Due to the favourable sun and wind in the Northern Cape, the province has around 3.3 GW of committed renewable generation with over 10 GW expected by 2030. Eskom Holdings SOC Ltd (Eskom) is required to respond to the aggressive plans for the country to achieve a diversified energy mix. This entails strengthening of the Transmission infrastructure network to evacuate the existing and expected renewable power out of the Northern Cape Province to other load centres in the country. Aries – Kronos – Hydra 400 kV is one of the three major backbone corridors that move power to and from the Northern Cape. Furthermore, with the current generation allocation, the existing Hydra- Kronos 400 kV line will experience thermal overload by this year thus requiring the need for a second (2nd) Hydra- Kronos 400 kV line.

The proposed construction of the 2nd Hydra-Kronos 400 kV line triggers activities listed in the Environmental Impact Assessment (EIA) Regulations of 2014 as amended, promulgated under that National Environmental Management Act No. 107 of 1998 (NEMA). Section 24 F (1) (a) of National Environmental Management Act (NEMA), Act 107 of 1998, as amended, indicates that no person may commence an activity listed or specified in terms of Section 24(2)(a) or (b), except per the Environmental Authorisation (EA) issued for that activity. Eskom has therefore appointed DIGES Group (hereinafter DIGES) to lodge an application with the Department of Forestry, Fisheries, and the Environment (DFFE) for an Environmental Authorisation for the 2nd Hydra-Kronos 400 kV power line within Emthanjeni, Kareeberg and Siyathemba Local Municipalities, under the Pixley ka Seme District Municipality, Northern Cape Province. The proposed activities to be undertaken together with the infrastructure to be provided are listed as having negative impacts on the environment and as such requires that a Scoping and Environmental Impact Assessment be undertaken. However, NEMA Government Notice 113 of 16 February 2018, as amended, indicates that where the greater part of the proposed powerline is to occur in one or more Strategic Transmission Corridors, a Basic Assessment (BA) procedure contemplated in Regulation 19 and 20 of the Environmental Impact Assessment Regulations, Government Notice

R982 of 2014, as amended (hereinafter EIA Regulations, 2014 (as amended)) must be followed in order to obtain EA, as required in terms of the Act. Approximately 60% of the 2nd Hydra-Kronos 400 kV powerline falls within the Central Strategic Transmission Infrastructure Zone hence a Basic Assessment (BA) is being undertaken for this project. In addition, the proposed powerline falls with the National Water Act, Act 36 of 1998 (NWA), 500m regulated area hence a General Authorisation is also required in terms of Government Notice 509 of 2016: Generall Authorisation in terms of section 39 of the Act for water uses as defined in section 21 (c) or section 21 (i) of the Act.

The following activities are being undertaken as part of the BA process:

i. Compilation of a screening report as per the DFFE Screening Tool.
ii. Site Sensitivity Verification.
iii. Specialists Assessment.
iv. Undertaking the Public Participation Process.
v. Compilation of the Draft Basic Assessment Report and Environmental Management Programme.

1.1 Details of the Applicant

The details of the applicant are given in the Table below.

Table 1-1: Applicant's Details

Name of Company	Eskom Holdings SOC Ltd
Physical Address	Megawatt Park, Maxwell Drive, Sunninghill, Sandton
Postal Address	P.O. Box 1091, Johannesburg, 2001
Contact Person	Madinare Mukhuba
Email Address	MukhubDM@eskom.co.za>

1.2 Details of Environmental Impact Assessment Practitioner (EAP)

Section 13 of EIA Regulations, 2014 as amended indicates that an Environment Assessment Practitioner (EAP) should be independent and have expertise in conducting Environmental Impact Assessments, including knowledge of the Act and any guidelines relevant to the proposed activity.

DIGES Group is a black-owned BBB-EE consultancy company established in 2004 that offers services in the geo-environmental sector. The company has completed many Environmental Impact Assessments for various developments. The details for the project EAPs are given below as per Section 3(1)(a)(i) of Appendix 1 of the EIA Regulations, 2014 as amended. Reference is also made to the CVs attached in Appendix A.

Table 1-2: EAP Details

Aspect	Details
Principal EAP	
Company name of EAP:	DIGES Group
EAP's name and surname:	Brenda Makanza
Postal address:	P.O. Box 7068, Midrand, 1685
Tel:	011 312 2878
Fax:	011 312 7824
E-mail:	brendam@diges.co.za
Qualifications and relevant experience	• B.Sc. Honours Environmental Science. • Professional Diploma Geographic Information Systems • Twenty-one (21) in the environmental consulting field. Refer to Appendix A for CV and Qualifications
Professional affiliations	• South African Council for Natural Scientific Professions (SACNASP). Registration Number 400016/17. • Environmental Assessment Practitioners of South Africa (EAPASA). Registration Number 2019/1542.
EAP	
Company name of EAP:	DIGES Group
EAP's name and surname:	Masala Mahumela
Postal address:	P.O. BOX 7068, Midrand, 1685
Tel:	011 312 2878
Fax:	011 312 7824
E-mail:	masala1209@hotmail.com
Qualifications and relevant experience	• B.Sc. Honours Environmental Management. • Fifteen years (15) in the environmental consulting field. Refer to Appendix A for CV and Qualifications
Professional affiliations	• South African Council for Natural Scientific Professions (SACNASP). Registration Number 400536/14. • Environmental Assessment Practitioners of South Africa (EAPASA). Registration Number 2019/1296.

1.3 Location

1.3.1 Regional Context of the Project

The Northern Cape Province is the largest province in South Africa and covers an area of 361 830 km^2, constituting approximately 30% of South Africa. The province is divided into five district municipalities (DM), namely, Frances Baard, Karoo, Namakwa, ZF Mgcawu and Pixley Ka Seme District Municipality. The project area falls within the Pixley Ka Seme District Municipality (DC07), a Category C Municipality located on the south-eastern section of the province. It shares its borders with three other provinces: the Free State in the east, the Eastern Cape in the south-east, and the Western Cape in the south-west. Pixley ka Seme is the second largest district in the province, it makes up almost a third of its geographical area covering 102 727 km² (DTP Ditsamai Investments and Projects, 2022)

The district is ideally placed, as various national routes such as the N1 from Musina to Cape Town., cuts across it There are also 7 main towns within the district, of which, three, i.e., Prieska, Carnarvon, and De Aar are in the Local Municipalities affected by the proposed project. Figure 1-1 shows the regional location of the project area.

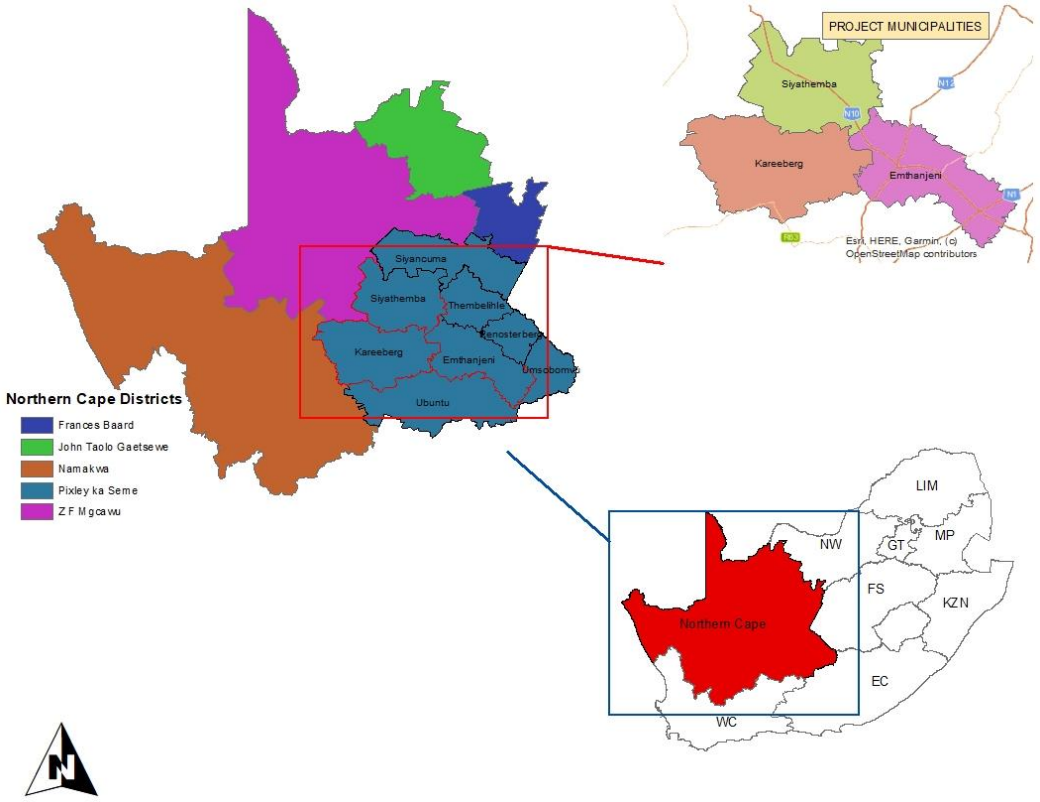


Figure 1-1: Regional location

The general description of the project affected municipalities is as follows:

- Emthanjeni Local Municipality (NC073): The municipality covers an area of 13 472km² and is located approximately 300km south-west of Kimberley, 440km south-east of Upington, 300km north-east of Beaufort West and 300km south-west of Bloemfontein. Its main economic hub of the district with three main towns, De Aar, Britstown and Hanover. De Aar is best known for its central location as a railway gateway which joins Johannesburg, Cape Town, Port Elizabeth, and Namibia.
- Siyathemba Local Municipality (NC077) is a Category B municipality that covers are area of 14 704km². It comprises of three towns, Marydale, Prieska and Niekerkshoop. Prieska is the seat of the municipality and is located on the hills of the Doring Mountains on the southern banks of the Orange River. There is an easy access to the main railway line to Namibia; good, tarred road linkage with Kimberley, Upington and De Aar; two landing strips for light aircraft.
- Kareeberg Local Municipality (NC074): is a Category B that is bordered by the ZF Mgcawu District and Siyathemba in the north, Ubuntu in the south, Emthanjeni in the east, and the Namakwa District in the west. It covers the area of 17 701km², accounting for 17% of the geographical area of the district. The municipality comprises three towns, Carnarvon, Van Wyksvlei and Vosburg, and is an entry point to the Western Cape Province.

1.3.2 Description of the Project Location

The project area for the proposed Hydra – Kronos 2nd 400kV Line is extensive due to the linear nature of the project and includes two operation and maintenance substations. The proposed transmission line traverses approximately ±187 km of land from De Aar to Copperton in the Northern Cape. The proposed transmission line is aligned with an existing transmission line between the Hydra and Kronos Substations and, therefore, has an existing service road along the transmission line, which can be accessed at multiple points from main roads such as the N10 in De Aar. The proposed transmission line begins at the Hydra Substation heading in a north-westerly direction towards the Kronos Substation. Reference is made to Table 1-3, Table 1-4 and Table 1-5 for the location details, the farms and erven traversed by the line and the powerline coordinates at 10000m interval. Reference is also made to Appendix B for the coordinates at 1000m interval. Figure 1-2 shows the locality of the project.

Table 1-3: Project Location Information

Province	Northern Cape
District Municipality	Pixley ka Seme
Local Municipalities and Ward Nos.	Siyathemba (5 and 6) Kareeberg: (6) Emthanjeni (3, 6, 7 and 8)
Towns and Settlements within 10km	Copperton, Griesenkraal, Britstown, De Aar
Surrounding land-uses	Agriculture Game Reserves Settlements Wilderness Farming
Route Summary	**Start (Hydra):** 30°42'52.02"S, 24° 5'5.24"E. **Mid-point:** 30° 28' 20.669" S, 23° 10' 54.029" E

	End (Kronos): 30° 1'29.58"S, 22°20'20.63"E **Length:** ±187km
Assessed Corridor Width	300m In addition, the entire Holput (Farm 91) was assessed.

Table 1-4: Farms and Erven traversed by the Proposed Powerline

FARM NAME	PORTION	21 DIGITS
Wagt En Bittje 5	3	C03000000000000500003
Hartebeest Hoek 31	0	C03000000000003100000
Zoutaar	1	C01200000000006600001
Zoutaar	2	C01200000000006600002
Zoutaar	0	C01200000000006600000
Biessies Poort	0	C01200000000006700000
Jagtscherm	0	C01200000000006800000
Holpan	0	C01200000000006900000
Brandfontein	0	C01200000000008700000
Brandfontein/ Rheno	7	C01200000000008700007
Farm 91 (Holput)	0	C01200000000009100000
Farm 91 (Rooidam/ Karreldam)	1	C01200000000009100001
Sweetfontein	2	C01200000000009200002
Sweetfontein	3	C01200000000009200003
Sweetfontein	4	C01200000000009200004
Blaauwbosch Put	0	C01200000000009300000
Farm 96 (Blaauwbosch Put 96)	0	C01200000000009600000
Pettsspot	0	C01200000000009700000
Pettsspot	2	C01200000000009700002
Gemsbokfontein	6	C01200000000009800006
Kareeboschpan	3	C01200000000009900003
Kareeboschpan	4	C01200000000009900004
Kareeboschpan	5	C01200000000009900005
Kareeboschpan	2	C01200000000009900002
Doorskuilen	1	C01200000000010000001
Tygerpoort	0	C01200000000010200000
Tygerpoort	1	C01200000000010200001
Raathfontein	6	C01200000000010400006
Klipgats Pan	4	C06000000000011700004
Kaffirs Kolk (Mierdam)	1	C06000000000011800001
Kaffirs Kolk	3	C06000000000011800003
Grenaat Kop	1	C06000000000012000001
Jonkerwater	0	C06000000000012100000
Jonkerwater	1	C06000000000012100001

FARM NAME	PORTION	21 DIGITS
Jonkerwater	3	C06000000000012100003
Jonkerwater	5	C06000000000012100005
Jonkerwater	2	C06000000000012100002
Naauwe Kloof	4	C06000000000012200004
Roodevloer	0	C06000000000012300000
Roodevloer	1	C06000000000012300001
Roodevloer	2	C06000000000012300002
Wielpan	0	C06000000000012400000
Wielpan	1	C06000000000012400001
Modderfontein	0	C06000000000012500000
Zwartekopjes	0	C01200000000013100000
Zwartekopjes	2	C01200000000013100002
Hartebeest Plaat (De Put/ Elands Kloof)	0	C01200000000013500000
Hartebeest Plaat	3	C01200000000013500003
Bosjesmans (Winterhoek De Put)	1	C01200000000013600001
Hoekplaas	0	C06000000000014600000
Brakwater/ Leno Rust	0	C01200000000017300000
ERVEN		
REGION	**PARCEL NO**	**21 DIGITS**
Giesenskraal Settlement	70	C012000200000070000000
Giesenskraal Settlement	75	C012000200000075000000
Giesenskraal Settlement	76	C012000200000076000000
Giesenskraal Settlement	157	C012000200000157000000
Giesenskraal Settlement	161	C012000200000161000000
Britstown	423	C012000100000423000001

Table 1-5: Coordinates at 10 000m intervals

DISTANCE (m)	LATITUDE (S)	LONGITUDE (E)
Hydra Substation	30° 42' 51,910" S	24° 5' 6,092" E
10000	30° 43' 29,315" S	23° 59' 6,750" E
20000	30° 42' 39,687" S	23° 53' 6,443" E
30000	30° 40' 54,932" S	23° 47' 11,137" E
40000	30° 39' 14,876" S	23° 41' 14,166" E
50000	30° 37' 59,851" S	23° 35' 9,202" E
60000	30° 36' 35,358" S	23° 29' 7,407" E
70000	30° 34' 13,863" S	23° 23' 29,997" E
80000	30° 31' 49,142" S	23° 17' 55,864" E
90000	30° 29' 13,476" S	23° 12' 27,556" E

DISTANCE (m)	LATITUDE (S)	LONGITUDE (E)
100000	30° 26' 16,842" S	23° 7' 13,569" E
110000	30° 23' 20,023" S	23° 1' 59,912" E
120000	30° 20' 26,405" S	22° 56' 44,176" E
130000	30° 17' 42,834" S	22° 51' 21,475" E
140000	30° 14' 59,068" S	22° 45' 59,091" E
150000	30° 12' 15,847" S	22° 40' 36,527" E
160000	30° 9' 25,786" S	22° 35' 19,217" E
170000	30° 6' 42,840" S	22° 29' 56,847" E
180000	30° 3' 59,703" S	22° 24' 34,791" E
Kronos Substation	30° 1'29.58"S,	22°20'20.63"E

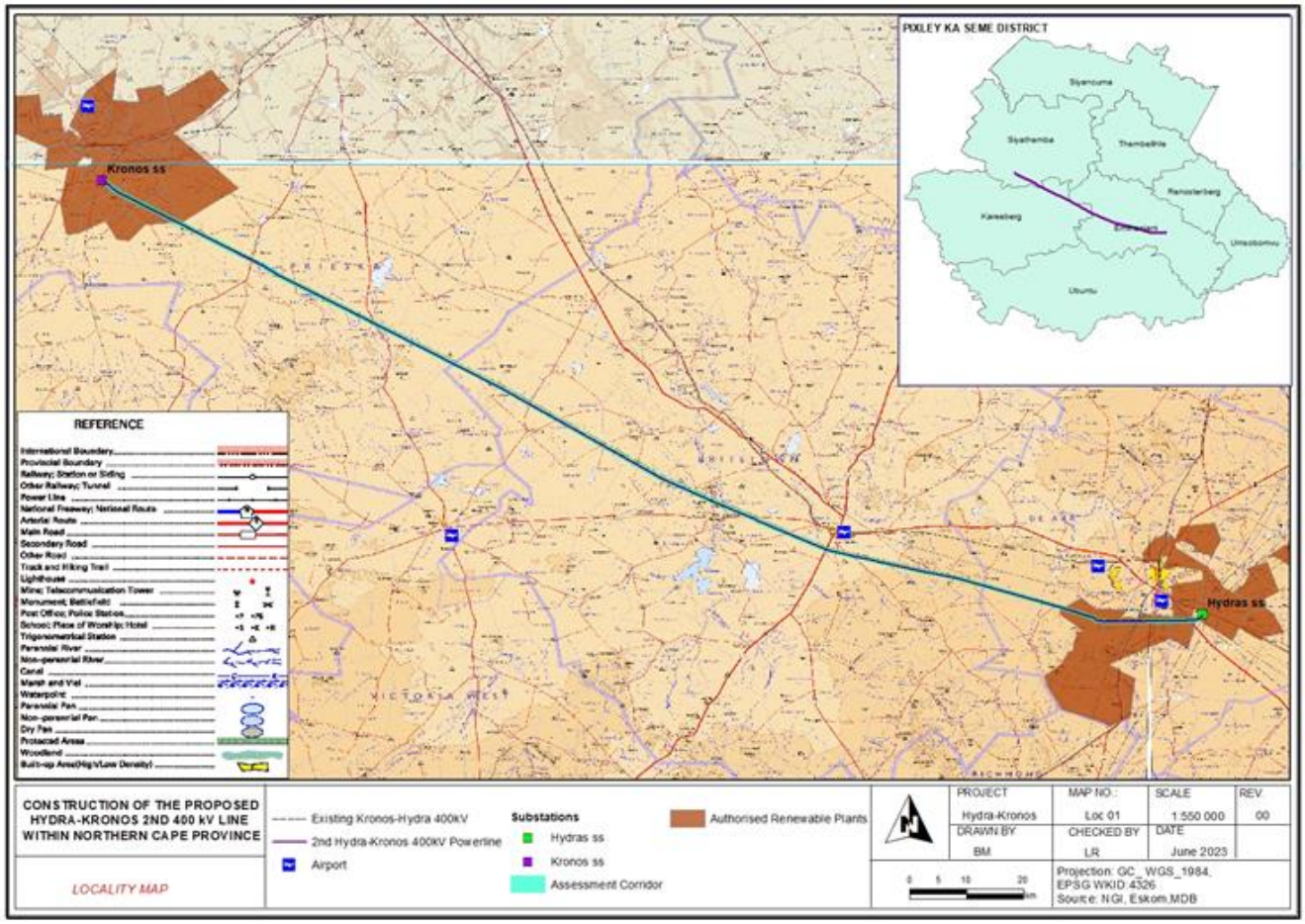


Figure 1-2: Locality map indicating the existing substations and the proposed power line corridor.

2 PROJECT DESCRIPTION

This section of the report details the information required as per Section 3(1)(d) of Appendix 1 of Environmental Impact Assessment (EIA) Regulations, Government Notice R982 of 2014 (as amended).

(d) a description of the scope of the proposed activity, including—
(i) all listed and specified activities triggered and being applied for; and
(ii) a description of the activities to be undertaken including associated structures and infrastructure

2.1 Description

Aries-Kronos-Hydra 400kV is one of the three major corridors that move power to and from the Northern Cape Province. Furthermore, with the current generation allocation, the existing Hydra-Kronos 400kV line will experience thermal overload, thus requiring the need for a second Hydra-Kronos 400 kV power line. The scope of work entails the following:

Hydra – Kronos 2nd 400 kV line

- Construct a second ±187 km 400 kV line from Hydra to Kronos Substation.
- Bypass series compensation on the 1st Hydra – Kronos 400 kV line.
- The power line corridor assessed is 300m wide.

Kronos Substation

- Extend 400 kV busbar at Kronos Substation.
- Establish and equip a new 400 kV feeder bay at Kronos Substation.

Hydra Substation

- Equip existing 400 kV feeder bay at Hydra Substation.

EIA Regulations, 2014 (as amended) published in terms of sections 24(5) and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), makes provision for two types or levels of assessment, namely Basic Assessment, and Scoping and EIA. The Regulations specify that all activities that appear in Listing Notice 1, Government Notice R983 of 2014 (as amended) and Listing Notice Government Notice R985, as amended require a Basic Assessment whilst activities indicated in Listing Notice 2 Government Notice R. 984 of 2014 (as amended) require a Scoping and EIA to be done. The construction of a 400kV line is listed in Listing 2, however as a greater part of the proposed powerline is within the Central Strategic Transmission Corridor, the application will be done per Government Notice No. 113 of 2018 (as amended) read with the EIA Regulations, 2014 (as amended). As a result, a Basic Assessment (BA) process will be undertaken, and an application will be lodged with the DFFE towards obtaining an Environmental Authorisation. Table 2-1 indicates the listed activities being applied for.

Table 2-1: Activities triggered under NEMA EIA Listing Notices

Activity Number	Description of the relevant Basic Assessment Activity as per Listing Notice	Applicability of the Listed Activity to the proposed project
Listing Notice 1 (GNR 983) under EIA Regulations of 2014 as amended		
12(ii)	*The development of infrastructure or structures with a physical footprint of 100 square metres or more where such development occurs:* *(a) within a watercourse* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.*	The average footprint required for the specified towers ranges from 59 to 3 803m². The powerline crosses multiple watercourses, and some towers will be placed within 32m of these watercourses.
19	*The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse*	The construction of towers near watercourses as well as access to tower locations via watercourses will result in the excavation of more than 10 m^3 and infilling of the identified watercourses with more than 10 m^3 of material.
27	*The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation.*	The clearance of approximately 3.28 hectares for the construction of the 400kV yard at the Kronos substation.
47	*The expansion of facilities or infrastructure for the transmission and distribution of electricity where the expanded capacity will exceed 275 kilovolts and the development footprint will increase.*	Kronos substation will be upgraded by extending the 400 kV busbar, establishing, and equipping a new 400 kV feeder bay. This will increase the development footprint of the substation by 3.28 hectares.
Listing Notice 2 (GNR984) under EIA Regulations of 2014as amended		
9	*The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex*	The construction of a ±187km, 400kV powerline from Hydra Substation that is approximately 7.7km southeast of De Aar to Kronos substation which is approximately 6.5km southwest of Copperton in the Northern Cape Province. The project area is classified as rural.
Listing Notice 3 (GNR985) under EIA Regulations of 2014 as amended		
12	*The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.* *(g) Northern Cape* *ii. Within critical biodiversity areas identified in bioregional plans*	The clearance of approximately 5500 square metres of indigenous vegetation in an area classified as CBA2 in the Northern Cape CBA Map.
14ii	*The development of infrastructure or structures with a physical footprint of 10 square metres or more, where such development occurs—* *(a) within a watercourse.* *(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse.* *g. Northern Cape* *ii. Outside urban areas:* *(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity*	The average footprint required for the specified towers ranges from 59 to 3803m². The powerline crosses multiple watercourses that are within CBA2 in the Northern Cape CBA Map. Some towers will be placed within 32m of the watercourses.

2.2 Technical Details of the Project

2.2.1 400kV Power line

The photos below show the existing Hydra-Kronos 400kV powerline and indicates the proposed power line technical details. Requirements of a 400kV powerline are discussed in subsequent sections.

Table 2-2: Powerline Details

Component	Description/dimensions
Power line capacity	400 kV
Length	±187 km
Servitude	90m
Tower Structures	- Guyed "VEE" Suspension Tower (520B) - Cross Rope Suspension Tower (529A, C) - Cross Rope Strain Tower (528C) - Self-Supporting Suspension Tower (518H, 517A) - Self-Supporting Transposition Tower (518E) - Angle Strain and Closing Span Tower (518C & D, 517E & F) - Underpass tower (518DR)
Tower Height	30-42m
Tower clearance (Phase to Phase)	5.7m to 7.5m
Minimum ground clearance	8.1m

2.2.1.1 Towers

Different types of towers may be used on the proposed project depending on the terrain being crossed. The towers will consist of a lattice steel framework reaching a maximum height of 42 m with electrical cables suspended between them. The average spacing between the towers will be approximately 450 m. Although the study is assessing a 300 m wide corridor, the type of towers to be used by Eskom will be confirmed when the profile is finalized. **Error! Reference source not found.** shows the different towers that may be used. Reference is also made to Appendix C for the drawings of the tower structures.

2.2.1.2 Minimum Clearance Distances

For safety reasons, the transmission line requires minimum clearance distances. These are summarized as follows:

i. The minimum vertical clearance distance between the ground and 6 power line conductors is 8.1 m; The maximum crop height permitted within the servitude is 4.3 m;
ii. The minimum vertical clearance to any fixed structure that does not form part of the power line is 5.6 m;
iii. Farming activity, except for sugarcane and commercial forestry, can be practiced under the conductors, provided that there is adherence to safe working clearances, crop height restrictions and building restrictions.

2.2.2 Substation Upgrades

A substation is an important element of electricity generation, transmission, and distribution system. Its function is to transform voltages from high to low or the reverse, using transformers and other heavy-duty electric switchgear. The proposed 400kV lines will require 400kV feeder bay on each substation for connection purposes and the proposed works at both substations will occur within the substation fenced area. **Error! Reference source not found.** indicates the proposed works at each substation whilst Figures 2-4 to 2-7 show the Hydra and Kronos substations. In addition, Figures 2-8 and 2-9 indicate the proposed works per substation. The drawings are also attached in Appendix C.

Table 2-3: Substations upgrade details

Hydra Substation	– Equip existing 400 kV feeder bay at Hydra Substation.
Kronos Substation	– Equip vacant 400 kV feeder bay at Kronos Substation. (vacant bay to be available at time of construction)
Associated Infrastructure (Kronos)	– The extension of the 6m wide road to the storage area by 85m. – The extension of a 9m wide road to the new 400 kV yard by 110m.
Height of structures	– 26m
Kronos Extension Areas	Extension area 1(0.88ha): A: 30°1'27.67" S, 22°20'26.58" E B: 30°1'25.92" S, 22°20'21.44" E C: 30°1'24.06" S, 22°22'22.23" E

	D: 30°1'25.97" S, 22°20'27.38" E <u>Extension area 2 (2.40ha):</u> A: 30°1'31.98" S, 22°20'17.12" E B: 30°1'34.10" S, 22°20'24.93" E C: 30°1'37.63" S, 22°20'23.57" E D: 30°1'35.30" S, 22°20'16.01" E

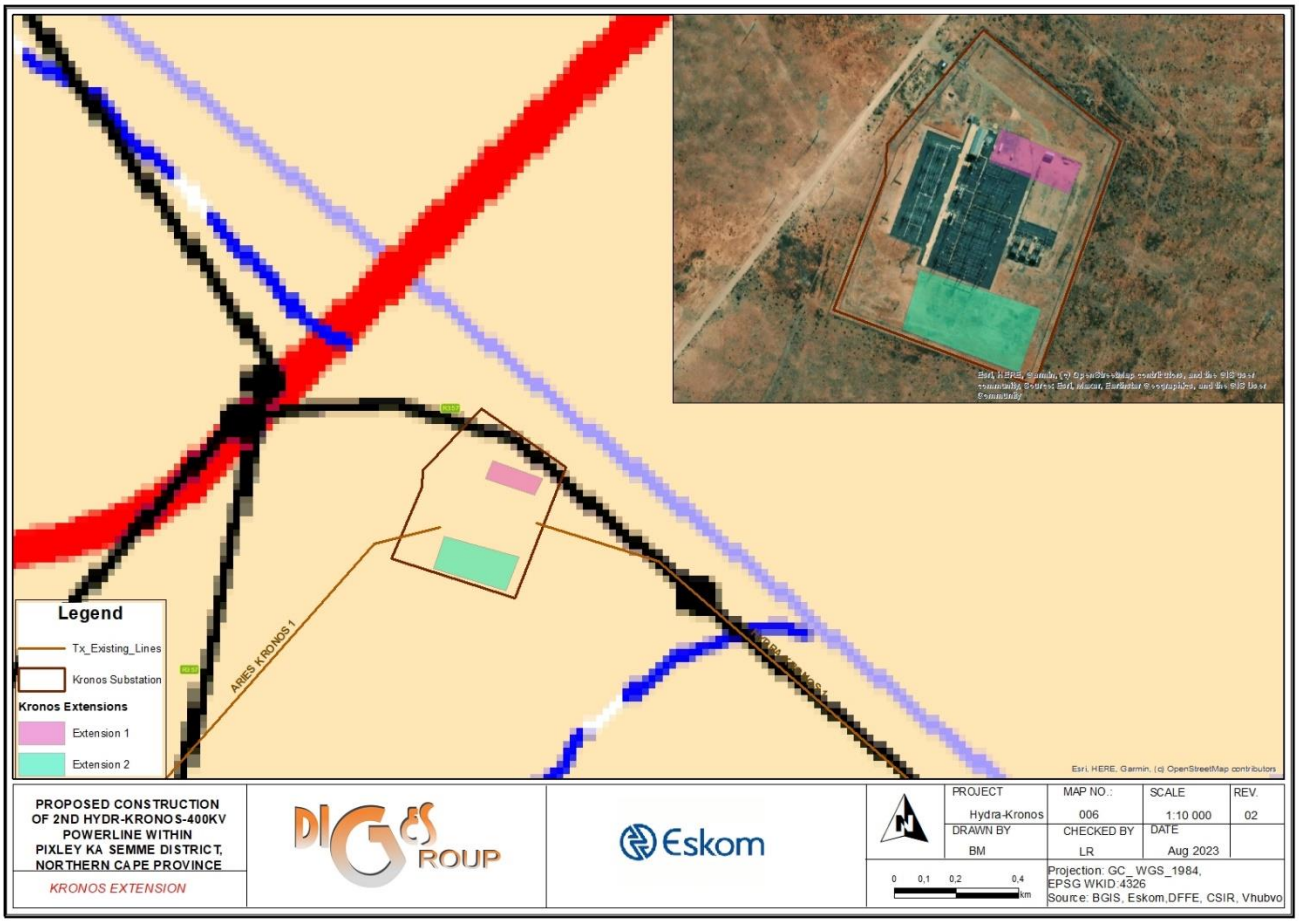


Figure 2-1: Kronos substation extension

Table 2-4: Characteristics of the proposed towers

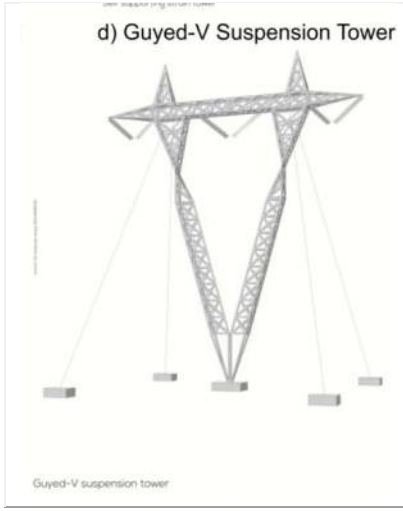
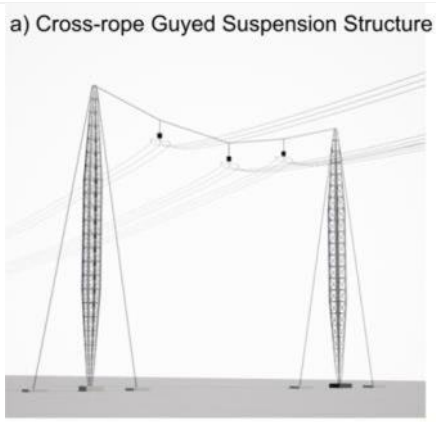
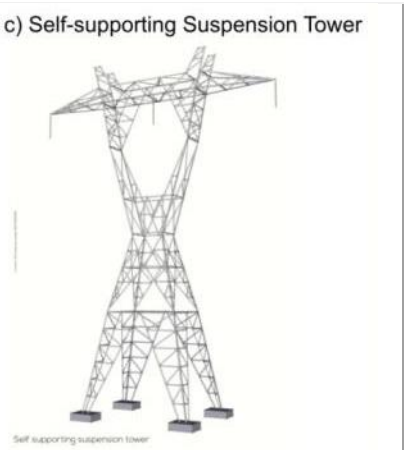
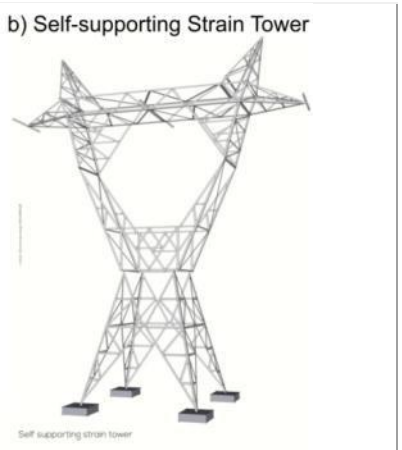
Type	Guyed "VEE" Suspension Tower (515B/520B)	Cross Rope Suspension Tower (529A, C)	Self-Supporting Suspension Tower (515H/518H)	Angle Strain and Closing Span Tower (517E & F or 518C & D)
				
Maximum Height	40 m	42.2 m	51.2 m	58 m
Span	500 m	500 m	500 m	450-500 m
Minimum Servitude Width	35 m	90 m	55 m	55 m
Characteristics	Guyed-V Suspension Tower (515H/520B) – mainly used where there are space constraints.	529A: Narrow phase spacing, used at low altitudes. 529C: The tower is used at higher altitudes (1800m or higher) due to its broad phase spacing to improve Corona and Noise performance.	Self-Supporting Suspension Towers are used where it is not technically possible to use the cross-rope and guyed-vee structures, e.g., in the face of space and terrain considerations.	Self-Supporting Strain Towers are used at bends in the line, between 10° and 60° and it can also be used as a 0° terminal tower.

Figure 2-4: Entrance to Kronos substation

Figure 2-5: Hydra substation

Figure 2-6: Other existing infrastructure near Kronos substation

Figure 2-7: Access Road to Hydra substation

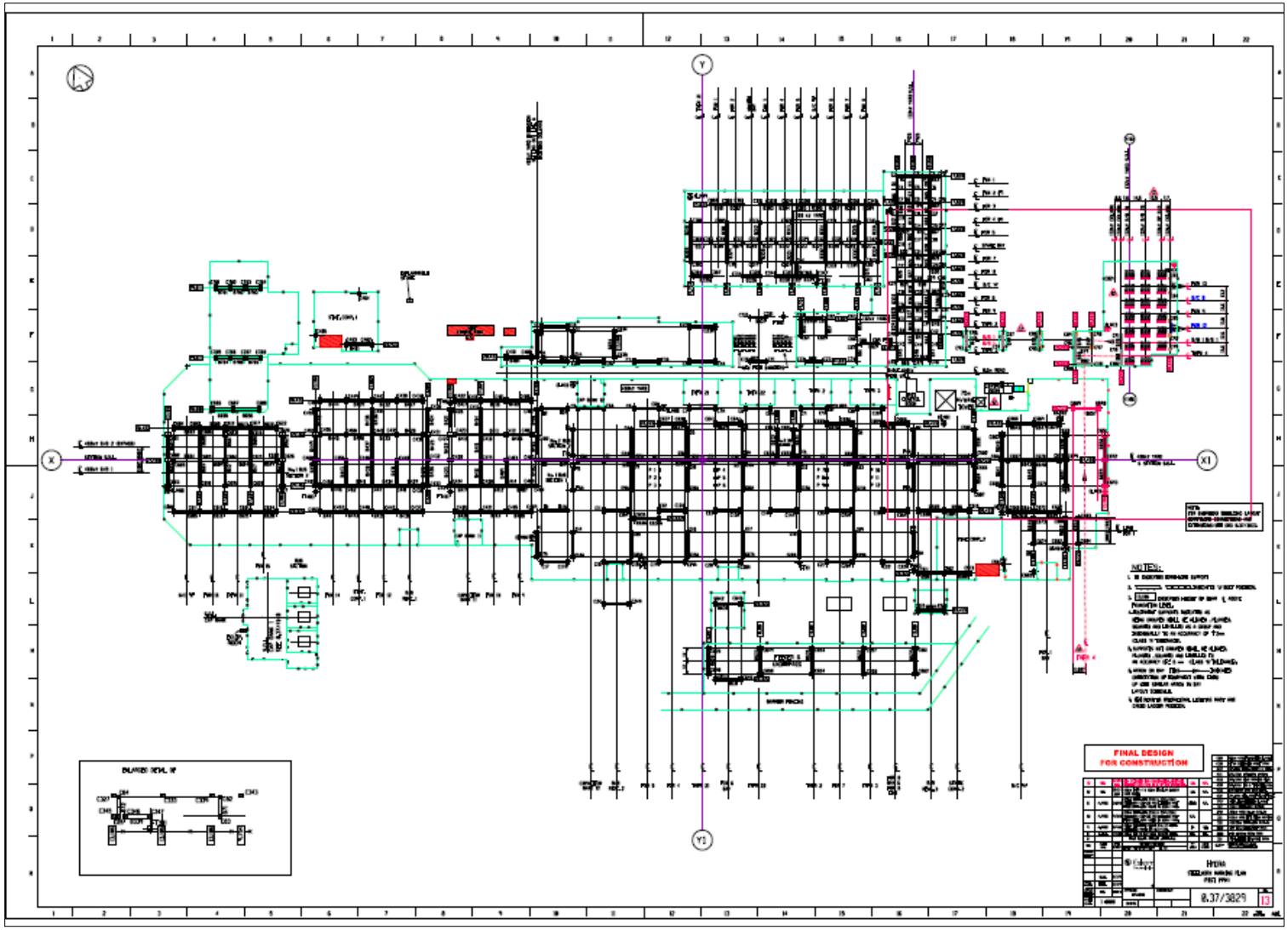


Figure 2-8: Hydra substation steelworks marking plan in 400kV yard.

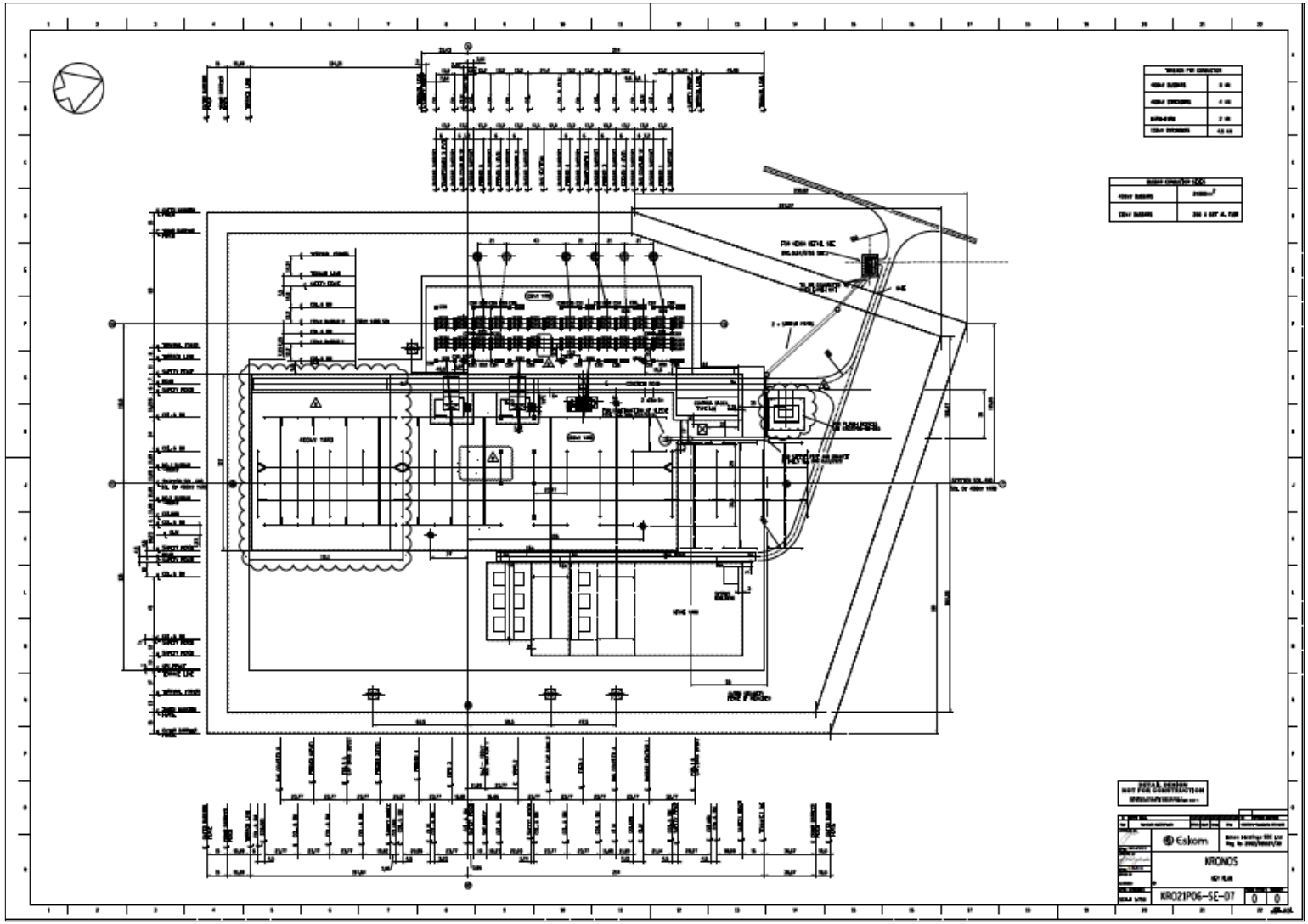


Figure 2-9: Kronos substation

2.3 Pre-construction and Construction Phase

The main works to be undertaken during the preconstruction and construction phases of the proposed project include the following:

2.3.1 Pre-Construction

2.3.1.1 Land Negotiation

The route being assessed has been pre-negotiated with the affected landowners. Eskom therefore has certain rights and controls within the negotiated servitude that support the safe and effective operation of the line. These include:

(i) Access to erect a transmission line along a specific agreed route;
(ii) Reasonable access to operate and maintain the line inside the servitude area;
(iii) The removal of trees and vegetation that will interfere with the operation of the power line.

2.3.1.2 Right of Way Surveying

Before the overhead power line is constructed, a thorough ground survey is carried out to determine the ground profile along the centre of the power line route and where the ground profile slopes across the power line route. This is to ensure that the location selected for towers and stays and their relationship with each other comply with the technical limits. Further consideration is given to detailed environmental effects. Where the line route passes over or near trees that could infringe safe clearances to 'live' conductors, the trees must be felled or pruned before the line's construction.

2.3.1.3 Soil sampling

Geotechnical investigations will be carried out at tower positions and substation expansion footprint to determine the type of foundation required. The holes will be filled in after soil sampling is completed.

2.3.1.4 Structure Stacking

A survey crew will peg the substation extension and the power line servitude.

2.3.2 Construction Phase

The construction of the line and substation upgrades is expected to require 12 months to complete. The sequence of construction activities is listed below and briefly discussed in the following sections:

- Construction campsite and laydown area establishment.
- Vegetation clearing to facilitate access, construction, and the safe operation of the infrastructure.
- Establishing access roads on the servitude where required.
- Preparation for construction right-of-way and ground preparation.
- Pegging of tower positions for construction.
- Transportation of equipment, materials and personnel to sites and stores.
- Installation of foundations for the towers.

- Tower assembly and erection.
- Conductor stringing and regulation.
- Transfer of the line from the Contractor for commissioning.
- Final inspection of the line, commissioning and transfer to the Grid Line and Servitude Manager for operation.
- Rehabilitation of disturbed areas.
- Signing off Landowners on acceptability of the rehabilitation upon completion of the construction and rehabilitation.
- Transfer of the servitude by the Grid Environmental Manager; and
- Operation and maintenance of the infrastructure.

2.3.2.1 Construction Camp

The establishment of the construction camp will involve the clearing of vegetation, fencing of the camp and the construction of workshops and storerooms as well as temporary site offices. The location is selected by the contractor who will consider such aspects as access to the construction site, access to services, access to materials, etc. The contractor will then agree with a landowner for the establishment of the construction camp. The material lay-down yards are expected to be located adjacent to the construction camps and will serve as storage areas for the construction material and equipment.

2.3.2.2 Clearing

The Right of Way (ROW) must be cleared to allow for construction and operation activities of the power line; hence the landowners will be notified before construction clearing.

2.3.2.3 Access Road

The proposed transmission line is aligned with an existing transmission line between the Hydra and Kronos Substations and, therefore, has an existing service road along the transmission line, which can be accessed at multiple points from main roads such as the N10 in De Aar. It should however be noted that the service road may require to be widened by less than 4m and Eskom, together with a representative of the Contractor would have to negotiate with each landowner where widening is required. Once the access has been negotiated, the contractor would need to signpost the access to the tower positions (Eskom Transmission, 2004).

2.3.2.4 Foundation Installation

A work crew will excavate the foundations for the tower structures and the foundation is influenced by the terrain encountered and the underlying geotechnical condition. The actual size and type of foundation to be installed will depend on the soil bearing capacity and can be excavated manually or by using machines. Strain structures require more extensive foundations for support than in-line suspension structures, which contribute to the cost of the construction of the powerline. Before erecting the towers and filling of the foundations, the excavated foundations are protected to safeguard unsuspecting animals and people from possible injury. The foundations will be backfilled, stabilized through compaction, and capped with concrete.

2.3.2.5 *Insulators*

Composite insulators are used to connect the conductors to the towers. Glass and porcelain have previously been used to connect the conductors for many years and are the most common. These products are, however, heavy, and susceptible to breakage by vandals and contamination by pollution. Composite insulators have a glass-fibre core with silicon sheds for insulation. Composite insulators are lightweight and resistant to both vandalism and pollution. Composite (Long rod type) insulators with silicone-based weather shed material will be used for strain assemblies. Composite horizontal line post insulators will be used for the intermediate structures and on the jumper supports.

2.3.2.6 *Conductors*

The conductors are made of aluminium with a steel core for strength. Power transfer is determined by the area of aluminium in the conductors. Conductors are used singularly, in pairs, or in bundles of three, four or six. The choice is determined by factors such as audible noise, corona, and electro-magnetic field (E-MF) mitigation. The size of conductor to be used is based on the initial and life-cycle costs of different combinations of size and bundles, as well as the required load to be transmitted.

2.3.2.7 *Erecting structures and stringing Conductors*

The Right of Way corridor may be used as an area for temporary storage and handling of equipment and materials related to construction. Steel components of structures may be delivered and placed on the ground near foundation sites. Once foundations are in place, the erection of the structures within the Right of Way will be done.

A guide wire is used to string the conductors between towers. This can be undertaken mechanically or by hand. The powerline is generally strung in sections (from bend to bend). Depending on the length of the conductor, cable drums are placed at 2km intervals during this stringing process.

2.4 Bulk Services and Infrastructure

The supply of the following basic services forms part of the contract between Eskom and the contractor hence the agreements will be acquired by the contractor. The proposed services are indicated below:

i. **Water**: This report has not quantified the expected volume of water required for the construction phase of this project. A general authorization may be required if the water used for construction is sourced from surface water or a borehole where the abstracted quantities are more than what is permissible within the quaternary catchment.
ii. **Sewerage:** Sewerage generation is anticipated during the construction phase due to the presence of the workforce contracted for the project. Consequently, the use of portable chemical toilets is suggested, which will be serviced periodically.
iii. **Stormwater:** Storm-water measures will be implemented to suit the terrain. The measures to be implemented are detailed in the Environmental Management Programme attached in Appendix H.
iv. **Solid Waste:** It is anticipated that solid waste will be produced mostly in the construction phase such as litter, packaging materials such as plastics, carton boxes, paper, beverages, and stockpiles. This type of waste will not pose any threat to the proposed project and will not require a Waste Management License. The contractor will be required to compile a Waste Management Method Statement before the commencement of construction activities.

2.5 Operation and Maintenance of the Power line

The management of a transmission line servitude depends on the details and conditions of the agreement between the landowner and Eskom and is, therefore site-specific. These may, therefore, vary from location to location. However, it is common that there is a dual responsibility for the maintenance of the servitude and Eskom will be responsible for the tower structures, access roads, and roads relating to servitude access.

2.5.1 Land Use and Power Line Operation

Literature studies have shown that farming and associated infrastructure such as irrigation systems and support structures, can be practised under 400 kV power lines provided that all the safe working clearances, crop height restrictions and building restrictions are properly followed. However, there is also a need for the landowner to have an agreement with Eskom concerning the activities that can be carried out underneath the servitude. The following activities are generally allowed:

- **Livestock grazing:** Bush clearing in the servitude will have little impact on the grazing potential of the land because most of the vegetation can be re-established under servitude. Overhead power lines do not affect the behaviour of livestock health; therefore, they can continue to feed underneath the power line once the cleared vegetation becomes re-vegetated; and
- **Overhead power lines** do not affect the growth of any crops and other low-growing vegetation. Tree height should not exceed the minimum height restriction.

3 KEY LEGISLATIVE REQUIREMENTS

This section of the report details the information required as per Section 3(1)(e) of Appendix 1 of Environmental Impact Assessment (EIA) Regulations, Government Notice R982 of 2014 (as amended).

(e) a description of the policy and legislative context within which the development is proposed including—
(i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and
(ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments.

3.1 Key Legislation

Environmental laws are formulated to realize sustainable development strategies, preventing adverse impacts on the environment from implementing plans and construction projects and promoting coordinative development of the economy, society, and environment. Most developments are regulated by legislation, with the Constitution of the Republic of South Africa and NEMA being the cornerstone of environmental law. The aim of the legislation is to incorporate both human rights and sustainable development in terms of the environment. The following laws, principles and regulations have been formulated to promote environmental sustainability and that are relevant to this project are discussed below:

Table 3-1: Legislation, Policies and Guidelines applicable to the proposed project

Legislation/Policy/Guideline	Applicability
The Constitution of South Africa, 1996 (Act 108 of 1996)	Section 24 of the constitution states that: *Everyone has the right—* *a) to an environment that is not harmful to their health or wellbeing; and* *b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that—* *(i) prevent pollution and ecological degradation.* *(ii) promote conservation; and* *(iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.* The proposed project will have some negative impacts on the environment. These will need to be mitigated such that they do not compromise the rights of other human beings. The Bill of Rights in Chapter 2 of the Constitution entrenches the right to information, freedom of expression, participation in political activity, administrative justice and fundamental science, cultural, legal, economic, and environmental rights. In addition, the Constitution requires all legislature to facilitate public involvement in the legislative and other policy processes. Citizens have the right to engage in public initiatives and processes on an ongoing basis. Based on the Bill of Rights, the public

Legislation/Policy/Guideline	Applicability
	will access all information developed and compiled during the Basic Assessment process.
National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA), as amended	The National Environmental Management Act 107 of 1998 (NEMA) creates the legislative framework for environmental protection in South Africa and is aimed at giving effect to the environmental right in the Constitution. It sets out several guiding principles that apply to the actions of all organs of state that may significantly affect the environment. Sustainable development (socially, environmentally, and economically) is one of the key principles, and internationally accepted principles of environmental management, such as the precautionary principle and the polluter pays principle, are also incorporated. NEMA also provides that a wide variety of listed developmental activities, which may significantly affect the environment, may be performed only after an environmental impact assessment has been done and authorization has been obtained from the relevant authority. The proposed project is within the Central Strategic Corridor gazetted as identified. geographical areas in Government Notice No. 113 published under Government Gazette No. 41445 of 16 February 2018. GN No. 113 of 2018 must be read with NEMA EIA Regulations (as amended) as the proposed development has activities that are listed in terms Listing Notices 1, 2 and 3 of 2014 as amended. An Environmental Authorisation should be obtained before commencement of the proposed project. In addition, Integrated Environmental Management (IEM) Guidelines were used during the entire EIA process: • Stakeholder Engagement, Integrated Environmental Management, Information Series 3. • Specialists Studies, Integrated Environmental Management, Information Series 4. • Impact Significance, Integrated Environmental Management, Information Series 5. • Ecological Risk Assessment, Integrated Environmental Management, Information Series 6. • Cumulative Effects Assessment, Integrated Environmental Management, Information Series 7. • Criteria for determining alternatives, Integrated Environmental Management, Information Series 11.
SPECIFIC ENVIORNMENTAL MANAGEMENT ACTS	
The National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA)	The Act sets out the mechanisms for managing and conserving South Africa's biodiversity and its components; protecting species and ecosystems that warrant national protection; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bioprospecting, including indigenous biological resources. Some of the lists that have been promulgated in terms of various sections of the Act are: i. Threatened or Protected Species Regulations,

Legislation/Policy/Guideline	Applicability
	ii. GN 1003 of 18 September 2020: Alien and Invasive Species Lists, 2020 iii. GN 2747 of 18 November 2022: The revised National list of ecosystems that are threatened and in need of protection. Categories are defined as Critically Endangered, Endangered, Vulnerable, and Protected, depending on their ecological structure, function, and composition. The primary implication of the Revised National List of Ecosystems that are Threatened or in need of Protection is that it is linked to Listing Notice 3 published under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The ecosystem within the project area is not classified as Critically Endangered or Endangered. Mitigation measures have been recommended for the conservation of biodiversity.
National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEMWA).	NEMWA sets out to protect health and the environment in terms of the constitutional right to have an environment that is not harmful to health and well-being, and to protect the environment for the benefit of present and future generations while promoting justifiable economic development. This is to be achieved through measures including uniform application of strategies throughout the Republic as well as norms and standards which seek to ensure best waste practices within a system of co-operative governance to achieve: • prevention of pollution and ecological degradation through institutional arrangements, planning and standards for regulating waste management by all spheres of government. • remediation of contaminated land • implementation of the national waste information system • compliance and enforcement. Sections 26 and 27 prohibits unauthorised disposal and littering. The Environmental Management Programme (Appendix H) outlines how the waste will be managed.
National Environmental Management: Air Quality Act 2004 (Act 39 of 2004)	The Act has introduced prescribed standards to protect and enhance air quality and pollution prevention in South Africa. This includes the National Ambient Air Quality Standards (AAQ Standards), which set ambient air quality standards for sulphur dioxide (SO2), nitrogen dioxide (NO2) and particulate matter, amongst other priority pollutants. In addition, the Minister has published the National Dust Control Regulations in the gazette for controlling dust in all areas (Government Gazette No.36974, Notice No.827 of 01 November 2013), including the requirements for monitoring, dust management plan development and implementation and reporting. Mitigation measures have been recommended to ensure the minimisation of dust emissions during construction.
WATER	
National Water Act, 1998 (Act 36 of 1998) (NWA)	The Act seeks to ensure that the country's water resources are protected, used, developed, conserved, managed, and controlled in a manner that considers relevant factors such as meeting the basic human needs of present and future generations. In terms of Section 19(1) an owner of land or a person in control of land where any

Legislation/Policy/Guideline	Applicability
	activity or process is or was performed or undertaken or where any situation exists must take all reasonable measures to ensure that which causes, has caused, or is likely to cause pollution of a water resource, must take all appropriate measures to prevent any such pollution from occurring, continuing, or recurring. Section 19(2) further indicates that measures must be undertaken to cease or modify the activity, comply with any waste standard or management practice, or eliminate the source of pollution. It further clarifies what is termed water use, and these 11 waters uses, as specified in Section 21, require a license/ General Authorization/ Water Use Licence. A General Authorisation/ Water Use Licence is required per Section 21(c) and (i) of the Act since the route is within 500m of delineated wetlands.
FORESTRY	
National Forestry Act, Act No. 84 of 1998	This Act provides for the management, utilisation, and protection of forests through the enforcement of permitting requirements associated with the removal of protected tree species, as indicated in a list of protected trees. Protected and indigenous tree cutting permits in terms of the Section 15(1) of the Act. The protected trees that shall not be cut are indicates in the List of Protected Trees.
ENERGY	
National Energy Act, 2008 (Act 34 of 2008)	One of the objectives of the National Energy Act (2008) is to promote diversity of supply of energy and its sources. In this regard, the preamble makes direct reference to renewable resources, including wind "to ensure that diverse energy resources are available, in sustainable quantities, and at affordable prices, to the South African economy, in support of economic growth and poverty alleviation, taking into account environmental management requirements…; to provide for… increased generation and consumption of renewable energies". The proposed project will ensure that electricity generated from solar, and wind is evacuated from the province to other parts of the country.
White Paper on Renewable Energy (2003)	The White Paper on Renewable Energy (November 2003) (further referred to as the White Paper) supplements the White Paper on Energy Policy and recognises that the medium- and long-term potential of renewable energy is significant. This Paper sets out Government's vision, policy principles, strategic goals, and objectives for promoting and implementing renewable energy in South Africa. The White Paper notes that, while South Africa is well endowed with renewable energy resources that have the potential to become sustainable alternatives to fossil fuels, these have thus far remained largely untapped. IRP 2010 aims to allocate 43% of new energy generation facilities in South Africa to renewables. Apart from the reduction of greenhouse gas emissions, the promotion of renewable energy sources is aimed at ensuring energy security through the diversification of supply (also refer to the objectives of the National Energy Act). Government's long-term goal is the establishment of a renewable energy industry

Legislation/Policy/Guideline	Applicability
	producing modern energy carriers that will offer in future years a sustainable, fully non-subsidised alternative to fossil fuels,
HERITAGE	
National Heritage Resources Act, 1999 (Act 25 of 1999)	This legislation aims to promote good management of the national estate, and to enable and encourage communities to nurture and conserve their legacy so that it may be bequeathed to future generations. The National Heritage Resources Act (NHRA) has introduced an integrated system for the identification, assessment, and management of the heritage resources of South Africa. Section 3 of the Act lists a wide range of national resources protected under the act as they are deemed to be national estate. When conducting a Heritage Impact Assessment (HIA), heritage resources must be identified. In addition, the Act also makes provision for the general protection of heritage resources: ▪ Section 34 in respect of the built environment. ▪ Section 35 in respect of archaeology, palaeontology, and meteorites; and ▪ Section 36 in respect of graves and burial grounds. Section 38 sets out guidelines for Heritage Resources Management and the conditions under which heritage impact assessments are required when developments impact upon heritage resources. If the appropriate authority permits the disturbance, the impacts on heritage resource/s affected must be mitigated to ensure the recovery and recording of information about that site. The screening tool has indicated the sensitivity of Palaeontology and Cultural Heritage to be very high. An archaeologist and palaeontologist have been commissioned to assess the significance of the project's impacts on archaeological and palaeontological resources.
AGRICULTURE	
Conservation of Agricultural Resources Act (Act No. 43 of 1983)	To provide for control over the utilization of the natural agricultural resources of the Republic in order 1 to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith. The proposed project will impact on agricultural land, soil, water resources and vegetation hence a soil potential and land capability assessment has been undertaken.
ASTRONOMY ADVANTAGE AREAS	
The Astronomy Geographic Advantage (AGA) Act 21 of 2007	The Act gives the Minister of Science and Technology the power to protect areas, through regulations, that are of strategic national importance for astronomy and related scientific endeavours. Regulations (R.465 of 22 June 2012) have been promulgated in terms of Sections 22 and 23 of the Act to prohibit or restrict certain

Legislation/Policy/Guideline	Applicability
	activities in core Astronomy Advantage Areas in terms of the Astronomy Geographic Advantage Act, 2007. Regulation 2f indicates the restriction to the operation, construction, or expansion of facilities for generating, transmitting, or distributing electricity. A section of the powerline servitude (Kronos to farms near Britstown) falls within the Karoo Central Astronomy Advantage Area 1.
HEALTH AND SAFETY	
Occupational Health and Safety Act (Act No. 85 of 1993)	The purpose of the act includes providing for the health and safety of persons at work and the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work. Alongside the Act, a compensation scheme for victims of occupational accidents and diseases and their dependants is foreseen in the Compensation for Occupational Injuries and Diseases Act 130 of 1993. In addition, there are ancillary occupational safety and health regulations (e.g., Construction Regulations, 2014; Environmental Regulations for Workplaces, 1987; Facilities Regulations, 2004). The applicable Regulations should be implemented and adhered to during the project life cycle.
PROVINCIAL	
Northern Cape Nature Conservation Act No 9 of 2009	This act provides for the sustainable utilisation of wild animals, aquatic biota, and plants; the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; describes offences and penalties for contravention of the Act; provides for the appointment of nature conservators to implement the provisions of the Act; provides for the issuing of permits and other authorisations; and provides for matters connected therewith. Sections 49 and 50 of the Act indicate restricted activities that require a permit when dealing with specially protected plants and protected plants while Section 51 deals with the picking, receipt, possession, acquisition, or handling of indigenous vegetation. Schedules have been published for the species that require permits per the Sections indicated.
POLICIES, PLANS, GUIDELINES AND PROTOCOLS	
Energy Policy	The white paper gives an overview of the South African energy sector's contribution to Gross Domestic Product (GDP), employment, taxes, and the balance of payments. It concludes that the sector can greatly contribute to a successful and sustainable national growth and development strategy. The Energy Sector Policy objectives are as follows: • Increasing access to affordable energy services. • Improving energy governance.

Legislation/Policy/Guideline	Applicability
	• Stimulating economic development. • Managing energy-related environmental and health impacts. • Securing supply through diversity
Integrated Resource Plan (IRP 2010 - 2023)	The promulgated IRP 2010–2030 identified the preferred generation technology required to meet expected demand growth up to 2030. It incorporated government objectives such as affordable electricity, reduced greenhouse gas (GHG) emissions, reduced water consumption, diversified electricity generation sources, localisation, and regional development.
The National Environmental Management Act 107 of 1998 (NEMA) Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal and or Avifaunal Species	This protocol provides the criteria for the specialist assessment and minimum report content requirements for impacts on terrestrial animal and/or avifaunal species for activities requiring environmental authorisation. This protocol replaces the requirements of Appendix 6 of the Environmental Impact Assessment Regulations. The assessment and reporting requirements of this protocol are associated with a level of environmental sensitivity identified by the national web based environmental screening tool (screening tool) for terrestrial animal species. The relevant terrestrial animal species data in the screening tool has been provided by the South African National Biodiversity Institute (SANBI).
Species Environmental Assessment Guideline: Guidelines for the implementation of the Terrestrial Flora (3c) & Terrestrial Fauna (3d) Species Protocols for environmental impact assessments in South Africa.	The Species Environmental Assessment Guideline provides background and context to the assessment and minimum reporting criteria contained within the Terrestrial Animal and Plant Species Protocols; as well as to provide guidance on sampling and data collection methodologies for the different taxonomic groups that are represented in the respective protocols. This guideline is intended for specialist studies undertaken for activities that have triggered a listed and specified activity in terms of the National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA), as identified by the EIA Regulations, 2014 (as amended) and Listing Notices 1-3.
Strategic Infrastructure Projects	The South African Government adopted an Infrastructure Plan, and from the spatial analysis of the country's needs carried out, 17 Strategic Integrated Projects (SIP) have been identified that cover a wide range of economic and social infrastructure. The construction and operation of the powerline and associated infrastructure addresses the following SIP: **SIP 10:** Electricity transmission and distribution for all. Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. Align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity. The activities undertaken for the proposed project will contribute to SIP 10 is achieved. A SIP letter is attached to the application.

3.2 Other Relevant Legislation and Documents

The table below lists the other legislation and documents that have been considered for this project.

Table 3-2: Other Relevant Legislation and Documents

OTHER LEGISLATION	
✓ Civil Aviation Act (Act No. 13 of 2009) ✓ Infrastructure Development Act (Act No. 23 of 2014) ✓ Promotion of Access to Information Act (No. 2 of 2000) ✓ Promotion of Administrative Justice Act (No.3 of 2000) ✓ Protection of Personal Information Act (No. 4 of 2013), POPIA ✓ Spatial Planning and Land Use Management Act (Act No. 16 of 2013) ✓ Hazardous Substances Act (No. 15 of 1973) ✓ National Roads Act (Act No. 93 of 1996)	
PROVINCIAL, DISTRICT AND LOCAL MUNICIPALITIES	
✓ Pixley ka Seme Spatial Development Framework 2022 ✓ Pixley ka Seme IDP (2022-2027) ✓ Emthanjeni Local Municipality Final 5th Generation IDP (2022-2027) ✓ Kareeberg Local Municipality IDP (2023-24) ✓ Siyathemba Local Municipality IDP (2023-24)	
ESKOM STANDARDS AND GUIDELINES	
✓ Chemical Spillage Assessment and reporting. ✓ Waste Management. ✓ Water Strategy. ✓ Water Management Policy. ✓ Vegetation management and maintenance within Eskom land servitudes and Right of Way.	
Municipal Bylaws	The proposed project will have to comply with the bylaws of Emthanjeni, Kareeberg and Siyathemba Local Municipality including the Pixley Ka Seme District Municipality.

3.3 Permits And Registrations

Table 3- indicates the permits that are required for the project.

Table 3-3: Required Permits

LEGISLATION	PERMIT	COMPETENT AUTHORITY	STATUS
NEMA: EIA Regulations GNR 982, 2014 (as amended) and its Listing Notices	Environmental Authorisation	DFFE	Ongoing
National Water Act: Government Notice (GN) 509, published in August 2016 in Government Gazette (GG) no. 40229	Water Use Licence/ General Authorisation	DWS	Ongoing
The National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA)	TOPS Permit	Department of Forestry, Fisheries, and the Environment	Application not yet started

LEGISLATION	PERMIT	COMPETENT AUTHORITY	STATUS
Northern Cape Nature Conservation Act (NCNCA)- Schedules 1, 2 and 3	Specially Protected and protected species (animal and plant)	Department of Agriculture, Environmental Affairs, Rural Development and Land Reform	Application not yet started
National Forest Act, Act 84 of 1998	Tree permit	Department of Forestry, Fisheries, and the Environment	Application not yet started

4 BASIC ASSESSMENT PROCESS

This Section gives a general overview of the BA process and the activities that have been taken to date.

A Basic Assessment (BA) is a proactive and systematic process where both positive and negative potential environmental impacts associated with certain activities are assessed. Every BA project has two objectives namely, process and content objectives. The process objectives are to ensure that the process is open, transparent, and inclusive, supply stakeholders with sufficient information afford them ample opportunity to contribute and make them feel that their contributions are valued. The content objectives of the project are in the form of "hard" information: facts based on the scientific and technical study, statistics, or technical data.

Section 24(4) of NEMA prescribes that the procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment must, inter alia, concerning every application for environmental authorization, ensure that the general objectives of Integrated Environmental Management (IEM) are considered. The BA should include an investigation of the potential consequences or impacts of the alternatives on the environment and an assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity. Figure 4-1 overleaf presents the BA process to be followed for the proposed development.

4.1 Objectives of a Basic Assessment

The objectives of the BA process are:

(a) To 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 the 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 managed, avoided, or mitigated.
(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 manage, avoid or mitigate identified impacts; and
    iii. identify residual risks that need to be managed and monitored.

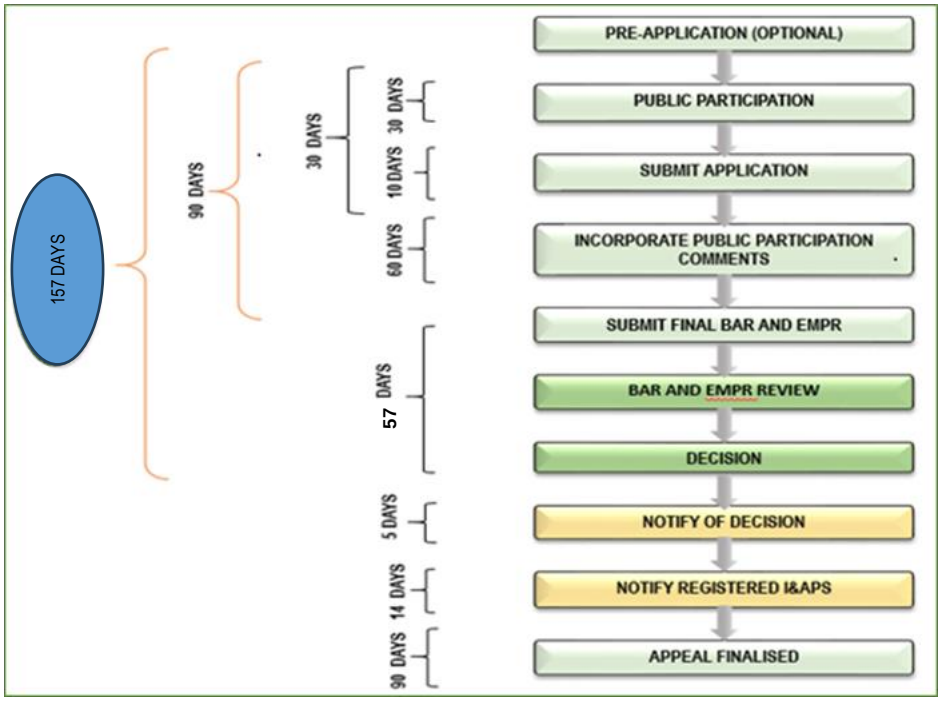


Figure 4-1: Basic Assessment Process

4.2 Methodology

The following phases have been undertaken for this assessment:

4.2.1 Screening Phase

Screening is the first stage in the EIA process whereby the EAP and the applicant determine if an EIA is required for the project in terms of the EIA Regulations, 2014 as amended, and its associated Listing Notices. The screening process carried out determined that based on the project activities and the geographic area, a Basic Assessment process was required as the construction of the 400kV power line and substations upgrade. In addition, Screening Reports were generated for the powerline corridor and the substations from the National Web-based Environmental Screening Tool. These reports provide site-specific environmental information and sensitivities. The reports are attached in Appendix G as per the requirement.

4.2.2 Pre-Application Meeting

For every new application where public participation is required, the Integrated Environmental Authorisations (IEA) of the DFFE has determined that a pre-application meeting request must be filed before the application is lodged. To comply with this criterion, a request for the meeting was made on April 20, 2023, and the assigned case officer responded that no meeting was necessary. Reference is made to Appendix F for the correspondence with DFFE.

4.2.3 Literature Review

A background study was undertaken to assess the environmental baseline conditions of the project area. Policy, legal and administrative framework, and requirements were identified through the review of relevant legal documents, guidelines, and

planning procedures. This was done to ensure that necessary measures are included in the design and implementation of the project. Reference is made to Section 3 of this report for the key legislative framework. The following documents were also consulted:

i. Farm owner information from Windeed.
ii. Northern Cape, Pixley ka Seme District, Emthanjeni, Kareeberg and Siyathemba Local Municipalities Integrated Development Plans (IDP), Spatial Development Frameworks (SDF), Local Economic Development (LED)
iii. Northern Cape CBA Maps.
iv. Department of Water and Sanitation (DWS), then Department of Water Affairs (DWA) Integrated Environmental Management (IEM) series.
v. Other Provincial and local municipality environmental tools.
vi. Relevant documents on water published by the Department of Water and Sanitation.
vii. Eskom's project motivation.

In addition, spatial data was also used to identify the affected farms, different habitats, and sensitive areas within the area of study.

4.2.4 Site Assessment and Specialist Studies

DIGES conducted site inspections between May and June 2023. During the field surveys, the project area was covered with a vehicle where access routes existed and on foot. Photographs were taken to document the existing environmental conditions on site. Specialist impact assessments were commissioned as part of the environmental process to investigate and assess the impacts associated with the proposed project as well as prescribe mitigation measures. The specialist studies undertaken include agricultural, archaeology, avifauna, Terrestrial biodiversity (animal and plants), palaeontology, visual and Riverine. Reference is made to Appendix D-2 to D-10 for the detailed reports. The assessment methodologies applied by the specialists are based on guidance specific to each topic area, i.e., Protocols for the assessment and minimum report content requirements of environmental impacts for various environmental themes.

4.2.5 Public Participation

To find potentially interested and affected parties, a proactive strategy was employed. Preliminary information was gathered from landowners, municipal and government authorities, and community liaisons to identify the Interested Parties. The application was announced to stakeholders via emails and text messages. Along with the notifications, a Background Information Document (BID) was sent. In addition, site notices were posted at conspicuous locations and municipal places within 10 kilometres of the corridor and the substations, and an advertisement was also published in the regional newspaper.

Notifications will be sent to inform stakeholders and IAPs of the availability of the DBAR for a 30-day public review period. In addition, meetings will be undertaken during the public review of the Draft Basic Assessment Report. All comments received will be incorporated into the Comments and Response Report that has been compiled for the previous application. Reference is also made to Section 7 of this report for the comprehensive details of the public participation process.

4.2.6 Impact Assessment

An impact assessment has been carried out and has been guided by the following criteria:

- **Assessment Criteria for Impacts**: As a means of determining the significance of the various impacts that can or may be associated with the project, a series of assessment criteria were used for each impact. These criteria included an examination of the nature, extent, duration, intensity, and probability of the impact occurring, and assessing whether the impact will be positive or negative for the biophysical and social environments at the site and surrounding areas.
- **Environmental Sensitivity Map:** An environmental sensitivity map was used to indicate environmentally sensitive features found on site that must be protected.
- **Maximization of Positive Impacts:** The philosophy followed focused on maximising the benefits to the local environment.
- **Specialists Integration**: DIGES collated information from all specialists and summarized it in this report.
- **Identification of Mitigation Measures and Environmental Management Programme:** The mitigatory measures recommended describe possible actions for the reduction of the significant negative environmental impacts identified in the assessment. As per Government Notice 435 of March 2019, a project that entails the construction of power lines and substations should submit a generic EMPr as developed by the Competent Authority. The plan provides guidelines for the planning, construction, operation, maintenance of the proposed power line and substation upgrade, as well as a holistic management and monitoring plan for the entire project. The relevant Sections as determined have been completed and the EMPr is appended to this report.

5 THE NEED AND DESIRABILITY FOR THE PROPOSED DEVELOPMENT

This section of the report details the information required as per Section 3(1)(f) of Appendix 1 of Environmental Impact Assessment (EIA) Regulations, Government Notice R982 of 2014 (as amended).

(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.

South Africa has embarked on a process of diversifying its energy-mix to enhance energy security while also lowering green-house gas emissions. The country is blessed with a climate that allows Renewable Energy (RE) technologies like solar photovoltaic (PV) and Wind generation to be installed almost anywhere in the country. According to the Integrated Resource Plan 2019 (IRP 2019, Eskom) a total of 14400MW wind power capacity plus 6000MW of solar PV technology is allocated for procurement leading up to 2030. Of this allocation 4800MW is allocated to wind energy and 2000MW of Solar PV. Of concern for future Renewable Energy Development is access to the transmission network of the Eskom. The Northern Cape is running out of transmission capacity and the province will not be able to connect any new renewable energy generation projects in the near future. The Northern Cape power corridors are highly constrained and cannot evacuate additional generations further to what has already been approved. Substantial upstream network strengthening will therefore be required to facilitate new generation capacity. The Northern Cape network requires strengthening to achieve system security and N-1 Grid Code compliance for the increasing demand as well as for the integration and evacuation of RE generation. According to the Transmission Development Plan (2020-2029), the Hydra – Aries 2nd 400 kV Corridor has been raised to serve as an evacuation corridor for the large concentration of RE in the province as such the scope of work for this application is the construction of the 2nd Hydra-Kronos powerline and associated substation upgrades. This route/ corridor will run parallel the first line which is strongly desired as it does not impact on the sense of place and there are already existing linear uses that have already been established such as roads.

At the national, provincial, and local levels, there is a strong commitment to the growth of renewable energy sources and the energy infrastructure that goes along with it. The National Development Plan, New Growth Path Framework, and National Infrastructure Plan, which all emphasize the significance of energy security and investment in energy infrastructure, all support the development and investment in renewable energy and related energy transmission (AfroConserva Integration, 2023) infrastructure. Therefore, the development of the planned power line is backed by important policy and planning documents and is consistent with the strategic energy planning environment of South Africa.

6 ALTERNATIVES

This section of the report details the information required as per Section 3(1)(g) to (h) (i) of Appendix 1 of Environmental Impact Assessment (EIA) Regulations, Government Notice R982 of 2014 (as amended).

(g) a motivation for the preferred site, activity, and technology alternative.
(h) a full description of the process followed to reach the proposed preferred alternative within the site, including:
(i) details of all the alternatives considered.

6.1 A motivation for the Preferred site, Activity and Technology Alternative

In terms of the EIA Regulations, 2014 (as amended), alternatives in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the—

(a) property on which or location where the activity is proposed to be undertaken.

(b) type of activity to be undertaken.

(c) design or layout of the activity.

(d) technology to be used in the activity; or

(e) operational aspects of the activity.

and includes the option of not implementing the activity.

6.1.1 Route Alternative

To provide for future generation scenarios, five Strategic Transmission Corridors were assessed as part of the 2016 Electricity Grid Infrastructure (EGI) Strategic Environmental Assessment (SEA), (See Figure below):

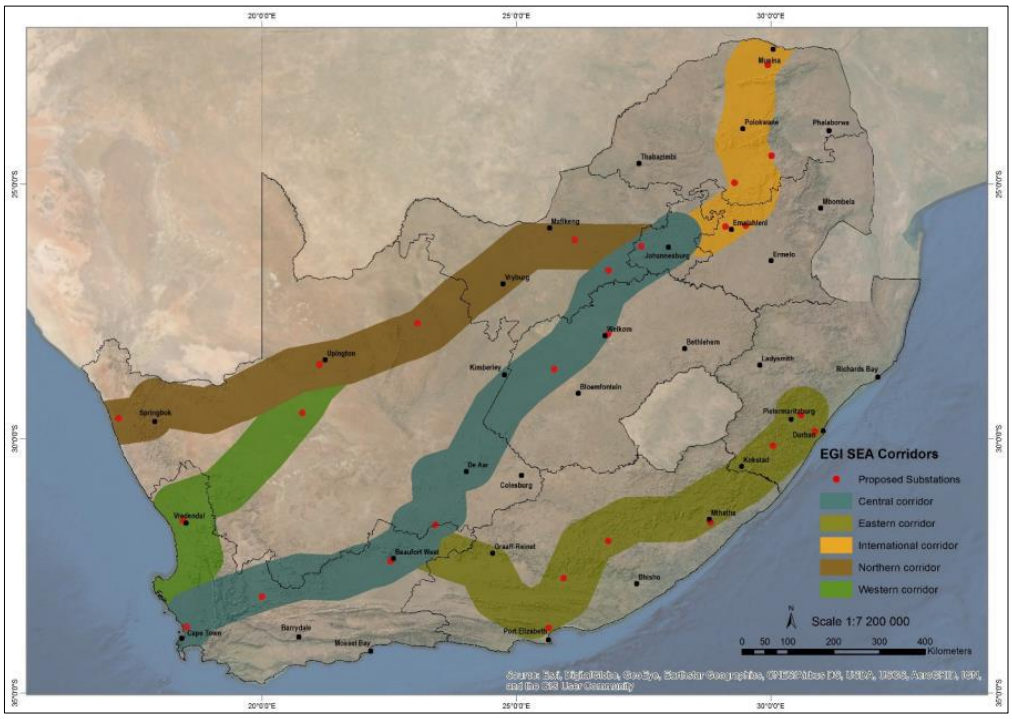


Figure 6-1: Five Strategic Transmission Corridor (Department of Environment, Forestry and Fisheries, 2019)

These corridors were gazetted for implementation on 16 February 2018 in Government Gazette 41445, Government Notice 113. The Gazette documented notice given by the Minister of Environmental Affairs of alternative procedures to be followed when applying for Environmental Authorisation for large scale electricity transmission and distribution development activities, identified in terms of section 24(2)(a) of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) in the identified Strategic Transmission Corridors (i.e., areas declared as geographical areas of strategic importance), (Department of Environment, Forestry and Fisheries, 2019). The notice indicates that where a larger section of the route is within a gazetted corridor, then the conditions as indicated in the Government Notice apply. The 2nd Hydra-Kronos 400kV powerline is within the Central Strategic Transmission corridor as such a pre-negotiated route is being assessed hence no other routes are being assessed. This will limit landowner issues that would otherwise be anticipated if there were many alternatives being dealt with in the project. The submission of a per-negotiated route is beneficial for Eskom as an upfront approval from landowners has been obtained prior to applying for an EA. In addition, the following was also considered during the route selection process:

i. The proposed corridor is along existing ROWs where linear uses are already established such as the 1st Hydra-Kronos 400 kV powerline. In addition, the proposed corridor aligns with existing disturbance, which include:
   - existing roads and access tracks.
   - previously disturbed areas.
   - fence lines.

ii. The proposed line is not close to the main roads and motorists will not be near the power lines. The presence of the existing power line mitigates the visual impact.

6.1.2 Design Alternatives

There are no design Alternatives that are being considered for this project.

6.1.3 Electricity line system Alternatives

There are two electricity line transmission systems, i.e., overhead powerlines and underground cables. The overhead powerlines hang in the air and are supported by pylons, while underground cables are buried beneath the earth's surface.

6.1.3.1 Comparison of overhead transmission powerlines and underground cables

For this project, the option of installing the powerline cable underground has been considered and so is the option of installing the powerline aboveground. Both options have been compared and below is the outcome.

Voltage levels

The underground cables currently have a limited voltage capacity and cannot carry more than 66kV, whereas the overhead powerlines can handle more than 400kV, resulting in them being ideal for serving high-energy needs such as industrial applications.

Cost and Maintenance

Underground cables cost more to buy, install, and maintain compared to the overhead powerlines. Digging trenches and installing manholes and other special equipment or underground cables is more expensive than erecting pylons for overhead powerlines. In addition, underground cables must be coated by a thick coating because of the surrounding soil, which add to their manufacturing costs. Overhead powerlines use the surrounding air as insulation, reducing costs significantly.

Outage and Repairs

Underground cables are less susceptible to outages compared to overhead powerlines. The latter is secured underground, but overhead power lines are exposed to destructive elements such as extreme weather, birds, and critters. However, underground cables are difficult to repair because of their rigid structure. It may take hours or days to locate and fix the problem. Overhead powerlines are easier to assess and repair.

Application and Lifespan

Underground cable has approximately half the durability and lifespan of overhead power lines. They last for about 35 years, while overhead powerlines can last for up to 70 years. In addition, underground cables have a limited application scope because of their limited voltage capacity. They are recommended for crowed cities where pylons are difficult to set up.

Utilising Overhead Powerlines with protective Equipment

Overhead powerlines often offer more benefits than underground cables. However, they may be more susceptible to damages from critters, but this is a manageable problem using Critter Guards products.

After considering the above findings, it has been decided that the Alternative that will be most suitable for the proposed project is the construction of the overhead powerlines. As such, going forward, underground powerline cable will not be considered. Therefore, the proposed powerline will be overhead and within the 300m corridor which is located within the Strategic Transmission Corridor in the Northern Cape Province.

6.2 No-go Alternative

The No-go Alternative is the option of not constructing the powerline and associated infrastructure. If the powerline is not constructed, the following will take place:

- There will be no disturbance of the environment including fauna, flora, soil, heritage, palaeontology, aquatic, topography and more.
- There will be no strengthening of the Transmission infrastructure network to evacuate the existing and expected renewable power out of the Northern Cape Province to other load centres in the country.
- The existing Hydra-Kronos 400 kV line will experience thermal overload by 2023.
- Power cuts will continue; and
- There will be no employment opportunities created.
- Inadequate electricity supply can result in low productivity which will lead to economic stagnation.
- Intermittent supply of electricity may also result in a loss of prospective.

6.3 Public Participation Process Undertaken

Apart from the information provided above, PPP for this project is being undertaken in line with Chapter 6 of the EIA Regulations of 2014 as amended. Thus far in the project there have not been any objections on the project and as such, this is another motivation for preferring the proposed site. The full PPP undertaken to date is detailed in Section 7.

6.4 Outcome of the specialist studies undertaken

The following specialist studies have been undertaken for the proposed project:

- Plant Assessment.
- Animal Assessment.
- Visual Impact Assessment.
- Heritage Impact Assessment.
- Palaeontological Impact Assessment.
- Soil and Land Capability Study.
- Social Impact Assessment.
- Avifauna Impact Assessment; and
- Riverine Baseline Study & Risk Assessment.

All the findings and recommendations of these studies support the development of the proposed project within the 300m corridor. Reference is made to Section 10 for the summary of the specialists' findings.

6.5 Conclusion

Government Notice 113 of 2018 indicates that where a larger section of the route is within a gazetted corridor, then the conditions as indicated in the Government Notice apply. The 2nd Hydra-Kronos 400kV powerline is within the Central Strategic Transmission corridor as such a pre-negotiated route is being assessed with no alternatives being assessed. No design alternatives were considered however a comparison of overhead lines and underground cables was done and it was noted that overhead lines are the most suitable option for the proposed project. As such the underground cables will not be further assessed. In addition, the No-go alternatives is also considered with the advantages and disadvantaged being noted in Section 9.8.

7 PUBLIC PARTICIPATION PROCESS

This section of the report details the information required as per Section 3(1) (h) (i)and (ii) of Appendix 1 of Environmental Impact Assessment (EIA) Regulations, Government Notice R982 of 2014 (as amended)

h(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs. (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

Public Participation Process (PPP) is viewed as a process of empowering communities and stakeholders in their efforts to safeguard the resource-base in more efficient ways and to use the resources sustainably. It also enables people to play lead roles in identifying, designing, directing, and implementing any development activity which has an impact on their immediate environment, and therefore on their way of life. When undertaking a Basic Assessment project, PPP is undertaken in terms of the Regulations set out in Chapter 6 of the EIA Regulations, 2014 as amended. The activities that will be carried out as part of the process are as follows:

- Section 40 –all registered Interested and Affected Parties (I&APs) are given 30 days to submit comments on generated reports.
- Section 41 – the person conducting a PPP must give notice to all I&APs by fixing notice boards, giving written notice, and placing advertisements in local newspapers and provincial/national newspapers.
- Section 42 – open and continuously maintain a register of Interested and Affected Parties (I&APs).
- Section 43 – all registered I&APs are entitled to comment on all reports and the person conducting the PPP must ensure that comments raised are brought to the attention of the proponent or applicant.
- Section 44 – the person conducting the PPP must ensure that comments of I&APs and records of meetings are recorded and responded to. The comments and responses report must be attached to the reports that are submitted to the competent authority.

7.1 Objectives and approach to the PPP

The objectives of the PPP are:

i. To gather input from Interested and Affected Parties (IAPs) regarding the level and nature of their interest to better plan public participation activities related to the Basic Assessment Process.
ii. To obtain local knowledge from the public to enhance our understanding of the environmental, cultural, and socio-economic setting of the proposed project for use in the Basic Assessment Process.
iii. To understand the reasons behind the views of the public regarding the potential environmental impacts.
iv. To solicit public input or views regarding potential alternatives and mitigation measures to reduce environmental impacts.
v. To work with the public to resolve a specific issue.
vi. To obtain public comments on all project documentation to verify whether information in the report is accurate, representative, and adequate.

vii. To provide feedback to Interested and Affected Parties about how their input, views, issues, and concerns have been considered in the process.

viii. To inform the public about the Competent Authority's (Department of Forestry, Fisheries, and the Environment) decision and the next steps to follow.

7.2 Methodology Adopted

Public Participation Process entails that all stakeholders that might be affected or have interest in the proposed project be afforded an opportunity to participate in the impact assessment of the project and they must each realize that they have responsibilities. The PPP will be undertaken in three (3) parts, where in Part 1 has already been undertaken as follows:

7.2.1 Part 1 of Public Participation Process

The following activities were undertaken during this phase.

7.2.1.1 Site Reconnaissance

A reconnaissance site visit was undertaken to develop an understanding of the social context (representative structures; language; communication media, etc.). The outcome of this site visit was that the line traverses across privately owned land where there are farmer's forums. In addition, information to the communities within 10-kilometre radii would be first distributed via municipal leadership, e.g., mayoral, and municipal manager's offices.

7.2.1.2 Stakeholder Database

With the help of landowners' database developed by Eskom during the negotiation process, Windeed and through networking and advertising, I&APs were identified, and these I&APs are currently registered on the database. The database of registered stakeholders will be per POPIA and will include the following:

- All persons who, because of the PPP conducted have submitted written comments.
- All persons who have requested, in writing, for their names to be placed on the register; and
- All organs of state which have jurisdiction in the proposed project.
- The register will continue to be updated as the project progresses. Refer to Appendix E-4 for a copy of the Database.

7.2.1.3 Notification

To create awareness, use was made of Background Information Document (BID), emails; telephone calls; newspaper advertisements and site notices. A Background Information Document (BID) was distributed to landowners, government departments, interested and interested and affected parties (I&APs) for review and comment.

The BID included the following information:

- The type of environmental assessment process (BA) being undertaken.
- Purpose of the BID.
- The description, nature, and location of the activity to which the application relates.

- Project legal requirement.
- Activities triggered by the proposed project.
- Other Permits required for the proposed project.
- Potential impacts.
- Where further information on the application or proposed application can be obtained;
- The manner in which and the person to whom representations/comments/objections in respect of the application or proposed application may be made.
- Name of consultant and contact details of the consultant.
- Invitation of the public members to register as I&APs.
- Public Participation Process to be followed and how the I&AP can get involved in the project.
- Registration and comments form.

Refer to appendix E-3 for the BID and proof of its distribution.

A2 size site notices were prepared in English, Afrikaans and IsiXhosa and placed on various conspicuous areas around the project site on 5 – 7 June 2023. Refer to Appendix E-1 for the proof of placement of site notices. In addition, an advert was published on the Noordkaap Bulletin on 6 June 2023 placed in the newspapers notifying the Interested and Affected Parties about the project. The site notices and newspaper advert included the following information:

- The type of environmental assessment process (BA) being undertaken.
- The nature and location of the activity to which the application relates.
- Where further information on the application or proposed application can be obtained.
- The manner in which and the person to whom representations/comments/objections in respect of the application or proposed application may be made.
- Name of consultant and contact details of the consultant.
- Invitation of the public members to register as I&APs.

Visiting municipal offices also helped the PPP Team to establish the preferred consultation process in the area. Refer to Appendix E-2 for a copy of newspaper advert. This was done to encourage them to register as I&APs and to comment.

7.2.1.4 Comments and Responses Report

A full description of the comments and issues raised during the inception phases of the project are recorded in the Comment & Response Report attached in Appendix E-5. This have also been incorporated into this document. To date the comments received have been largely centred on requesting to be registered.

7.2.2 Part 2 of Public Participation Process

Part 2 pertains to the Draft BAR being made available for a 30-day public review and comment period. Copies of the Draft BAR will be sent to all registered I&APs by email, fax, registered mail, link on a text message, CD, or a memory stick. In

addition, the report will also be uploaded on DIGES website (www.diges.co.za). Hard copies of the Draft BAR will be placed at the following venues:

Table 7-1: Venues where the Draft BAR will be placed.

Library Venue	Contact Details
De Aar Public Library	Tel: 053 632 9151 Address: Alida St, De Aar, 7000
Kareeberg Library	Contact: Rose Reen Tel: 053 382 3012 Email: kareeberglib@ncpg.gov.za Address: 10 Hanau Street, 8925 Carnarvon, Northern Cape Province
Prieska Library	Contact: Adaleen Accom Tel: :053 353 5305 Address: Stewart St, 8940 Prieska, Northern Cape Province

7.2.2.1 Newspaper Advert and Site Notices

Newspaper adverts will be published, and site notices will be placed at various conspicuous areas around the proposed project area and other sites that I&APs may visit. Adverts and notices will inform the public of the availability of the Draft BAR for review and comment; and where and how the Draft BAR can be accessed. Further, they will also inform the public of the details regarding review and comment timelines and where the comments or queries can be submitted to, and the dates of the public meetings.

7.2.2.2 Public Meetings

Three (3) in-person public meetings and one (1) virtual meeting will be held during the 30 days Draft BAR review and comment period. The details of the meetings will be published in the newspaper advert and included in the site notices. Further, the information pertaining public meetings will also be sent to I&APs by email, fax, registered mail, and text message.

7.2.2.3 Minutes of the Meetings

During the public meetings, minutes of the meetings will be recorded and distributed to I&APs. Further, the minutes of the meetings will be submitted to the DFFE as part of the Final BAR.

7.2.2.4 Comments and Responses Report

The comments received during Part 2 of the PPP will be addressed and included in the Comments and Responses Report. The Comments and Responses Report will form part of the Final BAR that will be submitted to the DFFE.

7.2.3 Part 3 of Public Participation Process

Part 3 includes notifying the I&APs of DFFE's decision and appeal procedure in terms of Chapter 2 of the National Appeals Regulations of 2014 (as amended). This is the final part of PPP.

7.2.3.1 Summary of the issues raised by I&APs

The issues raised and responses received will be addressed in the Final BAR and will also be recorded in the Comments and Response Report attached in Appendix E-5.

8 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE ALTERNATIVES

This section of the report details the information required as per Section 3(1)(g)(iv) of Appendix 1 of Environmental Impact Assessment (EIA) Regulations, Government Notice R982 of 2014 (as amended).

(g) (iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

This information is provided as a baseline to ensure an understanding of the possible impacts of the proposed development on the environment. As such, aspects of the biophysical and socio-economic environment that the project could directly or indirectly impact have been discussed. This information has been sourced from existing documents such as the SDFs and IDPs for the Local Municipalities and Pixley ka Seme District Municipality, the site, and the specialists' assessments. A more detailed description of each aspect of the affected environment is included in the specialist reports. The specialists commissioned are given in the table below:

Table 8-1: Details of Specialists

ORGANISATION AND NAME OF SPECIALIST	THEME
Bioassets cc Dr Wynand Vlok	Animal
Feathers Environmental Services Megan Diamond	Avifauna
Vhubvo Consultancy Munyadziwa Magoma	Archaeology and Cultural Heritage
Wits University Marion Bamford	Palaeontology
The Biodiversity Company Michael Ryan	Riverine Baseline Study and Risk Assessment
Nyamoki Consulting Lutendo Mutshaine	Soil and Land Capability
Afro Conserva Integration Nyasha Mapira	Social
David Hoare Consulting (Pty) Ltd David Hoare	Terrestrial Plant Species
Outline Landscape Architects cc Kathrin Hammel-Louw	Visual

8.1 General Setting

The Kronos substation lies at an elevation of 1080 amsl whilst Hydra substation is at 1300 amsl. The powerline corridor runs through a semi-arid landscape that consists of extensive plains interspersed with intermittent hills, ridges, outcrops, and flattish uplands. There are also regular drainage valleys of various dimensions crossing the corridor.

8.2 Meteorological Setting

Meteorological information including primary precipitation, ambient temperature, as well as wind direction and speed, are essential data for adequately assessing the environmental impacts. Except for a few places where stations are in operation, meteorological records are rarely accessible. The Pixley Ka Seme District lies in the upper regions of the Karoo and experiences moderate to hot summers and cold dry winters. Being a very hot area, the average annual maximum temperature is around 40C, while the average annual minimum temperature is -10C. The winters are cold and dry with moderate frost occurring during the night. The coldest months are during June and July. The area is in a summer rainfall region with very little rainfall. This region is very dry and most of the region receives less than 300mm of rain per annum with the areas in the east receiving generally more rain than the dryer areas in the west. Rain occurs predominantly in the form of summer thunderstorms and 60% of the average annual rainfall occurs between October and April. The mean annual rainfall ranges from 130mm - 300mm per year. Average annual evaporation ranges between 1600mm in the east and 2400mm in the west. (DTP Ditsamai Investments and Projects, 2022)

8.3 Geology

The geology information indicated in this section has been sourced from (Bamford, 2023). The Kronos Substation lies on the Dwyka Group tillites and diamictites that are moderately sensitive. The route for the power line traverses the Dwyka Group, the Waterford Formation, and from Britstown to De Aar on the Tierberg and Prince Albert Formation. South of De Aar the powerline partly is in the very Adelaide Subgroup rocks. The Dwyka Group is made up of seven facies that were deposited in a marine basin under differing environmental settings of glacial formation and retreat (Visser, 1986, 1989; Johnson et al., 2006). In the north and east these are called the Mbizane Formation, and the Elandsvlei Formation in the south and west. Described below are the seven facies (Johnson et al., 2006 p. 463-465):

i. The massive diamictite facies comprises highly compacted diamictite that is clast-poor in the north. It was deposited in subaqueous or subglacial positions.
ii. The stratified diamictite comprises alternating diamictite, mudrock, sandstone and conglomerate beds. They are interpreted as being rapidly deposited, sediment gravity flows but with some possible reworking of the subglacial diamictites.
iii. The massive carbonate-rich diamictite facies is clast-poor and was formed by the rainout of debris, with the carbonate probably originating by crystallisation from interstitial waters.
iv. The conglomerate facies range from single layer boulder beds to poorly sorted pebble and granule conglomerates. The boulder beds are interpreted as lodgement deposits whereas the poorly sorted conglomerates are a product of water-reworking of diamicton by high-density sediment gravity flows.
v. The sandstone facies were formed as turbidite deposits.
vi. The mudrock with stones facies represents rainout deposits in the distal iceberg zone.
vii. The mudrock facies consists of dark-coloured, commonly carbonaceous mudstone, shale or silty rhythmite that was formed when the mud or silt in suspension settled. This is the only fossiliferous facies of the Dwyka Group.

West and east of 24°E, the Ecca Group comprises the basal Prince Albert Formation, in the southwestern half of the Karoo Basin, and comprises shales and silty shales. In the west where is overlies the Dwyka Group there are fining upward sequences of sandstones, siltstones, silty shales and rhythmites. The southern facies of the Prince Albert Formation have

darker shales, chert and carbonaceous nodules produced under a reducing environment, with rare marine fossil fragments (Johnson et al., 2006). In the southern part of the basin the Waterford Formation comprises alternating very fine-grained lithofeldspathic sandstones and mudrock or clastic rhythmite units. These sediments represent shallow water accumulations with deformation and dewatering features. A delta front setting is implied, and trace fossils of trails, tubes and burrows have been reported (Johnson et al., 2006).

In the westernmost part of the basin the Tierberg Formation is predominantly argillaceous. In the northwest of its occurrence where it is in contact with the Collingham or Whitehill Formations, it grades up into the arenaceous overlying Waterford Formation (Johnson et al., 2006). Trace fossils of Nereites, Planolites and Zoophycus can be found in the fine mudstones (Johnson et al., 2006). The Adelaide Subgroup is part of the eastern foredeep basin and was deposited in the overfilled or non-marine phase (Catuneanu et al., 2005) and so comprises terrestrial deposits. There are numerous fining-upward cycles, abundant red mudrocks and sedimentary structures that indicate deposition under fluvial conditions (Johnson et al., 2006). Some of the lower strata probably represent a subaerial upper delta-plain environment and the generally finer grained materials are typical of meandering rather than braided rivers. Channel deposits are indicated by sandstones while overbank deposits are indicated by the mudstones (Johnson et al., 2006). From the updated Karoo Biostratigraphic map and biostratigraphy, De Aar is in the Abrahamskraal Formation and the Tapinocephalus Assemblage Zone (Smith et al., 2020). There are vast exposures of Jurassic dolerite that intruded through the Karoo Sequence, but this is volcanic rock and does not preserve fossils. The geology of the area is shown in the map below.

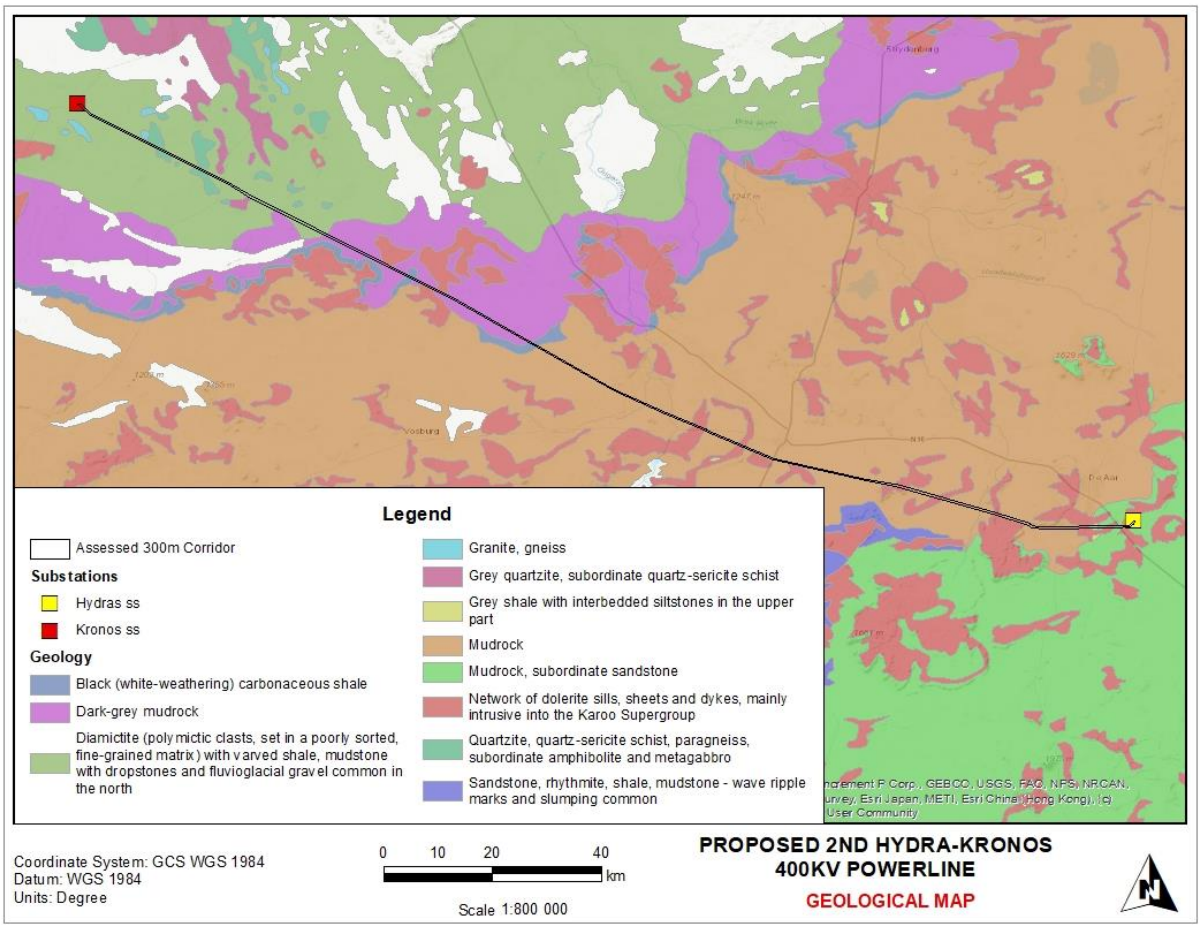


Figure 8-1: Geology of the area.

8.4 Soils and Land Capability

The project area is characterised by seven types of soils with both substations having freely drained, structureless soils, The dominant soil types are indicated in the Table below and Figure 8-2. Predicted soil erosion and the sediment delivery potential is deemed medium.

Table 8-2: Dominant Soil Characteristics

Soil ID	Soil Class	Limitation	Properties
S2	Freely drained, structureless soils	May have restricted soil depth, excessive drainage, high erodibility, low natural fertility	Favourable physical properties
S7	Soils with a pedocutanic horizon	Restricted effective depth; may have slow water infiltration	Somewhat high natural fertility
S13	Lithosols (shallow soils on hard or weathering rock)	Restricted soil depth; associated with rockiness	May receive water runoff from associated rock
S16	Non soil land classes	Restricted land use options	May be water-intake areas
S17	Association of Classes 1 to 4: Undifferentiated structureless soils	One or more of: low base status, restricted soil depth, excessive or imperfect drainage, high erodibility	Favourable physical properties
S19	Association of Classes 7 and14: Undifferentiated texture contrast soils	One or more of: restricted effective depth; slow water infiltration; seasonal wetness; high erodibility	Somewhat high natural fertility or relative wetness favourable in dry areas
S21	Association of Classes 13 and 16: Undifferentiated shallow soils and land classes	Restricted land use options	Soil may receive water runoff from associated rock; water-intake areas
S23	Association of Classes 17 and 19: Structureless and textural contrast soils	Restricted depth, imperfect drainage, high erodibility; slow water infiltration; seasonal wetness	May have favourable physical properties, somewhat high natural fertility; relative wetness favourable in dry areas

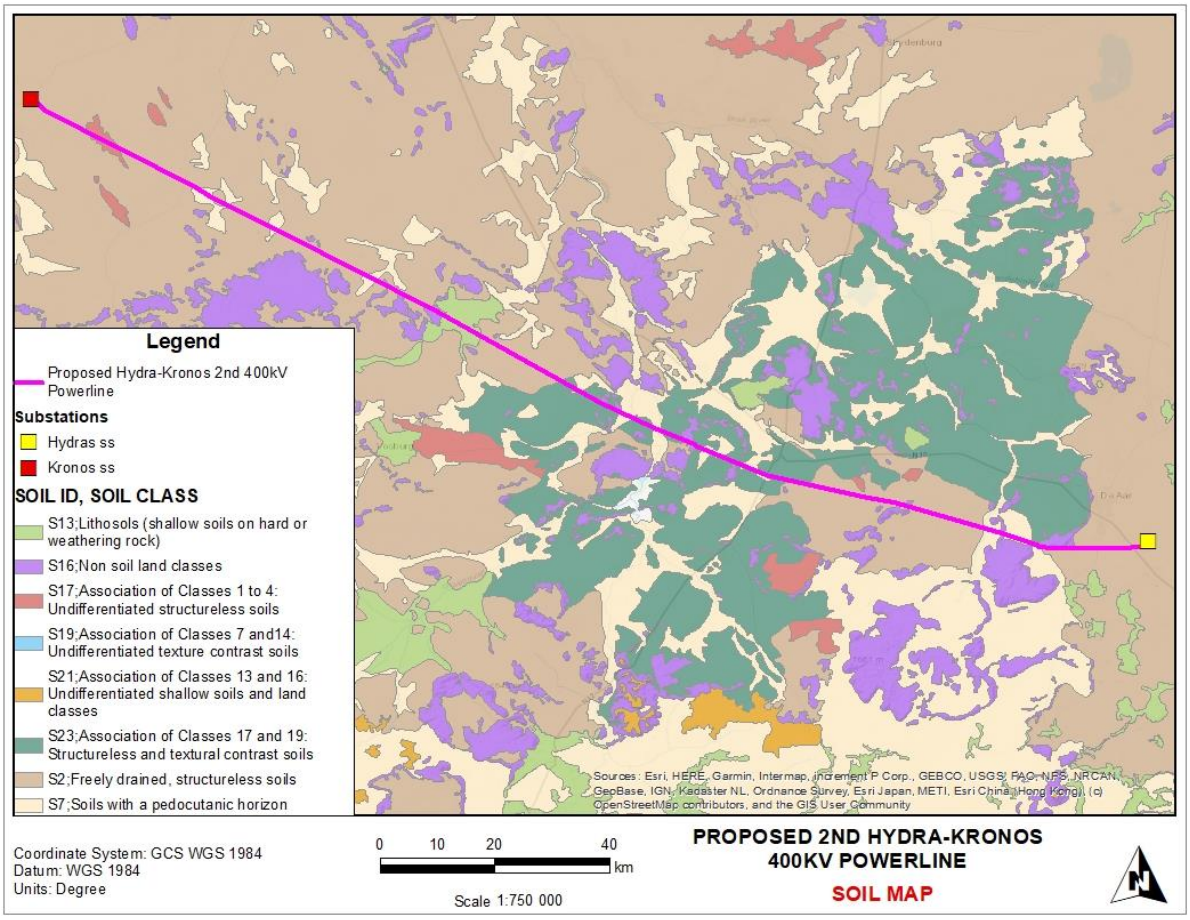


Figure 8-2: Dominant soil types within the area

According to Nyamoki Consulting Pty Ltd, 2023, land capability refers to the capability of producing commonly cultivated crops and pasture plants without deteriorating over a long period of time. Land capability and agricultural potential are determined by a combination of soil, terrain, and climate features and Table 8-2 shows that land capability is divided into eight classes, and these may be divided into three capabilities. The land classes and groups are arranged in order of decreasing capability and ranges of use. In addition, the risk of use increases from class I to class VIII is also shown.

Table 8-2: Land capability class and intensity of use (Smith, 2006 as cited in Nyamoki Consulting Pty Ltd, 2023)

Land Capability Class	Increased Intensity of Use									Land Capability Groups
I	W	F	LG	MG	IG	LC	MC	IC	VIC	Arable Land
II	W	F	LG	MG	IG	LC	MC	IC		
III	W	F	LG	MG	IG	LC	MC			
IV	W	F	LG	MG	IG	LC				
V	W	F	LG	MG						Grazing Land
VI	W	F	LG	MG						
VII	W	F	LG							
VIII	W									Wildlife
W-Wildlife		MG-Moderate Grazing			MC – Moderate Grazing					
F-Forest		IG- Intensive Grazing			IC- Intensive Grazing					
LG-Light Grazing		LC- Light Cultivation			VIC- Very Intensive Cultivation					

The land traversed by the powerline corridor is categorized as very low to low moderate, i.e., the land has low potential yield to produce crops due to its capability, climate associated with it, soil capability meaning that soil has limited capacity to allow crops to grow due to limited soil depth The corridor is mainly dominated by low in the northwest towards Copperton Town and low moderate land capability in the far southeast towards De Aar Town and Table 8-2 above indicates that the area is primarily for grazing purpose and wildlife.

8.5 Water Resources

The powerline line starts in the east with the Hydra Substation in D62D quaternary catchment and traverses the landscape to the west into the D62C quaternary catchment followed by the D62E quaternary catchment, D62A quaternary catchment, D62B quaternary catchment and D62H quaternary catchment until ending in the D54D quaternary catchment at the Kronos substation. These quaternary catchments fall within the Orange Water Management Area (WMA - 6) or the old Lower Orange WMA (14) within the Nama Karoo aquatic ecoregion. The proposed transmission line will directly cross the Elandsfontein unnamed, Ongers and Sand National Freshwater Ecosystem Priority Areas (NFEPA) rivers along with multiple tributaries of these systems as well as tributaries which flow into the Brak and an unnamed River SQRs. The project area traverses multiple sub-quaternary catchments, and these include 4544, 4767, 4662, 4951, 5070, 5081, 5105, 5118, 5082, 5138, 5205, 5235, 5306, 5332, 5339, 5344, 5419 and 5422 Sub-quaternary catchments. The 4767, 4662, 4951, 5070, 5081, 5105, 5082, 5138, 5205, 5235, 5306 and 5339 sub-quaternary catchments have no attached sensitivities. The 4544 and 5118 sub-quaternary catchments are considered River NFEPA while the 5332, 5419 and 5422 sub-quaternary catchments are considered Upstream Management Areas (UMA) which contain wetland NFEPAs as presented in Table 10-3. The transmission line crosses multiple watercourses of which eleven are considered Sub-Quaternary Reaches (SQRs). All other watercourses form part of the drainage networks of these eleven SQRs.

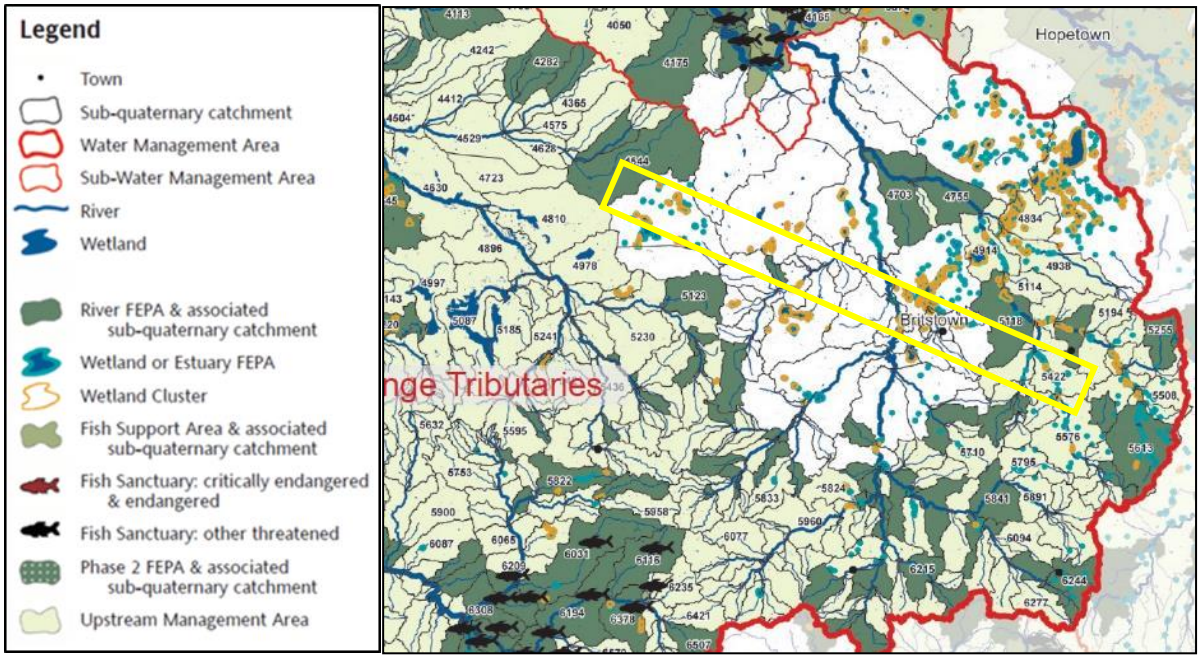


Figure 8-3: Map illustrating fish and river FEPAs for the project area, the project area is represented by the yellow square (Nel et al., 2011) (Source: The Biodiversity Company – Aquatic Report, 2023)

8.5.1 Threatened Ecosystems

Ecosystem threat status outlines the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function, and composition, on which their ability to provide ecosystem services ultimately depends (Van Deventer, *et al*., 2019). Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Threatened (LT), based on the proportion of each ecosystem type that remains in good ecological condition (Van Deventer, *et al*., 2019). The Ecosystem Threat Status (ETS) of each river assessed was based on the extent to which the system had been modified from its natural condition (SANBI, 2018). According to the South African Inventory of Inland Aquatic Ecosystems (SAIIAE) released with the National Biodiversity Assessment (NBA) of rivers, the rivers which were superimposed on the aquatic ecosystem threat status (Figure 5 3) indicate that the proposed infrastructure crosses multiple watercourses which are considered *Endangered* ecosystems, bar the Ongers River system which is considered a *Least Threatened* ecosystem. (The Biodiversity Company, 2023)

Figure 8-4: Elandsfontein Eastern Limb riparian areas

Figure 8-5: Elandsfontein Western Limb riparian areas

The following information was sourced from the Terrestrial Plant Species Assessment Report for the proposed Hydra-Kronos 2nd 400kV line prepared by David Hoare in 2023.

8.6 Terrestrial Plant Species

The corridor passes through several regional vegetation types. These are divided between two main regions, the Bushmanland region near to Copperton and the Nama-Karoo region across the remainder of the corridor. Within the Bushmanland region are three vegetation types, namely Bushmanland Arid Grassland, Bushmanland Basin Shrubland and Bushmanland Vloere. The Nama-Karoo region consists primarily of Northern Upper Karoo on the plains and Upper Karoo Hardeveld on the hills and ridges. There is a small area of Eastern Upper Karoo near to De Aar, but it is a small area of two

large regions that grade floristically into one another, therefore no local differences are evident, and the plains vegetation can be treated as a single type, namely Northern Upper Karoo. The Northern Upper Karoo (NKu3) vegetation type is the dominant vegetation type covering 75.53% of the Project Area of Influence (PAOI). (David Hoare Consulting (Pty) Ltd, 2023) Vegetation types within the PAOI are shown in the map below.

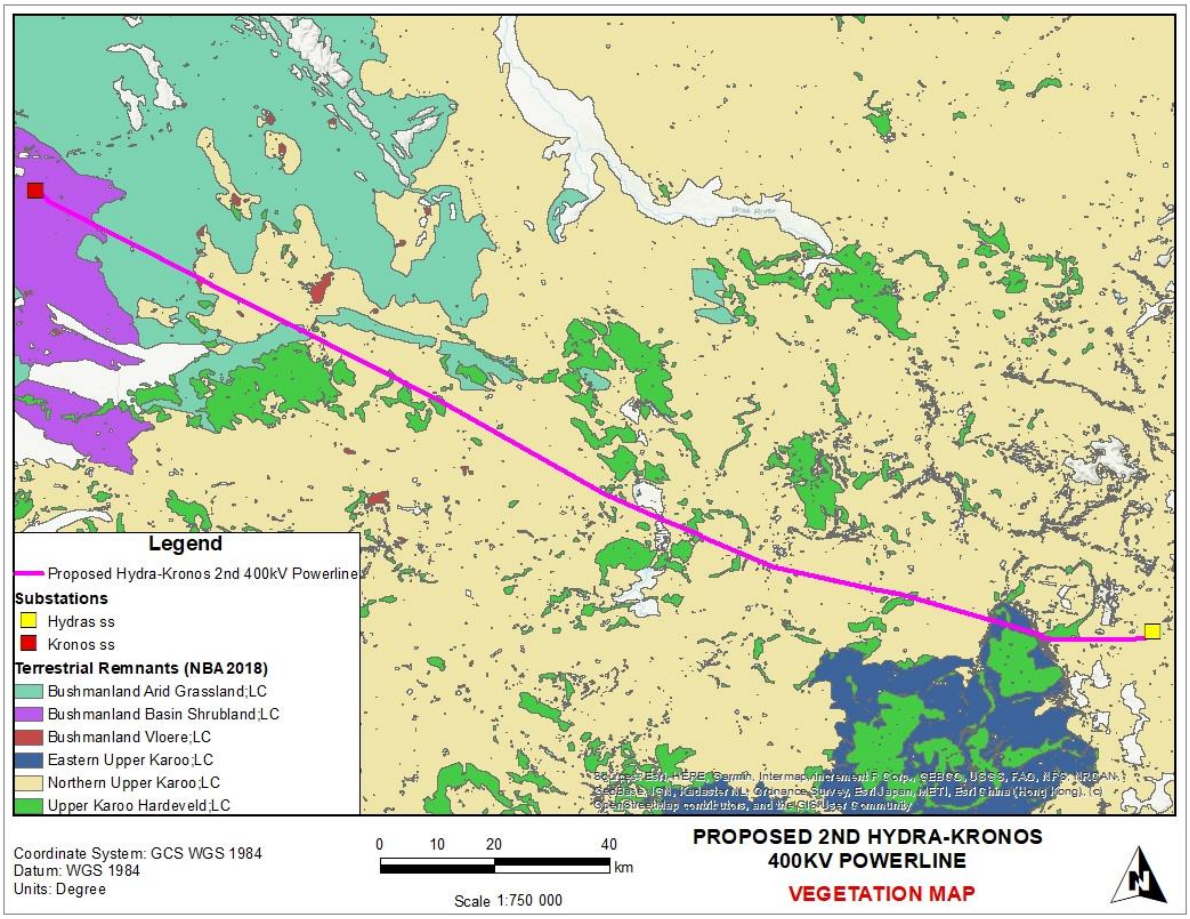


Figure 8-6: Regional Vegetation Types

The flora differs between these different parts of the landscape, determined largely by broad soil properties - the plains tend to have relatively shallow soils, but low rock cover; the ridges and hills have shallow soils and high rock and stone cover; and the drainage areas tend to have deep, fine-grained soils with few rocks. Corresponding with these soil patterns, the ridges have high shrub cover, but a diversity of habitats that support a variety of other plant functional types. The plains tend to have a relatively uniform cover of dwarf shrub-dominated vegetation with grass cover dependent on recent rainfall amounts. Drainage areas tend to be dominated by low spiny shrubs with relatively high cover of grasses. A total of 129 plant species were found within the corridor. None of these are Red List species, but one is listed as Near Threatened (*Hoodia officinalis* subsp. *officinalis*) and one is listed as Rare (*Gethyllis longistyla*). A few of the plant species were noted which are potentially sensitive, despite not being listed in any conservation category, including *Titanopsis calcarea, Hereroa pallens, Lithops hookeri, Anacampseros filimentosa, Anacampseros albissima, Aloe calviflora, Aloe hereroensis, Euphorbia braunsii, Euphorbia crassipes, Monsonia salmoniflora, Monsonia crassicaulis,* and *Hoodia officinalis*. The following species were also noted on site.

Table 8-3: Species noted on site (David Hoare Consulting (Pty) Ltd, 2023)

PHOTOGRAPHIC EVIDENCE	STATUS	DESCRIPTION
	Protected	Boscia albitrunca (shepherds' tree), and mostly as scattered individuals. Some of these occur within the corridor and may possibly be affected by the proposed powerline
	Near threatened	Threatened species was observed at one location on site, namely Hoodia officinalis subsp. Officinalis. Other plants of Hoodia were found on site but were not flowering and looked like Hoodia gordonii (Data Deficient). Although not threatened, the latter species is protected nationally.
	Rare	One Rare species was found at several locations, namely Gethyllis longistyla (Figure 10-17). It is also protected under the Northern Cape Nature Conservation Act, and is additionally a Sensitive Species, according to the Screening Tool.

8.6.1 Protected Tree Species

According to (David Hoare Consulting (Pty) Ltd, 2023), the corridor is within geographic distribution of three protected tree species, i.e., Vachellia erioloba, Vachellia haematoxylon and Boscia albitrunca. One species, Boscia albitrunca (shepherds' tree), was however found, mostly as scattered individuals. Some of these occur within the corridor and may possibly be affected by the proposed powerline.

8.6.2 Plant species of concern

No threatened plant species were found on site. One Near Threatened species was found at one location on site, namely Hoodia officinalis subsp. Officinalis. Other plants of Hoodia were found on site but were not flowering and looked like Hoodia gordonii (Data Deficient). (David Hoare Consulting (Pty) Ltd, 2023)

8.6.3 Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs")

Critical Biodiversity Areas are areas required to meet biodiversity targets for ecosystems, species, and ecological processes, as identified in a systematic biodiversity plan. Ecological Support Areas are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and protected areas and/or in delivering ecosystem services. (Skowno, et al 2019)

Critical Biodiversity Area Map is a spatial plan for ecological sustainability. It identifies a set of biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with Protected Areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape (SANBI 2017b as cited in Skowno, et al 2019). These maps are a form of strategic planning for the natural environment, providing a coherent and systematically identified set of geographic priorities to inform planning, action and decision making in support of sustainable development. The powerline corridor was overlain on the Northern Cape CBA Map, 2016 accessed from SANBI BGIS site, to verify if the project area was characterised by CBAs and ESAs. It was noted that the corridor was characterised by CBAs (One and Two) as well as ESAs in sone sections (See Figure 8-7). The table below shows that the percentage coverage of CBAs and ESAs within the corridor as compared to the province is significantly low.

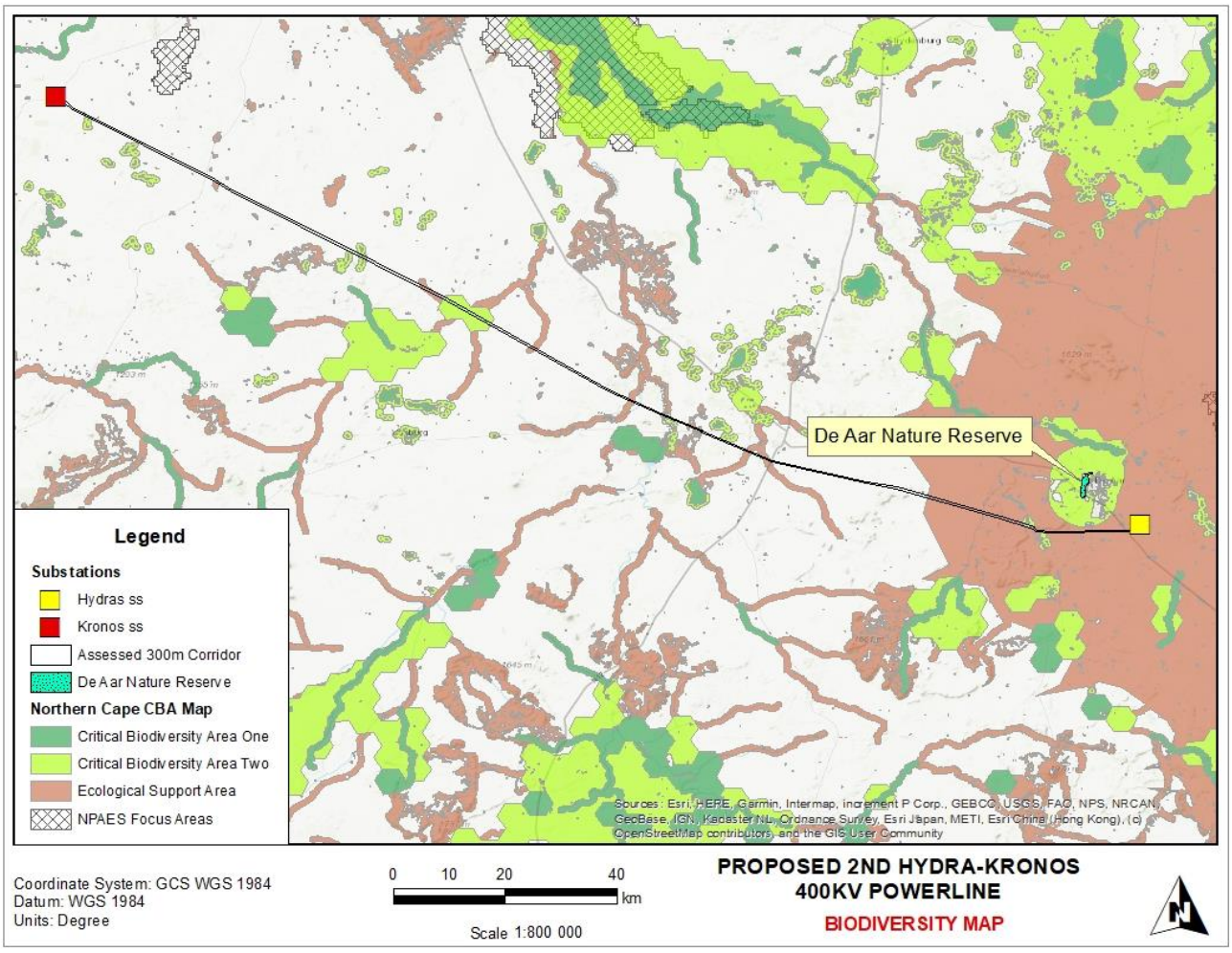


Figure 8-7: Critical Biodiversity Areas, Ecological Support Areas, and reserves

Table 8-4: CBAs and ESAs within the 300m assessed corridor.

CBA Category	NC Area (ha)	Corridor Area (ha)	% Coverage
Critical Biodiversity Area One & Two	10 644 800,00	400,47	0,0038%
Ecological Support Area	5 265 400,00	1334,20	0,0253%

8.6.4 Threatened Ecosystems

Ecosystem threat statusis an indicator of the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function, or composition (Skowno & Monyeki, 2021; https://iucnrle.org/; NBA, 2018). These ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Concern (LC), based on quantitative criteria and thresholds linked to ecosystem extent and condition (NBA 2018). The National Biodiversity Assessment (2018) published the threat status for all the realms in the country (Figure 2). The Red List of Threatened Ecosystems was firstly published and gazetted in 2011 following a series of assessment undertaken to evaluate the risks of the ecosystems. This was undertaken to understand whether ecosystems are still intact, or if they are losing vital aspects of their structure, function, or composition in relations to a series of thresholds set. In 2021, the Minister of Forestry, Fisheries, and the Environment, published the Revised National List of Threatened Terrestrial Ecosystems in Government Gazette 7526 (Notice No. 2747) in terms of the National Environmental Management: Biodiversity Act (NEMBA, Act No. 10 of 2004). The list was revised following the International Union for Conservation of Nature (IUCN) standard and 456 terrestrial ecosystem types described in South Africa (Mucina and Rutherford 2006; with updates described in Dayaram et al., 2019) were assessed. The revised list identified 120 threatened terrestrial ecosystem types (51 Critically Endangered, 55 Endangered and 14 Vulnerable types). This was for terrestrial ecosystems only however as stated earlier, the National Biodiversity Assessment (2018) assessed the threats status for all ecosystem realms (terrestrial, freshwater, coastal, and marine). The primary implication of the Revised National List of Ecosystem that are threatened or in need of protection is that it is linked to Listing Notice 3 published under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). Some of the activities listed in Listing Notice 3 require environmental authorisation when they are carried out in a threatened ecosystem.

No listed ecosystems occur along the corridor.

8.6.5 Protected Areas and Protected Area Expansion Strategy

Protected Areas are defined geographical national assets (land and sea) that serve as nodes in South Africa's ecological infrastructure network. They are recognized by various legislature or other effective means to manage and conserve biodiversity. Protected areas maintain key habitats that ensures natural processes are maintained across the land or seascape and protect ecosystems that deliver important services to people, such as the production of clean water, flood moderation, prevention of erosion (NBA, 2018) The project area is not within a protected area or a Protected Area Expansion Strategy. The closest reserve is De Aar Nature Reserve which is approximately 6km north of the proposed 400kV power line.

8.7 Fauna

BioAssets, 2023 indicates that the habitat for the three (3) red data species, Felis nigripes, Otomys auratus and Chersobius boulengeri are present. The animals observed within the project area include Tragelaphus strepsiceros, Herpestes sanguineus, Cynictis penicillata, Raphicerus campestris, Oreotragus oreotragus, Procavia capensis, Pelea capreolus, Canis mesomelas, Otocyon megalotis, Oryx gazella, Antidorcas marsupialis, Psammobates tentorius tentorius, Cryptomys hottentotus (mole hills), Orycteropus afer (feeding activity and dens), Hystrix africaeaustralis (quills, feeding activities and dens), Lepus saxatilis, Lepus saxatilis, Nucras intertexta and Pedioplanis lineoocellata pulchella. In addition, a family group of nine Otocyon megalotis.was also observed.

8.8 Avifauna

Assessment of the Project Area of Interest (PAOI) by (Feathers Environmental Services revealed seven broadly described avifaunal micro habitats i.e., karoo, surface waterbodies, wetlands, rocky ridges, agriculture, exotic/alien tree stands and high voltage power line infrastructure. Refer Figure 8-8 to 8-18 for the photographic record of the bird habitats observed within the PAOI. In addition, the southeastern portion of the proposed 400kV power line, close to Hydra MTS, occurs within the Platberg-Karoo Conservancy Important Bird Area (IBA) - SA037. IBAs are sites, that have been carefully identified on the basis of the bird numbers and species complements they hold (i.e., globally threatened, range restricted and or migratory or congregatory species). They are selected such that, taken together, they form a network throughout the species' biogeographic distributions. IBAs are key sites for conservation – small enough to be conserved in their entirety and often already part of a protected-area network. (Feathers Environmental Services, 2023). The Platberg-Karoo Conservancy IBA contributes significantly to the conservation of large terrestrial birds and raptors. These include Blue Crane Grus paradiseus, Ludwig's Bustard Neotis ludwigii, Kori Bustard Ardeotis kori, Blue Korhaan Eupodotis caerulescens, Black Stork Ciconia nigra, Secretarybird Sagittarius serpentarius, Martial Eagle Polemaetus bellicosus, Verreauxs' Eagle Aquila verreauxii and Tawny Eagle Aquila rapax. A total of 289 bird species are known to occur here. In summer, close to 10% of the global population of Lesser Kestrel Falco naumanni congregate and roost in this IBA. Amur Falcons Falco amurensis are also abundant and forage and roost with Lesser Kestrels. This IBA is seasonally important for White Stork Ciconia ciconia and Coordinated Avifaunal Roadcounts indicate high numbers of this species during outbreaks of brown locusts and armoured ground crickets. The IBA also supports the following biome-restricted species: Karoo Lark Calendulauda albescens, Karoo Long-billed Lark Certhilauda subcoronata, Karoo Chat Cercomela schlegelii, Tractrac Chat Cercomela tractrac, Sickle-winged Chat Cercomela sinuata, Namaqua Warbler Phragmacia substriata, Layard's Tit-Babbler Sylvia layardi, Pale-winged Starling Onychognathus nabouroup and Black-headed Canary Serinus alario. Except for Karoo Lark, Karoo Chat, and Namaqua Warbler, each of the remaining aforementioned species have been observed in the relevant SABAP2 pentads.

A total of 184 bird species have been recorded across the two pentads, within which the Hydra-Kronos 2nd 400kV power line and MTS infrastructure project is located, during the SABAP2 atlassing period to date. The presence of these species in the broader area provides an indication of the diversity of species that could potentially occur at the along the proposed power line corridor. Of the 184 species, 48 species are classified as priority species of which 14 are regional SCC (Taylor et al, 2015), one Endemic and two Near Endemic species. Relevant to this power line development, of the power line sensitive species, almost half (n=22) are likely to occur frequently within the PAOI. In addition, the PAOI contains mountainous areas and exposed rocky ridges that are likely to support the foraging and breeding needs of Verreaux's Eagle, Rock Kestrel, and Spotted

Eagle-Owl. (Feathers Environmental Services, 2023). The findings of the site survey are detailed in the Avifauna Impact Assessment attached in Appendix D-3.

Figure 8-8: Typical Nama Karoo habitat within the PAOI

Figure 8-9: Grassy Karoo habitat

Figure 8-10: Ephemeral River/ drainage line (riparian vegetation)

Figure 8-11: Ephemeral pan

Figure 8-12: Farm Dam

Figure 8-13: Mountainous area

Figure 8-14: Rocky ridges

Figure 8-15: Agricultural lands

Figure 8-16: Exotic/ Alien trees

Figure 8-17: Water trough

Figure 8-18: Active Verreaux's Eagle nest

8.9 Archaeology and Cultural Heritage

The information below regarding the archaeology and cultural heritage of the site has been obtained from the (Vhubvo Consultancy cc, 2023).

8.9.1 Archaeological Sites

Although the Namaqua area is rich of archaeological sites, it has until recent remained unknown to archaeologists in the country. The first studies of the area can be accredited to Robershaw (1977) and Webley (1984). After this research it became clear that the dry areas of the Namaqua were astonishingly archaeologically rich. The primary inhabitants of Namaqua were probably Khoi-San – the ancestors of the present-day Nama-speakers. Hundreds of Stone Age archaeological sites have since been documented in the wider area of the Namaqua (Parkington and Hart 1991; Parkington and Poggenpoel 1990; Parkington and Hart 1993; Halkett and Hart 1997; Hart and Lanham 1997; Penn 1995; Ross 2003; Steenkamp 1975). Nonetheless, few archaeological impact assessments have yielded several stone artefacts close to the proposed area. These have been documented by amongst others Hart (2007); Kaplan (2010); Mackay et al. (2010); Magoma (2014); Orton (2010a, 2010b, 2011, 2012, 2013); Orton and Hart (2011); Orton et al. (2011). Most of these Stone Age tools are generally in poor context, and do not constitute a site. Research in the area have revealed that scattered Stone material are found in numbers, however, they remain hidden under the sand, and tend to be seen where the Aeolian sands have eroded, exposing the underlying dorbank layers (Hart 2006). Chances of finding Stone tools during construction stages in the area are thus considered a possibility.

8.9.2 Graves and Burials

Most of the graves in the Namaqualand have been documented in the coastline, very few have been documented inland (Dewar 2008; Jerardino et al. 1992; Morris 1992). Farm graveyards are known to exist in the area throughout, however, these

are marginal since majority of the farms do not have graveyards, and farm owners (and workers) are buried in the nearest town graveyard (Hart 2006). Possibility of exposing graves (or its content) in this area is considered. The possibility of exposing graves (or its content) in this area is very low.

8.9.3 Built Environment

People were first granted farms in this area from the 19th century, as a result, historical resources predating this era are rare (Hart 2006). Farm structures with historical significance are as a result found throughout the area (Orton and Hart 2011). However, these are limited to farmhouses.

8.10 Land use

The study area consists mainly of shrubland and barren undeveloped land, as well as land used for agriculture, residential, and game farms. Major production activities of the area include wool production and livestock farming. De Aar is situated between Cape Town and Kimberley and is a primary commercial distribution centre for the central Great Karoo. Coppertown is a small town, now mostly derelict but once had a copper and zinc mine. Several new renewable energy projects have been established in the area. The site is located close to an existing Hydra-Kronos 400kV powerline. The site is accessed through the R357 near Kronos substation, R386, R403, R384, N12, R388 and the N10. The powerline can also be accessed through secondary roads such as Leo Cres Road. A servitude road will be opened for easy access of the powerline.

8.11 Socio-Economic Attributes

Socio-economic profile noted in this Section is as per the Social Impact Assessment Report compiled by Vhubvo Consultancy cc, 2023.

8.11.1 Demographics

8.11.1.1 Structure of the population by broad age groups

The age profiles for Siyathemba, Emthanjeni and Kareeberg are similar to that of Pixley ka Seme District and the Northern Cape Province, with most residents falling in the age group 15–34 years, followed by 35–64 and 0–14 years. The smallest number of residents fall in the age group 65+ years.

8.11.1.2 Population growth rates

The Northern Cape Province, Pixley ka Seme District, Siyathemba, Emthanjeni and Kareeberg all had negative growth rates between the period 1996–2001. This changed after 2001, with positive growth rates being recorded for the province, district, and local municipalities for the periods 2001–2011 and 2011–2016.

According to the Stats SA 2016 Community Survey, the Northern Cape also has the smallest percentage of residents who were born outside South Africa, namely 1.1%, compared to 50.8% in Gauteng and 12.2% (the second highest percentage in the country) in the Western Cape. Of the residents of Pixley ka Seme DM who were born outside South Africa, 50.5% were born in one of the SADC countries, 10.5% were born elsewhere in Africa, 6.3% were born in Europe, 31.5% were born in Asia, 1.3% were born in North America, and none were born in the remaining continents.

8.11.1.3 Population groups

The population distribution for the district and local municipalities differs from that of the country and the province - in South Africa and the Northern Cape Province, the dominant population group is Black African, whereas in Pixley ka Seme, Siyathemba, Emthanjeni and Kareeberg it is Coloured. The proportion Coloured residents in the province, however, does not reflect that of the country, with their distribution in the province being much higher in the province than in the country. On all levels (National, Provincial, District and Local), Whites are the third most prevalent, with the lowest number of residents on all levels being Indian/Asian.

8.11.1.4 Religious affiliation

In terms of religious affiliation, most residents (96%) of the Northern Cape Province are Christian, followed by no religious affiliation/belief (2%), Traditional African Religion (1%) and Muslims (1%).

8.11.1.5 Dependency ratios

Dependency ratios indicate to what extent the working age group (15–64 years) of a population must support those aged 0–14 years and 65+ years. Emthanjeni dependency ratio has decreased very slightly between 2001 and 2011, with larger decreases seen in the province and district. The age dependency ratio of Siyathemba declined from 0.7 in 2000 to 0.6 dependents (children & the elderly) in 2010 for every working age adult.

8.11.1.6 Education

The highest percentage of residents older than 20 years residing in Emthanjeni has completed some secondary education, followed by those who completed Grade 12/Std 10, some primary, no schooling, completed primary, and higher. In Siyathemba and Kareeberg, the picture is similar to that of Emthanjeni. This is also similar to levels for the district and province, except that a larger percentage of residents in the province completed some primary education than those completing Grade 12/Std 10. There are only slight differences for highest level of education completed between males and females. There has been an 8,3% increase in the number of learners that have accessed education between 1996 and 2001. There has been a 27,1% increase in the number of learners that have matriculated. The percentage of the population between the ages of 5- and 24-years attending school has decreased between 2011 and 2016 in the province, district and Emthanjeni, after having shown an increase in the period 2001–2011. In Siyathemba, there has been an 8,3% increase in the number of learners that have accessed education between 1996 and 2001. There has been a 27,1% increase in the number of learners that have matriculated. In Kareeberg, the tertiary level of education decreased from 6.3 % in 2001 to 5.5.% in 2011. Between 2001 and 2011 the rates of no-schooling have been halved across the municipal area. The percentage of persons 20 years and older who have no schooling decreased from 27.3% in 2001 to 18% in 2011. The literacy efforts for adults and the increasing influx of 20-year-olds with proper levels of education are expected to drive these proportions further down in the years to come.

Attendance of pre-school or Early Childhood Development (ECD) institutions increased with age in the province, district, and local municipalities.

8.11.1.7 Labour market, income, and ability to buy food.

People in the Pixley Ka Seme district are employed in the following sectors: Farming, Industry, Mining, Trade, Government, Transport, Tourism, Manufacturing, Construction and Energy. In 2018, Pixley Ka Seme employed 45 400 people, which is 13.98% of the total employment in Northern Cape Province (325 000), and 0.28% of total employment in South Africa (16.1 million). Employment within Pixley Ka Seme increased annually at an average rate of 0.59% from 2008 to 2018. Also, in 2018, a total number of 23 400 people were reported as unemployed in Pixley Ka Seme, which is an increase of 3 900 from 19 500 in 2008. The total number of unemployed people within Pixley Ka Seme constitutes 18.27% of the total number of unemployed people in the Northern Cape Province. The District Municipality experienced an average annual increase of 1.84% in the number of unemployed people, whilst the Northern Cape Province as a whole had an average annual increase in unemployment of 2.14%

The unemployment rate decreased in the province, district, and local municipalities between 2001 and 2011. However, these figures are dated and realistically speaking likely much higher, with a significant increase between 2011 and 2022 expected. The employment figures contained in the Siyathemba Local Municipality Integrated Development Plan (2021/2022), Emthanjeni Local Municipality Integrated Development Plan (2022/2027), Kareeberg Local Municipality Integrated Development Plan (2022/2027) are unfortunately also from the 2011 census. Figures in the province and municipality will likely follow the same trajectory as national figures, which increased significantly from around 24% in 2011 to 35.3% in the fourth quarter of 2021. The increase in the unemployment rate from 2020 to 2021 was steeper than between 2011 and 2020, likely due to the impact of Covid-19 and accompanying lockdowns which resulted in businesses closing and employees losing their jobs. The average yearly household income in Emthanjeni was R88 244.00 (translating to R7 354.00 per month) in 2011—slightly higher than the provincial average and significantly higher than the district average, which was R75 237.00.

There has been a decrease in the number of people unemployed in the Kareeberg municipal area between 2001 and 2011. This is directly related to the number of businesses that are still operating in the region during the period reflected and indicates the need for the retention of wholesale and retail strategy regarding these businesses. Unemployment reaching approximately 25.0% in 2011 and youth unemployment reaching 44.6% in 2011 as per Stats SA 2011 Census. In 2001 the percentage of households with no income was 9.9% and shows a slight difference when compared to those earning less than R4800 (9.7%). The percentage of those earning up to R9600 equals that of people earning up to R19200 with 25.5% each category in 2001. Percentages in 2001 however differ from one category to the next on households, but a conclusion may be made that percentages deteriorate as income estimates increase. While the number of jobs increased in South Africa, as well as the Northern Cape and Pixley Ka Seme between 2000 and 2009, it declined in Siyathemba. During 2009, the unemployment rate for Siyathemba was estimated at some 34.7%, which was slightly higher than the District Average. The unemployment rate has steadily increased in Siyathemba over the past decade. The labour force participation rate indicates the portion of working-age adults who are employed and those actively seeking employment. Since 2000, the portion of such adults increased from 53.2% to 57.4%. Compared to the other Regions under observation, a small portion of workers (10.3%) in Siyathemba can be classified as highly skilled. In fact, more than 52% of workers can be regarded as semi- or unskilled workers.

8.11.1.8 Housing

The three local municipalities are composed of various residential components varying from formal housing units to informal dwelling units. Within the District, 82, 8% of the people live in formal housing, 10, 8% in informal housing and only 2% in traditional houses. Households in the whole District is about 49 193 in respect to the Census 2011, where the average Household Size is about 3.70%, female headed households are about 36.90%, formal dwellings at 86.30% and the housing owned is at 52%

8.11.1.9 Access to services

93.5% of residents of Emthanjeni LM indicated in the 2016 Community Survey had access to safe drinking water, with 92.5% of residents of Pixley ka Seme District and 88.5% of residents of the Northern Cape indicating that they did. 88.3% of residents of Ubuntu LM indicated that they had access to safe drinking water.

Almost all (95.6%) residents of Emthanjeni LM as well as Ubuntu LM (92.5%) indicated in 2011 that they had piped (tap) water inside their dwelling or yard. This was significantly higher than the provincial figure of 79.7% in 2011. Most residents had access to flush/chemical toilet facilities (86.1% in Emthanjeni LM, 76.5% in Ubuntu LM and 74.3% in Pixley ka Seme District) in 2011. The percentage of households that had no access to electricity in 2016 was lower in Emthanjeni LM (4.5%) than in the district (7.2%) and province (8.5%). In terms of the extent to which households agreed that their municipalities were trying to mitigate high electricity costs, the largest percentage of residents who strongly disagreed were in the greater district (55.2%), followed by the province (50.4%). In the Pixley Ka Seme District the proportion of the households using electricity for lighting has increased from 57% in 1996 to 84% in 2011. South Africa aims to ensure that by 2030 at least 90% of people have access to grid electricity. Increase in both demand and tariffs may slow down this last effort. Households using electricity as a source of energy for cooking increased from 47,5% in 1993 to 73,9% in Census 2011. Although relatively expensive, paraffin and gas are used on a limited scale for cooking and heating. Animal dung also features on a limited scale as energy/fuel source for cooking and heating in some rural areas. There has been an increase in the use of electricity as an energy source and a decrease in the use of paraffin, gas, and candles as a source of energy/lighting. Emthanjeni is one of the local municipalities with the biggest backlog of electricity representing approximately 59,5% of the backlogs in the district. All the recent information indicates that much of the district households, 83% households have access to electricity for lighting and cooking purposes. As much as the existing situation is encouraging, it is however very important to note that some households (17%) are still using candles and paraffin as alternative power sources for meeting their power needs.

8.11.1.10 Female-headed households

The percentage of female-headed households increased from 1996 to 2011 across the province, district, and local municipalities. Data for 2016 was not available for the local municipalities, but it showed a decrease in female-headed households from 2011 to 2016 in both the province and the district.

8.11.1.11 Child-headed households

The percentage of child-headed households decreased in the province, district, and local municipality from 1996 to 2011.

8.11.1.12 Crime and perceptions of safety

A lower percentage of households experienced crime in the 12 months preceding the 2016 Community Survey in the respective municipalities, the district, and the province. In the province, 12.9% of residents indicated that they felt unsafe when walking alone during the day. These percentages increased significantly when respondents were asked if they felt unsafe when walking alone during the night, with more than half (52.2%) of residents in the province indicating they felt unsafe walking alone during the night.

8.11.1.13 Roads and Transport

According to the latest assessment in 2007, the Department of Roads and Transport (DORT), the average visual conditions of roads in Pixley Ka Seme yielded "fair". The state of roads in the district has an impact on the economic development of the area. Most roads leading to where most of the district population is, are not tarred/paved, and, as such, hinder the proper transportation of people, goods, and services. Some of the roads close to the site are shown in the map below. Some of the key concerns regarding roads and transport in the Pixley Ka Seme District include:

i. Conditions of road infrastructure, especially in rural areas and the accessibility and cost of public transport for rural communities.
ii. Worsening conditions of roads in both rural and urban areas, especially in townships; and
iii. Lack of maintenance for road infrastructure.

.

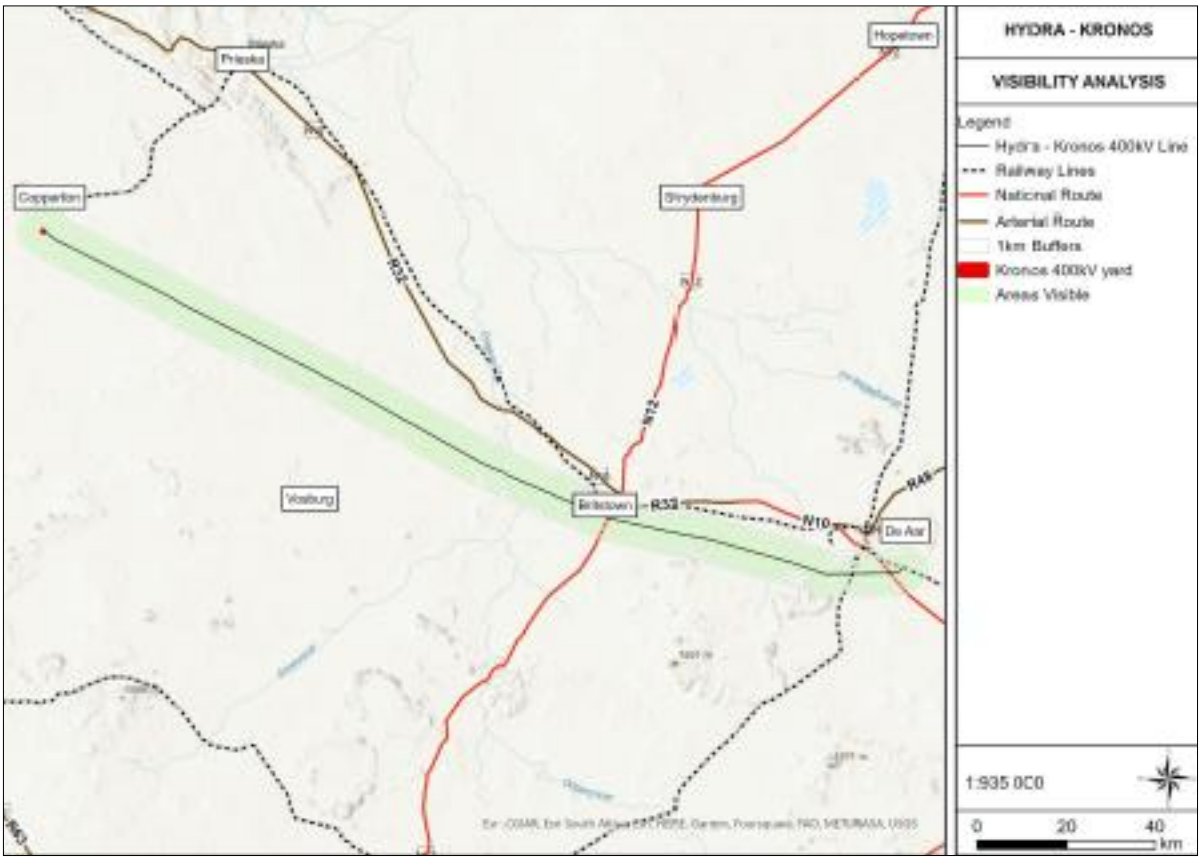


Figure 8-19: Some of the major roads associated with the project site (Source: Outline Landscape – 2nd Hydra Kronos Visual Impact Assessment Report)

9 ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGY

This section of the report details the information required as per Section 3(1)**(h)(**v) -(xi), **(i)** and **(j)** of Appendix 1 of Environmental Impact Assessment (EIA) Regulations, Government Notice R982 of 2014 (as amended).

(h) (v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which these impacts—

(aa) can be reversed.

(bb) may cause irreplaceable loss of resources; and

(cc) can be avoided, managed or mitigated.

(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.

(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.

(viii) the possible mitigation measures that could be applied and level of residual risk.

(ix) the outcome of the site selection matrix.

(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such.

(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity.

(i) a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including—

(i) a description of all environmental issues and risks that were identified during the environmental impact assessment process.

(ii) 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.

(j) an assessment of each identified potentially significant impact and risk, including—

(i) cumulative impacts.

(ii) the nature, significance and consequences of the impact and risk.

(iii) the extent and duration of the impact and risk.

(iv) the probability of the impact and risk occurring.

(v) the degree to which the impact and risk can be reversed.

(vi) the degree to which the impact and risk may cause irreplaceable loss of resources.

(vii) the degree to which the impact and risk can be avoided, managed, or mitigated;

9.1 EIA Methodology

The identification and assessment of environmental impacts is a multi-faceted process, using a combination of quantitative and qualitative descriptions and evaluations. It involves applying scientific measurements and professional judgment to determine the significance of environmental impacts associated with the proposed project. The process involves consideration of, inter alia: the purpose and need for the project; views and concerns of interested and affected parties; social and political norms, and general public interest.

The methodology used for assessing impacts associated with the proposed project follows the philosophy of environmental impact assessments, as described in the booklet Impact Significance, Integrated Environmental Management Information Series 5 (DEAT, 2002b). The philosophy is summarised by the following extracts:

"The impact magnitude [or intensity] and significance should as far as possible be determined by reference to legal requirements, accepted scientific standards or social acceptability. If no legislation or scientific standards are available, the EIA practitioner can evaluate impact magnitude based on clearly described criteria. Except for the exceeding of standards set by law or scientific knowledge, the description of significance is largely judgemental, subjective, and variable. However, generic criteria can be used systematically to identify, predict, evaluate, and determine the significance of impacts." (DEAT, 2002b).

"Determining significance [of impacts] is ultimately a judgement call. Judgemental factors can be applied rigorously and consistently by displaying information related to an issue in a standard worksheet format." (Haug et al., 1984 taken from DEAT, 2002b).

The purpose of undertaking an impact assessment is to ensure that the project proactively considers environmental issues as part of the project planning and decision-making processes throughout the project life cycle.

9.1.1 The Impact Rating System:

Details of the impact assessment methodology used to determine the significance of physical, bio- physical and socio-economic impacts are provided below.

Table 9-1: Impact Assessment Methodology

The impacts are assessed as either having a: negative effect (i.e., at a `cost' to the environment), positive effect (i.e., a `benefit' to the environment), or Neutral effect on the environment.
Extent of the Impact (1) Site (site only), (2) Local (site boundary and immediate surrounds), (3) Regional (within the three local municipalities), (4) National, or (5) International.
Duration of the Impact The length that the impact will last for is described as either: (1) Immediate (<1 year) (2) Short term (1-5 years), (3) Medium term (5-15 years), (4) Long term (ceases after the operational life span of the project),

(5) Permanent.
Magnitude of the Impact The intensity or severity of the impacts is indicated as either: (0) None, (2) Minor, (4) Low, (6) Moderate (environmental functions altered but continue), (8) High (environmental functions temporarily cease), or (10) Very high / Unsure (environmental functions permanently cease).
Probability of Occurrence The likelihood of the impact actually occurring is indicated as either: (0) None (the impact will not occur), (1) Improbable (probability very low due to design or experience) (2) Low probability (unlikely to occur), (3) Medium probability (distinct probability that the impact will occur), (4) High probability (most likely to occur), or (5) Definite.
Reversibility The degree to which an impact is reversible: (1) Completely reversible (2) Partly reversible (3) Barely reversible (4) Irreversible

9.1.2 Significance of the Impact

Based on the information contained in the points above, the potential impacts are assigned a significance rating (S). This rating is formulated by adding the sum of the numbers assigned to extent (E), duration.

(D) and magnitude (M) and multiplying this sum by the probability (P) of the impact. S=(E+D+M) P

The significance ratings are given below.

Table 9-2: Legend for Impact Significance

	Significance	Description of Significance
(<30)	Low	The activity will have a low impact in the environment. This impact would not have a direct influence on the decision to develop in the area.
(30-60)	Medium	Medium Impact – the activity will have a medium impact on the environment. The impact could influence the decision to develop in the area unless it is effectively mitigated.
(>60)	High	The activity will have a high impact on the environment. The impact must have an influence on the decision process to develop in the area.

9.2 The Assessment of Environmental Impacts and Risks

The proposed powerline will result in many positive and negative impacts. Mitigation measures have been provided for the negative impacts identified. The mitigation measures should be implemented in line with the Mitigation hierarchy as described by the DEA (2013). Refer to Figure 12-21 below for the Mitigation Hierarchy. This section is largely based on the recommendations by specialist and the EAP's experience on similar projects.

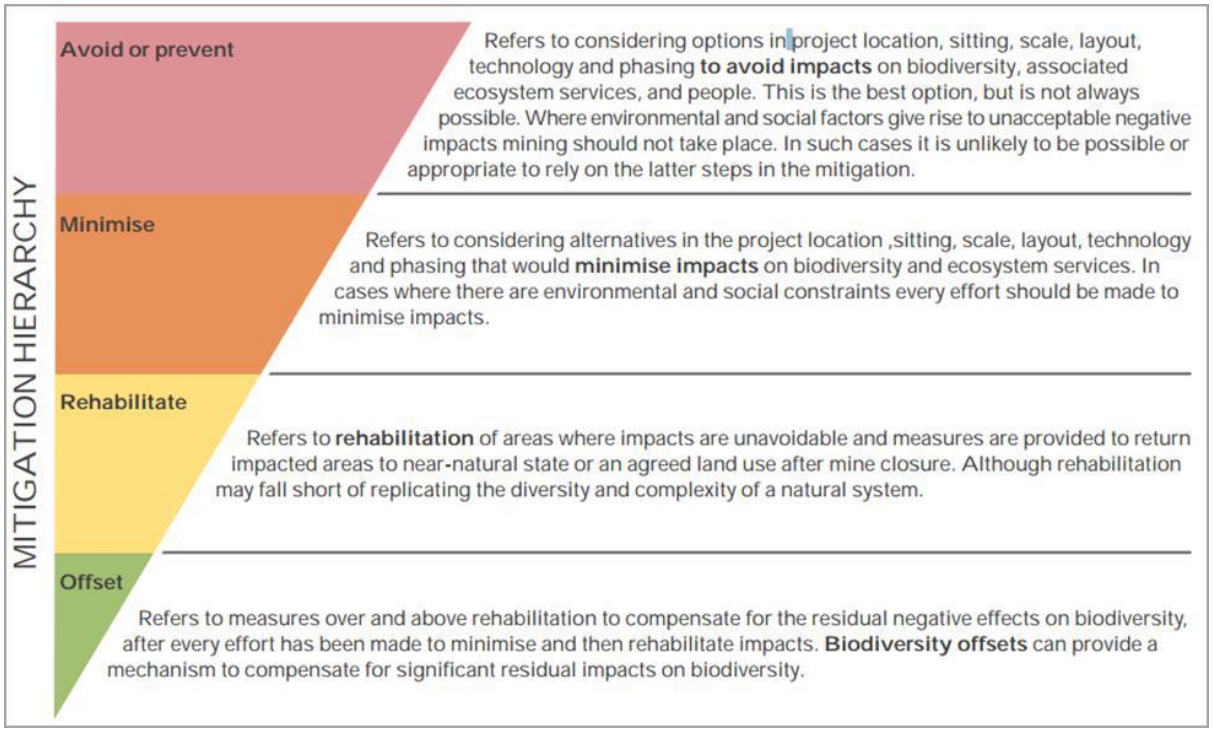


Figure 9-1: Mitigation Hierarchy as described by the DEA (2013)

The environmental impacts/risks have been grouped according to the phase of the project as follows:

- Pre-construction.
- Construction.
- Operational.
- Closure/decommissioning.

9.3 Impact Assessment During Pre-Construction Phase

9.3.1 Job Creation

Impact: Job creation (This is a positive impact)											
Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
2		3		2		8		5		75 = High Positive Impact	
Mitigation Measures: • The Developer and Contractor should follow the applicable legislation when hiring staff.											
Mitigation Measures: After completion of construction activities, some of the jobs will come to an end. However, there will be staff that will continue to work on the powerline during the operational phase, but it will be a smaller number. After decommissioning of the powerline there will be no more job opportunities on this project. There is no mitigation measure proposed for this impact.											

9.3.2 Disturbance of the sub-surface environment

Impact: Disturbance of the sub-surface environment (Geotechnical)											
Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
4	4	3	2	5	2	8	4	3	2	60 = Medium	24 = Low
Mitigation Measures: • Geotechnical Investigations should be done before commencement of construction activities. • Towers and any other structures should be constructed on areas that are geotechnically stable.											

9.3.3 Environmental Awareness

Impact: Non-compliance with authorisations, permits and licenses due to poor or no Environmental awareness training											
Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation

2	1	3	1	3	2	8	2	4	2	64 = high	12 = Low

Mitigation Measures:

- All personnel and contractors should undergo Environmental Awareness Training.
- The induction is to include aspects such as the EMPr conditions, project permits conditions, need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping".
- The training should focus on the compliance of the conditions of the Environmental Authorisation (EA), Environmental Management Programme (EMPr), and any other relevant permits and licences.
- A signed register of attendance must be kept for proof.
- Awareness posters should be placed on the site notice board or any other placed allowed on site.
- Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the possible presence of SSC, their identification, conservation status and importance, biology, habitat requirements and management requirements the Environmental Authorisation and within the EMPr.
- The avoidance and protection of the surrounding watercourses and riparian areas must be included into a site induction.
- Contractors and employees must all undergo the induction and be made aware of the areas to be avoided.
- The Contractor must provide method statements on the protocols to be followed and contingencies to be implemented.

- Training on Cultural and Heritage Aspect
  - Prior to construction, contractors should be given training on how to identify and protect archaeological remains that may be discovered during the construction phase. The pre-construction training should include some site recognition training for the types of archaeological sites that may occur in the construction areas. Below are some indicators of an archaeological site that may be found during construction:
    - Flaked stone tools, bone tools and loose pieces of flaked stone.
    - Ash and charcoal.
    - Bones and shell fragments.
    - Artefacts (e.g., beads or hearths); and
    - Packed stones which might be uncounted underground and might indicate a grave or collapse stone walling.

9.4 Impact Assessment During Construction Phase

9.4.1 Light Pollution

Impact: Light Pollution

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
2	1	3	2	2	2	8	4	3	2	45 = Medium	18 = Low

Mitigation Measures:

- No lights to be left on at the sites at night, as this will attract animals to these areas – e.g., increased insect activity and this will attract bats, snakes and small mammals feeding on the insects, resulting in a higher incidence of snakes on the construction areas and animals being trapped in the open excavation pits.
- Should it be necessary to work at night, the following should be implemented:
    - Switch off unnecessary lights to reduce light pollution.
    - Where possible use automatic light systems that turn off at certain times.
    - Outdoor lights should not be directed towards neighboring properties as they can create discomfort.
    - Where possible, use glare-free bulbs.
    - Where possible, ensure that lights are facing downwards.
    - Where possible, cover the bulbs to reduce bright skies at night.

9.4.2 Noise Pollution

Impact: Noise Pollution

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
2	1	3	2	3	2	6	4	4	2	56 = Medium	18 = Low

Mitigation Measures:

- Use noise barriers and equipment with low noise.
- Noise control plan should be prepared.
- Site vehicles and equipment should be regularly serviced and maintained in a good working order.
- Where necessary staff should be provided with ear plugs.

9.4.3 Fire

Impact: Uncontrolled/unmanaged fire that spreads to the surrounding natural grassland and wetlands

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
2	1	3	2	3	1	8	4	3	2	48= Medium	20 = Low

Mitigation Measures:

- Serviced fire extinguishers and fire beater should be available on site.
- Contact details of the nearest Fire Department should be made available on site and communicated staff members.
- Relevant staff should be treated on fire management.
- A Fire Management and Emergency Response Plan needs to be prepared and implemented to restrict the impact that fire may have on the project area and it's immediate surrounding.

9.4.4 Traffic Congestion

Impact: Traffic congestion on private and public roads

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	2	3	2	2	2	4	2	3	2	30 = Low	16 = Low

Mitigation Measures:

- The current existing roads should be used to access the powerline.
- The necessary traffic control signage should be installed on site.
- Delivery of material be outside of peak hours to prevent traffic congestion.
- Should temporary roads be required, these should agree with the landowners.
- Powerline servitude road should be developed and used as per the agreement with the landowners.
- Reduce speed to prevent animal road kills.

9.4.5 Waste generation, handling, storage, and disposal

Impact: Inadequate handling, storage and disposal of Domestic and industrial waste resulting in odour, soil, surface, and ground water pollution.

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	2	3	2	3	3	6	4	4	2	60 = Medium	22 = Low

Mitigation Measures:

- The management hierarchy should be implemented when managing waste generated. The waste management Hierarchy is indicated below.

Figure 9-2: Waste management Hierarchy

- The Hierarchy indicates that:
  - Avoidance and Reduction: Materials and products must be designed in a way that reduces the natural materials used, their waste components and the waste generated during production as well as after the consumption of the material or product.

- Re-use: Materials can be used for different or similar purposes without changing their properties or shape. This approach seeks to re-use a product or material when it is no longer in use. In this way, it becomes an input for new materials and products.
- Recycling: This includes the separation of materials from the waste stream and its processing as raw materials or products. The foundation of the 'cradle-to-cradle' waste management approach is the first elements of the waste management hierarchy.
- Recovery: Recycle specific materials or components or use as fuel.
- Treatment and disposal: This is a 'last resort' within the waste hierarchy. Treatment refers to the alteration of the physical properties of waste or destroying the toxic constituents of waste. Disposal refers specifically to the burial or disposal of waste in or on the land. For example, landfill disposal.

- Formal waste management and sewerage systems must be put in place for contractors.
- Waste management must be a priority and all waste must be collected and stored effectively.
- No dumping of litter, rubble or cleared vegetation on site should be allowed. Infrastructure and rubble removed because of the construction activities should be reduced, re-used, or recycled with disposal to landfill as last resort.
- No temporary dump sites should be allowed in areas with natural vegetation. It is advised that waste disposal containers and bins be provided during the construction phase for all construction rubble and general waste.
- Vegetation cuttings must be carefully collected and disposed of at a separate waste facility.
- Well labelled refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site.
- Burying of any waste including rubble, domestic waste, empty containers on the site should be strictly prohibited.
- All construction rubble waste and any other types of waste must be removed and disposed of at a suitable authorised disposal facility.
- Contractors and construction crew conducting the works on site should be informed about approved waste disposal facilities.
- The skips and bins should be properly marked to indicate the type of waste that should be stored.
- Waste should be stored at approved areas.
- It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site.
- The Contractor should supply sealable and properly marked domestic waste collection bins or skips and all solid waste collected shall be disposed of at a registered waste disposal site.
- Where a registered disposal facility is not available close to the project area, the Contractor shall provide a method statement regarding waste management.
- Under no circumstances may domestic waste be burned on site.
- Temporary storage of domestic waste shall be in covered waste bins/skips.
- No dumping of construction material on-site may take place.
- All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials should be supported.

9.4.6 Sewage handling and disposal

Impact: Improper handling and disposal of sewage

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	1	3	2	3	2	8	4	3	2	51 = Medium	18 = Low

Mitigation Measures:

- Adequate sanitary facilities and ablutions on the servitude must be provided for all personnel throughout the project area. Use of these facilities must be enforced.
- The toilets should be anchored to prevent them from being blown by the wind.
- A minimum of one toilet must be provided per 10 persons.
- Portable toilets must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area.
- The toilets must be kept clean so that they are a desired alternative to the surrounding vegetation.
- All staff on site should use the toilets.
- Safe Disposal Certificates (SDC) for sewage disposal should be provided to the Environmental Control Officer and filed on site.

9.4.7 Poor stormwater management

Impact: Poor management of stormwater

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	2	3	2	4	2	8	2	3	2	54 = Medium	16 = Low

Mitigation Measures:

- A Stormwater Management Plan must be developed to control runoff and prevent erosion of the site and its surroundings.
- Appropriate stormwater structures alongside a Stormwater Management Plan must be designed to minimise erosion of the surrounding environment and sedimentation of surrounding watercourses.

9.4.8 Soil erosion and dust suppression

Impact: Soil Erosion and Dust Emission

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	2	3	2	4	2	6	4	3	2	48 = Medium	20 = Low

Mitigation Measures:

- Dust minimization and control measures should be implemented at the construction site at regular intervals. This includes wetting of exposed soft soil surfaces.
- No water may be abstracted from any water source without an applicable License from the Department of Water and Sanitation (DWS).
- The frequency of implementation of dust suppression measures should be increased when it is expected that high wind conditions will develop.
- Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species.
- Vegetation clearing should only occur immediately prior to the commencement of construction activities in an area to minimize the amount of exposed soil on the site.
- Topsoil should be stored separately from subsoil.
- Measures should be implemented to prevent stockpiles from being washed away or blown away by the wind. Where possible, soil stockpiles must be covered with tarps or straw to prevent fugitive dust.

9.4.9 Potential Contamination of surface and groundwater

Impact: improper waste management and handling of hazardous waste may result in potential contamination of surface and groundwater

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	1	3	2	5	2	8	2	3	2	57 = Medium	14 = Low

Mitigation Measures:

- No hazardous waste will be buried on site. All waste should be collected by a registered service provider and disposed of at a suitable registered waste facility.
- Concrete mixing should be done on an impervious surface.
- Empty cement bags and any waste concrete should be treated as hazardous waste and disposed of at a suitable registered waste disposal site.
- No left-over concrete will be buried on site.

9.4.10 Hydrocarbon Spillage

Impact: Contamination of habitat as well as water resources associated with hydrocarbon spillage.

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	2	3	1	3	2	6	2	4	3	60 = Medium	21 = Low

Mitigation Measure:

- A spill response kit must be always available at the working area.
- Soil, rags, and any material contaminated with hydrocarbons should be treated as hazardous waste.
- Well labelled hazardous waste bin with lid should be available at a designated area on site.
- Hazardous waste should be disposed of at a suitable registered waste disposal facility.
- Safe Disposal Certificates should be submitted to the Environmental Control Officer for record keeping.
- All machinery and equipment should be inspected regularly for faults and possible leaks; these should be serviced off-site.

9.4.11 Displacement of SCC and non-SCC priority species because of habitat loss & transformation

Impact: Displacement of SCC and non-SCC priority species because of habitat loss & transformation

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	3	1	1	3	3	3	2	4	3	40 = Medium	27 = Low

Mitigation Measures:

- Avoid removal of sensitive vegetation types. The recommendations of the terrestrial plant specialist must be strictly implemented, especially as far as limitation of the construction footprint and rehabilitation of disturbed areas is concerned.
- Construction activity should be restricted to the immediate footprint of the infrastructure.
- All construction activities should be strictly managed according to generally accepted environmental best practice standards, to avoid any unnecessary impact on the receiving environment.
- All temporary disturbed areas should be rehabilitated according to the site's rehabilitation plan, following construction.
- Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.

9.4.12 Displacement of SCC and non-SCC priority species as a result disturbance

Impact: Displacement of SCC and non-SCC priority species as a result disturbance

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	1	2	2	2	2	4	2	4	3	44 = Medium	21 = Low

Mitigation Measures:

- Conduct a pre-construction inspection (avifaunal walk-through) of the final power line alignment to identify priority species that may be breeding within the final footprint. If an SSC nest is occupied, the contractor must consult with the avifaunal specialist to find ways of minimizing the potential disturbance to the breeding birds during the construction period. This could include measures such as delaying some of the activities until after the breeding season.
- A site-specific Construction EMPr (EMPr) must be implemented, which gives appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the CEMPr and should apply good environmental practice during construction. The CEMPr must specifically include the following:
    - No off-road driving.
    - Maximum use of existing roads, where possible.
    - Measures to control noise and dust according to latest best practice.
    - Restricted access to the rest of the property.
    - Strict application of all recommendations in the biodiversity specialist report pertaining to the limitation of the footprint.
    - Inclusion of operational measures to be followed with Environmental Awareness Training.

9.4.13 Destruction of heritage artefacts

Impact: Destruction of heritage artefacts

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	1	2	1	3	2	6	4	4	2	48 = Medium	16 = Low

Mitigation Measures:

- If any evidence of archaeological sites or remains (e.g., remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal, and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA (Natasha Higgitt 021 202 8660/ nhiggitt@sahra.org.za) must be alerted as per section 35(3) of the National Heritage Resources Act (NHRA). Non-compliance with section of the NHRA is an offense in terms of section.
- If unmarked human burials are uncovered, the South African Police Service should be contacted immediately. Further, the SAHRA Burial Grounds and Graves (BGG) Unit (Ngqabutho Madida 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA.
- If heritage resources are uncovered during the development, a professional archaeologist depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA.
- As per the Archaeological and Cultural Heritage Assessment, at Hyk01 (GPS Coordinate -30.714703:23.899187), the Contractor and ECO are to inspect the subsurface occurrence during construction.
- As per the Archaeological and Cultural Heritage Assessment, at Hyk02 (GPS Coordinates -30.646732: 23.649670), the Contractor should test trench to evaluate the subsurface density.

9.4.14 Potential disturbance of paleontological resources

Impact: Potential disturbance of paleontological resources

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	1	2	2	3	2	4	4	3	2	36 = Medium	27 = Low

Mitigation Measures:

- Based on the fossil record and previous surveys in the area, fossils are very rare in this area which is already disturbed. It is extremely unlikely that any fossils would be preserved in the overlying soils and sands of the Quaternary. There is a very small chance that fossils may occur below the ground surface in the shales of the Ecca Group and the Abrahamskraal Formation. If fossils are found by the environmental officer, or other responsible person once excavations and drilling have commenced, then they should be rescued, and a palaeontologist called to assess and collect a representative sample. The following Fossil Chance Find Protocol should be implemented. It should be noted that the following procedure is only required If fossils are seen on the surface and when excavation commence:
    - When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (trace fossils, fossils of plants, insects, bone or coalified material) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
    - Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (for example see Figures 10-18 and 10-19). This information will be built into the EMP's training and awareness plan and procedures.
    - Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
    - If there is any possible fossil material found by the contractor/environmental officer then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
    - Fossil plants or vertebrates that are of good quality or scientific interest by the palaeontologist must be removed, catalogued, and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
    - If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
    - If no fossils are found and the excavations have finished, then no further monitoring is required.

9.4.15 Stripping and stockpiling of topsoil resulting to disturbance of in situ horizon organisation.

Impact: Stripping and Stockpiling of topsoil resulting to disturbance of in situ horizon organisation

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
4	3	3	2	5	5	6	6	4	4	76 = High	72 = High

Mitigation Measures:

- The only mitigation for this impact is to keep the surface disturbance footprint as small as possible. However, horizon inversion/disturbance is a permanent impact.

9.4.16 Stripping and stockpiling of topsoil resulting in loss of soil fertility through impacts on nutrient cycles.

Impact: Stripping and Stockpiling of topsoil resulting in loss of soil fertility through impacts on nutrient cycles

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	2	3	2	4	3	8	4	5	5	90 = High	55 = Medium

Mitigation Measures:

- Soil nutrient cycles can somehow be maintained by re-vegetation of topsoil stockpiles and through proper ecological land rehabilitation.

9.4.17 Vehicle traffic and construction of infrastructure resulting in soil compaction.

Impact: Vehicle traffic and construction of infrastructure resulting in soil compaction

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	2	3	2	4	3	8	4	5	5	90 = High	55 = Medium

Mitigation Measures:

- The project footprint should be kept as small as possible. Traffic should be restricted to existing roads only. Topsoil stripping and stockpiling should not be conducted during wet periods, soil moisture should be below a pre-determined level.

9.4.18 Soil chemical pollution

Impact: Trucks and equipment on site and waste generation by construction activities can result in soil chemical pollution

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	2	3	2	3	2	6	4	3	2	45 = Medium	20 = Low

Mitigation Measures:

- Implement proper soil contamination prevention measures to mitigate the risk for example checking vehicles before they drive onto the site.

9.4.19 Vegetation clearance leading to soil erosion.

Impact: Vegetation clearance exposes the soil surface to the energy of wind and water movement, and this can result in soil erosion

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	2	3	2	3	2	6	4	3	2	45 = Medium	20 = Low

Mitigation Measures:

- Control soil erosion using geotextiles and re-vegetation of exposed soil surfaces where possible.

9.4.20 Loss of arable land capability

Impact: Soil stripping and construction of infrastructure can result in loss of arable land capability											
Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	2	3	2	5	5	6	4	5	4	85 = High	52 = Medium
Mitigation Measures: • Current soil rehabilitation techniques are not able to restore the arable land capability and the loss is therefore permanent.											

9.4.21 Loss of grazing land capability.

Impact: Soil stripping and construction of infrastructure can result in loss of grazing land capability.											
Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	2	3	2	3	2	6	4	4	3	60 = Medium	30 = Medium
Mitigation Measures: • Rehabilitation of land can restore the grazing capacity to a large extend. • Rehabilitation of soil needs to be done concurrently with construction activities to avoid soil erosion and water damming for long periods during the rainy season.											

9.4.22 Loss of wetland

Impact: Soil stripping and construction of infrastructure can result in loss of wetland											
Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	2	3	2	3	2	6	4	4	2	60 = Medium	20 = Medium
Mitigation Measures: • Avoid wetland areas as far as possible and do not include areas of surface disturbance											

9.4.23 Potential poaching activities

Impact: Potential poaching activities where people can actively hunt or collect slower moving animals (e.g., the tortoises) or by snaring (small mammals and birds).											
Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	2	3	2	4	2	8	4	4	2	72 = High	20 = Low

Mitigation Measures:

- No poaching will be allowed on site.
- Animals caught within the working areas should be rescued to safer sites within the area.
- Traffic control signs should be installed on site and all drivers should be urged to comply with them.
- To limit impacts on the larger ecosystem, it is recommended that the existing corridor (1st power line) is used as access during construction and maintenance for the 2nd 400 kV power line.
- Placement of pylons must as far as possibly avoid rocky outcrops, low hills, and drainage lines. It will not be possible to avoid all areas, but with planning, the impacts can be limited.
- No travelling should be done under the new power line – access to construction sites must be from the existing corridor and road.
- Where possible, limit travel over outcrops, hills, and low mountains – access from either side during construction to limit negative impact on the sloped areas. This will lower damage to the sensitive areas and lower the risk of erosion on the slopes.

9.4.24 Destroying of animals

Impact: Destroying of animals (mammals and reptiles) trapped in deep excavate holes during construction

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	2	3	2	4	2	8	4	4	2	72 = High	20 = Low

Mitigation Measures:

- Monitor all open pits daily.
- Where possible, holes for construction must be dug only when the teams are ready for construction.

9.4.25 Potential visual impacts on motorists and tourists

Impact: Potential visual impacts on motorists and tourists: Construction camp, lay-down yard, excavations, and stockpiles may cause unsightly views

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	2	2	2	2	2	4	2	2	2	22 = Low	16 = Low

Mitigation Measures:

- Plants should be salvaged where areas are going to be disturbed through the destruction of vegetation, for example the establishment of the construction camp, and kept in a controlled environment such as a nursery, for future replanting in the disturbed areas as a measure of rehabilitation.
- Make use of existing access roads where possible.
- Where new access roads are required, the disturbance area should be kept to a minimum. A two-track dirt road will be the most preferred option.
- Locate access routes to limit modification to the topography and to avoid the removal of established vegetation.
- Avoid crossing over or through ridges, rivers, pans, or any natural features that have visual value. This also includes centres of floral endemism and areas where vegetation is not resilient and takes extended periods to recover.
- Maintain no or minimum cleared road verges.

- Access routes should be located on the perimeter of disturbed areas such as cultivated/fallow lands as not to fragment intact vegetated areas.
- If it is necessary to clear vegetation for a road, avoid doing so in a continuous straight line. Alternatively, curve the road to reduce the visible extent of the cleared corridor.
- Locate the alignment and the associated cleared servitude to avoid the removal of established vegetation.
- Avoid a continuous linear path of cleared vegetation that would strongly contrast with the surrounding landscape character. Feather the edges of the cleared corridor to avoid a clearly defined line through the landscape.
- If practically possible, locate construction camps in areas that are already disturbed or where it isn't necessary to remove established vegetation like for example naturally bare areas.
- Utilise existing screening features such as dense vegetation stands or topographical features to place the construction camps and lay-down yards out of the view of sensitivity visual receptors.
- Keep the construction sites and camps neat, clean, and organised to portray a tidy appearance.
- Screen the construction camp and lay-down yards by enclosing the entire area with a dark green or black shade cloth of no less than 2m height.
- Keep the construction camps away from existing residents and especially lodges and tourist venues.

9.4.26 Small scale drainage patterns change.

Impact: Small scale drainage patterns change

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
2	1	2	1	2	1	4	2	3	2	30 = Low	10 = Low

Mitigation Measures:

- The footprint area of the transmission line must be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas.
- The footprint area must be aligned with the existing road/railway reserves wherever possible. Disturbed areas should be sought as the preferred alignment area.
- The locations of all single circuit angle steel towers which hold the transmission line must be located outside of all delineated watercourses as far as possible. This should be achieved by increasing or decreasing the distances between towers.
- As far as possible all access roads should use existing service road.
- Preferential flow paths should be identified that intersect with the road so that silt traps and fences can be installed to avoid siltation of watercourses; and
- An appropriate stormwater management plan must be developed for all substations, or the existing ones updated.

9.4.27 Isolated removal of embankment vegetation

Impact: Isolated removal of embankment vegetation areas for select roads

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	2	3	2	3	2	4	2	3	2	36 = Medium	16 = Low

Mitigation Measures:

- The footprint area of the transmission line must be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas.
- The footprint area must be aligned with the existing road/railway reserves wherever possible. Disturbed areas should be sought as the preferred alignment area.
- The locations of all single circuit angle steel towers which hold the transmission line must be located outside of all delineated watercourses as far as possible. This should be achieved by increasing or decreasing the distances between towers.

9.4.28 Operation of equipment and machinery outside delineated watercourses or buffers

Impact: Operation of equipment and machinery outside delineated watercourses or buffers

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
2	1	2	1	2	1	4	2	3	2	30 = Low	10 = Low

Mitigation Measures:

- The construction vehicles and machinery must make use of existing access routes as much as possible before adjacent areas are considered for access.
- As far as possible, all building materials used for the substations should be prefabricated and transported to site to avoid any risks of contamination to any watercourse.
- All removed soil and material must not be stockpiled within the system. Stockpiling should take place outside of the watercourse. All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds

9.4.29 Soil and building material stockpile management.

Impact: Soil and building material stockpile management

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
2	1	2	1	2	1	4	2	3	2	30 = Low	10 = Low

Mitigation Measures:

- Laydown yards, camps and storage areas must be beyond the aquatic areas delineated watercourse extend and associated buffer zones.
- Where possible, the construction of the transmission line and substations must take place from the existing road servitudes and not from within the aquatic systems.
- All construction areas should be clearly demarcated.

9.4.30 Storage of chemicals, mixes, and fuel (hazardous substances)

Impact: Storage of chemicals, mixes, and fuel (hazardous substances) may contaminate soil and water resources.

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
2	1	2	1	2	1	4	2	3	2	30 = Low	10 = Low

Mitigation Measures:

- All chemicals and toxicants to be used for the construction must be stored outside any channel system and in a bunded area.
- Material Safety Data Sheet for all chemical used on site should be kept on site.
- Proper signage should be placed at the hazardous substance storage site.
- The contractors should have spill kits available to ensure that any fuel or oil spills are cleaned-up and discarded at registered waste disposal site.

9.4.31 Final landscaping and post-construction rehabilitation

Impact: Inadequate waste management, oil spillages during rehabilitation may result in soil and water contamination.

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
2	1	2	1	2	1	4	2	3	2	30 = Low	10 = Low

Mitigation Measures:

- Any exposed earth should be rehabilitated promptly by planting suitable vegetation (vigorous indigenous grasses) to protect the exposed soil.
- Compacted areas should be loosened and seeded as necessary.
- All waste material should be removed from site and disposed of at a registered waste disposal facility.
- Waste that can be reused should be removed and stored by the contractor off – site.
- All spillages should be cleaned up and waste disposed as hazardous waste.
- Temporary structures should be removed from site and stored off-site by the Contractor.
- No material which was brought by the Contractor will be left on site.

9.4.32 Constructed Electrical Pylon or laydown yards within the delineated sensitive areas.

Impact: Constructed Electrical Pylon or laydown yards within the delineated sensitive areas

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
4	3	3	2	4	3	6	4	3	3	51 =Medium	36 = Medium

Mitigation Measures:

- Laydown yards, camps and storage areas must be beyond the aquatic areas delineated watercourse extend and associated buffer zones. Where possible, the construction of the transmission line and substations must take place from the existing road servitudes and not from within the aquatic systems.

9.4.33 Destruction of habitats

Impact: Destruction of habitats found on site:

- Plains (Northern Upper Karoo).
- Hills & outcrops (Upper Karoo Hardeveld).
- Bushmanland hills near Copperton (Bushmanland Basin Shrubland & Bushmanland Arid Grassland).

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
4	2	3	2	4	3	8	4	4	2	76 =High	22 = Low

Mitigation Measures:

- A permit must be obtained for any plant species that are protected under the Northern Cape Nature Conservation Act, 2009 (Act 9 of 2009) and the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004).
- If any individuals of the protected tree, *Boscia albitrunca*, are likely to be affected, a permit is required according to the requirements of the National Forests Act., Act 84 of 1998.

9.4.34 Destruction of habitats found on site: Drainage areas.

Impact: Destruction of habitats found on site: Drainage areas

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
4	2	3	2	4	3	6	4	3	2	51 = Medium	22 = Low

Mitigation Measures:

- A permit must be obtained for any plant species that are protected under the Northern Cape Nature Conservation Act, 2009 (Act 9 of 2009) and the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004).
- If any individuals of the protected tree, *Boscia albitrunca*, are likely to be affected, a permit is required according to the requirements of the National Forests Act.

9.4.35 Destruction of habitats found on site due to development of roads.

Impact: Destruction of habitats found on site due to development of roads

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
2	2	3	2	2	2	4	2	2	2	22 = Low	16 = Low

Mitigation Measures:

- Existing roads would be used.

9.4.36 Waged Labor/ Job Creation

Impact: Waged Labor/ Job creation

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
2	2	3	3	1	2	6	8	4	5	40 = Medium	65= High

										Positive Impact	Positive Impact

Mitigation Measures:

- Hiring should prioritize the nearby communities. If not, enmity, contempt, or anger toward the endeavour may grow.
- The contractor(s) should be upfront about the few work opportunities that will be created and should not set unreasonable expectations for employment opportunities.

9.4.37 Skills Development and Capacity Building

Impact: Construction of the proposed project is expected to lead to community capacity building, as the project can create opportunities for residents through training, coaching and skill transfer

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
2	2	1	1	1	2	4	8	4	5	24 = Low Positive Impact	55= Medium Positive Impact

Mitigation Measures:

- Stakeholders should be mutually accountable for increased opportunities regarding skills and competency development (general education and technical training). This training should be concentrated on skills that can be readily transferred to other employment opportunities in the local area, and only suitable qualified candidates in project management activities should be used.

9.4.38 Local Economic Development

Impact: Local economy will benefit from the short-term socio-economic spin offs such as increased buying power around the construction sites. The presence of temporary workers may provide a small incentive to the local economy if housing for these workers can be found locally, thereby boosting the local economy through the rent paid.

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
2	2	1	1	1	2	4	8	4	5	24 = Low Positive Impact	55= Medium Positive Impact

Mitigation Measures:

- Where possible, the contractor should consider buying material from local SMME's.

9.4.39 Influx of Construction Workers

Impact: The influx may also raise concerns, especially in towns, as the labourers from outside may be held accountable for criminal activity during construction.

Reversibility	Extent	Duration	Magnitude	Probability	Significance

Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	1	3	2	3	2	8	4	3	2	51 = Medium	18 = Low

Mitigation Measures:

- Maximising the use of local labour can make outsiders to realise that employment opportunities might not be readily available, and that recruitment is not taking place unsystematically. In addition, employment should be made through local community structures. No jobs will be created during the operational phase of the project and will thus be no influx of jobseekers.

9.5 Impact Assessment During Operation Phase

9.5.1 Mortality of SCC and non-SCC priority species due to collision

Impact: Mortality of SCC and non-SCC priority species due to collision with the 400kV power line conductors/earthwires

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	1	4	3	3	3	5	3	4	2	60 = Medium	20 = Low

Mitigation Measure:

- Eskom line and servitude managers are requested to report all bird collisions encountered during routine line patrols of the 400kV power line to the Eskom-Endangered Wildlife Trust Strategic Partnership.
- Bird flight diverters to be maintained on sections of power line during the operational life span of the 400kV power line.
- Eskom Environmental officials and/or line servitude staff should include avifaunal monitoring during routine inspections of the Hydra-Kronos 2nd 400kV power line and MTS infrastructure and record the number of mortalities, nesting activity and determine the effectiveness of the mitigation actions taken.

9.5.2 Mortality of SCC and non-SCC priority species because of electrocution

Impact: Mortality of SCC and non-SCC priority species because of electrocution on the infrastructure within the Hydra and Kronos MTS

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	1	3	2	3	2	3	2	3	1	36 = Medium	7 = Low

Mitigation Measures:

- Eskom line and servitude managers should report all bird electrocutions encountered during routine inspections of the Hydra MTS and Kronos MTS to the Eskom-Endangered Wildlife Trust Strategic Partnership.
- Insulating material (if applied) to be maintained during the operational life span Hydra MTS and Kronos MTS

9.5.3 Potential visual impacts on tourists

Impact: Potential visual impacts on tourists: The presence of a power line intrudes on existing views and spoils the open panoramic views of the landscape.

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	2	3	2	5	5	4	2	4	2	60 = Medium	22 = Low

Mitigation Measures:

- Avoid changing the alignment's direction too often to minimise the use of the self-supporting strain tower. This tower type is the most visually intrusive as the steel lattice structure is denser than the other two tower types, hence creating more visual obstruction.
- Rehabilitate disturbed areas around pylons as soon as practically possible after construction. This should be done to restrict extended periods of exposed soil.

9.5.4 Alteration of surface drainage and runoff, poor storm water management

Impact: Alteration of surface drainage and runoff, poor storm water management and operation of transmission line and substation

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
2	1	2	1	2	1	4	2	3	2	30 = Low	10 = Low

Mitigation Measures:

- The footprint area of the transmission line must be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas.
- The footprint area must be aligned with the existing road/railway reserves wherever possible. Disturbed areas should be sought as the preferred alignment area.
- The locations of all single circuit angle steel towers which hold the transmission line must be located outside of all delineated watercourses as far as possible. This should be achieved by increasing or decreasing the distances between towers.
- As far as possible all access roads should use existing service road.
- Preferential flow paths should be identified that intersect with the road so that silt traps and fences can be installed to avoid siltation of watercourses; and
- An appropriate stormwater management plan must be developed for all substations, or the existing ones updated.

9.5.5 Establishment of alien plants on disturbed areas

Impact: Establishment of alien plants on disturbed areas

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
2	1	2	1	2	1	4	2	3	2	30 = Low	10 = Low

Mitigation Measures:

- An alien invasive Plant Management Plan needs to be implemented post construction to control current invaded areas and prevent the growth of invasives on cleared areas.

9.5.6 Deterioration of infrastructure

Impact: Deterioration of infrastructure due to lack of maintenance

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
2	1	2	1	2	1	4	2	3	2	30 = Low	10 = Low

Mitigation Measures:

- Inspections on the powerline must be regularly undertaken and record any environmental negative impacts occurring on the powerline/ substation post construction. Where specialists are required to correct/mitigate any aspect, this should be done urgently.

9.5.7 Maintenance of pylons within the delineated sensitive areas

Impact: Maintenance of pylons within the delineated sensitive areas may result in the degradation of the environment.

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
4	3	3	2	4	3	6	4	3	3	51 =Medium	36 = Medium

Mitigation Measures:

- Towers constructed within the delineated sensitive areas should be regularly inspected to ensure that they are intact and that the sensitive environments are not compromised.

9.5.8 Mortality because of collision

Impact: Mortality because of collision with the overhead conductors and/or earthwires of the 400kV power line

Reversibility		Extent		Duration		Magnitude		Probability		Significance	
Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
3	1	4	3	3	3	5	3	4	2	60 = Medium	20 = Low

Mitigation Measures:

- Powerline spans that require the installation of bird flight diverters will be identified during the walkdown and indicated in the Final Environmental Management Plan.

9.6 Assessment of Cumulative Impacts

"Cumulative Impact", in relation to an activity, means the past, current, and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity that may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

The role of the cumulative assessment is to test if such impacts are relevant to the proposed project in the proposed location (i.e., whether the addition of the proposed project in the area will increase the impact). This section addresses whether the construction of the proposed development will result in:

- Unacceptable risk
- Unacceptable loss
- Complete or whole-scale changes to the environment
- Unacceptable increase in impact

The proposed site is characterised by existing operational powerlines and substations. Further, there are also solar farms that exists within the area. As a result, the impacts of the proposed project will add onto other existing impacts caused by the afore-mentioned facilities. Refer to Figure 12-5 below for other existing infrastructure near the proposed site.

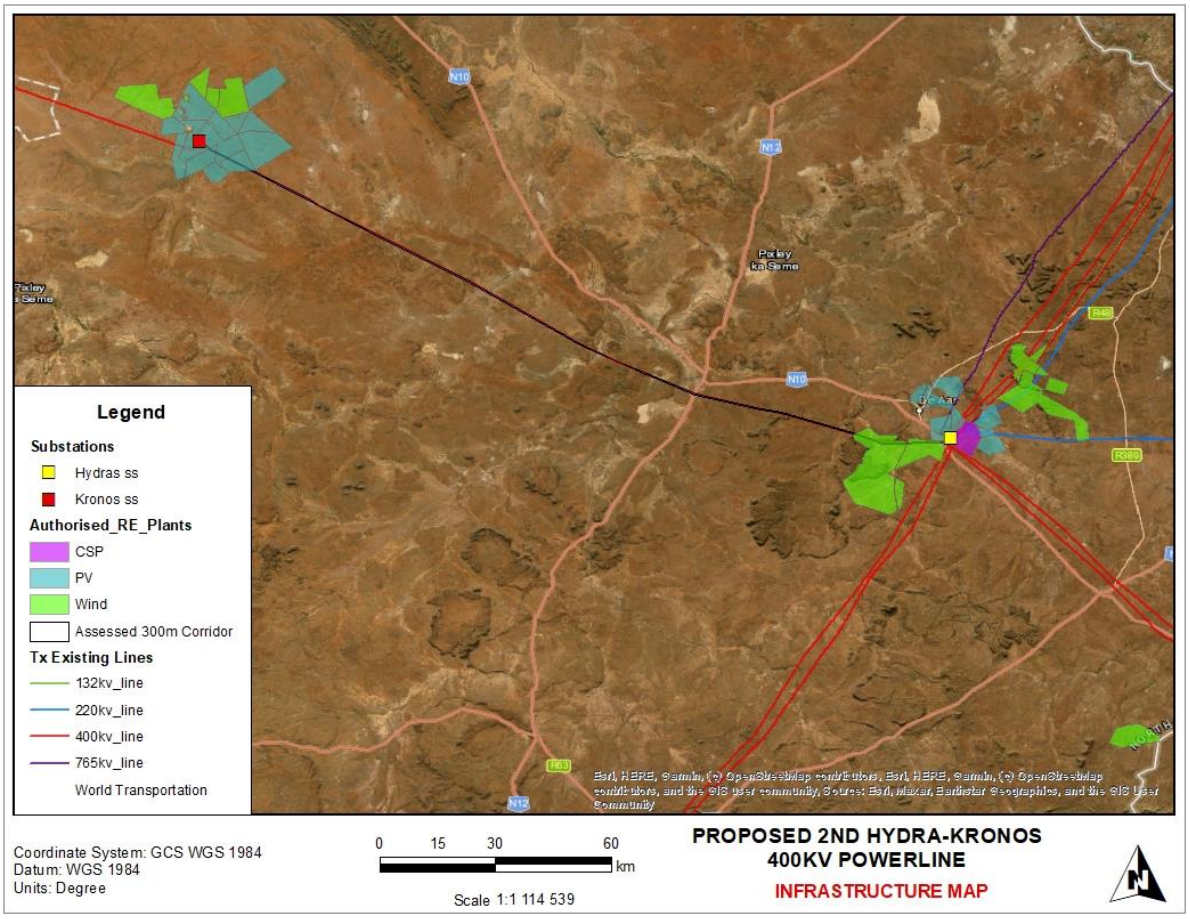


Figure 9-3: Authorised Renewable Energy Plants and Existing Eskom Powerlines

9.6.1 Cumulative Impacts for Biodiversity

The powerline corridor runs through a semi-arid landscape that consists of extensive plains interspersed with intermittent hills, ridges, outcrops and flattish uplands. The corridor passes through several regional vegetation types. These are divided between two main regions, the Bushmanland region near to Copperton and the Nama-Karoo region across the remainder of the corridor. Within the Bushmanland region are three vegetation types, namely Bushmanland Arid Grassland, Bushmanland Basin Shrubland and Bushmanland Vloere (David Hoare Consulting (Pty) Ltd, 2023). These vegetation types are spread out over a vast area and are not thought to be particularly prone to powerline effects however the proposed and existing powerlines will contribute to the fragmentation of the CBA and ESA. Long-term threats to these habitats could, however, result from cumulative effects like the expansion of solar power facilities in the region.

9.6.2 Cumulative Impacts for Avifauna

The proposed 400kV power line equates to a maximum of 187km. There are approximately several transmission powerlines and distribution powerlines totalling hundreds of kilometres of existing medium and high voltage lines within the 35km radius around the proposed project area. An intensive internet search was conducted to source information on the grid connections of the abovementioned projects available within the public domain, but in some instances no information could be obtained. The proposed development will thus increase the total number of existing high voltage lines by a fairly significant percentage. The contribution of the proposed 400kV to the cumulative impact of all the high voltage lines is thus Moderate. However, the combined cumulative impact of the existing and proposed powerlines on avifauna within a 35km radius is High.

The cumulative impact of displacement due to disturbance and habitat transformation at the Hydra MTS and Kronos MTS is LOW, due to the small size of the footprint and the fact that construction of the bays is within the confines of the existing Main Transformer Substation (MTS). The cumulative impact of potential electrocutions within the MTS yards is also likely to be LOW as it is expected to be a rare event.

9.6.3 Cumulative Impacts for Soil and Land Capability

The site is already characterised by the existing Hyra – Kronos powerline, therefore, the impacts of the proposed 2nd Hydra – Kronos powerline may be exacerbated due to the existing Hyra – Kronos power line and adjacent/ nearby projects of a similar nature. In terms of significance, the cumulative impacts anticipated on soil and land capability will be Low to Moderate. The impacts will be reversible, however, mitigation measures provided above should be implemented.

9.6.4 Cumulative Impacts for Aquatic Impact

The development of the proposed infrastructure will contribute to cumulative habitat loss within the local other natural areas and ESAs, watercourses, and adjacent habitat together with the potential for increased contaminants and sediment entering the watercourses. The loss/alteration of habitat lowers the buffering capacity of the catchment to water quality impacts, will have negative impacts on the ecological processes of the associated watercourse in the PAOI, with no impacts of significance expected in the region. The Significance of the cumulative impact of the project together with the existing and propose project in the area will be Medium. The cumulative impact cannot be well mitigated as some level of hydrological and habitat modification is unavoidable. Avoidance of watercourse areas will be of highest importance to mitigate impacts. In terms of

residual impacts, some level of modification is inevitable due to the nature of the construction and operational activities and cannot be entirely mitigated. The residual impact would be moderate and of long-term duration for the life of the project following the implementation of mitigation.

9.6.5 Cumulative Impacts for Socio-economic

Construction and operation of the proposed power line and the various Solar Plants that have been authorised would be a beneficial cumulative impact on surrounding areas, including the availability of electricity nationally and the revenue generated during the construction activities. The significance is expected to be medium to high with revenue being generated for a short timeframe whilst additional electricity will be added to the grid for a long time.

9.7 Impact Assessment for the Decommissioning / Closure Phase

It is anticipated that the proposed powerline will stay operational for many decades before it becomes decommissioned. During the decommissioning phase various impacts of which some will be similar to current ones will occur, and these will need to be mitigated. The decommissioning phase will need to comply with all the legislation that will be applicable at the time.

9.8 Positive and Negative Impacts that the Proposed Activity and Alternatives

The table below summarises the positive and negative impacts the proposed project will have on the environment.

Table 9-3: Positive and Negative Impacts of the proposed project

Aspect	Rating (Negative / Positive)	Impact Description
Positive and Negative Impacts that will be experienced if the powerline is constructed.		
Job creation	Positive	The proposed project will job opportunities during its various phases including planning and design, pre-construction, construction, operational and decommissioning phases.
Ecology (Flora)	Negative	One Near Threatened species occurs on site (*Hoodia officinalis subsp. officinalis*), one rare species occurs on site (*Gethyllis longistyla*), and one nationally protected species occurs on site (*Hoodia gordonii*). It is also possible that *Tridentea virescens* (listed as Rare) may occur on site. Several sensitive species occur on site, as well as a number of species protected under the Northern Cape Nature Conservation Act. However, no threatened plant species were found on site and the site therefore has "low" sensitivity for terrestrial plant species (as per the published Species Protocols). The clearing of vegetation will lead to loos of ground cover which may

Aspect	Rating (Negative / Positive)	Impact Description
		result in dust generation and erosion. If the *Hoodia gordonii* is to be removed, this will be a loss to biodiversity.
Ecology (Fauna)	Negative	Habitat for the three (3) red data species was observed on site. If not undertaken carefully, the construction activities may lead to destruction of the identified habitats.
Heritage	Neutral	Stone tools have been identified in two areas within the proposed site. These tools were found in secondary positions, with no provenance and are graded as of Medium-Low value. None of these can be of such significance that can prevent the proposed development from proceeding.
Palaeontology	Negative	Based on the fossil record and previous surveys in the area, fossils are very rare in this area which is already disturbed. It is extremely unlikely that any fossils would be preserved in the overlying soils and sands of the Quaternary. There is a very small chance that fossils may occur below the ground surface in the shales of the Ecca Group and the Abrahamskraal Formation. If fossils are found, the mitigation measures included in the EMPr should be implemented.
Aquatic	Negative	The proposed powerline will cross many hydrological / freshwater resources. Looking at the current PES of the assessed systems as well as the potential risks which may result from the powerline routes, the negative impacts identified can be mitigated successfully.
Avifauna	Negative	Seventy-five (75) bird species have been recorded on site. Most observations were of passerine species that are common to this area. Each of these species has the potential to be displaced by the construction and operation of the Hydra-Kronos 2nd 400kV power line and MTS infrastructure because of habitat transformation and/or disturbance. However, suitable habitat is available within the broader area, so the

Aspect	Rating (Negative / Positive)	Impact Description
		displacement impact will not be of regional or national significance. Sixteen priority species were recorded and during the survey and are highly susceptible to the collision impact associated with transmission power line infrastructure. This premise is confirmed with the observation of two collision mortalities on the 1Hydra-Kronos 400kV power line. Ludwig's Bustard, Karoo Korhaan and a nesting Verreaux's Eagle were the Species of Conservation Concern (SCC) recorded during the field survey. The impacts identified will be mitigated to acceptable levels with the implementation of the EMPr.
Visual impact	Negative	Visual character is based on human perception and the observer's response to the relationships between and composition of the visible project components. The transmission line, i.e., the towers and the cables suspended between each tower, is the most visible and permanent project component. The transmission towers have an industrial character enforced by the double steel pole and the electrical cables between the towers. The entire transmission line will be perceived as a rhythmic arrangement of vertical towers forming a linear element through the landscape. The electrical cables emphasise the linear character of the transmission line but are easily absorbed in the background when viewed from distances greater than 1km. The impacts have been assessed and can be mitigated to acceptable levels.
Soil and land capability	Negative	Erosion as well as hydrocarbon spills and leaks of vehicles and heavy machinery is expected to impact upon the groundwater source given the permeability of the underlying bedrock. These impacts can however be mitigated to a certain extent. The laydown area, camp site and tower positions will impact on the soil and other small crop farming area, this impact can be mitigated to acceptable levels with the implementation of the EMPr.

Aspect	Rating (Negative / Positive)	Impact Description
Traffic	Negative	Delivery of materials on site and workers travelling to work will lead to high traffic volumes. This impact has been assessed and can be mitigated to acceptable levels.
Waste	Negative	The proposed project will generate different waste stream. If the waste is not properly managed it can cause pollution on site. This impact has been assessed and mitigation measure are provided.
Noise	Negative	Noise will be generated from the movement of construction vehicles and equipment. This may impact on the humans and animals. This impact has been assessed and can be mitigated to acceptable levels.
Social	Positive	The following are impacts are expected during construction: Benefits accruing to the local economy due to short term socio-economic spin-offs, skills training of local labourers, the use of clean energy and constant supply of electricity are anticipated during the project life cycle. These impacts have been assessed and mitigation measures to enhance the impact.
	Negative	Influx of labourers, encroaching on private property, spreading of transmitted diseases, decline in the affected property value, visual intrusion on residents, motorists and tourists are some of the negative impacts that can be expected during the implementation phase. Apart from the intrusion, which is permanent, mitigation measures to minimise the negative impacts have been recommended.
Positive and Negative Impacts that will be experienced if the no-go alternative is implemented		
No job creation	Negative	If the powerline is not built, there will be no employment opportunities created.
No provision of additional power	Negative	South Africa has been impacted by load shedding which has negatively impacts, schooling, businesses, the society, and many other aspects of life. If this project does not take place, the following will take place:

Aspect	Rating (Negative / Positive)	Impact Description
		• There will be no strengthening of the Transmission infrastructure network to evacuate the existing and expected renewable power out of the Northern Cape Province to other load centres in the country. • The existing Hydra-Kronos 400 kV line will experience thermal overload by 2023. • Power cuts will continue.
Undisturbed environment	Positive	If the powerline is not built, there will be no disturbance of the environment including fauna, flora, soil, heritage, palaeontology, aquatic, topography and more.

9.9 The possible mitigation measures that could be applied and level of residual risk.

The possible mitigation measures that could be applied are included in Sections 9.3-9.5 and the EMPr attached.

9.10 The outcome of the site selection matrix

Section 6 above outlined the basis on which the selected site was made. This included the following:

- The location of the proposed powerline within the Strategic Transmission Corridor. The proposed powerline route has therefore been pre-negotiated, subsequently, there is no other route alternative to be considered.
- During the engagements with the I&APs, landowners, authorities, and the public in general no objections were raised pertaining to the proposed project and the pre-negotiated route.
- The specialist studies undertaken recommended that the project proceed.

In view of the above and all the assessments undertaken, the pre-selected powerline route is favourable and supported.

9.11 If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such.

The option of constructing the powerline underground was outlined in Section 6 above. The Alternative of installing cables underground has many negative impacts and the most prominent one is the fact that underground cables currently have a

limited voltage capacity and cannot carry more than 66kV, whereas the proposed project requires 400kV. This Alternative was therefore discarded and could not be continued with going forward in the project.

The proposed powerline project will take place in a pre-negotiated route and as such there are no other alternatives that are being considered.

9.12 A concluding statement indicating the preferred alternatives, including preferred location of the activity.

As indicated in Section 6 above, the 2nd Hydra – Kronos powerline route is a pre-negotiated route which will run parallel to the existing Hydra – Kronos 400kV powerline. The specialist works undertaken recommended that the project proceeds provided the mitigation measures outlined are implemented. During the public participation process undertaken, Competent Authorities, Landowners, Non-Governmental Organisation and Interested and Affected Parties were notified of the project, and none have objected. As such the pre-negotiated route is favourable for the proposed project.

10 SUMMARY OF THE FINDINGS AND IMPACT MANAGEMENT MEASURES IDENTIFIED IN ANY SPECIALIST REPORT

This section of the report details the information required as per Section 3(1)(k) of Appendix 1 of Environmental Impact Assessment (EIA) Regulations, Government Notice R982 of 2014 (as amended).

(k) where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report

10.1 Screening Report

The identification and commissioning of the specialist studies was based on the preliminary site inspection undertaken by DIGES and the Proponent (Eskom), to verify the environmental theme sensitivities as indicated in the Screening Reports generated for the powerlines and the substation. The site sensitivity verification was undertaken as per the Gazetted General Requirement Assessment Protocols. The table below indicates the environmental theme sensitivities and the recommended Specialist assessments as per the Screening Report generated from the DFFE tool. Reference is also made to the Site Sensitivity Verification and Screening Reports attached in Appendices D-1 and G.

Table 10-1: Environmental Sensitivities

THEME	SENSITIVITIES			SPECIALIST STUDY	
	Screening Tool Report (Powerlines)	Screening Tool Report (Substations))	Site Sensitivity Verification	Recommended in The Screening Tool Report	Undertaken as Part of the Basic Assessment
Agriculture	High	High	Yes	Yes	Yes
Animal Species	Medium	Medium	Medium	Yes	Yes
Avifauna	High	High	High	Yes	Yes
Aquatic Biodiversity	Very High	Very High	Very High	Yes	Yes
Archaeology & Heritage	Very High	Low	Low	Yes	Yes
Civil Aviation	High	High	High	Yes	No
Defence	Very High	Low	Low	No	No
Palaeontology	Very high	Very High	Very Low to low	Yes	Yes
Plant Species	Medium	Low	Low	Yes	Yes
Terrestrial Biodiversity	Very High	Very High	Very High	Yes	Yes Riverine Biodiversity Report

THEME	SENSITIVITIES			SPECIALIST STUDY	
	Screening Tool Report (Powerlines)	Screening Tool Report (Substations))	Site Sensitivity Verification	Recommended in The Screening Tool Report	Undertaken as Part of the Basic Assessment
Geotechnical	-	-	-	Yes	No
Visual	-			Yes	Yes
RFI	-	-	-	Yes	No

10.2 Commissioned Studies

In addition, to the specialist studies indicated in the Table above, visual/ landscape and Social Impact Assessments were also commissioned. The Specialist studies that have been undertaken have been based on the Gazetted Protocols published in Government Notice No. 320 of 20 March 2020. Where no protocol exists for a specific theme, the assessment and reporting of impacts on that feature or proposed area of development was done in accordance with Appendix 6 of the NEMA EIA Regulations Government Notice R982 of 2014 as amended. The studies undertaken have generally followed the same approach:

- Collection and collation of existing baseline information of the study area in addition to any supplementary survey work required to fill any data gaps.
- Regular consultation with specialists within the team.
- Consideration of the potential impacts of the proposed powerline on the existing baseline, followed by identification of possible route changes that would lead to the avoidance or reduction of predicted adverse effects.
- An evaluation of the significance of any residual and cumulative impacts.
- Recommendation of mitigation measures to minimize the anticipated impacts.

Summaries of the commissioned studies are given in Table 10-2 whilst the detailed reports are attached in Appendices D.

Table 10-2: Summary of Specialists Findings and Management Measures

Name of the report	Findings and Impact Management Measures Identified	Section of the report where the information is included
Animal Compliance Statement	**Findings (Excerpts from the Animal Compliance Statement:** The following are the findings from the Animal Assessment Study: • The terrestrial animal species flagged as having a medium sensitivity in the Screening Tool Report was not observed during the survey. However, a suitable habitat, rocky areas, was noted confirming the sensitivity rating of medium. • The vegetation over the larger study corridor is in a fair to moderately good condition. The corridor has a diverse habitat pattern as it forms a mosaic pattern with patches of drainage lines, open shrubland, rocky outcrops and low hills and mountains. This diversity is important in supporting the plants and animals in the semi-arid/arid areas. • The denser vegetation associated with the drainage lines (especially the seasonal streams) is important habitat for all animals – both for habitation and food resources and migration corridors. • The rocky habitats are important habitat for small birds, reptiles, and small mammals (habitation) and are therefore considered to be sensitive areas. • A general animal list has been compiled and includes *Tragelaphus strepsiceros, Herpestes sanguineus, Cynictis penicillata, Raphicerus campestris, Oreotragus, Procavia capensis, Pelea capreolus, Canis mesomelas, Otocyon megalotis, Oryx gazella, Antidorcas marsupialis*, *Psammobates tentorius, Cryptomys hottentotus* (mole hills), *Hystrix africaeaustralis* (quills, feeding activities and dens), *Lepus saxatilis, Lepus saxatilis, Nucras intertexta* and *Pedioplanis lineoocellata pulchella. L*ow numbers were observed, however a family group of nine *Otocyon megalotis.* • Habitat for three (3) red data species are present. With regards to *Felis nigripes*, the larger study area present suitable habitat (foraging and burrows) and potential food sources (e.g., rodents and birds). It must be noted that the animals are shy and will move away from the area during construction. Once construction is complete, there is a high probability that the small cats will return to the area. • The presence of Otomys *auratus* was not confirmed. The habitat, especially near drainage lines, are likely to have some specimens present. The animals will move out of the near proximity during construction but will return during the operational phase. • *Chersobius boulengeri* occurs in association with dolerite ridges and rocky outcrops and is only active for short period very early in the morning and late in the afternoons (generally). They are small animals and will not migrate from the activity zone with ease. The change of these animals being impacted is therefore higher.	Refer to Sections 8, 9, 13 and 15 of this report and Section C of the EMPr attached as Appendix H.

Name of the report	Findings and Impact Management Measures Identified	Section of the report where the information is included
	Management Measures Identified: • To limit impacts on the larger ecosystem, it is recommended that the existing corridor (1st power line) is used as access during construction and maintenance for the 2nd 400 kV power line. • Placement of pylons must as far as possibly avoid rocky outcrops, low hills, and drainage lines. It will not be possible to avoid all areas, but with planning, the impacts can be limited. • It is recommended no travelling must be done under the new power line – access to construction sites must be from the existing corridor and road. • Where possible, limit travel over outcrops, hills, and low mountains – access from either side during construction to limit negative impact on the sloped areas. This will lower damage to the sensitive areas and lower the risk of erosion on the slopes. • A concern is poaching where people can actively hunt or collect slower moving animals (e.g., the tortoises) or by snaring (small mammals and birds). • The higher traffic associated with construction can increase the potential for road kills. • During construction, animals (mammals and reptiles) can be trapped in deep excavate holes. It will be important to monitor all open pits daily. • It is recommended that where possible, holes for construction must be dug only when the teams are ready for construction. • No lights are to be left on at the sites at night, as this will attract animals to these areas – e.g., increased insect activity and this will attract bats, snakes and small mammals feeding on the insects, resulting in a higher incidence of snakes on the construction areas and animals being trapped in the open excavation pits.	
Avifauna Impact Assessment	**Findings:** <u>Screening Tool Sensitivity Verification:</u> A screening report for the Hydra-Kronos 2nd 400kV power line and MTS infrastructure was generated on 3 April 2023. The project site and immediate environment is classified as Medium and High sensitivity for terrestrial animals according to the Terrestrial Animal Species Theme. These classifications are linked to the potential occurrence of Ludwig's Bustard Neotis ludwigii, Lanner Falcon Falco biarmicus, Verreaux's Eagle Aquila verreauxii and Tawny Eagle Aquila rapax. In addition, the study area contains confirmed habitat for SCC as defined in the Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial animal species (Government Gazette No 43855, 30 October 2020). The presence of Ludwig's Bustard and Verreaux's Eagle were confirmed during the site verification and field survey of the PAOI. In addition, the specialist has conducted	Refer to Sections 8, 9, 13 and 15 of this report and Section C of the EMPr attached as Appendix H.

Name of the report	Findings and Impact Management Measures Identified	Section of the report where the information is included
	several assessments and research projects in the PAOI and has previously observed Lanner Falcon and Tawny Eagle. Based on these observations, the classification of HIGH sensitivity for avifauna in the screening tool is therefore confirmed. The site visit by the specialist produced a combined list of 75 avifauna species. Most observations were of passerine species that are common to the project area. Each of these species has the potential to be displaced by the construction and operation of the Hydra-Kronos 2nd 400kV power line and MTS infrastructure because of habitat transformation and/or disturbance. However, suitable habitat is available within the broader area, so the displacement impact will not be of regional or national significance. Sixteen priority (16) species were recorded during the survey and are highly susceptible to the collision impact associated with transmission power line infrastructure. This premise was confirmed with the observation of two collision mortalities on the 1st Hydra-Kronos 400kV power line. Ludwig's Bustard, Karoo Korhaan and a nesting Verreaux's Eagle were the SCC recorded during the field survey. See the map overleaf. The assessment of the Project Area of Influence (PAOI) revealed seven broadly described avifaunal micro habitats i.e. i. Karoo: The vegetation at the development area consists of Karoo shrub characterized by trees and taller woody shrubs are restricted mostly to watercourses and include Acacia karroo, Diospyros lycioides, Grewia robusta, Rhus lancea, and Tamarix usneoides. ii. Surface waterbodies: The study area contains sources of both permanent (i.e., water troughs) and ephemeral (i.e., dams) surface waterbodies. When filled with water, the dams typically attract flocks of several species. iii. Wetlands: There are examples of localized wetlands within the PAOI. These wetland areas when inundated with water are likely to attract sensitive species such as Blue Crane, Black Stork, and White Stork (Young 2003) that are usually attracted to habitats like this. Various common species i.e., korhaan, ibis, herons and geese will also utilise this wetland for their foraging needs. iv. Rocky ridges: The PAOI contains mountainous areas and exposed rocky ridges that are likely to support the foraging and breeding needs of Verreaux's Eagle, Rock Kestrel, and Spotted Eagle-Owl. v. Agriculture: Although the cultivated lands are not located within the proposed power line corridor, we must account for the potential movement birds across the power line alignment, as and when food resources become available within the cultivated areas, thereby increasing the risk of collision with the overhead power line conductors and/or earthwires. vi. Exotic/alien tree stands: The development area is largely devoid of trees, except for alien trees which have been planted in homestead areas.	

Name of the report	Findings and Impact Management Measures Identified	Section of the report where the information is included
	vii. High voltage power line infrastructure: The existing 1 Hydra-Kronos 400kV power line is located directly adjacent to the proposed Hydra-Kronos 2nd 400kV power line. Transmission lines are an important breeding and roosting substrate for raptors in the Karoo, due to the lack of large trees.	

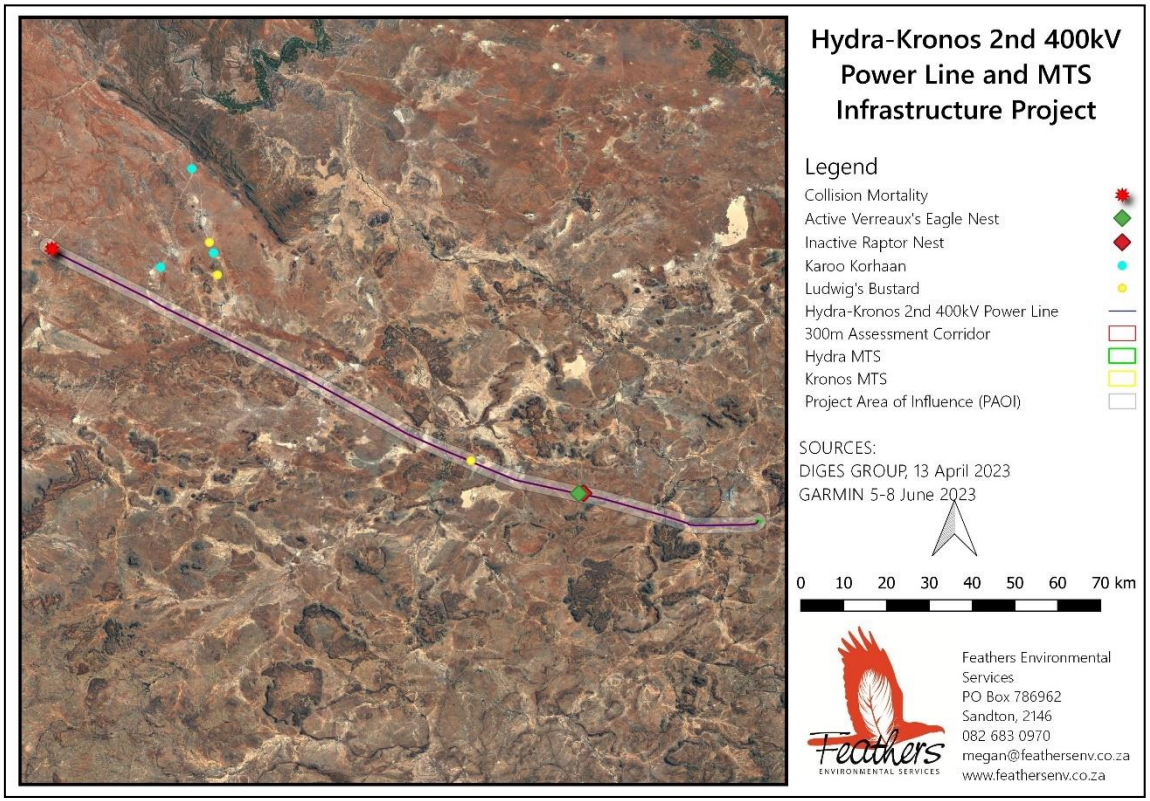


Figure 10-1: Notable field observations of SCC and collision mortalities made during the field survey on 5-8 June 2023

Impact Management Measures Identified:

<table>
<tr><th>Name of the report</th><th>Findings and Impact Management Measures Identified</th><th>Section of the report where the information is included</th></tr>
<tr><td></td><td>

Conduct a pre-construction inspection (avifaunal walk-through) of the final power line alignment to identify priority species that may be breeding within the final footprint. If an SSC nest is occupied, the avifaunal specialist must consult with the contractor to find ways of minimizing the potential disturbance to the breeding birds during the construction period. This could include measures such as delaying some of the activities until after the breeding season.
The pre-construction inspection (avifaunal walk-through) of the final power line alignment will also identify power line spans that will require the installation of bird flight diverters.
The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the construction footprint (especially the removal of natural vegetation) and rehabilitation of disturbed areas is concerned.
Construction activities (i.e., all staff, vehicle, and machinery) should be restricted to the immediate footprint of the infrastructure.
Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of avifaunal species.
Maximum use should be made of existing roads and the construction of new roads must be kept to a minimum.
If collision or electrocution impacts are recorded once the Hydra-Kronos 2nd 400kV power line and MTS infrastructure are operational, it is recommended that a representative from the Eskom-Endangered Wildlife Trust Strategic Partnership investigate the mortalities and provide recommendations for site-specific mitigation to be applied reactively.
In addition to this, the normal suite of environmental good practices should be applied, such as ensuring strict control of staff, vehicles and machinery on site and limiting the creation of new roads as far as possible.

</td><td></td></tr>
<tr><td>Heritage Impact Assessment</td><td>
Findings:
Two sites with isolated artifacts were identified. These tools were found in secondary positions, with no provenance and are graded as of Medium-Low value. None of these can be of such significance that can prevent the proposed development from proceeding. Although stone tools are almost ubiquitous in the wider region of Namaqualand, their unavailability in the proposed area is unexpected, archaeological objects are unlikely ascertainable on the surface in the Namaqua due to sand dunes. The Stone tools, chiefly associated with ancestors of the San and Khoekhoen, were only noted in areas where the Aeolian sands have eroded, exposing the underlying layers. The location and significance of the findings are indicated in the Table below:
<table>
<tr><th>Name</th><th>Co-ordinates</th><th>Significance</th><th>Mitigation</th></tr>
<tr><td>Hyk01</td><td>-30.714703, 23.899187</td><td>Medium-Low</td><td>C.f. Excavation to inspect the subsurface occurrence.</td></tr>
</table>
</td><td>Refer to Sections 8, 9, 13 and 15 of this report and Section C of the EMPr attached as Appendix H.</td></tr>
</table>

Name of the report	Findings and Impact Management Measures Identified	Section of the report where the information is included

Hyk02	-30.646732 23.649670	Medium-Low	*C.f.* Test trench to evaluate the subsurface density.

,

Figure 10-2: View of the stone tools noted in the proposed corridor.

Figure 10-3: View of the isolated tools noted in the proposed area

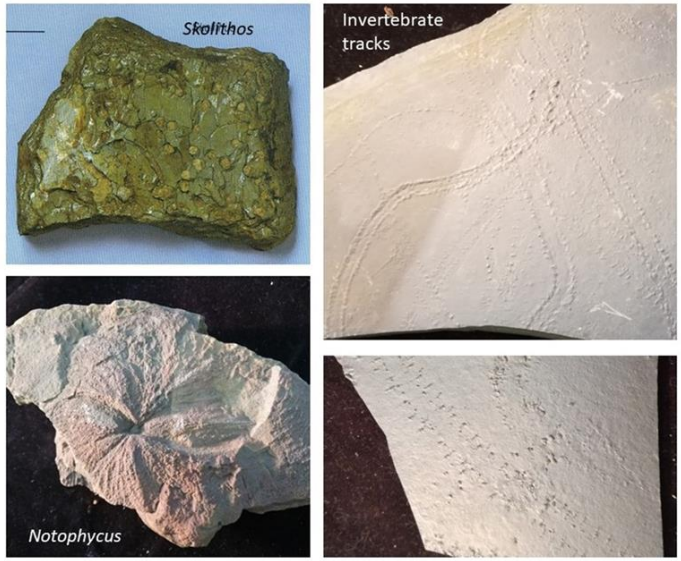
Impact Management Measures:

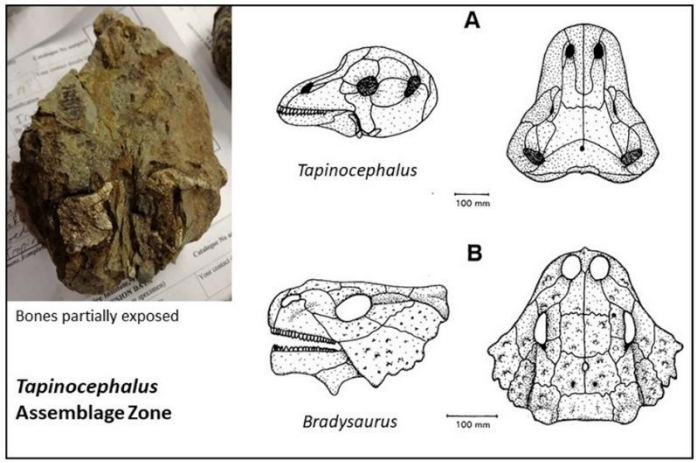
Name of the report	Findings and Impact Management Measures Identified	Section of the report where the information is included

	• Prior to construction starts, contractors should be given training on how to identify and protect archaeological remains that may be discovered during the project construction activities. The pre-construction training should include some site recognition training for the types of archaeological sites that may occur in the construction areas. Below are some indicators of an archaeological site that may be found during construction:
	  • Flaked stone tools, bone tools and loose pieces of flaked stone.
	  • Ash and charcoal.
	  • Bones and shell fragments.
	  • Artefacts (e.g., beads or hearths); and
	  • Packed stones which might be uncounted underground and might indicate a grave or collapse stone walling.	

Palaeontological Impact Assessment	**Findings:** The Kronos Substation lies on the Dwyka Group tillites and diamictites that are moderately sensitive. The route for the power line traverses the Dwyka Group, the Waterford Formation, and from Britstown to De Aar on the highly sensitive Tierberg and Prince Albert Formation. South of De Aar the powerline partly is in the very highly sensitive Adelaide Subgroup rocks. Based on the fossil record and previous surveys in the area, fossils are very rare in this area which is already disturbed. It is extremely unlikely that any fossils would be preserved in the overlying soils and sands of the Quaternary. There is a very small chance that fossils may occur below the ground surface in the shales of the Ecca Group and the Abrahamskraal Formation. **Impact Management Measures:** If fossils are found by the environmental officer, or other responsible person once excavations and drilling have commenced, then they should be rescued, and a palaeontologist called to assess and collect a representative sample. The following Fossil Chance Find Protocol should be included in the EMPr and implemented: This Monitoring Programme for Palaeontology is to commence once the excavations / drilling activities begin. The following procedure is only required if fossils are seen on the surface and when excavation commence.	Refer to Sections 8, 9, 13 and 15 of this report and Section C of the EMPr attached as Appendix H.

Name of the report	Findings and Impact Management Measures Identified	Section of the report where the information is included
	• When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (trace fossils, fossils of plants, insects, bone or coalified material) should be put aside in a suitably protected place. This way the project activities will not be interrupted. • Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (for example see Figures 18-1 and 18-2). This information will be built into the EMPr's training and awareness plan and procedures. • Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment. • If there is any possible fossil material found by the contractor/environmental officer then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible. • Fossil plants or vertebrates that are of good quality or scientific interest by the palaeontologist must be removed, catalogued, and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits. • If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils. • If no fossils are found and the excavations have finished, then no further monitoring is required.	

Name of the report	Findings and Impact Management Measures Identified	Section of the report where the information is included
	 Figure 10-4: Examples of fossils from the Ecca and Beaufort Groups	

Name of the report	Findings and Impact Management Measures Identified	Section of the report where the information is included
	 Figure 10-5: Photograph of bones as seen in the field and reconstruction diagrams of some examples from the Tapinocephalus Assemblage Zone	
Soil and Land Capability	**Findings:** Land-use: The current dominating land use is the natural land, which is used for cattle farming, followed by human settlement, and limited number of crop farming. The area is very dry with dry rivers along the powerline. Dominant Soil Forms The study area is characterized by the following soil types: • Soils with limited pedological development. Soils with minimal development, usually shallow, on hard or weathering rock, with or without intermittent diverse soils. Lime is generally present in part or most of the landscape. • Soils with strong texture contrast. Soils with a marked clay accumulation, strongly structured and a non-reddish colour. This may occur or be associated with one or more of vertic, melanic and plinthic soils.	Refer to Sections 8, 9, 13 and 15 of this report and Section C of the EMPr attached as Appendix H.

Name of the report	Findings and Impact Management Measures Identified	Section of the report where the information is included
	• Red-yellow soil with well drained characteristics, massive or weakly structured soils. Red soils with high base status. • Sandy soils with little or no profile development. Red and yellow, well drained sandy soils with high base status. • Strongly saline soils. Strongly saline soils generally occur in relatively deep deposits in low lying arid areas. • No permanently wet drainage ways are present in the area. Ten soil samples were collected along the powerline and two samples were collected at Holput 91 Farm and the following were recorded: one soil sample representing top, and subsoil combined at each sampling point. Soil samples were sealed in soil sampling plastic bags and sent to Soil Laboratory. Samples taken to determine baseline soil fertility were analysed for electrical conductivity (EC), pH (KCl and H2O), phosphorus (Bray1), exchangeable cations (calcium, magnesium, potassium, and sodium), organic carbon (Walkley- Black) and texture classes (relative fractions of sand, silt, and clay). The levels of the basic cations Ca, Mg, K and Na are determined in soil samples for agronomic purposes through extraction with an ammonium acetate solution. In general, the amounts of exchangeable cations normally follow the same trend as outlined for soil pH and texture. For most soils, cations follow the typical trend of Ca>Mg>K>Na. Calcium, magnesium and potassium levels in the soils were generally not adequate for crop production, not below the required levels and these nutrients have not been limited to any production or are considered toxic. There will be no need to add Ca, K and Mg sources as the proposed is not going to be used for agricultural purposes. The soil capability within the study area falls within the very low land capability and low moderate area. According to the land capability classes' distribution within the country per province (Schoeman *et al.,* 2002), the project falls within class VIII of which the climate capability L5 is a Vlei class. The results show the L5 is characterised by restricted potential: Regular and/or severe to moderate limitations due to soil, slope, temperatures, or rainfall. The route line is mainly dominated by low in the northwest towards Copperton Town and low moderate land capability in the far southeast thus in the De Aar Town. The area is used heavily for grazing purpose and wildlife. **Management and Mitigation Measures:** • Rehabilitation of soil needs to be done concurrently to the construction to avoid soil erosion and water damming for long periods during the rainy season. • Small crop farming areas should be considered when designing the powerline route.	

Name of the report	Findings and Impact Management Measures Identified	Section of the report where the information is included
	• The only mitigation for this impact is to keep the surface disturbance footprint as small as possible. However, horizon inversion/disturbance is a permanent impact. • To mitigate the disturbance of in situ horizon organisation, the only mitigation for this impact is to keep the surface disturbance footprint as small as possible. However, horizon inversion/disturbance is a permanent impact. • To mitigate loss of soil fertility through impacts on nutrient cycles, soil nutrient cycles can somehow be maintained by re-vegetation of topsoil stockpiles and through proper ecological land rehabilitation. • The project footprint should be kept as small as possible. Traffic should be restricted to existing roads only. Topsoil stripping and stockpiling should not be conducted during wet periods, soil moisture should be below a pre-determined level. • Proper soil contamination prevention measures should be implemented. • The Soil Management Plan should be implemented. • Control soil erosion using geotextiles and re-vegetation of exposed soil surfaces where possible. • With regards to the loss of arable land and land capability through soil stripping and construction activities, current soil rehabilitation techniques are not able to restore the arable land capability and the loss is therefore permanent. • The land affected by the construction activities should be rehabilitated restore the grazing capacity to a large extend. • Avoid wetland areas as far as possible and do not include areas of surface disturbance. • Keep the project surface footprint as small as possible. • Adhere to the management and monitoring measures specified in this report and the EMPr.	
Riverine Baseline Study and Risk Assessment	**Findings:** When reading these findings, it should be noted that rainfall had occurred a week before the study was done. The National Web Based Environmental Screening Tool (NWBEST) has characterised the aquatic sensitivity of the rivers of the project area as 'Very High' - requiring an assessment. This was confirmed by the specialist as the watercourses are designated as a Critical Biodiversity Areas or Ecological Support Areas and the remaining terrestrial habitat considered an Other Natural Area. These watercourses are considered endangered ecosystems, bar the Ongers River system which is considered a Least Threatened ecosystem but remains not protected.	Refer to Sections 8, 9, 13 and 15 of this report and Section C of the EMPr attached as Appendix H.

Name of the report	Findings and Impact Management Measures Identified	Section of the report where the information is included

Sub Quaternary reaches.

Desktop information for the Sub-Quaternary Reaches (SQRs) were obtained from DWS, 2014. The transmission line crosses multiple watercourses of which eleven are considered SQRs. All other watercourses form part of the drainage networks of these eleven SQR's. The desktop PES category of the eleven reaches', range from category C (moderately modified) to a class D (largely modified), with most systems not assessed due to its ephemeral nature. The modification status of these reaches is a result of impacts to instream habitat, wetland and riparian zone continuity, flow modifications and potential impacts on physico-chemical conditions (water quality).

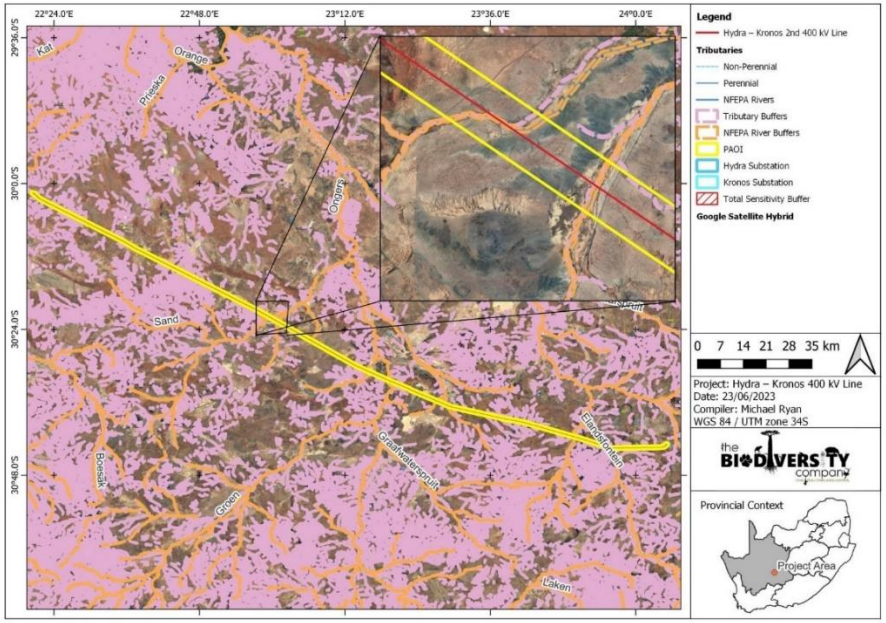
In situ water quality analysis was conducted during the study at all accessible watercourses within the project area which contained water. This included rivers, tributaries, and drainage lines as well as dams. Results have been compared to limits stipulated in the Target Water Quality Range (TWQR) for aquatic ecosystems (DWS, 1996). The results of the June 2023 assessment are presented in Table 18-3 with sites ordered in a downstream direction.

Table 10-3: In situ surface water quality results (June 2023)

Site	pH	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/l)	Dissolved Oxygen (%)	Temperature (°C)
TWQR*	6.5-9*	-	-	80 % - 120 % of saturation	5-30*
Elandsfontein					
Elandsfontein Eastern Limb	8.72	1 073	11.3	110.7	14.1
Elandsfontein Tributary 2 (ET2)	9.1	442	10.8	94	15.3
Elandsfontein Tributary 4 (ET4)	7.41	53.1	10.1	88.8	9.8
Elandsfontein Tributary (ET5)	7.75	51.5	11.0	99.5	10.2

*TWQR – Target Water Quality Range; Levels exceeding guideline levels are indicated in red; Elevated levels in yellow

Name of the report	Findings and Impact Management Measures Identified	Section of the report where the information is included
	In situ water quality for the project area indicates natural conditions for the watercourses of the project area, as all recorded parameters conform to TWQR. Due to the scale of the project area and multitude of sampling sites considered across multiple river systems the potential for modification within the project area increases. The recorded parameters assessed within *in-situ* water quality indicate conditions which would not hinder aquatic life in these systems, however this assessment is not considered robust enough to make this statement on a larger scale as chemical analysis is required to further understand the physiochemical conditions in the reach. Furthermore, the surface water is expected to completely evaporate within a week, with water quality within these systems extremely dynamic seasonally and therefore not a robust test for instream ecological integrity for the region. <u>Habitat Integrity</u> The results of the instream habitat assessment for the ephemeral systems indicates a largely natural state (class B) while the instream habitat assessment for the non-perennial systems indicates a moderately modified state (class C). The riparian habitat assessment indicates a moderately modified state (class C) for both the ephemeral and non-perennial systems. <u>Riparian Habitat – Watercourse Extent</u> The project area traverses through five vegetation types namely the Northern Upper Karoo (NKu3), Upper Karoo Hardeveld (NKu2), Eastern Upper Karoo (NKu4), Bushmanland Arid Grassland (NKb3) and Bushmanland Basin Shrubland (NKb6) from east to west. The Northern Upper Karoo (NKu3) vegetation type is the dominant vegetation type covering 75.53% of the PAOI. Vegetation within the riparian areas was composed of succulent herbs and shrubs. Due to the ephemeral and non-perennial nature of the river systems observed throughout the project area, surface flow is diminished for extended periods of the year. This results in a lack of hydrophilic species present within the riparian areas of the watercourses as terrestrial vegetation encroaches the active water channel. The only sections of a watercourse which presented vegetation characteristic of riparian areas were at sections where the channel contained infrastructure to store water such as a dam or weir. This was observed at the Elandsfontein Eastern Limb where some Cyprus sp. were observed. Another section of the same river as observed at the Elandsfontein Western Limb was found to contain no hydrophilic species with terrestrial overgrowth observed to have occurred. <u>Buffer Zones</u>	

Name of the report	Findings and Impact Management Measures Identified	Section of the report where the information is included
	Due to the scale of the project, main stem rivers classified as NFEPA scale rivers are given a 30m buffer (Chase *et al.* 1995, Desbonnet *et al*. 1994, McMillan, 2000 and Fisher *et al.* 2000). The smaller systems which are considered either tributaries or drainage lines were assigned an 18m buffer according to Dosskey (2000) to protect this habitat type. The wetland systems were assigned a 15m buffer as per Cooke (1992) recommendation – with Graham and de Winnaar, 2009 and Desbonnet *et al.* (1994) using the same buffer widths in wetter climates. The delineated riparian areas and associated buffer zones are considered N**o - go** areas for any infrastructure such as pillars or towers for the transmission powerline. It is however understood that the line will invariably cross systems which is unavoidable but associated infrastructure should be located outside the riparian buffers in accordance with the precautionary principle. The delineation of the watercourse extents riparian zone observed in the study area are presented in the Figure below. Further, Figure 10-7 indicates total sensitivity and associated buffer of the watercourses associated with the project area.  Figure 10-6: Riparian delineation and associated buffer of the watercourses associated with the project area (Source: The Biodiversity Company - 2023)	

Name of the report	Findings and Impact Management Measures Identified	Section of the report where the information is included

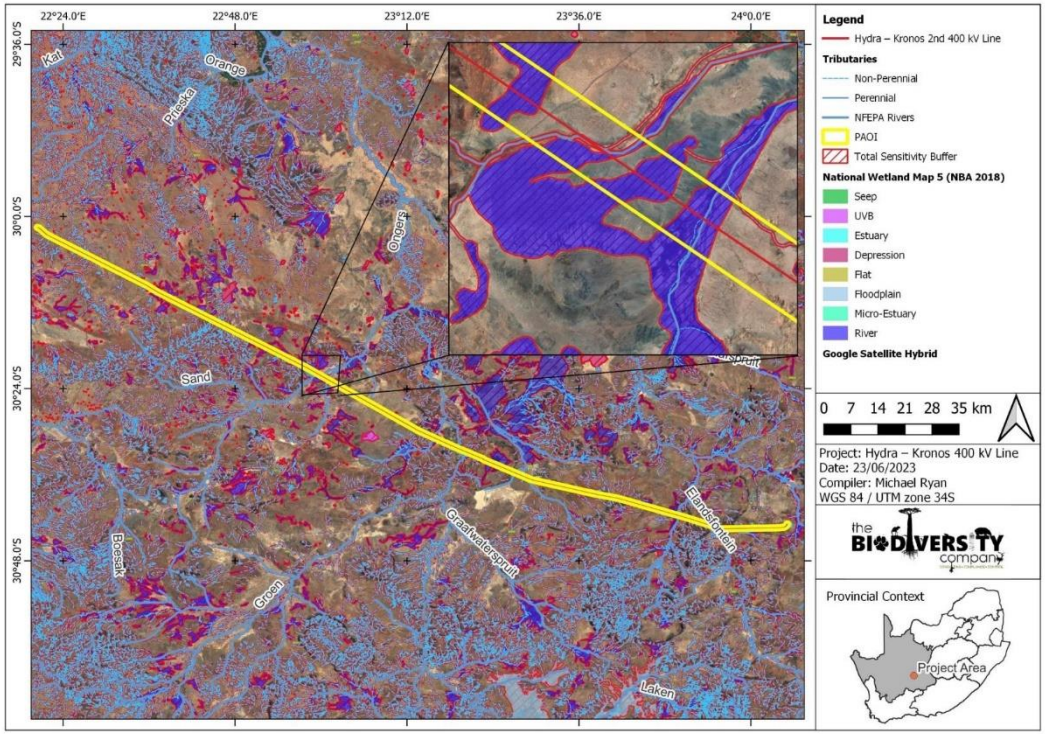


Figure 10-7: Total Sensitivity and associated buffer of the watercourses associated with the project area (Source: The Biodiversity Company - 2023)

Fish Communities

Due to the lack of surface flow and connectivity with perennial systems observed in with all watercourses sampled, no fish were sampled during the June 2023 survey.

Name of the report	Findings and Impact Management Measures Identified	Section of the report where the information is included
	Macroinvertebrate Habitat The habitat availability within the project area represents poor (class F) conditions. This resulted from the watercourse presenting as only a shallow pool surrounding a weir where the riverbed was dominated by bedrock which has a poor infiltration rate. This resulted in no present in current habitat. Further marginal vegetation was comprised of few different species such as sedges in isolated patches which presented uniform habitat. The only present substrate above the bedrock was mud at a uniform depth. The habitat assessment indicates that biotope results within the reach indicate that the habitat availability would be a limiting factor for the diversity of macroinvertebrate communities within the sampled river. **Impact Management Measures Identified** Transmission line installation specific mitigation measures • The footprint area of the transmission line must be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. • The footprint area must be aligned with the existing road/railway reserves wherever possible. Disturbed areas should be sought as the preferred alignment area. • The locations of all single circuit angle steel towers which hold the transmission line must be located outside of all delineated watercourses as far as possible. This should be achieved by increasing or decreasing the distances between towers. • As far as possible all access roads should use existing service road. • Preferential flow paths should be identified that intersect with the road so that silt traps and fences can be installed to avoid siltation of watercourses; and • An appropriate stormwater management plan must be developed for all substations, or the existing ones updated. General mitigation measures • The construction vehicles and machinery must make use of existing access routes as much as possible before adjacent areas are considered for access.	

Name of the report	Findings and Impact Management Measures Identified	Section of the report where the information is included
	• Laydown yards, camps and storage areas must be beyond the aquatic areas delineated watercourse extend and associated buffer zones. Where possible, the construction of the transmission line and substations must take place from the existing road servitudes and not from within the aquatic systems. • All construction areas should be clearly demarcated. • The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are cleaned-up and discarded correctly. • All chemicals and toxicants to be used for the construction must be stored outside any channel system and in a bunded area. • All machinery and equipment should be inspected regularly for faults and possible leaks; these should be serviced off-site. • All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping". • Adequate sanitary facilities and ablutions on the servitude must be provided for all personnel throughout the project area. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation). • All removed soil and material must not be stockpiled within the system. Stockpiling should take place outside of the watercourse. All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds. • Any exposed earth should be rehabilitated promptly by planting suitable vegetation (vigorous indigenous grasses) to protect the exposed soil. • As far as possible, all building materials used for the substations should be prefabricated and transported to site to avoid any risks of contamination to any watercourse: • No dumping of construction material on-site may take place. • All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials should be supported; and • An alien invasive plant management plan needs to be compiled and implemented post construction to control current invaded areas and prevent the growth of invasives on cleared areas.	
Social Impact Assessment	**Findings** No fatal flaws have been identified, and the negative impacts noted can be mitigated apart from the powerline's intrusion on the landscape's panoramic views. In addition, the project will create jobs, uplift SMMEs' within the area, and transmit electricity from the Northern Cape to various provinces. These	Refer to Sections 8, 9, 13 and 15 of this report and Section C of the EMPr attached as Appendix H.

Name of the report	Findings and Impact Management Measures Identified	Section of the report where the information is included
	positive impacts outweigh the negative as they also contribute to eradicating poverty, a Millennium Development Goal. It is therefore recommended that the project be approved from a social perspective and that the following conditions be included in the EMPr: ▪ A communication strategy should be developed that ensures the following: ✓ Good communication about the project is practiced throughout the construction. ✓ Good relationships with affected landowners are established and maintained. ✓ Lines of communication are always open, and complaints are handled appropriately and in a timely manner. ✓ Affected property owners are consulted and respected regarding site access and safety. Damage to directly affected property owners and adjacent property owners is minimized. ▪ Where possible, skills development must be done, and training must be concentrated in skills that can be readily transferred to other employment opportunities in the local area. ▪ Hiring should prioritize the nearby communities. If not, enmity, contempt, or anger toward the endeavour may grow. ▪ Eskom/ the contractor must be upfront about the few work opportunities that will be created and not set unreasonable expectations for employment opportunities. ▪ As far as possible, local SMMEs (contractors and suppliers) should be utilised throughout the project.	
Visual Impact Assessment	**Findings:** With regards to visual impacts on residents, the study area has a sparse population in the rural settlements and farming communities, and higher populations in the towns. The towns and surrounding areas vary from degraded and not very scenic to quaint and neat. The rural settlements and farming communities are normally situated along main transportation routes, near agricultural areas or adjacent rivers or water resources. There will be a moderately low number of affected viewers across the study areas. With regards to Tourism, the study found out that the entire study area is considered to have a low tourism potential. The proposed powerline runs south of the N10 and crosses the N12 that can be considered as thoroughfare roads to the Eastern and Western Cape holiday destinations. A few holiday farms, overnight stopovers and private game and hunting farms are found within the study area.	Refer to Sections 8, 9, 13 and 15 of this report and Section C of the EMPr attached as Appendix H.

Name of the report	Findings and Impact Management Measures Identified	Section of the report where the information is included
	With regards to the visual impacts on motorists, the major routes in the study area are the N10, N12, R384, R386 and the R403 connecting the towns, settlements, and farms. The secondary road network in the study area carries a much lower volume of motorists. Their duration of views will be temporary, and it is expected that the visual intrusion that they will experience will be low. The impact of the proposed activities on visual receptors varies between residents, tourists, and motorists. The proposed new power line traverses' mundane landscape with little ability to absorb the visual impact. The landscape has relatively few residents that will be impacted as most of the line follows through agricultural land and open areas. Very few tourists visit the area and motorists mainly pass through. **Impact Management Measures** • General o Plants should be salvaged where areas are going to be disturbed through the destruction of vegetation, for example the establishment of the construction camp, and kept in a controlled environment such as a nursery, for future replanting in the disturbed areas as a measure of rehabilitation. • Transmission Towers o Avoid changing the alignments direction too often to minimise the use of the self-supporting strain tower. This tower type is the most visually intrusive as the steel lattice structure is denser than the other two tower types, hence creating more visual obstruction. o Rehabilitate disturbed areas around pylons as soon as practically possible after construction. This should be done to restrict extended periods of exposed soil. • Access routes o Make use of existing access roads where possible. o Where new access roads are required, the disturbance area should be kept to a minimum. A two-track dirt road will be the most preferred option. o Locate access routes to limit modification to the topography and to avoid the removal of established vegetation. o Avoid crossing over or through ridges, rivers, pans, or any natural features that have visual value. This also includes centres of floral endemism and areas where vegetation is not resilient and takes extended periods to recover. o Maintain no or minimum cleared road verges.	

Name of the report	Findings and Impact Management Measures Identified	Section of the report where the information is included
	○ Access routes should be located on the perimeter of disturbed areas such as cultivated/fallow lands as not to fragment intact vegetated areas. ○ If it is necessary to clear vegetation for a road, avoid doing so in a continuous straight line. Alternatively, curve the road to reduce the visible extent of the cleared corridor. • Cleared servitudes. ○ Locate the alignment and the associated cleared servitude to avoid the removal of established vegetation. ○ Avoid a continuous linear path of cleared vegetation that would strongly contrast with the surrounding landscape character. Feather the edges of the cleared corridor to avoid a clearly defined line through the landscape. • Construction camps and lay down yards. ○ If practically possible, locate construction camps in areas that are already disturbed or where it isn't necessary to remove established vegetation like for example naturally bare areas. ○ Utilise existing screening features such as dense vegetation stands or topographical features to place the construction camps and lay-down yards out of the view of sensitivity visual receptors. ○ Keep the construction sites and camps neat, clean, and organised to portray a tidy appearance. ○ Screen the construction camp and lay-down yards by enclosing the entire area with a dark green or black shade cloth of no less than 2m height. ○ Keep the construction camps away from existing residents and especially lodges and tourist venues.	

11 ENVIRONMENTAL IMPACT STATEMENT

This section of the report details the information required as per Section 3(1)(l) of Appendix 1 of Environmental Impact Assessment (EIA) Regulations, Government Notice R982 of 2014 (as amended).

(l) an environmental impact statement which contains—

(i) a summary of the key findings of the environmental impact assessment.

(ii) 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

(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;

The proposed project will cause various positive and negative impacts on the environment. Specialist studies have been undertaken and all the specialists have recommended that the proposed project proceed provided that the recommended mitigation measures are implemented. Suitable mitigation measures have been provided for the negative impacts identified in Sections 9 and 12, and in the Environmental Management Programme attached to this report as Appendix H. The Interested and Affected Parties were involved in the project, and none objected to the proposed project. Authorities have been involved in the proposed project and none have objected to the proposed project. No fatal flaws have been identified in the proposed project. Based on the above, the EAP is of the opinion that the proposed project should be authorised.

Table 11-1: Summary of assessed impacts

THEME	ACTIVITY	IMPACT DESCRIPTION	SIGNIFICANCE WITHOUT MITIGATION	SIGNIFICANCE WITH MITIGATION	PROPOSED MITIGATION MEASURES
Social	Lighting of construction areas during the night.	Light pollution.	Medium (-)	Low (-)	See 9.4.1
Social	Construction activities. Delivery of materials.	Noise Pollution.	Medium (-)	Low (-)	See 9.4.2
Flora Water	Uncontrolled/unmanaged fire	Damage to the surrounding natural grassland and wetlands.	Medium (-)	Low (-)	See 9.4.3
Social	Movement of construction vehicles.	Traffic congestion on public and private roads	Low (-)	Low (-)	See 9.4.4
Land Water Soil	Generation, handling, and disposal of domestic and industrial waste.	Potential contamination of soil, surface, and groundwater.	Medium (-)	Low (-)	See 9.4.5
	Sewage generation.		Medium (-)	Low (-)	See 9.4.6
	Inadequate stormwater management.	Soil erosion and sedimentation of watercourses.	Medium (-)	Low (-)	See 9.4.7
Soil	Excavation at tower positions and stockpiling.	Soil erosion and dust emission.	Medium (-)	Low (-)	See 9.4.8
Water	Handling of waste and hazardous substances.	Potential contamination of surface and groundwater.	Medium (-)	Low (-)	See 9.4.9
Land Water	Hydrocarbon Spillage.	Contamination of habitat as well as water resources.	Medium (-)	Low (-)	See 9.4.10

THEME	ACTIVITY	IMPACT DESCRIPTION	SIGNIFICANCE WITHOUT MITIGATION	SIGNIFICANCE WITH MITIGATION	PROPOSED MITIGATION MEASURES
Flora	Vegetation clearance and construction activities	Displacement of SCC and non-SCC priority species because of habitat loss and transformation	Medium (-)	Low (-)	See 9.4.11
		Displacement of SCC and non-SCC priority species as a result disturbance	Medium (-)	Low (-)	See 9.4.12
Cultural Environment	Excavation	Destruction of heritage artefacts	Medium (-)	Low (-)	See 9.4.13
		Potential disturbance of paleontological resources	Medium (-)	Low (-)	See 9.4.14
Soil	Stripping and stockpiling of topsoil	Disturbance of in situ horizon organization	High (-)	High (-)	See 9.4.15
		Loss of soil fertility through impacts on nutrient cycles	High (-)	Medium (-)	See 9.4.16
	Vehicle traffic and construction of infrastructure	Soil compaction	High (-)	Medium (-)	See 9.4.17
Soil	Trucks and equipment on site and waste generation by construction activities	Soil chemical pollution	Medium (-)	Low (-)	See 9.4.18
	Vegetation clearance	Exposure of the soil surface to the energy of wind and water movement, can result in soil erosion	Medium (-)	Low (-)	See 9.4.19
Land capability	Soil stripping and construction of infrastructure.	Loss of arable land.	High (-)	Medium (-)	See 9.4.20

THEME	ACTIVITY	IMPACT DESCRIPTION	SIGNIFICANCE WITHOUT MITIGATION	SIGNIFICANCE WITH MITIGATION	PROPOSED MITIGATION MEASURES
	Soil stripping and construction of infrastructure.	Loss of grazing land	Medium (-)	Medium (-)	See 9.4.21
Water	Soil stripping and construction of infrastructure.	Loss of wetlands.	Medium (-)	Low (-)	See 9.4.22
Fauna	Potential poaching activities.	Hunting or collection of slower moving animals (e.g., the tortoises) or by snaring (small mammals and birds).	High (-)	Low (-)	See 9.4.23
	Excavations	Destroying of animals (mammals and reptiles) trapped in deep excavated holes during construction	High (-)	Low (-)	See 9.4.24
Social	Construction camp, lay-down yard, excavations, and stockpiles.	Potential visual impacts on motorists and tourists may cause unsightly views	Low (-)	Low (-)	See 9.4.25
Water	Construction activities	Small scale drainage patterns change	Low (-)	Low (-)	See 9.4.26
	Operation of equipment and machinery outside delineated watercourses or buffers	Degradation of watercourses.	Low (-)	Low (-)	See 9.4.28
Soil	Soil and building material stockpile management	Soil erosion	Low (-)	Low (-)	See 9.4.29
	Storage of chemicals, mixes, and fuel (hazardous substances)	Soil and water contamination	Low (-)	Low (-)	See 9.4.30
	Final landscaping and post-construction rehabilitation	Soil and water contamination	Low (-)	Low (-)	See 9.4.31

THEME	ACTIVITY	IMPACT DESCRIPTION	SIGNIFICANCE WITHOUT MITIGATION	SIGNIFICANCE WITH MITIGATION	PROPOSED MITIGATION MEASURES
Land Watercourse	Electrical Pylon or laydown yards within the delineated Sensitive Areas	Degradation of sensitive areas	Medium (-)	Medium (-)	See 9.4.32
Flora	Vegetation clearance	Destruction of habitats.	High (-)	Low (-)	See 9.4.33
Watercourse		Destruction of drainage areas	Medium (-)	Low (-)	See 9.4.34
Land Water	Development of roads	Destruction of habitats found on site	Low (-)	Low (-)	See 9.4.35
Social	Hiring for construction	Waged Labor	Medium (+)	High (+)	See 9.4.36
	On the job training	Skills Development	Low (+)	Medium (+)	See 9.4.37
	Procurement of materials Housing for laborer's	Local Economic Development	Low (+)	Medium (+)	See 9.4.38
	Influx of job seekers	Increase in crime and diseases	Medium (-)	Low (-)	See 9.4.39
OPERATIONAL PHASE					
Avifauna	Operation of powerline	Mortality of SCC and non-SCC priority species due to collision with the 400kV power line conductors/ earth wires.	Medium (-)	Low (-)	See 9.51
Avifauna	Operation of substations.	Mortality of SCC and non-SCC priority species because of electrocution on the	Medium (-)	Low (-)	See 9.5.1

THEME	ACTIVITY	IMPACT DESCRIPTION	SIGNIFICANCE WITHOUT MITIGATION	SIGNIFICANCE WITH MITIGATION	PROPOSED MITIGATION MEASURES
		infrastructure within the Hydra and Kronos MTS.			
Visual/ Aesthetics	Operation of the powerline infrastructure	Potential visual impacts on tourists: The presence of a power line intrudes on existing views and spoils the open panoramic views of the landscape.	Medium (-)	Low (-)	See 9.5.4
Water		Alteration of surface drainage and runoff, poor storm water management and operation of transmission line and substation.	Low (-)	Low (-)	See 9.5.4
Flora	Maintenance of powerline and substation infrastructure.	Establishment of alien plants on disturbed areas.	Low (-)	Low (-)	See 9.5.5
Infrastructure	Operation of powerline infrastructure.	Deterioration of infrastructure due to lack of maintenance.	Low (-)	Low (-)	See 9.5.6
Land Water	Maintenance of electrical pylon within the delineated sensitive areas.	Degradation of sensitive areas.	Medium (-)	Medium (-)	See 9.5.7

12 IMPACT MANAGEMENT MEASURES FROM SPECIALIST REPORTS FOR INCLUSION IN THE EMPR

This section of the report details the information required as per Section 3(1)(m) of Appendix 1 of Environmental Impact Assessment (EIA) Regulations, Government Notice R982 of 2014 (as amended).

(m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr;

The following impact management measures from specialist reports for inclusion into the EMPr.

12.1 Animal Impact Assessment

- To limit impacts on the larger ecosystem, it is recommended that the existing corridor (1st power line) is used as access during construction and maintenance for the 2nd 400 kV power line.
- Placement of pylons must as far as possibly avoid rocky outcrops, low hills, and drainage lines. It will not be possible to avoid all areas, but with planning, the impacts can be limited.
- It is recommended no travelling must be done under the new power line – access to construction sites must be from the existing corridor and road.
- Where possible, limit travel over outcrops, hills, and low mountains – access from either side during construction to limit negative impact on the sloped areas. This will lower damage to the sensitive areas and lower the risk of erosion on the slopes.
- A concern is poaching where people can actively hunt or collect slower moving animals (e.g., the tortoises) or by snaring (small mammals and birds).
- The higher traffic associated with construction can increase the potential for road kills.
- During construction, animals (mammals and reptiles) can be trapped in deep excavate holes.
- It will be important to monitor all open pits daily.
- It is recommended that where possible, holes for construction must be dug only when the teams are ready for construction.
- No lights to be left on at the sites at night, as this will attract animals to these areas – e.g., increased insect activity and this will attract bats, snakes and small mammals feeding on the insects, resulting in a higher incidence of snakes on the construction areas and animals being trapped in the open excavation pits.

12.2 Avifauna Impact Assessment

- If an SSC nest is occupied, the avifaunal specialist must consult with the contractor to find ways of minimizing the potential disturbance to the breeding birds during the construction period. This could include measures such as delaying some of the activities until after the breeding season.
- Install bird flight diverters where required.
- The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the construction footprint (especially the removal of natural vegetation) and rehabilitation of disturbed areas is concerned.
- Construction activities (i.e., all staff, vehicle, and machinery) should be restricted to the immediate footprint of the infrastructure.

- Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of avifaunal species.
- Maximum use should be made of existing roads and the construction of new roads must be kept to a minimum.
- If collision or electrocution impacts are recorded once the Hydra-Kronos 2nd 400kV power line and MTS infrastructure are operational, it is recommended that a representative from the Eskom-Endangered Wildlife Trust Strategic Partnership investigate the mortalities and provide recommendations for site-specific mitigation to be applied reactively.
- In addition to this, the normal suite of environmental good practices should be applied, such as ensuring strict control of staff, vehicles and machinery on site and limiting the creation of new roads as far as possible.

12.3 Heritage

- Prior to construction starts, contractors should be given training on how to identify and protect archaeological remains that may be discovered during the project construction activities. The pre-construction training should include some site recognition training for the types of archaeological sites that may occur in the construction areas. Below are some indicators of an archaeological site that may be found during construction:
    - Flaked stone tools, bone tools and loose pieces of flaked stone.
    - Ash and charcoal.
    - Bones and shell fragments.
    - Artefacts (e.g., beads or hearths); and
    - Packed stones which might be uncounted underground and might indicate a grave or collapse stone walling.

12.4 Palaeontological Impact Assessment

- If fossils are found by the environmental officer, or other responsible person once excavations and drilling have commenced, then they should be rescued, and a palaeontologist called to assess and collect a representative sample.
- The following Fossil Chance Find Protocol should be included in the EMPr and implemented:
- This Monitoring Programme for Palaeontology is to commence once the excavations / drilling activities begin. The following procedure is only required if fossils are seen on the surface and when excavation commence.
- When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (trace fossils, fossils of plants, insects, bone or coalified material) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
- Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (for example see Figures 20-1 and 20-2). This information will be built into the EMP's training and awareness plan and procedures.
- Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
- If there is any possible fossil material found by the contractor/environmental officer then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.

- Fossil plants or vertebrates that are of good quality or scientific interest by the palaeontologist must be removed, catalogued, and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
- If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
- If no fossils are found and the excavations have finished, then no further monitoring is required.

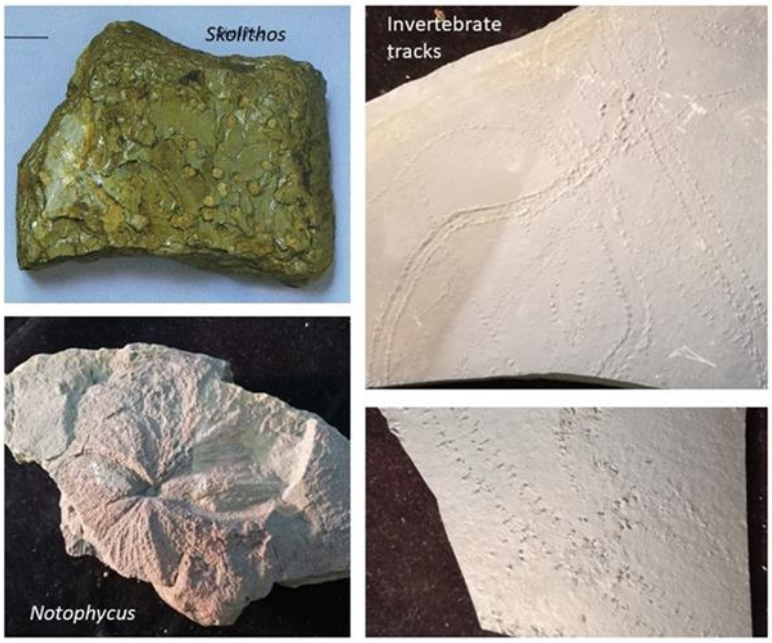


Figure 12-1: Examples of fossils from the Ecca and Beaufort Groups (Source: Bamford, 2023)

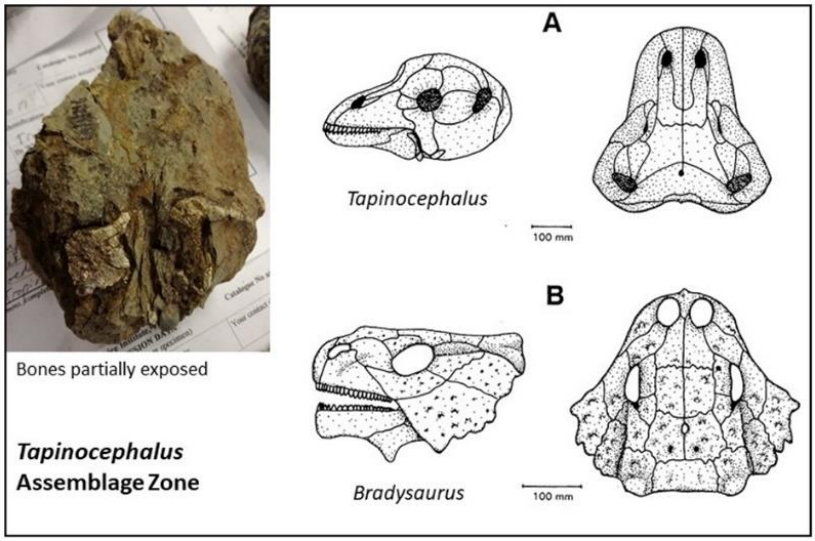


Figure 12-2: Photograph of bones as seen in the field and reconstruction diagrams of some examples from the Tapinocephalus Assemblage Zone (Source: Bamford, 2023)

12.5 Riverine Baseline Study and Risk Assessment

Transmission line installation specific mitigation measures

- The footprint area of the transmission line must be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas.
- The footprint area must be aligned with the existing road/railway reserves wherever possible. Disturbed areas should be sought as the preferred alignment area.
- The locations of all single circuit angle steel towers which hold the transmission line must be located outside of all delineated watercourses as far as possible. This should be achieved by increasing or decreasing the distances between towers.
- As far as possible all access roads should use existing service road.
- Preferential flow paths should be identified that intersect with the road so that silt traps and fences can be installed to avoid siltation of watercourses.
- An appropriate stormwater management plan must be developed for all substations, or the existing ones updated.

General mitigation measures

- The construction vehicles and machinery must make use of existing access routes as much as possible, before adjacent areas are considered for access.
- Laydown yards, camps and storage areas must be beyond the aquatic areas delineated watercourse extend and associated buffer zones. Where possible, the construction of the transmission line and substations must take place from the existing road servitudes and not from within the aquatic systems.
- All construction areas should be clearly demarcated.
- The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are cleaned-up and discarded correctly.
- All chemicals and toxicants to be used for the construction must be stored outside any channel system and in a bunded area.
- All machinery and equipment should be inspected regularly for faults and possible leaks; these should be serviced off-site.
- All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good “housekeeping”.
- Adequate sanitary facilities and ablutions on the servitude must be provided for all personnel throughout the project area. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation).
- All removed soil and material must not be stockpiled within the system. Stockpiling should take place outside of the watercourse. All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.
- Any exposed earth should be rehabilitated promptly by planting suitable vegetation (vigorous indigenous grasses) to protect the exposed soil.

- As far as possible, all building materials used for the substations should be prefabricated and transported to site to avoid any risks of contamination to any watercourse:
- No dumping of construction material on-site may take place.
- All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials should be supported.
- An alien invasive plant management plan needs to be compiled and implemented post construction to control current invaded areas and prevent the growth of invasives on cleared areas.

12.6 Social Assessment

- A communication strategy should be developed that ensures the following:
  - » Good communication about the project is practiced throughout the construction.
  - » Good relationships with affected landowners are established and maintained.
  - » Lines of communication are always open, and complaints are handled appropriately and in a timely manner.
  - » Affected property owners are consulted and respected regarding site access and safety. Damage to directly affected property owners and adjacent property owners is minimized.
- Where possible, skills development must be done, and training must be concentrated in skills that can be readily transferred to other employment opportunities in the local area.
- Hiring should prioritize the nearby communities. If not, enmity, contempt, or anger toward the endeavour may grow.
- Eskom/ the contractor must be upfront about the few work opportunities that will be created and not set unreasonable expectations for employment opportunities.
- As far as possible, local SMMEs (contractors and suppliers) should be utilised throughout the project.

12.7 Soil and Land Capability

- Rehabilitation of soil needs to be done concurrently to the construction to avoid soil erosion and water damming for long periods during the rainy season.
- Soil nutrient cycles can be maintained by revegetation of topsoil stockpiles and through proper ecological land rehabilitation.
- The project footprint should be kept as small as possible. Traffic should be restricted to existing roads only. Topsoil stripping and stockpiling should not be conducted during wet periods, soil moisture should be below a pre-determined level.
- Proper soil contamination prevention measures will mitigate the risk of soil chemical pollution, e.g., checking vehicles before they drive onto the site.
- Control soil erosion using geotextiles and revegetation of exposed soil surfaces where possible.
- Rehabilitate land to restore the grazing capacity to a large extend.
- Avoid wetland areas as far as possible and do not include areas of surface disturbance.

12.8 Terrestrial Plant Species Assessment

- A permit must be obtained for any plant species that are protected under the Northern Cape Nature Conservation Act, 2009 (Act 9 of 2009) and the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004).
- If any individuals of the protected tree, *Boscia albitrunca*, are likely to be affected, a permit is required according to the requirements of the National Forests Act.

12.9 Visual Impact Assessment

General

- Plants should be salvaged where areas are going to be disturbed through the destruction of vegetation, for example the establishment of the construction camp, and kept in a controlled environment such as a nursery, for future replanting in the disturbed areas as a measure of rehabilitation.

Transmission Towers

- Avoid changing the alignments direction too often in order to minimise the use of the self-supporting strain tower. This tower type is the most visually intrusive as the steel lattice structure is denser than the other two tower types, hence creating more visual obstruction.
- Rehabilitate disturbed areas around pylons as soon as practically possible after construction. This should be done to restrict extended periods of exposed soil.
- Access routes
- Make use of existing access roads where possible.
- Where new access roads are required, the disturbance area should be kept to a minimum. A two-track dirt road will be the most preferred option.
- Locate access routes so as to limit modification to the topography and to avoid the removal of established vegetation.
- Avoid crossing over or through ridges, rivers, pans or any natural features that have visual value. This also includes centres of floral endemism and areas where vegetation is not resilient and takes extended periods to recover.
- Maintain no or minimum cleared road verges.
- Access routes should be located on the perimeter of disturbed areas such as cultivated/fallow lands as not to fragment intact vegetated areas.
- If it is necessary to clear vegetation for a road, avoid doing so in a continuous straight line. Alternatively, curve the road to reduce the visible extent of the cleared corridor.

Cleared servitudes.

- Locate the alignment and the associated cleared servitude so as to avoid the removal of established vegetation.
- Avoid a continuous linear path of cleared vegetation that would strongly contrast with the surrounding landscape character. Feather the edges of the cleared corridor to avoid a clearly defined line through the landscape.

Construction camps and lay down yards

- If practically possible, locate construction camps in areas that are already disturbed or where it isn't necessary to remove established vegetation like for example naturally bare areas.
- Utilise existing screening features such as dense vegetation stands or topographical features to place the construction camps and lay-down yards out of the view of sensitivity visual receptors.
- Keep the construction sites and camps neat, clean and organised in order to portray a tidy appearance.

- Screen the construction camp and lay-down yards by enclosing the entire area with a dark green or black shade cloth of no less than 2m height.
- Keep the construction camps away from existing residents and especially lodges and tourist venues.

13 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

This section of the report details the information required as per Section 3(1)(n) of Appendix 1 of Environmental Impact Assessment (EIA) Regulations, Government Notice R982 of 2014 (as amended).

(n) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.

Sections 9 and 12 above include the findings and the recommendation by the Specialists as well as the recommendations by the EAP. The EAP recommends that the following conditions be included in the EA:

- Plants should be salvaged where areas are going to be disturbed through the destruction of vegetation, for example the establishment of the construction camp, and kept in a controlled environment such as a nursery, for future replanting in the disturbed areas as a measure of rehabilitation.
- A permit must be obtained for any plant species that are protected under the Northern Cape Nature Conservation Act, 2009 (Act 9 of 2009) and the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004).
- If any individuals of the protected tree, Boscia albitrunca, are likely to be affected, a permit is required according to the requirements of the National Forests Act.
- If an SSC nest is occupied, the avifaunal specialist must consult with the contractor to find ways of minimizing the potential disturbance to the breeding birds during the construction period. This could include measures such as delaying some of the activities until after the breeding season.
- If fossils are found by the environmental officer, or other responsible person once excavations and drilling have commenced, then they should be rescued, and a palaeontologist called to assess and collect a representative sample.
- An appropriate stormwater management plan must be developed for all substations, or the existing ones updated.

14 ASSUMPTIONS, UNCERTAINTIES, AND GAPS IN KNOWLEDGE WHICH RELATE TO THE ASSESSMENT AND MITIGATION MEASURES PROPOSED

This section of the report details the information required as per Section 3(1)(o) of Appendix 1 of Environmental Impact Assessment (EIA) Regulations, Government Notice R982 of 2014 (as amended).

(o) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed.

The assumptions, uncertainties and gaps in knowledge specified are as follows:

14.1 Environmental Assessment Practitioner

- The EAP compiled the Draft BAR using many sources including specialist reports. The EAP assumes that the information from the specialist reports is correct.

- The EAP assumes that the information provided by Eskom is correct.

14.2 Animal Assessment Specialist

The Specialists' assumptions, limitations and gaps in knowledge are as follows:

Availability of baseline information

- Baseline information for the study of the site was obtained from historic maps, photographs, and reports. The desktop survey provided adequate baseline information for the area and therefore this was not a constraint.
- The survey was conducted during daytime only. All the different habitats at the site were investigated and it was therefore possible to complete a rapid survey and obtain information on the protected and red data animals that are present along the proposed corridor. It is important to note that no trapping of small animals or reptiles were conducted (time constraint for the project).

Confidentially constraints

There were no confidentially constraints.

Implications for the study

Apart from the prevailing weather conditions at the site, there were no other significant constraints that would negatively impact upon the study. Access to all areas of the study site was possible even after the rains made areas very wet and restricted vehicle travel. There is sufficient good quality data available in the literature that partially negates the negative effect that the type of survey had on the quality of the assessment.

14.3 Avifauna Specialist

The avifaunal specialist assumed that the sources of information used for this assessment are reliable. However, it must be noted that there are limiting factors, and these may potentially detract from the accuracy of the predicted results.

- The report is the result of a short-term study and is based on a four-day field survey of the PAOI. No long-term, seasonal monitoring was conducted by the avifaunal specialist. This assessment relies upon secondary data sources with regards to bird occurrence and abundance such as the SABAP2 project. These comprehensive datasets provide a valuable baseline against which any changes in species presence, abundance, and distribution can be monitored. However, primary information on bird habitat and avifaunal species occurrence collected during the site visit and together with professional judgement, based on extensive field experience since 2006, was used directly in determining which species of conservation importance are likely to occur within suitable avifaunal habitat types within the PAOI. Based on these findings, the specialist was able to identify and assess the anticipated impacts and provide recommendations for mitigation; and
- Predictions in this study are based on experience of these and similar species in different parts of South Africa, through the authors' experience working in the avifaunal specialist field since 2006. However, bird behaviour can't be reduced to formulas that will hold true under all circumstances. It must also be noted that, it is often not possible to entirely eliminate the risk of the disturbance and displacement impacts associated with the construction and

operational activities. Our best possible efforts can probably not ensure zero impact on birds. Assessments such as this attempt to minimise the risk as far as possible, and although the displacement and collision impacts, associated with the construction and operation of the Hydra-Kronos 2nd 400kV power line and MTS infrastructure, will be unavoidable, they are likely to be temporary and of moderate significance.

The Avifauna specialist further recommended that limitations stated above be stated as part of the assessment of the proposed 2nd Hydra – Kronos power line so that the reader may fully understands the complexities. She further stated that the limitations do not detract from the confidence that she has in the findings of this impact assessment report and subsequent recommendations for this project.

14.4 Heritage Specialist

The Heritage Impact Specialists' assumptions, limitations and gaps in knowledge are as follows:

- As with any survey, archaeological materials may be under the surface and therefore unidentifiable to the surveyor until they are exposed once construction resume. As a result, should any archaeological/ or grave site be observed during construction stage, a heritage specialist monitoring the development must immediately be notified. In the meantime, no further disturbance may be made until such time as the heritage specialist has been able to make an assessment of the find in question. It is the responsibility of the contractor to protect the site from publicity (i.e., media) until all assessments are made. It is assumed that the Social Impact Assessment and Public Participation Process might also result in the identification of sites, features and objects, including sites of intangible heritage potential in the corridor and that these then will also have to be considered. In addition, it is also assumed that a Visual Impact Assessment will be done to determine the impact of development on any identified heritage sites.

14.5 Palaeontology Specialist

The Palaeontologist's assumptions, limitations and gaps in knowledge are as follows:

- Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, shales and sands are typical for the country and only some do contain fossil plant, insect, invertebrate and vertebrate material. The sands of the Quaternary period would not preserve fossils. It is not known if there are fossils below the ground surface.

14.6 Riverine Assessment

The following aspects were assumptions, limitations and gaps in knowledge of the assessment:

- It is assumed that the client has provided the specialist with all available data and information surrounding the project at the time of writing.
- It is assumed that all of this information is relevant and accurate.
- A single season aquatic ecology survey was completed for this assessment. Thus, temporal trends were not investigated.

- Due to the rapid nature of the assessment and the survey methods applied, fish diversity and abundance was likely to be underestimated.
- Access to site WOR7 was not possible due to the terrain. The site was however likely dry with a similar geomorphology to the surrounding systems however this could not be confirmed.
- No alternatives were provided for this assessment.
- This report only considers the linear activity of the transmission line and substation upgrades.

14.7 Social Assessment

The following assumptions and limitations are relevant to the project:

- The Social Impact Assessment (SIA) report is based on current information received while compiling the SIA. The report, therefore, considers project information relating to planning and design, implementation, and infrastructure placement available to AfroConserva during the compilation of this report. Consequently, It is assumed that the proponent and DIGES have provided accurate information on the proposed development.
- The SIA methodology relies on introducing the project to stakeholders through the NEMA EIA public participation process. Preliminary fieldwork has been done to understand the general project area; however, comprehensive fieldwork will only be undertaken after the draft Basic Assessment Report is made available to the public. Once the project has been widely announced to all stakeholders, interactive meetings and interviews will be held with key stakeholders to inform the SIA. The findings of the final report therefore will include these interactions.
- No economic modelling or analysis was done as part of the SIA. Any data relating to the economic profile of the area was obtained from census data (from 1996, 2001 and 2011 censuses, and the 2016 Community Survey conducted by StatsSA for a more recent municipal profile than what the census data provides); the municipalities Integrated Development Plan; and the websites of the affected province, district and local municipalities.
- Though other Social Impact Assessment reports for the Northern Cape have been reviewed, it should be noted that this report only applies to the proposed Kronos-Hydra 400kV line in the Northern Cape Province and will not necessarily be accurate for other developments at other sites; and
- In order to understand the social environment and predict impacts, complex systems must be reduced to simple representations of reality (DEAT, 2002a). The experience of impacts is subjective and what one person may see as a negative impact may not be perceived as such by another person.

14.8 Soil and Land Capability

- All information relating to the proposed project is assumed to be the latest available information.
- Best practice guidelines were taken into consideration and utilising the maximum expected heights of the infrastructures of the proposed powerline. Findings, recommendations, and conclusions provided in this report are based on the authors' best scientific and professional knowledge as well as information available at the time of compilation.
- The major limitation during the study was the acquisition of some relevant data, notably long-term climatic records for the project site.

14.9 Terrestrial Plant Species

The following assumptions, limitations, uncertainties are listed regarding the assessment of the site:

- The assessment is based on a single site visit. The current study is based on an extensive site visit as well as a desktop study of the available information. The time spent on site was adequate for understanding general patterns across affected areas.
- Compiling the list of species that could potentially occur on site is limited by the paucity of collection records for the area. The list of plant species that could potentially occur on site was therefore taken from a wider area and from literature sources that may include species that do not occur on site and may miss species that do occur on site. In order to compile a comprehensive site-specific list of the biota on site, studies would be required that would include different seasons, be undertaken over a number of years and include extensive sampling. Due to legislated time constraints for environmental authorisation processes, this is not possible.
- Rare and threatened plant species are, by their nature, usually very difficult to locate and can be easily missed. This addressed by undertaking careful searches in areas that are identified as being suitable for species of concern.
- Many plant species are only detectable during the growing season which, in a relatively arid area, is dependent on recent and seasonal rainfall. Surveys done during the incorrect season, or during periods of drought, are unlikely to detect the full suite of plant species that occur in an area. This is addressed by undertaking field surveys in the correct season, and/or undertaking multiple surveys.

14.10 Visual Specialist

The Visual Impact Specialists' assumptions, limitations and gaps in knowledge are as follows:

- This assessment was undertaken during the conceptual stage of the project and is based on information available at the time.
- The exact alignment of the proposed line and position of the pylons are not yet determined. The visibility results have been generated from the anticipated alignment and may deviate from the route for the final approved alignment. The differences are considered omissible.
- This level of assessment excludes surveys to establish viewer preference and thereby their sensitivity. Viewer sensitivity is determined by means of a commonly used rating system.

15 REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED

This section of the report details the information required as per Section 3(1)(p) of Appendix 1 of Environmental Impact Assessment (EIA) Regulations, Government Notice R982 of 2014 (as amended).

(p) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;

This Basic Assessment has shown that the proposed project will result in negative impacts; however, when mitigated adequately, these impacts will result in low residual impacts. It has also shown that there will be positive impacts, such as the

creation of employment opportunities, a boost in the local economy, and a positive step in achieving the targets set for the utlisation of clean (renewable) energy. The Specialists' studies undertaken assessments have concluded that the project is viable if all the mitigation measures stated are effectively implemented. Refer to the map below for the sensitivities note and Section 13 above for the impacts that have been identified and their ratings. Interested and Affected Parties and landowners have been involved in the proposed project and none has objected on the proposed project. The authorities who have jurisdiction on the proposed project have been involved and none have objected the proposed development. There are no fatal flaws that have been identified on the proposed project. The recommendation by the avifauna, animal, plant and heritage specialists to undertake a walkdown once the servitude and tower positions have been finalized is being implemented during this Basic Assessment process hence the Final Basic Assessment Report and Environmental Management Programme will include tower specific mitigation measures. In the interest of sustainable development, the specialists' recommendations, and my professional experience on related projects, I, as an EAP, recommend that the assessed powerline corridor and substation upgrades, be authorized subject to the following recommendations being included in the Environmental Authorization:

- Plants should be salvaged where areas are going to be disturbed through the destruction of vegetation, for example the establishment of the construction camp, and kept in a controlled environment such as a nursery, for future replanting in the disturbed areas as a measure of rehabilitation.
- A permit must be obtained for any plant species that are protected under the Northern Cape Nature Conservation Act, 2009 (Act 9 of 2009) and the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004).
- If any individuals of the protected tree, Boscia albitrunca, are likely to be affected, a permit is required according to the requirements of the National Forests Act.
- If an SSC nest is occupied, the avifaunal specialist must consult with the contractor to find ways of minimizing the potential disturbance to the breeding birds during the construction period. This could include measures such as delaying some of the activities until after the breeding season.
- Where possible, limit travel over outcrops, hills, and low mountains – access from either side during construction to limit negative impact on the sloped areas. This will lower damage to the sensitive areas and lower the risk of erosion on the slopes.
- In order to limit impacts on the larger ecosystem, it is recommended that the existing corridor (1st power line) is used as access during construction and maintenance for the 2nd 400 kV power line.
- Placement of pylons must as far as possible avoid rocky outcrops, low hills and drainage lines. It will not be possible to avoid all areas, but with planning, the impacts can be limited.
- Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of avifaunal species.
- Maximum use should be made of existing roads and the construction of new roads must be kept to a minimum.
- If collision or electrocution impacts are recorded once the *Hydra-Kronos 2nd 400kV power line and MTS infrastructure* are operational, it is recommended that a representative from the Eskom-Endangered Wildlife Trust Strategic Partnership investigate the mortalities and provide recommendations for site-specific mitigation to be applied reactively.
- If fossils are found by the environmental officer, or other responsible person once excavations and drilling have commenced, then they should be rescued, and a palaeontologist called to assess and collect a representative sample.
- An appropriate stormwater management plan must be developed for all substations, or the existing ones updated.

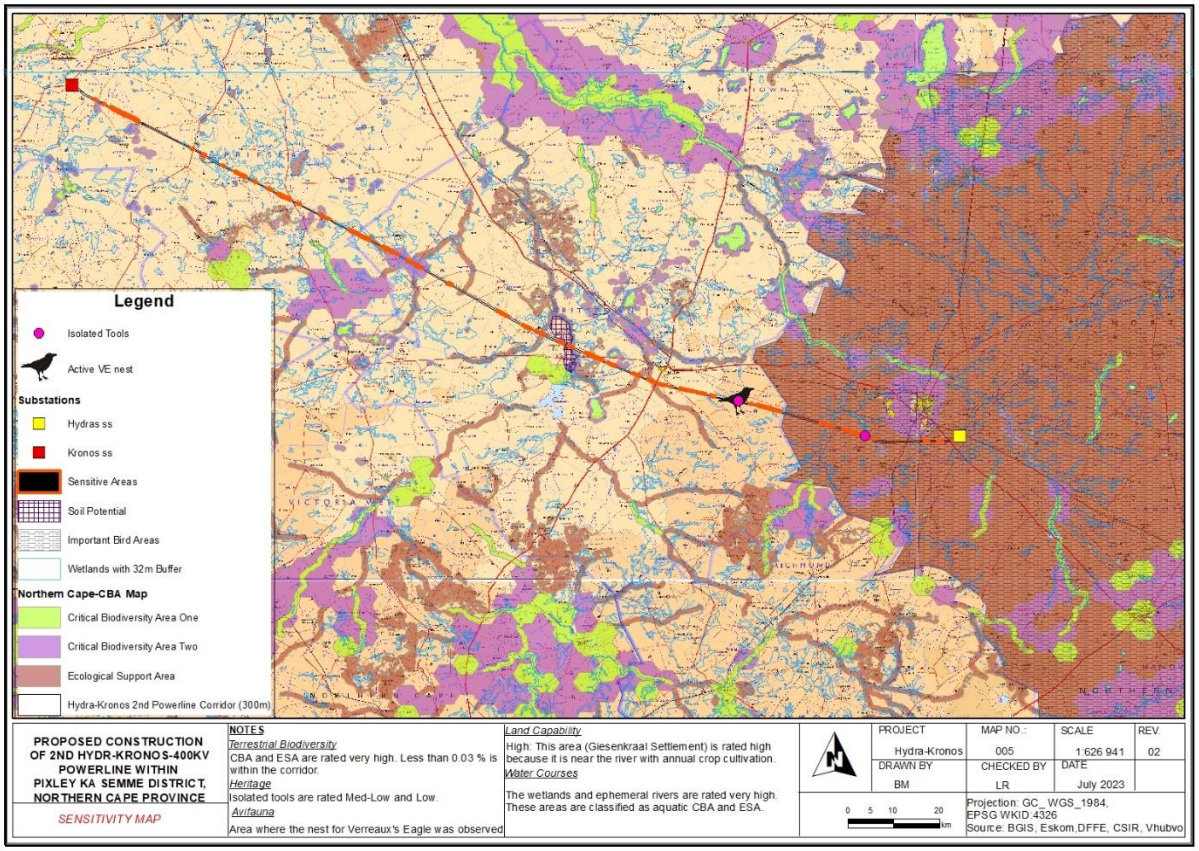


Figure 15-1: Sensitivity Map

16 THE PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

This section of the report details the information required as per Section 3(1)(q) of Appendix 1 of Environmental Impact Assessment (EIA) Regulations, Government Notice R982 of 2014 (as amended).

(q) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised

The Environmental Authorisation will be required for ten (10) years. The project requires additional permits/Licences such as Water use Licence (General Authorisation) and Tree removal permits, and these can take approximately 4 months to obtain.

17 AN UNDERTAKING UNDER OATH OR AFFIRMATION BY THE EAP IN RELATION TO

I Brenda Makanza, declare that:

- The information provided in this Draft Basic Assessment Report is correct.
- I have included the comments and inputs from stakeholders and I&APs;
- I have included the inputs and recommendations from the specialist reports where relevant; and
- I have provided information to interested and affected parties for review and comment. Comments or input from the Interested and Affected Parties have been responded to and also included in this report.

_____

Brenda Makanza

28 September 2023

_____

Date

18 ANY SPECIFIC INFORMATION THAT MAY BE REQUIRED BY THE COMPETENT AUTHORITY

The EAP is not aware of any specific information that may be required by the Competent Authority.

19 ANY OTHER MATTERS REQUIRED IN TERMS OF SECTION 24 (4) (A) AND (B) OF THE ACT

None.

20 CONCLUSION

The independent EAP has undertaken the Basic Assessment process for the proposed project as per the legislation. The project poses positive and negative impacts on the environment. Specialist reports were prepared and recommendation for mitigation of the impacts have been provided. The Public Participation Process was done in accordance with Chapter 6 of the EIA Regulations and comments and input received have been addressed and incorporated in this report. Based on the outcome of the specialist work done, engagement with the I&APs, authorities and landowners, the EAP recommends that the project be approved provided that the mitigation measures outlined in this report and the EMPr are implemented.

21 REFERENCES

AfroConserva Integration. (2023). *Social Impact Assessment EIA Specialist Report for The Proposed Construction of Hydra-Kronos 2nd 400kv Power Line and Associated Infrastructure Within Pixley Ka Seme District Municipality, Northern Cape Province. .*

Bamford, P. M. (2023). *Desktop Report (Phase 1) Palaeontological Impact Assessment for the proposed construction of Kronos-Hydra second 400kV powerline and associated infrastructure, Pixley ka Seme District Municipality, Northern Cape Province. .*

BioAssets: Biological Assessments. (2023). *General Animal Assessment: Conducting a corridor assessment for the animals for the Hydra-Kronos 2nd 400 kV power line. .*

David Hoare Consulting (Pty) Ltd. (2023). *Terrestrial Plant Species Assessment Report for the proposed Kronos – Hydra 2nd 400kV Line between De Aar and Copperton in the Northern Cape Province.*

DEA. (2017). *Guideline on Need and Desirability.* Pretoria: Department of Environmental Affairs.

Department of Environment, Forestry and Fisheries. (2019). *Strategic Environmental Assessment for the Expansion of Electricity Grid Infrastructure Corridors in South Africa. CSIR Report Number: CSIR/SPLA/EMS/ER/2019/0076/B. ISBN Number: ISBN 978-0-7988-5648.* Department of Environment, Forestry and Fisheries.

DTP Ditsamai Investments and Projects. (2022). *Review of the District Spatial Development Framework.* Pixley ka Seme District Municipality.

Eskom. (2020). *Transmission Development Plan (2020-2029).*

Eskom Transmission. (2004). *Transmission line towers and line construction. Eskom Transmission.* Eskom Transmission.

Feathers Environmental Services. (2023). *Hydra-Kronos 2nd 400kV Power Line: Specialist Impact Assessment (Avifauna). .*

Kareeberg LM. (2023). *Kareeberg Local Municipality Final Integrated Development Plan 2022-2027.* Kareeberg LM.

Nyamoki Consulting Pty Ltd. (2023). *Soil and land capability assessment for the proposed Hydra – Kronos 2nd 400 kV line in the Northern Cape Province.*

SANBI. (2023, May 3). *Northern Cape Department of Environment and Nature Conservation. 2016 Northern Cape Critical Biodiversity Areas Reason [Vector] 2016. .* Retrieved from Biodiversity GIS : http://bgis.sanbi.org/SpatialDataset/Detail/675

Skowno, A. P.-A. (2019). *National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report.* Pretoria: South African National Biodiversity Institute, an entity of the Department of Environment, Forestry and Fisheries .

The Biodiversity Company. (2023). *Riverine Baseline Study & Risk Assessment for the Proposed Construction of the Proposed Hydra – Kronos 2nd 400 kV Line.*

Vhubvo Consultancy cc. (2023). *Phase I Archaeological and Cultural Heritage Impact Assessment Specialist Report for the Proposed Construction of Hydra-Kronos 400kv Power Line and associated infrastructure within Pixley Ka Seme District Municipality of Northern Cape Province.*