Basic assessment and environmental management programme:
CONSTRUCTION OF A 132KV DISTRIBUTION LINE BETWEEN THE MERENSKY AND LYDENBURG SUBSTATIONS, MPUMALANGA PROVINCE

BASIC ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PROGRAMME: CONSTRUCTION OF A 132KV DISTRIBUTION LINE BETWEEN THE MERENSKY AND LYDENBURG SUBSTATIONS, MPUMALANGA PROVINCE

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Declaration:

I, J.A. van Schalkwyk, declare that I do not have any financial or personal interest in the proposed development, nor its developers or any of their subsidiaries, apart from the provision of heritage assessment and management services.

J A van Schalkwyk (D Litt et Phil)
Heritage Consultant
June 2013

EXECUTIVE SUMMARY

BASIC ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PROGRAMME: CONSTRUCTION OF A 132KV DISTRIBUTION LINE BETWEEN THE MERENSKY AND LYDENBURG SUBSTATIONS, MPUMALANGA PROVINCE

Due to rapid urban expansion as well as industrial development (mining), additional electricity supplies are urgently needed in the larger Lydenburg-Steelport region. In order to satisfy this demand, Eskom propose the construction of a 132kV power line from Merensky Substation, near Steelpoort, in a south-eastern direction towards the Lydenburg Substation. For this purpose Eskom has identified three alternative corridors to be evaluated as to its suitability for use in the construction of the power lines.

In accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by **Royal Haskoning DHV** to conduct a Basic Assessment to determine if any sites, features or objects of cultural heritage significance occur within the boundaries of the corridors that would disqualify any such corridor from being used for the construction of the power line, or would require the implementation of mitigation measures.

The aim of the survey was to evaluate potential heritage resources that would occur within the boundaries of a proposed electricity transmission corridor and to determine if there are any fatal flaws that would prevent the proposed development from taking place in any of the three corridors where it is proposed to develop the electricity transmission line.

The cultural landscape qualities of the region essentially consist of a two components. The first is a rural area in which the human occupation is made up of a pre-colonial (Stone Age and Iron Age) occupation and a much later colonial (farmer) component. This rural landscape has always been sparsely populated. The second component is an urban one consisting of a number of smaller towns, most of which developed during the last 150 years or less. Linked to this is an industrial landscape made up of a number of mines and infrastructure elements such as roads and bridges.

The following heritage sites were identified in the larger region:

- Pre-colonial archaeological sites dating to the Stone Age have been identified to occur in the region of study area. In most known cases the impact of the development would only be indirect, e.g. the power line crossing some distance from the site, thereby having only a visual impact. However, when more detailed information is available, e.g. the exact position of the different towers and access/inspection roads, which will give rise to physical disturbance of the material and its context, it might be determined that specific development aspects might have a direct disturbance, which would result in irreplaceable loss of heritage resources.

- Pre-colonial archaeological sites dating to the Iron Age have been identified to occur in the region of study area. In most known cases the impact of the development would only be indirect, e.g. the power line crossing some distance from the site, thereby having only a visual impact. However, when more detailed information is available, e.g. the exact position of the different towers and access/inspection roads, which will give rise to physical disturbance of the material and its context, it might be determined that specific development aspects might have a direct disturbance, which would result in irreplaceable loss of heritage resources.

- Colonial period or historic period heritage manifest in a wide variety – farmsteads, infrastructure and cemeteries. As the power line is to cross a rural landscape for the most part, the impact would only be indirect, e.g. the power line crossing some distance from the site, thereby having only a visual impact. available, However, when more detailed

information is available, e.g. the exact position of the different towers and access/inspection roads, which will give rise to physical disturbance of the material and its context, it might be determined that specific development aspects might have a direct disturbance, which would result in irreplaceable loss of heritage resources.

Sensitive areas:

- Rock outcrops in the region show signs of having being quarried by Stone Age people in order to obtain material for producing stone tools. In addition, in some cases rock engraving occur on some of the outcrops. Therefore, all outcrops should be avoided as far as possible.

- As Early Iron Age people preferred to settle on the alluvial soils close to rivers, all river banks are viewed to be sensitive and should be avoided as far as possible.

- All Late Iron Age stone walled sites should be buffered with a no-go zone of at least 100 metres from the last visible feature associated with the site.
- All farmsteads, whether occupied or not, should be buffered with a no-go zone of at least 100 metres from the last visible feature associated with the farmstead/homestead.

- All cemeteries should have a buffer of at least 20 metres from the outer most graves. Fortunately, many cemeteries are fenced off, which can then be used as a buffer.

- All other features such as bridges, station buildings, etc. should be buffered with a no-go zone of at least 20 metres.

Evaluation:

Proposed 132kV line: Lydenburg to Merensky Western Alternative (Green)
- At present this Alternative seems to be suitable for the development of this corridor.

Proposed 132kV line: Lydenburg to Merensky Central Alternative (Purple)
- At present this Alternative seems to be suitable for the development of this corridor.

Proposed 132kV line: Lydenburg to Merensky Eastern Alternative (Red)
- At present this Alternative seems to be suitable for the development of this corridor.

Recommendations:

Therefore, it is our opinion that from a heritage point of view there are no fatal flaws that would prevent the proposed development from taking place in any of the three corridors. However, having said that, it must be remembered that heritage sites are not only fixed features in the environment, occurring within specific spatial confines, but they are also finite in number. Avoiding of impacts on sites is therefore the preferred form of mitigation. In areas where a high density of sites occurs, if at all possible, exclusion zones where no development is to take place, should be set aside. If that is not possible, mitigation can only be achieved through archaeological investigation.

As the exact coordinates for the power line and the individual tower structures are not yet available, it is difficult to determine what the final impact of the proposed development would be. Therefore, for the project to continue, we propose the following:

- Mitigation should be based on avoiding of sites rather than anything else. In order to achieve this, a full “walk down” of the selected corridor must be done prior to construction

taking place, to document all sites, features and objects, in order to propose adjustments to the routes and thereby to avoid as many impacts as possible.

- In addition, the management measures, as set out in Section 7 of this report should be implemented prior to construction taking place.

- No impact on heritage sites, features or objects can be allowed without a valid permit from SAHRA.

J A van Schalkwyk
Heritage Consultant
June 2013

TECHNICAL SUMMARY

Property details	
Province	Mpumalanga Province
Magisterial district	Lydenburg
Local municipality	Thaba Cheu
Topo-cadastral map	2430CA, 2430CD, 2530AB
Closest town	Steelpoort/Lydenburg
Farm name	Various

Development criteria in terms of Section 38(1) of the NHR Act	Yes/No
Construction of road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length	Yes
Construction of bridge or similar structure exceeding 50m in length	No
Development exceeding 5000 sq m	No
Development involving three or more existing erven or subdivisions	No
Development involving three or more erven or divisions that have been consolidated within past five years	No
Rezoning of site exceeding 10 000 sq m	No
Any other development category, public open space, squares, parks, recreation grounds	No

Development	
Description	Development of an electricity transmission line
Project name	Merensky to Lydenburg transmission line

Land use	
Previous land use	Agriculture
Current land use	Agriculture

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GLOSSARY OF TERMS AND ABBREVIATIONS

TERMS

Study area: Refers to the entire study area as indicated by the client in the accompanying Fig. 1 & 2.

Stone Age: The first and longest part of human history is the Stone Age, which began with the appearance of early humans between 3-2 million years ago. Stone Age people were hunters, gatherers and scavengers who did not live in permanently settled communities. Their stone tools preserve well and are found in most places in South Africa and elsewhere.

Early Stone Age	2 000 000 - 150 000 Before Present
Middle Stone Age	150 000 - 30 000 BP
Late Stone Age	30 000 - until c. AD 200

Iron Age: Period covering the last 1800 years, when new people brought a new way of life to southern Africa. They established settled villages, cultivated domestic crops such as sorghum, millet and beans, and they herded cattle as well as sheep and goats. As they produced their own iron tools, archaeologists call this the Iron Age.

Early Iron Age	AD 200 - AD 900
Middle Iron Age	AD 900 - AD 1300
Late Iron Age	AD 1300 - AD 1830

Historical Period: Since the arrival of the white settlers - c. AD 1840 - in this part of the country

ABBREVIATIONS

ADRC	Archaeological Data Recording Centre
ASAPA	Association of Southern African Professional Archaeologists
BP	Before Present
CS-G	Chief Surveyor-General
EIA	Early Iron Age
ESA	Early Stone Age
LIA	Late Iron Age
LSA	Later Stone Age
HIA	Heritage Impact Assessment
MSA	Middle Stone Age
NASA	National Archives of South Africa
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Agency
SAHRA	South African Heritage Resources Agency

BASIC ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PROGRAMME: CONSTRUCTION OF A 132KV DISTRIBUTION LINE BETWEEN THE MERENSKY AND LYDENBURG SUBSTATIONS, MPUMALANGA PROVINCE

1. INTRODUCTION

Due to rapid urban expansion as well as industrial development (mining), additional electricity supplies are urgently needed in the larger Lydenburg-Steelport region. In order to satisfy this demand, Eskom propose the construction of a 132kV power line from Merensky Substation, near Steelpoort, in a south-eastern direction towards the Lydenburg Substation. For this purpose Eskom has identified three alternative corridors to be evaluated as to its suitability for use in the construction of the power lines.

South Africa's heritage resources, also described as the 'national estate', comprise a wide range of sites, features, objects and beliefs. However, according to Section 27(18) of the National Heritage Resources Act (NHRA), No. 25 of 1999, no person may destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of any heritage site without a permit issued by the heritage resources authority responsible for the protection of such site.

In accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by **Royal Haskoning DHV** to conduct a Basic Assessment to determine if any sites, features or objects of cultural heritage significance occur within the boundaries of the corridors that would disqualify any such corridor from being used for the construction of the power line, or would require the implementation of mitigation measures.

2. TERMS OF REFERENCE

2.1 **Scope of work**

The aim of this assessment, broadly speaking, is to determine if any sites, features or objects of cultural heritage significance occur within the boundaries of the area where it is planned to develop the distribution lines and if any of these would prevent the proposed development from continuing.

The scope of work for this study consisted of:
- Conducting of a desk-top investigation of the area, in which all available literature, reports, databases and maps were studied;
- A visit to the proposed development area.

The objectives were to
- Identify possible archaeological, cultural and historic sites within the proposed development area;
- Evaluate the potential impacts of construction, operation and maintenance of the proposed development on archaeological, cultural and historical resources;
- Recommend mitigation measures to ameliorate any negative impacts on areas of archaeological, cultural or historical importance.

2.2 **Limitations**

- From an archaeological perspective, this region very under researched.
- The routes were investigated only in a broad, overview approach as access to the different properties was not possible.
- Information such as the coordinates of the individual tower structures was not available.
- Information on aspects such as access roads, construction camps, etc. was not available.
- In some areas the vegetation, natural as well as agricultural/plantations, was very high and dense, seriously limiting archaeological visibility.

2.3 **Assumptions**

- It is assumed that the Social Impact Assessment and Public Participation Process might also result in the identification of sites, features and objects, including sites of intangible heritage potential in the corridors and that these then will also have to be considered in the selection of the preferred corridor.
- It is assumed that a Visual Impact Assessment will be done to determine the impact of the power line on any identified heritage sites.
- It is assumed that a Paleontological Review will be done by a suitably qualified specialist.

3. HERITAGE RESOURCES

3.1 **The National Estate**

The NHRA (No. 25 of 1999) defines the heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations that must be considered part of the national estate to include:

- places, buildings, structures and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features of cultural significance;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds, including-
    - ancestral graves;
    - royal graves and graves of traditional leaders;
    - graves of victims of conflict;
    - graves of individuals designated by the Minister by notice in the Gazette;
    - historical graves and cemeteries; and
    - other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
- sites of significance relating to the history of slavery in South Africa;
- movable objects, including-
    - objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
    - objects to which oral traditions are attached or which are associated with living heritage;
    - ethnographic art and objects;
    - military objects;
    - objects of decorative or fine art;
    - objects of scientific or technological interest; and
    - books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as

defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).

3.2 **Cultural significance**

In the NHRA, Section 2 (vi), it is stated that ‘‘cultural significance’’ means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. This is determined in relation to a site or feature’s uniqueness, condition of preservation and research potential.

According to Section 3(3) of the NHRA, a place or object is to be considered part of the national estate if it has cultural significance or other special value because of

- its importance in the community, or pattern of South Africa's history;
- its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- sites of significance relating to the history of slavery in South Africa.

4. STUDY APPROACH AND METHODOLOGY

4.1 **Extent of the Study**

This survey and impact assessment covers the area as presented in Section 5 and as illustrated in Figures 2 & 3.

4.2 **Methodology**

4.2.1 *Preliminary investigation*

4.2.1.1 Survey of the literature

A survey of the relevant literature was conducted with the aim of reviewing the previous research done and determining the potential of the area. In this regard, various anthropological, archaeological and historical sources were consulted – see list of references in Section 9.

- Information of a very general nature were obtained from these sources

4.2.1.2 Data bases

The *Heritage Atlas Database,* the *Environmental Potential Atlas*, the *SAHRA Database,* the *Chief Surveyor General* (CS-G) and the *National Archives of South Africa* (NASA) were consulted.

- Database surveys produced a number of sites located in the larger region of the proposed development.

- The original Title Deeds of some of the farms were located at the C S-G office and indicated a few features in the larger region that is of cultural historical interest.

- Some references were found in NASA, all dealing with aspects of the management of people, infrastructure and commerce in the region.

4.2.1.3 Other sources

Aerial photographs and topocadastral and other maps were also studied - see the list of references below.

- Information of a very general nature was obtained from these sources.

4.2.2 *Field survey*

The areas that had to be investigated were identified by **Royal Haskoning DHV** by means of maps. As the developments are linear in nature, it was surveyed by travelling the extent of the various corridors, accessing the corridors where possible, e.g. when it crosses a road.

5. DESCRIPTION OF THE AFFECTED ENVIRONMENT

5.1 **Site location and description**

The power line will run from Merensky Substation, near Steelpoort, in a south-eastern direction towards the Lydenburg Substation. For this purpose Eskom has identified three alternative corridors to be evaluated as to its suitability for use in the construction of the power lines (Fig. 1).

The area is very mountainous and as it is bisected by a number of swift running rivers, deep valleys occur sporadically throughout the area.

The southern part of the study area is classified as Mesic Highveld Grassland, which can be described as a temperate, moderately moist habitat. This zone is considered to be sour grasslands and is dominated by primarily andropogonoid grasses (tall annual or perennial grasses with spike-like racemes). In contrast the northern section is located in the Central Bushveld or sweet veld. In essence this is a savannah type of veld and is a plain or grassland typified by scattered small trees, singly or in clusters.

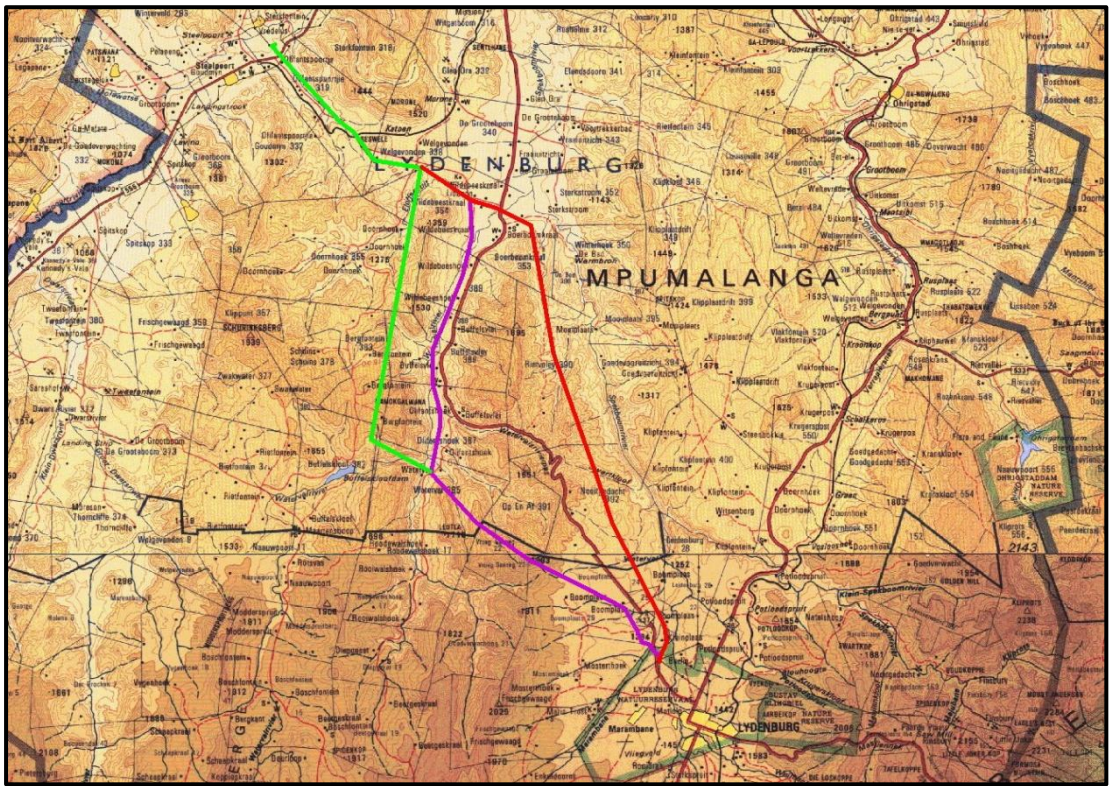


Fig. 1. Location of the study area in regional context.
(Map 2430, 2530: Chief Surveyor-General)

5.2 **Overview of the region**

The aim of this section is to present an overview of the history of the larger region in order to eventually determine the significance of heritage sites identified in the study area, within the context of their historic, aesthetic, scientific and social value, rarity and representivity – see Section 3.2 and Appendix 1 for more information.

The cultural landscape qualities of the region essentially consist of a two components. The first is a rural area in which the human occupation is made up of a pre-colonial (Stone Age and Iron Age) occupation and a much later colonial (farmer) component. This rural landscape has always been sparsely populated. The second component is an urban one consisting of a number of smaller towns, most of which developed during the last 150 years or less. Linked to this is an industrial landscape made up of a number of mines and infrastructure elements such as roads and bridges.

- Geological sites

One cannot think about the Steelpoort River valley and not think of mining. Probably the biggest impact the river had was to cut through the earth's natural layers and expose the rich mineral wealth hidden below. Platinum, chromite, vanadium, iron, manganese and magnetite are but a few of the minerals that were exposed in this way. This has played such an

important role that one such cutting in the Dwars River - one of the larger tributaries - was declared a national monument. Although identified as early as 1909 by the well-known geologist Dr A.L. Hall, it was only after it drew the attention of the American geologist Edward Sampson in 1929 that its significance became clear.

NHRA Category	Palaeontological sites
Protection status	
General Protection - Section 35: Archaeology, palaeontology and meteorites	

Early history

Very little habitation of the highveld area took place during Stone Age times. Tools dating to the Early Stone Age period are mostly found in the vicinity of larger watercourses, e.g. the Steelpoort River, or in sheltered areas such as the Lulu Mountains. During Middle Stone Age (MSA) times (c. 150 000 – 30 000 BP), people became more mobile, occupying areas formerly avoided. The MSA is a technological stage characterized by flakes and flake-blades with faceted platforms, produced from prepared cores, as distinct from the core tool-based ESA technology. Open sites were still preferred near watercourses.

Late Stone Age (LSA) people had even more advanced technology than the MSA people and therefore succeeded in occupying even more diverse habitats. Some sites are known to occur in the region. These are small rock shelters found in the sandstone cliffs near rivers and are located to the east and north of the study area. Some of these even contain rock paintings.

A site, with probably one of the longest sequences of human occupation in southern Africa, spanning all periods of the Stone Age as well as the Iron Age, is known as Bushman Rock Shelter and is found to the north of Ohrigstad.

Iron Age

Iron Age people started to settle in southern Africa c. AD 300, with one of the oldest known sites at Broederstroom south of Hartebeespoort Dam dating to AD 470. Having only had cereals (sorghum, millet) that need summer rainfall, Early Iron Age (EIA) people did not move outside this rainfall zone, and neither did they occupy the central interior highveld area. Because of their specific technology and economy, Iron Age people preferred to settle on the alluvial soils near rivers for agricultural purposes, but also for firewood and water.

The occupation of the larger geographical area (including the study area) did not start much before the 1500s. By the 16th century things changed, with the climate becoming warmer and

wetter, creating condition that allowed Late Iron Age (LIA) farmers to occupy areas previously unsuitable, for example the treeless plains of the Free State and the Mpumalanga highveld. This wet period came to a sudden end sometime between 1800 and 1820 by a major drought lasting 3 to 5 years. The drought must have caused an agricultural collapse on a large, subcontinent scale.

This was also a period of great military tension. Military pressure from Zululand spilled onto the highveld by at least 1821. Various marauding groups of displaced Sotho-Tswana moved across the plateau in the 1820s. Mzilikazi raided the plateau extensively between 1825 and 1837. The Boers trekked into this area in the 1830s. And throughout this time settled communities of Tswana people also attacked each other.

As a result of this troubled period, Sotho-Tswana people concentrated into large towns for defensive purposes. Because of the lack of trees they built their settlements in stone. These stone-walled villages were almost always located near cultivatable soil and a source of water.

Large numbers of stone-walled archaeological sites, which are dated to the Late Iron Age (c. AD 1640 - AD 1830s), are known from the larger study region. These sites are conventionally associated with Nguni-speaking people, although a second viewpoint is that it was built by Sotho-speakers. The alternative interpretation by a specific individual that these sites are of Hindu origin is discounted here.

From the air, these homesteads and towns are easily recognised and it is also possible to determine variations in smaller detail. Various researchers (Evers 1975, Marker & Evers 1976, Mason 1968 and Collet 1982) have attempted a classification of the stone walled sites on the Mpumalanga escarpment area. Of these, the work of Mason was the most extensive. However, he only focussed on homestead areas. By using site layout, he identified eight ruin classes. Collet (1982) subdivided the settlement units as:

- Simple ruins which consist of an isolated circular enclosure, and
- Complex ruins which consist of two or more contiguous circular or semi-circular enclosures.

Evers (1975) and Marker & Evers (1976) also considered other elements such as agricultural activities (terracing) and pathways (cattle track) as system of communication between settlements. According to Marker & Evers (1976:160) the combination between the three attributes forms a settlement. The current survey in the study area, have identified a fourth category of sites, namely initiation sites, which falls into a category of sites that are considered to have special meaning.

- Archaeological sites: Stone Age

NHRA Category	Archaeological and palaeontological sites
Protection status	
General Protection - Section 35: Archaeology, palaeontology and meteorites	

Heritage sites assessment		
Site type	*Site significance*	*Site grading (Section 7 of NHRA)*
Open sites; rock paintings	Paintings – high on a provincial level	II

Impact assessment	
Impact	
Mitigation	If the route change and the line is to cross such a feature, total documentation (mapping, photographing and oral documentation) would be required
Permits	SAHRA permits

- Archaeological sites: Iron Age

NHRA Category	Archaeological and palaeontological sites
Protection status	
General Protection - Section 35: Archaeology, palaeontology and meteorites	

Heritage sites assessment		
Site type	*Site significance*	*Site grading (Section 7 of NHRA)*
Stone walled sites	High on a regional level	III

Impact assessment	
Impact	A large number of sites dating to all phases of the Iron Age are known to occur in the larger region
Mitigation	If the route change and the line is to cross such a feature, total documentation (mapping, photographing and oral documentation) would be required
Permits	A permit from SAHRA would be required

Historic period

White settlers moved into the area during the first half of the 19th century. They were largely self-sufficient, basing their survival on cattle/sheep farming and hunting. Few towns were established and it remained an undeveloped area until the discovered of coal and later gold. The establishment of the Nederlandsche Zuid-Afrikaansche Spoorweg-Maatskappij (NZASM) railway line in the 1880s, linking Pretoria with Lourenço Marques (Maputo) and the world at large, brought much infra-structural and administrative development to the area. This railway line also became the scene of many battles during the Anglo-Boer War.

The various battles and skirmishes resulting from the conflict during the Anglo-Boer War (1899-1902) had a huge impact on heritage resources in the area, as many farms were burned down. Conversely, it also left a legacy of heritage sites scattered across the veld: fortifications and war cemeteries occur all over. Although most of the conflict centred on the railway line to Lorenço Marques (Maputo), incidents also took place in other areas (e.g. Cloete 2000).

However, the area remained up till today, a largely farming orientated community. Much of the heritage potential of the study area is therefore located within the many farmsteads in the area. Farmhouses and related structures (e.g. barns, sheds, etc.) and cemeteries dot the landscape. Equally important, are the homesteads, related structures and cemeteries of the farm labourers living on these farms.

- Farmsteads

Farmsteads are complex features in the landscape, being made up of different yet interconnected elements. Typically these consist of a main house, gardens, outbuildings, sheds and barns, with some distance from that labourer housing and various cemeteries. In addition roads and tracks, stock pens and wind mills complete the setup. An impact on one element therefore impacts on the whole.

NHRA Category	Buildings, structures, places and equipment of cultural significance
Protection status	
General Protection - Section 34: Structures older than 60 years	

Heritage sites assessment		
Site type	*Site significance*	*Site grading (Section 7 of NHRA)*
Farmsteads	Medium on a regional level	III

Impact assessment	
Impact	It is unlikely that the power line would cross over any existing farmstead or other buildings
Mitigation	If the route change and the line is to cross such a feature, total documentation (mapping, photographing and oral documentation) would be required
Permits	If older than 60 years, a permit from SAHRA would be required

- Cemeteries

Apart from the formal cemeteries that occur in municipal areas (towns or villages), a number of these, some quite informal, i.e. without fencing, is expected to occur sporadically all over, but probably in the vicinity of the various farmsteads. Many might also have been forgotten, making it very difficult to trace the descendants in a case where the graves are to be relocated.
Most of these cemeteries, irrespective of the fact that they are for land owner or farm labourers (with a few exceptions where they were integrated), are family orientated. They are therefore serve as important 'documents' linking people directly by name to the land.

NHRA Category	Graves, cemeteries and burial grounds
Protection status	
General Protection - Section 36: Graves or burial grounds	

Heritage sites assessment		
Site type	*Site significance*	*Site grading (Section 7 of NHRA)*
Cemetery	High on a regional level	III

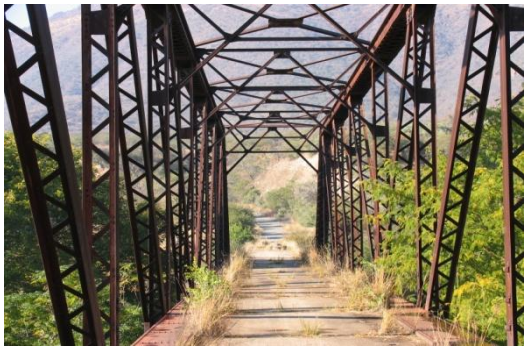
Impact assessment	
Impact	As it is unlikely that the power line would have any other than a visual impact on such sites, it is recommended that they are retained in their current location.
Mitigation	These sites should be avoided at all times. During construction it should be clearly demarcated, e.g. by using danger tape.
Permits	If retained, no permits are necessary

- Infrastructure and industrial heritage

In many cases this aspect of heritage is left out of surveys, largely due to the fact that it is taken for granted. However, the land and its resources could not be accessed and exploited without the development of features such as roads, bridges, railway lines, electricity lines and telephone lines.

NHRA Category	Buildings, structures, places and equipment of cultural significance
Protection status	
General Protection - Section 34: Structures older than 60 years	

Significance	Medium on a regional level – Grade III



Impact assessment	
Impact	As it is unlikely that the power line would have any other than a visual impact on such sites, it is recommended that they are retained in their current location.
Mitigation	These sites should be avoided at all times. During construction it should be clearly demarcated, e.g. by using danger tape.
Permits	If retained, no permits are necessary

- Public monuments and memorials

In many cases this aspect of heritage is left out of surveys, largely due to the fact that it is taken for granted.

NHRA Category	Buildings, structures, places and equipment of cultural significance
Protection status	
General Protection – Section 37: Public monuments and memorials	

Significance	Medium on a regional level – Grade III

Impact assessment	
Impact	As it is unlikely that the power line would have any other than a visual impact on such sites, it is recommended that they are retained in their current location.
Mitigation	These sites should be avoided at all times. During construction it should be clearly demarcated, e.g. by using danger tape.
Permits	If retained, no permits are necessary

5.3 **Route description**

The project consists of three proposed corridor alternatives which are presented in Fig. 4 below

- Proposed 132kV line: Lydenburg to Merensky Western Alternative (Green)
- Proposed 132kV line: Lydenburg to Merensky Central Alternative (Purple)
- Proposed 132kV line: Lydenburg to Merensky Eastern Alternative (Red)

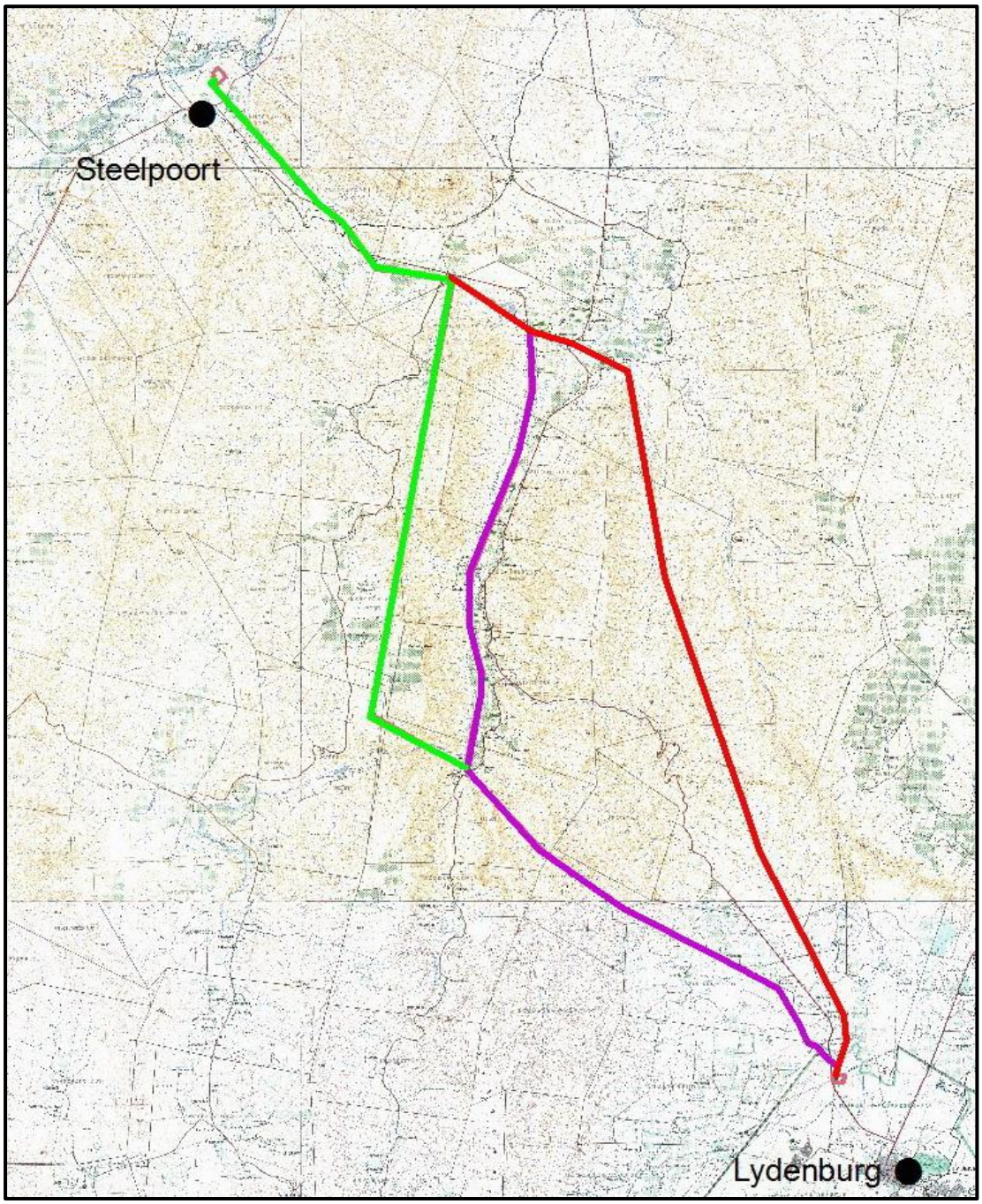


Fig. 2. Map showing the alternative corridors for the power line.

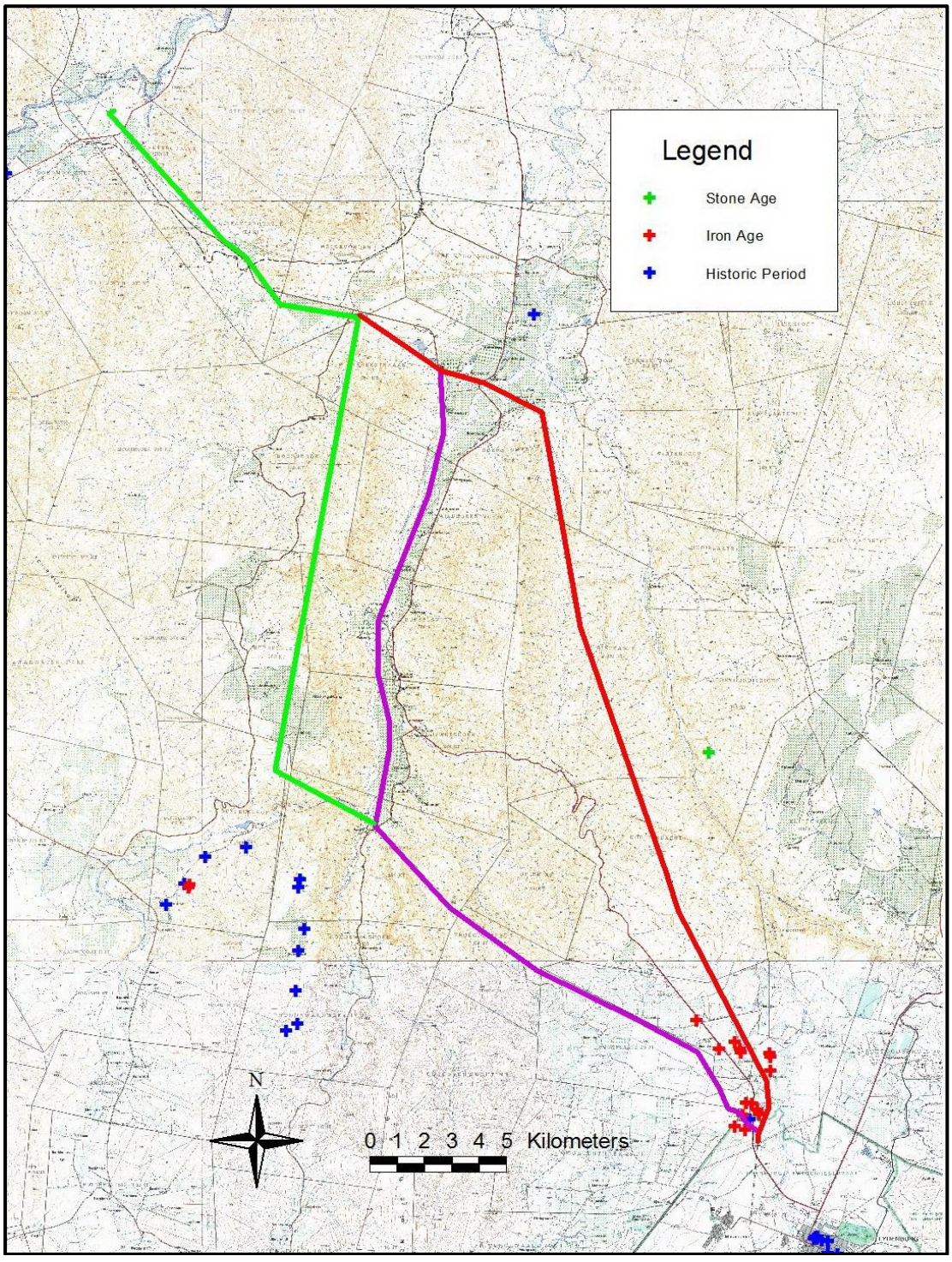


Fig. 3. Location of known heritage sites in relation to the corridors.

The following sites, features and objects of cultural significance are known to exist in the proximity of the identified corridors. This information is based solely on available information as no intensive field survey of the various routes was conducted:

- Some farmsteads and other farming related features occur in the vicinity of the western (green) Alternative.

- A large number of stone wall sites dating to the Late Iron Age are found in the vicinity of the Lydenburg Substation. This would have an impact on all three of the proposed Alternatives.

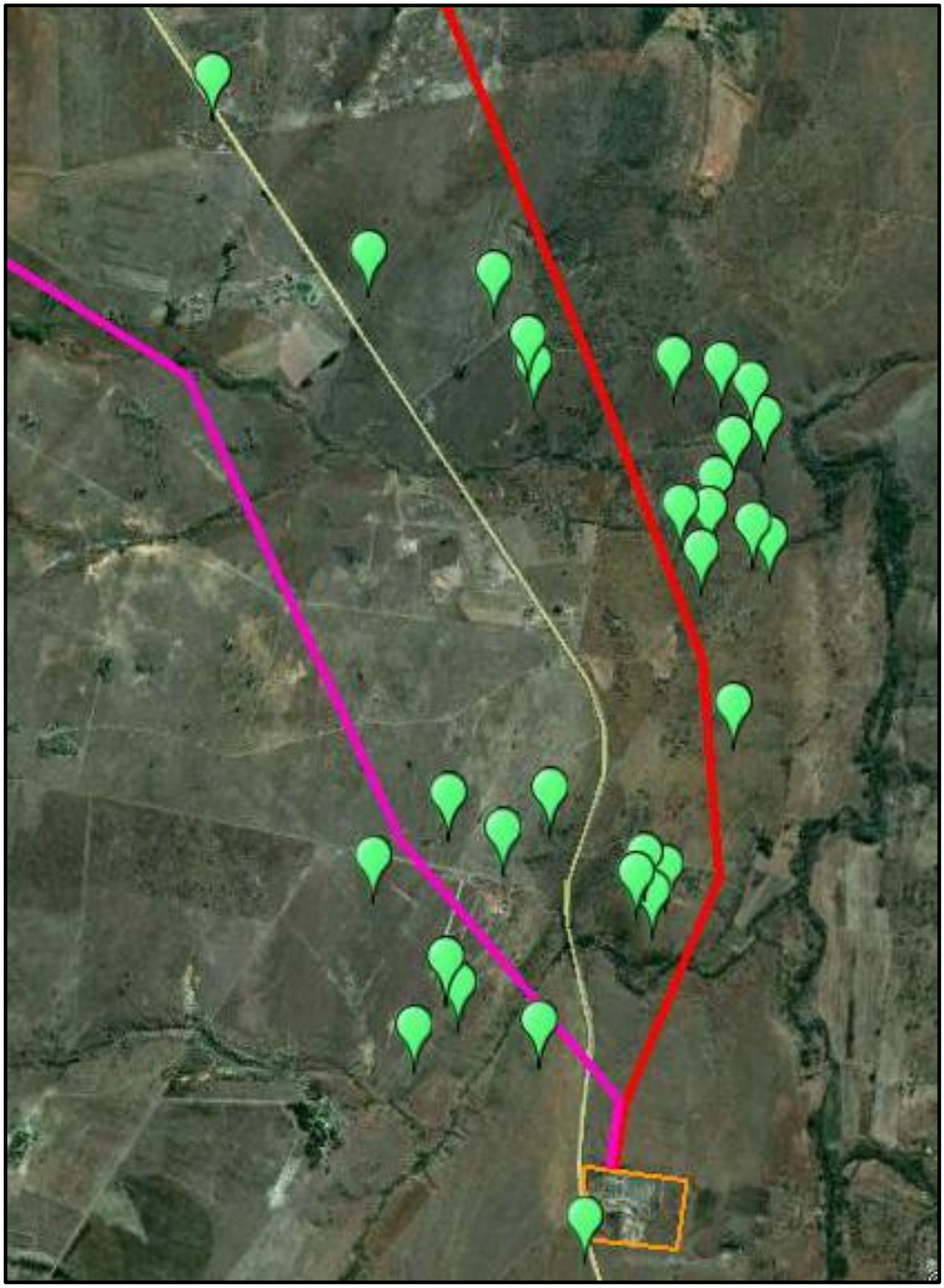


Fig. 4. Distribution of Iron Age sites in the region of the Lydenburg Substation.
(Photo: Google Earth)

6. COMPARATIVE ASSESSMENT OF ALTERNATIVES

Key

Preferred	The alternative will result in a low impact / reduce the impact
Not Preferred	The alternative will result in a high impact / increase the impact
Favourable	The impact will be relatively insignificant

Alternative	Preference	Reasons
MERENSKY-LYDENBURG POWER LINE		
Corridor Route 1 (green)	Favourable	
Corridor Route 2 (purple)	Favourable	
Corridor Route 3 (red)	Favourable	

7. SITE SIGNIFICANCE AND ASSESSMENT

7.1 **Heritage assessment criteria and grading**

According to the NHRA, No. 25 of 1999, Section 2(vi), the *significance* of heritage sites and artefacts is determined by it aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to the uniqueness, condition of preservation and research potential.

A matrix was developed whereby the above criteria, as set out in Sections 3(3) and 7 of the NHRA, No. 25 of 1999, were applied for each identified site (see Appendix 1). This allowed some form of control over the application of similar values for similar sites.

The NHRA stipulates the assessment criteria and grading of archaeological sites. The following categories are distinguished in Section 7 of the Act:

- **Grade I**: Heritage resources with qualities so exceptional that they are of special national significance;
- **Grade II**: Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region; and
- **Grade III**: Other heritage resources worthy of conservation, on a local authority level.

The occurrence of sites with Grade I significance will demand that the development activities be drastically altered in order to retain these sites in their original state. For Grade II and Grade III sites, the application of mitigation measures would allow the development activities to continue.

7.2 **Statement of significance**

In terms of Section 7 of the NHRA, all the sites currently known or which are expected to occur in the study area are evaluated to have Grade III significance with

- Early Iron Age sites would have a high significance on a provincial level.

- Late Iron Age stone walled sites would have a medium significance on a regional level.
- Farming and farming related activities, such as farmsteads, stock pens, windmills, etc. would have a high significance on a local level.
- Town/community cemeteries and farm cemeteries would have a high significance on a local level.

7.3 **Impact assessment**

Impact analysis of cultural heritage resources under threat of the proposed development, are based on the present understanding of the development.

Environmental Parameter	**Stone Age**	
Issue/Impact/Environmental Effect/Nature	Many sites are still unknown. Their potential and significance therefore unknown. The impact will be the physical disturbance of the material and its context. Impact will be focused on a particular node, i.e. if the power line cut through a site.	
Extent	Local	
Probability	Possible	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal loss	
Duration	Medium term	
Cumulative effect	Low cumulative effect	
Intensity/magnitude	Medium	
Significance Rating	Sites have a medium significance on a region level – viewed as NHRA Grade III sites.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	2	1
Reversibility	3	1
Irreplaceable loss	4	1
Duration	4	1
Cumulative effect	2	1
Intensity/magnitude	2	1
Significance rating	34 (Negative low impact)	6 (low negative)
Mitigation measures	All of these sites should be avoided as far as possible. Mitigation should take the form of isolating known sites and declare them as no-go zones with sufficient large buffer zones around them for protection. Sites that cannot be avoided should be excavated in full by an archaeologist qualified in Stone Age archaeology.	

Environmental Parameter	**Iron Age**

Issue/Impact/Environmental Effect/Nature	Many sites are still unknown. Their potential and significance therefore unknown. The impact will be the physical disturbance of the material and its context. Impact will be focused on a particular node, i.e. if the power line cut through a site.	
Extent	Local	
Probability	Possible	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal loss	
Duration	Medium term	
Cumulative effect	Low cumulative effect	
Intensity/magnitude	Medium	
Significance Rating	Sites have a medium significance on a region level – viewed as NHRA Grade III sites.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	2	1
Reversibility	3	1
Irreplaceable loss	4	1
Duration	4	1
Cumulative effect	2	1
Intensity/magnitude	2	1
Significance rating	34 (Negative low impact)	6 (low negative)
Mitigation measures	All of these sites should be avoided as far as possible. Mitigation should take the form of isolating known sites and declare them as no-go zones with sufficient large buffer zones around them for protection. Sites that cannot be avoided should be excavated in full by an archaeologist qualified in Iron Age archaeology.	

Environmental Parameter	**Colonial Period – farmsteads**	
Issue/Impact/Environmental Effect/Nature	The various features are subject to damage. Easier to identify and therefore easier to avoid. Variety of interconnected elements makes up the whole. Impact on part therefore implies an impact on the whole	
Extent	Local	
Probability	Possible	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal loss	
Duration	Medium term	
Cumulative effect	Low cumulative effect	
Intensity/magnitude	Medium	
Significance Rating	Sites have a medium significance on a region level – viewed as NHRA Grade III sites.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1

Probability	2	1
Reversibility	2	1
Irreplaceable loss	2	1
Duration	2	1
Cumulative effect	2	1
Intensity/magnitude	2	1
Significance rating	24 (Negative low impact)	6 (low negative)
Mitigation measures	All of these sites should be avoided as far as possible. Mitigation should take the form of isolating known sites and declare them as no-go zones with sufficient large buffer zones around them for protection. In exceptional cases mitigation can be implemented after required procedures have been followed.	

Environmental Parameter	**Colonial Period – cemeteries**	
Issue/Impact/Environmental Effect/Nature	The various features are subject to damage. Easier to identify and therefore easier to avoid. Variety of interconnected elements makes up the whole. Impact on part therefore implies an impact on the whole	
Extent	Local	
Probability	Possible	
Reversibility	Partly reversible	
Irreplaceable loss of resources	Marginal loss	
Duration	Medium term	
Cumulative effect	Low cumulative effect	
Intensity/magnitude	Medium	
Significance Rating	Sites have a medium significance on a region level – viewed as NHRA Grade III sites.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	2	1
Reversibility	2	1
Irreplaceable loss	2	1
Duration	2	1
Cumulative effect	2	1
Intensity/magnitude	2	1
Significance rating	24 (Negative low impact)	6 (low negative)
Mitigation measures	All of these sites should be avoided as far as possible. Mitigation should take the form of isolating known sites and declare them as no-go zones with sufficient large buffer zones around them for protection. In exceptional cases mitigation can be implemented after required procedures have been followed.	

8. CONCLUSIONS

The aim of the survey was to evaluate potential heritage resources that would occur within the boundaries of a proposed electricity transmission corridor and to determine if there are any fatal flaws that would prevent the proposed development from taking place in any of the three corridors where it is proposed to develop the electricity transmission line.

The cultural landscape qualities of the region essentially consist of a two components. The first is a rural area in which the human occupation is made up of a pre-colonial (Stone Age and Iron Age) occupation and a much later colonial (farmer) component. This rural landscape has always been sparsely populated. The second component is an urban one consisting of a number of smaller towns, most of which developed during the last 150 years or less. Linked to this is an industrial landscape made up of a number of mines and infrastructure elements such as roads and bridges.

The following heritage sites were identified in the larger region:

- Pre-colonial archaeological sites dating to the Stone Age have been identified to occur in the region of study area. In most known cases the impact of the development would only be indirect, e.g. the power line crossing some distance from the site, thereby having only a visual impact. However, when more detailed information is available, e.g. the exact position of the different towers and access/inspection roads, which will give rise to physical disturbance of the material and its context, it might be determined that specific development aspects might have a direct disturbance, which would result in irreplaceable loss of heritage resources.

- Pre-colonial archaeological sites dating to the Iron Age have been identified to occur in the region of study area. In most known cases the impact of the development would only be indirect, e.g. the power line crossing some distance from the site, thereby having only a visual impact. However, when more detailed information is available, e.g. the exact position of the different towers and access/inspection roads, which will give rise to physical disturbance of the material and its context, it might be determined that specific development aspects might have a direct disturbance, which would result in irreplaceable loss of heritage resources.

- Colonial period or historic period heritage manifest in a wide variety – farmsteads, infrastructure and cemeteries. As the power line is to cross a rural landscape for the most part, the impact would only be indirect, e.g. the power line crossing some distance from the site, thereby having only a visual impact. available, However, when more detailed information is available, e.g. the exact position of the different towers and access/inspection roads, which will give rise to physical disturbance of the material and its context, it might be determined that specific development aspects might have a direct disturbance, which would result in irreplaceable loss of heritage resources.

Sensitive areas:

- Rock outcrops in the region show signs of having being quarried by Stone Age people in order to obtain material for producing stone tools. In addition, in some cases rock engraving occur on some of the outcrops. Therefore, all outcrops should be avoided as far as possible.

- As Early Iron Age people preferred to settle on the alluvial soils close to rivers, all river banks are viewed to be sensitive and should be avoided as far as possible.

- All Late Iron Age stone walled sites should be buffered with a no-go zone of at least 100 metres from the last visible feature associated with the site.

- All farmsteads, whether occupied or not, should be buffered with a no-go zone of at least 100 metres from the last visible feature associated with the farmstead/homestead.

- All cemeteries should have a buffer of at least 20 metres from the outer most graves. Fortunately, many cemeteries are fenced off, which can then be used as a buffer.

- All other features such as bridges, station buildings, etc. should be buffered with a no-go zone of at least 20 metres.

Evaluation:

Proposed 132kV line: Lydenburg to Merensky Western Alternative (Green)
- At present this Alternative seems to be suitable for the development of this corridor.

Proposed 132kV line: Lydenburg to Merensky Central Alternative (Purple)
- At present this Alternative seems to be suitable for the development of this corridor.

Proposed 132kV line: Lydenburg to Merensky Eastern Alternative (Red)
- At present this Alternative seems to be suitable for the development of this corridor.

Recommendations:

Therefore, it is our opinion that from a heritage point of view there are no fatal flaws that would prevent the proposed development from taking place in any of the three corridors. However, having said that, it must be remembered that heritage sites are not only fixed features in the environment, occurring within specific spatial confines, but they are also finite in number. Avoiding of impacts on sites is therefore the preferred form of mitigation. In areas where a high density of sites occurs, if at all possible, exclusion zones where no development is to take place, should be set aside. If that is not possible, mitigation can only be achieved through archaeological investigation.

As the exact coordinates for the power line and the individual tower structures are not yet available, it is difficult to determine what the final impact of the proposed development would be. Therefore, for the project to continue, we propose the following:

- Mitigation should be based on avoiding of sites rather than anything else. In order to achieve this, a full “walk down” of the selected corridor must be done prior to construction taking place, to document all sites, features and objects, in order to propose adjustments to the routes and thereby to avoid as many impacts as possible.

- In addition, the management measures, as set out in Section 7 of this report should be implemented prior to construction taking place.

- No impact on heritage sites, features or objects can be allowed without a valid permit from SAHRA.

9. REFERENCES

9.1 **Data bases**

Chief Surveyor General
Environmental Potential Atlas, Department of Environmental Affairs and Tourism.
Heritage Atlas Database, Pretoria.
National Archives of South Africa
South African Heritage Resources Agency Database

9.2 **Literature**

Acocks, J.P.H. 1975. *Veld Types of South Africa*. Memoirs of the Botanical Survey of South Africa, No. 40. Pretoria: Botanical Research Institute.

Bergh, J.S. (red.). 1998. *Geskiedenisatlas van Suid-Afrika: die vier noordelike provinsies*. Pretoria: J.L. Schaik.

Celliers, J.P. 2008. *Phase 1 Archaeological Impact Assessment for MTC Minerals concerning mining activities on the farm Goudmyn 337KT*. Lydenburg: Kudzala Antiquity

Cloete, P.G. 2000. *The Anglo-Boer War: a Chronology*. Pretoria: JP van der Walt

Collett, D.P. 1979. *The Archaeology of the stone-walled settlements in the Eastern Transvaal, South Africa*. Unpublished MA Thesis. University of the Witwatersrand.

Collett, D.P. 1982. Excavations of stone-walled ruin types in the Badfontein Valley, Eastern Transvaal, South Africa. *South African Archaeological Bulletin*. Vol. 37.

Delius, P. (ed.) 2007. *Mpumalanga: history and heritage*. Scotsville: University of KwaZulu-Natal Press.

Küsel, U.S. 2006. *Cultural Heritage Resources Imapct Assessment of the proposed development area on the farms Buffelskloof 382JT, Waterval 385JT, Roodewalshoek 17JT, Naauwpoort 11JT and Belvedere385KT, Mpumalanga Province*. Pretoria: African Heritage Consultants cc.

Marker, M.E. & Evers, T.M. 1976. Iron Age Settlements and soil erosion in the Eastern Transvaal, South Africa. *South African Archaeological Bulletin*. Vol. 31.

Mason, R.J. 1962. *Prehistory of the Transvaal*. Johannesburg: Witwatersrand University Press.

Mason, R.J. 1968. Transvaal and Natal Iron Age settlement revealed by aerial photography and excavation. *African Studies*. Vol. 27.

Norman, N. & Whitfield, G. 2006. *Geological Journeys*. Cape Town: Struik Publishers

Praagh, L.V. (ed.) 1906. *The Transvaal and its mines*. London: Praagh & Lloyd.

Van der Walt, J. 2007. *Proposed industrial development on portions 136, 39 and 59 of the farm Lydenburg 31JT, Thaba Chweu, Mpumalanga*. Johannesburg: Wits Enterprise.

Van Wyk Rowe, C. 2009a. *Phase 1 Archaeological/heritage impact assessment: Portion 39 of Lydenburg Townlands 31JT, Mashishing/Lydenburg, Mpumalanga Province*. Lydenburg: Adansonia Heritage Consultants.

Van Wyk Rowe, C. 2009b. *Phase 1 Archaeological/heritage impact assessment: Sections 1a, 1b, 2, 3 & 4 of Leeuwvallei 297KT, Burgersfort, Limpopo Province*. Lydenburg: Adansonia Heritage Consultants.

9.3 **Maps and aerial photographs**

1: 50 000 Topocadastral maps:

Google Earth

APPENDIX 1: CONVENTIONS USED TO ASSESS THE SIGNIFICANCE OF HERITAGE RESOURCES

Significance

According to the NHRA, Section 2(vi) the **significance** of heritage sites and artefacts is determined by it aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to the uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.

Matrix used for assessing the significance of each identified site/feature

1. Historic value			
Is it important in the community, or pattern of history			
Does it have strong or special association with the life or work of a person, group or organisation of importance in history			
Does it have significance relating to the history of slavery			
2. Aesthetic value			
It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group			
3. Scientific value			
Does it have potential to yield information that will contribute to an understanding of natural or cultural heritage			
Is it important in demonstrating a high degree of creative or technical achievement at a particular period			
4. Social value			
Does it have strong or special association with a particular community or cultural group for social, cultural or spiritual reasons			
5. Rarity			
Does it possess uncommon, rare or endangered aspects of natural or cultural heritage			
6. Representivity			
Is it important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects			
Importance in demonstrating the principal characteristics of a range of landscapes or environments, the attributes of which identify it as being characteristic of its class			
Importance in demonstrating the principal characteristics of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province, region or locality.			
7. Sphere of Significance	High	Medium	Low
International			
National			
Provincial			
Regional			
Local			
Specific community			
8. Significance rating of feature			
1. Low			
2. Medium			
3. High			

APPENDIX 2. RELEVANT LEGISLATION

All archaeological and palaeontological sites, and meteorites are protected by the National Heritage Resources Act (Act no 25 of 1999) as stated in Section 35:

(1) Subject to the provisions of section 8, the protection of archaeological and palaeontological sites and material and meteorites is the responsibility of a provincial heritage resources authority: Provided that the protection of any wreck in the territorial waters and the maritime cultural zone shall be the responsibility of SAHRA.

(2) Subject to the provisions of subsection (8)(a), all archaeological objects, palaeontological material and meteorites are the property of the State. The responsible heritage authority must, on behalf of the State, at its discretion ensure that such objects are lodged with a museum or other public institution that has a collection policy acceptable to the heritage resources authority and may in so doing establish such terms and conditions as it sees fit for the conservation of such objects.

(3) Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority.

(4) No person may, without a permit issued by the responsible heritage resources authority-

(a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;

(b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;

(c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or

(d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.

In terms of cemeteries and graves the following (Section 36):

(1) Where it is not the responsibility of any other authority, SAHRA must conserve and generally care for burial grounds and graves protected in terms of this section, and it may make such arrangements for their conservation as it sees fit.

(2) SAHRA must identify and record the graves of victims of conflict and any other graves which it deems to be of cultural significance and may erect memorials associated with the grave referred to in subsection (1), and must maintain such memorials.

(3) No person may, without a permit issued by SAHRA or a provincial heritage resources authority-

(a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;

(b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or

(c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.

(4) SAHRA or a provincial heritage resources authority may not issue a permit for the destruction or damage of any burial ground or grave referred to in subsection (3)(a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant and in accordance with any regulations made by the responsible heritage resources authority.