

HERITAGE IMPACT ASSESSMENT: PROPOSED CONSTRUCTION OF A 400kV POWERLINE FROM BLANCO SUBSTATION (GEORGE) TO DROERIVIER SUBSTATION (BEAUFORT WEST), WESTERN CAPE

(Assessment conducted under Section 38 (8) of the
National Heritage Resources Act No 25 of 1999)

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August 2016



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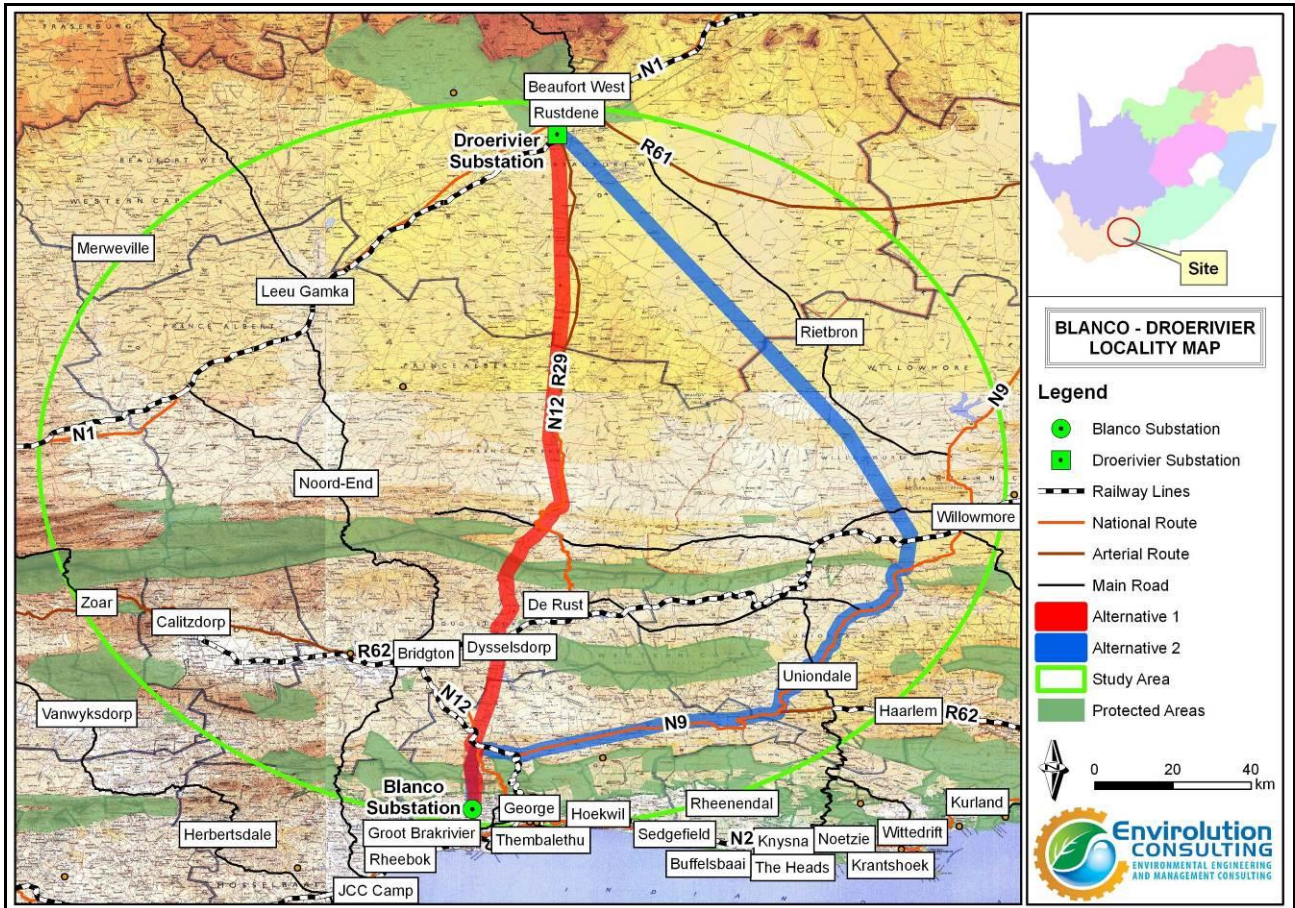
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EXECUTIVE SUMMARY

Site Name: Proposed 400 kV powerline from the Blanco substation to the Droërvier substation.

Location: Two alternative powerlines running between George and Beaufort West. Alternative 1 (red) falls in the Western Cape, but a portion of Alternative 2 (blue) runs through the Eastern Cape.

Locality Plan:



The position of the two alternative powerlines between the Blanco substation at George and the Droërvier Substation at Beaufort West.

Description of the Proposed Development:

- **Alternative 1** (red corridor or preferred alternative) is approximately 178 km long and aligned to the existing Droërvier - Proteus 400 kV powerline. From the proposed Blanco substation, the line will cross the Outeniqua Mountains and the N12 at the intersection with the R62/N9 in the Waboomskraal valley. It will pass some 800 m west of the town of Dysveldorp, cross the R341 and then cross over the Swartberg Mountains. The line will run 3 km to the west of the village of Klaarstroom. It will then cross the R407 and run parallel to the N12 across the escarpment (which is very flat) to the Droërvier substation.
- **Alternative 2** (blue corridor) is 270 km long. It will exit the Blanco substation and at the intersection of the N9 and N12, the proposed corridor will turn east and follow the N9/R62 (Langkloof), running very close to the western side of Uniondale. It will cross the R339 and the R407, and run 14 km to the west of Willowmore and 8 km to the west of Rietbron. This

small section of the line falls within the Eastern Cape Province. The section of lands between the R407 and the Droërivier substation appears to be untransformed Karoo veld.

The corridor will be 1km wide although the actual servitude will be 62 m.

The design of the pylons/towers has not been finalised. The first preference would be to use the 529 cross-rope and 520B guyed Vee towers in areas where there are no space constraints, and the 517/518 self-supporting towers at bends in areas where there are space constraints. Steel monopoles are considered the least desirable solution from Eskom due to cost.

Legal Background

A Notice of Intent to Develop was submitted to Heritage Western Cape and they have requested a Heritage Impact Assessment consisting of archaeology and a visual study with an integrated set of recommendations.

Archaeological Impact Assessment: Appendix 2
Visual Impact Assessment: Appendix 3

- The Interim Comment to the NID application did not request a Palaeontological Impact Assessment (although the Heritage specialist requested this).

Nevertheless, Envirolution Consulting did commission a **Palaeontological Baseline Assessment (desktop study)** and the results of this are included in this HIA (**Appendix 1**).

- Similarly, Heritage Western Cape did not ask for an assessment of the Built Environment or Cultural Landscape.

Following Section 38(3) of the National Heritage Resources Act (No 25 of 1999), even though certain specialist studies may be specifically requested, all heritage resources should be identified and assessed. Impacts to the Built Environment and Cultural Landscape are briefly identified and discussed in this HIA.

Since a short section of the line falls within the Eastern Cape Province, this report will also be submitted to the Eastern Cape PHRA (ECPHRA) for comment.

Palaeontological Resources Identified

The Baseline (desktop) assessment was conducted by John Almond of Natura Viva cc (Appendix 1).

Alternative 1: Sectors of potentially high palaeontological sensitivity along the Alternative 1 power-line route include several subunits of the Cape Supergroup, such as Bokkeveld Group bedrocks in the Klaarstroom area *plus* several narrow outcrop areas of Lower Witteberg Group (Weltevrede Subgroup) and Upper Witteberg Group (Lake Mentz and Kommadagga Subgroups) rocks within the Cape Fold Belt to the north. Karoo Supergroup subunits of potentially high palaeontological sensitivity include Lower Ecca Group rocks north of Klaarstroom, Waterford Formation deltaic sediments in the southern Karoo near Zwarskraal, as well as a long stretch of Lower Beaufort Group rocks across the width of the Great Karoo, from the Cape Fold Belt almost as far as the Great Escarpment near Beaufort West. The Lower Beaufort Group outcrop area here is of particular palaeontological interest because of its rich fossil vertebrates (e.g., reptiles, therapsids) of Middle Permian age that are assigned to the *Tapinocephalus* and *Priesterognathus* Assemblage Zones.

A member of the public has commented on the location of a Palaeontological Museum on the farm Klue, outside of Beaufort West.

Alternative 2: is considerably longer than Alternative 1. Sectors of potentially high palaeontological sensitivity along the Alternative 2 power-line include several subunits of the Cape Supergroup, such as Lower and Upper Bokkeveld Group bedrocks to the west of Willowmore area *plus* several narrow outcrop areas of Lower Witteberg Group (Weltevrede Subgroup) and Upper Witteberg Group (Lake Mentz and Kommadagga Subgroups) rocks within the Cape Fold Belt to the northwest of Willowmore. Karoo Supergroup subunits of potentially high palaeontological sensitivity include Lower Ecca Group rocks northwest of Willowmore, as well as a long stretch of Lower Beaufort Group rocks across the width of the Great Karoo, from the Cape Fold Belt almost as far as the Great Escarpment near Beaufort West. The Lower Beaufort Group outcrop area here is of particular palaeontological importance because of its rich fossil vertebrates (e.g., reptiles, therapsids) of Middle Permian age that are assigned to the *Tapinocephalus* and *Pristerognathus* Assemblage Zones. However, substantial areas of Beaufort Group bedrock here are masked by Late Cenozoic alluvium of low palaeontological sensitivity. Pan sediments to the southeast of Beaufort West are potentially of palaeontological interest.

Archaeological Heritage Resources Identified:

Archaeological Assessment was conducted by Lita Webley of ACO Associates cc (Appendix 2).

- Rock shelters with rock art and stone age archaeological deposit in the mountainous areas and particularly along the Langkloof valley (Alternative 2);
- Early and Middle Stone Age scatters across the landscape;
- Later Stone Age archaeological sites in proximity to koppies and river banks;
- Historical archaeological remains around farm steads;
- Remnants of historic roads and passes;
- Cemeteries and isolated graves associated with settlements and farms.

Built Environment Heritage Resources Identified:

The Built Environment assessment was conducted by Lita Webley of ACO Associates cc (although not specifically requested by HWC)

A range of towns, villages and farm complexes were identified during the drive down of the line options.

Town	Distance from Line alternatives
Beaufort West	Alternative 1 and 2 end 7 km south-west of Beaufort West
Blanco	Alternative 1 ends 4 km north-west of Blanco
De Rust	14 km to the east of Alternative 1
Dysseldorp	800 m to the east of Alternative 1
Klaarstroom	3 km to the east of Alternative 1
Schoonberg/Ezeljagt	1 km to the south of Alternative 2
Rietbron	8 km east of Alternative 2
Uniondale	700 m to the east of Alternative 2
Waboomskraal:	Alternative 1 will run through the middle of the valley
Willowmore	14 km east of Alternative 2

Although the two proposed powerline options do not cross any Provincial Heritage Sites, some farm buildings are of potential Grade IIIA significance.

Alternative 1: Individual farm house complexes of historic significance were noted in the Waboomskraal valley, along the Kammanassie River valley near Dysveldorp, along the Oude Muragie Valley and on the escarpment of the Great Karoo (Klue/Middelwater and Seekoeigat).

Alternative 2: Individual farm house complexes of historic significance were observed along the N9 between Uniondale and its intersection with the N12 (Langkloof).

Cultural Landscape Resources Identified:

The Cultural Landscape assessment was conducted by Lita Webley of ACO Associates cc (although not specifically requested by HWC)

After Winter & Oberholzer (2014), the following landscapes are considered of high scenic importance:

- The Outeniqua Mountains, the Kammanassieberge and the Groot Swartberge (all of Landscape Grade II significance).
- The Waboomskraal valley is a landscape of considerable aesthetic value with combination of a valley setting, wilderness surroundings and intensive hop cultivation (Landscape IIIB) and the Langkloof which extends through to Uniondale and is a rural settlement dating to the early 19th century, regarded as a distinctive valley, one of the most important fruit producing areas of the Cape (Landscape Grade II or IIIA).
- Mountain Passes including the *Outeniqua Pass* (Route II/III), the *Montagu Pass* (PHS), *Perdepoort* (Route III), *Meiringspoort* (Route II), the *Potjiesbergpas* and the *Duiwelskop Pass* (the latter two both ungraded).
- Scenic Routes including the road between Oudtshoorn and De Rust (Route III), the N9 from George to Uniondale (Route III) and the N12 from Klaarstroom to Beaufort Wes (Route III).

Visual Resources Identified:

The Visual Impact Assessment identifies the following four main landscape types:

- Groot Karoo
- Swartberg Mountain Range
- Klein Karoo Mountains
- Klein Karoo
- Outeniqua Mountains

The **Groot Karoo** landscape features a very strong desolate and isolated sense of place. It offers a unique sense of solitude and tranquillity in an arid natural environment. It is an arid landscape, sparsely populated with large Karoo sheep farms. The N12 is an important linking road through Meiringspoort to Beaufort West.

The **Swartberg Mountain Range** has a wilderness, natural landscape character that is an exceptional visual resource with high visual value. Large parts are considered to be in a pristine natural condition, with semi-natural conditions prevailing where major transport routes and power lines occur.

The **Klein Karoo Mountains** are largely in pristine natural condition and provide a picturesque backdrop the farms and towns of the Klein Karoo. Contained farming activities are present along the Nels and Kango Rivers, which have transformed the valleys to some extent. The agricultural modifications sometimes add favourably to the visual variety and promote visual harmony without major disruptions to the natural landscapes. Power lines traverse the landscape type and follow the same route as proposed by Alternative 1.

The **Klein Karoo** is mostly a rural landscape with various agricultural activities. Ostrich farming is synonymous with the Klein Karoo and flocks of ostriches are seen in camps across the central region. Large parts are transformed by agricultural activities in the form of pasture fields and ostrich camps. The central region has a more varied topography, occupied by the natural vegetation on the hill slopes and limiting agriculture on the level areas in the valleys.

The **Outeniqua Mountains** are considered the most southern part of the study area and consists of extreme topographic variation and pristine natural environments. It features high mountain

peaks and deep valleys which makes the area fairly inaccessible. The Langkloof is a 160 km valley that runs east west along the northern part of the mountain range, between the towns of Herald and Twee Riviere. It is a wide valley that provides agricultural potential. Waboomskraal is a valley basin that is located between some high peaks. It is particularly picturesque with the hop plantations in the valley, surrounded by high mountain peaks.

Anticipated Impacts on Heritage Resources:

While the footprint of the towers is relatively small so that direct physical impacts to heritage resources are unlikely, the visual impacts to heritage resources are high.

Impacts on Palaeontology

The Baseline Assessment by Almond (2015) concludes: A substantial proportion of proposed power-line sectors will cross formations that are conservatively regarded as moderate to high sensitivity". "In practice, however, the likelihood of significant negative impacts on fossil heritage on the ground is low over most sectors of these routes because the bedrocks here are often highly weathered, tectonically- deformed or covered by a substantial thickness of fossil-poor superficial deposits (scree, alluvium, soils, etc)".

Impacts on Archaeology

- Caves and rock shelters, whilst not directly impacted by the construction of a tower footing, may become more easily accessible to people leading to potential vandalism of rock art sites and archaeological deposits. The likelihood of this occurring is **medium to low**;
- In situ scatters of ESA and MSA stone artefacts may be damaged. The likelihood of this occurring is **very low**;
- In situ, LSA archaeological sites may be damaged by the construction of the tower footings and access roads. The likelihood of this occurring is **medium to low**;
- Ruined structures and historic rubbish dumps may be impacted by the tower footings and access roads. The likelihood of this occurring is **medium**;
- The proposed tower footings may result in the destruction of farm cemeteries and graves. The likelihood of this occurring is **medium**.

Impacts on Built Environment

- Visual impacts on the towns of Uniondale and Dysseldorp may occur;
- Visual impacts to historic farm complexes, particularly those in close proximity to the lines - impacting on their sense of place.

Impacts to Cultural Landscape

- The two proposed alternative lines will be crossing a number of mountain ranges (the Outeniqua, Kammanassie and Groot Swartberge). These mountains are of high significance and the impacts of the powerlines will be of a visual nature;
- With respect the mountain passes (Outeniqua & Montague Passes), the powerlines will run at a distance of at least 4 km and will not be visible. The powerlines will not be visible from Meiringspoort or Perdepoort;
- With regard scenic routes, Alternative 1 crosses the N12 and the R341 on two occasions, and then runs parallel to the N12 through the Great Karoo. However, it will be running in parallel to an existing 400 kV line. Its impact will be cumulative;
- Alternative 2 will run along the N9/R62 for a considerable length (120 km). Although there is a small powerline along sections of this route, a new line will introduce a very high visual impact in the narrow Langkloof valley.

Visual Impacts

The Visual Impacts are described in full in Appendix 3.

Briefly, the VIA noted that the viewers that are mostly affected are motorists, tourists and farming communities. Overall, a relatively low to medium viewer incidence is expected apart from the areas where major transport routes are crossed or are running parallel to the proposed routes. Highly sensitive viewers and viewer groups occur all along the proposed routes. Concentrations of highly sensitive viewers have been identified as:

- Residents of Dysseldorp and Uniondale;
- Motorists on the scenic routes such as the N9 through Langkloof to Willowmore and on the N12 section through Waboomskraal; and
- Tourists visiting the tourist attractions and overnight facilities that are within the ZMVE.

Cumulative Impacts

Alternative 1 runs in parallel with an existing 400 kV line for most of the route. Alternative 2 will run in parallel with a smaller powerline through the Langkloof.

A high risk of cumulative visual impacts will be experienced along Alternative 1 as the route is proposed alongside an existing transmission line and lower voltage power line. These parallel running power lines increase the visual dominance of electrical infrastructure, and contrast with the rural or pristine natural character that prevails.

Comments from Registered Conservation Bodies, Municipalities and I&APs

The **De Rust Heritage Conservation Association** was approached directly by the consultant to comment on the proposed line options, although Alternative 1 is at least 14 km to the west of the town. They have indicated that they have no comments to make.

The Simon van der Stel Foundation, Oudtshoorn Heritage, Prince Albert Cultural Foundation and the George Heritage Trust have all been approached to comment.

During the Scoping Phase of the EIA, at least five landowners reported that they had “Bushmen Paintings” on their properties and that they were concerned about potential impacts. However, the information provided with respect location of these sites it too vague to assist in their identification or mapping. They all occur within the Langkloof valley, where rock art sites have been reported in the past. Cognisance is taken of the presence of San paintings on both line options, particularly in mountainous areas.

Some landowners have reported on historic farm buildings on their properties.

Further specific comments from the public include:

- The historic wool washing troughs at Klaarstroom;
- A palaeontological museum on the farm Klue (Middelwater), near Klaarstroom;
- The mission station of Ganzenjacht in the Langkloof;
- Kammanassie settlement along the Kammanassie River;
- De Kruis and Voorsorg “ostrich palaces”.

Archaeological Recommendations:

The tower footings for the 400 kV line are relatively small and they are unlikely to result in significant damage to archaeological material such as scatters of ESA and MSA material, which are generally not in situ.

The walk down phase of the EMP should:

- Assess the possibility of impacts to *in situ* LSA sites by a targeted walk down of certain sections of the line, such as koppies and river banks;
- Where landowners have identified caves with rock art on their properties, a targeted survey at the walk-down phase can address any concerns about potential impacts. A range of mitigation options are possible, including the careful placement of the tower footings to avoid rock art sites (micro-siting of the tower footings will be required inside the 1 km wide corridors to avoid impacts);
- Rock art sites in proximity to the tower footings may also be protected from vandalism by ensuring that they are fenced off during the construction of the powerline;
- With respect historical archaeological material, a targeted walk-down of the line will be required after the final powerline route has been decided. It would concentrate on areas immediately around farm buildings and structures to ensure that a sufficient buffer has been implemented to avoid impacts to historic kraals, old sheds, rubbish dumps, etc;
- The walk down phase would concentrate on areas around historic farmsteads in order to ensure that graves area avoided;
- The towers may be constructed on/or in close proximity to farm graveyards. If graveyards are discovered during the walk down phase, a buffer of at least 15 m should be employed around them;
- If unmarked graves are uncovered during the construction of the tower footings, all work in that area should cease immediately, and HWC must be contacted.

Built Environment Recommendations:

The Visual Impact specialist has indicated that avoiding sensitive landscape features is the most effective mitigation measure in reducing direct, cumulative and residual impacts.

The position of the powerline with respect the farm structures, particularly those that are older than 60 years, will need to be negotiated with the landowner, on an individual case basis. In many cases it is preferable that the powerlines run behind the main residence, so that it is not visible in the viewshed, but landowners may differ in their perception of the visual impacts of powerlines. Some landowners may prefer the visual impacts to buildings rather than impacts to arable farm lands.

Visual Recommendations:

Reduction and remediation mitigation will not be effective to prevent residual impacts from occurring. The proposed transmission line will remain visible unless major design or alignment changes are implemented. The option of **consolidating existing lines into the design of the new transmission line is regarded as very effective and is highly recommended** to prevent major cumulative impacts. Although cumulative impacts may still occur, the significance thereof will be reduced and the breaching of a visual intolerance threshold may be avoided.

Avoiding sensitive landscape features and observers is regarded as being the most effective mitigation measure in reducing direct, cumulative and residual impacts. This is, however, a complex measure to implement, and is reliant on technical/feasibility studies as well as a much larger study area assessment to ensure that other sensitive features and observers are not impacted. Due to these unknown factors, avoidance mitigation is only proposed within the 2 km corridor that will reduce visual impacts on certain receptors

Preferred Line Option:

- From an archaeological and built environment perspective, Alternative 1 is considered the preferred alternative merely because it is shorter, and therefore the impacts are potentially less to heritage sites;
- From a visual impact assessment, preferred route is Alternative 1 as its impact is lower over its entire length than Alternative 2. The baseline environment is already impacted by electrical power line infrastructure, which lowers the sensitivity to some degree. It is generally more acceptable to have two power lines in one corridor and concentrating the impact in this corridor, than to impact on landscapes that are free of transmission lines, thereby spreading the impact.

Author/s and Date:

Lita Webley	Archaeology	ACO Associates cc
I-Dot design Studio CC trading as i-scape	Visual Impact Assessment	
Natura Viva cc	Palaeontological desktop	

THE AUTHOR

Lita Webley is an archaeologist (PhD from the University of Cape Town 1992) with ACO Associates cc and has been conducting Heritage Impact Assessment and archaeological specialist studies in the Western Cape, Northern Cape and Eastern Cape Provinces since 1996. She is accredited as a Principal Investigator by the Association of Southern African Professional Archaeologists (ASAPA) CRM section as follows:

- Principal Investigator: Stone Age, Shell Middens and Colonial Period; and
- Field Director: Grave Relocations.

ACO Associates cc has no financial or other interest in the proposed development and will derive no benefits other than fair remuneration for consulting services provided.

SPECIALIST DECLARATION

I, Lita Webley, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have potential of influencing – any decision to be taken with respect to the application by the competent authority; and – the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offense in terms of regulation 71 and is punishable in terms of section 24F of the Act.

Signature of specialist



Specialist Field: Archaeology and Heritage

Name of Company: ACO Associates

GLOSSARY

Archaeology: Remains resulting from human activity which is in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

National Estate: The collective heritage assets of the Nation

Palaeontology: Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

SAHRA: South African Heritage Resources Agency – the compliance authority which protects national heritage in the Northern Cape.

Structure (historic): Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith. Protected structures are those which are over 60 years old.

Acronyms

CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
ECPHRA	Eastern Cape Provincial Heritage Resources Authority
ESA	Early Stone Age
EMP	Environmental Management Programme
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
LSA	Later Stone Age
MSA	Middle Stone Age
NHRA	National Heritage Resources Act, No 25 of 1999
SAHRA	South African Heritage Resources Agency

Our Ref: HMCENTRAL KAROO/CENTRAL KAROO DMA/400KV TRANSMISSION
POWERLINE FROM BLANCO TO DROERIVER SUBSTATION



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Date: 22 April 2015

Case No: 15033005AS0331E

Auto IDs: 3228 - 3867

RESPONSE TO NOTIFICATION OF INTENT TO DEVELOP
In terms of section 38 of the National Heritage Resources Act (Act 25 of 1999)
and the Western Cape Provincial Gazette 6061, Notice 298 of 2003

Attention: Ms Marinda Le Roux
PO Box 1898
Sunninghill
2157

CASE NUMBER: 15033005AS0331E

NID: PROPOSED 400KV TRANSMISSION LINE FROM BLANCO TO DROERIVER SUBSTATION, CENTRAL KAROO & EDEN DMA.

The matter above has reference.

Your NID dated 31 March 2015 was tabled and the following was discussed:

1. HWC discussed the proposed installation of the powerline between the above-mentioned substations in the Central Karoo & Eden DMA.
2. HWC noted that the proposed powerline will have a negative impact on the visual and cultural landscape/environment.
3. HWC requires further studies addressing potential archaeological finds, visual impacts and any other heritage resources that will be adversely effected by the proposed development.
4. HWC notes that it will not review or consider any impacts that fall outside of the Western Cape unless it is contextually related to heritage resources found within the borders of the province.

Requirement:

1. Since there is reason to believe that heritage resources will be impacted upon, HWC requires an HIA in terms of S. 38(3) of the NHRA (Act 25 of 1999) assessing the impacts on the following heritage resources which it has identified; visual landscape and archaeology.
2. An HIA is required consisting of an archaeological study and a visual impact assessment.

TABLE OF CONTENTS

1. INTRODUCTION	14
2. DEVELOPMENT PROPOSALS	14
2.1 Substations	14
2.2 Powerline Options	14
2.3 Pylon/Tower specifications	16
3. HERITAGE LEGISLATION	20
3.1 Structures (Section 34(1))	20
3.2 Archaeology (Section 35(4))	21
3.3 Burial grounds and graves (Section 36(3))	21
3.4 Grading	21
4. RECEIVING ENVIRONMENT	22
5. METHODOLOGY	24
5.1 Archaeology	25
5.2 Visual Methodology	25
6. BACKGROUND STUDIES	25
6.1 Palaeontology	25
6.2 Pre-Colonial and Colonial Archaeology	25
6.3 History/Built Environment	25
6.4 Cemeteries and Graves	31
6.5 Cultural Landscape	31
7. IMPACT ASSESSMENT	33
7.1 Impact on Palaeontology	33
7.2 Impact on Pre-Colonial and Colonial Archaeology	33
7.3 Impacts to Graves	34
7.4 Impacts to Built Environment	34
7.5 Visual Impacts	35
8. CUMULATIVE IMPACTS	35
9. COMMENTS FROM REGISTERED CONSERVATION BODIES AND I&APS	35
10. RECOMMENDATIONS	36
11. REFERENCES	37

1. INTRODUCTION

ACO Associates cc was appointed by Envirolution Consulting on behalf of the client, Eskom Holdings, to undertake Heritage Impact Assessment for the construction of a 400 kV transmission power line from the Blanco (Narina) substation at George, on the southern Cape coast to the Droërvier substation near Beaufort West in the Karoo. Alternative 1 and Alternative 2 powerline options have been proposed (Figure 1).

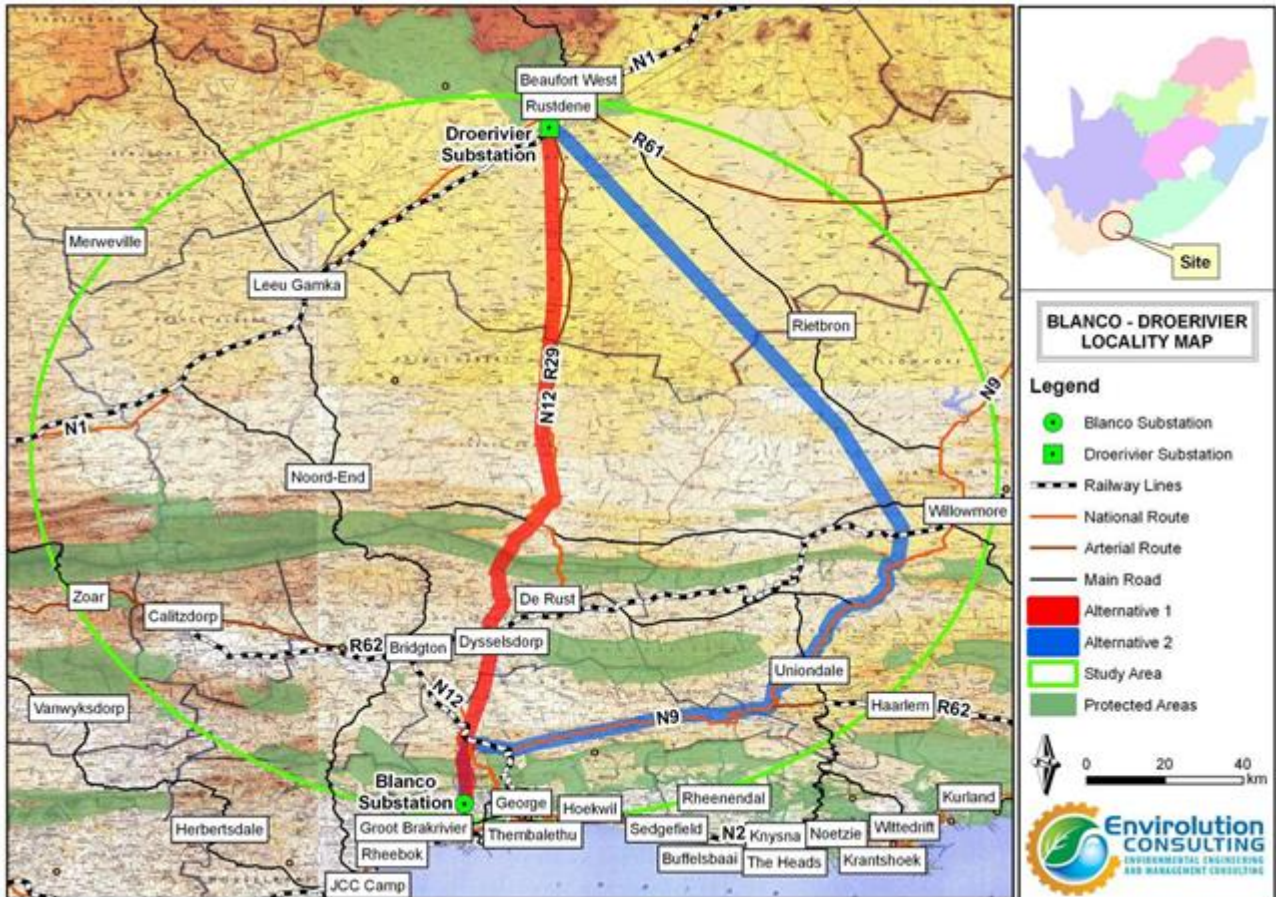


Figure 1: The location of the two powerline alternatives discussed in the text.

2. DEVELOPMENT PROPOSALS

2.1 Substations

The Droërvier substation is situated 3km south of the N2 and 5km from Beaufort West, while the Blanco (Narina) substation will be positioned on Alternative 5.

2.2 Powerline Options

The proposed powerline connecting Blanco and Droërvier will need to traverse two protected nature reserves.

Alternative 1 (red corridor or preferred alternative) is approximately 178 km long and aligned to the existing Droërvier - Proteus 400 kV powerline. From the proposed Blanco substation, the line will cross the Outeniqua Mountains which include the Ruitersbos Nature Reserve. There are already 2 existing powerlines which cross the nature reserve. Then the line will cross the N12 at the intersection with the R62/N9. It will pass some 800 m west of the town of Dysselsdorp, cross the R341 and then cross over the Swartberg Mountains. The proposed powerline will cross a

second nature reserve, the Groot Swartberg Nature Reserve, to the north-west of De Rust. The nature reserve stretches over the Swartberg Mountains for a distance of 200 km. The line will run 3 km to the west of the village of Klaarstroom. It will then cross the R407 and run parallel to the N12 across the escarpment (which is very flat) to the Droërvier substation.

Landuse in the area includes grazing lands and game farming. There are a few houses on Alternative 1.

The Droërvier substation is located on the farm Weltevreden 170/31, 35, 36 & 37. The substation is located about 8 km south-west of the town of Beaufort West. Access to the substation is from the N12.

Alternative 2 (blue corridor) is 270 km long. It will exit the Blanco substation and at the intersection of the N9 and N12, the proposed corridor will turn east and follow the N9/R62, running very close to the western side of Uniondale. It will cross the R339 and the R407, and run 14 km to the west of Willowmore and 8 km to the west of Rietbron. This small section of the line falls within the Eastern Cape Province. The section of lands between the R407 and the Droërvier substation appears to be untransformed Karoo veld.

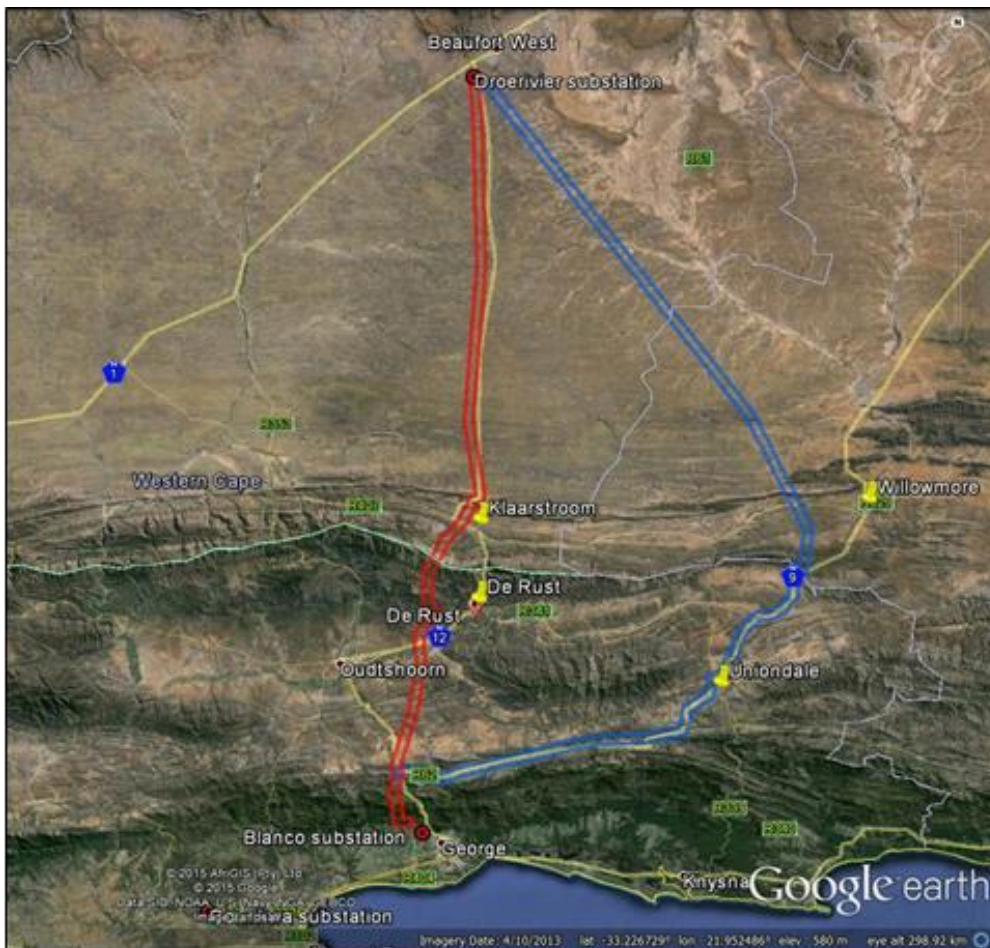


Figure 2: An aerial image of the location of the Blanco and Droërvier substations, and the towns of George, De Rust, Klaarstroom, Uniondale, Willowmore and Beaufort West.

- The corridor will be 1km wide although the actual servitude will be 62 m. Clearing of vegetation in the servitude is normally required to comply with safety standards;
- Construction of access roads may be required. Use will be made of existing roads where possible. It can be expected that new roads will be established by means of driving over the vegetation to create a two-tread track, as opposed to a graded road;
- Establishment of construction camps and stockyards will be required.

2.3 Pylon/Tower specifications

The first preference would be to use 529 cross-rope and 520B guyed Vee towers in areas of the line where there are no space/servitude constraints and 517/518 self-supporting towers at bends and in areas where there are space constraints. The height of the tower may vary depending on the terrain it traverses, but on average, it can reach heights of 50-60 m. Steel monopoles are the least desirable solution from Eskom mainly due to cost.

While it may be possible to paint the towers for a specific case, studies have shown that painting towers to “camouflage” them only works for a season i.e. a tower that is painted green may be less visible in spring/summer but be more visible in winter. “Camouflaged” towers could also have a negative environmental impact since birds and other species may collide with them. Should heavy machinery collide with one of the towers due to its camouflaged nature, this may result in interruption of power.



Plate 1: A 529 cross-rope tower



Plate 2: A 520B Guyed Vee tower



Plate 3: The 517/518 self-supporting tower. **Plate 4:** The extent of the impact of the tower footings are expected to be very low, unless placed directly on top of a heritage site.



Figure 3: The northern section of Alternative 1 of the Blanco-Droërivier line, showing the farm boundaries

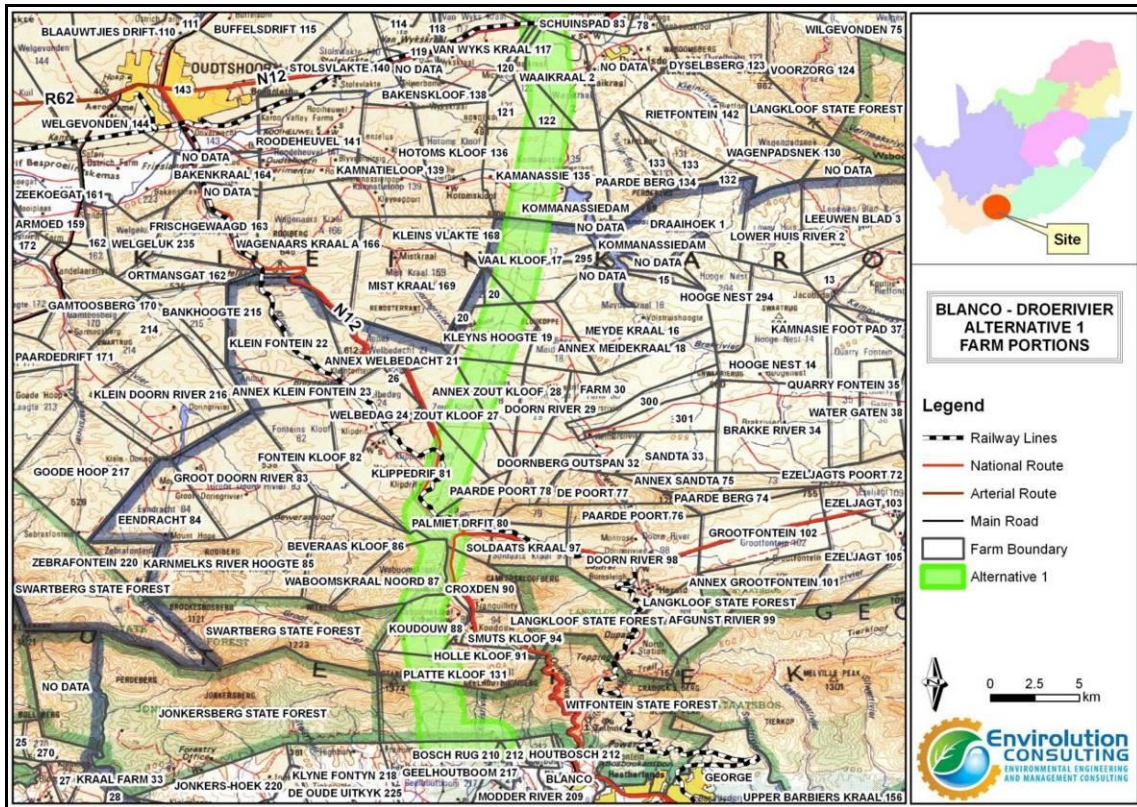


Figure 4: The southern section of Alternative 1, showing the farm boundaries crossed by the line.

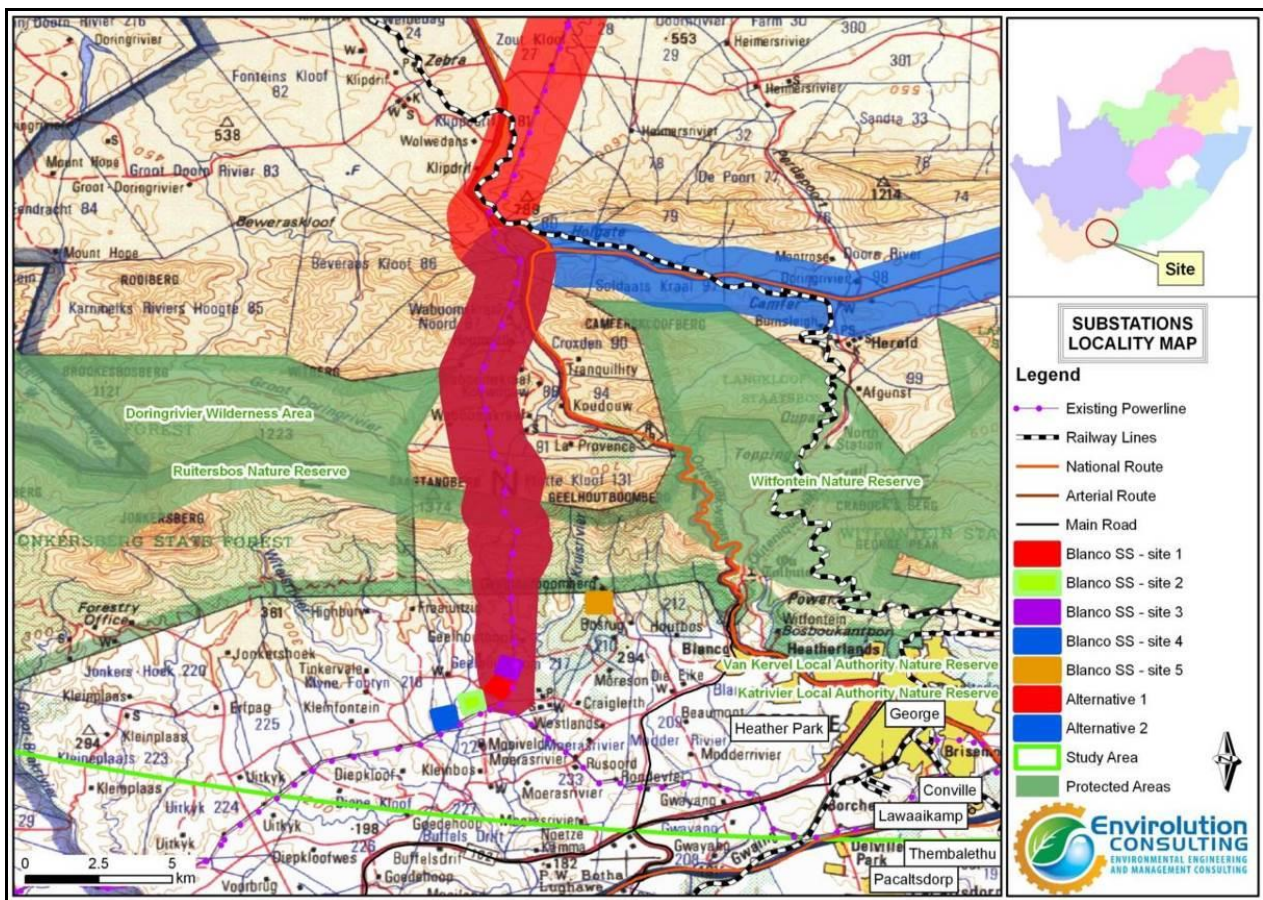


Figure 5: The route of both Alternative 1 and 2, over the mountains to the Blanco substation.

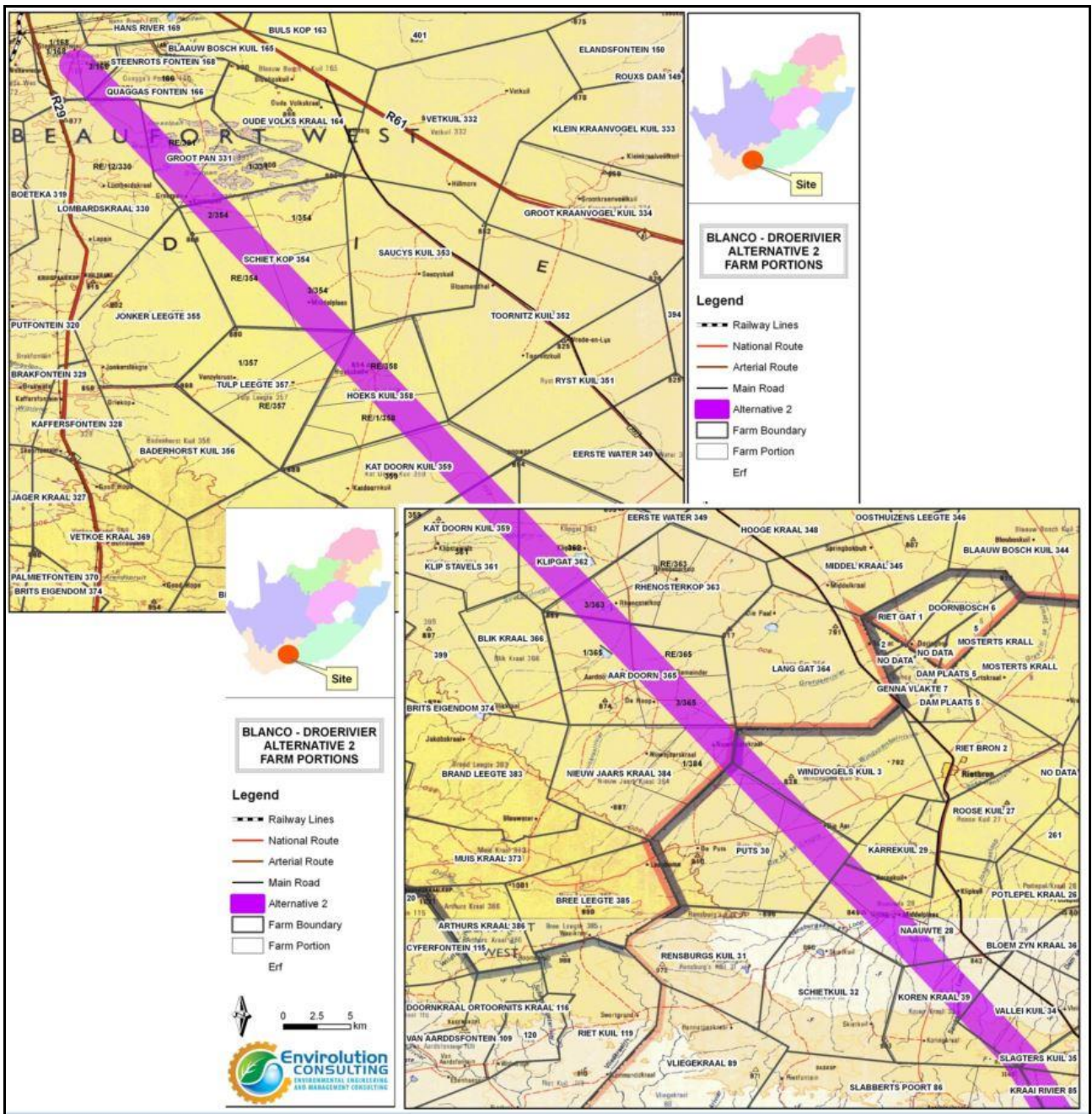


Figure 6: The northern section of Alternative 2, showing the farm boundaries.

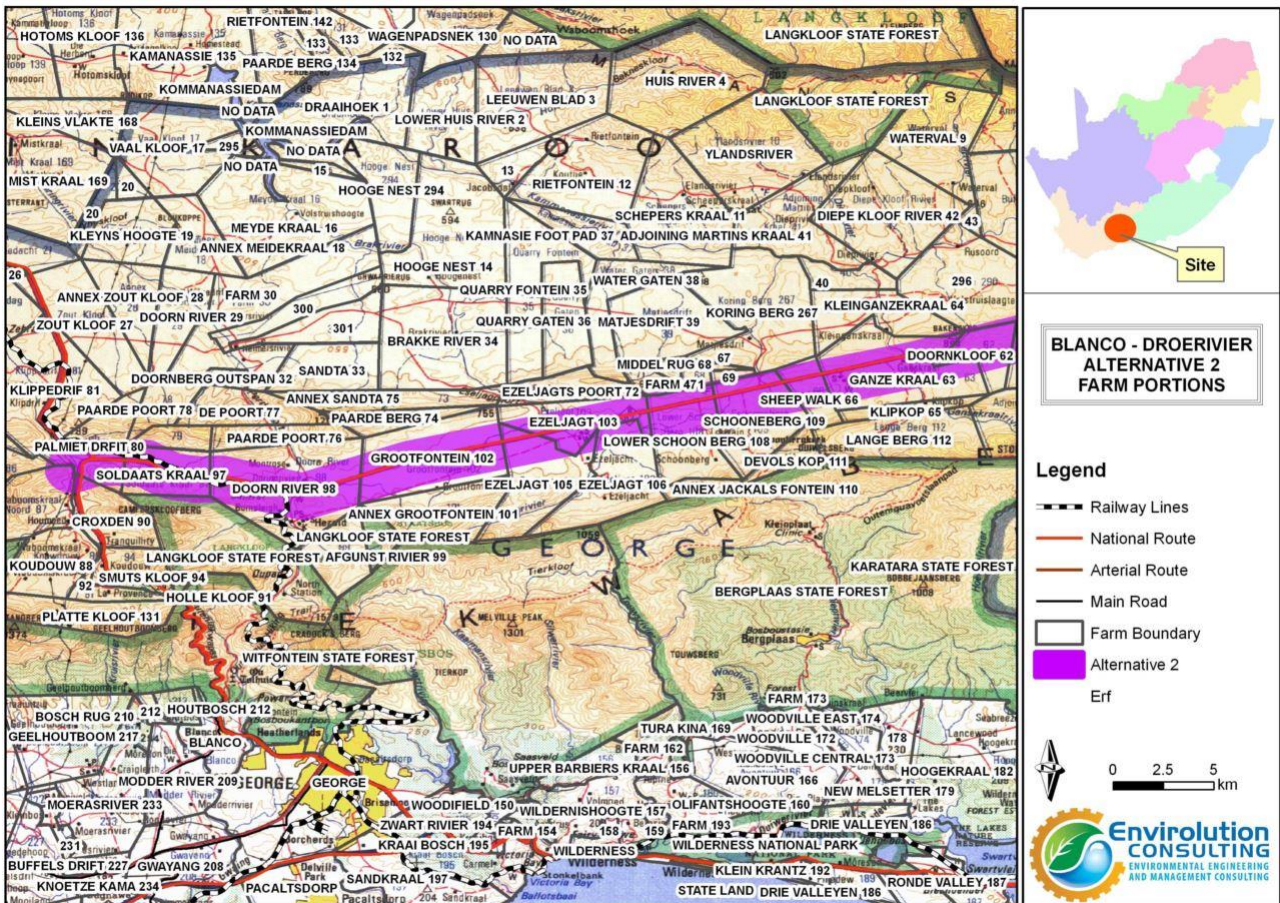


Plate 7: Southern section of Alternative 2, through the Langkloof, showing farm boundaries.

3. HERITAGE LEGISLATION

This report is conducted in terms of Section 38 (8) of the National Heritage Resources Act, No 25 of 1999.

The NHRA provides protection for the following categories of heritage resources:

- Landscapes, cultural or natural (Section 3 (3))
- Buildings or structures older than 60 years (Section 34);
- Archaeological Sites, palaeontological material and meteorites (Section 35);
- Burial grounds and graves (Section 36);
- Public monuments and memorials (Section 37);
- Living heritage (defined in the Act as including cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems and the holistic approach to nature, society and social relationships) (Section 2 (d) (xxi)).

3.1 Structures (Section 34(1))

No person may alter or demolish any structure part of a structure which is older than 60 years without a permit issued by Heritage Western Cape (HWC), the responsible provincial heritage resources authority.

3.2 Archaeology (Section 35(4))

No person may, without a permit issued by HWC, destroy, damage, excavate, alter or remove from its original position, or collect, any archaeological material or object.

3.3 Burial grounds and graves (Section 36(3))

No person may, without a permit issued by the South African Heritage Resources Authority (SAHRA), destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority.

3.4 Grading

The South African heritage resources management system is based on grading, which provides for assigning the appropriate level of management responsibility to a heritage resource.

Table 1: Grading of Heritage Resources

Grade	Level of significance	Description
I	National	Of high intrinsic, associational and contextual heritage value within a national context, i.e. formally declared or potential Grade 1 heritage resources.
II	Provincial	Of high intrinsic, associational and contextual heritage value within a provincial context, i.e. formally declared or potential Grade 2 heritage resources.
IIIa	Local	Of high intrinsic, associational and contextual heritage value within a local context, i.e. formally declared or potential Grade 3a heritage resources.
IIIb	Local	Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3b heritage resources.
IIIc	Local	Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3c heritage resources.

The grading of heritage sites, as prescribed in the NHRA, is only concerned with categories I, II and III. The subdivision of Grade III sites was introduced in the Western Cape. A draft document provides some guidelines to the grading of Archaeological and Palaeontological sites.

A Notice of Intent to Develop was submitted to Heritage Western Cape and they have requested a Heritage Impact Assessment consisting of archaeology and a visual study with an integrated set of recommendations.

Archaeological Impact Assessment: Appendix 2
Visual Impact Assessment: Appendix 3

Although the NID indicated the need for a Palaeontological Impact Assessment, this was not required in the Interim Comment to the NID.

Similarly, Heritage Western Cape did not ask for specialist studies on the Built Environment or the Cultural Landscape.

Nevertheless, Envirolution Consulting did commission a Palaeontological Baseline Assessment (desktop study) and the results of this are included in this HIA (Appendix 1). In addition, the Built Environment and Cultural Landscape are addressed in this report, following Section 38(3) of the

National Heritage Resources Act (No 25 of 1999), which states that even though certain specialist studies may be specifically requested, all heritage resources should be identified and assessed.

Since a short section of the line falls within the Eastern Cape Province, this report will also be submitted to the Eastern Cape PHRA (ECPHRA) for comment.

4. RECEIVING ENVIRONMENT

The Scoping VIA identifies the following receiving environment:

The **Outeniqua Mountains** include large parts in pristine natural condition including the Ruitersbos Nature Reserve and the Doringrivier Wilderness Area. The scenic Waboonskraal Valley occurs on the top of the mountains. The scenic quality of the mountains is high and it contributes to the aesthetic value and scenic quality of the region.



Plate 4: View of the Outeniqua Mountains



Plate 5: View of the existing 400 kV powerline running through the scenic Waboonskraal Valley at the top of the Outeniqua Pass.

The **Karoo Mountains** includes the northern slopes of the Outeniqua Mountains, the Swartberg Mountains range and the Kammanassie Mountains which outcrop between them. The Swartberg is protected by the Groot Swartberg Nature Reserve and the Swartberg East Reserve. The Kammanassie Nature Reserve lies between them. The mountains are largely in pristine natural condition and provide a picturesque backdrop the farms and towns of the Klein Karoo.



Plate 6: View of the Swartberg Mountains along the Oude Muragie Road near De Rust. Note the existing powerline crossing over the mountains.

The **Klein Karoo** is flanked by the Outeniqua and Swartberg Mountains and features a few towns and ostrich farms. It is surrounded by mountains and picturesque views of the high peaks. It is an undulating landscape with ostrich, game and sheep farming taking place. There are a number of small towns such as De Rust, Dysselfdorp and Uniondale and the main road network is frequently travelled by tourists.



Plate 7: Alternative 1 will cross over the outskirts of Dysselfdorp and then over the N12.



Plate 8: View of Uniondale (right). Alternative 2 powerline would run approximately 1 km to the left of the N9; i.e. on the opposite side of the road from the town.

The **Groot Karoo** landscape is monotonous but features a very strong desolate and isolated sense of place. Extensive views over the landscape are possible with distant views of the Swartberg and those north of Beaufort West are always present. It is an arid landscape, sparsely populated with large Karoo sheep farms. The N12 is an important linking road through Meiringspoort to Beaufort West.



Plate 9: The new line would run in parallel with this existing line, crossing the Great Karoo landscape. The Swartberg Mountains are visible in the background.

5. METHODOLOGY

The interim comment from Heritage Western Cape did not request a specialist palaeontological or Built Environment/Cultural Landscape study for the purposes of this powerline. Brief comments to these heritage issues are made in the body of this report.

5.1 Archaeology

Background archaeological research included a review of the published material as well as unpublished reports on the SAHRIS database. The 1:50 000 maps of the area as well as Google Earth aerial images were consulted. A desktop review was undertaken based on previous reports.

Fieldwork involved a drive down of the two alternative routes, where this was possible. However, in view of the distance traversed, it was not possible to undertake a walk down of all three routes. A physical walk down of the sections of the route will only be possible once the final route has been selected.

5.2 Visual Methodology

The methodology is described in chapter 4 of the VIA report. It includes assessing the study area, compiling a landscape character assessment, determining the sensitivity of receptors, undertaking the visual impact assessment and proposing mitigation measures.

6. BACKGROUND STUDIES

6.1 Palaeontology

The Baseline Palaeontological study is attached as Appendix 1.

Although a Palaeontological Impact Assessment was **not** required by HWC in their response to the Notice of Intent to Develop, Envirolution Consulting did commission a Palaeontological Baseline Assessment (desktop study) of the entire route.

6.2 Pre-Colonial and Colonial Archaeology

The full AIA is attached as Appendix 2.

- Briefly, there are Early and Middle Stone Age scatters across the landscape. They are generally not in situ and regard to be of low significance;
- Later Stone Age archaeological sites may occur in proximity to koppies and river banks. If they are found in situ, they may be of medium significance;
- Rock shelters with rock art and Stone Age archaeological deposit may occur in the mountainous areas. Reports of rock art sites have been made in CRM reports and have been reported by local landowners along the powerline routes;
- Historical archaeological remains around farm complexes. These can include ruined farm houses, sheds, stone kraals, shepherd's stockposts and stone walling;
- Remnants of historic roads and passes may occur in the mountainous areas.

6.3 History/Built Environment

An assessment of the Built Environment and Cultural Landscape was **not** requested in the Interim Comment to the NID application but is *briefly reviewed here*.

The preferred line (Alternative 1) will run 800 m to the west of Dysselsdorp and 3 km to the west of Klaarstroom. The alternative line (Alternative 2) will run close to the town of Uniondale, some 14 km west of Willowmore and 8 km west of Rietbron. Heritage resources, in particular Provincial Heritage Sites (PHS) are listed below.

Town	History	Distance from	Significance/Grading
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		Line	
Beaufort West	Beaufort West lies below the southern heights of the Nuweveld Range. During the second half of the 18th century, farmers started moving northward into the Karoo, settling in what was known as the Nuweveld and the Koup. In 1818 a new district was proclaimed and the farms Hooivlakte and Bosjesmansberg were bought as the site for a proposed town. The new district and town subsequently became known as Beaufort West. The town was laid out in 1820 and furrows, channelling water, were constructed along the streets. The railway from Cape Town reached the town in 1880 and it became a major locomotive depot and marshalling yard on the way to the north.	Alternative 1 and 2 end 7 km south-west of Beaufort West	At least 11 PHS sites in the town.
Blanco	Sprang up in the middle of the last century around the construction camp for the establishment of the Montague Pass. The pass began in 1844, replacing the old Cradock pass which had become unserviceable. Henry Fancourt White was brought out from Australia to build the pass. After retirement, he bought 180 acres of land of the farm Modderivier and laid out a township initially called "Whites Villa" but later changed to Blanco. After completion of the pass, Blanco experienced a boom as a stop-over for travellers.	Alternative 1 is 4 km north-west of Blanco	Historic Core rated III? By Winter & Oberholzer (2014) The Montague Pass, George District - Declared a PHS in 1972; Old Tollhouse, Montagu Pass, George District - Declared a PHS in 1972; Keur River Bridge, Montagu Pass, George District - Declared a PHS in 1970; Cradock Pass, George District – the Cradock pass over the Outeniqua Mountains- PHS in 1999.
De Rust	A late 19th century town (Fransen 2006) that saw its greatest development after the construction of the Meiringspoort Pass in 1900. It developed from an informal outspan. De Rust was founded in 1853 and was named after Sir Charles De Rust who came to the Cape as Lieutenant Governor in 1851.	8 km to the east of Alternative 1	Historic Core – Grade III by Winter & Oberholzer (2014). 1 PHS in town Herrie's Stone (Herrieklip), Meiringspoort, Oudtshoorn District - PHS in 1975
Dysseldorp	Dysseldorp: On a hill next to the road in Dysseldorp is the Kruisberg, topped with a small Catholic Church built by Father Rankel.	800 m to the east of Alternative 1	No PHS sites listed
Klaarstroom	Located at the northern entrance to Meiringspoort on the farm Klaare Stroom dating to 1763. It was the first opportunity for farmers traveling from the Great Karoo to Mossel Bay, to wash their cargo of wool in the mountain streams. A wool-washing facility was established here in 1874. A palaeontological museum listed on the farm Klue	3 km to the east of Alternative 1	Site worthy of heritage grading according to Winter & Oberholzer (2014) but this has not yet happened. Two buildings described by Fransen (2004). No PHS sites listed

	outside the village.		
Rietbron	Established in 1910 as a result of the decision of the NG Kerk in Willowmore with the aim of providing a parish for the residents of the “vlaktes” to the north-west of town. The NG Kerk dates to 1953. The town’s museum is located in the hall of the Afrikaans Christian Women’s Association, dating to 1927.	8 km east of Alternative 2	No PHS sites listed
Schoonberg in the Langkloof	Anglican church of St John the Baptist (1855), designed by Sophy Gray, the wife of the first Anglican Bishop of SA, Robert Gray. Together with Ezeljagt formed an important missionary complex on land donated by farmer in 1849. Church built by freed slaves?	Approximately 1 km north of Alternative 1 although portions of the site may lie in the corridor	Not a PHS Fransen (2004:487)
Uniondale	Fransen (2004, 2006) notes the original farm in the area, Rietvallei, was granted to M Zondagh in 1765. It was later divided in two with towns being founded on each of these farms in 1856. The name Uniondale came about once the two parts were amalgamated. There are five Anglo-Boer War forts around Uniondale, while an Anglo-Boer War fort sits on a prominent hill above the town	700 m to the east of Alternative 2	Historic Core graded III by Winter & Oberholzer (2014). The Anglo-Boer War fort is a declared Provincial Heritage Site (PHS), as are 10 other buildings within the town itself
Waboomskraal:	A hop producing valley on the top of the Outeniqua Pass.	Alternative 1 will run through the middle of the valley	Landscape Grade III by Winter & Oberholzer (2014) No PHS sites listed
Willowmore	Founded in 1858 when land was donated to the NG Kerk to establish a church. The town has many historical buildings. The graveyard contains graves from residents who died in the Anglo-Boer War.	14 km east of Alternative 2	There are no PHS sites listed in Willowmore

The only towns which may experience potential, direct visual impacts are Uniondale and Dysseldorp, while the valleys of the Langkloof and Waboomskraal will also be impacted. These impacts are addressed and discussed in Appendix 3.



Figure 8: The location of Alternative 2 with respect the town of Uniondale. Note how it follows the N9.

During the field assessment, the following structures were identified within the corridor of Alternative 1 which runs immediately east of the town of Dysveldorp:

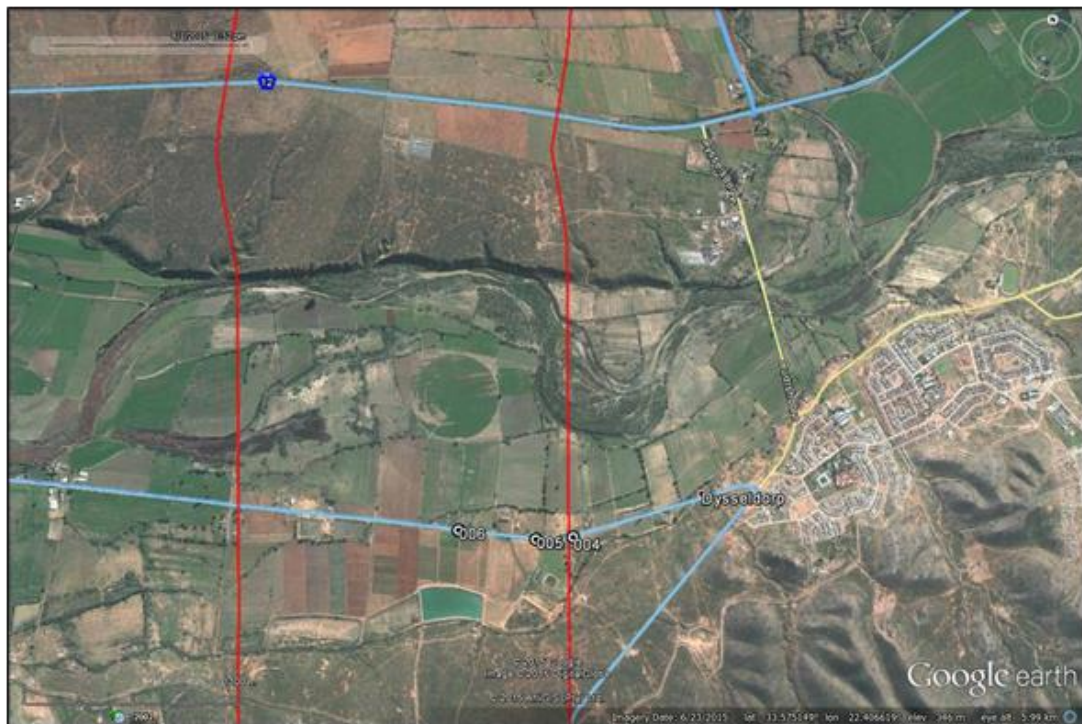


Figure 9: Buildings older than 60 years within the corridor of Alternative 1. Note how it crosses the N12.



Plates 10-12: Buildings within the corridor of Alternative 1 to the east of Dysselfdorp (Waaikraal).



Figure 10: The position of the Seekoegat Church and farm complex underneath Alternative 1.



Plate 13: The Seekoeigat Church (Site 009) on Figure 4. Note the memorial at the back. Fagan (2008) describes the historic settlement with its hotel, bottle-store, smithy, church, mill and school.

Historic Farms

According to Ferreira (1999) the Langkloof was settled as early as 1760. His review concentrates on the historic homestead of Eenzaamheid. Indications are that there was a dwelling on the property as early as 1766. James Walton sketched the “langhuis” in 1961. He commented that some of the finest, unaltered homesteads are to be found along the Langkloof and noted that Eenzaamheid is one of the finest examples of true South African vernacular architecture. Fransen (2004:488) provides background on the farm buildings – which should probably be graded IIIA (subject to inspection).

Other, early loan farms in the Langkloof, according to Ferreira (1999) include Doornrivier (see Fransen 2004:487), Ezeljagt, Schoonberg, Ganzekraal, Dieprivier and Keijkoe (Kykoe). Fransen (2004) also describes Molenrivier in the valley. Their approximate location is shown below:

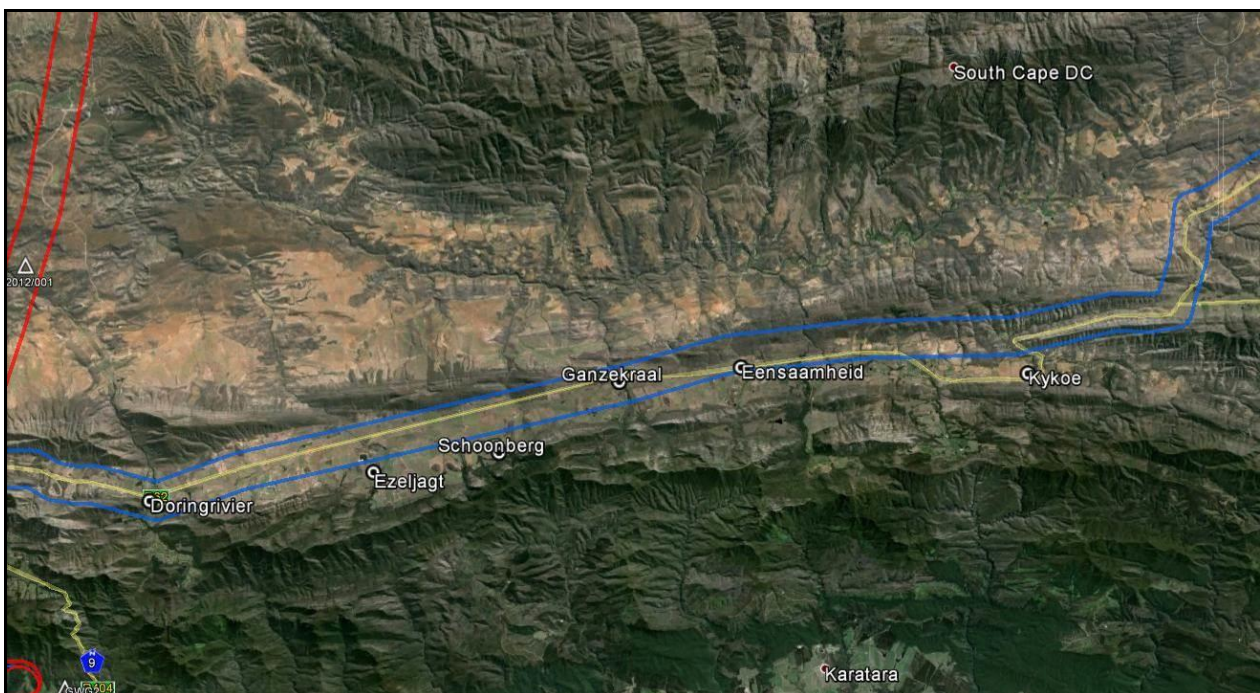


Figure 11: The position of some of the earliest farms in the Langkloof with respect the position of Alternative 2.

The “ostrich palace” called Hazenjacht, between Oudtshoorn and De Rust and dating to 1908, falls within Alternative 1 (Fransen 2004:505).

The Oude Muragie Valley, to the west of De Rust, contains a T-shaped dwelling dating to 1812 and a longhouse dating to c1840 (Fransen 2004: 505). The valley is bisected by Alternative 1.

The farm house of Klue (Middelwater) outside of Klaarwater is listed in Fransen (2004) as a minor H-shaped house, possibly dating to 1813. It is situated about 1 km to the west of the Alternative 1 corridor.

Various surveys along the route of the powerline options have identified areas and sites of heritage significance. Surveys by Orton & Hart (2014) near Uniondale, by Orton (2012) between the Outeniqua and Oudtshoorn substations, by Orton (2011) close to the Droërivier substation at Beaufort West and by Halkett (2009) near Beaufort West indicate the high probability that a foot survey may record evidence of the built environment which is not visible from aerial photography.

6.4 Cemeteries and Graves

Formal cemeteries are associated with settlements such as Blanco, Dysseldorp, Klaarstroom, Beaufort West, Rietbron, Willowmore and Uniondale. Farm graveyards may occur in proximity to farm house settlements and many have been recorded during surveys in these areas (for example eGGSA have a record of the farm cemetery on Eenzaamheid 60 in the Langkloof).

Halkett & Webley (2010) undertook a survey for a housing development on Welgevonden Farm, near De Rust, but some 16 km east of Alternative 1 and recorded a large unfenced graveyard on the farm with approximately 50 graves.

Halkett (2013) undertook a survey for a borrow pit near Uniondale and recorded a graveyard.

Halkett (2009) recorded graves on the farm Rystkuil to the south-east of Beaufort West and further graves are recorded by Kinahan’s survey (2008) on the same farm. He emphasises the need to an intensive burial survey of the area. The Phase 1 study should consider the full range of recommended options for burial sites, including both site protection measures (preferred option) and possible relocation of the burials.

6.5 Cultural Landscape

The abbreviations which precede each heritage resource refer to the key used by Winter & Oberholzer (2014) on their map below (Figure 5).

Mountain Ranges

Enl.3 - The Outeniqua Mountains are of high scenic importance. Landscape Grade II. Alternative 1 runs over the top of the Outeniqua Mountains.

Enl.7 – Kammanassieberge are a prominent peak with high scenic value. Landscape Grade II. Both alternatives avoid the mountains.

Enl. 8 – Groot Swartberge – range of high mountains with very high scenic value including a number of scenic passes including the Meiringspoort Pass. The mountain range divides the Klein and Groot Karoo. Landscape Grade II. Alternative 1 crosses the Swartberge.

Ecl. 4 – Waboonskraal is described a landscape exhibiting a pattern of rural settlement and cultivation at the base of the Outeniqua mountains. It is a landscape of considerable aesthetic

value with combination of a valley setting, wilderness surroundings and intensive hop cultivation. Landscape III? Alternative 1 runs along the bottom of the valley.

Ecl.8 – Langkloof which extends through to Uniondale and is a rural settlement dating to the mid-19th century, regarded as a distinctive valley, one of the most important fruit producing areas of the Cape. Landscape Grade II or III? Alternative 2 runs along the length of the valley.

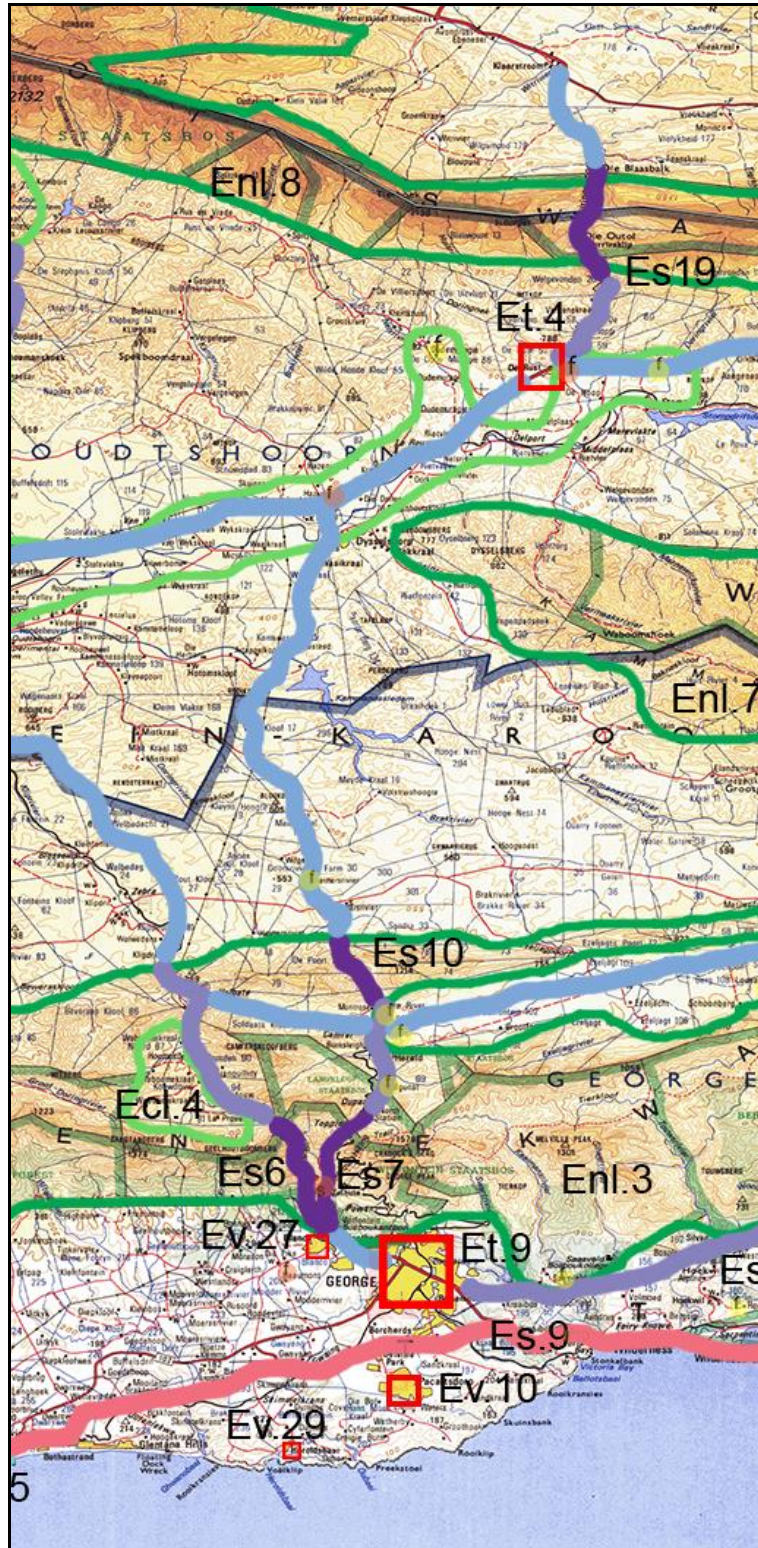


Figure 12: Extract from Winter & Oberholzer (2014) showing landscape features of cultural significance along the route of Alternative 1.

Mountain Passes of Significance

Es.6 – *Outeniqua Pass*, built as an alternative to the Montague Pass, has high scenic value and is located on a Route of Grade II/III significance. Alternative 1 runs at least 4 km to the east of the Pass, in parallel with an existing 400 kV powerline.

Es.7 – *Montagu Pass*, built in 1847 and contains the remains of the earlier Cradock Pass built even earlier. Of outstanding historical value. Route PHS II. Alternative 1 runs at least 4 km to the east of the Pass.

Es. 10 – *Perdepoort*, between Herold and Dysveldorp and considered of scenic value. Route III significance. However, Alternative 1 avoids the pass.

Es. 19 – *Meiringspoort* is an important route through the Swartberg to the Great Karoo, first opened in 1858. It has high scenic, historical and botanical importance. Route II. However, Alternative 1 avoids the pass.

In addition to the above passes listed and graded by Winter & Oberholzer (2014), the following passes must also be mentioned:

Potjiesbergpas – the N9 south of Uniondale, runs through the Pass, which dates to 1962. Alternative 2 may be visible from the Pass.

Duiwelskop Pass – the northern end of this historic pass exits on the farm Schoonberg (Lovain) in the Langkloof. Used by many 18th century travellers as it connected the coastal area with the Langkloof. Replaced by the Cradock Pass in 1812. Alternative 2 runs 1.5 km from the top of the pass.

Scenic Routes of Significance

Es. 20 - the R62 is considered an important linking route between Oudtshoorn and De Rust. It is of rural scenic value. Route III.

Es. 21 – the N9 from George to Uniondale is an important linking route of scenic value. Route III.

Ks. 11 – the N12 from Klaarstroom to Beaufort Wes is an important linking road. Route III (map not shown).

7. IMPACT ASSESSMENT

7.1 Impact on Palaeontology

With respect the potential impacts to palaeontological resources, the Baseline assessment produced by Almond (2015) notes:

“A substantial proportion of proposed power-line sectors will cross formations that are conservatively regarded as moderate to high sensitivity”. “In practice, however, the likelihood of significant negative impacts on fossil heritage on the ground is low over most sectors of these routes because the bedrocks here are often highly weathered, tectonically- deformed or covered by a substantial thickness of fossil-poor superficial deposits (scree, alluvium, soils, etc)”.

7.2 Impact on Pre-Colonial and Colonial Archaeology

The tower footings for the 400 kV line are relatively small and they are unlikely to result in significant damage to underlying archaeological material.

Appendix 1 reports: Since heritage sites, such as archaeological sites, are non-renewable, it is important that they are identified and their significance assessed prior to development.

The main cause of impacts to archaeological sites is direct, physical disturbance of the material itself and its context. The significance of an archaeological site is highly dependent on its geological and spatial context. Even though excavations for tower footings tend to be relatively small and shallow, they may expose buried archaeological sites and artefacts. These artefacts are relatively meaningless once removed from the area in which they were found. The impacts are likely to be most severe during the construction period although indirect impacts may occur during the operational phase of the project.

This report has highlighted the distinct possibility that caves with rock paintings may occur in the mountains along either powerline alternative. It is not anticipated that the tower footings will be placed on top of caves and rock shelters, thereby resulting in their destruction. However, if towers are placed in proximity to rock art sites, they will be more vulnerable to vandalism from construction crews and may become more easily accessible to the public too.

The tower footings for the 400 kV line are relatively small and they are unlikely to result in significant damage to archaeological material such as scatters of ESA and MSA material, which are generally not in situ.

The construction of pylons in close proximity to farmsteads may result in the destruction of historic rubbish dumps (middens), old kraals or the ruins of old dwellings.

7.3 Impacts to Graves

While large cemeteries in proximity to villages and on farms are generally fenced and easy to identify, isolated graves may occur in apparently random locations. They are often unfenced and may not have headstones, making them difficult to identify. Sometimes they are only visible because they are covered in cairns of unshaped stones. It is these graves which are most at risk from construction crews.

Human remains are the most complicated aspects of heritage to mitigate since they require their own public participation process (See Section 36 of the NHRA) before they can be exhumed. Human remains are protected by a plethora of legislation including the Human Tissues Act (Act No 65 of 1983), the Exhumation Ordinance of 1980 and the National Heritage Resources Act (Act No 25 of 1999). In the event of human bones being found on site, HWC must be informed immediately and the remains removed by an archaeologist under an emergency permit. This process will incur some expense as removal of human remains is at the cost of the developer. Time delays may result while application is made to the authorities and an archaeologist is appointed to do the work.

7.4 Impacts to Built Environment

The construction of pylons in close proximity to towns, villages and farm complexes may result in a visual impact on heritage resources. **The only towns which are in close proximity to the proposed lines are Uniondale which is 1 km east of Alternative 2, and Dysselfdorp which is 800 m east of Alternative 1.** Careful placement of the lines will be required to avoid a negative impact.

There are a number of farm complexes of historic significance along both routes which fall within the powerline corridors. Individual landowners will need to be contacted in this regard and their recommendations considered.

7.5 Visual Impacts

The visual impact assessment is considered in section 7 of the VIA report (Appendix 3) and summarized in Table 7.9.

8. CUMULATIVE IMPACTS

Alternative 1 runs in parallel with an existing 400 kV line for most of the route. Alternative 2 will run in parallel with a smaller powerline through the Langkloof.

A high risk of cumulative visual impacts will be experienced along Alternative 1 as the route is proposed alongside an existing transmission line and lower voltage power line. These parallel running power lines increase the visual dominance of electrical infrastructure, and contrast with the rural or pristine natural character that prevails.

9. COMMENTS FROM REGISTERED CONSERVATION BODIES AND I&APS

As per the requirement of the NID response, the following registered conservation bodies have been asked to respond to the integrated HIA and specialist reports:

- Simon van der Stel Foundation
- Oudtshoorn Heritage
- Prince Albert Cultural Foundation
- The George Heritage Trust

Heritage issues were also raised during the Scoping Phase from Interested and Affected Parties.

A total of 5 landowners expressed concern about potential impacts to archaeology (and the built environment).

Comments	Responses
Lamirsie/Doring Rivier/Grootfontein: There are sites of significant cultural value on the farms. Some of the buildings date from the 1800's and some bushmen paintings exist on the farms	Once the final route option has been decided, landowners will be contacted and a targeted walk down will be undertaken to ensure that sites are not impacted.
Molin River: On the farm there is areas of cultural importance including old bushmen drawings on the rock formations that he will protect at all costs	Once the final route option has been decided, landowners will be contacted and a targeted walk down will be undertaken to ensure that sites are not impacted.
Ganzekraal (Kamaniqwa): On the farm there is areas of cultural importance including old bushmen drawings on the rock formations	Once the final route option has been decided, landowners will be contacted and a targeted walk down will be undertaken to ensure that sites are not impacted.
Georgida: On the farm there is areas of cultural importance including old bushmen drawings on rock formations	Once the final route option has been decided, landowners will be contacted and a targeted walk down will be undertaken to ensure that sites are not impacted.
Kykoe 55 on the Keurboom River (Alternative Route): Landowner has reported Bushmen paintings on his property.	Once the final route option has been decided, landowners will be contacted and a targeted walk down will be undertaken to ensure that sites are not impacted.

Further comments from the public include:

- The historic wool washing troughs at Klaarstroom;
- A palaeontological museum on the farm Klue, near Klaarstroom;
- The mission station of Ganzenjacht in the Langkloof;
- Kammanassie settlement
- De Kruis and Voorsorg “ostrich palaces”

10. RECOMMENDATIONS

The tower footings for the 400 kV line are relatively small and they are unlikely to result in significant damage to archaeological material such as scatters of ESA and MSA material, which are generally not in situ.

Archaeology:

The walk down phase of the EMP should:

- Assess the possibility of impacts to in situ LSA sites by a targeted walk down of certain sections of the line, such as koppies and river banks;
- Where landowners have identified caves with rock art on their properties, a targeted survey at the walk-down phase can address any concerns about potential impacts. A range of mitigation options are possible, including the careful placement of the tower footings to avoid rock art sites (micro-siting of the tower footings will be required inside the 1 km wide corridors to avoid impacts);
- Rock art sites in proximity to the tower footings may also be protected from vandalism by ensuring that they are fenced off during the construction of the powerline;
- With respect historical archaeological material, a targeted walk-down of the line will be required after the final powerline route has been decided. It would concentrate on areas immediately around farm buildings and structures to ensure that a sufficient buffer has been implemented to avoid impacts to historic kraals, old sheds, rubbish dumps, etc;
- The walk down phase would concentrate on areas around historic farmsteads in order to ensure that graves area avoided;
- The towers may be constructed on/or in close proximity to farm graveyards. If graveyards are discovered during the walk down phase, a buffer of at least 15 m should be employed around them;
- If unmarked graves are uncovered during the construction of the tower footings, all work in that area should cease immediately, and HWC must be contacted.

Built Environment Recommendations:

The Visual Impact specialist will need to make recommendations with respect the impacts of Alternative 1 on the village of Dysseldorp and Alternative 2 on Uniondale.

There are a number of historic farmsteads/werfs within both alternative corridors.

The position of the powerline with respect the farm structures, particularly those that are older than 60 years, will need to be negotiated with the landowner, on an individual case basis.

- In many cases it is preferable that the powerlines run behind the main residence, so that it is not visible in the viewshed, but landowners may differ in their perception of the visual impacts of powerlines;
- Some landowners may prefer the visual impacts to farm buildings rather than impacts to arable farm lands;

- Undertake a walk-down of where historic farmsteads fall within the powerline corridor, and suggest mitigation measures.

Recommendations with respect the Cultural Landscape:

- Avoid constructing the powerline through mountain passes and scenic routes where they will be highly visible to motorists and residents;
- Avoid construction on ridge lines where they are highly visible.

Visual Recommendations:

Reduction and remediation mitigation will not be effective to prevent residual impacts from occurring. The proposed transmission line will remain visible unless major design or alignment changes are implemented. The option of **consolidating existing lines into the design of the new transmission line is regarded as very effective and is highly recommended** to prevent major cumulative impacts. Although cumulative impacts may still occur, the significance thereof will be reduced and the breaching of a visual intolerance threshold may be avoided.

Avoiding sensitive landscape features and observers is regarded as being the most effective mitigation measure in reducing direct, cumulative and residual impacts. This is, however, a complex measure to implement, and is reliant on technical/feasibility studies as well as a much larger study area assessment to ensure that other sensitive features and observers are not impacted. Due to these unknown factors, avoidance mitigation is only proposed within the 2 km corridor that will reduce visual impacts on certain receptors

Line Option Recommendations:

- From an archaeological and built environment perspective, Alternative 1 is considered the preferred alternative merely because it is shorter, and therefore the impacts are potentially less to heritage sites;
- From a visual impact assessment, preferred route is Alternative 1 as its impact is lower over its entire length than Alternative 2. The baseline environment is already impacted by electrical power line infrastructure, which lowers the sensitivity to some degree. It is generally more acceptable to have two power lines in one corridor and concentrating the impact in this corridor, than to impact on landscapes that are free of transmission lines, thereby spreading the impact.

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Appendix 1: Palaeontology specialist report

**GOURIKWA-BLANCO-DROËRIVIER 400 kV TRANSMISSION
POWER-LINE AND SUBSTATION UPGRADES, WESTERN &
EASTERN CAPE**



*Reconstruction of Middle Permian wildlife
of the Karoo Basin (260 million years ago)*

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Palaeontological heritage assessment: desktop study

GOURIKWA-BLANCO-DROËRIVIER 400 kV TRANSMISSION POWER-LINE AND SUBSTATION UPGRADES, WESTERN & EASTERN CAPE

John Almond & Wendy Taylor

(April 2015)

DRAFT SUMMARY

The South African public electricity company Eskom proposes to upgrade the electricity supply infrastructure in the Western and Eastern Cape through the construction of (1) a new Blanco (Narina) Substation on the western outskirts of George, (2) a new 400 kV transmission power-line from the existing Gourikwa Substation near Mossel Bay to Blanco Substation (c. 60 km) and (3) a new 400 kV transmission power-line from Blanco Substation to the existing Droërivier Substation near Beaufort West (c. 250 km). As far as possible, the proposed new power-line routes run parallel to existing lines and, to a considerable extent, also subparallel to major roads such as the N2, N12 and N9. Three route options for the Gourikwa – Blanco 400 kV power-line connection and two route options for the Blanco – Droërivier connection are under consideration.

The proposed power-line routes traverse the outcrop areas of some thirty different geological units that range in age from some 600 million years old to the Recent. Most of these units are sedimentary formations that are known to contain fossil heritage resources. Fossils preserved at or below the ground surface are likely to be disturbed, damaged or destroyed by surface clearing and excavations for access roads and electricity pylon footings undertaken during the construction phase of the project. In order to assess the possible need for further specialist studies and mitigation, the palaeontological sensitivity of each rock unit (*e.g.*, formation) crossed by the proposed power-line route options has been assessed here on the basis of its known fossil record as well as local levels of bedrock exposure and near-surface weathering, based on satellite images and the authors' previous field experience.

A substantial proportion of proposed power-line sectors will cross formations that are conservatively regarded as moderate to high sensitivity in palaeontological heritage terms (*cf* palaeonsensitivity maps on the SAHRIS website). In practice, however, the likelihood of significant negative impacts on fossil heritage on the ground is low over

most sectors of these routes because the bedrocks here are often highly weathered, tectonically-deformed or covered by a substantial thickness of fossil-poor superficial deposits (scree, alluvium, soils *etc*). In this baseline desktop study a small number of (mostly short) sectors where significant impacts to fossil heritage might occur during construction have been identified and indicated on strip maps extracted from the Riversdale, Beaufort West and Oudtshoorn 1: 250 000 geological sheets (Appendix 1, black dotted lines). The principal high-sensitivity sedimentary successions triggering Phase 1 palaeontological field assessment include shallow marine sediments of the Bokkeveld Group (Early to Middle Devonian), marine to lacustrine sediments of the Witteberg Group (Middle Devonian to Early Carboniferous) and Ecca Group (Early to Middle Permian), fluvial sediments of the Lower Beaufort Group (Middle to Late Permian), continental red beds of the Uitenhage Group (Early Cretaceous) and small outcrop areas of Quaternary estuarine deposits (Klein Brak Formation, Bredasdorp Group).

A realistic palaeontological heritage impact assessment of the Gourikwa – Blanco – Droërivier 400 kV power-line and substation upgrade project is only possible once the potentially sensitive sectors of the power-line route options identified in this study have been surveyed in the field by professional palaeontologists. This is likely to result in the “downgrading” of the inferred sensitivity of most of power-line route sectors, thereby keeping mitigation recommendations to a realistic minimum. It is therefore recommended that a pre-construction field-based assessment of these key sectors be carried out at the earliest opportunity so that any significant palaeontological heritage issues may be considered and addressed in the project design and construction phases. The proposed field assessment should focus on areas of good bedrock exposure along or close to the various power-line corridors under consideration, especially within the potentially sensitive sectors identified in Appendix 1 (black dotted lines on strip maps). Fossil material within these sectors should be recorded, the effective sensitivity of each sector assessed, and specific recommendations made regarding any further specialist studies, monitoring or mitigation required in the pre-construction or construction phase of the Gourikwa – Blanco - Droërivier power-line project.

1. Gourikwa – Blanco 400 kV power-line

The study area for this transmission line project lies on the southern coastal plain, from the Mossel Bay area to George (Fig. 1). Sectors of potentially high palaeontological sensitivity along the three proposed Gourikwa – Blanco power-line route options are shown by the black dotted lines on strip maps 1 to 3 (Appendix 1). They are situated to the northwest and north of Mossel Bay and mainly concern outcrop areas of Mesozoic

continental rocks of the Uitenhage Group. They include the Early Cretaceous Kirkwood Formation that has yielded important fossil material of dinosaurs and other terrestrial vertebrates, petrified woods and other well-preserved plant material, as well as the Early Cretaceous Hartenbos Formation that is also rich in fossil wood (*N.B.* These formations are included within an undifferentiated Uitenhage Group, Ke, on the Oudtshoorn 1: 250 000 geology sheet). Small outcrop areas of shell-rich estuarine deposits of the Klein Brak Formation (Bredasdorp Group) may also be transected by the power-line corridors to the north of Mossel Bay. From the Klein-Brakrivier north-eastwards to Blanco the corridors are of low palaeontological sensitivity since they overlie highly deformed and metamorphosed Late Precambrian sediments of the Kaaimans Group and associated intrusions of the Cape Granite Suite.

Pending field assessment, there is no preference on palaeontological heritage grounds for any particular power-line route option between Gourikwa and Blanco.

2. Blanco Substation

The footprint for the proposed new Blanco (Narina) Substation on the western outskirts of George is underlain at depth by highly metamorphosed, deformed sediments (schists, hornfels) of the Saasveld Formation (Kaaimans Group). These Late Proterozoic metasediments are unfossiliferous. The Precambrian bedrocks are overlain by superficial deposits of low palaeontological sensitivity and, furthermore, are probably highly weathered near-surface. The palaeontological impact significance of the construction of Blanco Substation is therefore assessed as LOW.

3. Blanco – Droërivier 400 kV power-line

The two alternative route options for the Blanco – Droërivier 400 kV power-line both traverse a very wide range of sedimentary rock units of the coastal plain, Cape Fold Belt, Little Karoo and Great Karoo regions.

Route Alternative 1 heads due north from Blanco, crossing the Outeniqua Range and then the eastern portion of the Little Karoo, passing to the west of Dysselsdorp and De Rust. After crossing the Swartberg Range it enters the Great Karoo proper north of Klaarstroom and then runs along the western side of the N12 to Beaufort West.

Sectors of potentially high palaeontological sensitivity along the Alternative 1 power-line route are indicated by the black dotted lines on strip maps 3 to 4 and 13 to 17 (Appendix 1). These include several subunits of the Cape Supergroup, such as Bokkeveld Group bedrocks in the Klaarstroom area *plus* several narrow outcrop areas of Lower Witteberg

Group (Weltevrede Subgroup) and Upper Witteberg Group (Lake Mentz and Kommadagga Subgroups) rocks within the Cape Fold Belt to the north. Karoo Supergroup subunits of potentially high palaeontological sensitivity include Lower Ecca Group rocks north of Klaarstroom, Waterford Formation deltaic sediments in the southern Karoo near Zwartskraal, as well as a long stretch (strip maps 13 to 16) of Lower Beaufort Group rocks across the width of the Great Karoo, from the Cape Fold Belt almost as far as the Great Escarpment near Beaufort West. The Lower Beaufort Group outcrop area here is of particular palaeontological interest because of its rich fossil vertebrates (*e.g.*, reptiles, therapsids) of Middle Permian age that are assigned to the *Tapinocephalus* and *Pristerognathus* Assemblage Zones.

Route Alternative 2 is considerably longer than Alternative 1. It diverges from the latter near Outeniqua Pass and initially heads eastwards along the northern flank of the Outeniquaberg Range before turning northeast to traverse the eastern end of the Little Karoo, passing by Uniondale. It crosses the eastern extension of the Groot Swartberg Range near Ghwarriepoort and then arcs round to the northwest in the area west of Willowmore. The power-line route then heads in a straight line across the Great Karoo to Beaufort West, passing to the southwest of Rietbron (*N.B.* The Ghwarriepoort – Rietbron section of the route lies within the Eastern Cape Province).

Sectors of potentially high palaeontological sensitivity along the Alternative 2 power-line route are indicated by the black dotted lines on strip maps 3 and 5 to 13 (Appendix 1). These include several subunits of the Cape Supergroup, such as Lower and Upper Bokkeveld Group bedrocks to the west of Willowmore area *plus* several narrow outcrop areas of Lower Witteberg Group (Weltevrede Subgroup) and Upper Witteberg Group (Lake Mentz and Kommadagga Subgroups) rocks within the Cape Fold Belt to the northwest of Willowmore. Karoo Supergroup subunits of potentially high palaeontological sensitivity include Lower Ecca Group rocks northwest of Willowmore, as well as a long stretch (strip maps 10 to 13) of Lower Beaufort Group rocks across the width of the Great Karoo, from the Cape Fold Belt almost as far as the Great Escarpment near Beaufort West. The Lower Beaufort Group outcrop area here is of particular palaeontological importance because of its rich fossil vertebrates (*e.g.*, reptiles, therapsids) of Middle Permian age that are assigned to the *Tapinocephalus* and *Pristerognathus* Assemblage Zones. However, substantial areas of Beaufort Group bedrock here are masked by Late Caenozoic alluvium of low palaeontological sensitivity. Pan sediments to the southeast of Beaufort West are potentially of palaeontological interest.

Pending field assessment, there is no preference on palaeontological heritage grounds for either power-line route alternative between Blanco and Droërivier.

Note that most of the power-line project lies within the Western Cape, for which the responsible heritage resources agency is Heritage Western Cape (Contact details: Protea Assurance Building, Green Market Square, Cape Town 8000. Private Bag X9067, Cape Town 8001. Tel: 086-142 142. Fax: 021-483 9842. Email: hwc@pgwc.gov.za). The Blanco – Droërivier Alternative 2 route crosses the Eastern Cape between Gharriepoort and Rietbron. Here the responsible heritage resources agency is ECPHRA (Contact details: Mr Sello Mokhanya, 74 Alexander Road, King Williams Town 5600; Email: smokhanya@ecphra.org.za).

Appendix 2: Archaeology specialist report

APPENDIX 2

ARCHAEOLOGICAL IMPACT ASSESSMENT: PROPOSED CONSTRUCTION OF A 400kV POWERLINE FROM BLANCO SUBSTATION (GEORGE) TO DROERIVER SUBSTATION (BEAUFORT WEST), WESTERN CAPE

(Assessment conducted under Section 38 (8) of the
National Heritage Resources Act No 25 of 1999)

Prepared for:
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August 2016



Prepared by:

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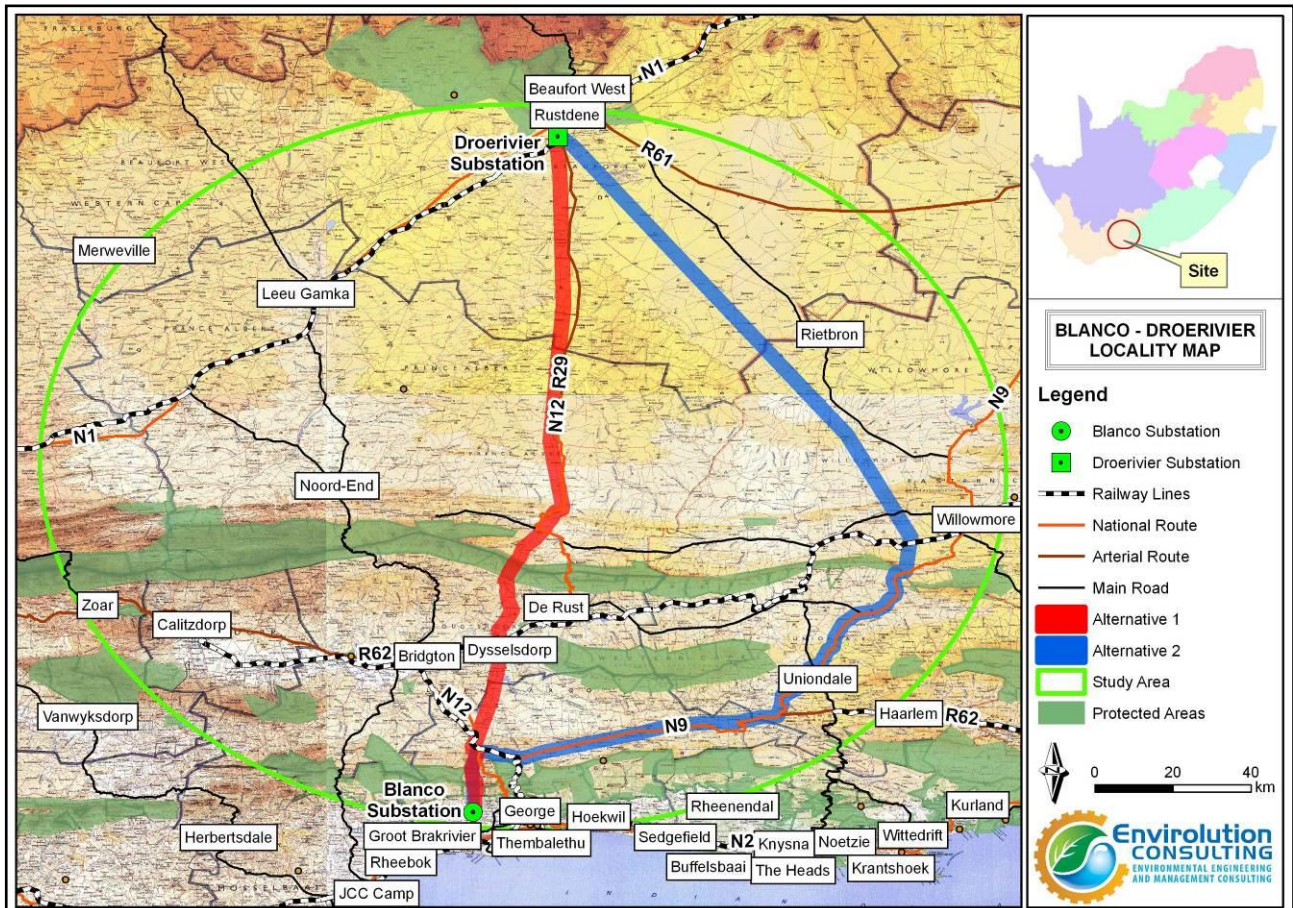
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EXECUTIVE SUMMARY

Site Name: Proposed 400 kV powerline from the Blanco substation (George) to the Droërvier Substation (Beaufort West)

Location: Two alternative powerlines running between George and Beaufort West.

Locality Plan:



The position of the two alternative powerlines between the Blanco substation at George and the Droërvier Substation at Beaufort West.

Description of the Proposed Development:

The proposed powerline connecting Blanco and Droërvier will need to traverse two protected nature reserves.

- **Alternative 1** (red corridor or preferred alternative) is approximately 178 km long and aligned to the existing Droërvier - Proteus 400 kV powerline. From the proposed Blanco substation, the line will cross the Outeniqua Mountains which include the Ruitersbos Nature Reserve. There are already 2 existing powerlines which cross the nature reserve. Then the line will cross the N12 at the intersection with the R62/N9 in the Waboomskraal valley. It will pass some 800 m west of the town of Disselsdorp, cross the R341 and then cross over the Swartberg Mountains. The proposed powerline will cross a second nature reserve, the Groot Swartberg Nature Reserve, to the north-west of De Rust. The nature reserve stretches over the Swartberg Mountains for a distance of 200 km. The line will run 3 km to the west of the village of Klaarstroom. It will then cross the R407 and run parallel to the N12 across the escarpment (which is very flat) to the Droërvier substation.
- **Alternative 2** (blue corridor) is 270 km long. It will exit the Blanco substation and at the intersection of the N9 and N12, the proposed corridor will turn east and follow the N9/R62, running very close to the western side of Uniondale. It will cross the R339 and the R407, and run 14 km to the west of

Willowmore and 8 km to the west of Rietbron. This small section of the line falls within the Eastern Cape Province. The section of lands between the R407 and the Droërivier substation appears to be untransformed Karoo veld.

The corridor will be 1km wide although the actual servitude will be 62 m.

The design of the pylons/towers has not been finalised. The first preference would be to use the 529 cross-rope and 520B guyed Vee towers in areas where there are no space constraints, and the 517/518 self-supporting towers at bends in areas where there are space constraints. Steel monopoles are considered the least desirable solution from Eskom due to cost.

A Notice of Intent to Develop was submitted to Heritage Western Cape and they have requested a Heritage Impact Assessment consisting of archaeology and a visual study with an integrated set of recommendations. The response to the NID is attached.

Since a short section of the line falls within the Eastern Cape Province, this report will also be submitted to the Eastern Cape PHRA (ECPHRA) for comment.

The Interim Comment to the NID application did not request a Palaeontological Impact Assessment (although the Heritage specialist requested this).

Nevertheless, Envirolution Consulting did commission a **Palaeontological Baseline Assessment (desktop study)** and the results of this are included in the HIA (**Appendix 1**). Following Section 38(3) of the National Heritage Resources Act (No 25 of 1999), even though certain specialist studies may be specifically requested, all heritage resources should be identified and assessed. Impacts to the Built Environment are briefly identified and discussed in this HIA.

This study fulfils the recommendations for an Archaeological specialist study.

Archaeological Resources Identified:

- Rock shelters with rock art and stone age archaeological deposit in the mountainous areas;
- Early and Middle Stone Age scatters across the landscape;
- Later Stone Age archaeological sites in proximity to koppies and river banks;
- Historical archaeological remains around farm steads;
- Remnants of historic roads and passes;
- Cemeteries and isolated graves associated with settlements and farms.

Anticipated Impacts on Archaeological Resources:

While the footprint of the tower is relatively small, impacts to heritage resources may occur.

- Caves and rock shelters, whilst generally not directly impacted by the construction of a tower footing, may become more easily accessible to people leading to potential vandalism of rock art sites and archaeological deposits. The likelihood of this occurring is **medium to low**;
- Scatters of ESA and MSA stone artefacts may be damaged. The likelihood of this occurring is **very low**;
- In situ, LSA archaeological sites may be damaged by the construction of the tower footings and access roads. The likelihood of this occurring is **medium to low**;
- Ruined structures and historic rubbish dumps may be impacted by the tower footings and access roads. The likelihood of this occurring is **medium**;
- The proposed tower footings may result in the destruction of farm cemeteries and graves. The likelihood of this occurring is **medium**.

Public Participation Comments:

At least five landowners reported that they had “Bushmen Paintings” on their properties and that they were concerned about potential impacts. However, for the purposes of this report, the information provided with respect location of these sites is too vague to assist in their identification or mapping and it is unclear whether they will fall within the 1 km corridor. Cognisance is taken of the fact that San paintings occur on both line options and recommendations are made for the walk down phase.

This issue is addressed in the report.

Recommendations:

The powerline corridors being assessed are 1 km wide, although the actual servitude will only be 62 m wide. This provides sufficient width for micro-placing of the tower footings to avoid impacts to archaeological sites.

The tower footings for the 400 kV line are relatively small and they are unlikely to result in significant damage to archaeological material such as scatters of ESA and MSA material, which are generally not in situ.

Once the final route option has been selected and the Environmental Authorisation issued, the following recommendations should be included in the EMP:

- Assess the possibility of impacts to in situ LSA sites by a targeted walk down of certain sections of the line, such as koppies and river banks;
- Where landowners have identified caves with rock art on their properties, a targeted survey at the walk-down phase can address any concerns about potential impacts. A range of mitigation options are possible, including the careful placement of the tower footings to avoid rock art sites (micro-siting of the tower footings will be required inside the 1 km wide corridors to avoid impacts);
- Rock art sites in proximity to the tower footings may also be protected from vandalism by ensuring that they are fenced off during the construction of the powerline;
- With respect historical archaeological material, a targeted walk-down of the line will be required after the final powerline route has been decided. It would concentrate on areas immediately around farm buildings and structures to ensure that a sufficient buffer has been implemented to avoid impacts to historic kraals, old sheds, rubbish dumps, etc;
- The walk down phase would concentrate on areas around historic farmsteads in order to ensure that graves area avoided;
- The towers may be constructed on/or in close proximity to farm graveyards. If graveyards are discovered during the walk down phase, a buffer of at least 15 m should be employed around them;
- If unmarked graves are uncovered during the construction of the tower footings, all work in that area should cease immediately, and HWC must be contacted.

These recommendations must be included in the final EMP.

There are no anticipated fatal flaws with regard the construction of the powerline and Alternative 1 is considered the preferred alternative merely because it is shorter, and therefore the impacts are potentially less to archaeological sites. Alternative 1 is associated with an existing line, and therefore a new access/service road to ensure maintenance of the line, will not be required.

Author/s and Date:

Lita Webley ACO Associates cc

Lita Webley is an archaeologist (PhD from the University of Cape Town 1992) with ACO Associates cc and has been conducting Heritage Impact Assessment and archaeological specialist studies in the Western Cape, Northern Cape and Eastern Cape Provinces since 1996. She is accredited as a Principal Investigator by the Association of Southern African Professional Archaeologists (ASAPA) CRM section as follows:

- Principal Investigator: Stone Age, Shell Middens and Colonial Period; and
- Field Director: Grave Relocations.

ACO Associates cc has no financial or other interest in the proposed development and will derive no benefits other than fair remuneration for consulting services provided.

SPECIALIST DECLARATION

I, Lita Webley, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have potential of influencing – any decision to be taken with respect to the application by the competent authority; and – the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offense in terms of regulation 71 and is punishable in terms of section 24F of the Act.

Signature of specialist



Specialist Field: Archaeology and Heritage

Name of Company: ACO Associates

GLOSSARY

Archaeology: Remains resulting from human activity which is in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.

Early Stone Age: The archaeology of the Stone Age between 700 000 and 2500 000 years ago.

Fossil: Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

Holocene: The most recent geological time period which commenced 10 000 years ago.

Late Stone Age: The archaeology of the last 20 000 years associated with fully modern people.

Middle Stone Age: The archaeology of the Stone Age between 20-300 000 years ago associated with early modern humans.

National Estate: The collective heritage assets of the Nation

Palaeontology: Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

Pleistocene: A geological time period (of 3 million – 20 000 years ago).

SAHRA: South African Heritage Resources Agency – the compliance authority which protects national heritage in the Northern Cape.

Structure (historic:) Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith. Protected structures are those which are over 60 years old.

Acronyms

CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
ESA	Early Stone Age
EMP	Environmental Management Plan
GPS	Global Positioning System
HIA	Heritage Impact Assessment
LSA	Late Stone Age
MSA	Middle Stone Age
NHRA	National Heritage Resources Act
SAHRA	South African Heritage Resources Agency

Our Ref: HMCENTRAL KAROO/CENTRAL KAROO DMA\400KV TRANSMISSION
POWERLINE FROM BLANCO TO DROERIVER SUBSTATION



Enquiries: Andrew September

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Email: andrew.september@westerncape.gov.za

Date: 22 April 2015

Case No: 15033005AS0331E

Auto IDs: 3228 - 3867

RESPONSE TO NOTIFICATION OF INTENT TO DEVELOP
In terms of section 38 of the National Heritage Resources Act (Act 25 of 1999)
and the Western Cape Provincial Gazette 6061, Notice 298 of 2003

Attention: Ms Marinda Le Roux
PO Box 1898
Sunninghill
2157

CASE NUMBER: 15033005AS0331E

NID: PROPOSED 400KV TRANSMISSION LINE FROM BLANCO TO DROERIVER SUBSTATION, CENTRAL KAROO & EDEN DMA.

The matter above has reference.

Your NID dated 31 March 2015 was tabled and the following was discussed:

1. HWC discussed the proposed installation of the powerline between the above-mentioned substations in the Central Karoo & Eden DMA.
2. HWC noted that the proposed powerline will have a negative impact on the visual and cultural landscape/environment.
3. HWC requires further studies addressing potential archaeological finds, visual impacts and any other heritage resources that will be adversely effected by the proposed development.
4. HWC notes that it will not review or consider any impacts that fall outside of the Western Cape unless it is contextually related to heritage resources found within the borders of the province.

Requirement:

1. Since there is reason to believe that heritage resources will be impacted upon, HWC requires an HIA in terms of S. 38(3) of the NHRA (Act 25 of 1999) assessing the impacts on the following heritage resources which it has identified; visual landscape and archaeology.
2. An HIA is required consisting of an archaeological study and a visual impact assessment.

TABLE OF CONTENTS

1. INTRODUCTION	9
2. DEVELOPMENT PROPOSALS	9
3. HERITAGE LEGISLATION	12
3.1 Structures (Section 34(1))	12
3.2 Archaeology (Section 35(4)).....	12
3.3 Burial grounds and graves (Section 36(3))	12
3.4 Grading	12
4. METHODOLOGY.....	13
4.1 Background Literature study.....	13
5. RECEIVING ENVIRONMENT	13
5.1 Desktop Archaeology and Field Observations	16
5.2 Rock art.....	19
5.3 Historical Background	19
5.4 Cemeteries and Graves	20
6. IMPACT ASSESSMENT	20
6.1 Impact on Pre-Colonial Archaeology	20
6.2 Impact on Colonial Period	22
6.3 Impacts to Graves	23
7. COMMENTS FROM INTERESTED AND AFFECTED PARTIES	24
8. CONCLUSION.....	25
9. REFERENCES	26

1. INTRODUCTION

ACO Associates cc was appointed by Envirolution Consulting on behalf of the client, Eskom Holdings, to undertake the Archaeological Impact Assessment for the construction of a 400 kV transmission power line from the Blanco (Narina) substation at George, on the southern Cape coast to the Droërvier substation near Beaufort West in the Karoo. Alternative 1 and Alternative 2 powerline options have been proposed (Figure 1).

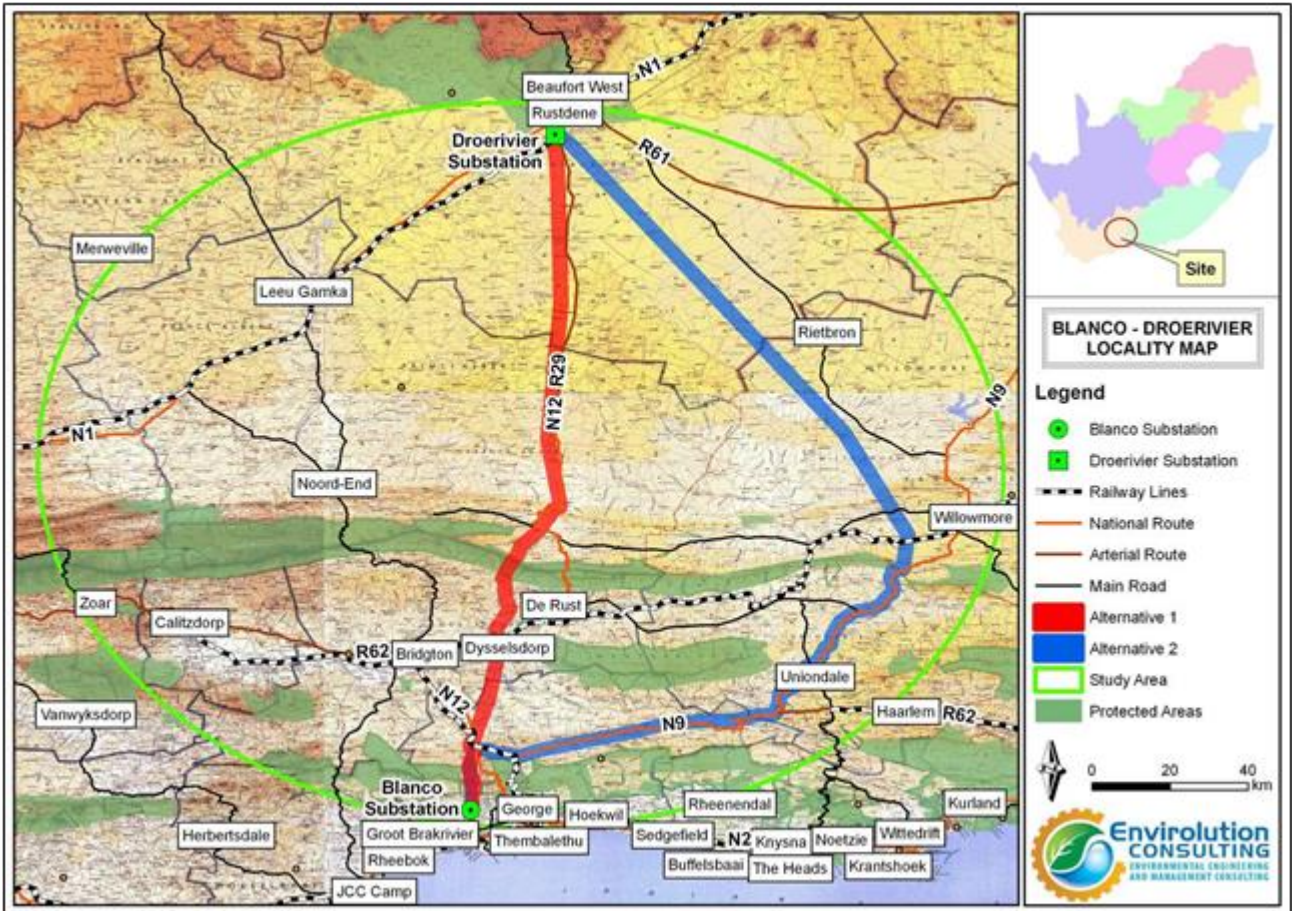


Figure 1: The location of the two powerline alternatives discussed in the text.

2. DEVELOPMENT PROPOSALS

2.1 Powerline options

The proposed powerline connecting Blanco and Droërvier will need to traverse two protected nature reserves.

Alternative 1 (red corridor or preferred alternative) is approximately 178 km long and aligned to the existing Droërvier - Proteus 400 kV powerline. From the proposed Blanco substation, the line will cross the Outeniqua Mountains which include the Ruitersbos Nature Reserve. There are already 2 existing powerlines which cross the nature reserve. Then the line will cross the N12 at the intersection with the R62/N9. It will pass some 800 m west of the town of Dysseisdorp, cross the R341 and then cross over the Swartberg Mountains. The proposed powerline will cross a second nature reserve, the Groot Swartberg nature Reserve, to the north-west of De Rust. The nature reserve stretches over the Swartberg Mountains for a distance of 200 km. The line will run 3 km to the west of the village of Klaarstroom. It will then cross the R407 and run parallel to the N12 across the escarpment (which is very flat) to the Droërvier substation.

Landuse in the area includes grazing lands and game farming. There are a few houses on Alternative 1.

The Droërvier substation is located on the farm Weltevreden 170/31, 35, 36 & 37. The substation is located about 8 km south-west of the town of Beaufort West. Access to the substation is from the N12.

Alternative 2 (blue corridor) is 270 km long. It will exit the Blanco substation and at the intersection of the N9 and N12, the proposed corridor will turn east and follow the N9/R62, running very close to the western side of Uniondale. It will cross the R339 and the R407, and run 14 km to the west of Willowmore and 8 km to the west of Rietbron. This small section of the line falls within the Eastern Cape Province. The section of lands between the R407 and the Droërvier substation appears to be untransformed Karoo veld.

The corridor will be 1km wide although the actual servitude will be 62 m.

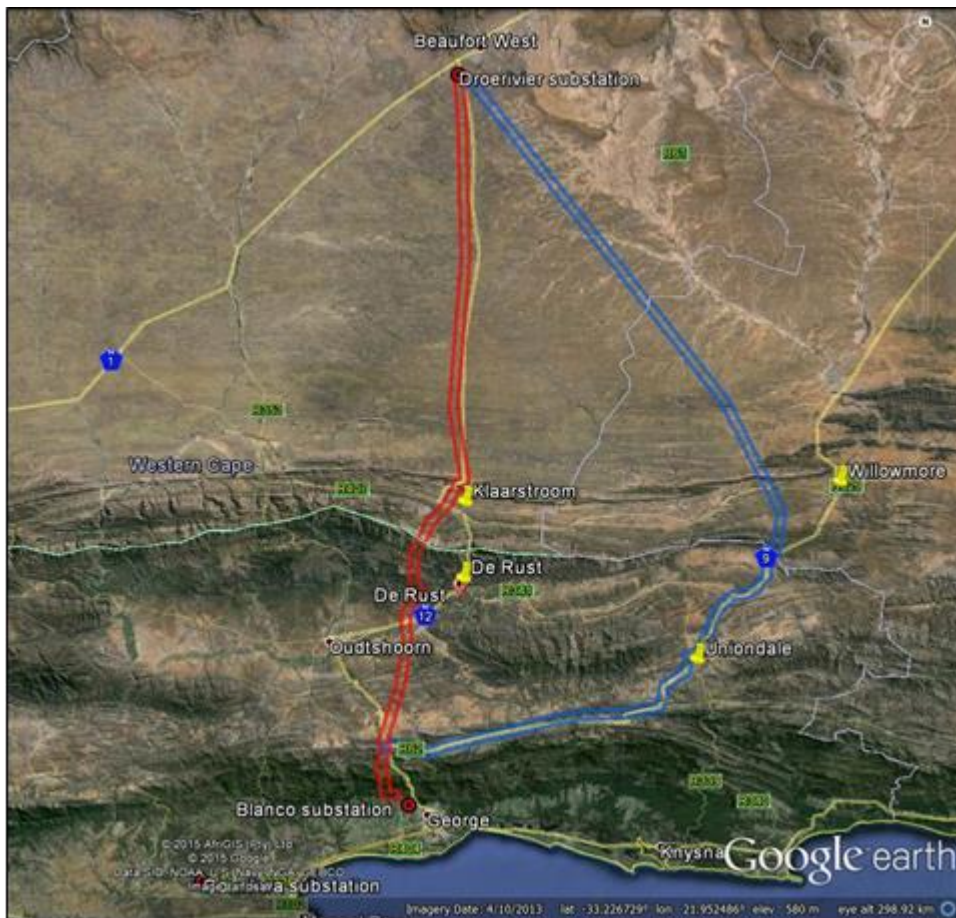


Figure 2: An aerial image of the location of the Blanco and Droërvier substations, and the towns of George, De Rust, Klaarstroom, Uniondale, Willowmore and Beaufort West.

2.2 Substations

The site for the Droërvier Substation cannot be assessed since the substation already exists and the infrastructure will only need to be upgraded to accommodate the new line connection. With respect the new Blanco (Narina substation), alternative 5 has been selected.

2.3 Pylon/Tower designs

The first preference would be to use 529 cross-roped and 520B guyed Vee towers in areas of the line where there are no space/servitude constraints and 517/518 self-supporting towers at bends and in areas where there are space constraints. The height of the tower may vary depending on the terrain it traverses, but on average, it can reach heights of 50-60 m. Steel monopoles are the least desirable solution from Eskom mainly due to cost.

While it may be possible to paint the towers for a specific case, studies have shown that painting towers to “camouflage” them only works for a season i.e. a tower that is painted green may be less visible in spring/summer but be more visible in winter. “Camouflaged” towers could also have a negative environmental impact since birds and other species may collide with them. Should heavy machinery collide with one of the towers due to its camouflaged nature, this may result in interruption of power.



Plate 1: A 529 cross-roped tower



Plate 2: A 520B Guyed Vee tower



Plate 3: The 517/518 self-supporting tower. **Plate 4:** The extent of the impact of the tower footings are expected to be very low, unless placed directly on top of a heritage site.

3. HERITAGE LEGISLATION

This report is conducted in terms of Section 38 (8) of the National Heritage Resources Act, No 25 of 1999.

The NHRA provides protection for the following categories of heritage resources:

- Landscapes, cultural or natural (Section 3 (3))
- Buildings or structures older than 60 years (Section 34);
- Archaeological Sites, palaeontological material and meteorites (Section 35);
- Burial grounds and graves (Section 36);
- Public monuments and memorials (Section 37);
- Living heritage (defined in the Act as including cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems and the holistic approach to nature, society and social relationships) (Section 2 (d) (xxi)).

3.1 Structures (Section 34(1))

No person may alter or demolish any structure part of a structure which is older than 60 years without a permit issued by Heritage Western Cape (HWC), the responsible provincial heritage resources authority.

3.2 Archaeology (Section 35(4))

No person may, without a permit issued by HWC, destroy, damage, excavate, alter or remove from its original position, or collect, any archaeological material or object.

3.3 Burial grounds and graves (Section 36(3))

No person may, without a permit issued by the South African Heritage Resources Authority (SAHRA), destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority.

3.4 Grading

The South African heritage resources management system is based on grading, which provides for assigning the appropriate level of management responsibility to a heritage resource.

Table 1: Grading of Heritage Resources

Grade	Level of significance	Description
I	National	Of high intrinsic, associational and contextual heritage value within a national context, i.e. formally declared or potential Grade 1 heritage resources.
II	Provincial	Of high intrinsic, associational and contextual heritage value within a provincial context, i.e. formally declared or potential Grade 2 heritage resources.
IIIA	Local	Of high intrinsic, associational and contextual heritage value within a local context, i.e. formally declared or potential Grade 3a heritage resources.
IIIB	Local	Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3b heritage resources.

IIIC	Local	Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3c heritage resources.
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The grading of heritage sites, as prescribed in the NHRA, is only concerned with categories I, II and III. The subdivision of Grade III sites was introduced in the Western Cape. Various versions of the grading document have been made available and these documents form the basis of the grading of Archaeological and Palaeontological sites in this report.

3.5 Legislative requirements

A Notice of Intent to Develop was submitted to Heritage Western Cape and they have requested a Heritage Impact Assessment consisting of archaeology and a visual study with an integrated set of recommendations. The response to the NID is attached.

This study fulfils the recommendations for an Archaeological study.

Since a short section of the line falls within the Eastern Cape Province, this report will also be submitted to the Eastern Cape PHRA (ECPHRA) for comment.

4. METHODOLOGY

4.1 Background Literature study

Background research included a review of the published material as well as unpublished reports on the SAHRIS database. The 1:50 000 maps of the area as well as Google Earth aerial images were consulted. A desktop review was undertaken based on previous reports.

Fieldwork involved a drive down of the two alternative routes, where this was possible. However, in view of the distance traversed, it was not possible to walk the route. A physical walk down of the sections of the route will only be possible once the final route option has been selected.

5. RECEIVING ENVIRONMENT

Both the proposed powerline will cross the Outeniqua and Swartberg Mountains but Alternative 1 takes the direct, and shorter route, over the mountains, while Alternative 2 attempts to skirt the eastern edge.

The Visual Impact identifies the following four main landscape types:

- Outeniqua Mountains
- Karoo Mountains
- Klein Karoo and Mountain Foothills; and
- Groot Karoo.



Plate 5: Waboomskraal valley indicating existing powerlines following the lower slopes of the Outeniqua mountains



Plate 6: Landscape to the south of Dysveldorp



Plate 7: Landscape on the Oude Muragie Road, near De Rust.



Plate 8: The Karoo landscape to the south of Beaufort West. This photograph shows the existing powerline following Alternative 1.



Plate 9: Typical rock overhang near Uniondale (along the R62) with rock paintings (Orton & Hart 2014).

5.1 Desktop Archaeology and Field Observations

Large sections of the terrain covered by the powerlines are extremely mountainous and mountain tops seldom contain a wealth of archaeological heritage resources. However, further down the slopes and in the valleys more archaeology is likely to be present.

With respect to the southern portions of the line alternatives (George to De Rust and then to Klaarstroom), archaeological resources known to occur include:

- Open scatters of ESA and MSA artefacts in secondary contexts;
- LSA deposits in caves,
- Rock art in rocky mountainous areas and koppies;
- Colonial heritage including many historical buildings and graveyards.

Archaeological resources are more dispersed along the northern section of the two Alternatives, where they cross the Karoo, being concentrated around the edges of pans and along the banks of dry river beds. ESA and MSA scatters are more common, while LSA sites may occur near small koppies.

George and Outeniqua Pass: Halkett (1999) surveyed the Gwaing and Blanco corridors linking the Outeniqua Pass and the N2 near George. He reported scatters of ESA and MSA artefacts on the slopes of the Outeniqua Mountains, which were largely under agriculture and therefore heavily ploughed. The sites BCO1 and GWG1 comprise scatters of ESA and MSA material (Figure 3). He found no LSA material but noted that the San and Khoekhoen are reported to have lived in the area. He did not locate any caves along these lower slopes and noted “we saw no possibility for the formation of caves and shelters anywhere along any of the routes”.

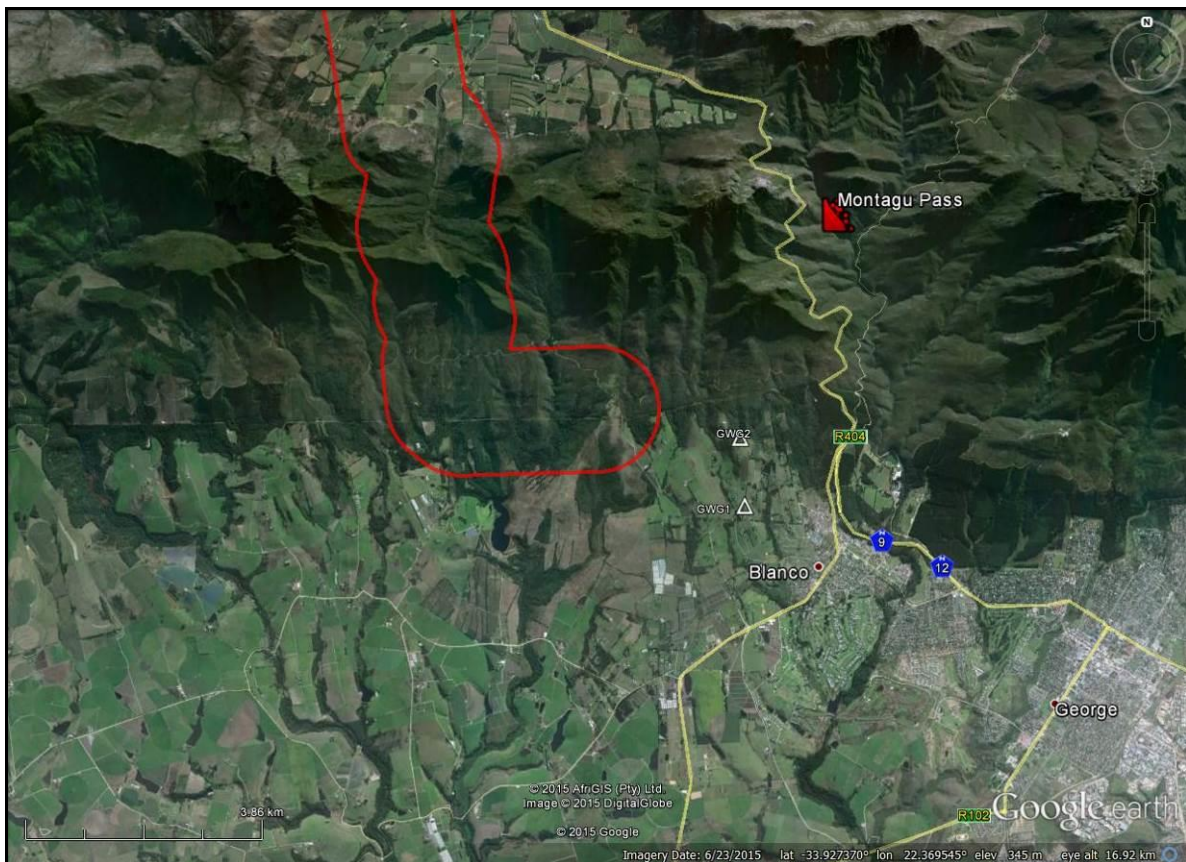


Figure 3: The commencement of Alternative 1, north of Blanco and between 2-4 km to the west of the Montagu Pass.

However, Kaplan (1991) during his assessment for the proposed Outeniqua Pass (a distance of some 20 km over the mountains), reported on seven (7) sites, of which three (3) were rock shelters with rock paintings, one (1) was a stone walled structure (probably a kraal) and three (3) were scatters of ESA and MSA material. He did not observe any archaeological occurrences along the Outeniqua Pass between Blanco and the beginning of Waboomskraal. His sites appear to be concentrated at the junction of the N12 and the R62, but his information is unfortunately not specific enough to allow mapping. The rock art icon in Figure 4 represents the approximate location of the rock art sites.

During his assessment for a 132 kV powerline linking the Outeniqua and Oudtshoorn substations, Orton (2012) recorded scatters of ESA and MSA artefacts, primarily in secondary contexts. He concluded that heritage resources were predominantly of low significance and he did not propose any mitigation measures. Site KLH2012/001 comprised a scatter of artefacts under the existing 400 kV lines (Figure 4).

Uniondale: During his survey for the Outeniqua Wind Farm near Uniondale, Orton (Orton & Hart 2014) recorded only four weathered stone artefacts. He also recorded a number of shelters with rock art in the Outeniqua Mountains (see below). One of the shelters contained some silcrete flakes (Figure 4).

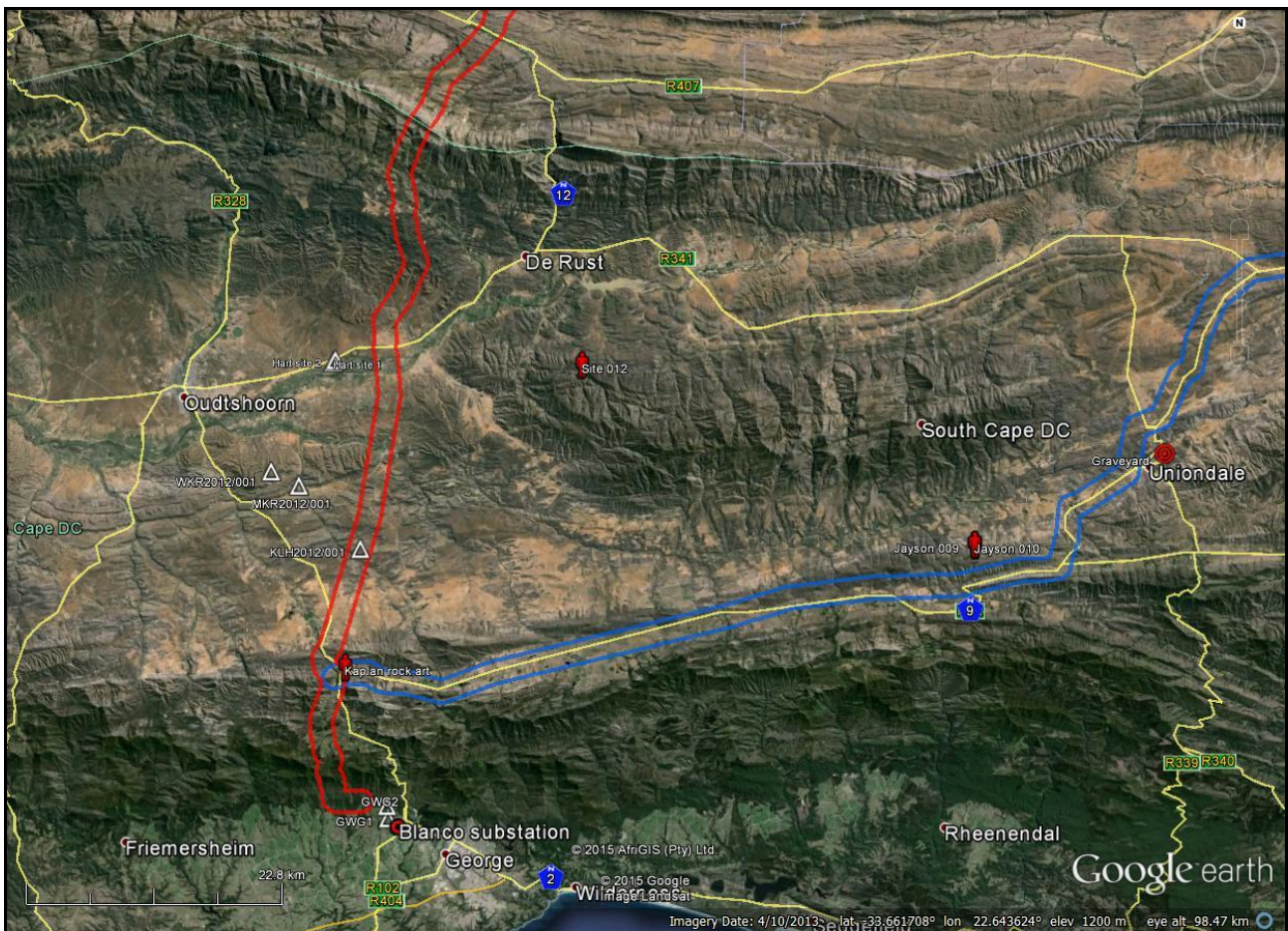


Figure 4: Map of archaeological sites between George, De Rust and Uniondale. The archaeological sites are indicated as a white triangle, the rock art as a red figure and a single recorded graveyard at Uniondale is shown as a red circle.

De Rust: Hart (2014) undertook a survey for borrow pits, at the intersection of the Dysveldorp Road and the N12, between Oudtshoorn and De Rust and recorded a light scatter of ESA-MSA stone artefacts conflated onto a Doorbank Horizon. A single small biface, attributable to the

Fauresmith, was recorded. The archaeological resources were graded as Grade IIIC. Halkett & Webley (2010) undertook a survey for a housing development on Welgevonden Farm, near De Rust, but some 16 km east of Alternative 1. They reported on some MSA stone artefacts.

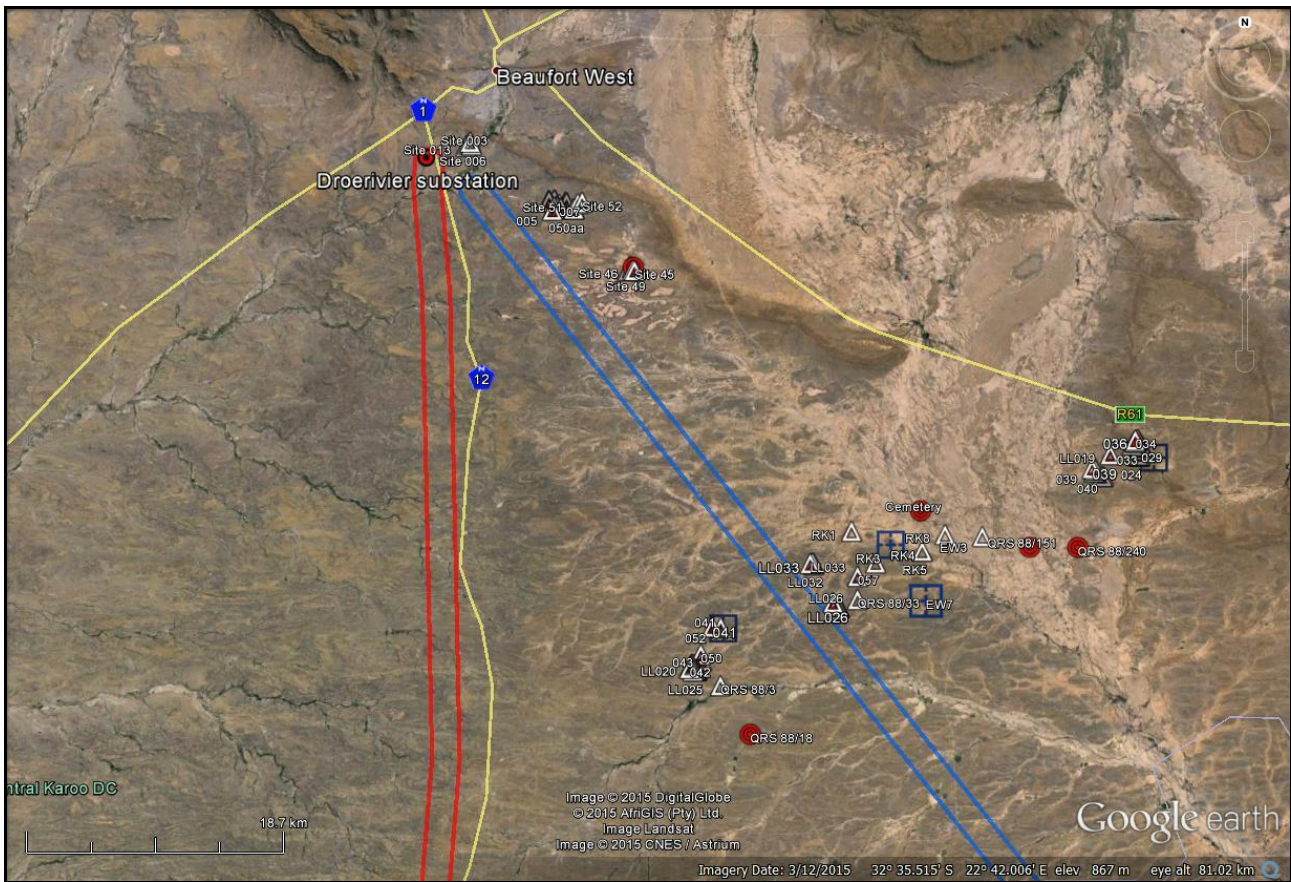


Figure 5: The distribution of known archaeological sites to the south of Beaufort West. The white triangles indicate Stone Age sites, the blue squares are historic sites and the red circles indicate cemeteries and graves. The density of sites recorded south of Beaufort West is due to a number of CRM surveys.

Beaufort West: A number of studies have been undertaken immediately south and east of the Droërvier substation for the construction of renewable energy facilities as well as prospecting for uranium. None of the reports (Orton 2011; Halkett 2009; Webley & Hart 2010 and Kinahan 2008) which have been consulted are actually located inside the corridors of the two Alternative powerline options, but they do indicate the range and significance of the archaeology of the Karoo plains to the south-west of Beaufort West (Figure 5).

During his survey at Beaufort West, close to the Droërvier Substation, Orton (2011) reported on scatters of stone artefacts but no clearly defined sites. Most of the artefacts were very weathered and probably dated to the Middle Stone Age. However, a number of fresher flakes were found and these may relate to the Later Stone Age. Nilssen (2014) undertook a Scoping assessment for a solar facility and recorded numerous isolated and very low density scatters of Stone Age implements ranging in age from Early through Middle to the Later Stone Age. Due to their temporally mixed nature and the absence of other faunal or cultural remains, these finds were considered to be of low significance.

Further to the east, studies by Kinahan (2008), Webley & Hart (2010) and Halkett (2009) for uranium prospecting have located a number of archaeological sites. In addition to the scatters of ESA and MSA artefacts, which appear to be ubiquitous across the landscape, Kinahan (2008) notes that the farm Ryskuil is characterized by an almost continuous surface scatter of the full range of archaeological material (ESA, MSA and LSA). The Holocene remains in particular appear to be well defined, mainly occurring at chert and hornfels quarry sites.

Similarly Halkett (2009), surveying in the same general area as Kinahan (2008) reported on scatters of ESA and MSA material across the landscape, with LSA sites more rare.

Aberdeen/Willowmore: Hart & Schietecatte (2012) in their assessment for the proposed powerline from Aberdeen to Beaufort West (slightly to the north of the study area), notes that direct assessment of impacts to archaeology and palaeontology can only be assessed and mitigated at the walk down phase. Binneman (2011) reports with respect Willowmore, the presence of only two weathered MSA stone artefacts.

5.2 Rock art

Rock art has been documented in the region since the 1950s by Hym Rabinowitz and others. They include the Cango Caves near Oudtshoorn. More recent rock art research in the southern Cape, including the Oudtshoorn region, is ongoing by Renee Rust (2011), Hugo Leggatt and Kevin Crause. An interesting motif which has caused much debate is the so-called “mermaid” at Ezeljagspoort near Oudtshoorn. Hollman (2005) has interpreted these paintings as representing the swift species of birds.

Deacon (1999) removed some graffiti from a cave on the hillside east of Highlands Lodge, Waboonskraal. Kaplan (1991) reported on rock art in shelters near the junction of the N12 and R62 observing a geometric rock art site (OP 1) which has been vandalised because of its proximity to the road; a small panel in a site (OP 2) with human figures and antelope and another small panel in site OP 3 with a small antelope.

Orton (2012) reports in his assessment for powerlines to the south of Oudtshoorn, that there is a rock art site on the farm Mist Kraal 169 although he was not able to record it during his survey.

J Deacon (1993) and her colleagues previously of the National Monuments Council (now SAHRA) cleaned a rock art site at Oude Muragie farm near De Rust. Halkett & Webley (2011) undertook a survey for a housing development on Welgevonden Farm, some 16 km east of Alternative 1 (and De Rust) and recorded a large cave in the mountains with rock paintings and archaeological deposit (Figure 4).

Orton (Orton & Hart 2014) also noted the existence of two rock art sites in a line of silcrete cliffs called “Oorvlakte” near Uniondale. He describes human figures and patches of finger dots in one site while the other contains an eland painted upside down (Figure 4).

A number of landowners who have responded during the Public Participation process have indicated the presence of rock art on their farms and their concerns around the potential damage to the art.

5.3 Historical Background

The historical background to the towns and villages (Blanco, Waboonskraal, Dysseldorp, De Rust, Klaarstroom, Beaufort West, Rietbron, Willowmore and Uniondale) along the route of the two powerline alternatives are discussed in more detail in the HIA report.

Orton & Hart (2014) discuss the potential impact of the proposed Outeniqua Wind Farm on the town of Uniondale including its Provincial Heritage sites, the cultural and natural landscape and scenic routes.

During his assessment for a 132 kV powerline linking the Outeniqua and Oudtshoorn substations, Orton (2012) recorded some historical ruins, two historical farm graveyards and several historical structures.

During his survey close to the Droërivier substation at Beaufort West, Orton (2011) reported a scatter of 19th century ceramics and glass. Halkett (2009) mentioned the remains of stone kraals and ruined stone buildings as well as possible farm graves near Beaufort West and Kinahan (2008) also records ruins of shepherd structures (possibly early pastoralist sites), stone kraals, rubbish dumps and farm cemeteries.

The historic remains are recorded a blue square on Figure 5. We may anticipate the full range of historical archaeological remains, including ruins of farm buildings, barns, stone kraals and stone walling in the area.

5.4 Cemeteries and Graves

Formal cemeteries are associated with settlements such as Blanco, Dysveldorp, Klaarstroom, Beaufort West, Rietbron, Willowmore and Uniondale. Farm graveyards may occur in proximity to farm house settlements and many have been recorded during surveys in these areas.

Halkett & Webley (2010) undertook a survey for a housing development on Welgevonden Farm, near De Rust, but some 16 km east of Alternative 1 and recorded a large unfenced graveyard on the farm with approximately 50 graves.

Halkett (2013) undertook a survey for a borrow pit near Uniondale and recorded a graveyard.

Halkett (2009) recorded graves on the farm Rystkuil to the south-east of Beaufort West and further graves are recorded by Kinahan's survey (2008) on the same farm. He emphasises the need to an intensive burial survey of the area. The Phase 1 study should consider the full range of recommended options for burial sites, including both site protection measures (preferred option) and possible relocation of the burials.

6. IMPACT ASSESSMENT

Impacts to archaeology are expected to be medium to low, and controllable.

6.1 Impact on Pre-Colonial Archaeology

Since heritage sites, such as archaeological sites, are non-renewable, it is important that they are identified and their significance assessed prior to development.

The main cause of impacts to archaeological sites is direct, physical disturbance of the material itself and its context. The significance of an archaeological site is highly dependent on its geological and spatial context. Even though excavations for tower footings tend to be relatively small and shallow, they may expose buried archaeological sites and artefacts. These artefacts are relatively meaningless once removed from the area in which they were found. The impacts are likely to be most severe during the construction period although indirect impacts may occur during the operational phase of the project.

This report has highlighted the distinct possibility that caves with rock paintings may occur in the mountains along either powerline alternative. It is not anticipated that the tower footings will be placed on top of caves and rock shelters, thereby resulting in their destruction. However, if towers are placed in proximity to rock art sites, they will be more vulnerable to vandalism from construction crews and may become more easily accessible to the public too.

Table 2: Potential impacts to Pre-colonial Archaeology (Alternative 1)

NATURE OF IMPACT: Negative impacts to archaeological material which may include caves with rock art and archaeological deposit as well as scatters of archaeological material.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
EXTENT	Local (2)	Local (1)
DURATION	Long term (4)	Long term (4)
MAGNITUDE	Moderate (4)	Minor (2)
PROBABILITY	Probable (3)	Improbable (2)
SIGNIFICANCE	(30)	(14)
STATUS	Negative	Neutral
OPERATIONAL PHASE		
EXTENT	Local (2)	Local (1)
DURATION	Long term (4)	Long term (4)
MAGNITUDE	Minor (2)	Minor (2)
PROBABILITY	Improbable (3)	Improbable (2)
SIGNIFICANCE	24	14
STATUS	Neutral	Neutral
REVERSIBILITY	Reversible	Reversible
IRREPLACEABLE LOSS OF RESOURCES?	Yes	No
CAN IMPACTS BE MITIGATED?	Yes	Yes
MITIGATION: Walk down of certain areas along the selected route, targeting koppies, river banks and rugged topography where the possibility of caves/rock shelters may exist. Micro-siting of pylons to avoid impacts.		
CUMULATIVE IMPACTS: Low		
RESIDUAL IMPACTS: n/a		

Table 3: Potential impacts to Pre-colonial Archaeology (Alternative 2)

NATURE OF IMPACT: Negative impacts to archaeological material which may include caves with rock art and archaeological deposit as well as scatters of archaeological material.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
EXTENT	Local (2)	Local (1)
DURATION	Long term (4)	Long term (4)
MAGNITUDE	Moderate (5)	Minor (2)
PROBABILITY	Probable (3)	Improbable (2)
SIGNIFICANCE	(33)	(14)
STATUS	Negative	Neutral
OPERATIONAL PHASE		
EXTENT	Local (2)	Local (1)
DURATION	Long term (4)	Long term (4)
MAGNITUDE	Minor (2)	Minor (2)
PROBABILITY	Improbable (3)	Improbable (2)
SIGNIFICANCE	24	14
STATUS	Neutral	Neutral

REVERSIBILITY	Reversible	Reversible
IRREPLACEABLE LOSS OF RESOURCES?	Yes	No
CAN IMPACTS BE MITIGATED?	Yes	Yes
MITIGATION: Walk down of certain areas along the selected route, targeting koppies, river banks and rugged topography where the possibility of caves/rock shelters may exist. Micro-siting of pylons to avoid impacts.		
CUMULATIVE IMPACTS: Low		
RESIDUAL IMPACTS: n/a		

Impacts to archaeology on Alternative 2 are slightly higher than on Alternative 1.

The tower footings for the 400 kV line are relatively small (Plate 4) and they are unlikely to result in significant damage to archaeological material such as scatters of ESA and MSA material, which are generally not in situ.

Recommendations:

- Assess the possibility of impacts to in situ LSA sites by a targeted walk down of certain sections of the line, such as koppies and river banks;
- Where landowners have identified caves with rock art on their properties, a targeted survey at the walk-down phase can address any concerns about potential impacts. A range of mitigation options are possible, including the careful placement of the tower footings to avoid rock art sites (i.e. micro-siting of the tower locations within the corridor);
- Rock art sites may also be protected from vandalism by ensuring that they are fenced off during the construction of the powerline.

The localities where there is a high probability of rock art occurring is indicated in Figure 6.

6.2 Impact on Colonial Period

The construction of pylons in close proximity to farmsteads may result in the destruction of historic rubbish dumps (middens), old kraals or the ruins of old dwellings.

Recommendations:

- A targeted walk-down of the line will be required after the final powerline route has been decided. The walk down would concentrate on areas immediately around farm buildings and structures.

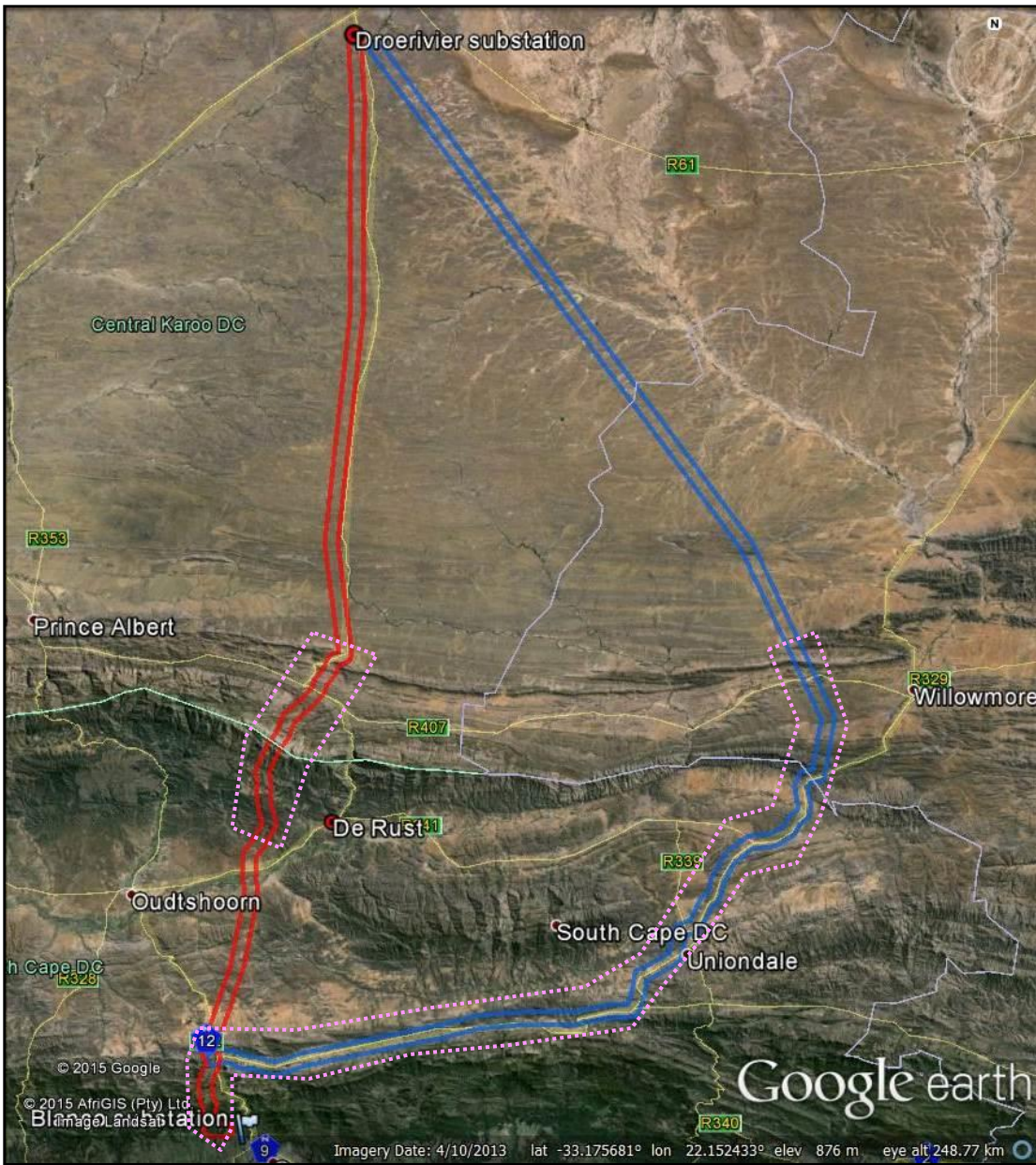


Figure 6: Rock art sites may occur in any mountainous areas or areas of rock outcrops along the both alternatives (indicated with the pink dotted line), although the probability of impacts is higher with Alternative 2.

6.3 Impacts to Graves

While large cemeteries in proximity to villages and on farms are generally fenced and easy to identify, isolated graves may occur in apparently random locations. They are often unfenced and may not have headstones, making them difficult to identify. Sometimes they are only visible because they are covered in cairns of unshaped stones. It is these graves which are most at risk from construction crews.

Human remains are the most complicated aspects of heritage to mitigate since they require their own public participation process (See Section 36 of the NHRA) before they can be exhumed. In the event of human bones being found on site, HWC must be informed immediately and the remains removed by an archaeologist under an emergency permit. This process will incur some expense as removal of human remains is at the cost of the developer. Time delays may result while application is made to the authorities and an archaeologist is appointed to do the work.

Table 4: Summary of impacts to Cemeteries and Graves (Alternatives 1 – 4)

NATURE OF IMPACT: Impacts will be through possible direct impacts on local historic cemeteries (near settlements and farms) as well as individual graves.		
	Without mitigation	With mitigation
CONSTRUCTION PHASE		
EXTENT	Regional (3)	Local (2)
DURATION	Long term (4)	Short duration (1)
MAGNITUDE	Moderate (6)	Low (4)
PROBABILITY	Probable (3)	Improbable (2)
SIGNIFICANCE	Medium (39)	Low (14)
STATUS	Negative	Neutral
OPERATION PHASE		
EXTENT	Local (2)	Local (1)
DURATION	Long term (4)	Long term (4)
MAGNITUDE	Minor (3)	Low (2)
PROBABILITY	Improbable (3)	Improbable (2)
SIGNIFICANCE	27	14
STATUS	Neutral	Neutral
REVERSIBILITY	Yes	Yes
IRREPLACEABLE LOSS OF RESOURCES?	No	No
CAN IMPACTS BE MITIGATED?	No	Yes
MITIGATION: Walk down of selected sections of the line near farmsteads where graves may be expected to occur. A protocol for dealing with the discovery of human remains during construction.		
CUMULATIVE IMPACTS: n/a.		
RESIDUAL IMPACTS: n/a.		

The towers may be constructed on/or in close proximity to farm graveyards as well as isolated graves/burial cairns resulting in potential impacts.

Recommendations:

Once the final route has been selected:

- A survey should be conducted during the walk-down phase around farmsteads in order to ensure that graves area avoided;
- A buffer of at least 15 m should be maintained around the perimeter of any farm graveyards to ensure that they are not damaged during construction;
- If unmarked graves are uncovered during the construction of the tower footings, all work in that area should cease immediately, and HWC must be contacted.

7. COMMENTS FROM INTERESTED AND AFFECTED PARTIES

The following comments, specifically related to archaeological issues, were received from Interested and Affected Parties:

Comments	Responses
Lamirsie/Doring Rivier/Grootfontein: There are sites of significant cultural value	Once the final route option has been decided, landowners will be contacted and a targeted walk down will be undertaken to ensure that sites are not impacted.

on the farms. Some of the buildings date from the 1800's and some bushmen paintings exist on the farms	
Molin River: On the farm there is areas of cultural importance including old bushmen drawings on the rock formations that he will protect at all costs	Once the final route option has been decided, landowners will be contacted and a targeted walk down will be undertaken to ensure that sites are not impacted.
Ganzekraal (Kamaniqwa): On the farm there is areas of cultural importance including old bushmen drawings on the rock formations	Once the final route option has been decided, landowners will be contacted and a targeted walk down will be undertaken to ensure that sites are not impacted.
Georgida: On the farm there is areas of cultural importance including old bushmen drawings on rock formations	Once the final route option has been decided, landowners will be contacted and a targeted walk down will be undertaken to ensure that sites are not impacted.
Kykoe 55 on the Keurboom River (Alternative Route): Landowner has reported Bushmen paintings on his property.	Once the final route option has been decided, landowners will be contacted and a targeted walk down will be undertaken to ensure that sites are not impacted.

The information provided in the public comments documents is too vague to assist in the identification and mapping of sites and to assess potential impacts. It is not clear whether the rock art occurs within the 1 km wide corridor. Depending on which line option is selected, these landowners will be contacted during the walk down phase, and the impacts to each rock art site will need to be assessed individually. Micro-siting of the line within the 1 km wide corridor will ensure that the rock art is avoided.

The comments from the Registered Conservation Bodies and the local municipalities is attached:

8. CONCLUSION

A small number of archaeological impact assessments have been conducted in the general area between George and Beaufort West.

A desktop review of archaeological sites in the general area of the proposed powerlines, as well as a drive down of the line alternatives, suggest the following heritage resources may occur:

- Early and Middle Stone Age scatters across the landscape;
- Later Stone Age archaeological sites in proximity to koppies and river banks;
- Rock shelters with rock art and stone age archaeological deposit in the mountainous areas;
- Historical archaeological remains around farm steads;
- Remnants of historic roads and passes;
- Cemeteries and isolated graves associated with settlements and farms.

Anticipated Impacts on Heritage Resources:

While the footprint of the tower is relatively small, impacts to heritage resources may occur.

- Caves and rock shelters, whilst not directly impacted by the construction of a tower footing, may become more easily accessible to people leading to potential vandalism of rock art sites and archaeological deposits. The likelihood of this occurring is **medium to low**;
- *In situ* scatters of ESA and MSA stone artefacts may be damaged. The likelihood of this occurring is **very low**;

- *In situ*, LSA archaeological sites may be damaged by the construction of the tower footings and access roads. The likelihood of this occurring is **medium to low**;
- Ruined structures and historic rubbish dumps may be impacted by the tower footings and access roads. The likelihood of this occurring is **medium**;
- The proposed tower footings may result in the destruction of farm cemeteries and graves. The likelihood of this occurring is **medium**.

Recommendations:

The tower footings for the 400 kV line are relatively small and they are unlikely to result in significant damage to archaeological material such as scatters of ESA and MSA material, which are generally not *in situ*.

The powerline corridors being assessed are 1 km wide, although the actual servitude will only be 62 m wide. This provides sufficient width for micro-placing of the tower footings to avoid impacts to archaeological sites.

Recommendations:

Once the final route option has been selected, the following recommendations must be included in the Environmental Authorisation and written into the EMP:

- Assess the possibility of impacts to *in situ* LSA sites by a targeted walk down of certain sections of the line, such as koppies and river banks;
- Where landowners have identified caves with rock art on their properties, a targeted survey at the walk-down phase can address any concerns about potential impacts. A range of mitigation options are possible, including the careful placement of the tower footings to avoid rock art sites (micro-siting of the towers within the 1 km corridor may be required);
- Rock art sites may also be protected from vandalism by ensuring that they are fenced off during the construction of the powerline;
- A targeted walk-down of the line must also concentrate on areas immediately around historic farm buildings and structures to ensure that a sufficient buffer has been implemented to avoid impacts to historic kraals, old sheds, rubbish dumps, etc;
- A survey should be conducted during the walk-down phase around farmsteads in order to ensure that graves area avoided;
- The towers may be constructed on/or in close proximity to farm graveyards. If graveyards are discovered during the walk down phase, a buffer of at least 15 m should be employed around them;
- If unmarked graves are uncovered during the construction of the tower footings, all work in that area should cease immediately, and HWC must be contacted.

There are no anticipated fatal flaws with regard the construction of the powerline and Alternative 1 is considered the preferred alternative merely because it is shorter, and therefore the impacts are potentially less to archaeological sites. Alternative 1 is associated with an existing line, and therefore a new access/service road to ensure maintenance of the line, will not be required.

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Appendix 3: Visual Impact Assessment

(refer to VIA report is **Appendix 4.6** as part of the main EIA part)