

**Heritage impact scoping assessment for the
PROPOSED DEVELOPMENT OF A 400KV TRANSMISSION LINE FROM
TABOR SUBSTATION TO THE NZHELELE SUBSTATION,
LIMPOPO PROVINCE**

HERITAGE IMPACT SCOPING ASSESSMENT FOR THE PROPOSED DEVELOPMENT OF A 400KV TRANSMISSION LINE FROM TABOR SUBSTATION TO THE NZHELELE SUBSTATION, LIMPOPO 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.



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December 2012

EXECUTIVE SUMMARY

HERITAGE IMPACT SCOPING ASSESSMENT FOR THE PROPOSED DEVELOPMENT OF A 400KV TRANSMISSION LINE FROM TABOR SUBSTATION TO THE NZHELELE SUBSTATION, LIMPOPO PROVINCE

Eskom Holding Limited proposes to construct a 400kV transmission power line from Tabor substation north of Polokwane to Nzhelele substation north of Louis Trichardt in Limpopo Province. The total length of the power line would be approximately 90km. For this purpose five alternative routes have been identified, one of which will be selected as the most viable proposition.

Power lines on the scale required for a project such as this put particular constraints on heritage resources. It is anticipated that overall the impact of the development would largely be indirect, as it might only pass over or in close proximity of a heritage site or feature. The impact therefore would largely be visual. In other cases the impact will be direct as it would focus on a particular node, i.e. tower positions or access/ inspection roads. This would give rise to the physical disturbance of the material and its context.

In accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by **Lidwala Consulting Engineers** on behalf of the applicant, Eskom Holdings Limited, to conduct a scoping assessment to determine if there are any fatal flaws that would prevent the proposed development from taking place in any of the routes where it is planned to develop the transmission line. Based on this review a preferred route would be identified, which would then be subjected to full Heritage Impact Assessment.

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.

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 some cases the power line would have a direct impact as it would cross directly over a site, with the possibility of a tower structure being erected on some of them. In addition, in a number of 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. 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.

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 routes. 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.

Based on current information, the best alternative for the proposed development would be as follows:

- Alternative 2 would be the best option in the southern section of the route.
- Moving northwards, Alternative 2 or Alternative 1 would be acceptable for this section.
- It seems as if Alternative 4 would be best, for the section through the mountain as well as the section northwards to the substation. However, this is the Alternative route about which the least information is available.

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



J A van Schalkwyk
Heritage Consultant
December 2012

TECHNICAL SUMMARY

Property details						
Province	Limpopo					
Magisterial district						
District municipality	Vhembe					
Closest town	Louis Trichardt (Makhado)					
Topo-cadastral map	2229DA, 2229DB, 2229DC, 2229DD, 2329BA, 2329BB, 2329BC, 2329BD					
Farm names	Various					
Coordinates	End points (approximate)					
	No	Latitude	Longitude	No	Latitude	Longitude
	1			2		

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 a 400kV electricity transmission line
Project name	Tabor-Nzhelele 400kV transmission power line

Land use	
Previous land use	Farming/urban
Current land use	Farming/urban

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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

HERITAGE IMPACT SCOPING ASSESSMENT FOR THE PROPOSED DEVELOPMENT OF A 400KV TRANSMISSION LINE FROM TABOR SUBSTATION TO THE NZHELELE SUBSTATION, LIMPOPO PROVINCE

1. INTRODUCTION

Eskom Holding Limited proposes to construct a 400kV transmission power line from Tabor substation north of Polokwane to Nzhelele substation north of Louis Trichardt in Limpopo Province. The total length of the power line would be approximately 90km. For this purpose five alternative routes have been identified, one of which will be selected as the most viable proposition.

Power lines on the scale required for a project such as this put particular constraints on heritage resources. It is anticipated that overall the impact of the development would largely be indirect, as it might only pass over or in close proximity of a heritage site or feature. The impact therefore would largely be visual. In other cases the impact will be direct as it would focus on a particular node, i.e. tower positions or access/ inspection roads. This would give rise to the physical disturbance of the material and its context.

South Africa's heritage resources, also described as the 'national estate', comprise a wide range of sites, features, objects and beliefs. 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 sites.

In accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by **Lidwala Consulting Engineers** on behalf of the applicant, Eskom Holdings Limited, to conduct a scoping assessment to determine if there are any fatal flaws that would prevent the proposed development from taking place in any of the routes where it is planned to develop the transmission line. Based on this review a preferred route would be identified, which would then be subjected to full Heritage Impact Assessment.

This report forms part of the Environmental Impact Assessment (EIA) as required by the EIA Regulations in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and is intended for submission to the South African Heritage Resources Agency (SAHRA).

2. TERMS OF REFERENCE

This report does not deal with development projects outside of or even adjacent to the study area as is presented in Section 5 of this report. The same holds true for heritage sites, except in a generalised sense where it is used to create an overview of the heritage potential in the larger region.

2.1 Scope of work

The aim of this scoping assessment is to determine the best route from a number of proposed alternatives for the development of a 400kV electricity transmission line from Tabor substation to Nzhelele substation in Limpopo Province.

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 the most suitable alternative of the various proposed routes to be used for the eventual construction of the power line.

2.2 Limitations

The investigation has been influenced by the following factors:

- Large sections of the study area have not yet been subjected to systematic archaeological surveys, creating huge gaps in existing knowledge.
- Furthermore, most available information was generated in specific areas and is based on research projects or specific impact assessments, thereby giving the available information a somewhat localised or thematic bias.
- During the field survey, access to the various properties was not possible.
- During the field survey the coordinates for the individual pole structures were not available.
- During the field survey information on the locality of access roads, construction camps and such were not available.
- The unpredictability of buried archaeological remains.

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 routes and that these then will also have to be considered in the selection of the preferred routes.

- It is assumed that a Visual Impact Assessment will be done by suitably qualified specialists 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.

A matrix was developed whereby the above criteria were applied for the determination of the significance of each identified site (see Appendix 1). This allowed some form of control over the application of similar values for similar identified sites.

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 1 & 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, historical sources and heritage impact assessment reports were consulted – Bergh 1999; Cloete 2000; Eastwood & Cnoops 1994; Loubser 1991; Mason 1962; Praagh 1906; Prinsloo 1974; Stayt 1968; Van Schalkwyk 2006, 2010.

- Information on events, sites and features in the larger region were obtained from these sources.

4.2.1.2 Data bases

The *Heritage Atlas Database*, the *Environmental Potential Atlas*, 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.

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 – see Fig. 1 below.

4.2.2 Field survey

The area that had to be investigated was identified by **Lidwala Consulting Engineers** by means of maps. The power line route alternatives were surveyed by travelling the different routes, accessing it where possible by means of existing roads. This was later followed up by a helicopter fly-over of the different alternative routes.

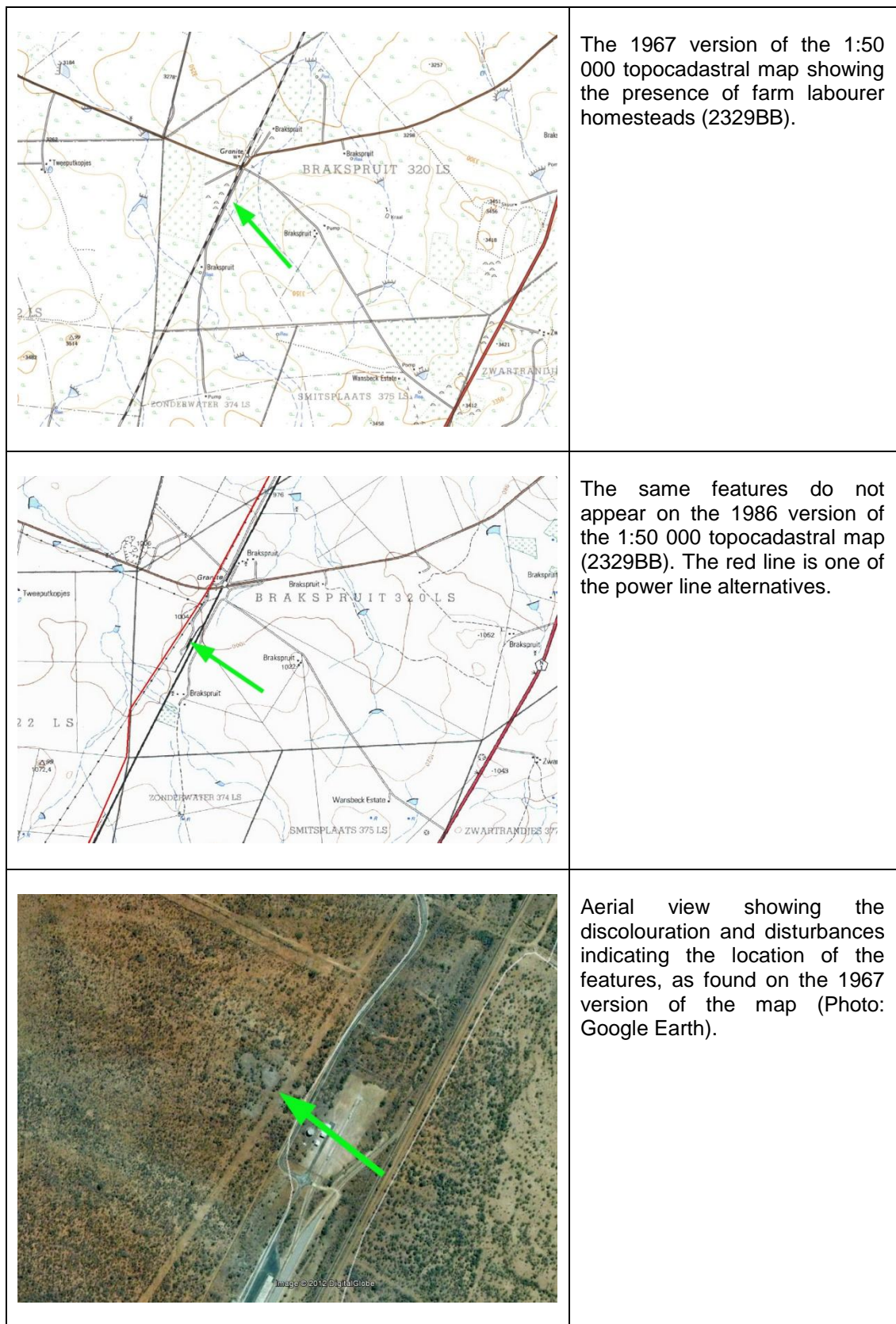


Fig. 1. Desktop study using maps and aerial photographs to identify possible heritage sites.

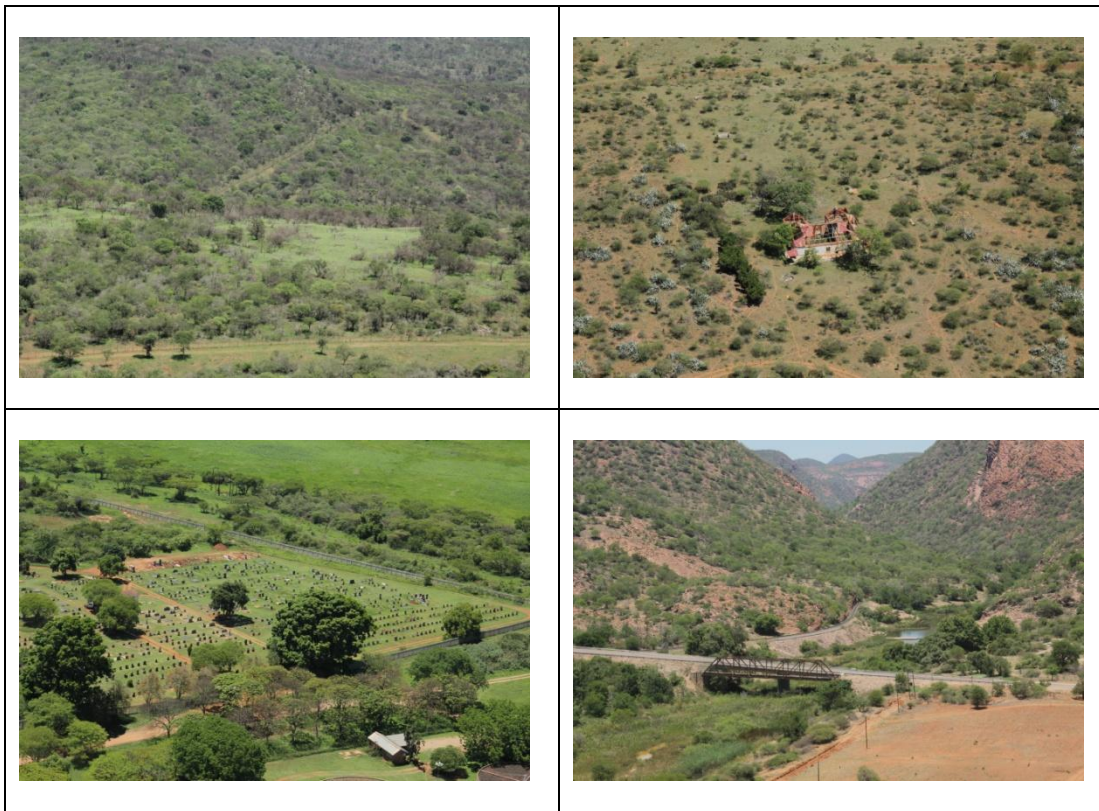


Fig. 2. Different heritage features identified during the helicopter fly-over.
(Iron Age site, old farmhouse, cemetery and an old bridge)

5. DESCRIPTION OF THE AFFECTED ENVIRONMENT

5.1 Site location and description

The proposed transmission power line will run from Tabor substation north of Polokwane to Nzhelele substation north of Louis Trichardt in Limpopo Province (Fig. 3). For more information, please see the Technical Summary presented above on p. iii above.

As can be expected with a study area ranging across such a long distance, the environment changes drastically when travelling from south to north. The southern part forms part of the so-called Pietersburg plateau, which is a highveld area typified by an undulating landscape and a Mixed Bushveld type of vegetation. The central section of the study area traverses the Soutpansberg, with the vegetation classified as the Soutpansberg Arid Mountain Bushveld. The northern section again is very flat with the vegetation classified as Mopane Bushveld. A central feature of the southern and northern areas is the lack of open water resources, all of which are localised in a few rivers.

In all three regions the natural environment has been impacted on by farming (agricultural/plantation) and urbanisation, which would have had a negative impact on heritage resources that might have occurred in the region. On the other hand, it also created new heritage resources that have to be considered.

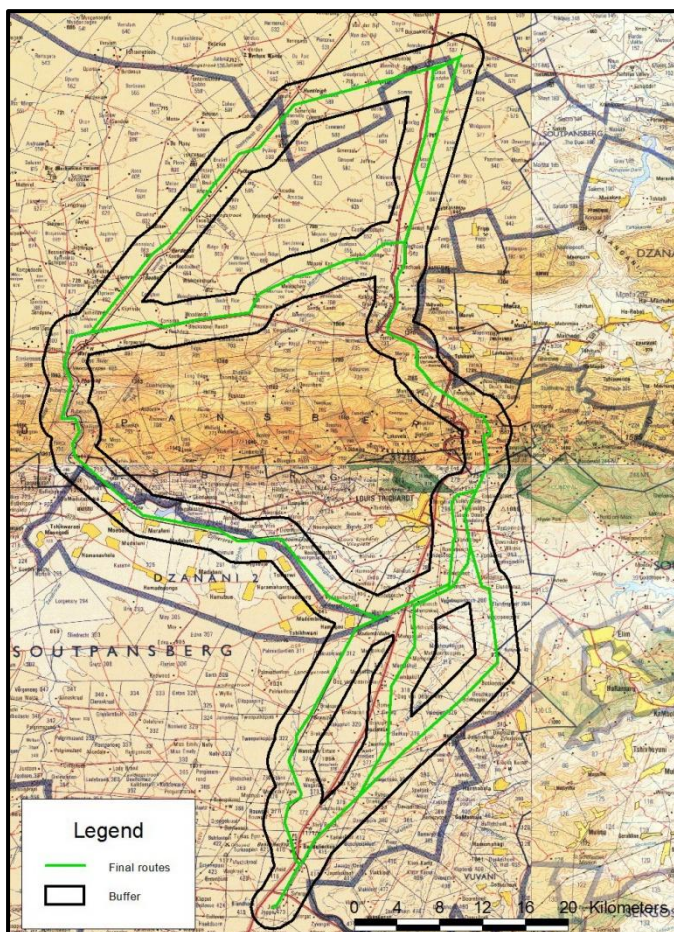


Fig. 3. Location of the study area in regional context.
(Map 2228, 2230, 2328, 2330: Chief Surveyor-General)

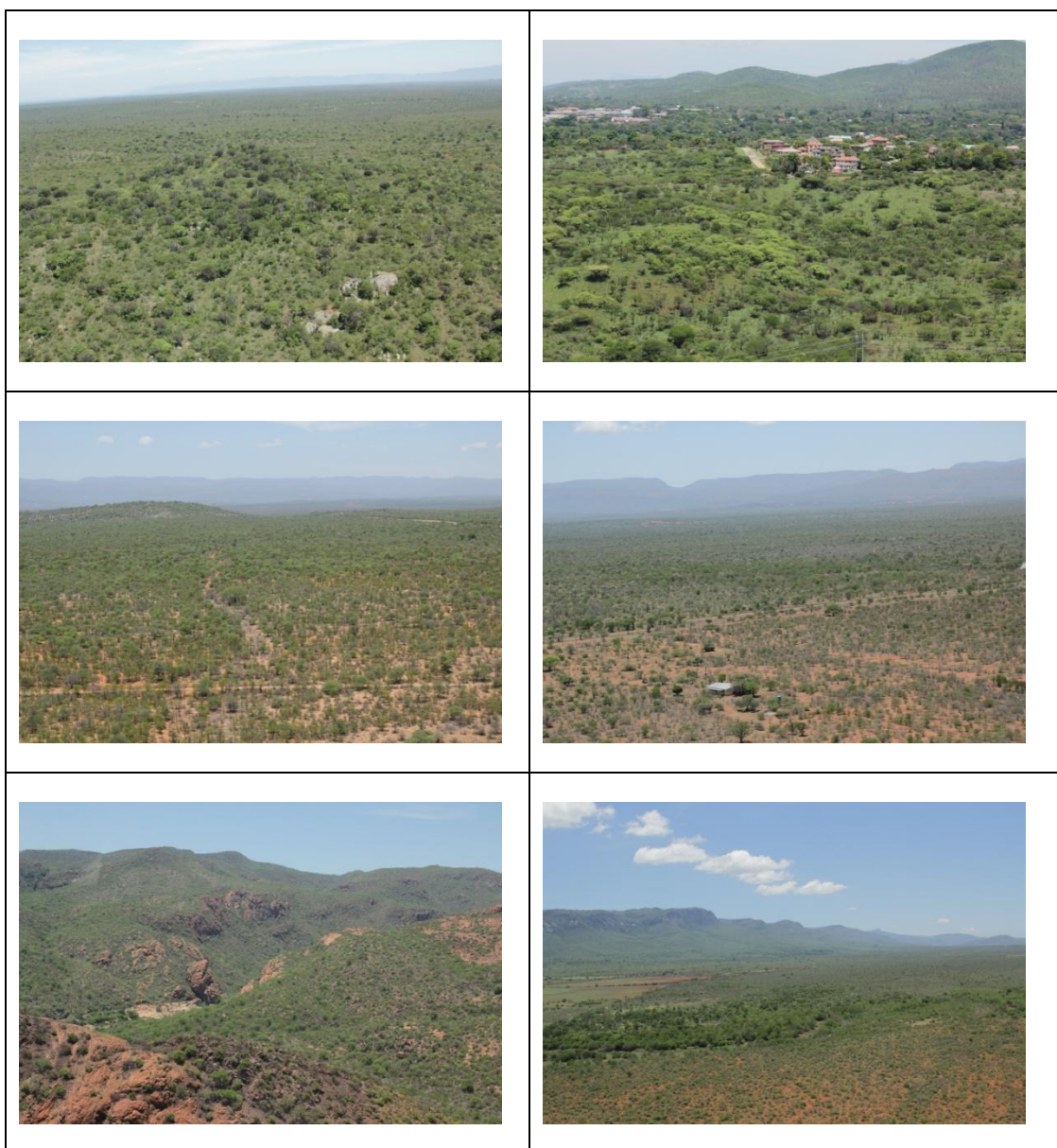


Fig. 4. Views over the study area seen from the air.

5.2 Project description

Eskom Holding Limited proposes to construct a 400kV transmission power line from Tabor substation north of Polokwane to Nzhelele substation north of Louis Trichardt in Limpopo Province. The total length of the power line would be approximately 90km. For this purpose five alternative routes have been identified.

For the purpose of this study a buffer of 4 km, i.e. 2 km on either side of the proposed power line was created and which formed part of the assessment. This was done to accommodate the possibility of smaller deviations that might later be required.

5.3 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 rural setup. In this the human occupation is made up of a pre-colonial element consisting of limited Stone Age occupation, Iron Age occupation, as well as a much later colonial (farmer) component. A much smaller component is an urban one, which is actually expanding rapidly at present due to population increase and as well as people moving to economic centres in search of work.

Human occupation of the larger geographical region took place since Early Stone Age (ESA) times. This is evidenced by the scattered stone tools found in a secondary context (open surface material), where they have been exposed in gravel terraces by rivers and streams as well as areas of sheet erosion. Normally this material is viewed to have a low significance and the localities where they are found are referred to as **find spots** rather than sites.

During the Middle Stone Age (MSA) human population in the region increased dramatically as is evidenced by the large number of finds pots in the larger region. This was the result of people becoming more mobile, occupying areas formerly avoided. According to Thackeray (1992) the MSA is a period that still remains somewhat murky, as much of the MSA lies beyond the limits of conventional radiocarbon dating. However, the concept of the MSA remains useful as a means of identifying 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. In the larger region, Mason (1962) has identified a variant of the MSA that became known as the Pietersburg Culture.

Open sites were still preferred near watercourses. These people were adept at exploiting the huge herds of animals that passed through the region, on their seasonal migration. As a result, tools belonging to this period also mostly occur in the open or in erosion dongas. Similar to the ESA material, artefacts from these surface collections are viewed not to be in a primary context and have little or no significance.

Late Stone Age (LSA) people had even more advanced technology than the MSA people and therefore succeeded in occupying even more diverse habitats. Also, for the first time we now get evidence of people's activities derived from material other than stone tools. Ostrich eggshell beads, ground bone arrowheads, small bored stones and wood fragments with incised markings are traditionally linked with the LSA.

LSA people preferred, though not exclusively, to occupy rock shelters and caves and it is this type of sealed context that make it possible for us to learn much more about them than is the case with earlier periods. They have also left us with a rich legacy of rock art, which is an expression of their complex social and spiritual beliefs. During an extensive survey, Eastwood & Cnoops (1994) identified a number of sites containing rock art in the western section of the Soutpansberg.

Iron Age people started to settle in southern Africa c. AD 300, with one of the oldest known sites at Silver Leaves, south east of Tzaneen dating to AD 270. Closer to the study area, dates of AD 430 and 415 have been obtained from sites at Klein Afrika and Happy Rest (near Schoemansdal (Prinsloo 1974). Other sites, more to the west, yielded dates centring around c. AD 800 (Van Schalkwyk 1998, 2004).

The occupation of the larger geographical area (including the study area) intensified after the 1500s. By the 16th century things changed, with the climate becoming warmer and wetter, creating a condition that allowed Late Iron Age (LIA) farmers to occupy areas previously unsuitable. Population movements, competition for resources, etc. created tensions amongst different groups and people were forced to congregate into large towns for defensive purposes. These stone-walled villages were almost always located near cultivatable soil and a source of water.

Shona-speaking chiefdoms moved from Zimbabwe to settle south of the Limpopo river from about AD 1400. Here they incorporated earlier Sotho-speakers and, after more than 100 years, this gave rise to the Venda language. By about AD 1690 the Singo, who was part of the Rozwi in Zimbabwe, entered the area and conquered most of the Venda (Huffman 2005).

Whites moved into the area, first as hunters, traders and missionaries, with settlers following closely on their heels. One of the first white settlements was located and Shoemansdal to the west of Makhado (Louis Trichardt). Over time, farms were surveyed and new towns were laid out. Few settled on the northern side of the mountain, possibly because of the isolation, malaria and hostile Venda-speakers. It was only after the beginning of the 20th century that whites started to occupy the area on a permanent basis. From early maps (Fig. 6 & 7) it can be deduced that the area was sparsely populated and under developed in early historic times.

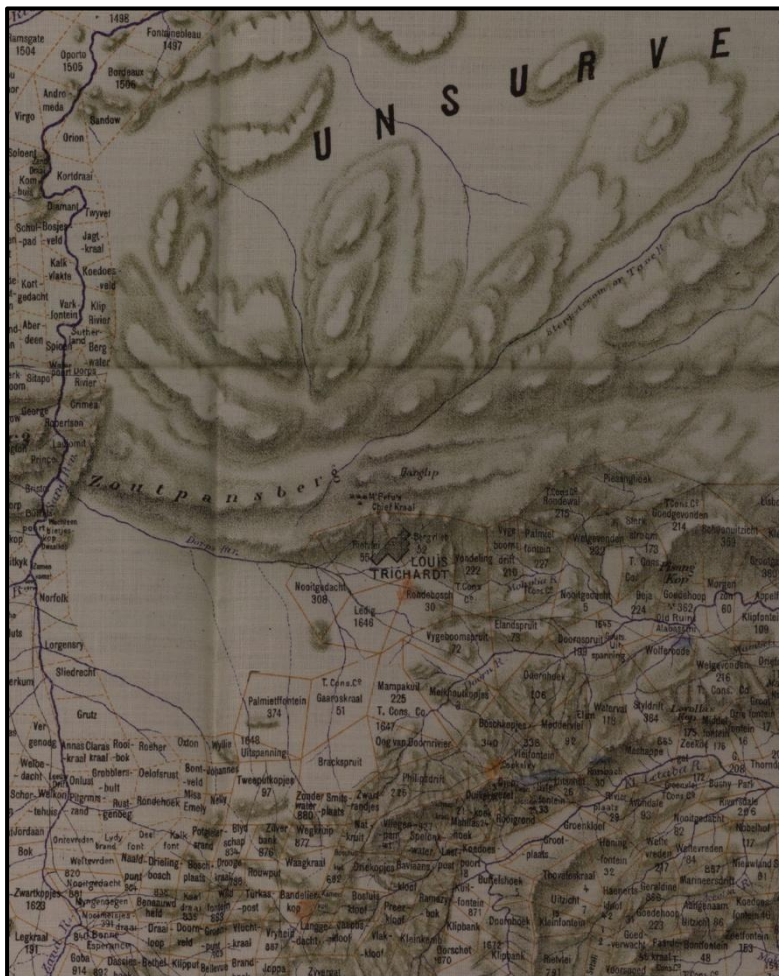


Fig. 6. The state of cadastral and geographical information of the study region in 1899. (Map: Jeppe 1899)

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

Significance	High on a regional level – Grade III
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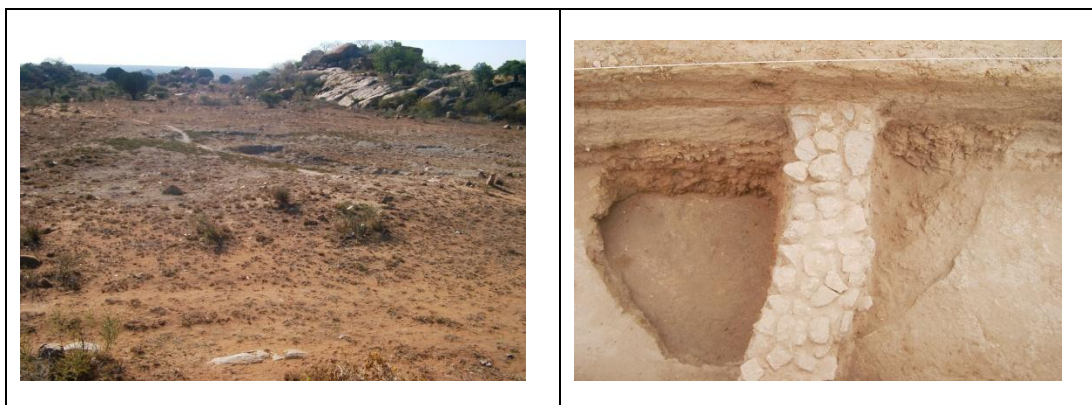


Fig. 9. A multi-component Iron Age sites, showing excavated features (Sekgosesse district).

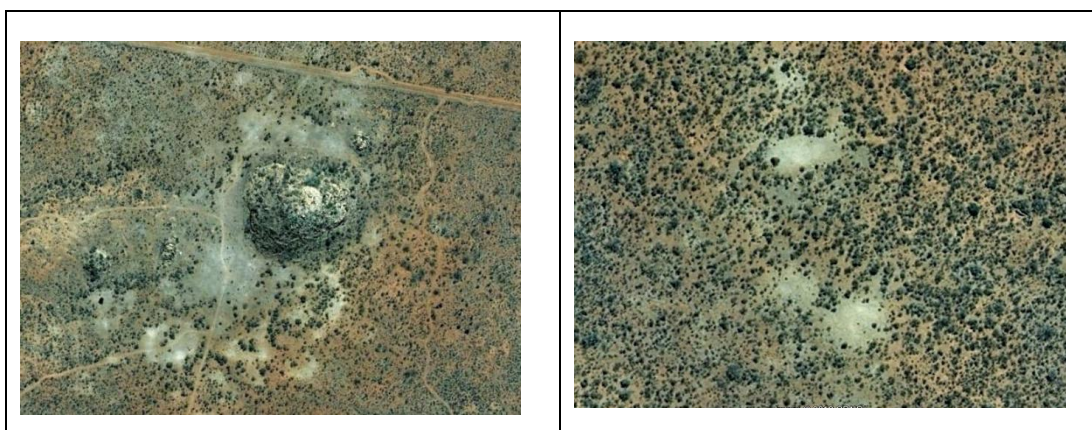


Fig. 10. A typical hilltop site and a much later open terrain site.
(Photographs: Google Earth)

- Built environment

These are complex features in the landscape, being made up of different yet interconnected elements. Two versions occur in the study area. The first is the more formal towns such as Louis Trichardt and the second are the more informal settlements located in areas that formed part of the former homelands in the region. Fortunately transmission lines do not usually impact on towns.

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

Significance	High on a regional level – Grade III
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Fig. 11. Buildings found in the urban environment.

- 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

Significance	High on a regional level – Grade III
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Fig. 12. Examples of farmsteads and farming related features identified in the region.

- Cemeteries

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 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

Significance	High on a local level – Grade III
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Fig. 13. Local cemeteries.

- Public monuments

Although most of these usually occur in urban areas, some also occur in rural areas where some event of significance took place.

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
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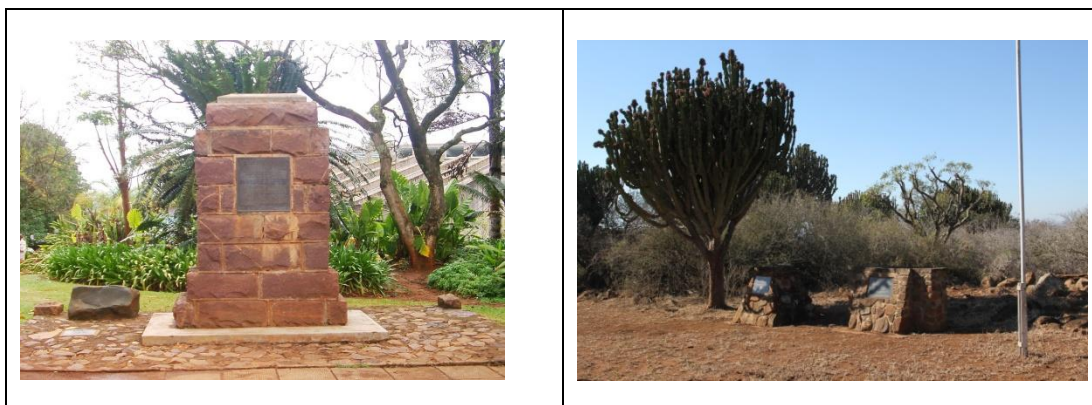


Fig. 14. Monuments in town and the rural area.

- 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
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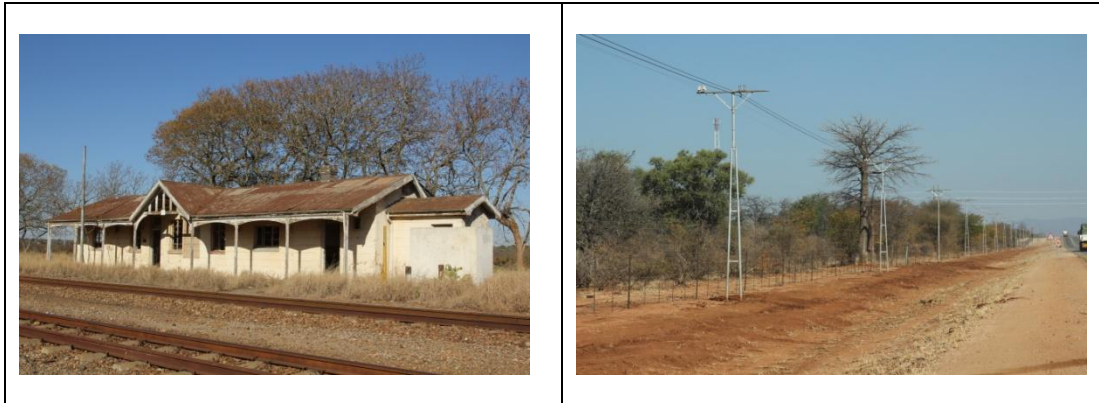


Fig. 15. Infrastructural elements in the environment (train stations and telephone lines).

6. ROUTE EVALUATION

Figure 16 below gives, at desktop level of investigation, an overview of the distribution of known sites of heritage significance. These sites are seen to be representative of the cultural sensitivity of the study area and is used to determine which of the proposed alternatives are the least likely to have an impact on heritage sites and as a result would qualify to be proposed as a preferred route, which can then be subjected to a full field survey. A list of all the known sites occurring within the boundaries of the buffer zone is presented in Appendix 3.

A number of factors that might negatively influence the image that is created are:

- Previous research projects focussed on specific topics (e.g. Loubser 1991), or regions (Van Schalkwyk 2006), thereby creating an illusion that more sites occur in these areas in contrast to others. The fact is that other areas are largely under researched.
- The various categories of sites are presented at a single level on the map, whereas the significance of sites belonging to a particular category can differ significantly from each other.
- A buffer of 4 km, i.e. 2 km on either side of the proposed power line was created, which also might create an impression that a large number of sites would be impacted on, whereas the power line would have a much smaller footprint.

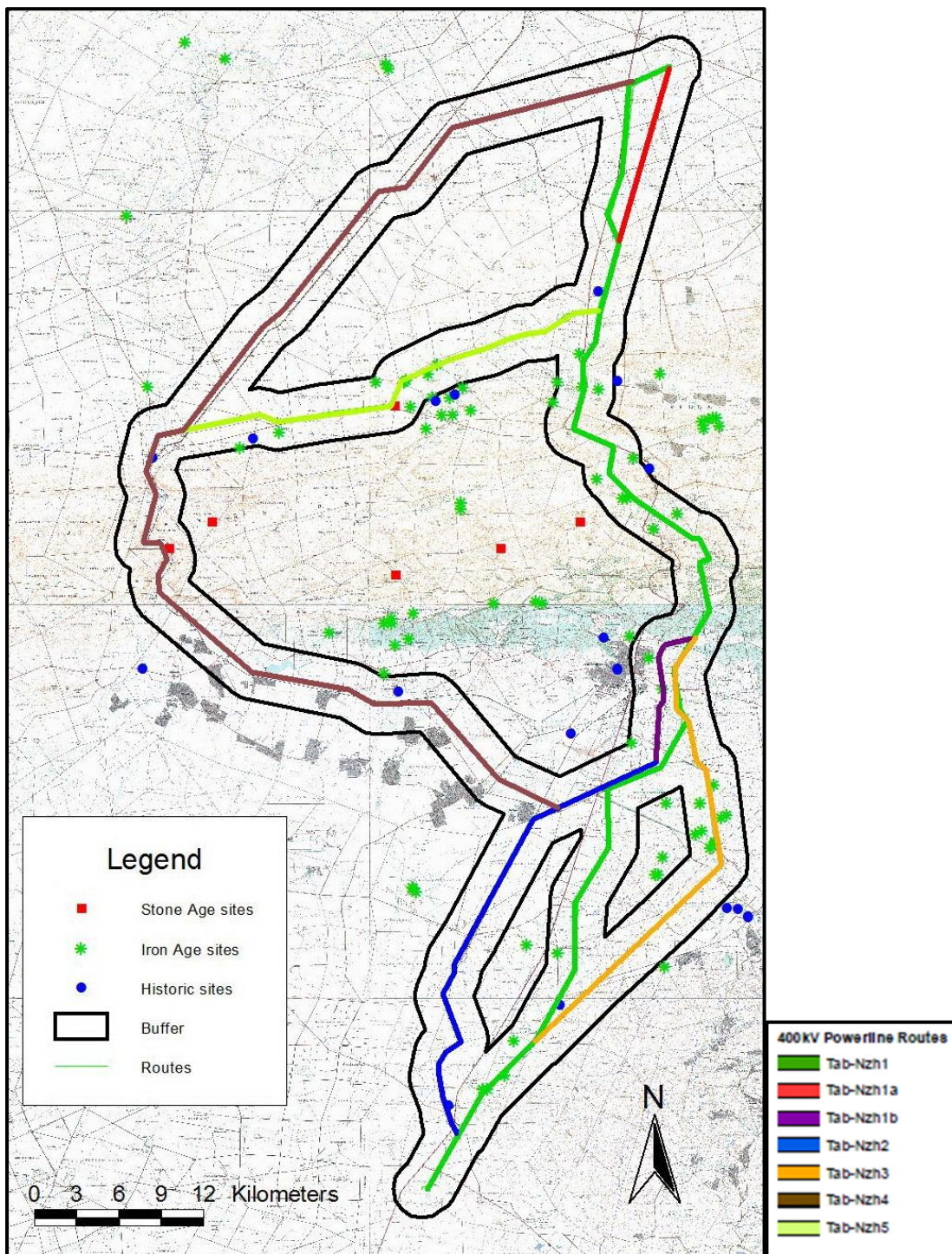


Fig. 16. Map indicating the location of known heritage sites.

Substations (Fig. 16)

Tabor Substation is an existing substation which is situated approximately 67km north of Polokwane and approximately 38km south of Louis Trichardt. The substation is located on the farm Joppa 473.

Nzhelele is a newly proposed Transmission substation. The proposed site is located approximately 45km to the north of Louis Trichardt town in the vicinity of the farm Scott 567.

Heritage potential

- *As far as is known, no sites, features or objects of cultural significance are known to exist or are likely to exist in either of the two substation sites.*

Tabor – Nzhelele – Alternative 1 (Fig. 16)

The proposed alignment exists the substation the north and then runs parallel on the western boundary of two Distribution HV line for approximately 4 km. The topography is flat and land use comprises game farms. Access to the route is available via existing service roads.

At this point the line crosses over the distribution HV line and runs parallel on the eastern side of the Tabor-Louis Trichardt 1 132kV line for approximately 30km. The topography is generally flat and land use comprises of mainly game farming and naturally irrigated agricultural lands. Access is available. To the north of this section lies the Ben Lavin Nature Reserve and the proposed route crosses the reserve at the western boundary and then runs parallel to the northern boundary for approximately 4km.

The route then traverses to the east of Louis Trichardt town and has been done to avoid existing and proposed development in the area. The topography can be classified as moderately flat to undulating and the land use in mainly residential and agricultural. Access is available via secondary roads.

From here-on the route follows parallel to the existing Louis Trichardt – Messina 132kV line over the mountainous areas north of Louis Trichardt and into the old Venda area. Land use in this section varies between game farms, agricultural, tribal residential and Bushveld. The proposed route crosses the N1 national road at two points. Access along this route will be more challenging due to the terrain.

Approximately 13km before Nzhelele, the route deviates from the 132kV line to the west and traverses parallel to the N1 up to Nzhelele. This deviation has been done to avoid a koppie and well-developed lodge situated adjacent to the Louis Trichardt 132kV line. Aside from a few koppies, the topography is moderately flat over this section.

Heritage potential

- *As can be seen from the presentation in Fig. 1, a number of heritage sites occur over the southern, as well as the middle section of this alternative. Know sites mostly date to the Early as well as the Late Iron Age.*

Tabor – Nzhelele – Alternative 2 (Fig. 16)

The first section of his route is common with the first section of Alternative 1.

From Tabor Substation alternative 2 runs parallel to the two 132kv lines. At the point where the two 132kV lines split, alternative 2 follows parallel to the Tabor – Flurian 132kV and Flurian – Louis Trichardt 132kV lines. These line lie west of the N1 national road. The topography can be described as moderately flat. Land use in this section is mainly game farming with small agricultural fields located sporadically all over. To the north this section passes close to residential villages and parallel to the northern boundary of the Ben Lavin Nature Reserve. The proposed route does not encroach over the reserve.

The route then traverses to the north and on the eastern side of the two 132kV lines. This route then crosses the 132kV lines and runs parallel on the western side of the distribution

lines. This has been done to minimize the impact on housing developments. The route then traverses north, crosses the 132kV lines and run parallel to a gravel road for approximately 2 km. From here-on the route runs parallel to the existing distribution lines which are common to the section of Alternative 1. The topography is flat to moderately undulating. Land use in this section is mainly residential with small subsistence farming in some areas. Access is available via existing service roads and other roads which intersect the route.

The remaining portion of the route is common to the sections of Alternative 1.

Heritage potential

- *As can be seen from the presentation in Fig. 1, a number of potential heritage sites are located in the central section of this alternative. These mostly date to the Early and Late Iron Age. For the remainder of the route, the situation is common to that described for Alternative 1.*

Tabor – Nzhelele – Alternative 3 (Fig. 16)

This route was developed to route the proposed power line to the eastern boundary of the Ben Lavine Nature Reserve. The first Section is common with the first Section of Alternative 1. From the end of this Section the route continues parallel (east) of the 132kV Tabor – Louis Trichardt line for approximately 8km. From here-on the route traverses in a north eastern direction towards the southern and eastern boundary of the nature reserve. Close to the southern boundary of the nature reserve the route turns to the north and runs parallel to the reserve boundary on the east. The route then crosses the R578 and continues in a northerly direction through vacant land on the east of Louis Trichardt. The route then crosses the R524 and turns to the north east until it joins up with the two 132kV distribution lines. From here-on the route is common to Alternative 1.

The topography is moderately flat and the land use is mainly game farming. In the northern section of the Alternative the land use comprises agricultural farming, residential and veld.

Heritage potential

- *The central section of this route, on the eastern boundary of the Ben Lavin Nature Reserve, is known to contain a large number of sites dating to the Late Iron Age. For the remainder of the route, the situation is common to that described for Alternative 1.*

Tabor – Nzhelele – Alternative 4 (Fig. 16)

The southern section of this route is common to sections of Alternative 2.

The southern section passes through a very flat area. The land use is agricultural farming and gam ranching. A large section of this area also formed part of the old Venda homeland, which is largely an urbanised region with subsistence farming.

The central section of this route passes through the Sandriviers Poort, following the existing railway line, twisting and turning on its way north. The topography is mountainous and the land use is game farming.

On existing Waterpoort the route continues in a north-eastern direction running parallel to the Musina railway line. Just to the south of the station of Huntleigh the line turns in a more easterly direction for approximately 12km to eventually cross over the N1 national road and link up with Alternative 1.

Heritage potential

- *Of all the different routes, the least is known about this Alternative. However, as can be seen from the presentation in Fig. 1, a number of potential heritage sites might be located in the southern section of this alternative. This is especially true in the old Venda homeland section, as it is known that they have been settled in the region for a considerable period of time. It is anticipated that old settlement sites, burial grounds and natural places of cultural significance would be identified all over.*
- *The central section, going through the Soutpansberg, are known to contain some important Stone Age sites, the number of which might increase if detailed surveys are conducted in the region.*
- *The northern section of this Alternative is also very much under researched. However, as it passes through an area which is relatively flat and dry, the changes of many sites, features and objects of cultural significance occurring here are deemed to be low.*

Tabor – Nzhelele – Alternative 5 (Fig. 16)

This alternative split off from Alternative 4 after it exists from Waterpoort, on the northern side of the Soutpansberg, turning in an easterly direction, following the R523. The topography is moderately flat and the land use is game farming and agricultural farming. Approximately halfway eastwards, the line turns to the north east in order to avoid a number of hills, koppies and the northern outliers of the Soutpansberg. Shortly after it crosses the N1 national route, it joins up with Alternative 1, approximately 17km south of the Nzhelele Substation

Heritage potential

- *A number of sites, features and objects of cultural heritage significance are known to exist in sections of this route. These mostly date to the Iron Age and historic period and include settlement sites as well as informal cemeteries/burial places. It is anticipated that a detailed survey would reveal many more sites, especially in the more broken area and areas close to water sources.*

7. SITE SIGNIFICANCE AND ASSESSMENT

7.1 Heritage assessment criteria and grading

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 a 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 applicable of mitigation measures would allow the development activities to continue.

7.2 Statement of significance

A matrix (see Appendix 1) 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. This allowed some form of control over the application of similar values for similar sites. Three categories of significance are recognized: low, medium and high.

In terms of Section 7 of the NHRA, the sites currently known or which are expected to occur in the study area are evaluated to have the following significance:

- Stone Age sites are viewed to have medium significance on a regional level and have Grade III significance;
- Rock art sites (Stone Age) are viewed to have high significance on a regional level and have Grade II significance;
- Iron Age stone walled sites are viewed to have high significance on a regional level and have Grade III significance.
- Farmsteads are viewed to have medium significance on a regional level and have Grade III significance;
- Graves and cemeteries are viewed to have high significance on a local level and have Grade III significance;
- Industrial and infrastructural heritage sites are viewed to have medium significance on a regional level and have Grade III significance.
- Public monuments are viewed to have high significance on a regional level and have Grade II significance.

Table 2. Summary of identified heritage resources in the study area.

Identified heritage resources	
<i>Category, according to NHRA</i>	<i>Identification/Description</i>
Formal protections (NHRA)	
National heritage site (Section 27)	No
Provincial heritage site (Section 27)	Yes
Provisional protection (Section 29)	Yes
Place listed in heritage register (Section 30)	Yes
General protections (NHRA)	
structures older than 60 years (Section 34)	Yes
archaeological site or material (Section 35)	Yes
palaeontological site or material (Section 35)	Unknown
graves or burial grounds (Section 36)	Yes
public monuments or memorials (Section 37)	Yes
Other	
Any other heritage resources (describe)	None

8. IMPACT ASSESSMENT

Impact analysis on cultural heritage resources under threat of the proposed development is based on the present understanding of the development, as set out in Section 5.2 above.

It is further complicated by the fact that large sections of all the proposed routes are still very much under researched and what might now, based on available information, be seen as a preferred alternative, might change if in-depth surveys of a particular route has been conducted.

The possible impact of the proposed development on the different categories of heritage sites is assessed as follows:

Environmental Parameter	Pre-colonial: Stone Age sites
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. tower positions or access/ inspection roads
Extent	Local
Probability	Can occur
Reversibility	Irreversible
Magnitude	High
Duration	Permanent
Significance Rating	Sites have a medium significance on a region level – viewed as NHRA Grade III sites. Distinguish from find spots, which have low significance. Rock art sites are viewed to have high significance on a regional level – viewed as NHRA Grade II sites.
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	Pre-colonial: Iron Age sites
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. tower positions or access/ inspection roads
Extent	Local
Probability	Can occur
Reversibility	Irreversible
Magnitude	High
Duration	Permanent

Significance Rating	Sites have a high significance on a region level – viewed as NHRA Grade III sites.
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	Unusual but possible
Reversibility	Reversible with human intervention
Magnitude	Moderate
Duration	Medium term
Significance Rating	Sites have a medium significance on a region level – viewed as NHRA Grade III sites.
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	Unusual but possible
Reversibility	Reversible with human intervention
Magnitude	Moderate
Duration	Medium term
Significance Rating	Sites have a medium significance on a region level – viewed as NHRA Grade III sites.
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 – industrial heritage
Issue/Impact/Environmental Effect/Nature	Different features are subject to damage. Some might be unique – no alternatives or second examples. Easy to

	identify and therefore easy to avoid
Extent	Site
Probability	Unusual but possible
Reversibility	Reversible with human intervention
Magnitude	Marginal loss of resources
Duration	Medium term
Significance Rating	Sites have a medium significance on a region level – viewed as NHRA Grade III sites.
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, but only as last case scenario.

9. CONCLUSIONS

The aim of the survey was to evaluate potential heritage resources that would occur within the boundaries of a proposed electricity transmission routes and to determine if there are any fatal flaws that would prevent the proposed development from taking place in any of the five routes 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.

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 some cases the power line would have a direct impact as it would cross directly over a site, with the possibility of a tower structure being erected on some of them. In addition, in a number of 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. 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.

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 routes. 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.

Based on current information, the best alternative for the proposed development would be as follows:

- Alternative 2 would be the best option in the southern section of the route.

- Moving northwards, Alternative 2 or Alternative 1 would be acceptable for this section.
- It seems as if Alternative 4 would be best, for the section through the mountain as well as the section northwards to the substation. However, this is the Alternative route about which the least information is available.

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

10. REFERENCES

10.1 Data bases

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10.2 Literature

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10.3 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 its 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.

APPENDIX 3. KNOWN SITES LOCATED IN THE BUFFER AREA

Code	Class	Name	Farm
1	Stone Age	Rock shelter with San paintings	Ladismit 761MS
2	Stone Age	MSA factory site	Bushy Rise 702MS
3	Iron Age	Makongoza stone walled hilltop site	Bergwater 697ms
4	Iron Age	Rochdale stone walled hilltop site	Rochdale 700ms
5	Iron Age	Klein Afrika EIA site	Parkfield 725ms
6	Iron Age	Bathonga stone walled hilltop site	Mountain View 706ms
7	Iron Age	Mountain View 2 stone walled hilltop site	Mountain View 706ms
8	Iron Age	Ngona stone walled hilltop site	Parkfield 725ms
9	Iron Age	Ngwenani stone walled hilltop site	Franshoek 726ms
10	Iron Age	Tshiluvhane stone walled hilltop site	Groot Geluk 711ms
11	Iron Age	Vhuneyla stone walled hilltop site	Mountain View 706ms
12	Iron Age	Mountain View 1 stone walled hilltop site	Mountain View 706ms
13	Iron Age	Divhani stone walled hilltop site	Masequa 714ms
14	Iron Age	Makhavhu stone walled hilltop site	Marius 732MS
15	Iron Age	Marius stone walled hilltop site	Delamere 731ms
16	Iron Age	Maune stone walled hilltop site	Windhoek 649ms
17	Iron Age	Maungure stone walled hilltop site	Grootgeluk 711ms
18	Iron Age	Mulambwane stone walled hilltop site	Princess Hill 704ms
19	Iron Age	Ramalamula stone walled hilltop site	Wallacedale 727ms
20	Iron Age	Tshipange stone walled hilltop site	Overwinning 713ms
21	Iron Age	Vhyneyla stone walled hilltop site	Mountain View 706ms
22	Iron Age	Mabovho stone walled hilltop site	Vygeboomspruit 286ls
23	Iron Age	Makasane stone walled hilltop site	Elandspruit 284ls
24	Iron Age	Manavhela stone walled hilltop site	Vygeboomspruit 286ls
25	Iron Age	Mokaba stone walled hilltop site	Elandspruit 284ls
26	Iron Age	Shubini stone walled hilltop site	Vygeboomspruit 286ls
27	Iron Age	Tavhatshena stone walled hilltop site	Vygeboomspruit 286ls
28	Iron Age	Langa stone walled hilltop site	Philipsdrift 317ls
29	Iron Age	Lemba stone walled hilltop site	Melkhoutkopjes 314ls
30	Iron Age	Malla stone walled hilltop site	Vygeboomspruit 286lt
31	Iron Age	Manavhela stone walled hilltop site	Vygeboomspruit 286lt
32	Iron Age	Thumbeni stone walled hilltop site	Louis Trichardt Townland
33	Iron Age	Maemu stone walled hilltop site	Rondebosch 287ls
34	Iron Age	Ramavhoya stone walled hilltop site	Vondeling 285ls
35	Iron Age	Bandelierskop (1) stone walled hilltop site	Bandelierkop 416ls
36	Iron Age	Beskuitkuil stone walled hilltop site	Beschuitkuil 379ls
37	Iron Age	Dung stone walled hilltop site	Beschuitkuil 379ls
38	Iron Age	Bandelierkop (2) stone walled hilltop site	Bandelierkop 416ls
39	Historic	Bridge – metal road bridge	Waterpoort 695MS
40	Historic	Ridge site – old farm labourer homestead	Rochdale 700MS
41	Historic	Small farm cemetery	Bekaf 650MS
42	Historic	Historic (reconstructed) Voortrekker Town	Schoemansdal Town

Site preference Rating	Criteria
Flora	
Preferred (4)	
Acceptable (3)	
Not Preferred (2)	
No-Go (1)	
Fauna	
Preferred (4)	
Acceptable (3)	
Not Preferred (2)	
No-Go (1)	
Soil and Agricultural Potential	
Preferred (4)	
Acceptable (3)	
Not Preferred (2)	
No-Go (1)	
Avifauna	
Preferred (4)	
Acceptable (3)	
Not Preferred (2)	
No-Go (1)	
Social	
Preferred (4)	
Acceptable (3)	
Not Preferred (2)	
No-Go (1)	
Visual	
Preferred (4)	
Acceptable (3)	
Not Preferred (2)	
No-Go (1)	

Study	Alt 1	Alt 1a	Alt 1b	Alt 2	Alt3	Alt 4	Alt 5
Fauna							
Avifauna							
Flora							
Soils and Agricultural Potential							
Social							
Visual							
Heritage							

Design and Technical							
Total							