

**Heritage impact assessment for the
PROPOSED CONSTRUCTION OF ESKOM FIVE (5) 88KV POWERLINES
CONNECTING KOOKFONTEIN AND JAGUAR SUBSTATIONS, MIDVAAL AND
EMFULENI MUNICIPALITIES, GAUTENG PROVINCE**

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GAUTENG 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

May 2013

EXECUTIVE SUMMARY

HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED CONSTRUCTION OF ESKOM FIVE (5) 88KV POWERLINES CONNECTING KOOKFONTEIN AND JAGUAR SUBSTATIONS, MIDVAAL AND EMFULENI MUNICIPALITIES, GAUTENG PROVINCE

As part of an on-going process of upgrading electricity supply, Eskom propose the construction of a 88kV power line between the Kookfontein and Jaguar substations in the Vereeniging magisterial district of Gauteng Province.

In accordance with Section 38 of the NHRA, an independent heritage consultant was appointed by **Envirovolution Consulting** to conduct a Heritage Impact Assessment (HIA) 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 project.

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. 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.

Information on the identified sites is presented in Fig. 7 and Appendix 3. The significance of each feature was determined by application of the matrix presented in Appendix 2. This allows that similar features can be rated in similar manner.

The following was found:

- Although a number of important sites dating to the Stone Age, e.g. Klipriver, Redan, etc. are known from the larger region, no sites, features or objects of cultural significance dating to the Stone Age were identified in the study area.
 - It is highly unlikely that any of these would be impacted on by the development of the proposed electricity distribution line.
- Although sites dating to the Later Iron Age are known from the larger region, no sites, features or objects of cultural significance dating to the Iron Age are known to exist in the study area.
 - It is highly unlikely that any of these would be impacted on by the development of the proposed electricity distribution line.
- The following sites, features and objects of cultural significance were identified in the study region:
 - A few old farmsteads are known to exist in the region of the study area, but it is highly unlikely that it would be impacted on by the proposed development.
 - A number of cemeteries and burial sites occur within the study area. The formal cemeteries are well defined and would be easy to avoid. The more informal burial sites are not well defined and are mostly hidden by tall grass.
 - A few old features of industrial and infrastructural heritage occur in the study region, but it is highly unlikely that it would be impacted on by the proposed development.

Based on the survey and the available literature, 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 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 measures for individual known sites have been indicated in Appendix 3 of this report. In essence this involves avoiding the sites by setting out a suitable buffer zone around each site which then should be treated as no-go areas.
- Mitigation should further 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 6 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.

ADDENDUM: 23 March 2013

As further information was made available when detailed planning of the proposed power line was done by Eskom, it was realised that the Jakobs Cemetery has expanded into the Eskom servitude, creating a possibility of the power line impacting not only physically on some of the graves, but also visually on the larger cemetery.

The cemetery was visited on 20 March 2013 in the company of an Eskom employee responsible for the project and Ms N Khandhela, the EAP for the project. The proposed alignment was investigated and it was found that it would transect the inner boundary of the cemetery.

Recommendations

It is unavoidable that the power line would cross the cemetery as the Eskom servitude precede the extension of the cemetery. The following can be said:

- The power line would pass between graves and not cross over it directly.
- The tower structures that will be used will have only a small impact on the ground.
- An existing power line already crosses the cemetery and a large number of graves, indicating that it would be possible to construct a new line without causing damage.

Mitigation

It is understood that it is not Eskom that is at fault here as the cemetery “grew” into the servitude. Developing a new servitude is not possible as there is no alternative route to be used. The following measures are recommended to minimise the risk of damage to the graves:

- A buffer zone of approximately 3m should be kept around the outermost graves to ensure that damage is not done to them when work on the power line is undertaken.
- The EAP should be present during construction in order to monitor activities and ensure that no damage is caused to any of the graves. This includes the erection of the tower structures as well as stringing the power lines.



J A van Schalkwyk
Heritage Consultant
May 2013

TECHNICAL SUMMARY

Property details	
Province	Gauteng
Magisterial district	Vereeniging
Topo-cadastral map	2627DB
Closest town	Vereeniging
Farm name	Various
Portions/Holdings	-

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	Construction of a 88kV distribution line
Project name	Kookfontein – Jaguar distribution line

Land use	
Previous land use	Farming/Small holdings
Current land use	Farming/Small holdings

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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 and 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
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

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1. INTRODUCTION

As part of an on-going process of upgrading electricity supply, Eskom propose the construction of a 88kV power line between the Kookfontein and Jaguar substations in the Vereeniging magisterial district of Gauteng Province.

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), Act 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 **Enviolution Consulting** to conduct a Heritage Impact Assessment (HIA) 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 project.

This HIA 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

2.1 Scope of work

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

- As access to the different properties was not possible, some sections of the routes could not physically be accessed.

Table 1: Applicable category of heritage impact assessment study and report.

Type of study	Aim	SAHRA involved	SAHRA response
Heritage Impact Assessment	The aim of a full HIA investigation is to provide an informed heritage-related opinion about the proposed development by an appropriate heritage specialist. The objectives are to identify heritage resources (involving site inspections, existing heritage data and additional heritage specialists if necessary); assess their significances; assess alternatives in order to promote heritage conservation issues; and to assess the acceptability of the proposed development from a heritage perspective.	Provincial Heritage Resources Authority	Comments on built environment and decision to approve or not
	The result of this investigation is a heritage impact assessment report indicating the presence/ absence of heritage resources and how to manage them in the context of the proposed development. Depending on SAHRA's acceptance of this report, the developer will receive permission to proceed with the proposed development, on condition of successful implementation of proposed mitigation measures.	SAHRA Archaeology, Palaeontology and Meteorites Unit	Comments and decision to approve or not

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 1 and 2.

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 – Breuil 1948; Mason 1969; Söhnge, Visser & Van Riet Lowe 1937; Thackeray 1992; Van Schalkwyk 2007, 2008, 2011.

- 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 were obtained from these sources

4.2.2 Field survey

The area that had to be investigated was identified by **Envirolution Consulting** by means of maps. The site was surveyed by travelling the proposed corridors as far as possible.

5. DESCRIPTION OF THE AFFECTED ENVIRONMENT

5.1 Site location and description

The area is located between Kookfontein substation in the south and Jaguar substation located to the northwest in the Midvaal and Emfuleni municipal areas of southern Gauteng Province (Fig. 1). For more information, please see the Technical Summary presented above.

The geology of the area is made up of quartzite and the original vegetation is classified as Rocky Highveld Grassland. However, the vegetation has completely being changed due to previous farming activities and current urban development.

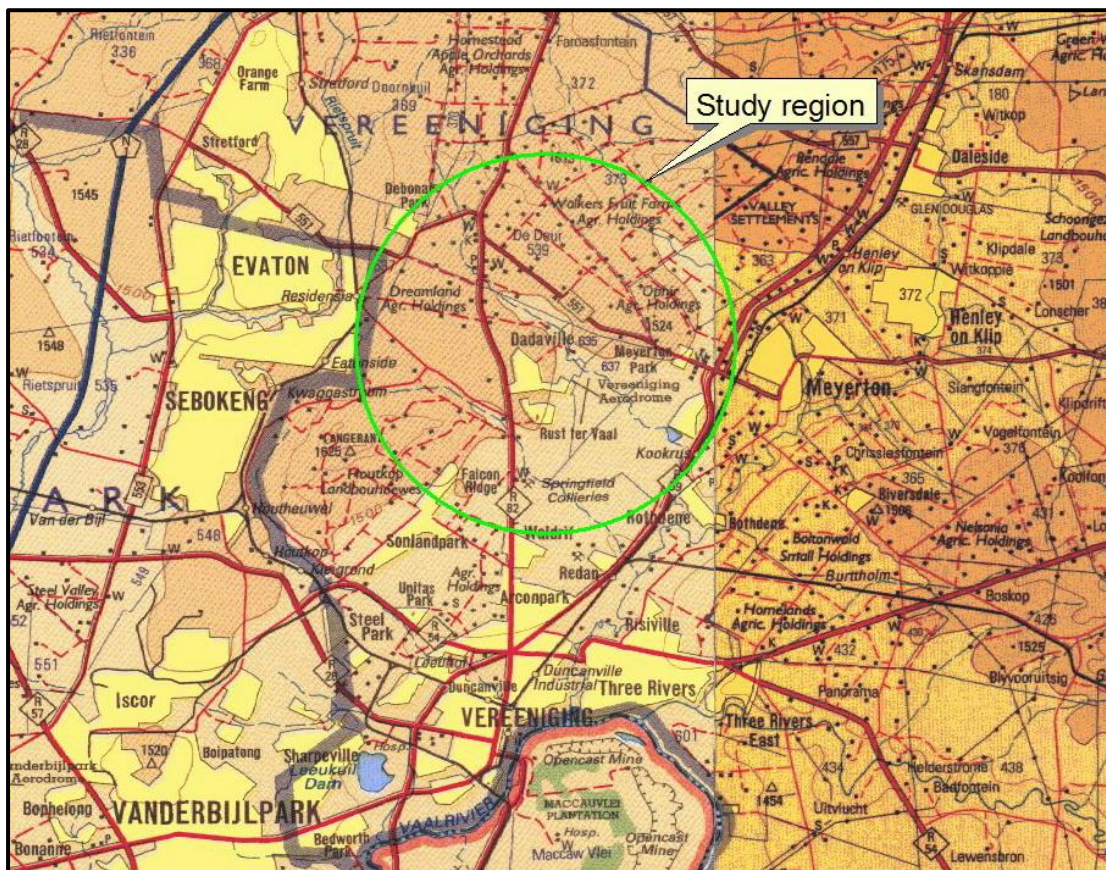


Fig. 1. Location of the study area in regional context.
(Map 2626, 2628: Chief Surveyor-General)



Fig. 2. Views over the study area.

5.2 Project description

Eskom distribution plan to construct a 88kV power line between Kookfontein and Jaguar substations in the Midvaal and Emfuleni municipal areas. For this purpose five alternative routes were identified, one of which would be selected – see Fig. 3 below.

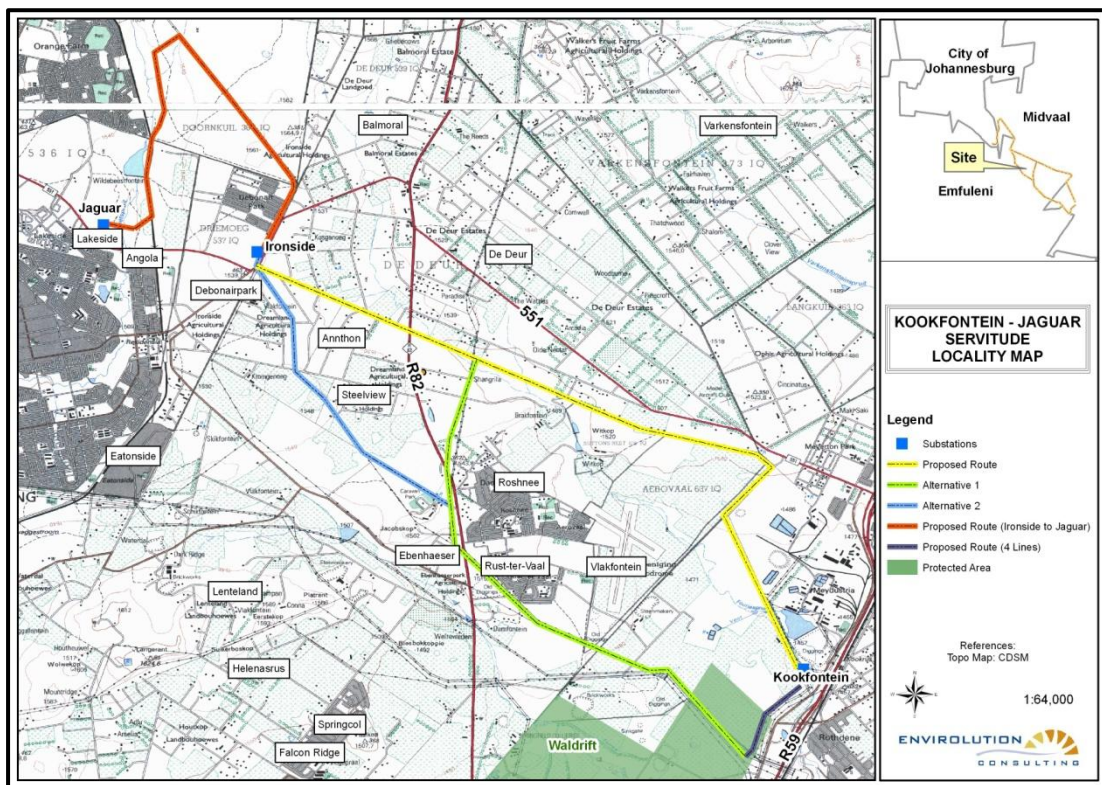


Fig. 3. Layout of the proposed development.

5.3 Overview of the region

Stone Age

The region has been inhabited by humans since Early Stone Age (ESA) times. Tools dating to this period are mostly, although not exclusively, found in the vicinity of watercourses. The original dating and evolutionary scheme for the development of tools during this early period, was based on a study of the river terrace gravels of the Vaal River, referred to as the *Older*, the *Younger* and the *Youngest gravels* (Söhnge, Visser & Van Riet-Lowe 1937; Breuil 1948). However, on subsequent investigation, the findings derived from this proved to be unacceptable as it was based on incorrect interpretations of the river gravels. It was only with the excavation of similar material from sealed, stratified sites, that it was realised that the material from the river gravels was not in its primary context, having been uncovered and washed about over many millenia. Consequently, artefacts derived from such surface collections are now seen to have little significance.

The oldest of these tools are known as choppers, crudely produced from large pebbles found in the river. Later, *Homo erectus* and early *Homo sapiens* people made tools shaped on both sides, called bifaces. Biface technology is known as the Acheulean tradition, from St Acheul in France, where bifaces were first identified in the mid-19th century. Biface technology is found over a large area of Africa, some parts of India, Arabia and the Near East, as well as parts of western Europe. This is one of the longest-lasting technologies the world has known, spanning a period of more than 1,5 million years.

During Middle Stone Age (MSA) times (c. 150 000 – 30 000 BP), people became more mobile, occupying areas formerly avoided. According to Thakeray (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.

Open sites were still preferred near watercourses. These people were adept at exploiting the huge herds of animals that passed through the area, 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.

In the case of the LSA people, they have also left us with a rich legacy of rock art, which is an expression of their complex social and spiritual beliefs. Site with engravings are found at Redan (east of Vereeniging) and in the Vaal River west of Vanderbijlpark.



Fig. 4. Stone tool typology and rock engravings at Redan.

The stone tools (on the left) are not from the region and are only used to illustrate the difference between Early (left), Middle (middle) and Later Stone Age (right) technology.

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 did not start much before the 1500s. To understand all of this, we have to take a look at the broader picture. Towards the end of the first millennium AD, Early Iron Age communities underwent a drastic change, brought on by increasing trade on the East African coast. This led to the rise of powerful ruling elites, for example at Mapungubwe. The abandonment of Mapungubwe (c. 1270) and other contemporaneous settlements show that widespread drought conditions led to the decline and eventual disintegration of this state.

By the 16th century things changed again, with the climate becoming warmer and wetter, creating condition that allowed Late Iron Age (LIA) farmers to occupy areas previously unsuitable, for example the Witwatersrand and the treeless, wind-swept plains of the Free State.

This period of consistently high rainfall started in about AD 1780. At the same time, maize was introduced from Maputo and grown extensively. Given good rains, maize crops yield far more than sorghum and millets. This increase in food production probably led to increased populations in coastal area as well as the central highveld interior by the beginning of the 19th century.

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.



Fig. 5. Typical Late Iron Age stone walled site.

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 discovery of gold.

During the Anglo-Boer War, the Vaal River played a significant role, as it formed a physical barrier that could be crossed only in a few places. Some skirmishes took place to the west of the study area, and most of the bridges were destroyed by the ZAR forces in an effort to keep the British at bay.

The study area falls within that zone usually located on the front edge of (city) urban-sprawl where the land previously used for agricultural use (only) have become subdivided into small holdings. What may used to be a large single agricultural unit or farm now consists of a number of small properties. These units do not have their economic base in traditional agriculture but are sustained by a variety of land uses and economic activities with strong urban associations. This phenomenon happened in the past thirty years. Therefore most of the built fabric, date from this period. The result was that any historic farmsteads older than 60 years that may have existed have either disappeared or have been 'upgraded'.

The oldest physical remains in these areas usually are planted vegetation such as lanes and tall trees in mature gardens, cemeteries, the remains of portions of farm and farmstead walling (dry stacked stone walls erected to demarcate the boundaries of a farmstead, an orchard or cattle kraal) farm roads, weirs (in the river) and water furrows.



Fig. 6. Examples of heritage resources dating to the recent past.

5.4 Identified sites

The following sites, features and objects of cultural significance were identified in the study area – see Appendix 3 for a description of the sites:

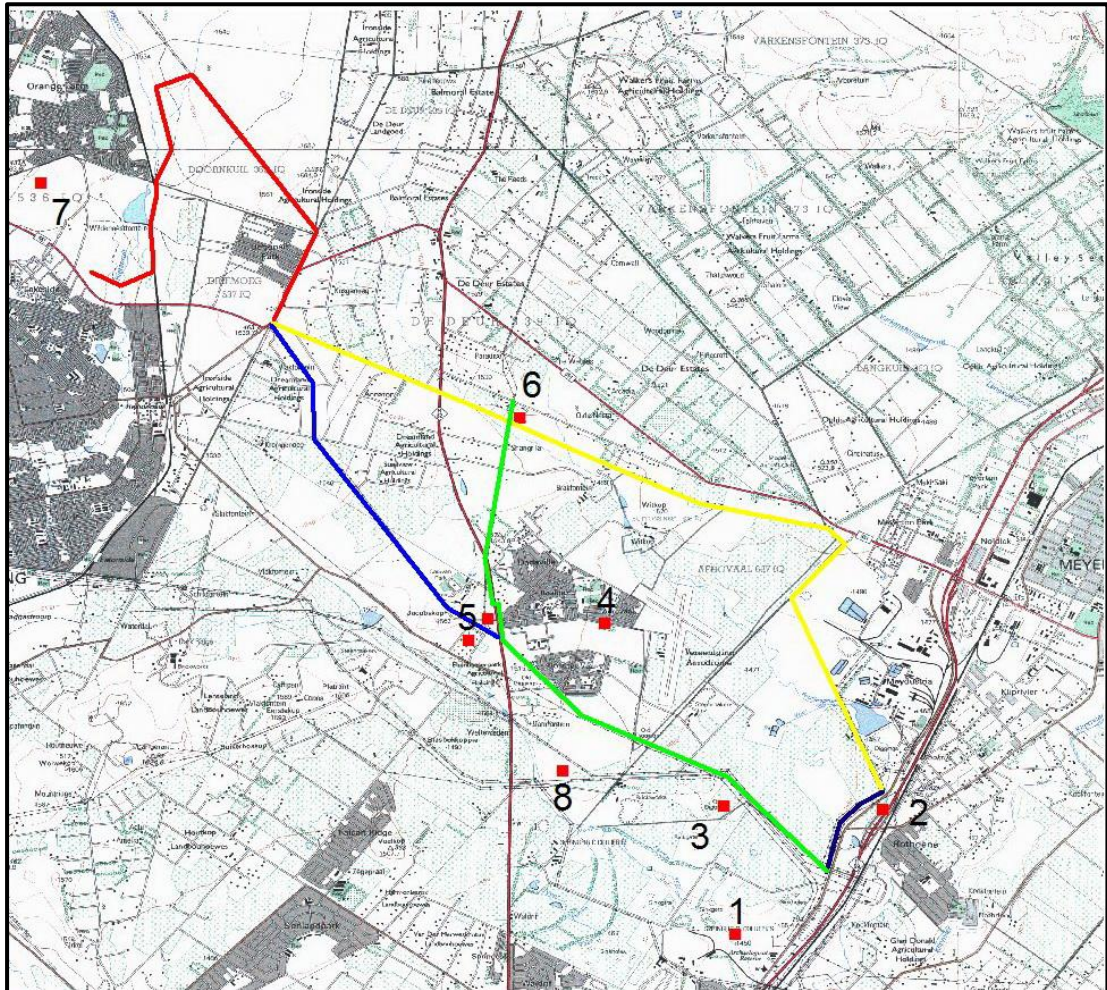


Fig. 7. The study area showing the location of known heritage sites.

5.3.1 Stone Age

Although a number of important sites dating to the Stone Age, e.g. Klipriver, Redan, etc. are known from the larger region, no sites, features or objects of cultural significance dating to the Stone Age were identified in the study area.

- It is highly unlikely that any of these would be impacted on by the development of the proposed electricity distribution line.

5.3.2 Iron Age

Although sites dating to the Later Iron Age are known from the larger region, no sites, features or objects of cultural significance dating to the Iron Age are known to exist in the study area.

- It is highly unlikely that any of these would be impacted on by the development of the proposed electricity distribution line.

5.3.3 Historic period

The following sites, features and objects of cultural significance were identified in the study region:

- A few old farmsteads are known to exist in the region of the study area, but it is highly unlikely that it would be impacted on by the proposed development.
- A number of cemeteries and burial sites occur within the study area. The formal cemeteries are well defined and would be easy to avoid. The more informal burial sites are not well defined and are mostly hidden by tall grass.
- A few old features of industrial and infrastructural heritage occur in the study region, but it is highly unlikely that it would be impacted on by the proposed development.

6. RECOMMENDED MANAGEMENT MEASURES

Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon them is permanent and non-reversible. Those resources that cannot be avoided and that are directly impacted by the development can be excavated/recorded and a management plan can be developed for future action. Those sites that are not impacted on can be written into the management plan, whence they can be avoided or cared for in the future.

6.1 Objectives

- Protection of archaeological, historical and any other site or land considered being of cultural value within the project boundary against vandalism, destruction and theft.
- The preservation and appropriate management of new discoveries in accordance with the National Heritage Resources Act (Act No. 25 of 1999), should these be discovered during construction.

6.1.2 Construction phase

General management objectives and commitments:

- To avoid disturbing sites of heritage importance; and
- To avoid disturbing burial sites.

The following shall apply:

- Known sites should be clearly demarcated in order that they can be avoided during construction activities.
- The contractors and workers should be notified that archaeological sites might be exposed during the construction work.

- Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible;
- All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken;
- Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and
- Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51. (1).

6.1.2 Operation phase

General management objectives and commitments:

- To avoid disturbing sites of heritage importance.

The following shall apply:

- Continued care should be taken to observe discovery of any sites of heritage significance during operation. Should any archaeological artifacts and palaeontological remains be exposed during operations, work on the area where the artefacts were found, shall cease immediately and the appropriate person shall be notified as soon as possible;
- Upon receipt of such notification, an Archaeologist or Palaeontologist shall investigate the site as soon as practicable. Acting upon advice from these specialists, the necessary actions shall be taken;
- Under no circumstances shall archaeological or palaeontological artefacts be removed, destroyed or interfered with by anyone on the site during operations; and
- The operator shall advise its workers of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51(1).

7. CONCLUSIONS

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

Information on the identified sites is presented in Fig. 7 and Appendix 3. The significance of each feature was determined by application of the matrix presented in Appendix 2. This allows that similar features can be rated in similar manner.

The following was found:

- Although a number of important sites dating to the Stone Age, e.g. Klipriver, Redan, etc. are known from the larger region, no sites, features or objects of cultural significance dating to the Stone Age were identified in the study area.
 - It is highly unlikely that any of these would be impacted on by the development of the proposed electricity distribution line.
- Although sites dating to the Later Iron Age are known from the larger region, no sites, features or objects of cultural significance dating to the Iron Age are known to exist in the study area.
 - It is highly unlikely that any of these would be impacted on by the development of the proposed electricity distribution line.
- The following sites, features and objects of cultural significance were identified in the study region:
 - A few old farmsteads are known to exist in the region of the study area, but it is highly unlikely that it would be impacted on by the proposed development.
 - A number of cemeteries and burial sites occur within the study area. The formal cemeteries are well defined and would be easy to avoid. The more informal burial sites are not well defined and are mostly hidden by tall grass.
 - A few old features of industrial and infrastructural heritage occur in the study region, but it is highly unlikely that it would be impacted on by the proposed development.

Based on the survey and the available literature, 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 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 measures for individual known sites have been indicated in Appendix 3 of this report. In essence this involves avoiding the sites by setting out a suitable buffer zone around each site which then should be treated as no-go areas.
- Mitigation should further 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 6 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.

8. REFERENCES

8.1 Data bases

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8.2 Literature

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Van Schalkwyk, J.A. 2007. *Heritage survey report for the proposed development in the Three Rivers Area of Vereeniging, Gauteng Province*. Unpublished report 2007JvS045.

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8.3 Maps and aerial photographs

1: 50 000 Topocadastral maps: 2627DB
Google Earth

APPENDIX 1: CONVENTIONS USED TO ASSESS THE IMPACT OF PROJECTS ON 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			

Significance of impact:

- low where the impact will not have an influence on or require to be significantly accommodated in the project design
- medium where the impact could have an influence which will require modification of the project design or alternative mitigation
- high where it would have a “no-go” implication on the project regardless of any mitigation

Certainty of prediction:

- Definite: More than 90% sure of a particular fact. Substantial supportive data to verify assessment
- Probable: More than 70% sure of a particular fact, or of the likelihood of that impact occurring
- Possible: Only more than 40% sure of a particular fact, or of the likelihood of an impact occurring
- Unsure: Less than 40% sure of a particular fact, or the likelihood of an impact occurring

Recommended management action:

For each impact, the recommended practically attainable mitigation actions which would result in a measurable reduction of the impact, must be identified. This is expressed according to the following:

- 1 = no further investigation/action necessary
- 2 = controlled sampling and/or mapping of the site necessary
- 3 = preserve site if possible, otherwise extensive salvage excavation and/or mapping necessary
- 4 = preserve site at all costs
- 5 = retain graves

Legal requirements:

Identify and list the specific legislation and permit requirements which potentially could be infringed upon by the proposed project, if mitigation is necessary.

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. IDENTIFIED SITES

No	Class	Description	Latitude	Longitude	Significance	Management
1	Stone Age	Rock engraving site at Redan	-26.61118	27.96829	High on a national level	Avoid site at all costs. Have rock art specialist determine outer edge of site and set out buffer area of 100 m.
2	Historic	Culvert of dressed stone that formed part of old railway line	-26.59355	27.98911	High on a regional level	Avoid site. Determine buffer of 10 m around structure as no-go area
3	Stone Age	Open site where stone tool were recovered some years ago	-26.59306	27.96667	Low on a regional level	Avoid site by taking coordinate as centre and set out buffer of 100 m as no-go area
4	Historic	Very large cemetery still in use by local community	-26.56732	27.94988	High on a local level	As the cemetery is already fenced, the existing boundary should be used as a buffer
5	Historic	Consists of two cemeteries - one more formal and other less formal. Still in use by community	-26.56675	27.93356	High on a local level	As the cemetery is already fenced, the existing boundary should be used as a buffer
6	Historic	Farmstead, dating 1940s, still in use	-26.53840	27.93796	Medium on a regional level	Avoid site: use property boundary as buffer area
7	Historic	Contemporary people's park	-26.50534	27.87054	Medium on a local level	Avoid site
8	Historic	Informal cemetery	-26.50534	27.87054	High a local level	As the cemetery is already fenced, the existing boundary should be used as a buffer

APPENDIX 4: ADDENDUM

As further information was made available when detailed planning of the proposed power line was done by Eskom, it was realised that the Jakobs Cemetery has expanded into the Eskom servitude, creating a possibility of the power line impacting not only physically on some of the graves, but also visually on the larger cemetery (Fig. 1).

The cemetery was visited on 20 March 2013 in the company of an Eskom employee responsible for the project and Ms N Khandhela, the EAP for the project. The proposed alignment was investigated and it was found that it would transect the inner boundary of the cemetery – see Fig. 1 below.

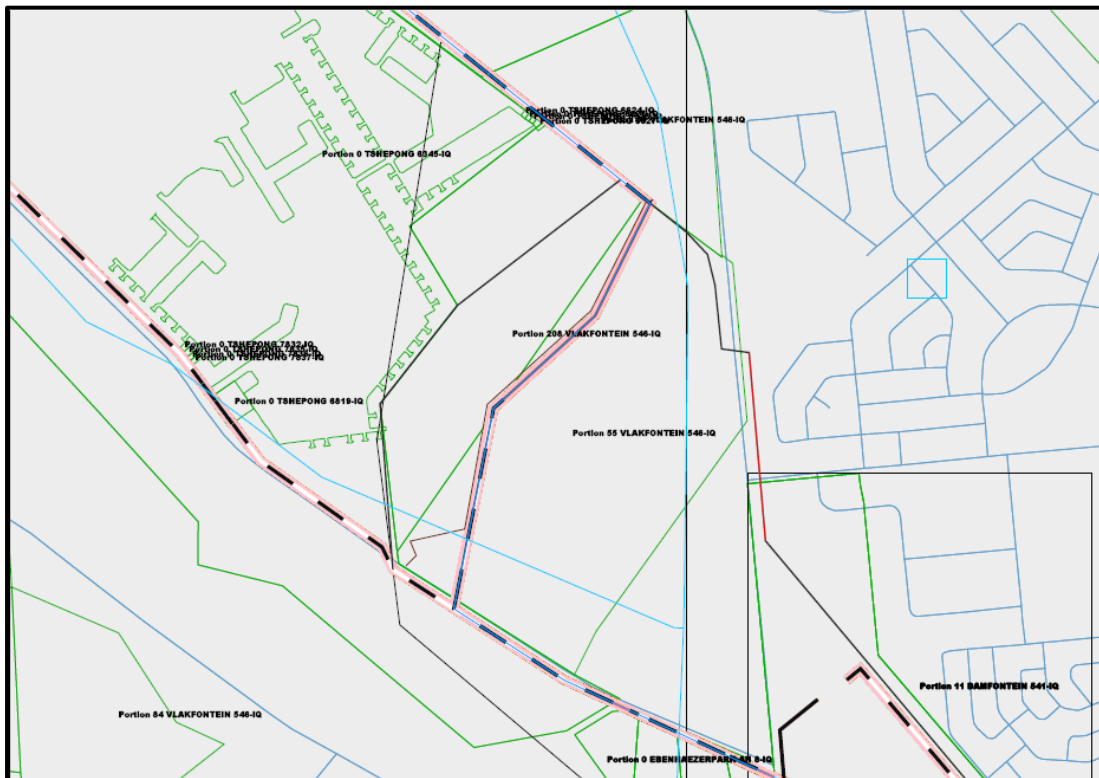


Fig. 1. Transect of the power line across the cemetery.

Closer inspection revealed that the power line would transect between a number of graves, fortunately not crossing any of them directly (Fig. 2 & 3). This is the case only for the western most section of the cemetery. No graves occur yet in the north-western section of the cemetery, so there will not be any impact (Fig. 4 & 5).



Fig. 2. Power line will transect through the open area in between these graves.



Fig. 3. Power line will transect through the open area in between these graves.



Fig. 4. North-western end of the cemetery where the powervline will transect, viewed from the south.



Fig. 5. North western end of the cemetery viewed from the north.



Fig. 6. An existing power line already transects the cemetery and some of the graves.

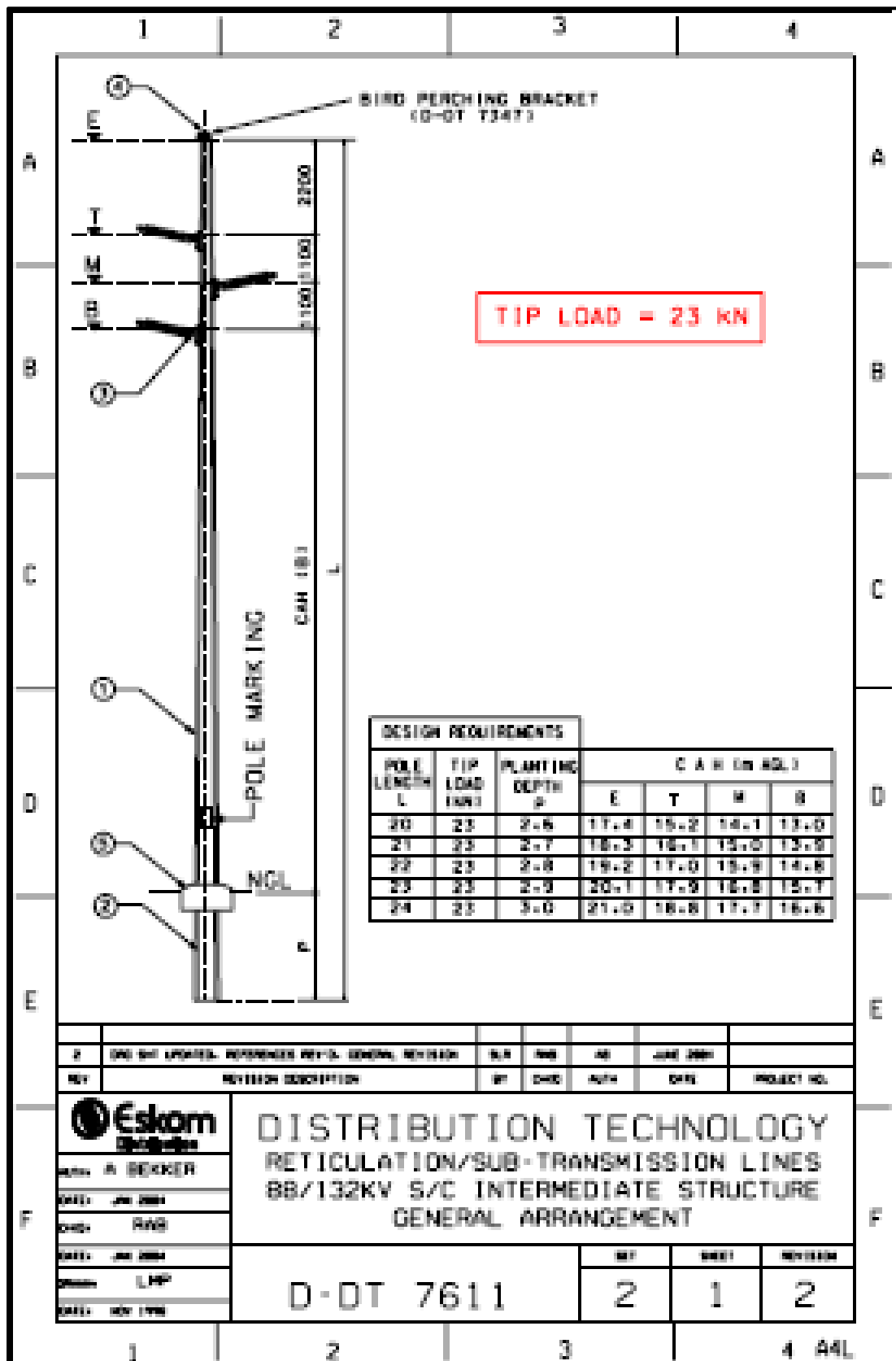


Fig. 7. The pole structures to be used in the cemetery. As it is a mono-pole, the impact on the ground would be very small.

Recommendations

It is unavoidable that the power line would cross the cemetery as the Eskom servitude precede the extension of the cemetery. The following can be said:

- The power line would pass between graves and not cross over it directly.
- The tower structures that will be used will have only a small impact on the ground.
- An existing power line already crosses the cemetery and a large number of graves, indicating that it would be possible to construct a new line without causing damage.

Mitigation

It is understood that it is not Eskom that is at fault here as the cemetery “grew” into the servitude. Developing a new servitude is not possible as there is no alternative route to be used. The following measures are recommended to minimise the risk of damage to the graves:

- A buffer zone of approximately 3m should be kept around the outermost graves to ensure that damage is not done to them when work on the power line is undertaken.
- The EAP should be present during construction in order to monitor activities and ensure that no damage is caused to any of the graves. This includes the erection of the tower structures as well as stringing the power lines.