A PHASE 1 HERITAGE IMPACT ASSESSMENT STUDY FOR THE PROPOSED 132kV LINES - SORATA-WITSIESHOEK, PHUTHADITJHABA, FREE STATE PROVINCE, SOUTH AFRICA.

PROJECTS & HERITAGE CONSULTANTS (PTY)LTD

VERSION: 01

10 February 2013

ACKNOWLEDGEMENT OF RECEIPT

CLIENT:	Margen Industrial Services
CONTACT PERSON:	Mr Tshepo Lopono Tel: +27 13 656 1212 Fax: +27 13 656 2233 Cell: +27 83 339 9103 E-mail: moses@margen.co.za
CONSULTANT:	NGT Projects & Heritage Consultants (Pty) Ltd Cell: +27 78 163 0657 E-mail: nkosinathi.tomose@gmail.com
CONTACT PERSON:	Mr Nkosinathi Tomose
SIGNATURE:	NGT__ Nkosinathi Tomose for NGT____

COPYRIGHT

This report (including all the associated data, project results and recommendations) whether manually or electronically produced, forming part of the submission and any other subsequent reports or project documents such as the inclusion in the EIA document for which it is intended for - totally vest with the author, Nkosinathi Tomose - Principal NGT Project & Heritage Consultants (Pty) Ltd. Therefore, it is the author's views that no parts of this report may be reproduced or transmitted in any form whatsoever for any person or entity without prior written consent and signature of the author. This limitation is with exception to Margen Industrial Services cc whose limitation to use the report and its results and recommendations shall be lifted with and after full settlement of the fees agreed upon with NGT Projects & Heritage Consultants for the compilation and production of the report.

The limitation for the transmission of the report, both manually and electronically without changing or altering the reports results and recommendations, shall also be lifted for the purposes of submission, circulation and adjudication purposes by the relevant heritage authorities such as SAHRA Free State (provincial heritage authority) and the SAHRA and/or any other interested legalised government authority such as the DEA.

DECLARATION OF INDEPENDENCE

This report has been compiled by Nkosinathi Tomose, leading archaeologist and heritage consultant for NGT Project & Heritage Consultants. The views expressed in this report are entirely those of the author and no other interest was displayed during the decision making process for the project.

HERITAGE CONSULTANT:	NGT Projects & Heritage Consultants (Pty) Ltd
CONTACT PERSON:	Nkosinathi Tomose
SIGNATURE:	NGT__Nkosinathi Tomose for NGT_

EXECUTIVE SUMMARY

NGT Projects & Heritage Consultants (Pty) Ltd was been appointed by Margen Industrial Services cc as an independent and lead CRM firm to conduct a HIA (exclusive of Palaeontological desktop study) for the proposed development (of 132kV Sorata-Witsieshoek Power Line) as part of specialists (inputs) impact assessment studies required to fulfil the BAR process and its requirements. The appointment of NGT Projects & Heritage Consultants (as an independent CRM firm) is in terms of the NHRA, No. 25 of 1999 (as amended), the NEMA, No.107 of 1998 (as amended & the applicable 2010 Regulations), as well as other applicable legislations such as the MPRDA) No. 28 of 2002. Nkosinathi Tomose, the lead archaeologist & heritage consultant of NGT Projects & Heritage Consultants, conducted the HIA study for the proposed 132kV Sorata-Witsieshoek Power Line in Maluti a Phofung, Free State Province, South Africa (Figure 1). Also refer to Figure 2 for the general location of the study area in the broader landscape. Below is the summary of survey results, conclusions and recommendations made up the study-

Findings:

The physical survey of 3 proposed corridors (i.e. Corridor 1, Corridor 2 & Corridor 3) yielded a total of 33 sites of which 4 are considered not to be historical or heritage sites based on the 60 year age classification. In total 5ive sites where identified in Corridor 1, 12 sites in Corridor 2 and a total of 16 sites in Corridor 3. Site QWAC1-5 in Corridor 1 and site QWAC2-12 in Corridor 2 is the same site - this is because Corridor 1 and Corridor 2 run on the same servitude towards Sorata-Substation, just after Wilge River. Table 1 below gives a summary of the corridors surveyed, site names, heritage resources identified per site and heritage significance evaluation for each site identified (Table 1).

Table 1- Summary of Identified heritage sites - Sorata-Witsieshoek 132kV Power Line.

CORRIDOR	SITE NAME	HERITAGE RESOURCES	HERITAGE SIGNIFICANCE
Corridor 1			
	QWAC1-1	Stone walled shed, a storage facility next to the shed, four houses and few structures located near the shed	Medium significance
	QWAC1-2	Six structures, namely: two flat roof flats, two rondavals and two outside ablution	Not a heritage site

		facilities (toilets)	
	QWAC1-3	A rectangular sandstone kraal	Low significance
	QWAC1-4	farm labours homestead	Not a heritage site
	QWAC1-5	32 graves with stone mound dressings and cement headstones	High significance
Corridor 2			
	QWAC2-1	Two rondaval foundation structures	Medium significance
	QWAC2-2	Two rectangular stone foundations, a big kraal which is surrounded by approximately six small round/circle structures and two smaller kraals in a C.C.P pattern	High significance
	QWAC2-3	A rectangular to square stone walled structure	Medium significance
	QWAC2-4	Two round stone wall foundations that look to have been rondavals	Medium significance
	QWAC2-5	A round stone wall foundations	Low significance
	QWAC2-6	Three round stone wall foundations	Medium significance
	QWAC2-7	A rectangular stone walled kraal	Medium significance
	QWAC2-8	A concrete reservoir	Not a heritage site
	QWAC2-9	A stone walled kraal and three stone mound/ cairns structures predicted to be 'potential' graves	High significance
	QWAC2-10	A big stone walled kraal and approximately nineteen small structures around/surrounding it. The site complex is well preserved - good state of preservation. It forms a typical C.C.P pattern.	High significance
	QWAC2-11	Four structures which include: a stone walled kraal, farm shed, a dam and a grave	High/Medium significance
	QWAC2-12	Thirty two graves with stone mound/cairns dressings and cement headstones	High significance
Corridor 3			
	QWAC3-1	Farmhouse foundations,	Medium significance

		fence walls, reservoir remains old bricks, ash dumps and rusted corrugated iron sheets and metal poles or fence droppers	
	QWAC3-2	A rectangular stone walled kraal	Medium significance
	QWAC3-3	A rectangular stone walled kraal on the hillside	Medium significance
	QWAC3-4	Farms house ruins, approximately three reservoirs, cattle drinking pond, garden walls and other garden decorative features	Medium significance
	QWAC3-5	A shed with two garage size doors and a smaller shed with a single door and a smaller structure in front of the shed	Medium significance
	QWAC3-6	A cement reservoir	Not a heritage site
	QWAC3-7	Stone walled kraal foundation and at the back of the kraal are three graves.	High/Medium significance
	QWAC3-8	A stone walled kraal foundation and approximately four graves located at the back of the kraal	High/Medium significance
	QWAC3-9a	A stone walled kraal. The kraal is located approximately 80m or less from QWAC3-9b	Medium significance
	QWAC3-9b	Two stone kraal foundations and two rondavals foundations	Medium significance
	QWAC3-10	Three stone mound/cairns structures - possible graves	High/Medium significance
	QWAC3-11	A historic farmstead consisting of approximately five house structures	High/Medium significance
	QWAC3-12	A stone walled kraal	Medium significance
	QWAC3-13	A scatter of four ceramic fragments located on the hill slope near an area that is forming a gully	Low significance
	QWAC3-14	Four rondavals foundations and two rectangular stone walled structures	High significance

	QWAC3-15	A historic Iron Age complex site covering approximately 287m in length and about 92m in width at the base of a hill. The site consists of approximately forty or more structures which include stone walled kraals of various sizes and shape with the most dominant shape being the round kraal. Around the kraal are rondaval structures as well as some rectangular structure foundations. Some of the kraals have internal divisions.	High significance
	QWAC3-16	An old farm fence - presumable the gate	Low significance

Conclusions and recommendations:

The following conclusions and recommendations are made about Sorata-Witsieshoek 132kV based on existing literature about the project area, observations made during the physical survey of the proposed development area, assessment and evaluation methods using SAHRA minimum standards for evaluation and grading of archaeological (and other heritage) resources as well as the NHRA, No 25 of 1999 for the protection, conservation and management of the Nation Estate (Section 3 of the NHRA, No 25 of 1999), and assessment of associated impacts in term of the BAR Assessment Standards:

- Study concludes that Corridor 1 is the least heritage sensitive corridor in terms of heritage resources management and based on the impact significance ratings according to Heritage and BAR Impact Assessment Standards. Most sites identified in this corridor from where it starts in Witsieshoek are of low heritage significance and some are not even considered heritage resources. This is with exception to QWAC1-5, a none municipal formalised cemetery consisting of 32 graves within the fence in Sorata-Substation where this corridor ends.
- Corridor 3 is the second least heritage sensitive corridor in terms of heritage resources management and according to impact assessment rating using Heritage and BAR Impact Assessment Standards.

- Corridor 2 proved to be the highly sensitive corridor in terms of heritage resources management and based on the impact significance ratings according to Heritage and BAR Impact Assessment Standards. One of the sites which significantly contributed to this, in this corridor, is QWAC2-10 and a combination of it (i.e. QWAC2-10) with QWAC2-9, QWAC2-12 and QWAC2-2.

Based on the above the study makes the following recommendations about the Sorata-Witsieshoek 132kV Power Line.

- Corridor 1/2 (i.e. combination of Corridor 1 and Corridor 2) is the preferred and recommended corridor from a heritage management point of view. Meaning that the power line will start at Sorata Substation using Corridor 2 and where Corridor 2 and Corridor 1 splits (i.e. at GPS Coordinates S28° 20' 22.3" E028° 52' 43.6"), the line will follow Corridor 1 up to where it rejoins Corridor 2 again (i.e. at GPS Coordinates: S28° 25' 15.5" E028° 49' 46.6") until it reached Witsieshoek Substation (Figure 106).
- The second alternative to Corridor 1/2 is Corridor 2. The reason for this preference is that a combination of Corridor 2 and Corridor 3, if Corridor 3 was to be considered as second alternative corridor based on the fact that it has the second least heritage sensitive and high impact significance sites as compared to Corridor 2, will result in an increased number of heritage sensitive and high impact significant sites. Corridor 3 has more sensitive and impact significant sites towards Witsieshoek Substation while Corridor 2 has more sensitive and high impact significant sites north-east of where it splits to form Corridor 3 on the mountainous area towards Wilge River. And Corridor 2 is less, but still highly sensitive toward Witsieshoek Substation. Therefore, a combination of Corridor 2 and Corridor 3 is not advisable as it would increase the impact significance levels of the power line on heritage resources. Thus, the choice to recommend Corridor 2, but with alternation or deviations from the current proposed servitude.

- A special recommendation is made about QWAC2-12 - it is recommended that this site should be fenced off from the rest of construction activities during the construction phase of the project and a cemetery management plan should be developed to manage this site prior, during and post the construction phase of the project.

* For detail conclusions and recommendations, read the conclusions and recommendations section of this report.

TABLE OF CONTENTS

TABLE OF FIGURES

LIST OF TABLES

ABBREVIATIONS

Acronyms	Description
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management

DEA	Department of Environmental Affairs
DoE	Department of Energy
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GIS	Geographic Information System
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
K.y.a	Thousand years ago
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act
NEMA	National Environmental Management Act
PHRA	Provincial Heritage Resources Authority
PSSA	Palaeontological Society of South Africa
ROD	Record of Decision
PDAFP	Proposed Development Area Footprint
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
SPV	Special Purpose Vehicle

TERMS & DEFINITION

Archaeological resources

This includes:

- material remains resulting from human activity which are 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;
- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- wrecks, being any vessel or aircraft, or any part thereof which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- Features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

Development

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in the change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

- construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- carrying out any works on or over or under a place;
- subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- constructing or putting up for display signs or boards;
- any change to the natural or existing condition or topography of land; and
- any removal or destruction of trees, or removal of vegetation or topsoil

Heritage resources

This means any place or object of cultural significance

1. INTRODUCTION

1.1. Project Background

1.1.1. Summary of the Proposed Project

This project is one of Eskom Power Strengthen projects and it involves construction of power transmission lines between Sorata and Witsieshoek Substations. The current study form part of specialists studies aimed at giving inputs in the BAR process and advising on the best suitable corridor, in terms heritage resources management - out of Corridor 1, Corridor 2 and Corridor (Figure 1).

1.1.2. Proposed Project Aims

The aim of the Sorata-Witsieshoek Project is to strengthen power Loads Centre (Witsieshoek) and the surroundings. The proposed project consists of the following:

- A 132kV power line between the existing Sorata and Witsieshoek substations
- A 31 m Servitude
- A 1000m Buffer including servitude, and
- Monopole structures are proposed for the Power Lines

1.1.3. Terms of Reference for the Appointment of Archaeologist and Heritage Specialist

Because of the nature and size of the proposed development - proposed 132kV power lines and associated infrastructure exceeding a total area of 5000m^2, a need to conduct a BAR

developed. In terms of the EIA Regulations of June 2010 (Government Notice 543-546 published in terms of the NEMA, No 107 of 1998) the construction of the proposed facilities is listed as an activity that requires environmental authorisation. This is because the project comprises development/expansion of 132kV power lines and servitudes – a development that occupies an area of more than 20ha. Undertaking a BAR process is therefore a requirement. The current process comprises of a BAR and it involves the identification and assessment of environmental impacts through specialist studies, as well as public participation.

NGT Projects & Heritage Consultants (Pty) Ltd has been appointed by Margen Industrial Services cc as an independent and lead CRM firm to conduct an HIA (exclusive of Palaeontological desktop study) for the proposed development as part of specialists (inputs) impact assessment studies required to fulfil the BAR process and its requirements. Nkosinathi Tomose, the lead archaeologist & heritage consultant or NGT Projects & Heritage Consultants, conducted the HIA study for the proposed 132kV Sorata-Witsieshoek Powerline in Maluti a Phofung, Free State Province, South Africa (Figure 1) Also refer to Figure 2 for the general location of the study area in the broader landscape.

The appointment of NGT Projects & Heritage Consultants (as an independent CRM firm) is in terms of the NHRA, No. 25 of 1999 (as amended), the NEMA, No.107 of 1998 (as amended & the applicable 2010 Regulations), as well as other applicable legislations such as the MPRDA No. 28 of 2002.

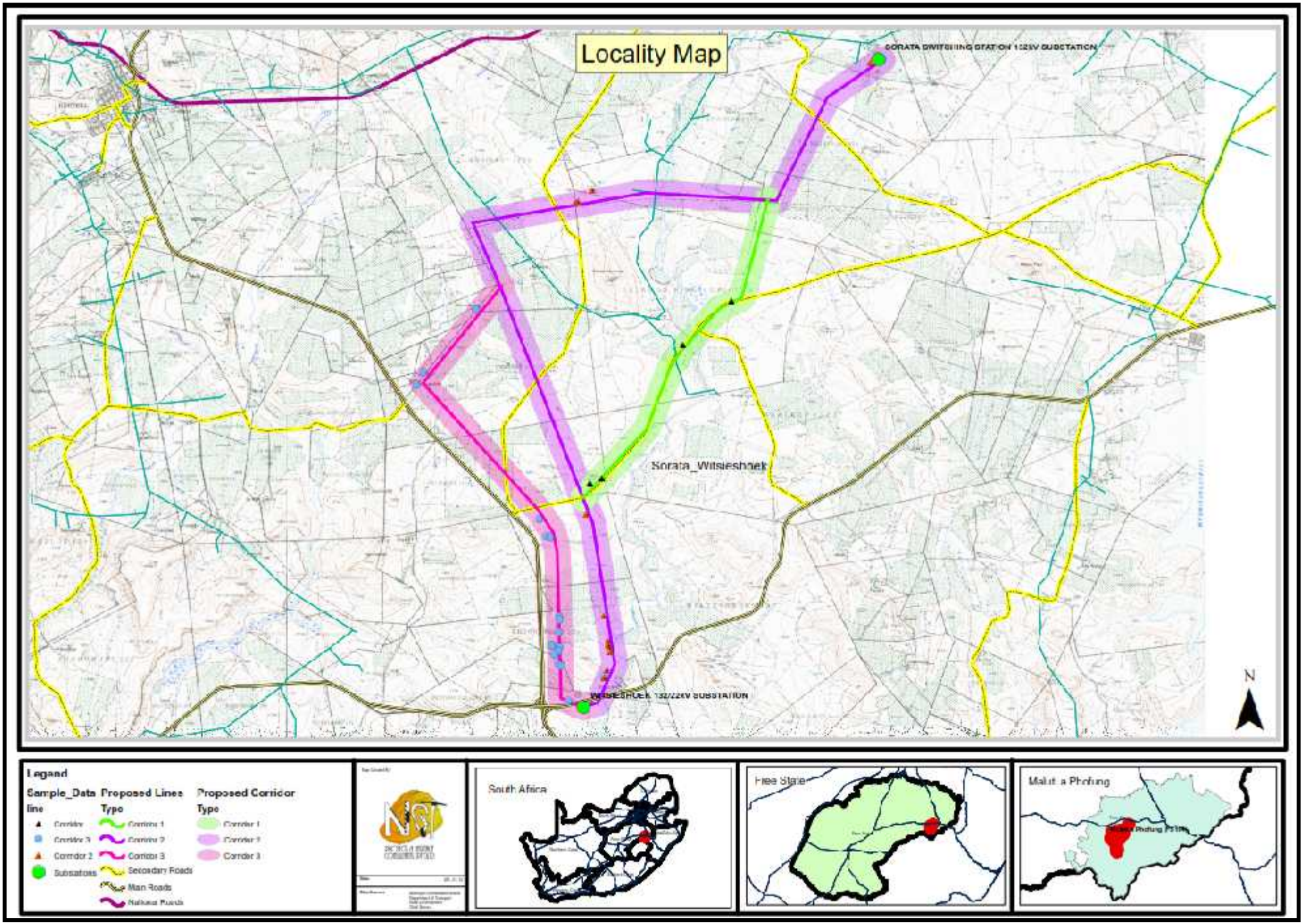

Locality Map
Sorata_Witsieshoek
N
Legend
Sample_Data
line
Corridor
Corridor 1
Corridor 2
Substations
Proposed Lines
Type
Corridor 1
Corridor 2
Corridor 3
Secondary Roads
Main Roads
National Roads
Proposed Corridor
Type
Corridor 1
Corridor 2
Corridor 3
South Africa
Free State
Maluti a Phofung

Figure 1- Location of the project area within South Africa, the Free State Province and in the Maluti a Phofung. Map Reference 1:50,000 Topographic Map

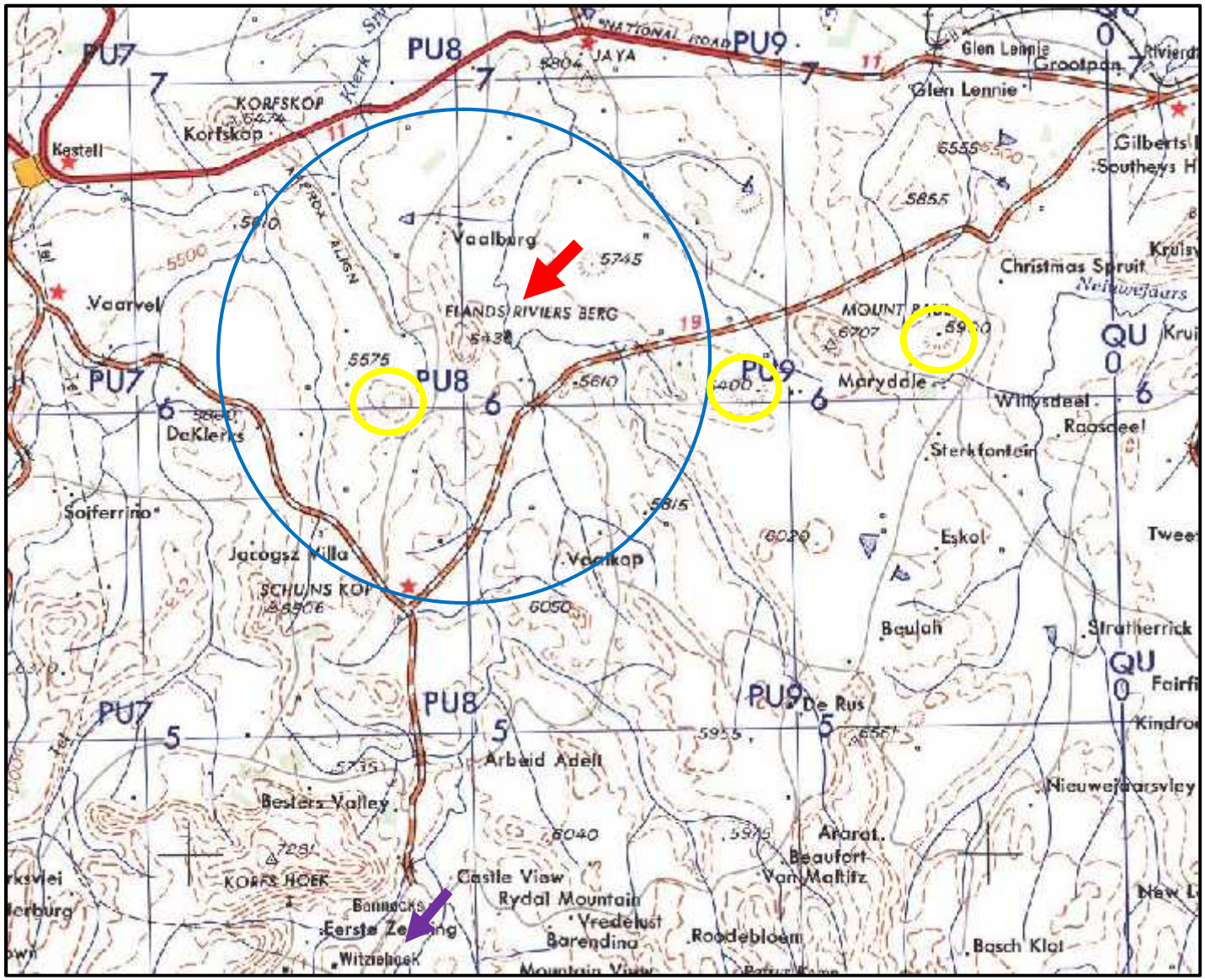


Figure 2 –General location of the study area within 1:250,000 Topographic Map. Map Reference - . Blue circle general location of the study area. Red arrow Elands Riviers Berg and solid purple arrow Witsieshoek.

2. BACKGROUND OF THE STUDY AREA

2.1. Description of the affected environment

The area under consideration falls under Maluti a Phofung, in the Free State Province, South Africa. It is ensconced between the town of Phuthaditjhaba (Qwaqwa) in the south, Kestell in the north-west and Harrismith in the north-east (Figure 3). It is found south of the N5 linking the town of Kestell and Harrismith, east of the R57 Road linking Phuthaditjhaba and Kestell, and north and west of the R712 linking Phuthaditjhaba and Harrismith.

The power line corridors will predominantly cover the farming/agricultural and rural landscape ensconced between the three towns mentioned above. The farming/agricultural and rural landscape is characterised by mountainous, to semi-flat adulating lands, rivers and tributaries that define the country side. Few wetland features and perennial water features as well as pan were observed in the landscape.

The Maluti a Phofung District Municipality or the area it occupies has long history dating as far back as the 1800s. Its prehistoric records, however, predates the 1800s. This becomes evident when one assess the names behind the place. For example, the name Phofung refers to a place/land of elands. Therefore, the region/district derived its name from the fact that it was once a land where herds of elands used to be found (Ntlhabo, 2010). This is attested to by the names given to some natural geographic in the area such as Elands Riviers Berg (e.g. Figure 2 - red arrow). Within the Phofung District another popular name is Witsieshoek, a name that is dominant in most written records about the study area and its surrounding as well as a popular name in cartographic records such as topographic and political maps of the area (e.g. Figure 2 & 3). The name Witsieshoek is said to have been popularised by the Boers in the region. A name (i.e. Witsieshoek) is arguable derived "...from the Afrikaans language “Witsie se Hoek” - the name, Witsie‟ is directly derived from the name of the leader of the Makholokoe in Qwa Qwa known as Oetsi. „Hoek‟ or „Corner‟ refers to the area that was occupied by the Makholokoe and Oetsi which is locked in the mountains" (Ntlhabo, 2010). To some the study area, together with the area where Witsie Cave is situated, is still called Witsieshoek. There is still a post office known as Witsieshoek Post Office which suggests or proves that indeed Oetsi and his followers once occupied the area that is today known

as Qwaqwa (ibid). On the other hand the name Qwaqwa is argued to have derived its name and meaning from San language - a name meaning more than white owing to the common snow occurrence in the Maluti Drakensburg Mountains.

The above brief cultural historic background makes the affected geography to be interesting both in terms of the cultural landscape and physical geography . One therefore expects the landscape to bear testimony to some of the things known from a cultural perspective about the region (both culturally and physical/natural).

Below is the description of the affected environment in terms of the 3 proposed Corridors, starting from Corridor 1 ending with Corridor 3.

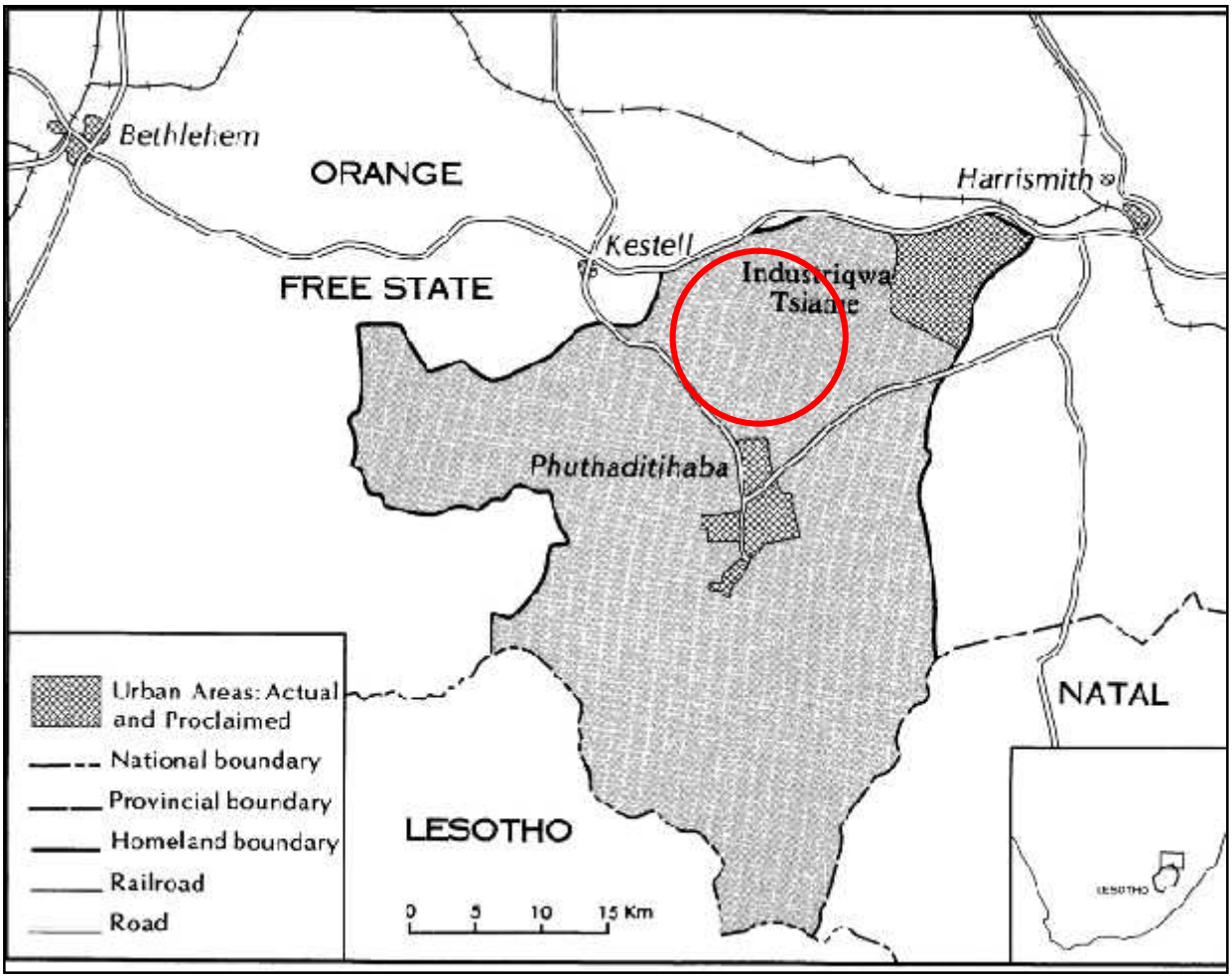


Figure 3- General location of the study area (red circle) in relation to known towns in the area.

2.1.1. Affected Environment Corridor 1

Corridor 1 is the shortest corridor out of the 3 proposed corridors. It deviates from Corridor 2 some 6.5km north of Witsieshoek Substation and rejoins it at approximately 5.7km south-west of Sorata Substation (Figure 1). In total this corridor covers approximately 10.6km in length and covers an area predominately dominated by agricultural fields. The main crop ploughed in this corridor is maize (Figure 4). There are some farm industries (e.g. processing plants) and farm houses located along this corridor. These are mostly in the left side of the corridor (Figure 5). Like Corridor 2, Corridor 1 also passes through Wilge River before it joins Corridor 2 with existing power lines (Figure 6).

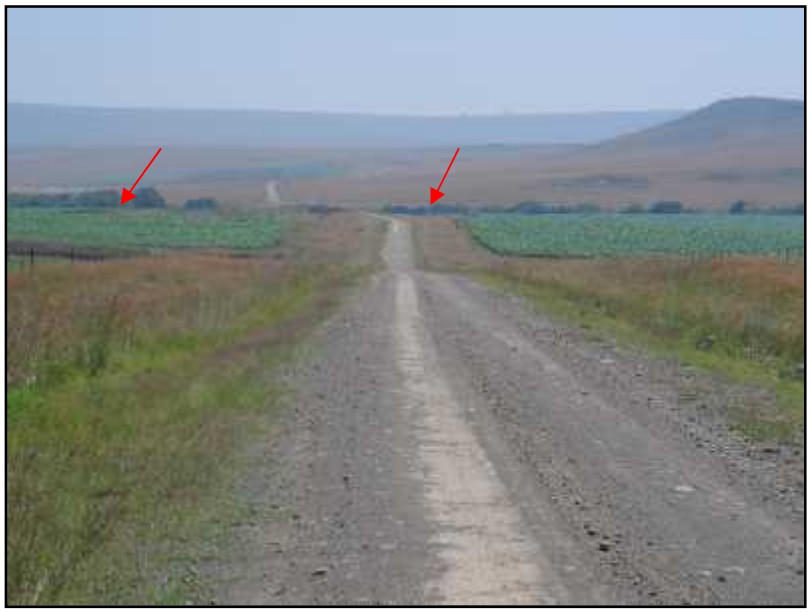


Figure 4- Maize plough fields. Thick bush area is Wilge River (red arrows)

Figure 5- Example of farm houses in the background of maize plough fields (white arrow)

Figure 6- Wilge River pictures. One showing a bridge (left picture) and the other (right picture) the main river channel south-west of where Corridor 2 joins Corridor 1.

2.1.2. Affected Environment Corridor 2

Corridor 2 is the longest corridor out of the 3 proposed corridors - it covers a total area of approximately 30.2km in length (Figure 1). It has existing Eskom power lines joining Sorata Substation with Witsieshoek Substation (refer, Figures - 7 to 11). The affected environment

for this is predominantly commercial farm lands or agricultural land. The main farming activities include wheat (Figure 7), maize (Figure 8) and peas/beans farming (Figure 9). Cattle farming (Figure 10) is secondary to these activities. Cattle was observed near Witsieshoek Substation (Figure 11). Close to this corridor, semi-urban settlement areas were observed (e.g. Figure 8). The Wilge River is the main geographic or natural features that the Corridor passes more than twice within the proposed development area (e.g. Figure 12). Otherwise the Corridor is dominated by open grassland (e.g. Figure 13), dams and wetland features are found near Sorata Substation (e.g. Figure 14). The power line also passes mountainous area more than twice - near Sorata and Witsieshoek Substations. Its terrain can be defined as mix of adulating hills, cliffs, mountains, rivers and tributaries that crisscross the landscape.

Figure 7 - Wheat plough fields located within Corridor 1

Figure 8- Maize plough fields

Figure 9- Peas/beans plough fields located within Corridor 1

Figure 10- Cattle near Sorata Substation

Figure 11- Witsieshoek Substation (red arrow) . Note University of the Free State Qwaqwa Campus in the background (yellow arrow)

Figure 12 - Wilge River pictures. One showing a bridge near Witsieshoek Substation (left picture) and the other (right picture) the main river channel just west of where Corridor 2 joins Corridor 1. Red arrow, location of semi-urban area north-east of Witsieshoek Substation.

Figure 13- Open grassland. Note the existing power lines.

Figure 14- Wetland feature near Sorata Substation.

2.1.3. Affected Environment Corridor 3

Corridor 3 is the second largest corridor out of the 3 proposed corridors - it covers a total area of approximately 15.4km in length. It Deviated from Corridor 2 and joins to Witsieshoek Substation in the south (Figure 1). The affected environment for Corridor 3 is predominantly commercial farm lands or agricultural land. The main farming activities include peas/bean (Figure 18 & 21) and maize farming (e.g. Figures 17 & 20). Cattle is secondary to these activities - large numbers of cattle were observed towards Witsieshoek Substation (Figure 22). There were also few goat found towards Witsieshoek substation (Figure 23). Therefore, Corridor 3 from its starting point, where it splits off from Corridor 2 to its ending point where it connects to Witsieshoek Substation is characterised by some farming activities (Figures 15 to 24). The terrain can be defined as mix of flat plains characterised by adulating hills, rivers and tributaries that crisscross the landscape.

Figure 15 - Connecting point for Corridor 3 to Corridor 2.

Figure 16 - Peas plough fields near Corridor 3 and Corridor 2 connection point

Figure 17 - Maize and peas plough fields between QWAC3-3 and QWAC3-4 and 5

Figure 18- Peas plough fields between QWAC3-5 and QWAC3-6

Figure 19- Water pan between QWAC3-5 and QWAC3-6 (GPS Coordinates : S28 25 17.4 E28 48 48.6)

Figure 20 - Maize plough fields between QWAC3-8 and QWAC3-9a

Figure 21- Peas plough fields between QWAC3-8 and QWAC3-9a

Figure 22 - Cattle grazing fields between QWAC3-15 and QWAC3-16

Figure 23- Goat grazing fields between QWAC3-15 and QWAC3-16

Figure 24- Grazing fields between QWAC3-15, 16 and Witsieshoek Substation

2.2. Desktop Study: Archaeological and Heritage:

South Africa is rich in diverse forms and types of heritage, ranging from natural to cultural heritage. The natural include among other things Geological, Palaeontological, and the various plant and animal species that define the country. The cultural heritage, which dates as far back as 2.5 million years ago (m.y.a), includes - the different periods of Stone Age Archaeology, the Iron Age Archaeology, Historical and Industrial Archaeology, as well as the "Political/Historic" geographies of South Africa.

2.2.1. Stone Age Archaeology:

The Stone Age Archaeology of South Africa is divided into three categories, namely: the ESA, MSA and the LSA. These Stone Age industries are well documented throughout southern Africa regions including the Free State province where the current study is located. Below are detailed summaries of the traits that characterises each industry artefact and/or material culture as well as the types of industries dominant in the province.

ESA – Early Stone Age:

The ESA is dated between 2.5m.y.a and 250 k.y.a (thousand years ago) – during this period predecessors of Homo Sapien Sapiens started making stone artefacts. The earliest known Stone Age industry is referred to as the Olduwan Industry. It derives its name from the first known Stone Age industry recorded in Olduvia Gorge, Tanzania north-east Africa. Stone artefacts associated with this industry are often described as crude and rudimentary in making – they define the earliest form of Stone Age technological innovation. The Olduwan is replaced, in the archaeological records, by the Acheulian Industry some 1.5 m.y.a. The Acheulian is characterised by large cutting tools (also referred to as bifaces) - hand axes and cleavers are the dominant forms of artefacts found in this industry.

In the Free State, the earliest known ESA industry is the Victoria West Stone Industry which also spreads to the Northern Cape where it becomes dominant. The Victoria West Stone Industry was first recorded and defined by R. A., Smith in 1915 and in the Free State region it is found along the Vaal River basin. Tools found in this industry included hand axes and what Smith refers to as 'Tortoise Cores' (Smith, 1920). This was probably Smith reference to the

peculiar feature or morphology of Prepared Cores – where different pieces of where chipped off from a single piece of parent material to make way for the ultimate removal or shaping of a specific tool and most likely a well defined hand axe. A. H. J., Goodwin (1935) defines the Victoria West Industry with and without cores. Meaning that hand axes and cleavers could have been produced without necessarily having to prepare a parent material to a point to which a single definable tool could be produced. The absence of prepared cores in relation to hand axes and cleaver did not mean the end to this stone tool manufacturing techniques for it become a dominant and defining feature towards the end of the ESA into the MSA. What first became known as 'Tortoise Cores' was later defined as the transition marker between the ESA and the MSA. Therefore, the Prepared Cored of the Victoria West industry can be taken as the markers of transitional period in the Stone Age industry from Acheulian into the MSA, a second clearly defined phase in Stone Age technological innovation. Lycett (2009) sees the Victoria West as an evolutionary step towards the Levallois Prepared Core Technique which signifies the outwards spread of the Stone Age technology.

Stone artefacts dated to the above ESA industries are commonly found in open sites as secondary occurrences and/or scatters and not within their primary context. It is there argued here it is important during the survey to pay special attention to open air area that may potential yield some of these artefacts.

In the QwaQwa area such tools have been identified and defined by--

MSA – Middle Stone Age:

The MSA stone artefact replace the dominant large and often imposing hand axes and cleavers that characterise the ESA. Such a distinction or transition in archaeological records has this far be dated to 250 k.y.a. During this period, smaller artefacts define the archaeological records and the most dominant ones are flake and blade industry. This period has been defined by some in archaeological circles as a period that signifies a secondary step towards the modern human behaviour through technology, physical appearance, art and symbolism (e.g. Binneman et al. 2011). This industry innovation is suggested to have been at its most highest during the last 120 k.y.a. With surface scatters of the flake and blade industries found throughout the southern Africa regions (Thompson & Maream, 2008). They often occur between surface and approximately 50-80cm below ground. Fossil bones may be associated with the MSA in some sites. The flakes and blade industries are often found in secondary context as surface scatters and occurrence like their predecessor industries. Malan (1949) defines the earliest MSA stone

industry as the Mangosia and its distribution stretching across the Limpopo, the Qriqualand in Northern Cape, Natal, the Cape Point and the Free State our region of interest in the case. The Prepared Core Technique which had become the defining technological technique of the MSA is in this industry replaced by the Micro Lithics that become a dominant feature or trait in the LSA. In the Free State artefacts associated with the Mangosia industry are known to have been made from indurate shale raw material (e.g. Binneman et al. 2011). They mostly occur as surface scatter. The MSA tools include flakes, blades and points. Their time sequence is often not known because they mostly occur in surface. Other industries within the MSA include:

- The Howieson's Poort which is known to have wide distribution throughout southern African including the Free State province.
- The Orangia 128 to 75 k.y.a.
- Florisbad and Zeekoegat industries dated between 64 and 32 k.y.a - Florisbad is dominant in the Free State province.

Most of the MSA stone artefacts are made from the following materials: fine grain quartzite, quartz, silcrete, chalcedony and hornfels (Binneman et al. 2011, see also Binneman et al. 2010a). Like the ESA artefacts, the MSA stone artefacts occur in secondary context owing to a variety of reasons. One is due to natural events and/or activities such as erosion and being wash down by water and/or riverine activities, animal and human disturbances etc. It would, therefore, be in the best interest of the author (and the involved archaeologist and heritage consultant) to pay special attention to exposed surfaces, disturbed pieces of land and along any gullies and hill foot slopes during the survey process.

LSA – Late Stone Age:

The LSA spans a period from 30 k.y.a to the historical time i.e. the last 500 years to 100 years ago. It is associated, in archaeological records, with the San hunter-gathers. This is particular important for the last 10 k.y.a whereby the San material culture dominates the archaeological records -mostly in rock shelters, caves as well as open air sites in both the interior and coastal regions. However, the San open air sites are not always easy to find because they are in most cases covered by the various forms and types of vegetation and the other contributing factor is the mobility nature of these people. They were not sedentary communities like their counter-parts - e.g. the Iron Age people/communities who needed to settled the land for ploughing, grazing etc. In the coastal regions, sand dunes sometimes become impediments in locating

LSA sites. Owning to all these factors the preservation state of the LSA archaeology is often poor and not easily disenable (Deacon & Deacon 1999). Caves and rock shelters provide a more substantial preservation record of pre-colonial record of indigenous people's archaeology. This is in a form of stone artefacts, rock art and other material culture such as beads etc. The LSA archaeology was, however, not only dominated by the San hunter-gathers - in about 2 k.y.a the southern Africa landscape is known to have also been penetrated and occupied by the Khoekhoe pastoralists/herders who introduce sheep and cattle (e.g. Hall & Smith, 2000). Ceramic vessels are some of the material culture that signifies the Khoekhoe material culture in archaeological records – including the depiction of sheep and cattle often found in San hunter-gather rock art (ibid). Smith and Hall (2000) give detailed descriptions of potential relations that could have taken place between the San, the Khoekhoe and later the Iron Age farmers. They also argue that the material culture of the Khoekhoe herders included among other things the art of making rock art in form of geometrics, concentric circles etc. Binneman (et al. 2011) asserts that the diet of this new group of people would have also included muscle collected along the muddy river banks, coastal line and riverine and terrestrial foods. Other than the material culture such as artefacts found within the LSA industries, burials or human remains become dominant in the landscape. In the coast they are often found buried underneath middens (dumpsites) (e.g. Deacon & Deacon 1999). While in the interior regions they are sporadic and can occur across various features in the landscape.

The LSA archaeology is therefore rich and varied consisting of stone artefacts, other forms of material cultures such as beads (ostrich egg shell beads are dominant), pottery, rock art in form of paintings and engravings with engraving dominating the central low land and the interior regions. However, it has to be noted that the engravings are also found in the Highveld regions of the country spreading as far as the Limpopo Province. Among stone tools, bifaces still continue and are supplemented by tanged barbed arrow heads made from the various materials found with the southern Africa regions. Dark or black fine grained chalcedony would have been the most preferred form of material in the Karoo (Northern Cape regions), the Free State Province and Lesotho (Humphrey, 1969).

Smithfield settlement sites are concentrated among hills and ridges in preference to flat and mountains. Smithfield was divided into three phases using scrapper size and shape (Goodwin & Van Riet Lowe 1929). Smithfield A – large scrappers

Smithfield B – long and narrow scrappers

Smithfield C – small thumbnail scrappers.

2.2.2. Iron Age Archaeology:

The Iron Age Archaeological is divided into two categories, namely the EIA (Early Iron Age) and the LIA (Late Iron Age). There is no clearly defined Middle Iron Age period as asserted by Tomose 2012.

The EIA communities first appear in southern African archaeological records in the 1st Millennium AD. The eastern regions of the country were their preferred regions because of their rainfall patterns – summer rainfall climates conducive for ploughing and growing crops like maize, sorghum and millet. In the interior regions, the former Transvaal areas (e.g. Limpopo and Gauteng Province) were preferred. In the Free State their first evidence is documented in the south-eastern regions where they came into contact with the San people. Most of existing evidence about the Iron Age communities in the Free State dates to the 16th and 18th when they moved across the Vaal River coming to contact with the San hunter-gather people (e.g. Klatzow 1994). Numerous stone wall structures and pottery dating to this period have been recorded and lie on the frontier zone where the San people come into contact with agro-pastoralist (Thorp 1996).

Stonewalls are one major characteristic of the Iron Age people. However, they are not the only characteristic or feature of the Iron Age people. Huffman (1982), for example described cattle dug, both vitrified and unverified, as one of the Iron Age traits. He also includes pits and burials, with some located inside the cattle kraals (ibid).

Among the well known and documented areas with evidence of the Iron Age farmers in the Free State region is the Caledon River Valley -known to have been settled by the Fokeng group of Iron Age speakers (the Sotho Speakers). The Fokeng are suggested to have later settled in Metlaeeng, after dwelling the foothill of Ntsuana-tsatsi between Frankfort and Vrede (Walton 1953).

North of the Vaal River in what is today known as the Limpopo Province the Iron Age communities are known to have also practice the tradition of making rock art, especially during the last period of the Iron Age characterised by the different encounters between these communities and the colonial settlers. The Makgabeng rock art is known to have depict conflict scenes associated with the Malebogo Wars – war between Chief Malebogo of the Hananwa people and President Kruger of the ZAR.

In the Free State rock art linked to the Iron Age communities by association, it is not directly executed or engraved by them. For example, in the south-eastern Orange Free State recordings of cattle paintings are found, with some depicting conflict scenes – figures include 'hour-glass' Sotho shields which Binneman (et al. 2011) argues could be referring to the period of unrest in southern Africa called Imfecane (or Difaqane in some literature). However, it would not be totally truthful to argue that the south-eastern Free State only depict conflict scenes - paintings of sheep are and other none conflict scenes are found. One such site is known to exist on the Farm Kwartelfontein near Smithfield and is found in association with the depiction of cattle (Manhire et al. 1986). Other painting include man walking with hunting dogs etc. Other than rock art, stone walls and pottery – the material culture of the Iron Age communities also includes Iron Implements, traded beads, rainmaking site features, spear sharpening groves on rock surfaces, grinding stones etc (e.g. Huffman, 2007).

The LSA of the eastern Free State, particular the region in which our study area is located, coincides with the historic colonial settlement of the area by European settlers in the 1800s.

2.2.3. Historical Archaeology:

The Historical archaeology is a period in archaeological records that refers to the last 500 years in archaeological records. This period encapsulates the Late Stone Age, Late Iron Age, and the period of European settlers and/or "colonist" in southern Africa. The archaeological records that characterises this period includes ruminants of Stone Age industries (and material culture), the Late Iron Age material culture (e.g. pottery/ceramics, iron age implements etc) and built environment (e.g. elaborate stone wall settlements etc) and the settlers material culture and built environment. Towns become a dominant form of built environment and landscape features. In the Free State and in the history of South Africa the town of Bloemfontein is one of the most significant interior towns that were established by the European settlers of Dutch descent – the Afrikaans communities after they Trekked from the then Cape Colony to avoid British Administration. Other towns within the close proximity of the study area include the town of Bethlem, Kestell, Harrismith and Phuthaditjhaba. Various monuments, statues and memorials associated with this period are found across the Free State province. The same is true with buildings demonstrating various architectural styles and vernacular. Also associated with colonial part of historical archaeology are two South African Wars (i.e. the First South African War and the Second South Africa War) commonly known as

the Anglo-Boer Wars in 1860s and in the late 1890s to 1901. The area between Phuthaditjhaba and Harrismith is well known for some of South African War features such as block houses (e.g. Figure 25) and sites concentrated with bullet cartridges of these wars are known to occur along the R712 to Harrismith (Figure 26). It is not surprising to find such sites in the area because an assessment of maps showing the different movement of troupes during the Second South Africa war show that this was indeed an active region during the war and played a pivotal role (Figure 27)

Also important during the last 500 years within the Maluti a Phofung are the different encounters between the different Bantu language speakers (i.e. the Sotho-Tswana), the San people, the Afrikaans and English speaking settlers. In the Phuthaditjhaba area, an account of some of these events is given in Makashane Ntlhabo 2010 study of the heritage significance of Witsie Cave (Figure 28). The study is titled,

"Investigation of the Site Significance of Heritage Site: The Case of Witsie Cave in Qwaqwa".

This study give a detailed encounter of the arrival of the Sotho-Tswana people in the region in the early 1800s, which becomes useful in relatively dating the Late Iron Age of the region i.e. to the early 1800s.

Figure 25 - Example of Blockhouses found in the Harrismith area @ http://samilitaryhistory.org

Figure 26- Bullet cartridge site located west of the R712 Road to Harrismith from Phuthaditjhaba

Figure 27- Movements of troupes or Imperial Forces @ http://samilitaryhistory.org

Figure 28- Example of Witsie Cave

3. METHODOLOGY

3.1. Legislative Requirements

The NEMA, No. 107 of 1998 stipulated that for any development in South African to be granted permission to go ahead an assessment of the potential impacts of the proposed development on both the natural and cultural environment need to be conducted. As such, this HIA fulfils the requirements of NEMA (and the applicable 2010 EIA Regulations) and is conducted in-line with Section 38 (1) of the NHRA, No. 25 of 1999.

3.2. Methodology

This chapter outline the methodologies used in conducting this study. This HIA report was compiled by Nkosinathi Tomose, lead archaeologist and heritage consultant for NGT Projects & Heritage Consultants for the proposed Sorata-Witsieshoek 88kV Lines (i.e. Corridor 1, Corridor 2 and Corridor 3), Phuthaditjhaba, Free State Province, South Africa.

3. 2.1. Step I – Literature Review (Desktop Phase):

- The background information search of the proposed area of development was conducted following the receipt of the appointment letter and sites maps from the client. Sources used in this study included, but not limited to published academic papers and HIA studies conducted in and around the region where the current development will take place.
- Map Archives - Historical maps of the proposed area of development and its surround were assessed to aid information about the proposed area of development and its surround.
- This also included a review and assessment of relevant environmental and heritage legislations such as the NEMA (together with the 2010 EIA Regulations) and the NHRA.

3.2.2. Step II – Physical Survey:

- The physical survey of the proposed 3 corridors was conducted by a qualified archaeologist and general heritage specialist from NGT Projects & Heritage Consultants between the 28th of December and the 30th of December 2012.
- The survey covered all proposed corridors on foot and track logs of each corridor survey were recorded using Garmin GPSmap 62s.
- The objective of the survey was to locate and identify archaeological and heritage resources and/or sites in each of the 3 proposed corridors; record them using necessary and applicable tools and technology.
- The physical survey was deemed necessary since the desktop phase of the project yielded archaeological resources and many other heritage/historic resources about the eastern Free State Province formerly known as the Eastern Orange Free State in many of the old archaeological records.
- The survey also paid special attention to disturbed and exposed layers of soils as such as eroded surfaces because these areas are more likely to exposed or yield archaeological and other heritage resources that may be buried underneath the soil and be brought to the earth surface by animal and human activities such as animal barrow pits and human excavated grounds. The edges/sides of dirty roads were also inspected for possible Stone Age scatters as well as exposed Iron Age implements and other resources.

- The following technological tools and platforms were deemed important for documenting and recording located and/or identified sites:
    - Garmin GPSmap 62s – to take Lat/Long coordinates of the identified sites and to take track logs of each of the 3 corridors.
    - Lenovo ThinkPad aided with Garmin Basecamp Software, Google Earth – to plot the propose corridors.
    - ArcGIS Software (ArcView Series 10) was used to plot all the identified heritage resources and to develop heritage maps in order to inform the heritage analysis of the 3 proposed corridors.
    - Maps provided by the client before the survey also proved invaluable
    - Shapefiles (KMZ files) provided by the client were used to map the corridors and sites located in each corridor servitude and immediately outside
    - Samsung camera – was use to take photos of the affected environment and the identified heritage sites.

3.2.3. Step III – Data Consolidation and Report Writing:

- The final step involved the consolidation of the data collected using the various sources as described above.
- This involved the manipulation Shapefiles/KMZ files through ArcGIS
- Assessing the significance and potential impact of the identified sites, discussing the finds, report writing and making recommendation on the management and mitigation measures of the identified sites and resources as well as the impact and influence of these sites and resources on the proposed corridors. This process took place between the 6 and 19 of January 2012. It took longer than anticipated because of the number of identified heritage resources in each of the proposed corridors which required a special attention to each corridor affected environment and heritage resources and the potential impact of such resources on the overall proposed project.

3.3. Assessment of Site Significance in Terms of Heritage Resources Management Methodologies

The significance of heritage sites was based on four main criteria:

- Site integrity (i.e. primary vs. secondary context)
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures)
    - Density of scatter (dispersed scatter)
    - Low - <10/50m^2
    - Medium - 10-50/50m^2
    - High - >50/50m^2
- Uniqueness and
- Potential to answer present research questions.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows:

- A - No further action necessary;
- B - Mapping of the site and controlled sampling required;
- C - No-go or relocate pylon position
- D - Preserve site, or extensive data collection and mapping of the site; and
- E - Preserve site
- Impacts on these sites by the development will be evaluated as follows:

Site Significance

The following site significance classification minimum standards as prescribed by the SAHRA (2006) and approved by the ASAPA for the SADC region were used for the purpose of this report.

Table 2- Site significance classification standards as prescribed by SAHRA

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	-	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)	-	High / Medium Significance	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium Significance	Recording before destruction
Generally Protected C (GP.A)	-	Low Significance	Destruction

3.4. Methodology for Impact Assessment in terms of Environmental Impact Assessment Methodologies including Measures for Environmental Management Plan Consideration:

The Basic Assessment Methodology assists in evaluating the overall effect of a proposed activity on the environment. The determination of the effects of environmental impact on an environmental parameter is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the environmental practitioner through the process of the Basic Assessment & Environmental Impact Assessment. The impact evaluation of predicted impacts was undertaken through an assessment of the significance of the impacts:

The Basic Assessment included:

- an indication of the methodology used in determining the significance of potential environmental impacts
- a description of all environmental issues that were identified during the environmental impact assessment process
- an assessment of the significance of direct, indirect and cumulative impacts in terms of the following criteria:

    - the nature of the impact, which shall include a description of what causes the effect, what will be affected and how it will be affected
    - the extent of the impact, indicating whether the impact will be local (limited to the immediate area or site of development), regional, national or international
    - the duration of the impact, indicating whether the lifetime of the impact will be of a short-term duration (0–5 years), medium-term (5–15 years), long-term (> 15 years, where the impact will cease after the operational life of the activity) or permanent
    - the probability of the impact, describing the likelihood of the impact actually occurring, indicated as improbable (low likelihood), probable (distinct possibility), highly probable (most likely), or definite (impact will occur regardless of any preventative measures)
    - the severity/beneficial scale, indicating whether the impact will be very severe/beneficial (a permanent change which cannot be mitigated/permanent and significant benefit, with no real alternative to achieving this benefit), severe/beneficial (long-term impact that could be mitigated/long-term benefit), moderately severe/beneficial (medium- to long-term impact that could be mitigated/ medium- to long-term benefit), slight or have no effect
    - the significance, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high
    - the status, which will be described as either positive, negative or neutral
    - the degree to which the impact can be reversed
    - the degree to which the impact may cause irreplaceable loss of resources
    - the degree to which the impact can be mitigated

- a description and comparative assessment of all alternatives identified during the environmental impact assessment process
- recommendations regarding practical mitigation measures for potentially significant impacts, for inclusion in the Environmental Management Plan (EMP)

- an indication of the extent to which the issue could be addressed by the adoption of mitigation measures
- a description of any assumptions, uncertainties and gaps in knowledge
- an environmental impact statement which contains:

    - a summary of the key findings of the environmental impact assessment;
    - an assessment of the positive and negative implications of the proposed activity (one alternative only in EIA phase);
    - a comparative assessment of the positive and negative implications of identified alternatives

Assessment of Impacts

Direct, indirect and cumulative impacts of the issues identified through the scoping study, as well as all other issues identified in the EIA phase must be assessed in terms of the following criteria:

- The nature, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The extent, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- The duration, wherein it will be indicated whether:

    - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
    - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
    - medium-term (5–15 years) – assigned a score of 3;
    - long term (> 15 years) - assigned a score of 4; or
    - permanent - assigned a score of 5;

- The magnitude, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily

cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.

- The probability of occurrence, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- the significance, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- The status, which will be described as positive, negative or neutral.
- The degree to which the impact can be reversed.
- The degree to which the impact may cause irreplaceable loss of resources.
- The degree to which the impact can be mitigated.

The significance is calculated by combining the criteria in the following formula:

S= (E+D+M) P

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The significance weightings for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

Assessment of impacts must be summarised in the following table format. The rating values as per the above criteria must also be included.

Table 3-Example of Impact table summarising the significance of impacts (with and without mitigation).

Nature:		
	Without mitigation	With mitigation
Extent	High (3)	Low (1)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	36 (Medium)	24 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation: Mitigation Measures		
Cumulative impacts: Cumulative Impacts		
Residual Impacts: Residual Impacts		

Table 4--Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: Description of the objective, which is necessary in order to meet the overall goals; these take into account the findings of the environmental impact assessment specialist studies		
Project component/s	List of project components affecting the objective	
Potential Impact	Brief description of potential environmental impact if objective is not met	
Activity/risk source	Description of activities which could impact on achieving objective	
Mitigation: Target/Objective	Description of the target; include quantitative measures and/or dates of completion	
Mitigation: Action/control	Responsibility	Timeframe
List specific action(s) required to meet the mitigation target/objective described above	Who is responsible for the measures	Time periods for implementation of measures
Performance Indicator	Description of key indicator(s) that track progress/indicate the effectiveness of the management plan.	
Monitoring	Mechanisms for monitoring compliance; the key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods and reporting	

4. ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations exist in terms of the present study:

- The current study is a Phase 1 Heritage Impact Assessment. As such, a historical and archival desktop study as well as a field survey were undertaken to identify tangible heritage resources located in and around the proposed development area footprint. No formal heritage social consultation took place with the study.
- Because the power lines cover many farms there was no deeds search of individuals farms that the power lines will pass/traverse between Sorata and Witsieshoek Substations.

- The survey was conducted in December, summer period - as such there was high level of vegetation cover for the archaeologist/heritage surveyor to pick up all the different archaeological and heritage features in the landscape such as unmarked graves and Stone Age artefacts like stone tools. This forms one major limitation in terms of observing and recording of all forms of archaeological and heritage sites in the surveyed landscape.

5. FINDINGS

The findings of this study are presented in three ways as per the search and other methodological methods used in conducting it. Such as desktop study, map and physical survey of the proposed 3 corridors. Because there was no deeds search - no deeds information is provided of the farms that the power lines will pass.

5.1. Anticipated Heritage Resources and Sites within the proposed Sorata-Witsieshoek 132kV Power Line corridors known as Corridor 1, Corridor 2 and Corridor 3 –

Based on the known archaeological and historical events that took place within this region of the Free State and eastern Free State to be specific - the following archaeological and heritage resources sites are anticipated to occur within each of the 3 proposed corridors in the eastern Free State in general:

- Iron Age implements or ceramics
- Iron Age graves and burials
- Iron Age stone settlements and kraals
- Historic monuments – some associated with the South African Wars (commonly known as the Anglo-Boer Wars)
- Historical cemeteries and graves
- Historic houses/buildings
- Farming heritage resources
- There is also a likelihood of finding Stone Age artefacts, but chance are very slow

5.2. Results of Desktop Search-

The desktop search of the area revealed a number of things and activities that took place within the region - the literature review section above gives an accounts of this. Resources anticipated to be found mostly emanates from the findings of the Desktop Search.

5.3. Cadastral Search:

The following maps of the study area were used to assess the evolutions of the landscape in and around the area in which the proposed corridors will be placed:

- 1:50,000 Topographic Map of the study area and its surrounding as presented in Figure 1. This map is also used to overlay heritage sites in the GIS Mapping system (Figure 1 & Figure 106)
- A 1:250,000 Map of Ladysmith (SH35-4, Series Z501) (Figure 2)
- A political map of the former Bantu Homesteads (Figure 3)
- A Military Map showing movement of Imperial Tropes in the Harrismith - Phuthaditjhaba area during the Second South African War (Figure 27).

These maps provide us with enough information about our study area. For example, we know that during the Second South African War there were various military activities taking places in and around our study area. Battle and skirmish site would have therefore been an issue of the day. The 1:250,000 Map of the study area does show or represent any sites resembling battle fields or skirmish sites. What would initial be considered to be representation of battle sites in maps such as the 1900s Major Jackson Series Military Maps is in this map use to show highest points of relief (Figure 2 - yellow circles). The Bantu Homestead political map becomes useful in terms of showing areas that were either demarcated as rural or urban towns.

5.4. Deeds Search:

No deeds search was conducted as part of the study.

5.5. Field Survey and Identified Archaeological/Heritage Resources:

The physical survey of the proposed Sorata-Witsieshoek 132kV Power Line corridors (i.e. corridors 1, 2 & 3) made a number of observations about the presence of archaeological and heritage resources in each corridor and the general surrounding landscape as described in the 'affected environment' section above. A number of sites varying from archaeological to historical heritage sites were identified in each of the 3 corridors. As a result of such observations the following sections of the NHRA, No. 25 of 1999 were triggered:

- Section 34 for the built environment and landscape features which include the historic buildings in this case
- Section 35 for archaeological resources (e.g. for the stone kraal and other prehistoric features or artefacts)
- And Section 36 for burial grounds and graves (e.g. the cemeteries and/or burial sites)

Below is the description and evaluation of identified sites in each of the 3 proposed corridors starting from Corridor 1, ending in Corridor 3.

Corridor 1 - Archaeological and Heritage Sites:

Site Name:	QWAC1-1
Type:	Farmstead
Density:	Approximately 9 structures
Location/GPS Coordinates:	S28 25 01.0 E28 49 55.9
Approximate Age:	Some buildings over 60 years
Applicable NHRA Section:	Section 34
Closest Pylon:	N/A at this stage at this stage

Description:

The farmstead consists of a stone walled shed, a storage facility next to the shed, 4 houses and few structures located near the shed (e.g. Figure 30). The other structures seem to be

used for small stock. A big sandstone kraal associate with the farmstead is located some 210 meters from the 31m power line servitude and the dirty road in which the power line is going to travel (Figure 31). It therefore falls within the proposed 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPB	-	Localised	Low	Medium significance	Improbable	Short term: Construction phase	C – avoid the side

Nature: Construction activities (& development of associated infrastructure) will not directly impact on the identified historic farmstead.		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Short duration (2)	Short duration (2)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Improbable (2)
Significance	(10)Low	(10) Low
Status (positive or negative)	Negative	Negative
Reversibility	Low	Medium
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation: The farmstead and the sandstone kraal which is located some 200m from the servitude and within the 1000m buffer should be avoided. This will mitigate unintended direct/indirect destructive impacts.
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development).
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings. • The negative residual impact is that The Power Line development will dwarf the farmstead in terms of visual aesthetics

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 1. In order to achieve this goal it is recommended that the farmstead and the sandstone kraal be completely avoided during the construction activities (& associated infrastructure development) to avoid any unintended direct/indirect destructive impacts. This is particular important for the stone kraal which falls directly within the 1000m buffer of the corridor.

Project component/s	Construction phase of the project		
Potential Impact	In the case where the sandstone kraal which falls directly within the 1000m buffer is not avoided as recommended above, the following impacts are predicted: unintended destruction of the stone kraal and loss of heritage and historical resource.		
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan		
Mitigation: Target/Objective	The sandstone kraal and associated farmstead should be completely avoided to avoid any unintended direct/indirect impacts.		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the ECO should		ECO	Prior to the construction

ensure that construction activities and machinery is kept away from the stone kraal in order to avoid any unpredicted/unintended impacts		phase and during the construction phase
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.	
Monitoring	The ECO should do the monitoring prior and during the construction phase of the project and should report any unintended destructive actives.	

Figure 29 - Picture showing infrastructure associated with the farmstead.

Figure 30- Picture of the sandstone kraal associated with the farmstead

Site Name:	QWAC1-2
Type:	Farm labours homestead
Density:	6 structures
Location/GPS Coordinates:	S28 24 55.6 E28 50 07.8
Approximate Age:	Definitely less than 60 years old
Applicable NHRA Section:	Section 34
Closest Pylon:	N/A at this stage

Description:

The site is a recent farm labours homestead consisting of 6 structures, namely: 2 flat roof flats, 2 rondavals and 2 outside ablution facilities (toilets) (e.g. Figure 32). Based on the type of building materials used to build the farm labours one can argue with certainty that the farm labours homestead is recent in age. It, however, falls directly within the 1000m buffer of the 31m power line servitude.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Because the site is not a heritage site, there is no heritage impact evaluation for it in terms of heritage resources management. However, because the houses are still in use - it would only be advisable to try and avoid them.

Nature: Construction activities (& development of associated infrastructure) will not directly impact on the identified farmstead.

	Without mitigation	With mitigation
Extent	Local (5)	Local (1)
Duration	Short duration (2)	Very short duration (1)
Magnitude	High (8)	Minor (2)
Probability	Improbable (2)	Very improbable (1)
Significance	(30)Medium	(4) Low
Status (positive or negative)	Negative	Positive
Reversibility	Low	Medium
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation: The farm labourers quarters which are located within the 1000m buffer should be avoided. This will mitigate any intended direct/indirect impacts.

Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.

Residual Impacts:

- The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.
- The negative residual impact is that The Power Line development will dwarf the farm labours

quarters in terms of visual aesthetics

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint -the proposed 31m servitude and 1000m buffer within Corridor 1. The site is not a heritage site (recent in age) but because of the housing shortage in South Africa as a basic human need it is it is recommended that construction activities and associated infrastructure should avoid the farm labours quarters

Project component/s	Construction phase of the project		
Potential Impact	In case where the farm labours quarters which falls directly within the 1000m buffer are not avoided as recommended above, the following impacts are predicted: disturbance of social and pattern of life of the occupants.		
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan		
Mitigation: Target/Objective	The farm labours quarters should be avoided at all costs to avoid any direct destructive impacts.		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the ECO should ensure that construction activities and machinery is kept away from the houses to avoid unpredicted destructive activities		ECO	Prior to the construction phase and during the construction phase
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		
Monitoring	The ECO should do the monitoring during the project construction phase		

Figure 31 - Farm labours quarters

Site Name:	QWAC1-3
Type:	Stone walled kraal
Density:	1 structure
Location/GPS Coordinates:	S28 22 45.8 E28 51 27.2
Approximate Age:	More than 60 years old
Applicable NHRA Section:	Section 34
Closest Pylon:	N/A at this stage

Description:

The site is a Rectangular sandstone kraal located along the road in which the Powerline is going to travel (Figure 33). It is near the Wilge River bridge on the maize field. The kraal is approximately 20m2 and it is covered in long grass and some invasive weeds. It is located approximately 25m from the power line servitude and within the 1000m buffer. No graves or burials were located in and around it – this may be the case because of long vegetation cover.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPC	-	Localised	Low	Low significance	Improbable	Long-term: Construction	C – avoid the site

Nature: Construction activities (& development of associated infrastructure)		
	Without mitigation	With mitigation
Extent	Local (3)	Local (1)
Duration	Permanent (5)	Short duration (1)
Magnitude	Moderate (6)	Minor (4)
Probability	Improbable (2)	Improbable (2)
Significance	(28) Low	(12) Low
Status (positive or negative)	Negative	Positive
Reversibility	Low	Medium
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: The sandstone kraal which is located some 25m from the servitude and within the 1000m buffer should be avoided. This will mitigate unintended direct/indirect destructive impacts.		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development).		
Residual Impacts:		

- The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 1. In order to achieve this goal it is recommended that the stone walled kraal be avoided			
Project component/s	Construction phase of the project		
Potential Impact	In the case where the sandstone stone walled kraal which falls directly within the 1000m buffer is not avoided as recommended above, the following impacts are predicted: unintended destruction of the stone walled kraal and loss of heritage and historical resource.		
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan		
Mitigation: Target/Objective	The sandstone stone walled kraal and associated farmstead should be completely avoided to avoid any unintended direct/indirect impacts.		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the ECO should ensure that construction activities and machinery is kept away from the stone walled kraal in order to avoid any unpredicted/unintended impacts		ECO	Prior to the construction phase and during the construction phase
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		
Monitoring	The ECO should do the monitoring prior and during the construction phase of the project and should report any unintended destructive actives.		

Figure 32- Sandstone kraal on the maize plough fields

Site Name:	QWAC1-4
Type:	Farm labours houses
Density:	1 structure
Location/GPS Coordinates:	S28 22 02.1 E28 52 14.7
Approximate Age:	Less than 60 years old
Applicable NHRA Section:	Section 34
Closest Pylon:	N/A at this stage

Description:

The site is a farm labours homestead which looks to have been recently unburdened (e.g. Figure 34). Close to it are storage facilities that are still in use, but in a state of disrepair (e.g. Figure 35). The site consist of approximately 8 structures. Based on the type of building materials used to construct the buildings at the site - the site is considered to be recent and not a heritage resources when the 60 year period age concept is applied.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Because the site is not a heritage site, there is no heritage impact evaluation for it in terms of heritage resources management. However, because the houses are still in use - it would only be advisable to try and avoid them.

Nature: Construction activities (& development of associated infrastructure)		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Short duration (1)	Short duration (1)
Magnitude	Small (0)	Small (0)
Probability	Very improbable (1)	Very improbable (1)
Significance	(2) Low	(2) Low
Status (positive or negative)	Negative	Positive
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: No proposed mitigation measures for this site since it is already derelict and abandoned		
Cumulative impacts: No cumulative impacts		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint - i.e. proposed 31m servitude and 1000m buffer within Corridor 1. In order to achieve this goal it is recommended that any heritage resources site located within the servitude and the 1000m buffer be mitigated.

Project component/s	Construction and operational phases of the project		
Potential Impact	Destruction of the derelict and abandoned farm labours quarters		
Activity/risk source	There are not risk source from a heritage perspective in terms of these structures		
Mitigation: Target/Objective	There are no proposed mitigation measures proposed for these structures		
Mitigation: Action/control		Responsibility	Timeframe
ECO should monitor potential finds around these structures for possible unmarked graves		ECO	Construction phase
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		
Monitoring	The ECO can monitor for potential finds such as unmarked graves		

Figure 33 - Example of the type of houses found at the site

Figure 34 - Storage facilities

Site Name:	QWAC1-5
Type:	Cemetery
Density:	Approximately 32 graves
Location/GPS Coordinates:	S28 18 09.2 E28 54 30.4

Approximate Age: Older than 60 years

Applicable NHRA Section: Section 36

Closest Pylon: N/A at this stage

Description:

The site is a none municipal formalised cemetery located on first fence of Sorata Sub-Station. It consists of approximately 32 graves with stone mound dressings and cement headstones (e.g. Figure 64). 4 of the 32 graves have cross cement headstones. 1 grave is fenced-off from the rest. 2 graves have black painted cement headstones (Figure 65). The site is located approximately 22m from the centre of the 31m servitude and within the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
LS	3A	Localised	Medium/Low	High significance	Probable without mitigation	Long-term : Construction & operational phases	E – mitigate by fencing it off

Nature: Construction activities (& development of associated infrastructure) will not impact on the identified farmstead.		
	Without mitigation	With mitigation
Extent	Local (3)	Local (1)
Duration	Short duration (2)	Short duration (2)
Magnitude	Moderate (6)	Minor (2)

Probability	Probable (3)	Very improbable (1)
Significance	(33) Medium	(5) Low
Status (positive or negative)	Negative	Positive
Reversibility	Low	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: The cemetery should be fenced off during the construction and operational phase of the project. Because the cemetery is located within the Sorata immediate boundary, it is the authors opinion that it would be advisable for Eskom to develop a cemetery management plan to mitigate and future and potential threats to the cemetery.		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings. •		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 2. In order to achieve this goal it is recommended that the cemetery with approximately 32 graves be fenced-off from the rest of the construction activities (& associated infrastructure development). A cemetery management plan should be developed to manage the cemetery during both the construction and operation phases of the project. This is intended to mitigate any future potential threats to the cemetery.

Project component/s	Construction and operational phases of the project
Potential Impact	In case where the identified cemetery is not fenced-off from construction and operational activities and the management plan is not developed as

	recommended above, the following impacts are predicted: disturbance of the cemetery/gravesite (e.g. exposure of the remains as a result of machinery excavation activities; destruction of grave markers/headstones/dressers – making it difficult for the deceased families to recognise their graves resulting to legal disputes between the developer and affected families), uncontrolled access to the gravesite may also pose security threat to the Sorata Substation.
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan
Mitigation: Target/Objective	The cemetery management plan should be developed prior to the construction phase of the project; this should also include the physical construction of the fence around the cemetery leaving a buffer (+/- 5m buffer) between the cemetery and construction activities. An access gate to the cemetery should also be developed with the construction of the fence. The dates (e.g. days/months/years) for the project life span are not yet known

Mitigation: Action/control	Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant (preferable the one already familiar with the project) to develop the cemetery management plan (including recommendation on control measures for access to the cemetery by the families of the deceased) and advise on the fencing process and procedures	Environmental Control Officer in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase, during and post the construction phase to project operational phase.

Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant (preferable the one already familiar with the project) to develop the cemetery management plan prior to the commencement of the project construction

	activities. The cemetery management plan should include a plan/strategy on how to best manage issues of access to the cemetery by relatives of the deceased during the project construction and operational phases. The cemetery management plan should then be incorporated into the project Environmental Management Framework. Once included, during the project construction phase the ECO should do weekly monitoring of the cemetery/gravesite disturbances and record the visitor's numbers to the cemetery and report to the Environmental Consultant. A bi-weekly report on the state of the identified heritage resources should be developed and submitted to the Environmental Consultant by the ECO – this should be done in the first 3 months of the project commencement of construction activities, thereafter a monthly report. However, should any graves or burials previously unidentified around the cemetery/gravesite be exposed during the construction phase the ECO should report these urgently.

Note! Please refer to Figure 64 and Figure 65 for pictures of this site. It is the same site with site QWAC2-12

Corridor 2 - Archaeological and heritage Sites:

Site Name:	QWAC2-1
Type:	Stone wall foundations
Density:	Approximately 3 structures
Location/GPS Coordinates:	S28 28 11.5 E28 50 09.8
Approximate Age:	Older than 60 years
Applicable NHRA Section:	Section 35
Closest Pylon:	N/A at this stage

Description:

The site consists of 2 rondaval foundation structures (Figure 36) and 1 stone mound structure (Figure 37). Base on known archaeological examples of such structures located close to the houses – the stone mound structure is mostly likely to have been a storage facility. Grain bins are a typical example of storage facilities to have been located in close proximity to the houses. The site is located 52m from the 31m servitude and within the 1000m buffer. Therefore it falls outside the proposed servitude.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPB	-	Localised	Low	Medium significance	Improbable	Long-term without mitigation	C – Avoid the site

Nature: Construction activities (& development of associated infrastructure)		
	Without mitigation	With mitigation
Extent	Local (3)	Local (1)
Duration	Life duration (5)	Short duration (2)
Magnitude	Low (4)	Minor (2)
Probability	Improbable (2)	Very improbable (1)
Significance	(24) Low	(5) Low
Status (positive or negative)	Negative	Positive
Reversibility	Low	Medium

Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: Avoid the side completely during the construction activities. Monitoring it will be a positive mitigation measures		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities and associated infrastructure development		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 2. In order to achieve this goal it is recommended that the site be avoided and be monitored during the construction phase of the project.			
Project component/s	Construction phases of the project		
Potential Impact	In case where the identified site is not avoided and monitored during the construction phase of the project : unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.		
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan		
Mitigation: Target/Objective	The site should be avoided and a monitoring plan should be developed. A buffer of approximately 25m between the site and the 31m servitude is proposed.		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should		ECO in consultation with the appointed	Prior to the construction phase

consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.	archaeologist/heritage consultant	and during construction phase of the project

Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.

Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.

Figure 35 - Rondaval structures

Figure 36- Stone mound structure

Site Name:	QWAC2-2
Type:	Historic homestead
Density:	Approximately 9 structures
Location/GPS Coordinates:	S28 28 04.3 E28 50 12.6
Approximate Age:	Older than 60 years
Applicable NHRA Sections:	Section 34 and 35
Closest Pylon:	N/A at this stage

Description:

The historic homestead consists of the following structures: 1 x rectangular stone foundations (Figure 38), a big kraal (Figure 40) which is surrounded by approximately 6 small round/circle structures (Figure 39) and 2 smaller kraals in a C.C.P form. Also found in association with these stone foundations is a small ash midden (Figure 41). Other structures vary from rectangular to round circle structures (Figure 42). The site is located approximately 64m from the centre of the 31m servitude and within the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
LS	3A	Localised	Low	High significance	Improbable	Short-term : Construction phase	C – avoid

Nature: Construction activities and development of associated infrastructure .		
	Without mitigation	With mitigation
Extent	Local (3)	Local (1)
Duration	Permanent duration (5)	Short duration (2)
Magnitude	Low (4)	Minor (2)
Probability	Improbable (2)	Very improbable (1)
Significance	(24) Low	(5) Low
Status (positive or negative)	Negative	Positive
Reversibility	Low	Medium
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: It is recommended that the site be avoided and a monitoring strategy be devised to monitor it during the construction phase of the project.		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		

Residual Impacts:

- The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 2. In order to achieve this goal it is recommended that the site be avoided and be monitored during the construction phase of the project.			
Project component/s	Construction phases of the project		
Potential Impact	In case where the identified site is not avoided and monitored during the construction phase of the project : unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.		
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan		
Mitigation: Target/Objective	The site should be avoided and a monitoring plan should be developed. A buffer of approximately 25m between the site and the 31m servitude is proposed.		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.		ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		

Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.

Figure 37- Large Rectangular/square structure

Figure 38 - Close up view of circle structures. These are mostly likely to have been rondavals associated with the Rectangular/square and circle kraals

Figure 39 - Circle kraals

Figure 40 - Ash dump located between the rondavals and the kraals

Figure 41 - Other structures associated with the circle. They vary from Rectangular to square structures

Site Name:	QWAC2-3
Type:	Stone wall
Density:	1 structure
Location/GPS Coordinates:	S28 27 46.3 E28 50 15.7
Approximate Age:	Older than 60 years
Applicable NHRA Section:	Section 35
Closest Pylon:	N/A at this stage

Description:

The site is a rectangular to square stone walled structure found at the base and on the north facing side of a small cliff that overlook the Wilge River (Figure 43). The structure looks to have been a kraal. The site falls directly within the 31m servitude and within the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPB	-	Localised	Low	Medium significance	Highly probable	Short term : Construction phase	C – avoid the site

Nature: Construction activities and development of associated infrastructure		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Short duration (2)	Short duration (2)
Magnitude	Low (4)	Minor (2)
Probability	Highly probable (4)	Highly probable (4)
Significance	(28) Low	(20) Low
Status (positive or negative)	Negative	Negative
Reversibility	Low	Medium
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: Because the side fall directly in the servitude - once the pylon positions have been decided, the pylon will need to avoid the site		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 2. The site falls directly within 31m servitude and in order to achieve this goal it is recommended that the site be avoided by placing the pylon away from it once pylon positions are decided.

Project component/s	Construction phases of the project		
Potential Impact	In case where the identified site is not avoided: unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.		
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan		
Mitigation: Target/Objective	The site should be avoided.		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on possible location of pylon position that will avoid the site.		Environmental Consultant and/or ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the planning of pylon positions that will avoid the site.		

Figure 42- Stone walled kraal at the base of a cliff overlooking Wilge River.

Site Name:	QWAC2-4
Type:	Stone wall foundations
Density:	2 structures
Location/GPS Coordinates:	S28 27 41.4 E28 50 14.8
Approximate Age:	Older than 60 years
Applicable NHRA Section:	Section 35
Closest Pylon:	N/A at this stage

Description:

The site is consists of 2 round stone wall foundations that look to have been rondavals (Figure 44). Like QWAC2-3 the site is located below a cliff overlooking the Wilge River. The site falls directly within the 31m servitude and within the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPB	-	Localised	Low	Medium significance	Highly probable	Short term : Construction phase	C – avoid the site

Nature: Construction activities and development of associated infrastructure		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Short duration (2)	Short duration (2)
Magnitude	Low (4)	Minor (2)
Probability	Highly probable (4)	Highly probable (4)
Significance	(28) Low	(20) Low
Status (positive or negative)	Negative	Negative
Reversibility	Low	Medium
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: Because the side fall directly in the servitude - once the pylon positions have been decided, the pylon will need to avoid the site		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 2. The site falls directly within 31m servitude and in order to achieve this goal it is recommended that the site be avoided by placing the pylon away from it once pylon positions are decided.

Project component/s	Construction phases of the project		
Potential Impact	In case where the identified site is not avoided: unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.		
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan		
Mitigation: Target/Objective	The site should be avoided.		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on possible location of pylon position that will avoid the site.		Environmental Consultant and/or ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the planning of pylon positions that will avoid the site.		

Figure 43- Stone walled circle structure at the base of a cliff overlooking Wilge River

Site Name:	QWAC2-5
Type:	Stone wall foundation
Density:	1 structure
Location/GPS Coordinates:	S28 27 38.9 E28 50 13.9
Approximate Age:	Older than 60 years
Applicable NHRA Section:	Section 35
Closest Pylon:	N/A at this stage

Description:

The site is consists of 1 round stone wall foundation that look to have been rondaval. Like QWAC2-3 and 4 the site is located below a cliff overlooking the Wilge River (Figure 45). The site is located some 24m (outside) from centre of the 31m servitude and within the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPC	-	Localised	Low	Low significance	Improbable	Short-term : Construction phase	C – avoid

Nature: Construction activities and development of associated infrastructure .		
	Without mitigation	With mitigation
Extent	Local (3)	Local (1)
Duration	Permanent duration (5)	Short duration (2)
Magnitude	Low (4)	Minor (2)
Probability	Improbable (2)	Very improbable (1)
Significance	(24) Low	(5) Low
Status (positive or negative)	Negative	Positive
Reversibility	Low	Medium
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: It is recommended that the site be avoided and a monitoring strategy be devised to monitor it during the construction phase of the project.		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 2. In order to achieve this goal it is recommended that the site be avoided and be monitored during the construction phase of the project.			
Project component/s	Construction phases of the project		
Potential Impact	In case where the identified site is not avoided and monitored during the construction phase of the project : unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.		
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan		
Mitigation: Target/Objective	The site should be avoided and a monitoring plan should be developed. A buffer of approximately 25m between the site and the 31m servitude is proposed.		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.		ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.		

Figure 44- Stone walled foundation. Note the level of grass cover.

Site Name:	QWAC2-6
Type:	Stone wall foundations
Density:	Approximately 3 structures
Location/GPS Coordinates:	S28 27 35.0 E28 50 13.7
Approximate Age:	Older than 60 years
Applicable NHRA Section:	Section 35
Closest Pylon:	N/A AT THIS STAGE

Description:

The site is consists of 3 round stone wall foundations. 1 of the 3 structures is located some 20m from the other 2 (Figure 46 & 47). Like QWAC2-3, 4 and 5 the site is located below a cliff overlooking the Wilge River. The site is located approximately 15m from the centre of the 31m servitude (falls directly within) and within the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPB	-	Localised	Low	Medium significance	Highly probable	Short term : Construction phase	C – avoid the site

Nature: Construction activities and development of associated infrastructure		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Short duration (2)	Short duration (2)
Magnitude	Low (4)	Minor (2)
Probability	Highly probable (4)	Highly probable (4)
Significance	(28) Low	(20) Low
Status (positive or negative)	Negative	Negative
Reversibility	Low	Medium
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: Because the side fall directly in the servitude - once the pylon positions have been decided, the pylon will need to avoid the site		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		

Residual Impacts:

- The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 2. The site falls directly within 31m servitude and in order to achieve this goal it is recommended that the site be avoided by placing the pylon away from it once pylon positions are decided.

Project component/s	Construction phases of the project
Potential Impact	In case where the identified site is not avoided: unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan
Mitigation: Target/Objective	The site should be avoided.

Mitigation: Action/control	Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on possible location of pylon position that will avoid the site.	Environmental Consultant and/or ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project

Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.

Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the planning of pylon positions that will avoid the site.

Figure 45- Stone walled foundations on the foot slope of a cliff overlooking Wilge River. Close view.

Figure 46- Stone walled foundations on the foothill of a cliff overlooking Wilge River

Site Name: QWAC2-7

Type: Stone walled kraal

Density: 1 structure

Location/GPS Coordinates: S28 27 10.6 E28 50 09.7

Approximate Age: Some buildings over 60 years

Applicable NHRA Section: Section 34

Closest Pylon: N/A at this stage

Description:

The site is a rectangular stone walled kraal. It is located in the plough fields and there are trees growing in and around the kraal (Figure 48). The site is located some 22m (immediately outside) from the centre of the 31m servitude and within the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPB	-	Localised	Low	Medium significance	Improbable	Short-term : Construction phase	C – avoid

Nature: Construction activities and development of associated infrastructure .		
	Without mitigation	With mitigation
Extent	Local (3)	Local (1)
Duration	Permanent duration (5)	Short duration (2)
Magnitude	Low (4)	Minor (2)

Probability	Improbable (2)	Very improbable (1)
Significance	(24) Low	(5) Low
Status (positive or negative)	Negative	Positive
Reversibility	Low	Medium
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: It is recommended that the site be avoided and a monitoring strategy be devised to monitor it during the construction phase of the project.		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 2. In order to achieve this goal it is recommended that the site be avoided and be monitored during the construction phase of the project.	
Project component/s	Construction phases of the project
Potential Impact	In case where the identified site is not avoided and monitored during the construction phase of the project : unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan
Mitigation:	The site should be avoided and a monitoring plan should be developed. A

Target/Objective	buffer of approximately 25m between the site and the 31m servitude is proposed.		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.		ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.		

Figure 47- Rectangular stone walled kraal.

Site Name: QWAC2-8

Type: Reservoir

Density: 1 structure

Location/GPS Coordinates: S28 25 31.5 E28 49 52.4

Approximate Age: Less than 60 years

Applicable NHRA Section: Section 35

Closest Pylon: N/A at this stage

Description:

The site is a concrete reservoir (Figure 49). The site is located some 26m (outside) from the centre of the 31m servitude and within the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Because the site is not a heritage site, there is no heritage impact evaluation for it in terms of heritage resources management. However, because the reservoir is still in use - it would only be advisable to try and avoid it.

Nature: Construction activities and development of associated infrastructure .		
	Without mitigation	With mitigation
Extent	Local (3)	Local (1)
Duration	Permanent duration (5)	Short duration (2)
Magnitude	Low (4)	Minor (2)
Probability	Improbable (2)	Very improbable (1)
Significance	(24) Low	(5) Low
Status (positive or negative)	Negative	Positive

Reversibility	Low	Medium
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: It is recommended that the site be avoided and a monitoring strategy be devised to monitor it during the construction phase of the project.		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 2. In order to achieve this goal it is recommended that the site be avoided and be monitored during the construction phase of the project.			
Project component/s	Construction phases of the project		
Potential Impact	In case where the identified site is not avoided and monitored during the construction phase of the project : unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.		
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan		
Mitigation: Target/Objective	The site should be avoided and a monitoring plan should be developed. A buffer of approximately 25m between the site and the 31m servitude is proposed.		
Mitigation: Action/control		Responsibility	Timeframe

With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.		ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.		

Figure 48- Reservoir in the middle of grazing fields. Note the existing power line in the background- red arrow.

Site Name: QWAC2-9

Type: Stone walled structure and 3 graves

Density: 1 structure and 3 graves

Location/GPS Coordinates: S28 20 25.4 E28 49 42.3

Approximate Age: Older than 60 years

Applicable NHRA Sections: Section 35 and 36

Closest Pylon: N/A at this stage

Description:

The site consists of a stone walled kraal (Figure 50-51) and 3 stone mound structures predicted to be potential graves (Figure 52-53). The orientation and the directions of the stone mounds are suggestive of graves. The site is located approximately 32m from the centre of the 31m servitude and within the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
LS	Grade 3A	Regional	Medium/Low	High significance	Probable	Short-term : Construction phase	C – avoid the site

Nature: Construction activities and development of associated infrastructure .		
	Without mitigation	With mitigation
Extent	Local (4)	Local (2)
Duration	Permanent (5)	Permanent (5)

Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	(39) Medium	(27) Low
Status (positive or negative)	Negative	Positive
Reversibility	Low	Medium
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: It is recommended that the site be avoided and a monitoring strategy be devised to monitor it during the construction phase of the project.		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings. • The project negative residual impact is potential long term disturbance of the site during servitude maintenance.		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 2. In order to achieve this goal it is recommended that the site be avoided and be monitored during the construction phase of the project.	
Project component/s	Construction phases of the project
Potential Impact	In case where the identified site is not avoided and monitored during the construction phase of the project : unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.

Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan		
Mitigation: Target/Objective	The site should be avoided and a monitoring plan should be developed. A buffer of approximately 25m between the site and the 31m servitude is proposed.		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.		ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.		

Figure 49 - Stone wall kraal - distant view

Figure 50- Stone wall kraal - close-up view. Note the level of stone preservation.

Figure 51 - Potential graves.

Figure 52 - Picture No.2 of potential graves. Note the level of grass cover.

Site Name:	QWAC2-10
Type:	Historic homestead
Density:	Approximately 20 structures
Location/GPS Coordinates:	S28 20 24.3 E28 49 44.1
Approximate Age:	Older than 60 years
Applicable NHRA Section:	Section 35
Closest Pylon:	N/A at this stage

Description:

The site consists of a big stone walled kraal (Figures 54-57) and approximately 19 small structures around/surrounding it (Figures 58-59). The site complex is well preserved - good state of preservation. It forms a typical C.C.P pattern. The site is located on the hilltop and is located some 59m away of QWAC2-9. It is located approximately 5m from the centre of the 31m servitude (directly with the servitude) and the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
LS	Grade 3A	Regional	High	High significance	Definite	Permanent: Construction and operational phase	E- preserve the site (no go area)

Nature: Construction activities and development of associated infrastructure		
	Without mitigation	With mitigation
Extent	Local (5)	Local (3)
Duration	Permanent (5)	Permanent (5)
Magnitude	Very high (10)	High (8)
Probability	Definite (5)	Definite (5)
Significance	(100) High	(80) High
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation: Because the side fall directly in the servitude and is one significant site the servitude should be diverted away from the site. It should be placed east of the existing line to avoid QWAC2-10 as well as QWAC9. A buffer of approximately 50m is proposed between the site and the deviated servitude line.		

Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings. • The project negative residual impact is potential long term disturbance of the site during servitude maintenance.

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 2. The site falls directly within 31m servitude and in order to achieve this goal it is recommended that the site be avoided by placing the pylon away from it once pylon positions are decided.			
Project component/s	Construction phases of the project		
Potential Impact	In case where the identified site is not avoided: unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.		
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan		
Mitigation: Target/Objective	The site should be avoided.		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on possible location of pylon position that will avoid the site.		Environmental Consultant and/or ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project

Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the planning of pylon positions that will avoid the site.

Figure 53 - Stone walled C.C.P site complex - distant view. Note the level of grass cover.

Figure 54 - A close-up view of the stone walled C.C.P site complex. Note smaller structures around the kraal

Figure 55 - Another close-up view of the extent of the kraal and surrounding structures

Figure 56- Close up view of the extent of the kraal. Note the state of preservation.

Figure 57- Close-up view of the surrounding rondaval structures. Note the state of preservation. Also note the presence of Eskom lines in the background - red arrow.

Figure 58 - Distant view of the surrounding rondaval foundations

Site Name:	QWAC2-11
Type:	Historic farmstead
Density:	Approximately 4 structures
Location/GPS Coordinates:	S28 20 13.8 E28 49 58.5
Approximate Age:	Older than 60 years
Applicable NHRA Sections:	Section 34, 35 and 36
Closest Pylon:	N/A at this stage

Description:

The historic farmstead is located some 258m from the 31m corridor, but within the 1000m buffer. It consists of approximately 4 structures which include: a stone walled kraal, farm shed, a dam and a grave (Figure 60). The shed and the stone walled kraal are well preserved and still structurally sound and the shed roof (painted in red-maroon colour) (Figure 61).

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPA	-	Localised	Low	High/Medium significance	Improbable	Short-term : Construction phase	C – avoid

Nature: Construction activities and development of associated infrastructure .		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Short duration (2)	Short duration (2)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Very improbable (1)
Significance	(10) Low	(5) Low
Status (positive or negative)	Positive	Positive
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: It is recommended that the site be avoided and a monitoring strategy be devised to		

monitor it during the construction phase of the project.
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 2. In order to achieve this goal it is recommended that the site be avoided and be monitored during the construction phase of the project.		
Project component/s	Construction phases of the project	
Potential Impact	In case where the identified site is not avoided and monitored during the construction phase of the project : unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.	
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan	
Mitigation: Target/Objective	The site should be avoided and a monitoring plan should be developed to ensure that no machinery is placed at the site	
Mitigation: Action/control	Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.	ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project
Performance	The type of indicator used here will be Actionable Indicators – this will	

Indicator	measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.

Figure 59- Distant view of the farmstead. Note the tree density(yellow circle) y, the kraal, a dam as marked by the red arrow and a sandstone shed

Figure 60- View of the shed and the stone walled kraal.

Site Name:	QWAC2-12
Type:	Cemetery
Density:	Approximately 32 graves
Location/GPS Coordinates:	S28 18 09.2 E28 54 30.4
Approximate Age:	Older than 60 years
Applicable NHRA Section:	Section 36
Closest Pylon:	N/A at this stage

Description:

The site is a none municipal formalised cemetery located on first fence of Sorata Sub-Station. It consists of approximately 32 graves with stone mound dressings and cement headstones (e.g. Figure 64). 4 of the 32 graves have cross cement headstones. 1 grave is fenced-off from the rest. 2 graves have black painted cement headstones (Figure 65). The site is located approximately 22m from the centre of the 31m servitude and within the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
LS	3A	Localised	Medium/Low	High significance	Probable without mitigation	Long-term : Construction & operational phases	E – mitigate by fencing it off

Nature: Construction activities (& development of associated infrastructure) will not impact on the identified farmstead.

	Without mitigation	With mitigation
Extent	Local (3)	Local (1)
Duration	Short duration (2)	Short duration (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Probable (3)	Very improbable (1)
Significance	(33) Medium	(5) Low
Status (positive or negative)	Negative	Positive
Reversibility	Low	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation: The cemetery should be fenced off during the construction and operational phase of the project. Because the cemetery is located within the Sorata immediate boundary, it is the authors opinion that it would be advisable for Eskom to develop a cemetery management plan to mitigate and future and potential threats to the cemetery.

Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings. •

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 2. In order to achieve this goal it is recommended that the cemetery with approximately 32 graves be fenced-off from the rest of the construction activities (& associated infrastructure development). A cemetery management plan should be developed to manage the cemetery during both the construction and operation phases of the project. This is intended to mitigate any future potential threats to the cemetery.

Project component/s	Construction and operational phases of the project
Potential Impact	In case where the identified cemetery is not fenced-off from construction and operational activities and the management plan is not developed as recommended above, the following impacts are predicted: disturbance of the cemetery/gravesite (e.g. exposure of the remains as a result of machinery excavation activities; destruction of grave markers/headstones/dressers – making it difficult for the deceased families to recognise their graves resulting to legal disputes between the developer and affected families), uncontrolled access to the gravesite may also pose security threat to the Sorata Substation.
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan
Mitigation: Target/Objective	The cemetery management plan should be developed prior to the construction phase of the project; this should also include the physical construction of the fence around the cemetery leaving a buffer (+/- 5m buffer) between the cemetery and construction activities. An access gate to the cemetery should also be developed with the construction of the fence. The dates (e.g.

	days/months/years) for the project life span are not yet known

Mitigation: Action/control	Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant (preferable the one already familiar with the project) to develop the cemetery management plan (including recommendation on control measures for access to the cemetery by the families of the deceased) and advise on the fencing process and procedures	Environmental Control Officer in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase, during and post the construction phase to project operational phase.

Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant (preferable the one already familiar with the project) to develop the cemetery management plan prior to the commencement of the project construction activities. The cemetery management plan should include a plan/strategy on how to best manage issues of access to the cemetery by relatives of the deceased during the project construction and operational phases. The cemetery management plan should then be incorporated into the project Environmental Management Framework. Once included, during the project construction phase the ECO should do weekly monitoring of the cemetery/gravesite disturbances and record the visitor's numbers to the cemetery and report to the Environmental Consultant. A bi-weekly report on the state of the identified heritage resources should be developed and submitted to the Environmental Consultant by the ECO – this should be done in the first 3 months of the project commencement of construction activities, thereafter a monthly report. However, should any graves or burials previously unidentified around the cemetery/gravesite be exposed during the construction phase the ECO should report these urgently.

Figure 61 - Picture showing graves within the cemetery

Figure 62 - Close-up views of the graves

Corridor 3 - Archaeological and heritage Sites:

Site Name: QWAC3-1

Type: Ruins of a historic farmstead

Density: Approximately 10 structures/foundations

Location/GPS Coordinates: S28 28 11.5 E28 50 09.8

Approximate Age: Some buildings over 60 years

Applicable NHRA Section: Section 34

Closest Pylon: N/A at this stage

Description:

The sites consists of farmhouse foundations, fence walls, reservoir remains old bricks, ash dumps and rusted corrugated iron sheets and metal poles or fence droppers (e.g. Figure 64-65). The tree plantation and other features such as Agave Americana plants also suggest that this was a farmstead (e.g. Figures 66-67). The site is located approximately 42m from the centre of the 31m servitude but within the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPB	-	Localised	Low	Medium significance	Improbable	Short-term : Construction phase	C – avoid

Nature: Construction activities and development of associated infrastructure .		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Short duration (2)	Short duration (2)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Very improbable (1)
Significance	(10) Low	(5) Low
Status (positive or negative)	Positive	Positive
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: It is recommended that the site be avoided and a monitoring strategy be devised to monitor it during the construction phase of the project.		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 3. In order to achieve this goal it is recommended that the site be avoided and be monitored during the construction phase of the project.	
Project component/s	Construction phases of the project

Potential Impact	In case where the identified site is not avoided and monitored during the construction phase of the project : unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.		
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan		
Mitigation: Target/Objective	The site should be avoided and a monitoring plan should be developed to ensure that no machinery is placed at the site		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.		ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.		

Figure 63 - Stone foundations as part of the farmstead

Figure 64 - Cement pole for the gate (blue arrow). Note the reservoir in the background (red arrow)

Figure 65 -Plantation in the area in which the old farmstead use to be based.

Figure 66- Agave Americana plants. Indicators of soil disturbance

Site Name: QWAC3-2

Type: Stone walled kraal

Density: 1 Structure

Location/GPS Coordinates: S28 22 10.7 E28 48 04.2

Approximate Age: Some buildings over 60 years

Applicable NHRA Section: Section 34

Closest Pylon: N/A at this stage

Description:

The site is a rectangular stone walled kraal (Figure 68). On the eastern side the kraal has an extension which could have been used to keep small stock or calf's if it was a cattle kraal. The site is located approximately 124m from the centre of the proposed 31m servitude and is within the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPB	-	Localised	Low	Medium significance	Improbable	Short term: Construction phase	C – avoid the side

Nature: Construction activities (& development of associated infrastructure) will not directly impact on the identified historic farmstead.		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)

Duration	Short duration (2)	Short duration (2)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Improbable (2)
Significance	(10)Low	(10) Low
Status (positive or negative)	Negative	Negative
Reversibility	Low	Medium
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: The farmstead and the sandstone kraal which is located some 200m from the servitude and within the 1000m buffer should be avoided. This will mitigate unintended direct/indirect destructive impacts.		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development).		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings. • The negative residual impact is that The Power Line development will dwarf the farmstead in terms of visual aesthetics		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 3. In order to achieve this goal it is recommended that the stone walled kraal be completely avoided during the construction activities (& associated infrastructure development) to avoid any unintended direct/indirect destructive impacts. This is particular important for the stone kraal which falls directly within the 1000m buffer of the corridor.

Project component/s	Construction phase of the project

Potential Impact	In the case where the sandstone kraal which falls directly within the 1000m buffer is not avoided as recommended above, the following impacts are predicted: unintended destruction of the stone kraal and loss of heritage and historical resource.		
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan		
Mitigation: Target/Objective	The sandstone kraal and associated farmstead should be completely avoided to avoid any unintended direct/indirect impacts.		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the ECO should ensure that construction activities and machinery is kept away from the stone kraal in order to avoid any unpredicted/unintended impacts		ECO	Prior to the construction phase and during the construction phase
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		
Monitoring	The ECO should do the monitoring prior and during the construction phase of the project and should report any unintended destructive actives.		

Figure 67- Stone walled kraal

Site Name:	QWAC3-3
Type:	Stone walled kraal
Density:	1 structure
Location/GPS Coordinates:	S28 22 11.9 E28 48 04.1
Approximate Age:	Some buildings over 60 years
Applicable NHRA Section:	Section 34
Closest Pylon:	N/A at this stage

Description:

The site is a rectangular stone walled kraal on the hillside (Figure). The kraal back wall is against the hill. The kraal is possible associated with sites QWAC3-1 and 2. It is located approximately 26m from the centre of the 31m servitude and within the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPB	-	Localised	Low	Medium significance	Improbable	Short term: Construction phase	C – avoid the side

Nature: Construction activities (& development of associated infrastructure) will not directly impact on the identified historic farmstead.		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Short duration (2)	Short duration (2)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Improbable (2)
Significance	(10)Low	(10) Low
Status (positive or negative)	Negative	Negative
Reversibility	Low	Medium
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: The farmstead and the sandstone kraal which is located some 200m from the servitude and within the 1000m buffer should be avoided. This will mitigate unintended direct/indirect destructive impacts.		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development).		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and		

the surroundings.

- The negative residual impact is that The Power Line development will dwarf the farmstead in terms of visual aesthetics

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 3. In order to achieve this goal it is recommended that the stone walled kraal be completely avoided during the construction activities (& associated infrastructure development) to avoid any unintended direct/indirect destructive impacts. This is particular important for the stone kraal which falls directly within the 1000m buffer of the corridor.

Project component/s	Construction phase of the project
Potential Impact	In the case where the sandstone kraal which falls directly within the 1000m buffer is not avoided as recommended above, the following impacts are predicted: unintended destruction of the stone kraal and loss of heritage and historical resource.
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan
Mitigation: Target/Objective	The sandstone kraal and associated farmstead should be completely avoided to avoid any unintended direct/indirect impacts.

Mitigation: Action/control	Responsibility	Timeframe
With the approval of the project, the ECO should ensure that construction activities and machinery is kept away from the stone kraal in order to avoid any unpredicted/unintended impacts	ECO	Prior to the construction phase and during the construction phase

Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.
Monitoring	The ECO should do the monitoring prior and during the construction phase

	of the project and should report any unintended destructive actives.

Figure 68 - Stone kraal against the hill

Site Name:	QWAC3-4
Type:	Ruins of a historic farmstead
Density:	Approximately 12 structure
Location/GPS Coordinates:	S28 23 12.7 E28 47 12.6
Approximate Age:	Older than 60 years
Applicable NHRA Section:	Section 34
Closest Pylon:	N/A at this stage

Description:

The site is derelict farmstead. The farmstead consists of the farms house ruins (Figure 70), approximately 3 reservoirs (Figure 71), cattle drinking pond (Figure 72), garden walls and other garden decorative features (Figure 74). It is located approximately 64m from the centre of the 31m servitude and within the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPB	-	Localised	Low	Medium significance	Improbable	Short-term : Construction phase	C – avoid

Nature: Construction activities and development of associated infrastructure .		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Short duration (2)	Short duration (2)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Very improbable (1)
Significance	(10) Low	(5) Low
Status (positive or negative)	Positive	Positive
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: It is recommended that the site be avoided and a monitoring strategy be devised to monitor it during the construction phase of the project.		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 3. In order to achieve this goal it is recommended that the site be avoided and be monitored during the construction phase of the project.			
Project component/s	Construction phases of the project		
Potential Impact	In case where the identified site is not avoided and monitored during the construction phase of the project : unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.		
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan		
Mitigation: Target/Objective	The site should be avoided and a monitoring plan should be developed to ensure that no machinery is placed at the site		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.		ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.		

Figure 69 - Farm house ruins

Figure 70 - Reservoirs. Note the fence and other garden features

Figure 71 - Cattle drinking pond

Figure 72 - Fence and decorative garden features

Site Name:	QWAC3-5
Type:	Sheds
Density:	Approximately 4 structures
Location/GPS Coordinates:	S28 23 24.3 E28 47 05.4
Approximate Age:	Some buildings over 60 years
Applicable NHRA Section:	Section 34

Closest Pylon: N/A at this stage

Description:

The site is consists of approximately 4 structures - a shed with 2 garage size doors and a smaller door shed (Figure 74) , a smaller structure in front of the shed (Figure 75- red arrow) and one stone platform presumable used to load stuff on the tractors etc. The site is located 16m (almost within) from the centre of the proposed 31m servitude and within the proposed 1000m buffer.

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPB	-	Localised	Low	Medium significance	Highly probable	Short term : Construction phase	C – avoid the site

Nature: Construction activities and development of associated infrastructure		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Short duration (2)	Short duration (2)
Magnitude	Low (4)	Minor (2)
Probability	Highly probable (4)	Highly probable (4)
Significance	(28) Low	(20) Low
Status (positive or negative)	Negative	Negative
Reversibility	Low	Medium
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: Because the side fall directly in the servitude - once the pylon positions have been		

decided, the pylon will need to avoid the site
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 3. The site falls directly within 31m servitude and in order to achieve this goal it is recommended that the site be avoided by placing the pylon away from it once pylon positions are decided.

Project component/s	Construction phases of the project
Potential Impact	In case where the identified site is not avoided: unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan
Mitigation: Target/Objective	The site should be avoided.

Mitigation: Action/control	Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on possible location of pylon position that will avoid the site.	Environmental Consultant and/or ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project

Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the planning of pylon positions that will avoid the site.

Figure 73 - Brick and cement shed. Note the 2 garage size doors and smaller door. Also note another smaller structure in front of the shed (red arrow)

Figure 74 - 2 stone walled structures in front of the shed.

Site Name: QWAC3-6

Type: Reservoir

Density: 1 structure

Location/GPS Coordinates: S28 25 36.5 E28 49 06.6

Approximate Age: Less than 60 years, but could be older

Applicable NHRA Section: Section 34

Closest Pylon: N/A at this stage

Description:

The site is a cement reservoir in the middle of the farm and along the alignment (Figure 76). The site is located approximately 34m from the centre of the proposed 31m servitude and within the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Because the site is not a heritage site, there is no heritage impact evaluation for it in terms of heritage resources management. However, because the reservoir is still in use - it would only be advisable to try and avoid it.

Nature: Construction activities and development of associated infrastructure .		
	Without mitigation	With mitigation
Extent	Local (3)	Local (1)
Duration	Permanent duration (5)	Short duration (2)
Magnitude	Low (4)	Minor (2)
Probability	Improbable (2)	Very improbable (1)
Significance	(24) Low	(5) Low

Status (positive or negative)	Negative	Positive
Reversibility	Low	Medium
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: It is recommended that the site be avoided and a monitoring strategy be devised to monitor it during the construction phase of the project.		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 3. In order to achieve this goal it is recommended that the site be avoided and be monitored during the construction phase of the project.	
Project component/s	Construction phases of the project
Potential Impact	In case where the identified site is not avoided and monitored during the construction phase of the project : unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan
Mitigation: Target/Objective	The site should be avoided and a monitoring plan should be developed. A buffer of approximately 25m between the site and the 31m servitude is proposed.

Mitigation: Action/control	Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.	ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project

Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.

Figure 75 - Cement reservoir located in the middle of grazing fields

Site Name: QWAC3-7

Type: Stone kraal foundation and 3 graves

Density: 1 structures and 3 graves

Location/GPS Coordinates: S28 25 53.1 E28 49 13.1

Approximate Age: Older than 60 years

Applicable NHRA Sections: Section 35 and 36

Closest Pylon: N/A at this stage

Description:

The site consists of a stone walled kraal foundation (Figure 77) and at the back of the kraal are 3 graves (Figure 78). The site is located approximately 143m from the centre of the proposed 31m servitude and is within the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPA	-	Localised	Low	High/Medium significance	Improbable	Short-term : Construction phase	C – avoid

Nature: Construction activities and development of associated infrastructure .		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Short duration (2)	Short duration (2)
Magnitude	Minor (2)	Minor (2)

Probability	Improbable (2)	Very improbable (1)
Significance	(10) Low	(5) Low
Status (positive or negative)	Positive	Positive
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: It is recommended that the site be avoided and a monitoring strategy be devised to monitor it during the construction phase of the project.		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 2. In order to achieve this goal it is recommended that the site be avoided and be monitored during the construction phase of the project.	
Project component/s	Construction phases of the project
Potential Impact	In case where the identified site is not avoided and monitored during the construction phase of the project : unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan
Mitigation:	The site should be avoided and a monitoring plan should be developed to

Target/Objective	ensure that no machinery is placed at the site		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.		ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.		

Figure 76 - Stone walled kraal remains

Figure 77 - graves at the back of the kraal

Site Name:	QWAC3-8
Type:	Stone walled kraal and graves
Density:	1 structure and approximately 4 graves
Location/GPS Coordinates:	S28 25 54.1 E28 49 17.3
Approximate Age:	Older than 60 years
Applicable NHRA Sections:	Section 35 and 36
Closest Pylon:	N/A at this stage

Description:

The site consist of a stone walled kraal foundation (Figure 79) and approximately 4 graves located at the back of the kraal (Figure 80). 2 of the four graves are clearly visible through stone mound dressings and the other 2 are not as visible. The site is located some 52m from the centre of the 31m servitude and within the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPA	-	Localised	Low	High/Medium significance	Improbable	Short-term : Construction phase	C – avoid

Nature: Construction activities and development of associated infrastructure .		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Short duration (2)	Short duration (2)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Very improbable (1)
Significance	(10) Low	(5) Low
Status (positive or negative)	Positive	Positive
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: It is recommended that the site be avoided and a monitoring strategy be devised to monitor it during the construction phase of the project.		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		

Residual Impacts:

- The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 2. In order to achieve this goal it is recommended that the site be avoided and be monitored during the construction phase of the project.

Project component/s	Construction phases of the project		
Potential Impact	In case where the identified site is not avoided and monitored during the construction phase of the project : unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.		
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan		
Mitigation: Target/Objective	The site should be avoided and a monitoring plan should be developed to ensure that no machinery is placed at the site		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.		ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to		

advise on the monitoring strategy for these resources.

Figure 78 - Remains of a stone walled kraal and graves

Figure 79 - Graves found at the back of the kraal

Site Name: QWAC3-9a

Type: Stone walled kraal

Density: 1 structures

Location/GPS Coordinates: S28 27 11.1 E28 49 25.4

Approximate Age: Older than 60 years

Applicable NHRA Section: Section 35

Closest Pylon: N/A at this stage

Description:

The site consists of a stone walled kraal (Figure 81). The kraal is located approximately 80m or less from QWAC3-9b. There seem to been other features or structures between the 2 sites, but because of the vegetation cover these structures/features could not be determined. The long grass made it impossible to see what else was present, thus the link between two sites and describing them as 9a and 9b (Figure 82). In cases of kraal connected like this, there is always a possibility of finding graves. This site is located approximately 2m from the centre of the 31m servitude - meaning it is directly with the servitude and the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPB	-	Localised	Medium	Medium significance	Highly probable	Short term : Construction phase	C – avoid the site

Nature: Construction activities and development of associated infrastructure		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Medium (6)	Low (4)
Probability	Highly probable (4)	Highly probable (4)
Significance	(48) Medium	(40) Medium
Status (positive or negative)	Negative	Negative
Reversibility	Low	Medium
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: Because the site fall directly in the servitude - once the pylon positions have been decided, the pylon will need to avoid the site		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 3. The site falls directly within 31m servitude and in order to achieve this goal it is recommended that the site be avoided by placing the pylon away from it once pylon positions are decided.

Project component/s	Construction phases of the project		
Potential Impact	In case where the identified site is not avoided: unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.		
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan		
Mitigation: Target/Objective	The site should be avoided.		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on possible location of pylon position that will avoid the site.		Environmental Consultant and/or ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the planning of pylon positions that will avoid the site.		

Figure 80 - Stone walled kraal remains

Figure 81 - Extension of one of the kraal wall. Note the vegetation cover.

Site Name: QWAC3-9b

Type: Historic homestead

Density: Approximately 4 structures

Location/GPS Coordinates: S28 27 14.5 E28 49 25.9

Approximate Age: Older than 60 years

Applicable NHRA Section: Section 34

Closest Pylon: N/A at this stage

Description:

The site consists of 2 stone kraal foundations (e.g. Figure 83) and 2 rondavals foundations (e.g. Figures 84-85). There seem to have been other features or structures in the close proximity, but because of long vegetation cover i.e. grass that is probably over 1.6 or 1.7m long it was difficult to get a clear indication of what else is present at the site. The site falls directly within the servitude (8m from the servitude centre line) and 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPB	-	Localised	Medium	Medium significance	Highly probable	Short term : Construction phase	C – avoid the site

Nature: Construction activities and development of associated infrastructure		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)

Duration	Permanent (5)	Permanent (5)
Magnitude	Medium (6)	Low (4)
Probability	Highly probable (4)	Highly probable (4)
Significance	(48) Medium	(40) Medium
Status (positive or negative)	Negative	Negative
Reversibility	Low	Medium
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: Because the side fall directly in the servitude - once the pylon positions have been decided, the pylon will need to avoid the site		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 3. The site falls directly within 31m servitude and in order to achieve this goal it is recommended that the site be avoided by placing the pylon away from it once pylon positions are decided.

Project component/s	Construction phases of the project
Potential Impact	In case where the identified site is not avoided: unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.

Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan		
Mitigation: Target/Objective	The site should be avoided.		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on possible location of pylon position that will avoid the site.		Environmental Consultant and/or ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the planning of pylon positions that will avoid the site.		

Figure 82 - Stone walled kraal. Note the level of vegetation cover.

Figure 83 - Rondaval foundation

Figure 84- 2 rondaval foundations

Site Name:	QWAC3-10
Type:	3 possible graves
Density:	Approximately 3 possible graves
Location/GPS Coordinates:	S28 27 26.3 E28 49 25.0
Approximate Age:	If graves they are older than 60 years
Applicable NHRA Section:	Section 36
Closest Pylon:	N/A at this stage

Description:

The sites consists of 3 stone mound structures, possible graves (Figures 86-88). Each of the stone mounds has a big stone similar to a grave headstone (e.g. Figures 86-88). However, unlike typical graves the 3 possible graves are located approximately 3.5m from one another or each other. Even though these structures cannot be conclusively confirmed to be graves - we will treat them as such . The site is located 25m from the centre of the proposed 31m servitude and is within the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPA	-	Localised	Low	High/Medium significance	Improbable	Short-term : Construction phase	C – avoid

Nature: Construction activities and development of associated infrastructure .		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Short duration (2)	Short duration (2)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Very improbable (1)
Significance	(10) Low	(5) Low
Status (positive or negative)	Positive	Positive
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: It is recommended that the site be avoided and a monitoring strategy be devised to monitor it during the construction phase of the project.		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 3. In order to achieve this goal it is recommended that the site be avoided and be monitored during the construction phase of the project.			
Project component/s	Construction phases of the project		
Potential Impact	In case where the identified site is not avoided and monitored during the construction phase of the project : unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.		
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan		
Mitigation: Target/Objective	The site should be avoided and a monitoring plan should be developed to ensure that no machinery is placed at the site		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.		ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.		

Figure 85 - Possible grave No.1

Figure 86 - Possible grave No.2

Figure 87 - Possible grave No.3

Site Name:	QWAC3-11
Type:	Historic farmstead
Density:	Approximately 5 structures
Location/GPS Coordinates:	S28 27 40.3 E28 49 18.5
Approximate Age:	Some buildings over 60 years
Applicable NHRA Section:	Section 34
Closest Pylon:	N/A at this stage

Description:

The site is a historic farmstead consisting of approximately 5 structures (e.g. Figure 89-90) . The farmstead looks to be solely used by the farm labours - it does not look to be well maintained, but the old historic buildings still stands (e.g. Figures 89-90). The site is located approximately 215m from the centre of the proposed 31m servitude and within the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPA	-	Localised	Low	High/Medium significance	Improbable	Short-term : Construction phase	C – avoid

Nature: Construction activities and development of associated infrastructure .		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Short duration (2)	Short duration (2)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Very improbable (1)
Significance	(10) Low	(5) Low
Status (positive or negative)	Positive	Positive
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: It is recommended that the site be avoided and a monitoring strategy be devised to monitor it during the construction phase of the project.		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		

Residual Impacts:

- The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 3. In order to achieve this goal it is recommended that the site be avoided and be monitored during the construction phase of the project.

Project component/s	Construction phases of the project		
Potential Impact	In case where the identified site is not avoided and monitored during the construction phase of the project : unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.		
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan		
Mitigation: Target/Objective	The site should be avoided and a monitoring plan should be developed to ensure that no machinery is placed at the site		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.		ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to		

advise on the monitoring strategy for these resources.

Figure 88 - Roofs of historic structures forming part of the historic farmstead

Figure 89 - A distance view of the farmstead. Note the existence of flat roof mud houses. Presumable of other farm labours.

Site Name: QWAC3-12

Type: Stone walled kraal

Density: 1 structures

Approximate Age: Older than 60 years

Applicable NHRA Section: Section 35

Location/GPS Coordinates: S28 27 41.2 E28 49 26.0

Closest Pylon: N/A at this stage

Description:

The site is a single stone walled kraal (Figure 91) and it is located at the base/edge of a hill (Figure 92).

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPB	3A	Localised	Low	Medium significance	Improbable	Short-term : Construction phase	C – avoid

Nature: Construction activities and development of associated infrastructure .		
	Without mitigation	With mitigation
Extent	Local (3)	Local (1)
Duration	Permanent duration (5)	Short duration (2)
Magnitude	Low (4)	Minor (2)

Probability	Improbable (2)	Very improbable (1)
Significance	(24) Low	(5) Low
Status (positive or negative)	Negative	Positive
Reversibility	Low	Medium
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: It is recommended that the site be avoided and a monitoring strategy be devised to monitor it during the construction phase of the project.		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 3. In order to achieve this goal it is recommended that the site be avoided and be monitored during the construction phase of the project.	
Project component/s	Construction phases of the project
Potential Impact	In case where the identified site is not avoided and monitored during the construction phase of the project : unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan
Mitigation:	The site should be avoided and a monitoring plan should be developed. A

Target/Objective	buffer of approximately 25m between the site and the 31m servitude is proposed.		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.		ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.		

Figure 90 - Stone walled kraal remains

Figure 91 - Picture showing the hill and the barrow pit/ditch

Site Name:	QWAC3-13
Type:	Ceramic fragments
Density:	Approximately 4 piece
Location/GPS Coordinates:	S28 27 45.9 E28 49 25.3
Approximate Age:	Older than 60 years
Applicable NHRA Section:	Section 35
Closest Pylon:	N/A at this stage

Description:

This is not a site rather a scatter of 4 ceramic fragments located on the hill slope near an area that is forming a gully. 3 of the 4 fragments are of same pot or material (Figure 93). These scatter are located approximately 35m from the proposed 31m servitude and within the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPC	-	Localised	Low	Low significance	Improbable	Short-term : Construction phase	A

Nature: Construction activities and development of associated infrastructure .		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Short-term (1)	Short-term (1)
Magnitude	Low (0)	Low (0)
Probability	Probable (3)	Improbable (3)
Significance	(6) Low	(6) Low
Status (positive or negative)	Positive	Positive
Reversibility	Low	Low
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No	
Mitigation: There are not mitigation measures proposed - the resources are insignificant ceramic scatters in their secondary context		
Cumulative impacts: No cumulative impacts are predicted for the two MSA stone artefact scatters		
Residual Impacts: No residual impacts are predicated – resources are two insignificant MSA stone artefact scatters		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE:

The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development footprint. For these two stone artefact scatters there are no

Project component/s	N/A
Potential Impact	N/A
Activity/risk source	N/A
Mitigation: Target/Objective	N/A

Mitigation: Action/control	Responsibility	Timeframe
N/A	N/A	N/A

Performance Indicator	N/A
Monitoring	N/A

Figure 92 - Scatter of ceramic fragments

Site Name:	QWAC3-14
Type:	Historic homestead
Density:	Approximately 6 structures
Location/GPS Coordinates:	S28 27 49.4 E28 49 21.4
Approximate Age:	Over 60 years
Applicable NHRA Section:	Section 35
Closest Pylon:	N/A at this stage

Description:

The site consists of approximately 6 structures. 4 rondavals foundations and 2 Rectangular stone walled structures. 1 looks to have been a kraal (e.g. Figure 94). It is located approximately 125m from the centre of the 31m servitude and within the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
LS	3A	Localised	Low	High significance	Improbable	Short-term : Construction phase	C – avoid

Nature: Construction activities and development of associated infrastructure .		
	Without mitigation	With mitigation
Extent	Local (3)	Local (1)
Duration	Permanent duration (5)	Short duration (2)
Magnitude	Low (4)	Minor (2)
Probability	Improbable (2)	Very improbable (1)
Significance	(24) Low	(5) Low
Status (positive or negative)	Negative	Positive
Reversibility	Low	Medium
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: It is recommended that the site be avoided and a monitoring strategy be devised to monitor it during the construction phase of the project.		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 3. In order to achieve this goal it is recommended that the site be avoided and be monitored during the construction phase of the project.		
Project component/s	Construction phases of the project	
Potential Impact	In case where the identified site is not avoided and monitored during the construction phase of the project : unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.	
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan	
Mitigation: Target/Objective	The site should be avoided and a monitoring plan should be developed. A buffer of approximately 25m between the site and the 31m servitude is proposed.	
Mitigation: Action/control	Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.	ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.	
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.	

Figure 93 - Stone foundations found at site QWAC3-14

Site Name:	QWAC3-15
Type:	Historic farmstead
Density:	Approximately 40 or more structures
Location/GPS Coordinates:	S28 27 40.3 E28 49 18.5 (Start Point)
	S28 27 57.4 E28 49 24.7 (Middle Point)
	S28 28 00.0 E28 49 27.6 (End Point)
Approximate Age:	Older than 60 years
Applicable NHRA Section:	Section 35
Closest Pylon:	N/A at this stage

Description:

The site is a historic Iron Age Complex site covering approximately 287m in length and about 92m in width (e.g. Figure 101-103) and it is located on the base of a hill (Figures 95 & 96). The site consists of approximately 40 or more structures which include stone walled kraals of various sizes and shape with the most dominant shape being the round kraal (Figure 96 & 98). Around the kraal are rondaval structures as well as some Rectangular structure foundations (Figure 99 & 101). Some of the kraals have internal divisions (Figure 98). Most of the site structures are covered by long vegetation which includes trees and long grass (Figures 95-97).

Among some of the material culture found at the site is a grinding stone (Figure 100). A survey of the site during winter season would reveal more about the site.

- The starting point of the site is located approximately 141m from the servitude centre
- The middle point of the site is located approximately 64m from the servitude centre
- The end point of the sites is located approximately 15m from the servitude centre - it is practically within the servitude.
- The above points are all within the 100m buffer

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
LS	Grade 3A	Regional	High	High significance	Definite	Permanent: Construction and operational phase	E- preserve the site (no go area)

Nature: Construction activities and development of associated infrastructure		
	Without mitigation	With mitigation
Extent	Local (5)	Local (3)
Duration	Permanent (5)	Permanent (5)
Magnitude	Very high (10)	High (8)
Probability	Definite (5)	Definite (5)
Significance	(100) High	(80) High
Status (positive or negative)	Negative	Negative

Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation: Because the side fall directly in the servitude and is one significant site the servitude should be diverted away from the site. It should be placed east of the existing line to avoid QWAC2-10 as well as QWAC9. A buffer of approximately 50m is proposed between the site and the deviated servitude line.		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings. • The project negative residual impact is potential long term disturbance of the site during servitude maintenance.		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 3. The site falls directly within 31m servitude and in order to achieve this goal it is recommended that the site be avoided by placing the pylon away from it once pylon positions are decided.

Project component/s	Construction phases of the project
Potential Impact	In case where the identified site is not avoided: unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan
Mitigation:	The site should be avoided.

Target/Objective			
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on possible location of pylon position that will avoid the site.		Environmental Consultant and/or ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the planning of pylon positions that will avoid the site.		

Figure 94- Pictures showing the site on the base of a hill and just above another smaller hill. Note the vegetation cover.

Figure 95 - Pictures showing the site on the base of a hill. Note the well preserved stone walls.

Figure 96 - Pictures showing the altitude or the height of the hill in which this site is found at as compared to the surrounding flat plains/land. Note the red arrows showing the flat lands and the blue arrow showing the road to Kestell

Figure 97 - Picture showing one of the kraals well preserved walls. Note the subdivisions inside the kraal.

Figure 98 - Example of Rectangular structures forming part of the site complex

Figure 99 - Grinding stone

Figure 100 - Pictures showing the extent of the site complex

Figure 101 - Picture showing the extent of the site complex - note the relief.

Figure 102 - Example of rondaval structure foundations. Note the relief.

Site Name:	QWAC3-16
Type:	Historic farmstead
Density:	Approximately structures
Location/GPS Coordinates:	S28 28 34.1 E28 49 34.6

Approximate Age: Some buildings over 60 years

Applicable NHRA Section: Section 34

Closest Pylon: N/A at this stage

Description:

The site is remains of an old farm fence - presumable the gate. It is located approximately 24m from the centre line of the 31m servitude and is within the 1000m buffer.

It

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPC	-	Localised	Low	Low significance	Highly probable	Short term : Construction phase	C – avoid the site

Nature: Construction activities and development of associated infrastructure		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Short duration (2)	Short duration (2)
Magnitude	Low (4)	Minor (2)
Probability	Highly probable (4)	Highly probable (4)
Significance	(28) Low	(20) Low
Status (positive or negative)	Negative	Negative

Reversibility	Low	Medium
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: Because the side fall directly in the servitude - once the pylon positions have been decided, the pylon will need to avoid the site		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 3. The site falls directly within 31m servitude and in order to achieve this goal it is recommended that the site be avoided by placing the pylon away from it once pylon positions are decided.			
Project component/s	Construction phases of the project		
Potential Impact	In case where the identified site is not avoided: unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.		
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan		
Mitigation: Target/Objective	The site should be avoided.		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the		Environmental Consultant	Prior to the

Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on possible location of pylon position that will avoid the site.		and/or ECO in consultation with the appointed archaeologist/heritage consultant	construction phase and during construction phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the planning of pylon positions that will avoid the site.		

Figure 103- Historic fence pole (cement)s and fence wall (stone)

Site Name:	QWAC3-17
Type:	Stone walled structure and 3 graves
Density:	1 structure and 3 graves
Location/GPS Coordinates:	S28 20 25.4 E28 49 42.3

Approximate Age: Older than 60 years

Applicable NHRA Sections: Section 35 and 36

Closest Pylon: N/A at this stage

Description:

The site consists of a stone walled kraal (Figure 50-51) and 3 stone mound structures predicted to be potential graves (Figure 52-53). The orientation and the directions of the stone mounds are suggestive of graves. The site is located approximately 32m from the centre of the 31m servitude and within the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
LS	Grade 3A	Regional	Medium/Low	High significance	Probable	Short-term : Construction phase	C – avoid the site

Nature: Construction activities and development of associated infrastructure .		
	Without mitigation	With mitigation
Extent	Local (4)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	(39) Medium	(27) Low
Status (positive or negative)	Negative	Positive

Reversibility	Low	Medium
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: It is recommended that the site be avoided and a monitoring strategy be devised to monitor it during the construction phase of the project.		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings. • The project negative residual impact is potential long term disturbance of the site during servitude maintenance.		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 2. In order to achieve this goal it is recommended that the site be avoided and be monitored during the construction phase of the project.	
Project component/s	Construction phases of the project
Potential Impact	In case where the identified site is not avoided and monitored during the construction phase of the project : unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan
Mitigation: Target/Objective	The site should be avoided and a monitoring plan should be developed. A buffer of approximately 25m between the site and the 31m servitude is proposed.

Mitigation: Action/control	Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.	ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project

Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.

Site Name: QWAC3-18

Type: Historic homestead

Density: Approximately 20 structures

Location/GPS Coordinates: S28 20 24.3 E28 49 44.1

Approximate Age: Older than 60 years

Applicable NHRA Section: Section 35

Closest Pylon: N/A at this stage

Description:

The site consists of a big stone walled kraal (Figures 54-57) and approximately 19 small structures around/surrounding it (Figures 58-59). The site complex is well preserved - good state of preservation. It forms a typical C.C.P pattern. The site is located on the hilltop and is located some 59m away of QWAC2-9. It is located approximately 5m from the centre of the 31m servitude (directly with the servitude) and the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
LS	Grade 3A	Regional	High	High significance	Definite	Permanent: Construction and operational phase	E- preserve the site (no go area)

Nature: Construction activities and development of associated infrastructure		
	Without mitigation	With mitigation
Extent	Local (5)	Local (3)
Duration	Permanent (5)	Permanent (5)
Magnitude	Very high (10)	High (8)
Probability	Definite (5)	Definite (5)
Significance	(100) High	(80) High
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation: Because the side fall directly in the servitude and is one significant site the servitude should be diverted away from the site. It should be placed east of the existing line to avoid QWAC2-10 as well as QWAC9. A buffer of approximately 50m is proposed between the site and the		

deviated servitude line.
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings. • The project negative residual impact is potential long term disturbance of the site during servitude maintenance.

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 2. The site falls directly within 31m servitude and in order to achieve this goal it is recommended that the site be avoided by placing the pylon away from it once pylon positions are decided.

Project component/s	Construction phases of the project		
Potential Impact	In case where the identified site is not avoided: unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.		
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan		
Mitigation: Target/Objective	The site should be avoided.		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on possible location of pylon		Environmental Consultant and/or ECO in consultation with the appointed archaeologist/heritage	Prior to the construction phase and during construction phase

position that will avoid the site.	consultant	of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.	
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the planning of pylon positions that will avoid the site.	

Site Name: QWAC3-19

Type: Historic farmstead

Density: Approximately 4 structures

Location/GPS Coordinates: S28 20 13.8 E28 49 58.5

Approximate Age: Older than 60 years

Applicable NHRA Sections: Section 34, 35 and 36

Closest Pylon: N/A at this stage

Description:

The historic farmstead is located some 258m from the 31m corridor, but within the 1000m buffer. It consists of approximately 4 structures which include: a stone walled kraal, farm shed, a dam and a grave (Figure 60). The shed and the stone walled kraal are well preserved and still structurally sound and the shed roof (painted in red-maroon colour) (Figure 61).

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of	Duration	Mitigation

					Impacts		
GPA	-	Localised	Low	High/Medium significance	Improbable	Short-term : Construction phase	C – avoid

Nature: Construction activities and development of associated infrastructure .		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Short duration (2)	Short duration (2)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Very improbable (1)
Significance	(10) Low	(5) Low
Status (positive or negative)	Positive	Positive
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: It is recommended that the site be avoided and a monitoring strategy be devised to monitor it during the construction phase of the project.		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings.		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 2. In order to achieve this goal it is recommended that the site be avoided and be monitored during the construction phase of the project.

Project component/s	Construction phases of the project		
Potential Impact	In case where the identified site is not avoided and monitored during the construction phase of the project : unintended and destruction activities of the site may occur and result will be permanent loss of heritage resources.		
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan		
Mitigation: Target/Objective	The site should be avoided and a monitoring plan should be developed to ensure that no machinery is placed at the site		
Mitigation: Action/control		Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.		ECO in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase and during construction phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to advise on the monitoring strategy for these resources.		

Site Name: QWAC3-20

Type: Cemetery

Density: Approximately 32 graves

Location/GPS Coordinates: S28 18 09.2 E28 54 30.4

Approximate Age: Older than 60 years

Applicable NHRA Section: Section 36

Closest Pylon: N/A at this stage

Description:

The site is a none municipal formalised cemetery located on first fence of Sorata Sub-Station. It consists of approximately 32 graves with stone mound dressings and cement headstones (e.g. Figure 64). 4 of the 32 graves have cross cement headstones. 1 grave is fenced-off from the rest. 2 graves have black painted cement headstones (Figure 65). The site is located approximately 22m from the centre of the 31m servitude and within the 1000m buffer.

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
LS	3A	Localised	Medium/Low	High significance	Probable without mitigation	Long-term : Construction & operational phases	E – mitigate by fencing it off

Nature: Construction activities (& development of associated infrastructure) will not impact on the identified farmstead.		
	Without mitigation	With mitigation
Extent	Local (3)	Local (1)
Duration	Short duration (2)	Short duration (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Probable (3)	Very improbable (1)
Significance	(33) Medium	(5) Low
Status (positive or negative)	Negative	Positive
Reversibility	Low	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: The cemetery should be fenced off during the construction and operational phase of the project. Because the cemetery is located within the Sorata immediate boundary, it is the authors opinion that it would be advisable for Eskom to develop a cemetery management plan to mitigate and future and potential threats to the cemetery.		
Cumulative impacts: cumulative impacts are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects.		
Residual Impacts: • The project will positively contribute to strengthening power Loads Centre (Witsieshoek) and the surroundings. •		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed 31m servitude and 1000m buffer within Corridor 2. In order to achieve this goal it is recommended that the cemetery with approximately 32 graves be fenced-off from the rest of the construction activities (& associated infrastructure development). A cemetery management plan should be developed to manage the cemetery during both the construction and operation phases of the project. This is intended to mitigate any future potential threats to the cemetery.

Project component/s	Construction and operational phases of the project
Potential Impact	In case where the identified cemetery is not fenced-off from construction and operational activities and the management plan is not developed as recommended above, the following impacts are predicted: disturbance of the cemetery/gravesite (e.g. exposure of the remains as a result of machinery excavation activities; destruction of grave markers/headstones/dressers – making it difficult for the deceased families to recognise their graves resulting to legal disputes between the developer and affected families), uncontrolled access to the gravesite may also pose security threat to the Sorata Substation.
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan
Mitigation: Target/Objective	The cemetery management plan should be developed prior to the construction phase of the project; this should also include the physical construction of the fence around the cemetery leaving a buffer (+/- 5m buffer) between the cemetery and construction activities. An access gate to the cemetery should also be developed with the construction of the fence. The dates (e.g. days/months/years) for the project life span are not yet known

Mitigation: Action/control	Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or ECO should consult with the appointed archaeologist/heritage consultant (preferable the one already familiar with the project) to develop the cemetery management plan (including recommendation on control measures for access to the cemetery by the families of the deceased) and advise on the fencing process and procedures	Environmental Control Officer in consultation with the appointed archaeologist/heritage consultant	Prior to the construction phase, during and post the construction phase to project operational phase.

Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant (preferable the one already familiar with the project) to develop the cemetery management plan prior to the commencement of the project construction activities. The cemetery management plan should include a plan/strategy on how to best manage issues of access to the cemetery by relatives of the deceased during the project construction and operational phases. The cemetery management plan should then be incorporated into the project Environmental Management Framework. Once included, during the project construction phase the ECO should do weekly monitoring of the cemetery/gravesite disturbances and record the visitor's numbers to the cemetery and report to the Environmental Consultant. A bi-weekly report on the state of the identified heritage resources should be developed and submitted to the Environmental Consultant by the ECO – this should be done in the first 3 months of the project commencement of construction activities, thereafter a monthly report. However, should any graves or burials previously unidentified around the cemetery/gravesite be exposed during the construction phase the ECO should report these urgently.

6. DISCUSSION

The physical survey of 3 proposed corridors (i.e. Corridor 1, Corridor 2 & Corridor 3) yielded a total of 33 sites of which 4 are considered not to be historical or heritage sites based on the 60 year age classification (Table 5, Table 7). These sites, which are not heritage or historic sites, are also located in close proximity to the proposed 31m power line servitude and within the 1000m buffer. Because of their close proximity to the servitude, the sites have been recorded, documented, mapped and they include: QWAC1-2 and QWAC1-4, QWAC2-8, and QWAC3-6 (Figure 105). In terms of sites distribution, inclusive of these 4 sites of no heritage significance, Corridor 3 yielded more sites (52%) than both Corridor 1 (12%) and Corridor 2 (36%) combined (i.e. 48%). Out of the 33 sites identified a total of 13 sites are found in between corridors running on the same servitude. For example, site QWAC1-5 is the same site as QWAC2-12; QWAC1-6 same as QWAC2-1; QWAC1-7 same as QWAC2-2; QWAC1-8 same as QWAC2-3; QWAC1-9 same as QWAC2-4; QWAC1-10 same as QWAC2-5; QWAC1-11 same as QWAC2-6; QWAC1-12 same as QWAC2-7; and QWAC1-13 same as QWAC2-8. The same is true for Corridor 2 and Corridor 3 - for example, QWAC2-9 is the same as QWAC3-17; QWAC2-10 same as QWAC3-18; QWAC2-11 same as QWAC3-19; and QWAC2-12 same as QWAC3-20.

When one excludes the 4 none heritage sites from the equation and considers sites that are found in between corridors running on the same servitude as single sites (same sites) such as the sites mentioned above- the survey yielded a total of 29 heritage sites (Table 6).

In terms of heritage sites distribution, using the figure/number 33 as the total number representative of sites within the various corridors, Corridor 3 (55%) yielded more sites than both Corridor 1 (7%) and Corridor 2 (38%) combined. When one assesses a corridor with a high number of highly significant sites in terms of their heritage value with high impact significance status in terms of potential impacts of the proposed development on their heritage value and fabric, inclusive of sites found between corridors running on the same servitude - Corridor 3 is a corridor with most Highly Significant heritage sites (5) followed by Corridor 2 (i.e. with 4 sites) and Corridor 1 (i.e. with 2 site - QWAC1-5, QWAC1-7) (Table 6 &7). When one assess a corridor with a high number of High/Medium and Medium heritage significant sites - Corridor 3 still dominates the equation with 5 sites of High/Medium significance sites and 8 sites of Medium significance as compared to Corridor 2 with 1 site of High/Medium significance site and 5 sites of Medium significance. Corridor 1 has 1 sites of Medium significance site and no site of High/Medium significance (Table 5). In terms of sites of Low significance, both

Corridor 1 and Corridor 2 are equal with each having 1 site of Low heritage significance (Table 6). Corridor 3 has 2 sites of Low heritage significance (Table 6).

Table 5- Breakdown of the total number of identified sites per corridor (inclusive of sites of no heritage significance) and according to site significance:

Corridors	Total Number of Sites Per Corridor	Sites Significance				
		None heritage	Low Significance	Medium Significance	High/Medium Significance	High Significance
Corridor 1	5 (QWAC1-5 & QWAC2-12 = same site)	2	1	1		2
Corridor 2	12 (QWAC1-5 & QWAC2-12 = same site)	1	1	5	1	4
Corridor 3	17	1	2	8	5	5

Table 6- Breakdown of the total number of heritage sites per corridor (exclusive of sites of no heritage significance) and according to site significance:

Corridors	Total Number of Sites Per Corridor	Sites Significance			
		Low Significance	Medium Significance	High/Medium Significance	High Significance
Corridor 1	3 (QWAC1-5 & QWAC2-12 = same site)	1	1		2
Corridor 2	11 (QWAC1-5 & QWAC2-12 = 1/ same site)	1	5	1	4
Corridor 3	16 (	2	8	5	5

In summary, it means that Corridor 1 has least sites than Corridor 2 and Corridor 3. Site located in this corridor are also the least sensitive sites in terms of heritage resources management and in terms of potential impacts emanating from the proposed development. For example, out of the 3 heritage sites identified in this corridor - only 1 site has High heritage significance (i.e. QWAC1-5) and only 1 site has Medium significance (i.e. QWAC1-1). The other site (QWAC1-3) is of Low heritage significance and has low impact significance. This makes

this corridor the least sensitive corridor out of the 3 proposed corridors in terms of heritage resources management. This is because the impact significance of both QWAC1-1 and QWAC1-3 is Low in terms of Heritage and BAR Impact Assessment Standards. On the other hand the impact significance QWAC1-5 is Medium/Low even though the site is of High heritage significance.

Corridor 2 has the second least High heritage sensitive sites such as QWAC2-2, QWAC2-9, QWAC2-10 and QWAC2-12. However, only QWAC2-10 has high impact significance in term of Heritage and BAR Impact Assessment Standards. This (QWAC2-10) is a good example of Iron Age site in the area and possibly the region and it falls directly within the proposed 31m servitude. Based on its heritage or archaeological qualities (i.e. value & fabric), such as being a well preserved C.C.P site, the site cannot be compromised. The proposition would be to shift the servitude before QWAC2-9 (Medium/Low impact significance) and QWAC2-10. The other site that would require special attention during the project construction phase is QWAC2-12. This site if of High heritage significance, but has Medium/Low impact significance in terms of Heritage and BAR Impact Assessment Standards. This sites, together with other sites located in this corridor which are predominately of High and Medium heritage significance makes this corridor a sensitive corridor in terms of heritage resources management.

Corridor 3 is the second sensitive corridor in terms of heritage resource management. Out of the 16 heritage sites located in this corridor - only 1 site (i.e. QWAC3-15) has High impact significance and 2 sites (i.e. QWAC3-9a & QWAC3-9b) have Medium impact significance in terms of Heritage and BAR Impact Assessment Standards. The rest of the sites have Low impact significance.

Table 7- Summary of Identified heritage sites - Sorata-Witsieshoek 132kV Power Line.

CORRIDOR	SITE NAME	HERITAGE RESOURCES	HERITAGE SIGNIFICANCE
Corridor 1			
	QWAC1-1	Stone walled shed, a storage facility next to the shed, four houses and few structures located near the shed	Medium significance
	QWAC1-2	Six structures, namely: two flat roof flats, two rondavals and two outside ablution facilities (toilets)	Not a heritage site
	QWAC1-3	A rectangular sandstone kraal	Low significance
	QWAC1-4	farm labours homestead	Not a heritage site
Same as QWAC2-12	QWAC1-5	32 graves with stone mound dressings and cement headstones	High significance
Same as QWAC2-1	QWAC1-6	Two rondaval foundation structures	Medium significance
Same as QWAC2-2	QWAC1-7	Two rectangular stone foundations, a big kraal which is surrounded by approximately six small round/circle structures and two smaller kraals in a C.C.P pattern	High significance
Same as QWAC2-3	QWAC1-8	A rectangular to square stone walled structure	Medium significance
Same as QWAC2-4	QWAC1-9	Two round stone wall foundations that look to have been rondavals	Medium significance
Same as QWAC2-5	QWAC1-10	A round stone wall foundations	Low significance
Same as QWAC2-6	QWAC1-11	Three round stone wall foundations	Medium significance
Same as QWAC2-7	QWAC1-12	A rectangular stone walled kraal	Medium significance
Same as QWAC2-8	QWAC1-13	A concrete reservoir	Not a heritage site
Corridor 2			
	QWAC2-1	Two rondaval foundation structures	Medium significance
	QWAC2-2	Two rectangular stone foundations, a big kraal which is surrounded by approximately six small round/circle structures and two smaller kraals in a C.C.P pattern	High significance

	QWAC2-3	A rectangular to square stone walled structure	Medium significance
	QWAC2-4	Two round stone wall foundations that look to have been rondavals	Medium significance
	QWAC2-5	A round stone wall foundations	Low significance
	QWAC2-6	Three round stone wall foundations	Medium significance
	QWAC2-7	A rectangular stone walled kraal	Medium significance
	QWAC2-8	A concrete reservoir	Not a heritage site
	QWAC2-9	A stone walled kraal and three stone mound/ cairns structures predicted to be 'potential' graves	High significance
	QWAC2-10	A big stone walled kraal and approximately nineteen small structures around/surrounding it. The site complex is well preserved - good state of preservation. It forms a typical C.C.P pattern.	High significance
	QWAC2-11	Four structures which include: a stone walled kraal, farm shed, a dam and a grave	High/Medium significance
	QWAC2-12	Thirty two graves with stone mound/cairns dressings and cement headstones	High significance
Corridor 3			
	QWAC3-1	Farmhouse foundations, fence walls, reservoir remains old bricks, ash dumps and rusted corrugated iron sheets and metal poles or fence droppers	Medium significance
	QWAC3-2	A rectangular stone walled kraal	Medium significance
	QWAC3-3	A rectangular stone walled kraal on the hillside	Medium significance
	QWAC3-4	Farms house ruins, approximately three reservoirs, cattle drinking pond, garden walls and other garden decorative features	Medium significance
	QWAC3-5	A shed with two garage size doors and a smaller shed	Medium significance

		with a single door and a smaller structure in front of the shed	
	QWAC3-6	A cement reservoir	Not a heritage site
	QWAC3-7	Stone walled kraal foundation and at the back of the kraal are three graves.	High/Medium significance
	QWAC3-8	A stone walled kraal foundation and approximately four graves located at the back of the kraal	High/Medium significance
	QWAC3-9a	A stone walled kraal. The kraal is located approximately 80m or less from QWAC3-9b	Medium significance
	QWAC3-9b	Two stone kraal foundations and two rondavals foundations	Medium significance
	QWAC3-10	Three stone mound/cairns structures - possible graves	High/Medium significance
	QWAC3-11	A historic farmstead consisting of approximately five house structures	High/Medium significance
	QWAC3-12	A stone walled kraal	Medium significance
	QWAC3-13	A scatter of four ceramic fragments located on the hill slope near an area that is forming a gully	Low significance
	QWAC3-14	Four rondavals foundations and two rectangular stone walled structures	High significance
	QWAC3-15	A historic Iron Age complex site covering approximately 287m in length and about 92m in width at the base of a hill. The site consists of approximately forty or more structures which include stone walled kraals of various sizes and shape with the most dominant shape being the round kraal. Around the kraal are rondaval structures as well as some rectangular structure foundations. Some of the kraals have internal divisions.	High significance
	QWAC3-16	An old farm fence -	Low significance

		presumable the gate	
Same as QWAC2-9	QWAC3-17	A stone walled kraal and three stone mound/ cairns structures predicted to be 'potential' graves	High significance
Same as QWAC2-10	QWAC2-18	A big stone walled kraal and approximately nineteen small structures around/surrounding it. The site complex is well preserved - good state of preservation. It forms a typical C.C.P pattern.	High significance
Same as QWAC2-11	QWAC2-19	Four structures which include: a stone walled kraal, farm shed, a dam and a grave	High/Medium significance
Same as QWAC2-12	QWAC2-20	Thirty two graves with stone mound/cairns dressings and cement headstones	High significance

7. CONCLUSIONS

After assessing and evaluating the 3 different proposed corridors (i.e. Corridor 1, Corridor 2 and Corridor 3) based on the type of heritage resources identified in each corridor and on the impact assessment ratings using a combination of Heritage and BAR Impact Assessment Standards. It is concluded that Corridor 1 is the least heritage sensitive corridor in terms of heritage resources management and based on the impact significance ratings according to Heritage and BAR Impact Assessment Standards. Corridor 3 is the second least heritage sensitive corridor in terms of heritage resources management. According to impact assessment rating using Heritage and BAR Impact Assessment Standards this corridor is less sensitive than Corridor 2. Corridor 2 proved to be the highly sensitive corridor in terms of heritage resources management and in terms of impact significance ratings according to Heritage and BAR Impact Assessment Standards. One of the sites which significantly contributed to this (in this corridor) is QWAC2-10 and a combination of it (i.e. QWAC2-10) with QWAC2-9, QWAC2-12 and QWAC2-2.

8. RECOMMENDATIONS

Based on the above conclusions about the least to high sensitive corridor and the need to advise on the best suitable corridor for the Sorata-Witsieshoek 132kV Power Line in terms of heritage resources management. Corridor 1 is the preferred and recommended corridor from a heritage management point of view. This means that the power line will start at Sorata-Substation where this Corridor runs on the same servitude with Corridor 2 and Corridor 3 until where it splits to follow a different and independent servitude at GPS Coordinates point S28° 20' 22.3" E028° 52' 43.6" leaving Corridor 2 and 3 on the same servitude. This corridor then runs on a separate and independent servitude until it rejoins the same servitude with Corridor 2 where they both run parallel on the same servitude until they both reach Witsieshoek-Substation at GPS Coordinates point S28° 25' 15.5" E028° 49' 46.6"). This preferred or recommended corridor (i.e., Corridor 1) and it is marked in Figure 106 using black dashed (Figure 105).

The second recommended corridor, even though it is a corridor with most sensitive and high impact significance sites (e.g. QWAC2-10) is Corridor 2. The reason for this preference is that if Corridor 3 is to be considered it shares the same servitude with Corridor 2 and 1 running on the same servitude with both these corridors until Corridor 1 splits from them and they (i.e., Corridor 2 & 3) run on the same servitude pass sites ute the servitude combination of Corridor 2 and Corridor 3, if Corridor 3 was to be considered as second alternative corridor based on the fact that it has the second least heritage sensitive and high impact significance sites as compared to Corridor 2, will result in an increased number of heritage sensitive and high impact significant sites. Corridor 3 has more sensitive and impact significant sites towards Witsieshoek Substation while Corridor 2 has more sensitive and high impact significant sites north-east of where it splits to form Corridor 3 on the mountainous area towards Wilge River. And Corridor 2 is less, but still highly sensitive toward Witsieshoek Substation. Therefore, a combination of Corridor 2 and Corridor 3 is not advisable as it would just increase the impact significance levels of the power line on heritage resources. Thus, the choices to recommend Corridor 2, but with alternation or deviations from the current proposed servitude. For example, in the area where it (i.e. Corridor 2) is deemed to have highly sensitive with high impact significant sites (i.e. between GPS Coordinate S28° 20' 47.6" E028° 47' 54.9" and GPS Coordinate S28° 20' 22.9" E028° 52' 42.0"), it is proposed that the servitude be shifted

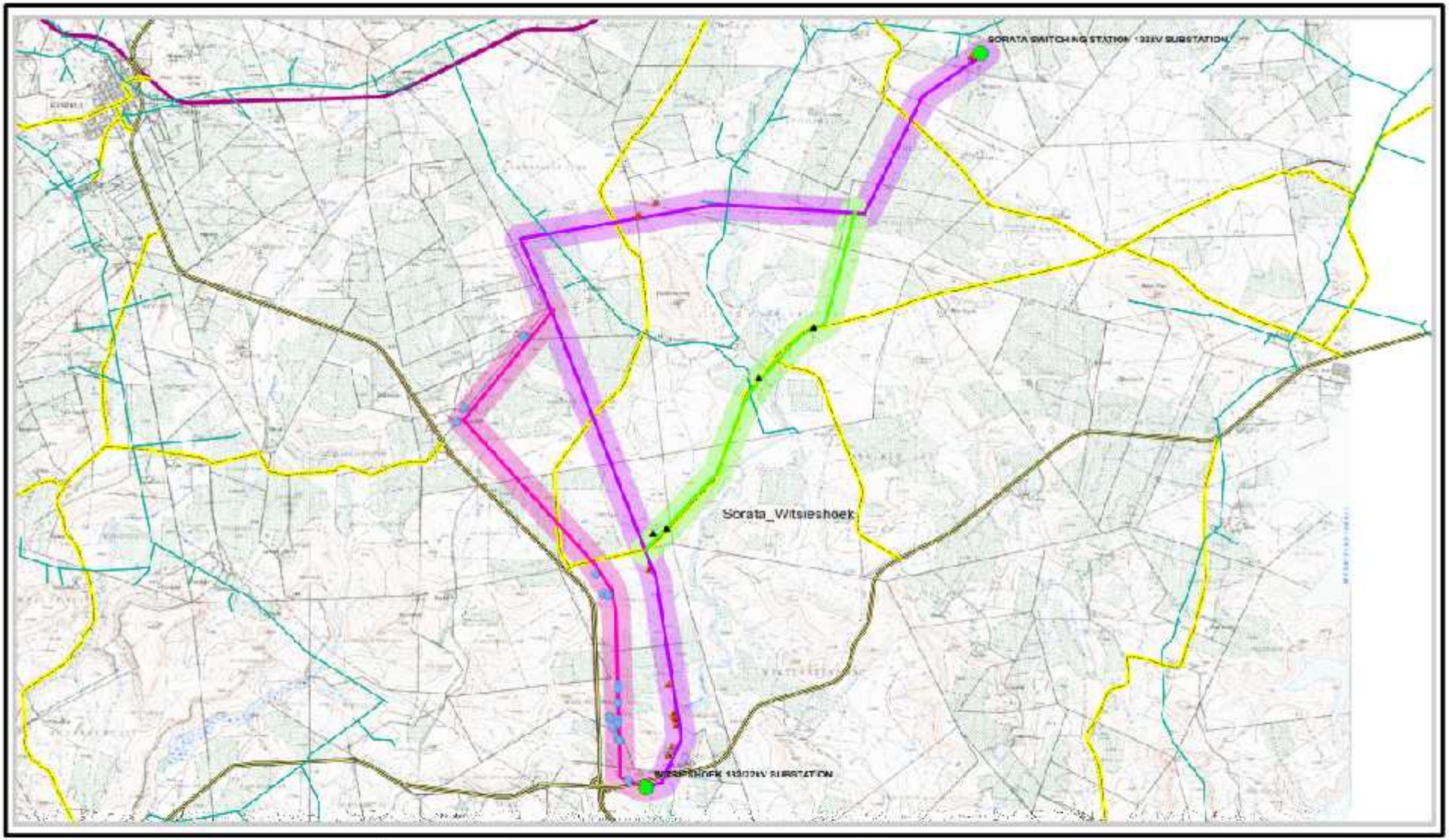
south of current proposed 31m servitude line. Meaning that it will have to cover the following coordinates i.e. starting from GPS Coordinate S28° 20' 47.6" E028° 47' 54.9" linking Corridor 1 at GPS S28° 20' 29.7" E028° 52' 38.4". This shift is represent in Figure 106 using yellow dots (Figure 106). The shifting of the current servitude south will assist avoid sensitive sites such as QWAC2-9 and QWAC2-10, especially QWAC2-10 deemed to be of high heritage significance with high impact significance rating than any other sites because of its heritage value (& fabric) and the fact that it falls directly within the current proposed servitude line of 31m.

Regarding other heritage sites identified within Corridor 2 - especially towards Witsieshoek Substation, the archaeologist and heritage specialist appointed for the EMP process will have to advise on the location of pylons positions in order to avoid direct impacts on the identified heritage resources and minimise the associated impacts thereof. A special recommendation for QWAC2-12, because it will be directly or indirectly impacted regardless of the selection of a corridor that combines Corridor 2 and Corridor 1 (Corridor 1/2) or the selection of Corridor 2 as the second alternative to Corridor1/2, is as follows:

- the site QWAC2-12 should be fenced off from the rest of construction activities and a cemetery management plan should be developed to manage this site during and post the construction phase of the project.

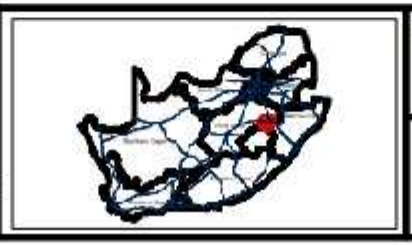
Please note that - the author, lead archaeologist and heritage specialist from NGT Project & Heritage Consultants categorically recommend that Corridor 1/2, which is a combination of Corridor 1 and Corridor 2, be the first choice corridor in terms of heritage resources management. This is based on the synthesis of the various forms of data and observations made about this corridor during fieldwork as well as the different forms of assessment and impact evaluation standards. Therefore, Corridor 2 as a second alternative should only be consider in cases where Corridor 1/2 is deemed highly sensitive in more than 3 other specialist fields (e.g. a combination of Ecology, Geology, Visual Impacts Assessment etc).

Emphasis!!! This alternative can only be selected if 3 other specialist fields deem this corridor (Corridor 1/2) highly-highly sensitive. That is when a compromise can be made, but the heritage recommendations of shifting the servitude (between GPS Coordinate S28° 20' 47.6" E028° 47' 54.9" linking Corridor 1 at GPS S28° 20' 29.7" E028° 52' 38.4") will have to be fully adhered to and implemented.



Legend

Sample_Data line	Proposed Lines Type	Proposed Corridor Type
Corridor	Corridor 1	Corridor 1
Corridor 1	Corridor 2	Corridor 2
Corridor 2	Corridor 3	Corridor 3
Substations	Secondary Roads	
	Main Roads	
	National Roads	



SITE PLAN: Topographic Map of Heritage Sites between Sorata & Witsieshoek Powerlines

0 5 10 Kilometers

N

Figure 104 - Distribution of heritage sites within and along the 3 proposed corridors i.e. Corridor 1, Corridor 2 and Corridor 3.

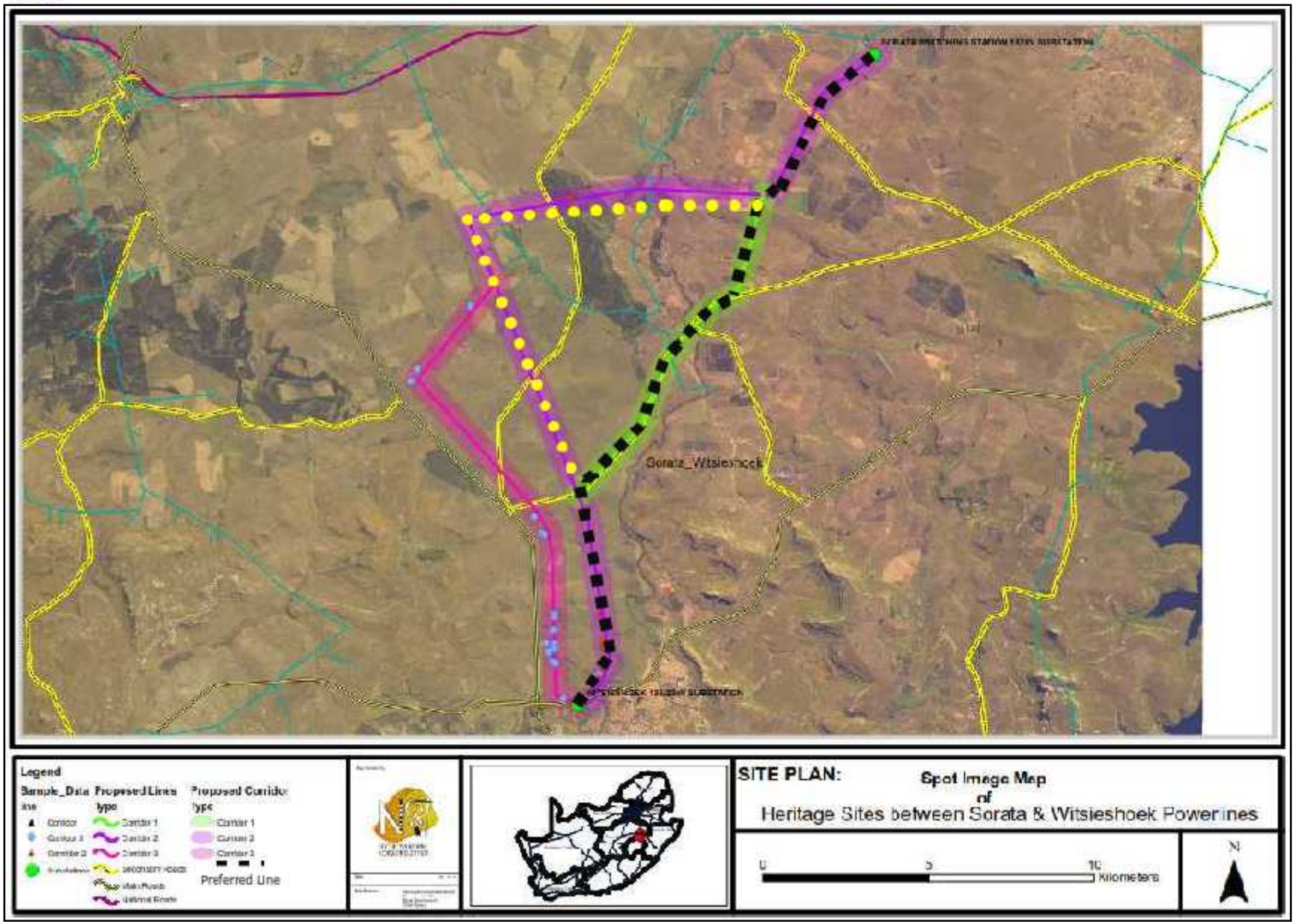

Sorata_Witsieshoek
Legend
Sample_Data
ine
Proposed Lines
ype
Proposed Corridor
ype
Preferred Line
SITE PLAN:
Spot Image Map
of
Heritage Sites between Sorata & Witsieshoek Powerlines
0
5
10
Kilometers
N

Figure 105 - Map Showing preferred Corridor Lines in terms of heritage resources management i.e. Corridor 1/2 (combination of Corridor 1 & Corridor 2) and Corridor 2 with an altered servitude (yellow dots). The preferred and recommended corridor is Corridor 1/2 as marked as marked in black dashes (black dashes). The second recommended Corridor is Corridor 2, but with an alteration of the servitude from GPS Coordinate S28° 20' 47.6" E028° 47' 54.9" and GPS Coordinate S28° 20' 22.9" E028° 52' 42.0". The servitude will have to be shifted south of the current proposed servitude line from GPS Coordinate S28° 20' 47.6" E028° 47' 54.9" to where this corridor links with Corridor 1 at GPS S28° 20' 29.7" E028° 52' 38.4" (Yellow dots).

9. REFERENCES

Binneman,J.N.F; C. Booth & Higgitt,N. 2011. An Archaeological Desktop Study And Phase 1 rchaeological Impact Assessment (Aia) for the Proposed Clidet Data Cable Between Bloemfontein, Orange Free State And Graaff Reinet, Eastern Cape Province; Colesberg, Orange Free State And Port Elizabeth, Eastern Cape Province; George,Western Cape Province And Port Elizabeth, Eastern Cape Province And; Aliwal North And East London, Eastern Cape Province.

Binneman, J.N.F; Booth, C & Higgitt, N. 2010c. A Phase 1 Archaeological Impact Assessment (AIA) for the proposed Dorper Wind Energy Facility on a site near Molteno, Chris Hani District Municipality, Eastern Cape Province.

Binneman, J., Webley, L. & Biggs, V. 1992. Preliminary notes on an Early Iron Age site in the Great Kei River Valley, Eastern Cape. Southern African Field Archaeology 1: 108-109.

Deacon, H.J. & Deacon, J. 1999. Human beginnings in South Africa. Cape Town: David Phillips Publishers.

Goodwin, A. J. H. 1926. The Victoria West Industry. In: Goodwin, A.J.H. & van Riet Lowe, C. (eds). The South African Cultures of South Africa. Annals of the South African Museum.

Goodwin, A.J.H. 1946. Earlier, Middle and Later. South African Archaeological Bulletin, 3 (1):74-76.

Goodwin, A.J.H. & Lowe, C. van Riet. 1929. The Stone Age cultures of South Africa. Annals of the South African Museum.

Hall, S & B.W. Smith, 2000. Empowering Places: Rock Shelters and Ritual control in the Farmer- Forager Interactions in the Limpopo Province [A Case of Saltpan Rock Shelter]

Huffman, T.N. 2007. Handbook for the Iron Age. Pietermaritzburg: UKZN Press.

Huffman, T. N. 1982. Archaeology and Ethnohistory of the African Iron Age. Annual review of Anthropology, 11:133-150.

Humphreys, A.J.B. 1991. On the distribution and dating of bifacial and tanged arrowheads in the interior of South Africa. The South African Archaeological Bulletin, 46(153):41-43.

Klatzow, S. 1994. Roosfontein, a contact site in the eastern Orange Free State. The South Africa Archaeological Bulletin, 49(159):9-15.

Klein, R. G. 1983. The Stone Age Prehistory of Southern Africa. Annual Review of Anthropology 12: 25-48.

Loubser, J; Brink, J & Laurens, G. 1990. Paintings of the extinct Blue Antelope, Hippotragus leucophaeus, in the Eastern Orange Free State. The South African archaeological Bulletin, 45(152):106-111.

Lycett, S.J. 2009. Are Victoria West cores “proto-Levallois”? A phylogenetic assessment. Journal of Human Evolution, Vol. 56:175-199.

Malan, B.D. 1949. Mangosian and Howieson’s Poort. The South African Archaeological Bulletin, 4(13):34-36.

Manhire, A. H; Parkington, J.E; Mazel, A.D & Maggs, T. M. 1986. Cattle, sheep and horses: A review of domestic animals in the rock art of southern Africa. South Africa Archaeological Society Goodwin Series, 5: 22-30.

Milton, J. 1983. The Edges of War. Cape Town: Juta & Co.

Morris, D. 1988. Engraved in place and time: a review of variability in the rock art of the Northern Cape and Karoo. South African Archaeological Bulletin, Vol. 43:109-121.

Neville, D; Sampson, B.E & Sampson, C.G. 1994. The Frontier Wagon Track System in the Seacow River Valley, North-Eastern Cape. The South African Archaeological Bulletin, 49(160):65-72.

Ntlhabo, M. 2010. Investigating The Significance Of A Heritage Site: The Case Of Witsies Cave In Qwa Qwa. A Report Submitted In Accordance With The Requirements Of The Degree Of Masters Of Arts In Hertiage Studies. The University Of Witwatersrand. Unpublished MA Thesis

Ouzman, S. 2005. The magical arts of a raider nation: Central South Africa's Korana rock Art. South Africa Archaeological Society Goodwin Series 9:101-113.

Pickles ,J& Woods, J. 1992. South Africa's Homelands in the Age of Reform: The Case of QwaQwa. Annals of the Association of American Geographers, Vol. 82, No. 4: 629-652

Sadr, K & Sampson, G. 1999. Khoekhoe ceramics of the upper Seacow Valley. South Africa Archaeological Bulletin, 54:3-15.

Sampson, C. G. 1984. Site clusters in the Smithfield settlement pattern. The South African Archaeological Bulletin, 39(139):5-23.

Sampson, C. G. 1985. Atlas of Stone Age Settlement in the Central and Upper Seacow Valley. Memoirs van die Nasionale Museum Bloemfontein, Vol. 20:1-116.

Sampson, C.G. 1988. Stylistic boundaries among mobile hunter-foragers. Washington: Smithsonian Institution Press.

Smith, R.A. 1919. Recent finds of the Stone Age in Africa. Man, 19:100-106.

Smith, A; Malherbe, C; Guenther, M and Berens, P. 2004. The Bushman of southern Africa: a foraging society in transition. Cape Town: David Philip Publishers:

SOUTH AFRICA,1983. Human Tissue Act. Government Gazette.

SOUTH AFRICA 1999. NATIONAL HERITAGE RESOURCES ACT (No 25 of 1999), Government Gazette. Cape Town..

SAHRA APMHOB. 2004. Policy for the management of Archaeology, Palaeontology, Meteorites and Heritage Object. . SAHRA: Cape Town.

SAHRA APM. 2006. Guidelines: Minimum standards for the archaeological and palaeontological Component of Impact Assessment Reports. . SAHRA: Cape Town.

SAHRA APMHOB 2002. General Introduction to surveys, impact assessments and management plans. . SAHRA: CT.

SAHRA. 2002. General guidelines to Archaeological Permitting Policy. SAHRA: Cape Town.

SAHRA. 2002. General Introduction to surveys, impact assessments and management plans.

SAHRA. What to do when Graves are uncovered accidentally.

Thackeray, A.I. 1983. Dating the Rock Art of Southern Africa. South Africa Archaeological Society Goodwin Series, 4:21-26.

Thompson, E. & Marean, C.W. 2008. The Mossel Bay lithic variant: 120 years of Middle Stone Age Research from Cape St. Blaize Cave to Pinnacle Point. South Africa Archaeological Society Goodwin Series, 10: 90-104.

Thorp, C.R. 1996. A preliminary report on evidence of interaction between hunter-gatherers and farmers along a hypothesised frontier in the eastern Free State. The South African Archaeological Bulletin, 51: 57-63.

Van Schalkwyk, J. 2011. Heritage Impact Assessment for the Propose 275kV Electricity Transmission Line, Everest to Merapi Substations, Free State Province. Unpublished HIA Report

Walton, J. 1953. An Early Fokeng-Hlakoana Settlement at Metlaeeng, Basutoland. The South

African Archaeological Bulletin, 8 (29): 3-11.

Woodhouse, H.C. 1984. [Correction:] Lion kills: A previously unidentified theme in the Bushman Art of Southern Africa. The South Africa Archaeological Bulletin, 39(139):4.

Internet

- http://www.sahistory.org.za/people/christiaan-rudolf-de-wet
- http://www.sahistory.org.za/topic/pretoria-timeline-1800-2009
- http://www.sahistory.org.za/topic/history-south-african-film-industry-timeline-1895-2003
- http://en.wikipedia.org/wiki/Battle_of_Majuba_Hill
- http://www.alltravels.com/south-africa/free-state/phuthaditjhaba/photos/current-photo-11743257