PROPOSED DEVELOPMENT OF A 132KV POWERLINE FROM MELKSPRUIT SUBSTATION, EASTERN CAPE PROVINCE TO ROUXVILLE SUBSTATION, FREE STATE PROVINCE

DRAFT BASIC ASSESSMENT REPORT

14/12/16/3/3/1/1847

CONSULTANTS

NSVT

ENVIRONMENTAL & SOCIAL SCIENTISTS

NOVEMBER 2017

DRAFT BASIC ASSESSMENT REPORT

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

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CONSULTANTS NSVT ENVIRONMENTAL & SOCIAL SCIENTISTS	Eskom

PROJECT INFORMATION

REPORT TITLE: BAR
REPORT STATUS: Draft
PURPOSE OF REPORT: The purpose of this BAR is to present the proposed development and the need for the development; provide details of the Environmental Assessment Practitioner ("EAP") appointed to undertake the Basic Assessment ("BA") process; provide an overview of the public participation process; and to set out the environmental outcomes, impacts and residual risks of the proposed development.
PROJECT TITLE: Proposed development of a 132 kV powerline from Melkspruit Substation in the Eastern Cape Province to Rouxville Substation in the Free State Province.
CLIENT: Eskom Free State Operating Unit
ENVIRONMENTAL CONSULTANTS: NSVT Consultants

REPORT COMPILATION RESPONSIBILITIES

REPORT COMPILED BY:

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Lorato Tigedi *Pr. Sci. Nat.* (400161/09)
South African Council for Natural Scientific Professions
Environmental Assessment Practitioner

EXECUTIVE SUMMARY

NSVT Consultants has been appointed by Eskom Free State Operating Unit as the independent EAP to undertake the BA process for the proposed 132kV overhead powerline between Melkspruit Substation in Aliwal North, Eastern Cape Province and Rouxville Substation, Free State Province. This powerline will be developed as a replacement of the existing 66kV line currently extending between the two aforementioned substations. Eskom FSOU proposed this development to compensate for future electricity needs as a result of population growth, which the existing 66kV powerline will eventually not be able to cater for. A basic assessment process that was udertaken to identifty environmental impacts that the proposed development would have on the receiving environment and its surroundings. For the BA process, two route alterntives were identified, but they have a high level of similarity as the route is between Aliwal North and Rouxville. Therefore the environmental settings do not differ much, i.e. there routes crosses farming lands, watercourses, N6 road, provincial roads and other infrastructure within the area. Public participation process was undertaken in line with the EIA regulations, to inform the identified stakeholders, i.e. Sanral, Transnet, Telkom, Free State Roads, Department of Water and Sanitation, Department of Agriculture, SAHRA, Local Authorities and I&APs, i.e. landowners, ward coucillors, Area 13 residents; about the proposed project. The issues and concerns raised were responded to and considered during the process, hence section of Route Alternative 1 had to be realigned for the application process. To identify environmental impacts associated with the proposed powerline, site visit was undertaken, desktop study/literature review, involvement of specialists, i.e. Palaeontologist, Archaeologist, Ecologist, Avifauna Specialist, Aquatic Specialist, Floodline Determination and Visual Specialists thereafter mitigation measures and management actions were outlined for the identified environmental impact. The impacts were assessed using the Signficance Assessment Methodology, whereby the significance of the impacts were assessed without and with adoption of the mitigation and management measures, and it was based on the nature of the impact, extent and duration, reversibility, probability, magnitude and whether it is cumulative and whether there were any residual risks. The identified impacts will be reduced greatly with implementation of the outline mitigation measures and there will be no residual impacts. Given the above information, the EAP hereby recommends that the provided recommenddations, condition and mitigation measures outlined in the EIAR and EMPr are adhered to and it is expected that DEA have been provided with adequate information to enable them to make an informed decision regarding the proposed powerline.

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ABBREVIATIONS

AIA	Archaeological Impact Assessment
BA	Basic Assessment
BAR	Basic Assessment Report
DEA	Department of Environmental Affairs
DWS	Department of Water and Sanitation
EC	Eastern Cape
EIA	Environmental Impact Assessment
EMPR	Environmental Management Programme
FSOU	Free State Operating Unit
IDP	Integrated Development Plan
I&AP	Interested and Affected Party
LM	Local Municipality
NEMA	National Environmental Management Act of 1998 as amended
SAHRA	South African Heritage Resources Agency

1. INTRODUCTION

1.1. PROJECT BACKGROUND

NSVT Consultants has been appointed by Eskom Free State Operating Unit ("FSOU") as the independent EAP to undertake the BA process for the proposed 132kV overhead powerline between Melkspruit Substation in Aliwal North, Eastern Cape ("EC") Province and Rouxville Substation, Free State ("FS") Province. This powerline will be developed as a replacement of the existing 66kV line currently extending between the two aforementioned substations. Eskom FSOU proposed this development to compensate for future electricity needs as a result of population growth, which the existing 66kV powerline will eventually not be able to cater for. The need for this BAR is in terms of the NEMA (as amended) and the EIA Regulations of 2014 (as amended). The competent authority for the application is the National Department of Environmental Affairs, as the proposed powerline route extends between two provinces, *i.e.* the EC and FS Provinces.

1.2. SCOPE

The main purpose of the BA process is to identify environmental issues surrounding the proposed development and provide management and/or mitigation measures for the identified impacts. Issues were identified through:

- desktop review study;
- review of available literature;
- review of relevant policies and legislation;
- site investigation;
- undertaking a comprehensive public participation process;
- specialists' input; and
- Professional judgement.

1.3. DETAILS OF THE EAP

The details of the EAP are summarized below and the Curriculum Vitae is attached hereto as **Appendix 1**.

<table>
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B. Sc. Hons. (Wildlife)
B. Sc. (Natural Science)</td><td>EXPERIENCE</td><td rowspan="2">14 years working in the environmental management field as an EAP. She has completed Scoping and EIA applications, BA applications, drafting of EMPR document sand environmental compliance monitoring for various developments within the Free State Province., North West, Northern Cape and Eastern Cape Provinces.</td></tr>
<tr><td>TRAINING</td><td>Resources & Sustainability, Physical & Biological Environment and Informatics, 2006
Project Management for Environmental Management, 2006
Social & Economic Sustainability, 2006
Use of Matrices in EIA, 2008
Public Participation Training, 2010
Introduction to Social Impact Assessment, 2011
Integrating HIV/AIDS and Gender related issues into the EIA Process, 2013
Integrated Water Resources Management, Water Use Authorisation and Water Use License Application, 2013
One Environmental System, 2015</td><td>PROFESSIONAL AFFILIATE</td><td>SACNASP Professional Natural Scientist-400161/09
Member of International Association for Public Participation Southern Africa Affiliate - (2010/ZA/FS0001)
Member of International Association for Impact Assessment SA - 2191</td></tr>
</table>

2. SITE LOCATION

The proposed powerline is to be located between Aliwal North within Walter Sisulu Local Municipality ("LM") in the EC Province and Rouxville within Mohokare LM in the FS Province. Since the powerline is a linear development, its location will be compromised of several different localities. Moreover, the starting point of the powerline is at the Melkspruit Substation located 30°42'07.89"S and 26°40'31.81" E, from where the powerline then crosses the Orange River alongside the N6 Road, watercourses, provincial roads, farmland and ends at the Rouxville Substation (30°25'49.91 "S, 26°50'18.40"E). The average length of the route is approximately 37km. Location details of the route alternatives are shown in Table 1 below.

Table 1: Location of the Proposed Powerline Route (From Aliwal North to Rouxville)

ROUTE ALTERNATIVE 1		
FARM NAME	**S21 DIGIT** CODE	**PROVINCE**
Melkspruit 12	C0050000000000120000	EC
Poortje 38	F0290000000000380000	FS
Klein Poortje 1082	F0290000000010820000	FS
Orangia A 1043	F0290000000010430000	FS
Orangia 810	F0290000000008100000	FS
Nuwejaarspruit 1089	F0290000000001080000	FS
The Willows 636	F0290000000000636000	FS
Windpoort 39	F0290000000000039000	FS
Noorwegen 463	F0290000000000463000	FS
Beestekraal 64	F0290000000000064000	FS
Esperance 1018	F0290000000001018000	FS
Steynbergsvlei 863	F0290000000000863000	FS
La Esperance 1024	F0290000000001024000	FS
Botha's kop 528	F0290000000000528000	FS
Kippersol 882	F0290000000000882000	FS
Stoltzkraal 66	F0290000000000066000	FS
Avignon 961	F0290000000000961000	FS
Driekop 94	F0290000000000094000	FS
Gedachtenis 561	F0290000000000561000	FS
Dorpsgronden van Rouxville 108	F0290000000000108000	FS
ROUTE ALTERNATIVE 2		
Melkspruit 12	C00500000000001200000	EC
Poortje 38	F0290000000000380000	FS
Klein Poortje 1082	F0290000000010820000	FS
Waaiplaats 61	F0290000000000610000	FS
Mamre		FS
Digteby		FS
Wanganella 994	F0290000000009940000	FS

The Willows 636	F029000000000636000	FS
Windpoort 39	F029000000000039000	FS
Noorwegen 463	F029000000000463000	FS
Beestekraal 64	F029000000000064000	FS
Esperance 1018	F029000000001018000	FS
Steynbergsvlei 863	F029000000000863000	FS
La Esperance 1024	F029000000001024000	FS
Botha's kop 528	F029000000000528000	FS
Kippersol 882	F029000000000882000	FS
Stoltzkraal 66	F029000000000066000	FS
Avignon 961	F029000000000961000	FS
Driekop 94	F029000000000094000	FS
Gedachtenis 561	F029000000000561000	FS
Dorpsgronden van Rouxville 108	F029000000000108000	FS

The co-ordinates of the route alternatives for every 1km for the proposed powerline are listed in Table 2 below from Melkspruit (South) to Rouxville Substation (North):

Table 2: Coordinates of the Route Alternatives for the Proposed Powerline

FID	**ROUTE ALTERNATIVE 1**		**ROUTE ALTERNATIVE 2**	
	POINTS_X	POINTS_Y	POINTS_X	POINTS-Y
0	26.40'34.392 S	30.42'04.788" E	26.40'34.392 S	30.42'04.788" E
1	26.40'19.236" S	30.41'35.916" E	26.40'19.236" S	30.41'35.916" E
2	26.40'04.98" S	30.41'05.856" E	26.40'04.98" S	30.41'05.856" E
3	26.40'04.008" S	30.40'35.652'' E	26.40'04.008" S	30.40'35.652'' E
4	26.40'33.456" S	30.40'17.904" E	26.40'33.456" S	30.40'17.904" E
5	26.40' 51.672" S	30 39'49.5" E	26.40' 51.672" S	30 39'49.5" E
6	26.41'25.044" S	30.39'36.36" E	26.41'25.044" S	30.39'36.36" E
7	26.42'01.836" S	30.39'30.96" E	26.42'01.836" S	30.39'30.96" E
8	26.42'38.916" S	30.39'26.46" E	26.42'38.916" S	30.39'26.46" E
9	26.43'15.168" S	30.39'18" E	26.43'15.168" S	30.39'18" E
10	26.43'50.736" S	30.39'11.556"E	26.44'50.736" S	30.39'11.556"E
11	26.44'16.224" S	30.38'46.716" E	**26.44'12.732" S**	**30.38'45.594" E**
12	26.44'33.576" S	30.38'17.916" E	**26.44'30.696" S**	**30.38'15.828" E**
13	26.44'50.892" S	30.37'49.08" E	**26.44'47.76" S**	**30.37'47.64" E**
14	26.45'08.244" S	30.37'20.28" E	**26.45'5.292" S**	**30.37'18.3" E**
15	26.45'27" S	30.36'52.74" E	**26.45'23.688" S**	**30.36'48.168" E**
16	26.45' 54.684" S	30.36' 31.824" E	26.45' 54.684" S	30.36' 31.824" E
17	26.46'18.912" S	30.36' 07.02" E	26.46'18.912" S	30.36' 07.02" E
18	26.46' 37.704" S	30.35'39.336" E	26.46' 37.704" S	30.35'39.336" E
19	26. 46' 52.50" S	30.35'09.456" E	26. 46' 52.50" S	30.35'09.456" E
20	26.47' 07.26" S	30. 34'39.612" E	26.47' 07.26" S	30. 34'39.612" E
21	26.47'18.708" S	30. 34' 8.76" E	26.47'18.708" S	30. 34' 8.76" E
22	26.47'26.34" S	30. 33'36.972" E	26.47'26.34" S	30. 33'36.972" E
23	26.47' 33" S	30. 33' 05.004" E	26.47' 33" S	30. 33' 05.004" E
24	26.47'39.66" S	30.32'33.072" E	26.47'39.66" S	30.32'33.072" E

25	26.47'45.456" S	30. 32' 01.032" E	26.47'45.456" S	30. 32' 01.032" E
26	26.47'48.012" S	30. 31' 28.74" "E	26.47'48.012" S	30. 31' 28.74" "E
27	26.47'53.7" S	30. 30' 56.628" E	26.47'53.7" S	30. 30' 56.628" E
28	26.47'58.236" S	30. 30' 24.48" E	26.47'58.236" S	30. 30' 24.48" E
29	26.47' 56. 436" S	30. 29' 52.044" E	26.47' 56. 436" S	30. 29' 52.044" E
30	26.48' 18.576" S	30. 29' 26.376" E	26.48' 18.576" S	30. 29' 26.376" E
31	26. 48' 32.94" S	30. 28' 58.116" E	26. 48' 32.94" S	30. 28' 58.116" E
32	26. 48' 44.784" S	30. 28' 27.912" E	26. 48' 44.784" S	30. 28' 27.912" E
33	26.49' 01.164'' S	30. 27' 58.68" E	26.49' 01.164'' S	30. 27' 58.68" E
34	26.49' 17.508" S	30. 27' 29.484" E	26.49' 17.508" S	30. 27' 29.484" E
35	26.49' 33.888" S	30 27' 00.252" E	26.49' 33.888" S	30 27' 00.252" E
36	26.49'50.595" S	30. 26' 31.2" E	26.49'50.595" S	30. 26' 31.2" E
37	26.50'08.844'' S	30. 26'10.968'' E	26.50'08.844'' S	30. 26'10.968'' E
38	26.50'17.4" S	30.25' 50.484" E	26.50'17.4" S	30.25' 50.484" E

The section highlighted in green shows where the route alternative 2 deviates from route alternative 1, whereby route alternative 1 crosses over the N6 then runs along the N6 road on the eastern side whereas route alternative 2 runs on the western side until it crosses over the N6 road at The Willow Farm to join route alternative 1.

There are no coordinates for the poles/towers as the exact spanning will be done on approval of the suitable powerline route.

2.1. DESCRIPTION OF THE CORRIDOR FOR THE POWERLINE ROUTE

The proposed route starts from Melkspruit Substation in a southerly direction along the existing 66kV powerline. It then extends between the Orange River and Area 13, Dukathole and thereafter crosses over the Orange River in a north to north easterly direction towards the Rouxville Substation. It extends on the eastern side of the N6 Road and at some sections crosses over provincial roads, farming and grazing lands, hills/ridges, watercourses, railway line and telecommunication and powerlines. A 1k m corridor has been assessed on the proposed route alternative although only 31km servitude is required for the proposed powerline.

The locality map of the proposed route alternatives is attached hereto as **Appendix 2**.

3. DESCRIPTION OF THE PROJECT

3.1. LISTED ACTIVITIES TRIGGERED BY THE PROPOSED DEVELOPMENT

Listed activities which are triggered by the proposed development and description of the activities to be undertaken are tabulated in *Table 3* below.

Table 3: Activities triggered by the Proposed Development

LISTED ACTIVITY	DESCRIPTION OF ACTIVITY
Activity 11 of LN1- "*The development of infrastructure for transmission and distribution of electricity outside urban areas with a capacity of more than 33 but less than 275Kv*".	The proposed development entails establishing a new 132kV powerline for transmission and distribution of electricity between the Melkspruit Substation and Rouxville Substation.
Activity 12 of LN1-"*The development of* *(ii) infrastructure or structures with a physical footprint of 100 square metres or more;* *where such development occurs –* *(a) within a watercourse;* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse*".	The proposed development of the 132kv powerline, whereby the cumulative physical footprint of the powerline towers within a watercourse or within 32m is 100m^2 or more.
Activity 19 of LN1-"*The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand or rocks of more than 10 cubic metres from a watercourse*".	The proposed development entails the infilling, excavation, removal of soil or/and sand amounting to more than 10m^3 within watercourses.

The existing 66kV powerline will also be decommissioned. However, Activity 31 of LN 1 is not triggered as per the response received from the Enquiry Desk of the Department of Environmental Affairs on 26 July 2017. The communication is attached hereto as **Appendix 3**.

3.1.1. FULL SCOPE OF WORK FOR THE PROPOSED DEVELOPMENT

3.1.1.1. Proposed Associated Infrastructure

The powerline development will entail erection of new steel monopole structures with a T-bar tower. These are used because they are safer and longer lasting structures than the wooden structures used for the existing line. The powerline will have an approximately 31m wide servitude, *i.e*. approximately 15.5m on either side of the centre line. The preliminary tower design is attached hereto as **Appendix 4**.

3.1.1.2. Proposed Activities for the Project

The steps to be undertaken for the placing of actual infrastructure on the proposed route are as follows:

Step 1: Walk over survey of the development area
Step 2: Negotiation with landowners

Step 3: Deciding on the design and siting of the towers based on the geotechnical, topographical and potential environmental impacts of the development.
Step 4: Clearing of vegetation
Step 5: Construction of access roads, if required
Step 6: Assemblage and erection of the onsite infrastructure
Step 7: Stringing of the conductors
Step 8: Rehabilitation of protected/disturbed areas or sensitive eroded areas
Step 9: Maintenance of the infrastructure

4. POLICY AND LEGISLATIVE CONTEXT OF THE PROPOSED DEVELOPMENT

A description of the relevant policy and legislative context within which the development is proposed, including identified legislation, policies and guidelines applicable to this activity and those that have been considered in the preparation of this report and how the proposed development complies with and responds to them is tabulated in

Table *4:* below.

Table 4: List of Policy and Legislative Context for the Proposed Development

LEGISLATION AND GUIDELINES			
LEGISLATION	**AUTHORITY**	**APPLICABLE REQUIREMENT**	**HOW LEGISLATION AND GUIDELINE WERE CONSIDERED**
The Constitution of the Republic of South Africa Act (Act 108 of 1996)	Republic of South Africa	Section 24: It states that everyone has a right to an environment that is not harmful or detrimental to their health and which is sustainable for future generations	Any pollution that could occur as a result of the proposed development will be avoided or measures will be in place to minimize it to a greater extent, to ensure that the environment is protected for the benefit of the present and future generations.
National Environmental Management Act (Act 107 of 1998)	Department of Environmental Affairs	Section 24:-Environmental Authorisation The potential impact on the environment associated with the proposed development should be identified, assessed and the findings reported to the competent authority so that a decision can be taken regarding the proposed development.	The potential consequences for or impacts on the environment must be considered, investigated, assessed and reported to the competent authority, *i.e*. the National Department of Environmental Affairs.
National Environmental Management Act	Department of Environmental Affairs	Section 28-Duty of Care and remediation of environmental damage It indicates that every person who	Eskom will ensure that reasonable measures are undertaken for throughout the life cycle of this project to ensure that

(Act 107 of 1998)		causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring	any pollution or degradation of the environment associated with the project is avoided, stopped or minimized.
National Environmental Management Act (Act 107 of 1998)	Department of Environmental Affairs	Section 30-Control of Emergency Incidents	Should there be any unexpected sudden occurrence including fire leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate of delayed, Eskom will take all reasonable measures to contain and minimise the effects of the incident to the health, safety and property of persons; undertake clean-up procedures; remedy the effects of the incident and assess the immediate and long-term effects of the incident or the environment and public health.
EIA Regulations, 2014 (as amended)	Department of Environmental Affairs	Chapter 5-Promulgation of the EIA Regulations whereby listed activities which cannot commence without an environmental authorisation are identified within the EIA regulations.	A BA process that meets the requirements of Appendix 1 of GN R982 of the EIA Regulations, 2014 (as amended).is underway for the proposed development to be granted an Environmental Authorisation.
National Environmental Management: Biodiversity Act (Act 10 of 2004)	Department of Environmental Affairs	Section 52-Provides a national list of ecosystems that are threatened and in need of protection. Section 56-Provides a list of species that are threatened or in need of national protection. Section 69-Duty of care relating to alien	An ecological impact assessment was undertaken as part of the BA process to ensure that no critically endangered, endangered, vulnerable and protected ecosystems and/or species will be disturbed or affected by the proposed development.

		species Section 73-Duty of care relating to alien invasive species. Section 75-Control and Eradication of Listed Invasive Species	During operation, control and eradication of listed invasive species will be carried by methods that are appropriate for the species concerned and the environment in which it occurs. Only authorised persons should undertake restricted activities involving listed invasive species during operation of the powerline.
National Environmental Management: Air Quality Act 39 of 2004)	Department of Environmental Affairs	Section 32-Control of Dust to ensure steps are taken to prevent nuisance from dust or measures aimed at the control of dust are in place	It's addressed in the mitigation measures outlined and EMPR attached hereto as **Appendix 10**, dust suppression measures to be undertaken during the construction phase have been outlined.
National Environmental Management: Waste Act, 2008 (Act 59 of 2008)	Department of Environmental Affairs	Section 16-General Duty in respect of Waste Management to ensure measures for handling and disposing waste are in place.	In the EMPR attached hereto as **Appendix 10**, measures to ensure waste generated during construction is disposed in an environmentally sound manner have been outlined.
Environmental Conservation Act (Act 73 of 1980)	Department of Environmental Affairs	Section 25-Regulations regarding noise, vibration and shock during construction phase.	This is addressed in the mitigation measures outlined and the EMPR, attached hereto as **Appendix 10**, noise control measures that took into account sensitive noise receptors within the development area have been outlined.
National Water Act (Act 36 of 1998)	Department of Water and Sanitation	Section 21-States that a water use license should be obtained for water uses which are triggered by the proposed development.	Draft BAR including Aquatic impact study and Wetland delineation report has been sent to DWS-Orange Management Area for comment and an application for General Authorisation will be submitted.
National Heritage Resources Act (Act	South African Heritage	Section 38(1)-States that any person who intends to undertake a development	Draft BA Report including Heritage Impact Study Reports has been sent to SAHRA,

No 25 of 1999, Section 34 (1)	Resource Agency ("SAHRA")	exceeding 300m in length should undertake a heritage specialist study.	Heritage Resources Agency in the Eastern Cape and Free State for comments.
MUNICIPAL BY-LAWS			
Some activities are subject to the requirements of municipal by-laws and special conditions, e.g. noise control, waste removal, etc. which should be adhered to.			Mohokare LM and Walter Sisulu Local Municipalities by-laws will be adhered to.
GUIDELINES			
Public Participation Guideline in terms of National Environmental Management Act, 199 Environmental Impact Assessment Regulations, 2017	Department of Environmental Affairs	It provided guideline for public participation process that was undertaken as part of the BA process to ensure that the stakeholders and identified Interested and Affected Parties ("I&APs") were provided with an opportunity to participate during the process.	

5. NEED AND MOTIVATION FOR THE PROPOSED DEVELOPMENT

5.1. MOTIVATION FOR THE NEED AND DESIRABILITY FOR THE DEVELOPMENT OF THE POWERLINE

Eskom FSOU is responsible for its own planning, operation and maintenance of electricity infrastructure required to ensure reliable electricity supply. However, during planning, they have to consider the population growth of the areas in which they provide service. Currently, Eskom FSOU is experiencing the following difficulties with the existing 66kV during maintenance

1. Powerline has wooden poles, which are now old and deteriorated. Some poles are cracked, rotten or broken and therefore susceptible to burning as the area is prone to veldfires.
2. Some poles are located in wetlands thus have accessibility issues during repairs.
3. Most are located on rugged terrain, i.e. ridges/koppies as a result it is difficult for technical operators access it during power outages.

Given the aforementioned, Eskom FSOU identified a need to replace it with a line which will be able to withstand all weather conditions and that can be accessed easily using the existing farms roads. The existing line will not be able to provide sufficient electricity to meet the future demand caused by the growing population in and between Rouxville, Free State Province and Aliwal North, Eastern Cape Province. Therefore, the newly developed powerline will allow for an improvement in the future electrification in the areas. Once the new powerline is operational, the existing line will be decommissioned. Due to Area 13 having encroached onto the existing powerline, it is only in the best interest of the community to decommission the existing line.

Although other stakeholders weren't contacted during the planning of the project, their input will be obtained during the public participation process thus ensuring their future plans won't be affected by or will be aligned with the proposed development. The urban edge of both Rouxville and Aliwal North won't be compromised by the development. The overall benefit is to ensure that there will be an undisturbed supply of electricity in the future, as currently there is adequate supply.

5.2. MOTIVATION FOR THE PREFFERED ROUTE AND TECHNOLOGY TO BE USED

The reasons for the proposed powerline routes are determined by the area to be serviced, sensitivity of the area, land use, e.g. nature of the agricultural activities that currently exist, accessibility and ability to withstand the weather conditions. The proposed powerline will benefit the Rouxville and Aliwal North area, hence the proposed powerline route is from that area and it will replace the existing powerline, hence there are overlapping sections between the existing line and the new line corridor. The preferred route was selected in line with recommendations from the specialists' studies and input from I&APs. It will allow

Eskom to have easier accessibility during both construction and maintenance of the new powerline. As indicated, the infrastructure will make use of new steel monopoles because steel monopole structures are able to withstand all weather conditions, thus are longer-lasting than the previous wooden infrastructure.

6. DESCRIPTION OF THE PROCESSES FOLLOWED FOR THE PROPOSED PREFERRED ALTERNATIVE

6.1. DETAILS OF ALL THE ALTERNATIVES CONSIDERED

As previously mentioned, the proposed project entails constructing a 132kV powerline from the existing Melkspruit Substation in Aliwal North to the existing Rouxville Substation in Rouxville. A total of three alternatives have been proposed and assessed as part of this application, *i.e*. two route alternatives and a 'no-go' alternative.

6.1.1. DETAILS OF ROUTE ALTERNATIVES

The starting point for the two alternatives is at Melkspruit Substation, from which the powerline extends to Rouxville Substation. After the route crosses the Orange river at 30°40'14.83"S and 26°40'41.51"E, the first deviation is at 30°39'50.81"S and 26°40'450197"Ewhereby the Alternative 1 route extends alongside the P31/2 Provincial Road toward the N6 Road and the Alternative 2 route crosses farmlands (Poortjie farm) and extends along the base of a ridge. These routes meet up at 30°39'21.66" S and 26°42'59.82"E, and then once again deviate from each other at approximately 30°38'57.07" S and 26°44'05.72"E, where Alternative 1 crosses over the N6 Road immediately after Die Nes B&B the one extends on the eastern and Alternative 2 on the western side of the N6 Road. The routes meet up at approximately 30°36'47.80" S and 26°45'39.01"Eafter Alternative 2 has crossed over the N6 Road. Thereafter both routes extend on the eastern side of the N6 Road along the existing powerline route until the proposed route deviates from the existing powerline at 30°33'56.16"S and 26°47'22.50"E. The proposed route then joins the existing powerline at 30°42'11.44"S and 26°48'32.09"E. Both Route Alternatives cross waterbodies and courses including the Orange River, Provincial roads, N6 Road, cultivated lands, farming/grazing lands, ridges/hills, dongas, Telkom lines and railway lines.

For a detailed description of the route alternatives considered for the proposed development, refer to Table 5 below.

Table 5: Detailed description of the Route Alternatives

Route Alternative 1 Description
The route starts at the Melkspruit substation in Aliwal North in the Eastern Cape Province, it then extends NNW toward the Orange River and it turns around the ridge in the NNE direction between the Orange River on the west and Area 13, Dukathole on the east side until it crosses the Orange River. Thereafter the route starts in the Mohokare Local Municipality in the Free State Province, it crosses the P38/1 Road and extends in SE direction then turns in the NE crossing Annex Uitspanning 1044 farm towards the N6

Road. It extends alongside the N6 Road on the western side until it crosses over at Orangia 810, immediately after Die Nes Bed and Breakfast to the eastern side of the N6 Road. It then extends in a northerly direction along Nuwejaarspruit crossing over watercourses, dongas, and ridges/hills, grazing lands until it joins with the existing and Route Alternative 2 at The Willow 636 farm. Thereafter it follows the same route as the existing powerline over numerous farms and provincial routes until it deviates from the existing line in Beestekraal 463, alongside the N6 Road to bypass the ridge on the western side at Kippersol. Thereafter it turns in a NE direction towards the existing line. The route extends in a NNE direction crossing over cultivated lands until it ends at the substation in Rouxville.
Route Alternative 2
The route starts at the substation in Melkspruit, Aliwal North in the Eastern Cape Province, it then extends NNW toward the Orange River and it turns around the ridge in the NNE direction between the Orange River on the west and Area 13, Dukathole on the east side until it crosses the Orange River. The powerline route then continues in the Mohokare Local Municipality in the Free State Province, it crosses P38/1 Road and extends in a NE direction until it turns in a NE direction along the base of a ridge to go and join with Alternative 1 at Orangia 810.Thereafter it extends parallel to the N6 Road on the western side over dongas, railway lines, Telkom lines and provincial roads until it crosses the N6 Road at The Willow 636 farm. Thereafter it follows the same route as Alternative 1 until it ends at the substation in Rouxville.

Photographs below indicate the proposed routes.

Photo 1*: Proposed route along the ridge next to the existing 66kV Powerline*

Photo 2: *Location of the Orange River in relation to the existing 66kV Powerline*

Photo 3: *View of the existing power-lines in the vicinity of Area 13, Dukathole*

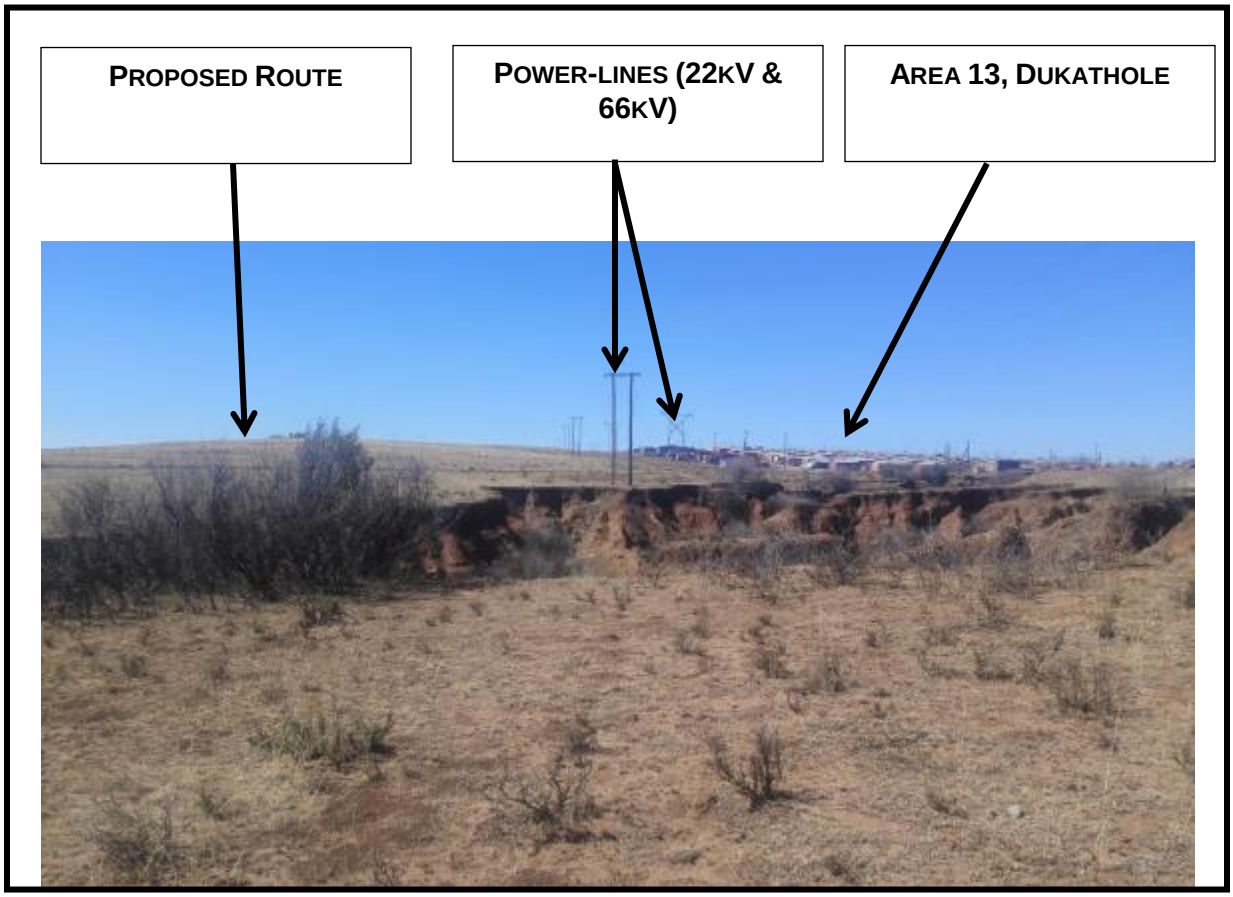

Photo 4: *Land uses in the vicinity of the Proposed Route*

Photo 5: *Proposed crossing over the Orange River to the left of the existing 66kV*

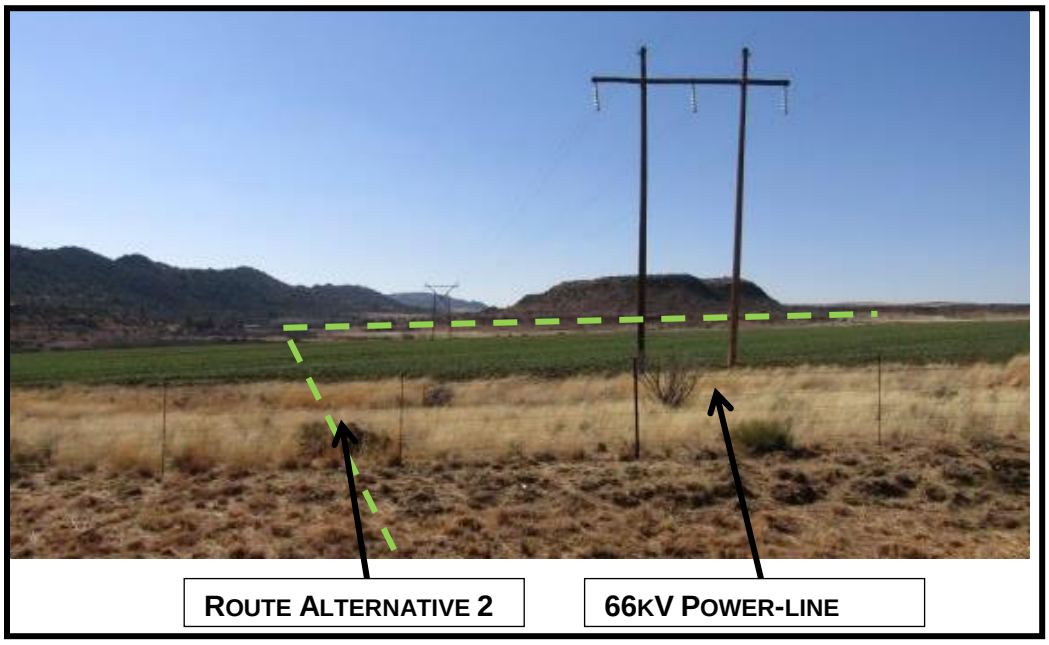

Photo 6: *North-eastern view of the Route Alternative 2 (left of the existing line)*

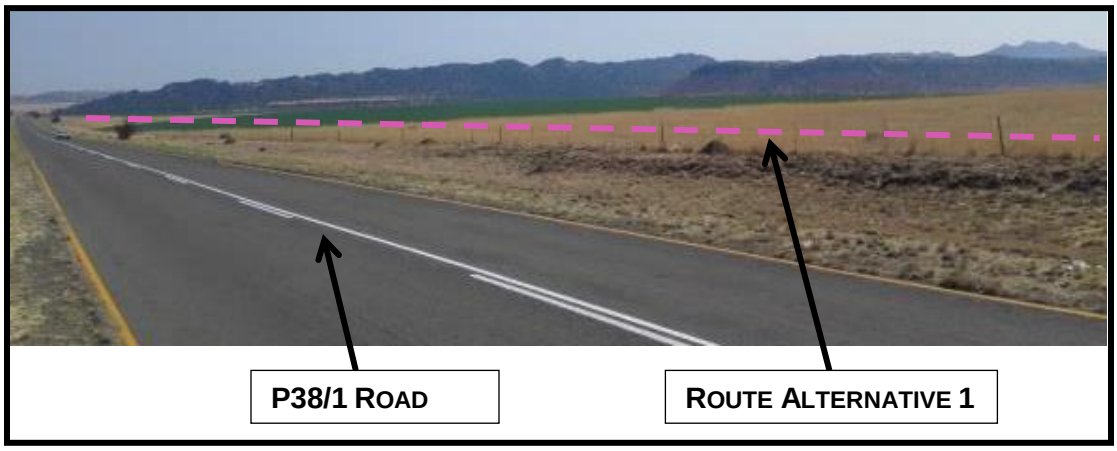

Photo 7: *Alternative 1 Route alongside P38/1 Road*

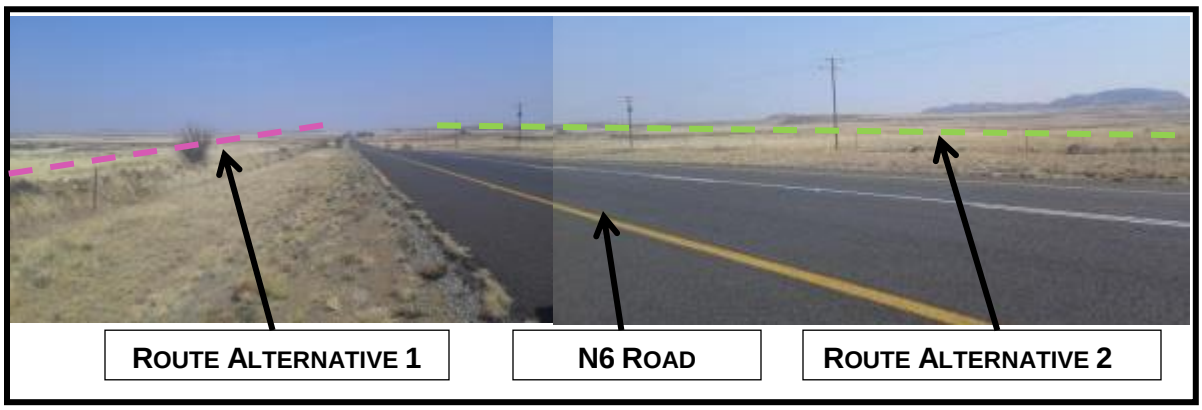

Photo 8: *Proposed Route Alternatives in relation to the N6 Road*

Photo 9*: Southern view of the Proposed Powerline along the 66kV Line across cultivated lands*

Photo 10*: View of the Powerline Route from Rouxville Substation*

Alternative 1, 2 and the existing powerline are depicted in *Figure 1* below with Alternative 1 being the purple-pinkish line, Alternative 2 is in green and the existing powerline is in red. Locality Map indicating the proposed route alternatives is attached hereto as **Appendix 5**.

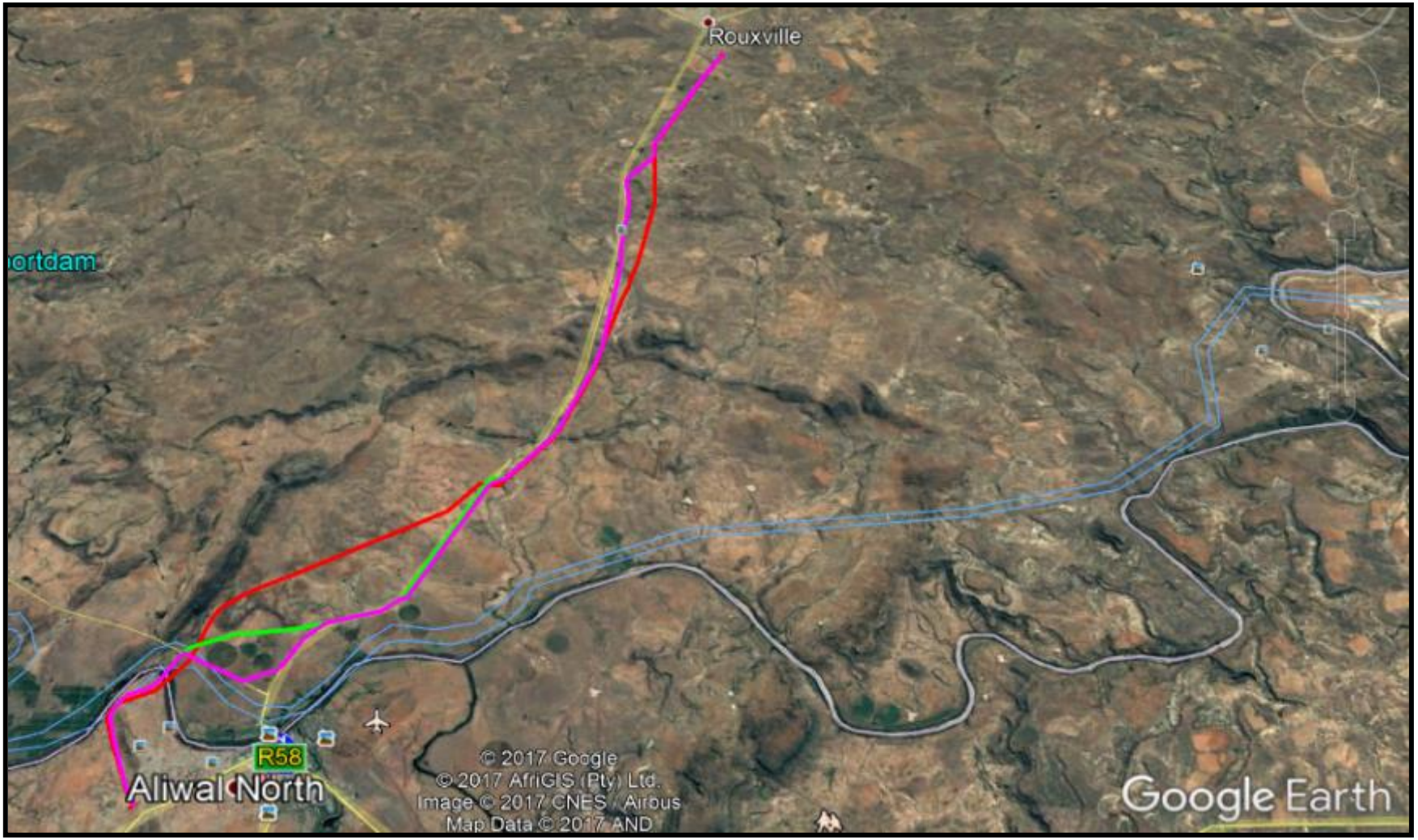

***Figure 1**:* Route Alternatives for the Proposed Powerline

6.1.2. NO GO ALTERNATIVE

No-go alternative is considered not feasible, as the existing powerline is posing serious danger to the residents along the powerline route. The line extends alongside people's yards and there is illegal dumping taking place under the overhead powerline with the community burning refuse there as well, see Photo 11 and 12 below. However, it should be noted that the residential development encroached onto the powerline; hence Eskom identified the need to relocate it. The conditions of the existing line are also poor therefore needs to be replaced and if the proposed development is not considered, then electrification in future will be a serious challenge, as electricity supply won't be able to meet with the demand.

Photo 11: Location of Existing 66kV and 22kV in relation to Area 13, Dukathole

Photo 12: Burning of domestic waste under the 66kV overhead powerline

6.2. DETAILS OF THE PUBLIC PARTICIPATION PROCESS

A comprehensive public participation process was conducted in terms of the EIA Regulations, 2014 (as amended) and the Public Participation Guidelines, 2017 were taken in to account to ensure that all I&APs were informed of the proposed development and to ensure that everyone had the opportunity to raise their concerns and/or comments that will influence the decision making process. The identified I&APs include local authorities, neighbouring residents, parastatals, the different organs of state whom are deemed relevant to the decision making process.

The methods that were undertaken to bring the proposed development to the attention of the identified I&APs are tabulated in Table 6 shown below:

Table 6: Methods undertaken during Public Participation Process

METHODS PER EIA REGULATIONS AND GUIDELINE	METHODS ADOPTED
Fixing a notice board at a place conspicuous to the public at the boundary or on the fence of the site where the activity to which the application.	On-site notice was placed at the Melkspruit Substation and Rouxville Substation. Posters were placed at the municipal offices and libraries in Aliwal North and Rouxville.
Giving written notice to- (i) The owner or person in control of the land if the applicant is not the owner or person in control of the land; (ii) The occupiers of the site where the activity is to be undertaken; (iii) Owners and occupiers of the land adjacent to the site where the activity is to be undertaken; (iv) The municipal councillor of the ward in which the site is situated; (v) The municipality which has jurisdiction in respect of any aspect of activity; and (vi) Any other party as required by the competent authority.	Background information document was hand delivered and/or emailed to identified Interested and Affected Parties, including organs of state, Parastatals and ward councillor of Ward 6.
Placing an advertisement in one local newspaper	Advertisement was placed in the local newspapers, Aliwal Weekly and The Weekly for Rouxville.
Use reasonable alternative Methods	Meeting was held on-site with the officials of Walter Sisulu LM. Public Meeting was held with the Area 13 residents organized through the ward councillor and

	Public Participation Officer of Walter Sisulu LM. Meeting was held with the Mohokare LM officials. Separate meetings were held with the Free State Department of Roads and Telkom. An Information Sharing Session was held with the Rouxville Farmers' Union. One-on-One meetings were held with the landowners.

Public participation Report containing more details of the methods undertaken, issues raised and responses and I&APs database that was maintained throughout the BA process is attached hereto as **Appendix 6**.

6.3. BROAD DESCRIPTION OF THE BIOPHYSICAL ENVIRONMENT

A comprehensive survey of the proposed area and its surroundings was carried out to determine the environmental baseline data and the findings are detailed below.

6.3.1. CLIMATE

Rouxville normally receives about 466mm of rain per year, with most rainfall occurring mainly during summer. The chart below (lower left) shows the average rainfall values for Rouxville per month. It receives the lowest rainfall (5mm) in July and the highest (78mm) in March. The monthly distribution of average daily maximum temperatures (centre chart below) shows that the average midday temperatures for Rouxville range from 14.8°C in June to 28.6°C in January. The region is the coldest during July when the temperature drops to -0.6°C on average during the night.
(http://www.saexplorer.co.za/south-africa/climate/rouxville_climate.asp)

Aliwal North normally receives about 418mm of rain per year, with most rainfall occurring mainly during summer. The chart below (lower left) shows the average rainfall values for Aliwal North per month. It receives the lowest rainfall (5mm) in July and the highest (71mm) in March. The monthly distribution of average daily maximum temperatures (centre chart below) shows that the average midday temperatures for Aliwal North range from 15.6°C in June to 29.7°C in January. The region is the coldest during July when the temperature drops to -0.1°C on average during the night. (http://www.saexplorer.co.za/south-africa/climate/aliwal_north_climate.asp).

Source accessed date 04th of October 2017

6.3.2. TOPOGRAPHY

The broad terrain morphology of the study area is described as slightly irregular undulating plains and hills to the north and lowlands with hills to the south. There is a distinct escarpment separating the northern and southern sections of the study area, with Aliwal North and the Melkspruit Substation located within the lowlands section at approximately 1400m above sea level. The Rouxville Substation is located at 1547m, an almost 150m difference in elevation.

6.3.3. GEOLOGY AND SOILS

6.3.3.1. Regional Geology of Aliwal North

The regional geology of the Aliwal North area is indicated in *Figure 2* below (3026 Aliwal North - 1:250 000 Geological Series). The proposed area is geologically situated on Alluvium, which is underlain by the Tarkastad Subgroup, of the Beaufort Group of the Karoo Sequence. The Tarkastad Subgroup consists of the Burgersdorp and Katberg formations.

The alluvium generally consists of an unconsolidated layer of fine sand, silt, clay and course gravel and is found in all streambeds. Along the Orange River and the tributaries alluvium can be found up to 60m above the current stream level.

Generally, the Tarkastad subgroup consists of alternating layers of:

- Yellow or khaki feldspathic sandstone with a fine to medium grained texture.
- Red, purple, blue or green mudstone.

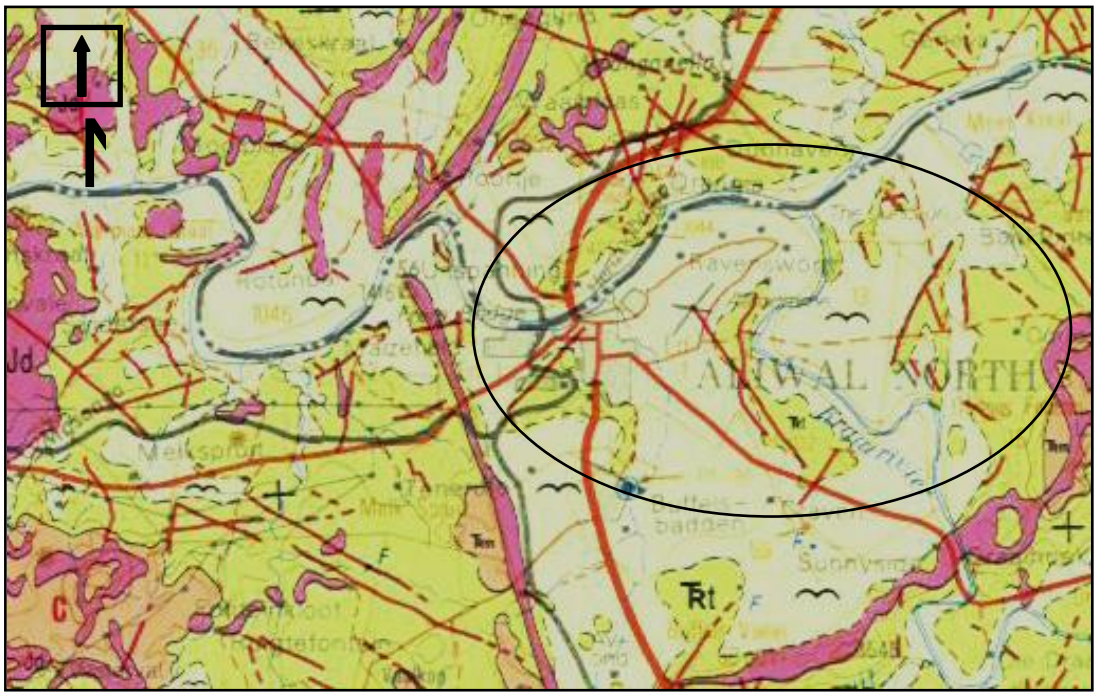

***Figure 2**: Geological Map of Aliwal North Area*

6.3.3.2. Regional Geology of Rouxville

The regional geology of the Rouxville area is indicated in *Figure 3* below (3026 Aliwal North - 1:250 000 Geological Series). From the Geological map it is evident that the project area is underlain by the following geological structures:

- Fine grained sand stone; red mudstone and clay pellet conglomerates form the Tarkastad Subgroup of the Beaufort Super Group.
- Dolerite intrusions in the form of dykes and sills
- Alluvium deposits are visible in the lower laying stream areas.

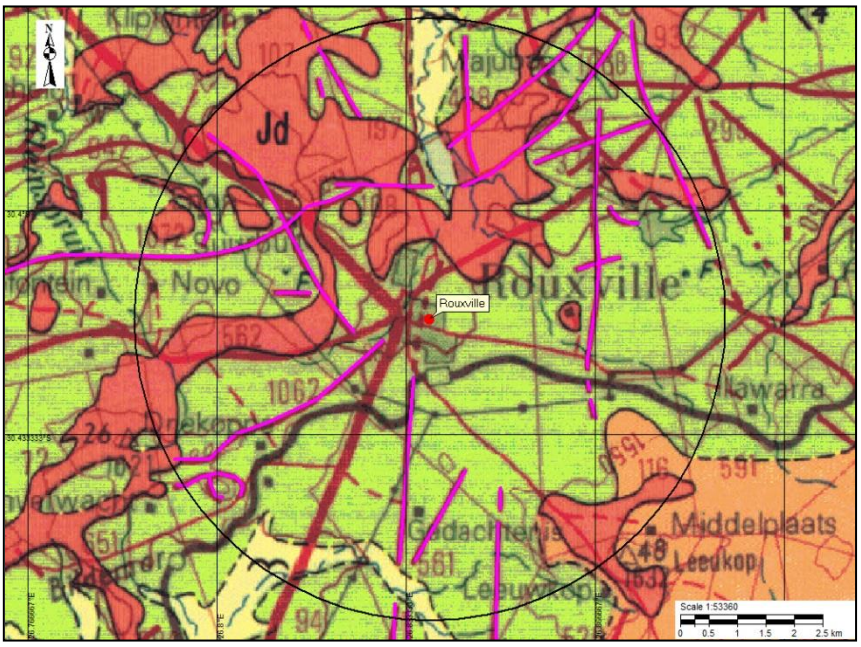

***Figure 3**: Geological Map of Rouxville Area*

6.3.4. GROUND AND SURFACE WATER

During the site survey, a few windmills were identified in the vicinity of Route Alternative 1 and 2. However, no geohydrological investigation was undertaken, as the proposed development is not expected to have any adverse effects on the groundwater resource or any groundwater users in the vicinity. There are a number of perennial rivers within the study area. The survey area falls within the Orange River (D) Primary Catchment and D1 Secondary Catchment. The largest is the Orange River, followed by the Kraai River, Nuwejaarspruit and Beeskraalspruit. The proposed alignments will cross these rivers and other non-perennial streams a number of times. Other hydrological features include man-made dams and wetlands. From the National Freshwater Ecosystem Priority Areas Atlas, it can be observed that there are primary and secondary rivers and artificial wetlands along the proposed route as indicated in the map attached hereto as **Appendix 7**, showing surface water resources within the development footprint.

Section 7 of the Ecological and Impact Survey Specialists Report provides the detailed surface water resources within the study area. According to the findings of the floodline determination, the 1:100 flood peak for the crossings on the powerline route is10.446$m^3.s^{-1}$ and one can work on the height of the 1309.50 contour line.

6.3.5. FLORA

6.3.5.1. General Flora Description

Rouxville and Aliwal North fall within the Grassland Biome. However, most of the natural vegetation in the area has been transformed by agricultural activities with associated developments, e.g. roads. This biome is also prone to fires, which maintains the grassland dominance over woodland; hence fire is considered a natural ecological component of the landscape.

6.3.5.2. Site Specific Flora Description

The proposed development area falls within the interface between the *Grassland* and *Nama-Karoo* biomes, and includes elements representative of both, with grasslands being included within the *Mesic Highveld* and *Dry Highveld Grasslands* bioregion, and the Nama-Karoo component being included within the Upper Karoo bioregion. There is also an association with alluvial vegetation within the southern areas pertaining to the banks and floodplains of the Orange River. The dominant vegetation unit pertaining to the survey area is Aliwal North Dry Grassland (constituting 60% of the alignment route), which dominates throughout the northern and central areas. Vegetation units that are of conservational concern include Zastron Moist Grassland and Upper Gariep Alluvial Vegetation, both of which are regarded as Vulnerable (Mucina & Rutherford, 2006).

The major vegetation units associated with the proposed alternatives are indicated in Table 7 below, which is adopted from Section 6.2 of the Ecological and Impact Survey Specialists Report.

*Table 7***:** *The association of the Proposed Powerline with the Major Vegetation Units within the Region.*

Biome	Bioregion	Vegetation unit	Conservation status	Distance
Grassland	Mesic Highveld Grassland	Zastron Moist Grassland	Vulnerable	1.74km (4.6%)
	Dry Highveld Grassland	Xhariep Karroid Grassland	Least Threatened	0.45km (1.2%)
		Aliwal North Dry Grassland		22.34km (59.4%)
		Besemkaree Koppies Shrubland		6.23km (16.6%)
Nama-Karoo	Upper Karoo	Eastern Upper Karoo	Least Threatened	1.69km (4.5%)
Azonal vegetation	Alluvial Vegetation	Upper Gariep Alluvial Vegetation	Vulnerable	5.19km (13.8%)

6.3.6. FAUNA

6.3.6.1. General Fauna Description

Due to the area being undeveloped, the potential habitat for fauna is intact and animals, inclusive of reptiles, amphibians, birdlife and small mammals are expected to inhabit the area.

6.3.6.2. Site Specific Fauna Description

During site inspection, no animals were observed. However, due to the pristine environment, there are animals which are expected to inhabit the development area and most of the habitat will be transformed due to the development, but they will relocate to undevelopable sections serving as natural corridors, which are excluded in the development footprint. It should be noted that there are land uses in the area, which have significantly transformed habitat for fauna in the area, e.g. agricultural activities. Section 6.3 of the Ecological and Impact Survey Specialists Report discusses the site specific fauna.

6.3.7. LAND USE

In the vicinity of the proposed route between the two substations, within a 500m radius, the following can be found:

1. Area 13, Dukathole;
2. Watercourses and bodies which includes Orange river, drainage lines, wetlands etc.;
3. Agricultural lands which includes cultivated lands and grazing areas;
4. Windmill and boreholes;
5. Homesteads and Bed and Breakfast;
6. National road N6 and provincial roads;
7. Telecommunication lines;
8. Railway line;
9. Power-lines;
10. Ridges/hills;
11. Dongas; and
12. Old borrow pits.

6.3.8. SOCIO ECONOMIC STRUCTURE OF THE AREA

The proposed powerline route spans extends from Aliwal North in the jurisdiction of Walter Sisulu LM in the Eastern Cape Province and Rouxville in the jurisdiction of Mohokare LM in the Free State Province. The two provinces are separated by the Orange River and the key road network between Aliwal North and Rouxville is the N6 Road. Walter Sisulu LM is situated in the Joe Gqabi District Municipality, which covers an area of 13 269km^2 and has a population of approximately 77 477. Mohokare LM covers an area of 8 776km^{2}and has a population of 35 840.

6.3.7.1. Economic Context

Aliwal North is well known for its stock farming and sheep production is one of the dominating sectors. According to the Walter Sisulu LM, Integrated Development Plan ("IDP") 2016/17 Financial Year, other sectors in the area are agriculture with tunnel farming being piloted in the area, manufacturing, construction, which is driven by demand for housing and office or business space, trade, which is predominantly driven by the retail business activity, transportation and communication and finance and business services. Government and community services also provide employment in the area.

Rouxville is predominantly an agricultural area and the main economic sector in the municipal area is agriculture and tourism as contained in the Mohokare LM Reviewed IDP 2012-2017.

6.3.7.2. Social Context

In both the areas, unemployment is a problem. There seems to be a high dependence on social grants. There are issues relating to establishment of informal settlements, eradication of bucket system toilets, electrification, water supply, etc. in the areas. However, according to the municipal IDPs, there are plans underway for social development in the area, e.g. Aliwal North has been identified as the area prioritised by its municipality for spending, resources and investment. The proposed project will create temporary employment for the local community and will also help to ensure that both the municipalities are able to supply electricity in the area, including electrification of newly developed areas, the provision and maintenance of lighting for streets and future developments that would require electricity.

6.3.7.3.Heritage Aspects

Due to the length of the proposed route, it is necessary to perform a Phase 1 Archaeological and Palaeontological Investigation to determine if there is any archaeological, heritage, cultural and/or palaeontological artefacts or sensitive features that could be affected by the proposed development. From the findings and recommendations of the heritage specialist study undertaken, investigations are summarized in Section 8 below and the reports contained under **Appendix 8**.

6.4. IDENTIFICATION OF IMPACTS AND RISKS ASSOCIATED WITH THE PROPOSED DEVELOPMENT

Due to the high similarity of the alignment of the Route Alternatives, they are expected to have similar impacts. The route differs on the section were they crosses the N6, thereafter the environmental settings remains the same.

For the purpose of this identification of impacts, the degree of reversibility is considered high or low. High is for impacts which are irreversible, *i.e.* impacts from which recovery is

not possible within a reasonable time scale. Such impacts are therefore deemed as permanent impact, whereas Low is impacts are impacts from which spontaneous recovery is possible as these are deemed as temporary impact.

6.4.1. IDENTIFICATION OF IMPACTS FROM PUBLIC PARTICIPATION PROCESS

During the public participation process concerns were raised regarding the proposed development and are discussed in detail in the Public Participation Report attached hereto, but the following are the concerns which will influence the route alignment of the proposed development and these are tabulated below.

Potential Impact: Impact on farming activity	**Impact on the irrigation pivots used on the cultivated lands**
Nature of impact	Decrease in crop productivity due to the impact of the powerline where the towers will be located within cultivated lands thus affecting functioning of irrigation pivots in Annex Uitspanning farm and resulting in loss of income.
Duration of Impact	Permanent
Extent of Impact	Localized
Probability of Impact	Definite
Consequence/magnitude	Very High
Degree to which the impact can be reversed	High
Degree to which the impact may cause irreplaceable loss of resources	High
Degree to which impact can be avoided, managed of mitigated	High
Significance prior to Mitigation	High

Potential Impact: Safety impact on P38/1 road users	**Encroachment of the powerline on to the P38/1 road reserve that could affect safety of the road users**
Nature of impact	Placement of powerline towers within the P38/1 road reserve
Duration of Impact	Permanent
Extent of Impact	Localized
Probability of Impact	Definite
Consequence/magnitude	Very High
Degree to which the impact can be reversed	High
Degree to which the impact may cause irreplaceable loss of resources	High

Degree to which impact can be avoided, managed of mitigated	High
Significance prior to Mitigation	High

6.4.2. IDENTIFICATION OF IMPACTS FROM SITE INVESTIGATION

The impacts below were identified during the site investigation and specialists studies that undertaken as part of the Basic Assessment Process were informed by these impacts.

Potential Impact: Noise Impact	**Increased noise levels during the construction phase**
Nature of impact	Excessive noise generated by construction machinery and vehicles, thereby causing nuisance to the neighbouring land users.
Duration of Impact	Temporary
Extent of Impact	Localized
Probability of Impact	Likely
Consequence/magnitude	Medium
Degree to which the impact can be reversed	High
Degree to which the impact may cause irreplaceable loss of resources	Low
Degree to which impact can be avoided, managed or mitigated	High
Significance prior to Mitigation	Low

Potential Impact: Air Quality	**Excessive generation of dust during construction phase**
Nature of impact	Excessive generation of dust due to the use of heavy equipment and machinery during the clearing and transportation of building material, thereby causing nuisance to the surrounding land users.
Duration of Impact	Temporary
Extent of Impact	Localized
Probability of Impact	Likely
Consequence/magnitude	Medium
Degree to which the impact can be reversed	High
Degree to which the impact may cause irreplaceable loss of resources	Low
Degree to which impact can be avoided, managed or mitigated	High
Significance prior to Mitigation	Low

Potential Impact: Traffic Impact	**Disturbance of traffic flow on the roads within the powerline route**
Nature of impact	Obstruction of traffic flow on the N6 road and provincial roads due to slow moving construction vehicles.
Duration of Impact	Temporary
Extent of Impact	Localized
Probability of Impact	Likely
Consequence/magnitude	High
Degree to which the impact can be reversed	High
Degree to which the impact may cause irreplaceable loss of resources	Low
Degree to which impact can be avoided, managed or mitigated	High
Significance prior to Mitigation	Low

Potential Impact: Impact on the Heritage Artefacts	**Destruction, loss or damaging of heritage artefacts occurring along the proposed development area during construction phase.**
Nature of impact	Damage or destruction to undiscovered heritage sites in the area due to associated earthmoving activities.
Duration of Impact	Permanent
Extent of Impact	Development Footprint
Probability of Impact	Likely
Consequence/magnitude	Very High
Degree to which the impact can be reversed	Low
Degree to which the impact may cause irreplaceable loss of resources	High
Degree to which impact can be avoided, managed or mitigated	High
Significance prior to Mitigation	Medium

Potential Impact: Impact on Vegetation	**Destruction or loss of vegetation including threatened or protected species along the proposed route**
Nature of impact	Potential destruction of Red Data Lists species and irreversible loss of natural habitat for flora
Duration of Impact	Permanent
Extent of Impact	Development Footprint
Probability of Impact	Highly Likely
Consequence/magnitude	Very High
Degree to which the impact can be reversed	Low
Degree to which the impact may cause irreplaceable loss of resources	High
Degree to which impact can be avoided, managed or mitigated	High
Significance prior to Mitigation	High

Potential Impact: Impact on Fauna	**Potential destruction of sensitive habitat and irreversible loss of natural habitat for fauna**
Nature of impact	Potential destruction of sensitive habitat and irreversible loss of natural habitat for fauna
Duration of Impact	Permanent
Extent of Impact	Development Footprint
Probability of Impact	Highly Likely
Consequence/magnitude	Very High
Degree to which the impact can be reversed	Low
Degree to which the impact may cause irreplaceable loss of resources	High
Degree to which impact can be avoided, managed or mitigated	High
Significance prior to Mitigation	High

Potential Impact: Destruction of Wetland	**Destruction of wetlands located along the powerline route due to construction activities associated with the proposed powerline development**
Nature of impact	Trampling and compaction of wetlands due to movement of construction vehicles, thereby negatively affecting the functioning of wetlands.
Duration of Impact	Permanent
Extent of Impact	Regional
Probability of Impact	Likely
Consequence/magnitude	Very High
Degree to which the impact can be reversed	Low
Degree to which the impact may cause irreplaceable loss of resources	High
Degree to which impact can be avoided, managed or mitigated	High
Significance prior to Mitigation	Medium

Potential Impact: Alteration of Water Quality	**Alteration of the resource quality of the watercourses during construction**
Nature of impact	Pollution of watercourse and streams by siltation caused by construction related activities during the crossing of the Orange River and other watercourses/bodies
Duration of Impact	Short term
Extent of Impact	Localized
Probability of Impact	Likely
Consequence/magnitude	Very High
Degree to which the impact can be reversed	High
Degree to which the impact may cause irreplaceable loss of resources	High
Degree to which impact can be avoided, managed or mitigated	High
Significance prior to Mitigation	Medium

Potential Impact: Impact on avifauna	Impact on avifauna during operation.
Nature of impact	Impact on avifauna due to collision with the powerline during operation.
Duration of Impact	Long term
Extent of Impact	Development Footprint
Probability of Impact	Highly Likely
Consequence/magnitude	Very High
Degree to which the impact can be reversed	Low
Degree to which the impact may cause irreplaceable loss of resources	High
Degree to which impact can be avoided, managed or mitigated	Medium
Significance prior to Mitigation	High

Potential Impact: Visual Impact	Visual impact on land users within vicinity of the development area
Nature of impact	The powerline will affect the landscape character of the receiving environment because it is very visible to the surrounding land-users.
Duration of Impact	Permanent
Extent of Impact	Localised
Probability of Impact	Definite
Consequence/magnitude	Very High
Degree to which the impact can be reversed	High
Degree to which the impact may cause irreplaceable loss of resources	Low
Degree to which impact can be avoided, managed of mitigated	Low
Significance prior to Mitigation	High

Potential Impact: Impact of Flooding on the powerline	Potential damage or disruption of electricity transmission due to floods
Nature of impact	Potential damage of the powerline by floods as a result of the placement of towers within the flood zone. This could result in the disruption of electricity transmission
Duration of Impact	Long term
Extent of Impact	Localised
Probability of Impact	Likely
Consequence/magnitude	Very High
Degree to which the impact can be reversed	High
Degree to which the impact may cause irreplaceable loss of resources	High
Degree to which impact can be avoided, managed of mitigated	High
Significance prior to Mitigation	Medium

Specialists were appointed to investigate the impacts with high significance and to how it can they be managed or mitigated if not possible to avoid.

The positive impacts associated with the proposed development is temporary job creation and that there will be no possible encroachment onto the new powerline. However, as these impacts will benefit residents between Aliwal North and Rouxville, they will not be assessed further and it is a norm for Eskom to ensure that recruitment for non-skilled and semi-skilled is limited to local communities. This will also ensure that there are no social unrests as a result of people from surrounding areas being recruited. Therefore it is imperative for the ward councillors and local municipalities to be informed prior to construction so that they are able to co-ordinate the appointment of Community Liaison Officer and compilation of recruitment database. However, the information on the exact number of jobs to be created during construction is not yet available. The other positive impact relate to improvement of electricity infrastructure in both the areas to enable the local municipalities to ensure electrification of the future development areas.

6.5. INFORMATION ON THE METHODOLOGY ADOPTED IN THE ASSESSMENT OF IDENTIFIED IMPACTS

The methodology adopted for the assessment of identified impacts is the Impact Rating Matrix, which is explained below.

NATURE: The character of the impact			
EXTENT	**DURATION**	**PROBABILITY**	**MAGNITUDE**
Area	Time Frame	Likelihood	Intensity of impact to destroy or alter the environment.
SIGNIFICANCE: Implication of the impact both with or without mitigation			
TYPE: Description as to whether the impact is negative or positive or neutral.			
MITIGATION: Possible impact management, minimization and mitigation of the identified impacts.			

6.5.1. NATURE OF IMPACT

Nature of impact describes the character of the impact in terms of the effect on the relevant environmental aspect.

6.5.2. SPATIAL EXTENT OF IMPACT

Measures the area extent, physical and spatial scale over which the impact will occur. This implies the scale limited to the Project Site (footprint) - including adjacent areas (localized), or the Local Municipality area (regional) or the entire Province (Provincial), or the entire country (National) or beyond the borders of South Africa.

Criteria	Footprint (F)	Site/Local (S-L)	Regional (R)	National (N)	International (I)
Rating	**1**	**2**	**3**	**4**	**5**

6.5.3. DURATION OF IMPACT

Duration measures the timeframe of the impact in relation to the lifetime of the project. It gives an assessment of whether the impact can be eliminated by mitigation immediately (0-1) after a short time (1-5 years), medium term (5-10 years), long term (11- 30 years of the Project activities), or permanent (persists beyond life) due to the Project activities.

Criteria	Temporary (T)	Short Term (ST)	Medium Term (MT)	Long Term (LT)	Permanent (P)
Rating	**1**	**2**	**3**	**4**	**5**

6.5.4. PROBABILITY OF IMPACT

Probability measures the probability or likelihood of the impact actually occurring, as either probable, possible, likely, highly likely or definite (impact will occur regardless of preventative measures).

Criteria	Probable (PR) (0-10%)	Possible (PO) (10-25%)	Likely (L) (25-50%)	Highly Likely (HL) (50-75%)	Definite (D) (100%)
Rating	**1**	**2**	**3**	**4**	**5**

6.5.5. MAGNITUDE/INTENSITY OF IMPACT

Magnitude or intensity of the impact measures whether the impact is destructive or benign, whether it destroys, alters the functioning of the environment, or alters the environment itself. It is rated as insignificant, low, medium, high or very high.

Criteria	Insignificant (I)	Low (L)	Medium (M)	High (H)	Very High (VH)
Rating	**2**	**4**	**6**	**8**	**10**

6.5.6. SIGNIFICANCE OF IMPACT

Significance measures the foreseeable significance of the impacts of the Project both with and without mitigation measures. The significance on the aspects of the environment is classified as:

Significance Rating (SR) =	(Extent + Intensity + Duration) x Probability

Extent	Duration	Intensity	Probability	Significance Rating	
Footprint	Temporary	Insignificant	Probable	**Insignificant**	**0-19**
Site	Short	Low	Possible	**Low**	**20-39**
Regional	Medium	Medium	Likely	**Medium**	**40-59**
National	Long	High	Highly Likely	**High**	**60-89**
International	Permanent	Very High	Definite	**Very High**	**90 <**

The following is a guide to interpreting the final scores of impact:

INSIGNIFICANT: the impact should cause no real damage to the environment, except where it has the opportunity to contribute to cumulative impacts.

LOW: the impact will be noticeable but should be localised or occur over a limited time period and not cause permanent or unacceptable changes; it should be addressed in the Environmental Management Programme report ("EMPR") and managed appropriately.

MEDIUM: the impact is significant and will affect the integrity of the environment; effort must be made to mitigate and reverse this impact; in addition the project benefits must be clearly shown as outweighing the negative impact.

HIGH: the impact will affect the environment to such an extent that permanent damage is likely and recovery will be slow and difficult; the impact is unacceptable without significant mitigation efforts or reversal plans; project benefits must be proven to be very substantial; the approval of the project will be in jeopardy if this impact cannot be addressed.

VERY HIGH the impact will result in large, permanent and severe impacts, such as local species extinction, minor human migrations or local economic collapses; even projects with major benefits may not go ahead with this level of impact; project alternatives which are substantially different should be looked at, otherwise the project should not be approved.

6.5.7. STATUS OF IMPACT

Status of impact describes whether the impact is positive (beneficial) on the affected environment (social) or negative (detrimental) or neutral.

6.6. POSITIVE AND NEGATIVE IMPACTS THAT THE PROPOSED DEVELOPMENT WILL HAVE ON THE ENVIRONMENT AND COMMUNITY

Due to the slight variation in the proposed route alternatives, there is a high similarity of negative impacts to the receiving environment. From the public participation conducted, it is evident that the section of Route Alternative 1 that is alongside theP38/1 Provincial Road, is not feasible, as it will be within cultivated fields and this will have a negative impact on the landowner's crop production. For the identified negative impacts in Section 6.4 above, mitigation measures and management actions have been outlined with input obtained from the specialists. The positive impacts relate to improvement of electricity infrastructure in the area to enable the municipality to ensure electrification of the development areas. There will be temporary creation of employment opportunities for the local communities during the construction phase. No resettlement of communities to accommodate the new powerline or possible encroachment of residential areas as it has happened with the existing 66kV.

6.7. THE MITIGATION MEASURES THAT COULD BE APPLIED AND LEVEL OF RISK RESIDUAL

The possible mitigation measures and the level of residual risk are contained in Section 7 below.

6.8. THE OUTCOME OF THE SITE SELECTION MATRIX

No site selection matrix was used, as a result of the high similarity between the two route alternatives. The only objection received was regarding the section of Route Alternative 1 that extends along the P38/1 Road. Hence this section was excluded from the Environmental Authorisation application.

6.9. CONCLUDING STATEMENT INDICATING THE PREFFERED ALTERNATIVE

In terms of the visual recommendations, Route Alternative2 had a lower visual impact compared to Route Alternative 1, whereas from an ecological perspective it was Route Alternative 1 that had a lower impact. However, the preferred route was based on the issues raised during public participation process. The Free State Department of Roads and Annex Uitspanning landowner indicated that the section of Route Alternative 1 which extends alongside the P38/1 Road should not be considered. Therefore, this route will follow the same corridor as alternative 2, *i.e.* crossing P38/, over the cultivated lands then turns to Easterly to run along base of the ridge until where it connects with the remaining section of Alternative 1 route and follow the alignment until Rouxville and it is the preferred route for the proposed development.

7. FULL DESCRIPTION OF THE PROCESS UNDERTAKEN TO IDENTIFY, ASSESS AND RANK THE POTENTIAL IMPACTS OF THE ACTIVITY ON THE PREFERRED LOCATION THROUGHOUT THE LIFE OF THE ACTIVITY

7.1. A DESCRIPTION OF ALL ENVIRONMENTAL ISSUES IDENTIFIED DURING THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The impacts were identified by means of site investigation considering the aspects of the receiving environment, outcome of the public participation process, input received from the specialist' reports and the professional judgement of the EAP. The assessment took into account the impact of the proposed powerline development during the construction and operational phase. These impacts have been discussed in Section 6.4 above and their significance without mitigation is as follows:

High significance:

1. Issues raised during the public participation process, i.e. impact on agricultural activities of Annex Uitspanning farm and safety of P38/1 road users;
2. Visual impact;
3. Impact on avifauna; and
4. Ecological impact, *i.e*., both flora and fauna.

Medium significance:

1. Wetland destruction;
2. Impact on heritage artefacts; and
3. Change in water quality of watercourses along the route.

Low significance:

1. Dust generation;
2. Traffic generation; and
3. Noise generation.

The positive impacts associated with the proposed powerline:

1. Temporary job creation;
2. Local authority will have adequate capacity with regards to provision of electricity for future developments;
3. No resettlement of communities required;
4. No possible encroachment of residential area onto the new powerline servitude.

7.2. ASSESSMENT OF THE SIGNIFICANCE OF EACH ISSUE AND AN INDICATION OF THE EXTENT TO WHICH THE ISSUE COULD BE AVOIDED OR ADDRESSED BY THE ADOPTION OF MITIGATION MEASURES

The assessment each identified impact and the extent to which it could be avoided or addressed by the adoption of mitigation measures are shown below.

IMPACT	SIGNIFICANCE WITHOUT MITIGATION	SIGNIFICANCE WITH MITIGATION	EXTENT TO WHICH IMPACT COULD BE MITIGATED
CONSTRUCTION PHASE			
Impact on existing agricultural activities	High	-	The impact cannot be mitigated. It should be avoided
Safety impact on P38/1 road users	High	-	The impact cannot be mitigated. It should be avoided
Noise impact	Low	Low	Localized
Air quality	Low	Low	Localized
Traffic impact	Low	Low	Localized
Impact on heritage artefacts	Medium	Low	Development footprint
Impact on vegetation	High	Moderate-Low	Development Footprint
Impact on fauna and loss of habitat	High	Low	Development Footprint
Destruction of wetlands	Medium	Low	Localized
Alteration of water quality	Medium	Low	Localized
OPERATION PHASE			
Impact on avifauna	High	Moderate	Localized
Visual impact	High	Moderate-High	No mitigation is possible for this recommendation but best practice measures are recommended
Impact of flooding on the powerline	Medium	Low	Localized

8. ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK

A comprehensive assessment of the environmental impacts identified in Section 6.4 above using the Impact Assessment Methodology outlined in Section 6.5 will indicate significance of impacts, the extent of the impacts with recommended mitigation measures. The identified impacts are assessed below.

The impacts concerning Route Alternative 1, which were identified during public participation process, *i.e.*, impact on agricultural activity and safety of the P38/1 road users will not be assessed further as avoidance is considered to be the only reasonable option. This also takes into considerations the slight decrease in the visual impact due to the realignment.

The impacts for which no specialists' studies were conducted and the impacts that specialist studies were undertaken as part of the assessment are outlined below.

Potential Impact: Noise Impact	**Increased noise levels during the construction phase**
Nature of impact	Excessive noise generated by construction machinery and vehicles may be a nuisance to the neighbouring land users.
Duration of Impact	Temporary
Extent of Impact	Localized
Probability of Impact	Probable
Consequence/magnitude	Low
Significance of Impact	Low
Degree to which the impact can be reversed	High
Degree to which the impact may cause irreplaceable loss of resources	Low
Degree to which impact can be avoided, managed or mitigated	High (Mitigated)
Mitigation	◊ All vehicles and equipment used on site must conform to the noise regulations standard. ◊ Construction should be limited to normal working days and office hours from 08h00 to 16h30. Should there be any deviation from this, then surrounding community should first be consulted. ◊ Limit use of noisy equipment, e.g. drilling should not be done at night

	◊ Ensure that employees and staff conduct themselves in an acceptable manner whilst on site. ◊ Compliance with the municipal bylaws and regulations controlling noise are mandatory.
Cumulative Impact	None expected
Residual Impact	None expected

Potential Impact: Air Quality	**Excessive generation of dust during construction phase**
Nature of impact	Excessive generation of dust due to the use of heavy equipment and construction machinery during the clearing and transportation of building material may be a nuisance to the surrounding land users.
Duration of Impact	Temporary
Extent of Impact	Localized
Probability of Impact	Probable
Consequence/magnitude	Low
Significance of Impact	Low
Degree to which the impact can be reversed	High
Degree to which the impact may cause irreplaceable loss of resources	Low
Degree to which impact can be avoided, managed or mitigated	High (Mitigated)
Mitigation	◊ Occasional wetting of access roads, haul roads and construction site should be done by using a water tanker truck. ◊ Speed limit of 20km/h should be adhered to on farm tracks and 40km/h on the access road. ◊ Water should be obtained from the relevant municipality. If water is abstracted from a watercourse, a Water Use License application should be lodged with DWS and the licence obtained before commencement of the water abstraction.
Cumulative	None expected
Residual Impact	None expected

Potential Impact: Traffic Impact	**Disturbance of traffic flow on the roads within the powerline route**
Nature of impact	Obstruction of traffic flow on the N6 National road and the provincial roads due to slow moving construction vehicles.
Duration of Impact	Temporary
Extent of Impact	Localized
Probability of Impact	Possible
Consequence/magnitude	Low
Significance	Low
Degree to which the impact can be reversed	High
Degree to which the impact may cause irreplaceable loss of resources	Low
Degree to which impact can be avoided, managed or mitigated	High (Mitigated)
Mitigation	◊ Traffic management plan should be compiled prior to construction activities. ◊ Compliance with traffic control regulations should be mandatory.
Cumulative Impact	None
Residual Impact	None

Potential Impact: Impact of Flooding on the powerline	**Potential damage or disruption of electricity transmission due to floods**
Nature of impact	Potential damage of the powerline by floods, due to the placement of towers within the flood zone and this could result in the disruption of electricity transmission
Duration of Impact	Long term
Extent of Impact	Localised
Probability of Impact	Probable
Consequence/magnitude	Low
Significance	Low
Degree to which the impact can be	High

reversed	
Degree to which the impact may cause irreplaceable loss of resources	High
Degree to which impact can be avoided, managed of mitigated	High-(Managed)
Mitigation	◊ Regular maintenance of the infrastructure during rainy season. However, the towers will not have any impact on the flood peak level. ◊ No towers will be placed within the river.
Cumulative Impact	None. With the existing powerline crossing, it's assumed no flood has damaged towers yet and affected the transmission of electricity as no concern was raised during the public participation process.
Residual Impact	None

The following assessments are as per the specialist studies undertaken.

Heritage Impact:

Potential Impact: Impact on the Heritage Artefacts	**Destruction, loss or damaging of heritage artefacts occurring along the proposed development area during construction phase.**
Nature of impact	Damage or destruction to undiscovered heritage sites in the area due to earthmoving activities associated with establishing the proposed powerline.
Duration of Impact	Permanent
Extent of Impact	Development Footprint
Probability of Impact	Likely
Consequence/magnitude	Medium
Significance	Low
Degree to which the impact can be reversed	Low
Degree to which the impact may cause irreplaceable loss of resources	High
Degree to which impact can be avoided, managed or mitigated	High-Mitigated

Mitigation	◊ Construction activities are restricted to within the boundaries of the development footprint ◊ Should fossil material exist within the development footprint any negative impact upon it could be mitigated by surveying, recording, describing and sampling of well-preserved fossils by a professional palaeontologist. This should take place after initial vegetation clearance has taken place.
Cumulative Impacts	Possible. Mitigation measures should be therefore adopted because the discovery of any fossils may turn the negative impact to a positive impact by enriching fossil discovery data in the area.
Residual Impact	None

Visual Impact:

Nature of Impact: Visual impact on observers travelling along the N6 National road, the arterial roads and observers residing at homesteads in close proximity to the powerline		
	Alternative 1	***Alternative 2***
Extent	Local **(4)**	Local **(4)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Very high **(10)**	Very high **(10)**
Probability	Highly probable **(4)**	Highly probable **(4)**
Significance	High **(72)**	High **(72)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No	
Mitigation / Management: Planning: ➢ Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude. Operations: ➢ Maintain the general appearance of the servitude as a whole. Decommissioning: ➢ Remove infrastructure not required for the post-decommissioning use of the servitude. ➢ Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications. ➢ Monitor rehabilitated areas post-decommissioning and implement remedial actions.		

Cumulative impacts: The construction of an additional powerline, together with the existing distribution powerlines in the area is likely to increase the potential cumulative visual impact of electricity distribution type infrastructure within the region. The decommissioning and removal of the existing Melkspruit-Rouxville 66kV powerline will alleviate the potential cumulative visual impact to some degree.
Residual impacts: The visual impact will be removed after decommissioning, provided the powerline infrastructure is removed. Failing this, the visual impact will remain.

Nature of Impact: Visual impact on sensitive visual receptors within the region located beyond 500m of the powerline		
	Alternative 1	***Alternative 2***
Extent	Regional **(3)**	Regional **(3)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	High **(8)**	High **(8)**
Probability	Probable **(3)**	Probable **(3)**
Significance	Moderate **(45)**	Moderate **(45)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No	
Mitigation / Management: Planning: ➢ Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude. Operations: ➢ Maintain the general appearance of the servitude as a whole. Decommissioning: ➢ Remove infrastructure not required for the post-decommissioning use of the site/servitude. ➢ Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications. ➢ Monitor rehabilitated areas post-decommissioning and implement remedial actions.		

Cumulative impacts: The construction of an additional powerline, together with the existing distribution powerlines in the area will likely increase the potential cumulative visual impact of electricity distribution infrastructure within the region. The decommissioning and removal of the existing Melkspruit-Rouxville 1 66kV powerline will alleviate the potential cumulative visual impact to some degree.
Residual impacts: The visual impact will be removed after decommissioning, provided that the powerline infrastructure is removed. Failing this, the visual impact will remain.

Ecological Impacts, Surface Water and Avifauna Impacts

PRE-CONSTRUCTION& CONSTRUCTION PHASE									
Activity	**Nature of Impact**	**Impact type**	**Extent**	**Duration**	**Potential Intensity**	**Likeli-hood**	**Rating**	**Mitigation***	**Interpretation**
Clearing of vegetation to accommodate infrastructure and services (roads, etc)	<u>Direct Impact:</u>	Expected	2	3	4	1.0	9.0 - MOD	Limit the footprint to only areas necessary for the construction process; Utilise single access roads only if service roads are not to be part of operations access roads; Avoid indiscriminate destruction of habitat outside of footprint area. Observation of the proposed ecological sensitivity mapping.	The survey area suffers varying degrees of vegetation transformation and therefore the significance of this impact also varies. Areas already suffering transformation will have lower impact significance than areas that have retained primary/natural vegetation. This rating is taken as an average of the overall impact.
	Vegetation stripping will be necessary to allow for the establishment of services and infrastructure; Vegetation will have to be removed to allow access for heavy earthmoving equipment, vehicles, etc. This will have varying levels of significance depending on whether it is undertaken in natural areas or areas that have already suffered disturbances.	Cumulative	3	3	4	1.0	10- HIGH		Cumulative loss of the vegetation units to accommodate agriculture is relatively high within the region.
		Residual	1	2	2	1.0	5.0- MOD		The footprint of the proposed development should be limited to the areas that already suffer transformation, taking the proposed ecological sensitivity map into consideration; Limited residual impact remains due to the ultimately small footprint area of each tower. Residual impacts will remain where new servitude roads have been established, but this is thought to have limited long-term impacts.

PRE-CONSTRUCTION& CONSTRUCTION PHASE									
Activity	**Nature of Impact**	**Impact type**	**Extent**	**Duration**	**Potential Intensity**	**Likeli-hood**	**Rating**	**Mitigation***	**Interpretation**
Loss of RDL floral species during site clearing.	<u>Direct Impact:</u>	Expected	2	3	4	0.2	1.8 - LOW	A walk-through of the alignment should be undertaken once the exact tower localities have been established/finalised in order to clear the area of any RDL flora; The occurrence of RDL floral species is thought to be limited to the rocky ridge and/or wetland habitat units, which should only suffer marginal impacts. This impact is therefore regarded as being limited in its significance.	The significance of this impact is regarded as being low as the placement of the towers can accommodate sensitive ecological features in most cases. The natural ridge habitat and the wetland habitats, which have the highest potential of supporting any RDL flora, will only suffer marginal/fringing impacts.
	Site clearing will remove all vegetation to accommodate the infrastructure development. RDL or otherwise sensitive floral species may be included when vegetation is stripped, suffering loss of individuals.	Cumulative	2	3	4	0.75	6.75 - MOD		Cumulative loss of RDL flora is relatively high at the national scale, but is generally low throughout the survey region due to the low-impact land uses that dominate. Cumulative losses of individuals and habitat are, however, the very reason why species become threatened.
		Residual	1	2	2	0.2	1.0 - LOW		If no RDL floral species are found within the actual layout footprint area of each tower and/or the service roads, then residual impact to RDL flora is minimal.
Loss and/or displacement of sensitive faunal species.	<u>Direct Impact:</u>	Expected	2	3	4	0.2	1.8 - LOW	Indiscriminate habitat destruction to be avoided and the proposed development should remain as localised as possible (including support areas and services); Observation of the ecological sensitivity map and inclusion of the sensitive areas into planning of access routes, etc will reduce this impact; Site reinstatement and clean up following the completion of the construction phase of each tower site will be important.	The significance of this impact is regarded as being minimal due to the availability of alternate habitat within the area. The ridge and wetland habitats, which have the most potential of supporting RDL or sensitive fauna, will only suffer marginal/fringing impacts. Sensitive and habitat specialist species will also be dependent on the wetland and riparian habitats.
	Site disturbances and vegetation (habitat) loss may lead to the loss of faunal species that are sensitive to disturbances.	Cumulative	2	3	4	0.75	6.75 - MOD		Displacement of sensitive faunal species due to habitat destruction and habitat fragmentation eventually leads to isolation and loss of those species. This is, however, considered to be low within the region.

PRE-CONSTRUCTION& CONSTRUCTION PHASE									
Activity	**Nature of Impact**	**Impact type**	**Extent**	**Duration**	**Potential Intensity**	**Likeli-hood**	**Rating**	**Mitigation***	**Interpretation**
		Residual	1	2	2	0.2	1.0 - LOW		Limited residual impact will remain following site reinstatement of each tower footprint following the completion of the construction phase.
Destruction of nesting and/or roosting habitat for faunal species.	Direct Impact:	Expected	2	3	4	0.2	1.8 - LOW	A walk-through of the site should be undertaken once tower footprint sites have been established in order to clear the area of any RDL species; Limit the footprint to only areas necessary for the construction process; Utilise single access roads only; Avoid indiscriminate destruction of habitat; Rehabilitate areas affected by the construction process as far as possible.	The likelihood of destroying active nesting/roosting habitat is regarded as being limited. Cattle activity throughout most of the survey area is common, which lowers the likelihood of established ground-nesting activities.
	Site clearing will remove all vegetation to accommodate the infrastructure development. This may include established nests and/or roosting areas..	Cumulative	2	3	4	0.75	6.75 - MOD		Destruction of nesting habitat displaces the affected species eventually leading to loss of those species.
		Residual	1	2	2	0.2	1.0 - LOW		Following completion of the construction and rehabilitation phases, the site should not be subject to routine disturbances and therefore species will return to the area.
Destruction of ground-dwelling and/or sedentary fauna.	Direct Impact:	Expected	2	3	4	0.2	1.8 - LOW	A walk-through of the site should be undertaken once tower footprint sites have been established in order to clear the area of any RDL species; Limit the footprint to only areas necessary for the construction process; Utilise single access roads only; Avoid indiscriminate destruction of habitat; Rehabilitate areas affected by the construction process as far as possible.	A walk-through of the alignment route once the tower positions have been established will be able to identify areas or concern and appropriate mitigation measures can be put into place to abate the impacts.
	Site clearing will remove all vegetation and habitat to accommodate the infrastructure development. Ground-dwelling fauna (e.g. Mygalomorph spiders) or ground-nesting birds may be included when vegetation is stripped, suffering loss of individuals.	Cumulative	2	3	4	0.75	6.75 - MOD		Destruction of nesting habitat displaces the affected species eventually leads to loss of those species.
		Residual	1	2	2	0.2	1.0 - LOW		Following completion of the construction and rehabilitation phases, the site should not be subject to routine disturbances and therefore species will return to the area.

PRE-CONSTRUCTION& CONSTRUCTION PHASE									
Activity	**Nature of Impact**	**Impact type**	**Extent**	**Duration**	**Potential Intensity**	**Likeli-hood**	**Rating**	**Mitigation***	**Interpretation**
Destruction of sensitive habitat.	<u>Direct Impact:</u>	Expected	2	4	4	1.0	10 - HIGH	Indiscriminate habitat destruction to be avoided and the proposed development should remain as localised as possible (including support areas and services); Observation of the ecological sensitivity map and inclusion of the sensitive areas into planning of access routes, etc will reduce this impact; Site reinstatement and clean up following the completion of the construction phase of each tower site will be important.	The survey area suffers varying degrees of habitat transformation and therefore the significance of this impact also varies. Areas already suffering transformation will have lower impact significance than areas that have retained primary/natural vegetation. This rating is taken as an average of the overall impact.
		Cumulative	2	3	4	1.0	9 - MOD		Cumulative loss of sensitive habitat units is relatively rare as these areas are generally unsuitable for agricultural purposes (the main land use within the area).
	Wetlands are considered sensitive and ecologically important habitat features regardless of ecological state. Destruction of ecologically sensitive habitat units will lead to loss of ecological functionality and destruction/loss of natural biodiversity. Rocky ridge habitat is also regarded as being ecologically sensitive.	Residual	2	1	2	0.75	3.75 - MOD		The footprint of the proposed development should be limited to the areas that already suffer transformation, taking the proposed ecological sensitivity map into consideration; Limited residual impact remains due to the ultimately small footprint area of each tower. Residual impacts will remain where new servitude roads have been established, but this is thought to have limited long-term impacts.
Disturbance features that alter the vegetation structures	<u>Indirect Impact:</u>	Expected	2	4	4	1.0	10 - HIGH	Disturbance of soils will enhance the growth and recruitment of exotic and pioneering vegetation. There is a limited seedbank within the area and therefore this is regarded as being of limited significance. Management of existing exotic vegetation, especially within riparian zones, should	Exotic vegetation is limited to isolated areas within wetland and riparian habitat (especially) and some isolated occurrences within the terrestrial habitats.
	Disturbances of soils will lead to altered state of vegetation structures. This will often lead to bush encroachment or	Cumulative	2	4	4	1.0	10 - HIGH		Cumulative loss of primary vegetation features due to exotic vegetation and vegetation transformation is high at the national level and therefore should be avoided.

PRE-CONSTRUCTION& CONSTRUCTION PHASE									
Activity	**Nature of Impact**	**Impact type**	**Extent**	**Duration**	**Potential Intensity**	**Likeli-hood**	**Rating**	**Mitigation***	**Interpretation**
	establishment of exotic invasive species.	Residual	2	1	2	0.5	2.5 - LOW	be implemented. Ongoing management of exotic vegetation recruitment as well as future recruitment of exotic vegetation must be managed. A monitoring protocol must be developed and utilised during both the construction and operations/management phases of the development.	Transformation of vegetation structure within areas that have suffered disturbances required active management. If mitigation measures are put into place to manage vegetation degradation then little to no residual impacts should remain.
Habitat fragmentation resulting from infrastructure development.	<u>Direct Impact:</u>	Expected	1	2	2	0.2	1.0 - LOW	Infrastructure that crosses linear habitat units (watercourses, riparian zones, rocky ridges, etc) should be designed to not impeded freedom of migration. This includes bridges and culverts that do not alter the water levels between upstream and downstream areas.	This has limited significance to the project as access to servitudes, etc can use existing infrastructure.
	Linear habitat units such as watercourses are utilised as migratory corridors by mobile faunal species. Development that impacts these linear habitat units will lead to ecological fragmentation and population isolation	Cumulative	2	3	8	0.5	6.5 - MOD		Habitat fragmentation is relatively low throughout the region.
		Residual	1	2	2	0.1	0.5 - LOW		Residual impacts will be minimal/inconsequential if mitigation measures are taken into consideration.
Impacts on water quality within wetland/aquatic habitat units.	<u>Direct Impact:</u>	Expected	1	2	2	0.2	1.0 - LOW	No fuel to be stored at or near rivers of riparian zones; Equipment to be properly maintained and serviced; Fuel storage and pump areas to be bunded to avoid accidental leakage;	Impacts to water quality should not occur should mitigation measures be in place.
	Impacts to water quality include accidental fuel/oil spills from poorly	Cumulative	2	3	8	0.5	6.5 - MOD		Water quality degradation is a common feature throughout the vast majority of the watercourses throughout the province.

PRE-CONSTRUCTION& CONSTRUCTION PHASE									
Activity	**Nature of Impact**	**Impact type**	**Extent**	**Duration**	**Potential Intensity**	**Likeli-hood**	**Rating**	**Mitigation***	**Interpretation**
	maintained equipment, accidents or container failure, and poorly managed fuelling stations; Impacts will also result from poor erosion control within the immediate catchment area.	Residual	1	2	2	0.1	0.5 - LOW	No refuelling should be done within the river or riparian zones (exceptions are made for stationery motors i.e. pumps); Accidental spills must be reported and cleaned immediately. Contaminated soils must be removed and disposed of at a registered disposal site; Erosion control of disturbed areas must be implemented to avoid silts entering into aquatic habitats and impacting water quality downstream of the site.	No residual impacts should remain should mitigation measures be in place.
Impacts to aquatic environments	<u>Direct Impact:</u>	Expected	1	2	2	0.2	1.0 - LOW	All established watercourses and associated buffer zones must be taken into consideration when planning the final tower footprints. Main watercourses (established aquatic habitats) must be spanned over; If it becomes necessary that minor watercourses are impacted by tower positions, then erosion control will be the most significant impact feature that will require mitigation.	This impact will most likely only impact minor watercourses that do not represent established aquatic habitat. All established aquatic habitat can be spanned over with no impact.
	There will be no direct impacts to the aquatic environments as the powerline can span across the watercourses and associated buffer zones. This includes all aquatic faunal and floral features as well.	Cumulative	2	3	8	0.5	6.5 - MOD		Cumulative impacts to established aquatic habitat within the area is low.
		Residual	1	2	2	0.1	0.5 - LOW		If mitigation measures are in place, no residual impacts should remain.
Soil erosion	<u>Direct Impact:</u>	Expected	2	4	4	1.0	10 - HIGH	Erosion must be strictly controlled through the utilization of silt traps, silt fencing, Gabions, etc. This is especially pertinent within areas of steeper gradients; Topsoil stockpiles should be protected from erosion through the utilization of silt	Soil erosion could result in a significant impact if not managed appropriately. Implementation of mitigation measures will greatly reduce the impacts.
	Soil erosion will take affect any unprotected soils that have suffered disturbances,	Cumulative	2	3	4	1.0	9.0 - MOD		Erosion, especially within watercourses, is a major impacting feature throughout the province.

PRE-CONSTRUCTION& CONSTRUCTION PHASE									
Activity	**Nature of Impact**	**Impact type**	**Extent**	**Duration**	**Potential Intensity**	**Likeli-hood**	**Rating**	**Mitigation***	**Interpretation**
	including unprotected stockpiles of stored topsoil. Soil stripping, soil compaction and vegetation removal will increase rates of erosion and entry of sediment into the general environment and surrounding watercourses.	Residual	1	1	2	0.2	0.8 - LOW	traps, silt fencing, Gabions, etc.	If mitigation measures are in place, no residual impacts should remain.

9. SUMMARY OF THE FINDINGS AND IMPACT MANAGEMENT MEASURES IDENTIFIED IN SPECIALISTS' REPORTS

The specialists' studies undertaken within 1km corridor of the proposed Route Alternatives as part of the BA process are the following:

- Archaeological Impact Assessment-Dr. Lloyd Rossouw;
- Palaeontological Impact Assessment-Elize Butler;
- Visual Impact Assessment-Lourens Du Plessis;
- Ecological Assessment and Avifauna Impact Assessment-Drs.Mathew & Tahla Ross;
- Aquatic Impact Assessment and Wetland Delineation-Drs. Mathew &Tahla Ross and
- Floodline Determination-Marius van Rensburg

Due to the slight differences in the proposed route alternatives, there is a high similarity in the findings and recommendations and these recommendations are summarised in Table 8 below and the specialist reports are contained in **Appendix 8**, attached hereto.

Table 8: Summary of the Findings and Recommendations of the Specialists

SPECIALISTS STUDY	FINDINGS	RECOMMENDATIONS	INCLUSION OF RECOMMENDATIONS IN THE ASSESSMENT REPORT
Archaeological	**Both Route Alternative 1 & 2** 1. Proposed development will largely impact areas that have been degraded by previous or current farming activities. 2. There is no aboveground evidence of graves, graveyards or historically significant structures older	As far as the archaeological heritage is concerned, the proposed development may proceed, provided that all construction activities are restricted to within the boundaries of the development	Recommendation has been included in the compiled EMPR.

	than 60 years within or in the immediate vicinity of the linear footprint. However, for Alternative 1 route: Several ruins, one small graveyard and two Voortrekker centenary memorials were recorded during the survey. However, these will not be impacted by the proposed development. 3. The development footprint is regarded as being of low archaeological significance and is assigned a rating of Generally Protected.		
Palaeontological	**Both Route Alternative1 & 2** 1. Few isolated loose, poorly preserved fossil fragments were observed. For this, a medium palaeontological sensitivity is assigned to the development footprint.	All the proposed powerline routes area acceptable and can be considered as feasible. No further palaeontological heritage studies, ground truthing and/or specialist mitigation are required for the commencement of this development, pending the discovery or exposure of any fossils remains during the	Recommendation has been included in the compiled EMPR.

		construction phase. Should fossil remains be discovered during any phase of construction, either on the surface or exposed by fresh excavations, the ECO responsible for the development should be alerted and ECO should alert SAHRA so that appropriate mitigation can be undertaken by a professional palaeontologist. Protocol that should be followed for Finds and Chance and Find Procedure are outlined in Section 9 and 10 respectively of the report.	
Visual	**Both Route Alternative 1 & 2** 1. There is very little difference in the visual exposure or visibility of the two powerline alternatives, due to the slight variation in alignments and the generally flat (undulating) terrain. 2. The visual exposure is only	The development for the powerline as proposed to be supported, subject to the implementation of mitigation measures and management actions. The preferred alternative may be the shorter of the	Mitigation measures and management actions have been included in the compiled EMPR. Section 2 of Alternative 2 has been tied in to Alternative 1 for the preferred route and this will ensure that the observers from road P38/1 have minimized visual impact.

	confined where hills or ridges occur. 3. There may be potential visual impact associated with the construction of the new 132kV powerline. 4. Visual impacts may influence observers travelling along the N6 Road; P38/1 Road (R701) and arterial roads within the region; number of observers residing at homesteads along the alignment. 5. In spite of the potential visual impacts neither of the proposed alignment alternatives is considered fatally flawed. 6. It is expected that the potential visual impacts associated with these options would be within acceptable limits and does not constitute an irreplaceable loss of visual resources. 7. Potential visual impact on sensitive visual receptors within 500m radius of the powerline structure for both alternatives is expected to be of high significance.	two routes, *i.e*. Route Alternative 2.	

	8. Potential visual impact of construction on sensitive visual receptors in close proximity to the proposed powerline is expected to be of a moderate and temporary significance. 9. Therefore, the anticipated visual impacts (post-mitigation) are not considered to be fatal flaws from a visual perspective.		
Ecological	**Both Route Alternative 1 & 2** Mid-section of the proposed alignment routes indicates a Critical Biodiversity Area and this coincides with a rocky ridge complex that extends perpendicular to the proposed alignment. Flora 1. The proposed development area occurs within an ecotone area that includes a diversity of habitat type, including riparian, savanna, Karoo and grasslands of various types. 2. The area is generally typified by grassland-dominated low-lying plains interspersed by low shrub-dominated rocky	Careful planning; implementation of thorough site searches of the construction footprint before the onset of the construction phase, a rescue plan and/or layout should be considered. Construction footprint should be minimised to reduce impacts on the habitat units. The ecological sensitivity map needs to be taken into consideration during the planning phase of	The ecological sensitivity map should be taken into account by the design engineer for the spanning of the towers within the authorised route corridor. A thorough site search should be conducted before the onset of the construction phase and a rescue plan. The mitigation measures have been included in the compiled EMPR.

	outcroppings and hills. 3. Agriculture is the dominant land use within the area, with cultivation and livestock grazing being a prominent feature and driver of ecological change. 4. No protected tree species were noted during the field survey. 5. Only three species were regarded as being rare in the desktop survey. Fauna 1. The habitat types identified for the survey region: Grassland, Bushveld and woodlands, Freshwater habitats, cultivated lands and Karoo. 2. Those species that are known to have a preference for the habitat units above are thought to suffer potential negative impacts from the proposed development activities. Mammals 1. There are 78 mammalian species that have been historically recorded from the region pertaining to the	the tower positions. Route Alternative 1 is the preferred route from an ecological perspective. However, Route Alternative 2 can also be supported.	

	proposed development site. 2. There are 10 species regarded as being of conservation significance and76% of the species which are regarded as being of least concern. 3. There is one species listed as endangered (*Mystromys albicaudatus* – African white-tailed rat), which is considered to have a medium probability of occurrence within the survey area. 4. Orange listed species that have a medium-high probability of occurrence within the survey area include *Leptailurus serval* – Serval (NT). 5. *Rhinolophusclivosus*- (Geoffroy's horseshoe bat) and *Myotistricolor* (Temminck's Myotis), which are near threatened species are recorded in the region. 6. One individual African striped weasel (*Poecilogale albinucha*) was observed during the survey that had been killed by a vehicle on		

	the N6 Road, confirming their presence within the area Reptiles 1. The region has relatively low reptilian species diversity, presumably as it is regarded as an under-studies area. 2. The rocky ridge habitat in particular is noted as a productive and therefore sensitive habitat type and remains an important habitat type for the conservation of these taxa within the region. Amphibians 1. The survey area does include wetland habitat of suitable quality and therefore it is assumed that Giant bullfrog (*Pyxicephalus adspersus*) does occur and breed within the local area. 2. The Common caco (*Cacosternum boettgeri*) was the only species encountered during the field survey. 3. All wetland zones associated with the survey area should be observed as ecologically sensitive habitat features to support amphibian diversity in general.		

	Fish 1. A total of ten fish species are known to inhabit the reach of the Orange River associated with the proposed powerline crossing point. None of these species are regarded as being of conservation concern. 2. One exotic species, namely the common carp (*Cyprinus carpio*) is also expected to occur Invertebrates 1. The invertebrate taxa that are of conservation concern include the Mygalomorph spiders, scorpions, certain butterfly (Lepidoptera) and dragonfly and damselfly (Odonata) species. 2. No Mygalomorph spiders were noted during the field survey, but viable habitat that would support these species is common throughout the region. 3. Scorpions also are regarded as an understudied taxon within the region. 4. Only five species are on record and none of which are		

	of conservation concern 5. No scorpion species were noted during the field survey, but viable habitat that would support these species is common throughout the region.		
Avifauna	**Both Route Alternative 1 & 2** 1. Migratory routes have been identified along the survey area. 2. The Greater flamingo (*Phoenicopterus ruber*) and Lesser flamingo (*Phoenicopterus minor*) have been recorded from the region. However, the likelihood of them occurring within the survey area in significant numbers is low. 3. Some watercourses are traversed by the proposed development and therefore collision impacts as a result of the proposed development area concern. 4. Species of conservation concern that could be adversely affected by this impact include the ground-dwelling and nesting species such as the bustards,	The fitment of bird flappers to make the lines visible must be undertaken within the migratory routes to mitigate against fatalities due to collisions with the overhead line	The proposed fitment of bird flappers will be considered by the design engineers. The mitigation measures have been included in the compiled EMPR.

	korhaans as well as the Secretary bird. This is also applicable to larger raptors that would potentially nest in the larger trees that occur within riparian zones of the watercourses within the area. 5. The White stork (*Ciconia ciconia*) and Abdim's Stork (*Ciconia abdimii*) are protected under the BONN Convention and are annual migrators to the region. These species are threatened as a result of their collisions with overhead infrastructure and habitat destruction on a global scale. 6. Abdim's storks were observed during the field survey. 7. The critically endangered species, Bearded vulture (*Gypaetus barbatus*) has been spotted along the eastern side of the survey area. 8. No RDL floral species were noted during the field survey. 9. Desktop survey indicated that the limited floral species within the area are		

	considered to be of conservation significance. 10. The non-RDL species that may be impacted by collisions with the proposed overhead powerline within the survey region include herons, egrets, waterfowl, larger game birds, owls and a variety of larger raptors. No very high/fatally flawed impacts have been perceived to be associated with the proposed development.		
Aquatic	**Both Route Alternative 1 & 2** The expected impacts would be limited to the clearing of some taller trees within the riparian zone. 1. The survey area falls within the Orange River (D) Primary Catchment and D1 Secondary Catchment. Northern area falls within the Highveld aquatic ecoregion and the southern areas falls within the Nama-Karoo aquatic Ecoregion. 2. Informal smaller impoundments along watercourses. 3. The hydrology of the	Habitat destruction should be limited to the absolute minimum. Care should be taken to minimise the construction footprints for each tower and not cause undue destruction of habitat. The overall risk to surface water ecosystems is thought to be insignificant, as the single steel poles can be spanned in a way that sensitive ecological	Mitigation measures have been included in the compiled EMPR.

	watercourses and local catchment is impacted by agricultural activity. 4. No significant changes to the land use of the catchment have occurred within the recent past and therefore it is assumed that this remains relevant. 5. The watercourses within this catchment area are categorised as moderately modified. 6. This is largely due to encroachment of agricultural activities within the riparian zones, the large number of impoundments along the watercourses and water quality degradation due to agro-chemical usage and also the impacts associated with urbanisation within the catchment. 7. The section of the Orange River that was surveyed had a homogenous habitat type (biotope). The substrate was dominated entirely by sand and finer gravel, which is regarded as a substrate of low productivity. The flow	features are avoided.	

	rate was either slow-medium within deeper areas and slow within the shallower areas. 8. As the survey took place within the low-flow season, the inner riparian zones were dominated by non-vegetated sand banks, which dominated the active channel. 9. The banks of the watercourse were subject to erosion and were therefore generally high-cut and incised, especially on the outer edges of bends within the river. The habitat can be regarded as poor and therefore a low aquatic biodiversity was expected. 10. Instream ecological integrity was rated at 76.4%, which indicates a relatively good rating 11. Abstraction for formal irrigation as well as the regulation of flow from upstream impoundments has altered the natural seasonality of the system, which is mostly evident during low-flow conditions.		

	12. A survey at Beeskraalspruit indicated that the watercourse was largely bedrock dominated, with a few loose rocks and cobbles. 13. The water was generally shallow due to the lack of substantial flow. 14. The presence of algae was noted as a prominent feature within the water, which is an indication of a high nutrient load. 15. A lot of cattle activity was noted throughout the riparian zones and therefore it is presumed that a large source of the nutrient load comes from livestock.		
Wetland Delineation	**Both Route Alternative 1 & 2** 1. The wetlands associated with the survey area represent channelled valley-bottom wetlands and seep zones associated with the watercourses. 2. The most substantive wetland habitat units associated with the area are channelled valley-bottom wetlands. 3. The proposed infrastructure,	A 30m wide recommended conservation buffer zone from the outer limits of these habitat units should be observed wherein development should be restricted. The overall risk to surface water ecosystems is thought to be insignificant as the single steel poles can be	The recommended conservation buffer zone will be considered during the detailed design of the powerline and erection of towers.

	being an overhead powerline is able to span across or otherwise avoid these sensitive ecological features. 4. The overall risk to surface water ecosystems is therefore deemed to be of low significance. 5. The hydrology of the wetland units has been modified through numerous impoundments that impede natural runoff. 6. The proposed development has an association with valley-bottom wetland habitat units, floodplain wetlands and hillslope seepage zones. 7. The most prominent driver of ecological change is grazing of livestock, which has altered vegetation structures and together with trampling impacts, has led to destabilisation and erosion of the majority of the watercourses. 8. The wetland units' fall within a C PES range, however, variations do occur. This translates to wetland systems that are currently	span in a way that sensitive ecological features are avoided.	

	supplying a *moderately low* ecological service. 9. The wetland functionality elements (flood attenuation, and water purification) are also ranked high. 10. Tourism and recreation also rank relatively high due to the opportunity for birding within these areas and the survey area is located along a tourist route. 11. The survey area has various associations with wetland habitat units and therefore conservation buffer zones are applicable.		
Floodline Determination	**Both Route Alternative 1& 2** The close proximity of the alternative sites has no influence on the level of the peak flood. It can be regarded as one crossing, which means the flood level will remain the same for all the crossings of the sites.	The 1:100 flood peak for the crossings of the powerlines is10.446$m^3.s^{-1}$ and one can work on the height of the 1309.50 contour line as indicated on the attached plans.	The findings of the floodline determination will be incorporated during the detailed design of the powerline.

10. AN ENVIRONMENTAL IMPACT STATEMENT

10.1. SUMMARY OF THE KEY FINDINGS OF THE ENVIRONMENTAL IMPACT ASSESSMENT

The summary of the key findings of the environmental impact assessment are as follows:

1. The alternative routes identified have common sections and some sections follow the route of the existing 66kV hence they have similar impacts.
2. Impacts that were identified during the public participation process could not be mitigated therefore had to be avoided completely by altering the alternative route 1 alignment. Visual impacts, which is considered to be high was not raised during consultation with identified I&APs. However, no objections were received for the proposed development.
3. The proposed development will largely impact areas that have been degraded by farming activities and associated infrastructure, e.g. boreholes, fencing of grazing areas, etc.
4. To be able to have a transmission line from Aliwal North to Rouxville, crossing of the Orange River, wetlands and streams cannot be avoided therefore mitigation measures have to be outlined.
5. Both proposed routes are not considered to be fatally flawed from ecological, visual, archaeological studies.
6. Mid-section of the proposed alignment routes indicates a Critical Biodiversity Area and this coincides with a rocky ridge complex that runs perpendicular to the proposed alignment.
7. The development footprint is assigned a medium palaeontological sensitivity.
8. Migratory birds were identified on both the proposed route alternatives and the critically endangered species, Bearded vulture has been spotted along the eastern side of the survey area.
9. .No Red Data Listed floral species were noted during the field survey.
10. The watercourses within this catchment area are categorised as a moderately modified and the banks of the Orange River were subject to erosion.
11. Wetland systems in the area are currently supplying a *Moderately low* ecological service.
12. There are other land uses within the vicinity of the proposed route, which has played a major role in the transformation of the area.

Due to the high similarity of the identified alternatives, impacts on the environment are expected to be similar. The significance of the identified impacts could reduced with outlined mitigation measures and ones which could not be mitigated, best practicable measures were outlined and these impacts ranges between development footprint and localized extent. It is clear that if mitigation measures are in place, then there will be no residual impacts.

10.2. A MAP WHICH SUPER IMPOSES THE PROPOSED ACTIVITY AND ITS ASSOCIATED STRUCTURES AND INFRASTRUCTURE ON THE ENVIRONMENTAL SENSITIVITIES OF THE PREFERRED SITE INDICATING ANY AREAS THAT SHOULD BE AVOIDED, INCLUDINGBUFFER AREAS

Based on the ecological impact assessment conducted, the map attached hereto as **Appendix 9** indicates the environmental sensitivity of the preferred route. From this map, it can be seen that the ecologically sensitive areas are where the powerline route crosses over the Orange River, the ridge which the route is along its base, Beestekraalspruit crossing and rocky ridges. These are the common areas for both alternative 1 and 2. However, should the mitigation measures outlined be adopted then the impact on these areas will be minimized to a greater extent therefore it is imperative for the sensitivity map to be considered during the final design of the powerline.

10.3. A SUMMARY OF THE POSITIVE AND NEGATIVE IMPACTS AND RISKS ASSOCIATED WITH THE PROPOSED ACTIVITY AND IDENTIFIED ALTERNATIVES

Positive impacts associated with the proposed development are as follows:

1. Temporary job creation-These will ensure that the local communities in Aliwal North and Rouxville areas benefit from job opportunities created during construction phase, although the opportunities will be limited to the semi-skilled and non-skilled individuals.
2. Adequate supply of electricity for future developments, whereby the local authorities will have enough capacity to fulfill their basic services to their residents relating to electrification.
3. No resettlement will be required for the proposed line or possible encroachment as it occurred with the existing 66kV.

These impacts are applicable for both the route alternatives identified for the proposed development.

The negative impacts identified were both for during construction and operation phase. These impacts are considered to have an active effect especially during construction phase; these impacts are air quality, excessive generation of noise and traffic flow impact due to construction-related activities. However, with mitigation, these impacts can be reduced to a greater extend. Other impacts associated with construction are destruction of wetlands, changes in the water quality, loss of vegetation and destruction of potential habitat and their effect can be greatly reduced if construction activities are limited to the development footprint and the outline mitigation measures are implemented. The impacts on the watercourses will be ameliorated if there will be no tower placement and the protection buffer zones of wetlands are demarcated prior to commencement of construction. No heritage artefacts were found on the proposed alternative routes,

therefore there will be no impact, however, should there be any findings then the outlined mitigation measures should be implemented.

During operation phase, identified impacts associated with the proposed powerline are visual intrusion and birds dying from collision with the transmission wires. After the decommissioning f the existing 66kV, visual intrusion will be lessened. Realignment of Alternative route 1 will also lessen the visual impacts on the P38/1 road users. There are migratory bird routes that have been identified and they are on both the identified route alternatives, hence, the proposed measure is to make the lines more visible by using bird flappers. There are no fatally flawed impacts have been perceived to be associated with the proposed development as most of the impacts can be mitigated and those that can't be avoided, *i.e*. visual intrusion and habitat modification, best practice measures have been outlined to reduce the impact significantly, which are to be included as conditions to the environmental authorisation.

11. BASED ON THE ASSESSMENT, AND WHERE APPLICABLE, IMPACT MANAGEMENT MEASURES FROM SPECIALIST REPORTS, THE RECORDING OF THE PROPOSED IMPACT MANAGEMENT OBJECTIVES, AND THE IMPACT MANAGEMENT OUTCOMES FOR THE DEVELOPMENT FOR INCLUSION IN THE EMPR

The impact management measures from specialists are as follows:

1. No mitigation measures outline for archaeological artefacts as the alternative routes have been assigned a low archaeological significance rating.
2. A mitigation measure for palaeontological is applicable if there are discoveries of palaeontological artefacts during construction, especially excavations, whereby Protocol for Finds should be followed.
3. Ecological sensitivity areas should be taken into account and 32m buffer zones should be adhered to during the planning of tower positions.
4. Fitment of bird flappers must be undertaken within the identified avifaunal migratory routes and zones to mitigate against fatalities due to collisions with the overhead powerline.
5. Careful planning of infrastructure so as to minimize visual impact. Basic education of operators and on-site management will enable the impacts to be significantly reduced.
6. Natural vegetation in all areas outside the development footprint must be retained during construction or re-established on completion of construction.
7. On completion of construction phase, all disturbed areas must be rehabilitated immediately and an ecologist should be consulted regarding rehabilitation specifications.

8. All rehabilitated areas should be monitored at least for a year following decommissioning and remedial actions implemented as and when required.

The management actions to be included in the EMPR are as follows:

1. Appointment of ECO prior to commencement of construction at least a month before.
2. ECO should approve areas identified for the establishment of site office, camp site, material storage areas to ensure they aren't located on sensitive areas, e.g. drainage lines and also minimize the overall construction footprint.
3. Sensitive areas must be demarcated prior to commencement of construction.
4. Walkover study should be undertaken a month vegetation clearance.
5. Environmental awareness training should be included in the daily toolbox talks to ensure that the workforce and individuals visiting the site are aware of their responsibilities.
6. Chemical toilets must be provided, with a 1:15 persons ratio and the positioning of toilets must be done in consultation with ECO.
7. Ongoing commitment of informing local authorities, stakeholders and landowners throughout the lifecycle of the project must be maintained.
8. Monitoring of environmental performance throughout the project will be the responsibility of the ECO.

The mitigation objectives that have been included in the EMPR are as follows:

1. Noise levels mustn't affect the neighbouring land-users and livestock.
2. Dust level generated must not impact on the health of the construction workers and surrounding land-users so that the air quality standards are maintained throughout the lifecycle of the project.
3. Waste generation doesn't impact on the surrounding environmental systems.
4. All disturbed areas during construction should be rehabilitated.
5. Construction workers should be provided with potable water and proper sanitation facilities.

It's imperative that daily observations are made regarding environmental performance and incident report with visual records and monthly reporting. Given the above, strict adherence to the EMPR attached hereto as **Appendix 10** should be mandatory to ensure that impacts on the receiving environment are significantly minimized.

12. ANY ASPECTS WHICH WERE CONDITIONAL TO THE FINDINGS OF THE ASSESSMENT EITHER BY THE EAP OR A SPECIALIST, WHICH ARE TO BE INCLUDED AS CONDITIONS OF AUTHORISATION

There were no other conditional aspects to the findings except for the ones discussed in Section 13 below.

13. A DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES, AND GAPS IN KNOWLEDGE WHICH RELATE TO THE ASSESSMENT AND MITIGATION MEASURES PROPOSED

Assumptions

- Some of the towers could be positioned within 32m of boundaries, but that will be confirmed on approval of the route.
- All information provided by NSVT Consultants and specialists involved is deemed valid and correct at the time it was provided.
- The methods undertaken during the public participation process are deemed adequate and were able to provide identified I&APs with opportunity to gain more knowledge about the proposed development and to enable them to voice any issues of concern throughout the process.
- The information contained in the report provide a complete understanding of the proposed development including its potential impacts and mitigation or management measures, which will enable DEA to make an informed decision.

Uncertainties

- The effect of the powerline (electromagnetic fields) on the livestock grazing under the transmission lines as this issue was raised during public participation.

Limitations/Gaps in Knowledge:

- Limited design information, i.e. positioning of the towers were provided by Eskom.
- From the palaeontological, limited studies have been undertaken in this area as a result there is limited material for literature review.
- From the ecological study, it is possible that some species could have been missed because the survey was conducted within a two days period thus the list provided doesn't give a true reflection of the species that occur within the route.

14. 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 INCLUDED IN THAT ENVIRONMENTAL AUTHORISATION

Although both route alternative had no fatal flaws that could result in the proposed development not going ahead, the EAP recommends Route Alternative 1 to be authorized by the DEA. However, the following conditions should be contained in the Environmental authorisation:

1. Sensitivity map be considered during the finalization of towers location.
2. The draft EMPR approved by DEA should be made a legally binding document on Eskom and contractors or anyone involved during implementation of the project.
3. Environmental Compliance Officer should be appointed to oversee monthly audits from pre-construction phase until completion of rehabilitation.
4. A walkover study should be undertaken prior to commencement of construction.
5. Landowners should be informed on the exact location of the towers have been finalized to ensure that the powerline doesn't interfere with the farming activities.
6. The contractor should provide method statement when undertaking vegetation clearance on the sensitive areas per sensitivity map.
7. Sanral, Telkom, Transnet and Free State Roads should be informed and way leaves applied where required.

15. WHERE THE PROPOSED ACTIVITY DOES NOT INCLUDE OPERATIONAL ASPECTS, THE PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED, THE DATE ON WHICH CONSTRUCTION WILL BE CONCLUDED, AND THE POST CONSTRUCTION MONITORING REQUIREMENTS FINALISED

The environmental authorization will be required during the construction phase of the proposed development and a date will only be set once all the necessary authorizations and licenses are received from competent authorities. However, the construction phase period, including post construction monitoring will require approximately 12 months; this is based on similar projects that have been undertaken before by Eskom, therefore the period could change based on various conditions.

16. ENVIRONMENTAL MANAGEMENT PROGRAMME

A draft Environmental Management Programme report which addresses the potential environmental impacts of the proposed development is attached hereto as **Appendix 10**. Eskom has overall and total environmental responsibility to ensure that the EMPR is implemented throughout the lifecycle of the project.

17. AN UNDERTAKING UNDER OATH BY THE EAP:

I, _____ in my capacity as the EAP hereby declare that:

1. The information provided in the report is correct;
2. Comments and inputs from stakeholders and I&APs have been included in the report;
3. Inputs and recommendations from the specialist reports have been included in the report;
4. Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties have been included in the report;
5. Have provided the competent authority with access to all information at my disposal regarding the application

Signature of the EAP:_____

Name of Company: **NSVT Consultants**

Date: _____

REFERENCES

Department of Environmental Affairs (2017), Public Participation guideline in terms of NEMA EIA Regulations, Department of Environmental Affairs, Pretoria, South Africa.

Geological Survey: Map 3026 Aliwal North - 1:250 000 Geological Series, Pretoria, 1983

Mohokare Local Municipality Draft 2012-2017 IDP

Walter Sisulu Local Municipality Integrated Development Plan 2016/17 Financial Year

http://www.saexplorer.co.za/south-africa/climate/rouxville_climate.asp
Source accessed 4th of October 2017

http://www.saexplorer.co.za/south-africa/climate/aliwal_north_climate.asp
Source accessed 4th of October 2017
Specialists Reports compiled as part of the BA Process

APPENDIX 1

CURRICULUM VITAE OF EAP

APPENDIX 2

LOCALITY MAP OF THE PROPOSED ROUTE ALTERNATIVES

APPENDIX 3

DECOMMISSIONING OF AN EXISTING POWERLINE ENQUIRY

APPENDIX 4

PRELIMINARY TOWER DESIGN

APPENDIX 5

LOCALITY MAP OF THE PROPOSED ROUTES BEFORE IDENTIFICATION OF PREFERRED ROUTE

APPENDIX 6

PUBLIC PARTICIPATION REPORT

APPENDIX 7

SURFACE WATER RESOURCES MAP

APPENDIX 8

SPECIALISTS' REPORT

APPENDIX 9

SENSITIVITY MAP

APPENDIX 10

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME