Archaeological Impact Assessment

For The Proposed Thabametsi Coal-Fired Power Station, Lephalale, Limpopo Province.

Prepared For

Savannah Environmental (Pty) Ltd

By

HERITAGE
Contracts and Archaeological Consulting

TEL: +27 82 373 8491. E –MAIL JACO.HERITAGE@GMAIL.COM
POSTNET SUITE# 426
PRIVATE BAG X4
WIERDA PARK
0149

VERSION 1.0
28 February 2014

Revised

7 March 2014

CLIENT: Savannah Environmental (Pty) Ltd

CONTACT PERSON: Ravisha Ajodhapersadh

Tel: 011 234 6621

Fax: 086 684 0547

E – mail: ravisha@savannahsa.com

SIGNATURE: _____

LEADING CONSULTANT: Heritage Contracts and Archaeological Consulting CC

CONTACT PERSON: Jaco van der Walt

Heritage Contracts and Archaeological Consulting

Professional Member of the Association of Southern African Professional Archaeologist (#159)

I, Jaco van der Walt as duly authorised representative of Heritage Contracts and Archaeological Consulting CC, hereby confirm my independence as a specialist and declare that neither I nor the Heritage Contracts and Archaeological Consulting CC have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which the client was appointed as Environmental Assessment practitioner, other than fair remuneration for work performed on this project.

SIGNATURE: _____

EXECUTIVE SUMMARY

Site name and location The Proposed Thabametsi Coal-Fired Power Station (on the farm Onbelyk 257 LQ) and transmission line alternatives are located approximately 25km North West of Lephalale in the Limpopo Province.

Purpose of the study: Phase 1 Archaeological Impact Assessment to determine the presence of cultural heritage sites and the impact of the proposed project on these resources within the study area.

1:50 000 Topographic Map: 2327 CB, 2327 DA, 2327 CD

Environmental Consultant: Savannah Environmental (Pty) Ltd.

Developer: Newshelf 1282 (Proprietary) Limited

Heritage Consultant: Heritage Contracts and Archaeological Consulting CC (HCAC).

Contact person: Jaco van der Walt Tel: +27 82 373 8491

E –mail jaco.heritage@gmail.com.

Date of Report: 28 February 2014

Findings of the Assessment:

The archaeology of the wider region has been recorded through several large scale CRM projects in the area (Huffman 2008, Huffman & van der Walt 2008, Huffman & van der Walt 2011, van Schalkwyk 2011, van Schalkwyk & Wahl 2014) and is characterised by Middle Stone Age sites representing what is called a Post Howieson's Poort Industry that date to between 60 000 and 40 000 years ago (Lombard et. al. 2012). These sites are associated with pans and ancient drainage systems throughout the larger study area. The remains of a few Iron Age cattle posts occur around pans to the north west of the current study area. These cattle posts were articulated with farming villages in the nearby Limpopo Valley. Ceramics from these sites (Huffman & van der Walt 2011) belong to a stylistic facies known as Letsibogo. This style dates to between 1550 AD and 1750 AD and was made by Sotho-Tswana people (Huffman 2007).

The area investigated for the proposed Thabametsi Coal-Fired Power Station (on the farm Onbelyk 257 LQ) is located in a hinterland without any drainage systems or pans. This water deficit for both people and livestock made the area unattractive for settlement in antiquity and the only archaeological site recorded is at Nelsonskop that consists of engravings of animal spoors, ephemeral stone enclosures on top of the hill with scattered MSA artefacts and undecorated ceramics. The proposed transmission alternative 2 and 3 are aligned just to the east of the site and therefore, alternative 1 is the preferred alternative from a heritage point of view, as this area has no heritage sites that will be impacted on. In the area proposed for the power station, two ruins of low heritage significance were recorded as well as a single grave located on the periphery of the development footprint and some recommendations are put forth in section 7 of this report.

Subject to approval from SAHRA there is from an archaeological point of view no reason why the development should not proceed if the recommendations as made in this report are adhered to.

General

Due to extensive ground disturbance, archaeological visibility was low on portions of the site during the survey. It must also be noted that due the subsurface nature of archaeological material and graves the possible occurrence of unmarked or informal graves and subsurface finds can thus not be excluded. If during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find.

Disclaimer: *Although all possible care is taken to identify sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the study. Heritage Contracts and Archaeological Consulting CC and its personnel will not be held liable for such oversights or for costs incurred as a result of such oversights.*

CONTENTS

FIGURES

ABBREVIATIONS

AIA: Archaeological Impact Assessment
ASAPA: Association of South African Professional Archaeologists
BIA: Basic Impact Assessment
CRM: Cultural Resource Management
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment*
EIA: Early Iron Age*
EIA Practitioner: Environmental Impact Assessment Practitioner
EMP: Environmental Management Plan
ESA: Early Stone Age
GPS: Global Positioning System
HIA: Heritage Impact Assessment
LIA: Late Iron Age
LSA: Late Stone Age
MEC: Member of the Executive Council
MIA: Middle Iron Age
MPRDA: Mineral and Petroleum Resources Development Act
MSA: Middle Stone Age
NEMA: National Environmental Management Act
PRHA: Provincial Heritage Resource Agency
SADC: Southern African Development Community
SAHRA: South African Heritage Resources Agency

**Although EIA refers to both Environmental Impact Assessment and the Early Iron Age both are internationally accepted abbreviations and must be read and interpreted in the context it is used.*

GLOSSARY

Archaeological site (remains of human activity over 100 years old)

Early Stone Age (~ 2.6 million to 200 000 years ago)

Middle Stone Age (~ 300 000 to 20 000 years ago)

Later Stone Age (~ 40-25 000, to recently, 100 years ago)

The Iron Age (~ AD 400 to 1840)

Historic (~ AD 1840 to 1950)

Historic building (over 60 years old)

1 BACKGROUND INFORMATION

Kind of study	Archaeological Impact Assessment
Type of development	Power Station and transmission lines
Developer:	Newshelf 1282 (Proprietary) Limited (the "Project Company")
Consultant:	Savannah Environmental (Pty) Ltd

Heritage Contracts and Archaeological Consulting CC was contracted by Savannah Environmental (Pty) Ltd to conduct an Archaeological Impact Assessment for the Proposed Thabametsi Coal-Fired Power Station, located to the north west of Lephalale in the Limpopo Province.

The Archaeological Impact Assessment report forms part of the EIA for the proposed project.

The aim of the study is to identify cultural heritage sites, document, and assess their importance within local, provincial and national context. It serves to assess the impact of the proposed project on non-renewable heritage resources, and to submit appropriate recommendations with regard to the responsible cultural resources management measures that might be required to assist the developer in managing the discovered heritage resources in a responsible manner. It is also conducted to protect, preserve, and develop such resources within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

The report outlines the approach and methodology utilized before and during the survey, which includes: Phase 1, a review of the heritage scoping report that includes collection from various sources and consultations; Phase 2, the physical surveying of the area on foot and by vehicle; Phase 3, reporting the outcome of the study.

During the survey two ruins were identified, as well as a grave and an engraving site. General site conditions and features on sites were recorded by means of photographs, GPS locations, and site descriptions. Possible impacts were identified and mitigation measures are proposed in the following report.

This report must also be submitted to the SAHRA for peer review and comment.

1.1 Terms of Reference

Field study

Conduct a field study to: a) systematically survey the proposed project area to locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; b) record GPS points of sites identified as significant areas; c) determine the levels of significance of the various types of heritage resources recorded in the project area.

Reporting

Report on the identification of anticipated and cumulative impacts the operational units and associated infrastructure of the proposed project activity may have on the identified heritage resources for all 3 phases of the project; i.e., construction, operation and decommissioning phases. Consider alternatives, should any significant sites be impacted adversely by the proposed project. Ensure that all studies and results comply with the relevant legislation and the code of ethics and guidelines of ASAPA.

To assist the developer in managing the discovered heritage resources in a responsible manner, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

1.2. Archaeological Legislation and Best Practice

Phase 1, an AIA or a HIA is a pre-requisite for development in South Africa as prescribed by SAHRA and stipulated by legislation. The overall purpose of a heritage specialist input is to:

- » Identify any heritage resources, which may be affected;
- » Assess the nature and degree of significance of such resources;
- » Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;
- » Assess the negative and positive impact of the development on these resources;
- » Make recommendations for the appropriate heritage management of these impacts.

The AIA or HIA, as a specialist sub-section of the EIA, is required under the National Heritage Resources Act NHRA of 1999 (Act 25 of 1999), Section 23(2)(b) of the NEMA and sections 39(3)(b)(iii) of the MPRDA.

The AIA should be submitted, as part of the EIA, BIA or EMP, to the PHRA if established in the province or to SAHRA. SAHRA will be ultimately responsible for the professional evaluation of Phase 1 AIA reports upon which review comments will be issued. 'Best practice' requires Phase 1 AIA reports and additional development information, as per the EIA, BIA/EMP, to be submitted in duplicate to SAHRA after completion of the study. SAHRA accepts Phase 1 AIA reports authored by professional archaeologists, accredited with ASAPA or with a proven ability to do archaeological work.

Minimum accreditation requirements include an Honours degree in archaeology or related discipline and 3 years post-university CRM experience (field supervisor level).

Minimum standards for reports, site documentation and descriptions are set by ASAPA in collaboration with SAHRA. ASAPA is a legal body, based in South Africa, representing professional archaeology in the SADC region. ASAPA is primarily involved in the overseeing of ethical practice and standards regarding the archaeological profession. Membership is based on proposal and secondment by other professional members.

Phase 1 AIAs are primarily concerned with the location and identification of sites situated within a proposed development area. Identified sites should be assessed according to their significance. Relevant conservation or Phase 2 mitigation recommendations should be made. Recommendations are subject to evaluation by SAHRA.

Conservation or Phase 2 mitigation recommendations, as approved by SAHRA, are to be used as guidelines in the developer's decision making process.

Phase 2 archaeological projects are primarily based on salvage/mitigation excavations preceding development destruction or impact on a site. Phase 2 excavations can only be conducted with a permit, issued by SAHRA to the appointed archaeologist. Permit conditions are prescribed by SAHRA and includes (as minimum requirements) reporting back strategies to SAHRA and deposition of excavated material at an accredited repository.

In the event of a site conservation option being preferred by the developer, a site management plan, prepared by a professional archaeologist and approved by SAHRA, will suffice as minimum requirement.

After mitigation of a site, a destruction permit must be applied for from SAHRA by the client before development may proceed.

Human remains older than 60 years are protected by the National Heritage Resources Act, with reference to Section 36. Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act), as well as the Human Tissues Act (Act 65 of 1983), and are the jurisdiction of SAHRA. The procedure for Consultation Regarding Burial Grounds and Graves (Section 36[5]) of Act 25 of 1999) is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in this age category, located inside a formal cemetery administrated by a local authority, require the same authorisation as set out for graves younger than 60 years, in addition to SAHRA authorisation. If the grave is not situated inside a formal cemetery, but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws, set by the cemetery authority, must be adhered to.

Human remains that are less than 60 years old are protected under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), as well as the Human Tissues Act (Act 65 of 1983), and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning; or in some cases, the MEC for Housing and Welfare.

Authorisation for exhumation and reinterment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. To handle and transport human remains, the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

1.3 Description of Study Area

1.3.1 Location Data

The study area is located approximately 25km to the north west of Lephalale. The footprint area for the power station is extremely flat with no landscape features like pans or hills. Some pans and drainage systems occur in the larger region and are often associated with archaeological sites. A similar scenario repeats itself for the area traversed by the proposed transmission lines apart from a single hill known as Nelsonskop. The vegetation is predominantly Limpopo Sweet Bushveld vegetation in the Savannah biome (Mucina & Rutherford 2006). The study area is used exclusively for game farming and cattle grazing while several mine and power generating facilities occur in the wider region.

.

1.3.2. Location Map

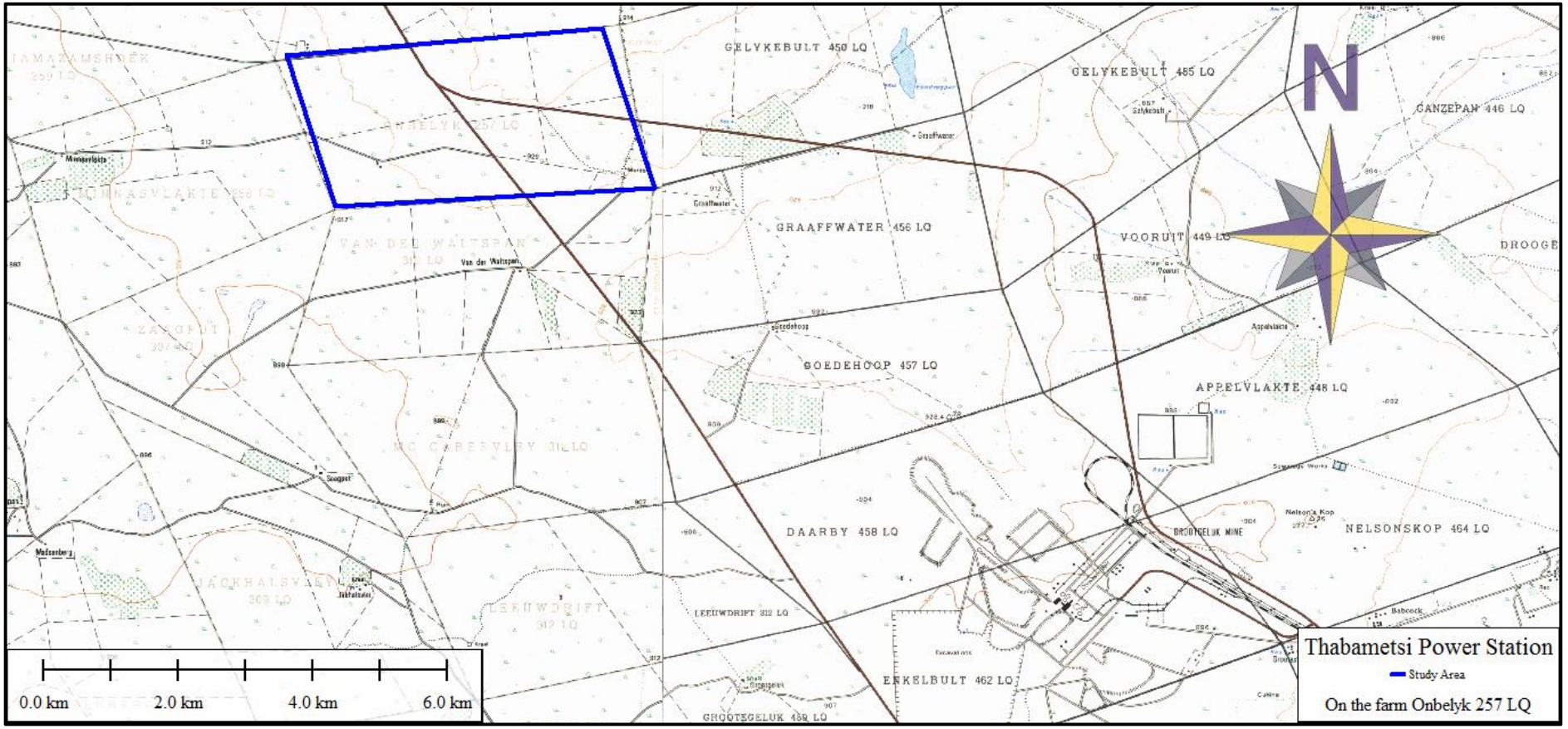

Figure 1: Power Station Location map.

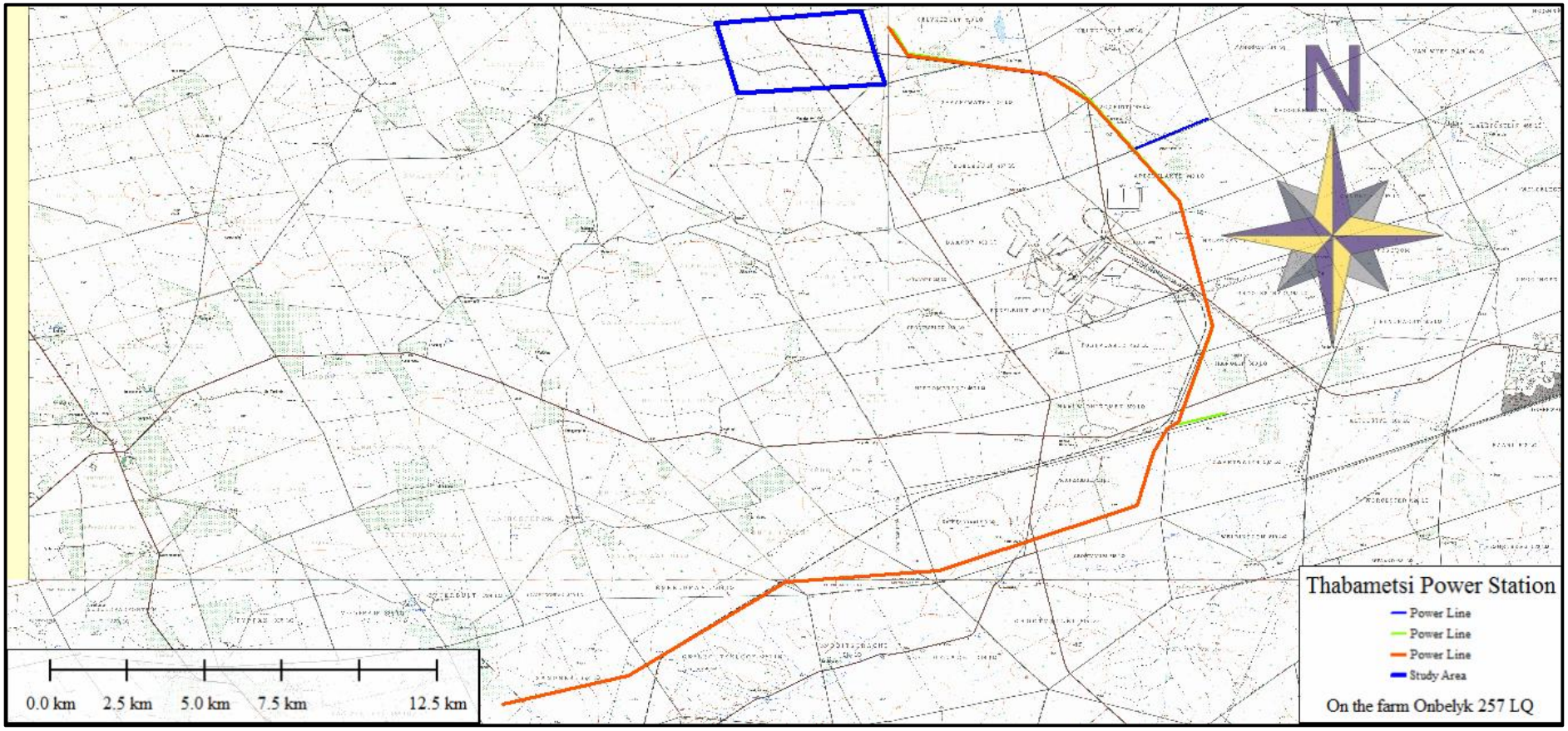

Figure 2: Transmission Line alternatives. Green Blue Orange

1.3.3. Google Maps

Figure 3: Google Image showing the farm Onbelyk (blue) and track log (black) of the areas that were covered during the survey.

2. APPROACH AND METHODOLOGY

The aim of the study is to cover archaeological databases and historical sources to compile a background history of the study area followed by field verification; this was accomplished by means of the following phases.

2.1 Phase 1 - Desktop Study

The first phase comprised a desktop study, gathering data to compile a background history of the area in question. It included scanning existing records for archaeological sites, historical sites, graves, and ethnographical information on the inhabitants of the area. This phase consisted of a heritage scoping report completed by Heritage Contracts and Archaeological Consulting CC (van der Walt 2012).

2.1.1 Literature Search
In addition to the archival study from the scoping study the actions indicated below were also taken.

2.1.2 Information Collection
The SAHRA report mapping project (Version 1.0) and SAHRIS was consulted to collect data from previously conducted CRM projects in the region to provide a comprehensive account of the history of the study area.

2.1.3 Consultation
A Public Participation process was conducted by Savannah Environmental for this project. No heritage concerns were raised.

2.1.4 Google Earth and Mapping Survey
Google Earth and 1:50 000 maps of the area were utilised to identify possible places where sites of heritage significance might be located.

2.1.5 Genealogical Society of South Africa
The database of the Genealogical Society was consulted to collect data on any known graves in the area.

2.2 Phase 2 - Physical Surveying
A field survey of the power station of 1024 ha was conducted; focusing on drainage lines, outcrops, high lying areas and disturbances in the topography. The study area was surveyed by means of vehicle and extensive surveys on foot by a professional archaeologist during the week of the 25th February 2014. The location of the proposed power station on the farm Onbelyk was surveyed in its entirety. The transmission line alternative 1 was also surveyed in its entirety but Alternative 2 and 3 was only assessed at a desktop level as access to the farms that the transmission lines traverse was limited, due to the fact that these properties are in private ownership.

All sites discovered inside the proposed development area was plotted on 1:50 000 maps and their GPS co-ordinates noted. Digital photographs were taken at all the sites.

2.3. Restrictions
Due to the fact that most cultural remains may occur below surface, the possibility exists that some features or artefacts may not have been discovered/ recorded during the survey. Low ground visibility of parts of the study area is due to high vegetation cover, and the possible occurrence of unmarked graves and other cultural material cannot be excluded. Only the surface infrastructure footprint areas were surveyed as indicated in the location map, and not the entire farm. This study did not assess the impact on the palaeontological component of the project. Although Heritage Contracts and Archaeological Consulting CC surveyed the area as thoroughly as possible, it is incumbent upon the developer to stop operations and inform the relevant heritage agency should further cultural remains, such as stone tool scatters, artefacts, bones or fossils, be exposed during the process of development.

3 NATURE OF THE DEVELOPMENT

The proposed power plant includes the following associated infrastructure as part of the Thabametsi Coal-Fired Power Station layout proposal:

- 1200 MW Power Plant
- Coal Stockpile
- Raw water dam
- Ash dump
- Pollution control dams

The Thabametsi Coal-Fired Power Station Infrastructure includes:

- Water supply pipeline
- Roads
- Transmission lines and
- Coal conveyer belts

It is important to note that the water supply pipeline and coal conveyor belts are being assessed within the EIA process for the Thabametsi Coal Mine to be located to the south of the proposed power station. In addition, the power line alternative to the Masa Substation follows the already authorised Mmamabula-Delta power line route. This route was the subject of an Environmental Impact Assessment process, which also included an HIA.

4. HISTORICAL AND ARCHAEOLOGICAL BACKGROUND OF THE STUDY AREA

4.1 General Information

CRM reports on the area together with secondary source material, primary sources, maps and online sources the study area was contextualised. Several previous heritage studies were conducted in the general study area (SAHRIS) by van Schalkwyk (2005), Pistorius (2007), Huffman 2008, Huffman & van der Walt (2008, 2011)

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where archaeological and historical sites might be located.

This scoping study revealed that pans in the area with exposed calcrete could contain Middle Stone age sites and although unlikely it might be possible to find Late Iron Age sites belonging to the *Letsibogo* ceramic *facie*s that dates to between 1550 AD and 1750 AD. San rock art has a well-earned reputation for aesthetic appeal and symbolic complexity (Lewis-Williams, 1981). There is a single known rock art site (S23.65132 E27.58651 in the project area, on Nelsonskop 464 LQ to the east (Pistorius, 2007, van Schalkwyk 2011). The transmission line option 2 and 3 traverses approximately 60 meters to the east of the site.

A study to the north west of the study area (Huffman & vd Walt 2008, 2011) found that shale lenses that lay in between coal seams might be of interest to palaeontologists. Their date and type of plant remains in particular need to be determined. It is not known if coal seams occur within the current study area. A fossilised elephant tooth was also recorded at a calcrete pan (Huffman & vd Walt 2011). The Palaeontological Impact Assessment was not included in the study as it was not part of the scope of work. The following background from Huffman & van der Walt are applicable for the study area.

4.2 Earlier Stone Age

Hominids began to make stone tools about 2.6 million years ago. Known as the Oldowan industry, most of the earliest tools were rough cobble cores and simple flakes. The flakes were used for such activities as skinning and cutting meat from scavenged animals. These early artefacts are difficult to recognize and have so far only been found in rock shelters such as the Sterkfontein Caves (Kuman, 1998); they are unlikely to occur in the study area.

At about 1.4 million years ago hominids started producing more recognizable stone artefacts such as hand axes, cleavers and core tools (Deacon & Deacon, 1999). Among other things these Acheulian tools were probably used to butcher large animals such as elephants, rhinoceros and hippopotamus that had died from natural causes. Acheulian artefacts are usually found near the raw material from where they were quarried, at butchering sites, or as isolated finds.

No Acheulian sites are on record near the project area, but isolated finds are possible. However, isolated finds have little value. Therefore, the project is unlikely to disturb a significant site. The lack of ESA finds were confirmed during the field investigation.

4.3 Middle Stone Age

By the beginning of the Middle Stone Age (MSA), tool kits included prepared cores, parallel-sided blades and triangular points hafted to make spears (Volman, 1984). MSA people had become accomplished hunters by this time, especially of large grazing animals such as wildebeest, hartebeest and eland.

These hunters are classified as early humans, but by 100,000 years ago, they were anatomically fully modern. The oldest evidence for this change has been found in South Africa, and it is an important point in debates about the origins of modern humanity. In particular, the degree to which behaviour was fully modern is still a matter of debate. The repeated use of caves indicates that MSA people had developed the concept of a home base and that they could make fire. These were two important steps in cultural evolution (Deacon & Deacon, 1999). Accordingly, if there are caves in the study, they may be sites of archaeological significance.

MSA artefacts have been found in the Oliboompoort Cave to the south of Lephalale (Mason, 1962; M. van der Ryst, 2006) and in the river gravels of the Limpopo, northwest of the project area (Pistorius, 2007). A large scale survey of almost 9000ha in 2011 by Huffman and vd Walt found that Middle Stone Age sites were associated with pans and ancient drainage systems throughout the project area. The lack of prominent pans in the study area or raw material suitable for knapping may explain the paucity of sites on the farm Onbelyk where the power station will be situated. At Nelsonskop flaked quartzite pebbles occur that was possibly carried in.

4.4 Later Stone Age

By the beginning of the Later Stone Age (LSA), human behaviour was undoubtedly modern. Uniquely human traits, such as rock art and purposeful burials with ornaments, became a regular practice. These people were the ancestors of the San (or Bushmen).

San rock art has a well-earned reputation for aesthetic appeal and symbolic complexity (Lewis-Williams, 1981). There is a single known rock art site (S23.65132 E27.58651 in the project area, on Nelsonskop 464 LQ to the east (Pistorius, 2007, van Schalkwyk 2011). The transmission line options 2 and 3 traverses very close to the site.

In addition to art, LSA sites contain diagnostic artefacts, including microlithic scrapers and segments made from very fine-grained rock (Wadley, 1987). Spear hunting probably continued, but LSA people also hunted small game with bows and poisoned arrows. Important LSA deposits have been excavated in Oliboompoort Cave (Mason, 1962) and other sites in the Waterberg to the south (Van der Ryst, 1998). Sites in the open are usually poorly preserved and therefore have less value than sites in caves or rock shelters.

4.5 The Iron Age (AD 400 to 1840)

Bantu-speaking people moved into Eastern and Southern Africa about 2,000 years ago (Mitchell, 2002). These people cultivated sorghum and millets, herded cattle and small stock and manufactured iron tools and copper ornaments. Because metalworking represents a new technology, archaeologists call this period the Iron Age. Characteristic ceramic styles help archaeologists to separate the sites into different groups and time periods. The first 1,000 years is called the Early Iron Age.

As mixed farmers, Iron Age people usually lived in semi-permanent settlements consisting of pole-and-daga (mud mixed with dung) houses and grain bins arranged around a central area for cattle (Huffman, 1982). Usually, these settlements with the ‘Central Cattle Pattern’ (CCP) were sited near water and good

soils that could be cultivated with an iron hoe. For the project area, archaeological sites such as these are unlikely to occur due to the lack of water sources.

Archaeologists have not yet resolved the role of a special pottery, known as Bambata, in the spread of pastoralism and mixed farming (Huffman, 2007). Some believe that Bambata pottery represents the vanguard of the Early Iron Age, or alternatively, Khoe pastoralists, while others believe it was acquired by LSA people through trade. This pottery has been found at Oliboompoort in LSA deposits (Mason, 1962; Van der Ryst, 2006) and is thus believed to exist in the general region.

Some Iron Age settlements are on record for the general area, for instance alongside the Matlabas River (Aukema in Huffman, 1990) and in Botswana (Biemond, 2005) and south of the Limpopo close to Steenbokpan (Huffman & vd Walt 2011). These sites are recognized by distinctive pottery known as the Letsibogo facies of Moloko (Huffman, 2007).

The Little Ice Age began at about AD 1300, and its impact on farming societies was particularly severe. Another major drought occurred at about AD 1650, and it is unlikely that Iron Age people lived in the larger project area at these times.

5.6 Cultural and Historic

Voortrekkers crossed the Vaal River in 1836, and within a few years, began to spread north. Much of the Limpopo Province contained tsetse fly, and so early Boer farmers didn't settle immediately in the area. European settlement of the region began at the beginning of the last century. Some of the first settlers, D.P. van der Westhuizen and C. Ricks, both arrived in about 1901. The study area is close to the ox-cart route to Botswana that crossed the Limpopo a few kilometres upstream from the modern border post. Some of the pans were used as outspans along the route. Because the area was not suitable for grain agriculture, African farmers did not live in the area, and labour had to come from far afield. Rather the area was used primarily for hunting. Even now, the general region is a big-game area (Huffman & vd Walt 2011).

5. HERITAGE SITE SIGNIFICANCE AND MITIGATION MEASURES

The presence and distribution of heritage resources define a 'heritage landscape'. In this landscape, every site is relevant. In addition, because heritage resources are non-renewable, heritage surveys need to investigate an entire project area, or a representative sample, depending on the nature of the project. In the case of the proposed power station and transmission lines the local extent of its impact necessitates a representative sample and only the footprint of the areas demarcated for development were surveyed. In all initial investigations, however, the specialists are responsible only for the identification of resources visible on the surface.

This section describes the evaluation criteria used for determining the significance of archaeological and heritage sites. The following criteria were used to establish site significance:

- The unique nature of a site;
- The integrity of the archaeological/cultural heritage deposits;
- The wider historic, archaeological and geographic context of the site;
- The location of the site in relation to other similar sites or features;
- The depth of the archaeological deposit (when it can be determined/is known);
- The preservation condition of the sites;
- Potential to answer present research questions.

Furthermore, The National Heritage Resources Act (Act No 25 of 1999, Sec 3) distinguishes nine criteria for places and objects to qualify as 'part of the national estate' if they have cultural significance or other special value. These criteria are:

- Its importance in/to 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;
- Sites of significance relating to the history of slavery in South Africa.

5.1. Field Rating of Sites

Site significance classification standards prescribed by SAHRA (2006), and approved by ASAPA for the SADC region, were used for the purpose of this report. The recommendations for each site should be read in conjunction with section 9 of this report.

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

5.2 Impact Rating of Assessment

The criteria below are used to establish the impact rating of a site. as provided by the client:

» The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.

» The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):

» The **duration**, wherein it will be indicated whether:

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

» The **magnitude**, quantified on a scale from 0-10 where; 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight

impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.

» The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1-5 where; 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).

» The **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and

» the **status**, which will be described as either positive, negative or neutral.

» the degree to which the impact can be reversed.

» the degree to which the impact may cause irreplaceable loss of resources.

the *degree* to which the impact can be mitigated.

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

S=(E+D+M)P

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance weightings** for each potential impact are as follows:

» < 30 points: Low (i.e., where this impact would not have a direct influence on the decision to develop in the area),

» 30-60 points: Medium (i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated),

» > 60 points: High (i.e., where the impact must have an influence on the decision process to develop in the area).

6. BASELINE STUDY-DESCRIPTION OF SITES

The study area is characterised by a featureless flat landscape that falls in an inhospitable environment with low rainfall. The lack of any ephemeral or permanent water sources possibly attributes to the marked paucity of archaeological sites in the study area. Palaeo drainage lines and seasonal pans in the wider study area are known to contain MSA material dating to what is referred to as a Post Howiesons Poort industry. While the Limpopo floodplain to the north was settled by Iron Age communities producing stylistic pottery known as Letsibogo while their herdsmen utilized the calcrete plateau for summer grazing as far as 15 km from the settlements (Huffman & van der Walt 2011). More favourable water rich areas to the south of the study area in the Waterberg was also inhabited by Stone Age communities (Van der Ryst 1998) and later by Iron Age groups producing stylistic pottery known as Eiland as well as Ndebele groups (Aukema 1989; Huffman 2007). Tsetse fly and the lack of good agricultural conditions also meant that the area was sparsely inhabited in the late 1800's and early 1900's.

The project area is however not void of heritage sites and the remains of two ruins possibly dating to the late 1950's based on dates from a grave (Figure 4) next to one of the ruins occur on the area investigated for the footprint of the power station (the farm Onbelyk). A single kopje known as Nelsonskop on an otherwise featureless landscape has engravings on the southern face of the kopje with ephemeral stone walls on top of the hill. The transmission line alternatives 2 & 3 traverse close to the site (approximately 60 meters to the east) (Figure 5).

6.1 Site Distribution Map

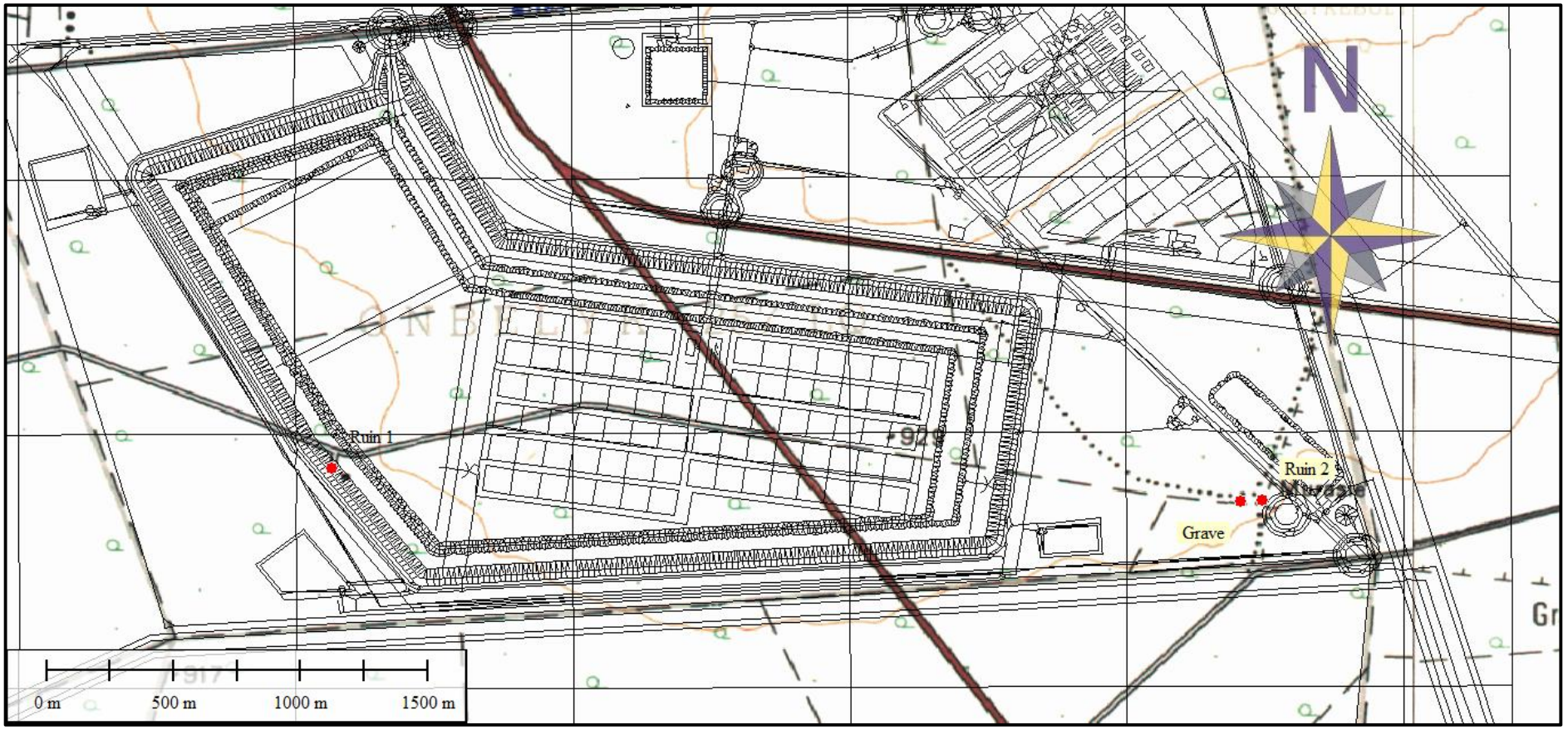

Figure 4: Showing the location of a recorded sites in relation to the proposed power station layout.

Figure 5: Engraving site at Nelsonskop with the proposed power line route.

Figure 6. Environment in the central portion of the farm Onbelyk.

Figure 7. Environment in the eastern portion of the farm Onbelyk.

Figure 8. Environment at transmission alternative on the farm Gelykebult.

Figure 9. Environment at transmission alternative 2&3 on the farm Nelsonskop.

6.2. Sites with Coordinates

Site Number	Type Site	Cultural Markers	Co ordinate	Impact
Ruin1	Recent	Rectangular foundations.	S23° 36' 12.0" E27° 27' 41.1"	Power Station Footprint
Grave	Modern	Granite headstone	S23° 36' 16.3" E27° 29' 36.9"	Power Station Footprint
Ruin 2	Recent	Rectangular foundations	S23° 36' 16.1" E27° 29' 39.6"	Power Station Footprint
Engraving	Archaeological	Engravings, Stone Tools and ceramics	S23° 39' 04.4" E27° 35' 11.6"	Transmission Line alternative 2&3

6.3. Site Descriptions

6.3.1. Ruin 1 and 2 (demolished foundations)

Site Number	Ruin 1 and 2	**1:50 000 map nr**	2327 CB
Site Data	**Description:**		
Type of site	Open site		
Site categories	Recent/historical ruin		
Context	**Ruin 1** consists of the demolished remains of a dwelling with 4 rooms. The building was constructed with clay bricks and is possibly a farm labourer dwelling. Associated with the site is a water dam and water tank. **Ruin 2** is a much larger setup and was possibly the old farm house. The site is also totally demolished and the only remains are rubble of clay and modern bricks. Both sites will be directly impacted on by the proposed power station footprint. It must be kept in mind that sites like these might contain unmarked graves.		
Cultural affinities, approximate age and significant features of the site;	Based on the date of the associated grave the structures are possibly younger than 60 years.		
Estimation or measurement of the extent	Ruin 1 covers an area of 5x6 meters. Ruin 2 covers an area of 10x12 meters.		
Description of artefacts	Modern industrial artefacts, such as wire, glass and cans, are scattered over the sites.		

Photographs

Figure 10: Cement foundations at ruin 1.

Figure 11: General Site conditions at ruin 1.

Figure 12: Demolished remains of house at ruin 2.

Figure 13: Cement and brick foundations of waterhole at ruin 1.

Field Rating (Recommended grading or field significance) of the site:	Generally Protected C
Statement of Significance (Heritage Value)	The sites are of low heritage significance.

Ruin 1 and 2

Impact evaluation of the proposed project on heritage resources

Nature: During the operation of the project an indirect visual impact is expected for the site.		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (3)	Low (3)
Probability	Probable (3)	Probable (3)
Significance	**Low (30)**	**Low (27)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation: The ruin sites have been destructed and have no conservation value (Please refer to section 7 for full details on recommendations).		
Cumulative impacts: N.A		
Residual Impacts: Historical and cultural sites are non-renewable and impact on any historical feature or material will be permanent and destructive.		

6.3.2. Grave

Site Number	Grave	**1:50 000 map nr**	2327 CB
Site Data	**Description:**		
Type of site	Open site		
Site categories	Grave located outside of a formal cemetery		
Context	The site consists of one visible grave of Hendrik Johannes van Wyk who passed away in 1959. The site is fenced with an access gate but the remains of a larger boundary fence are still visible around the grave and it is possible that other unmarked graves might be present. The site is located on the periphery of the power station footprint and a secondary impact is foreseen on the site.		
Cultural affinities, approximate age and significant features of the site;	The grave dates from 1959 as per the headstone inscription.		

Photographs

Figure 14: Grave viewed from the south east.

Figure 15: Granite headstone.

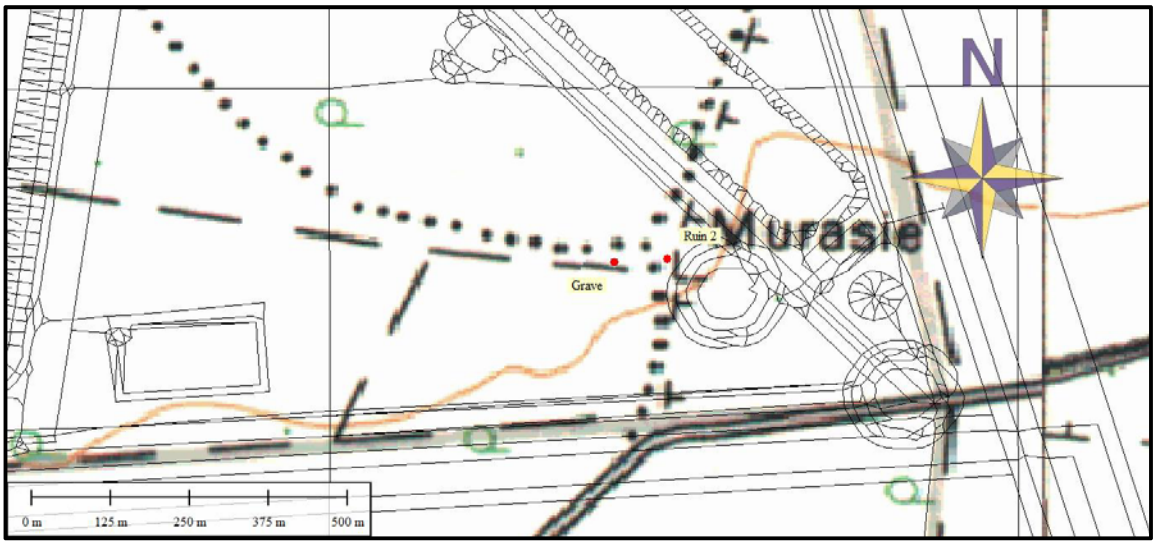

Figure 16: Grave in relation to development footprint.

Field Rating (Recommended grading or field significance) of the site:	Generally Protected A

Statement of Significance (Heritage Value)	High social significance

Impact evaluation of the proposed project on heritage resources

Nature: During the operation of the project a secondary impact is expected for the site.		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	High (8)
Probability	Probable (4)	Probable (3)
Significance	**60 (High)**	**42 (Medium)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation: The site is located outside of the development footprint and no direct impact is foreseen on the site. However to protect the site from accidental damage it should be fenced off during construction with an access gate for family members and a 20 m buffer zone. (Please refer to section 7 for full details on recommendations).		
Cumulative impacts: If the mitigation recommendation is followed and the site is preserved no cumulative impact is foreseen on graves in the area.		
Residual Impacts: Archaeological and cultural sites are non-renewable and impact on any archaeological context or material will be permanent and destructive.		

6.3.3. Engraving site at Nelsonskop

Site Number	Engraving	**1:50 000 map nr**	2327 CB
Site Data	**Description:**		
Type of site	Open site		
Site categories	Stone Age and possibly Iron Age		
Context	On the southern face of the hill is a panel with animal spoors, capules and elongated grooves. On top of the hill several very ephemeral small circular stone wall foundations occur. The site is highly overgrown and it is not possible to determine site layout but seems to consist of loose standing enclosures. At the engraving site some triangular flakes, miscellaneous flakes and chunks occur made from quartzite. The site is located 60 meters to the west of the proposed transmission line alternative 2 and 3 and no direct impact is foreseen on the site.		
Cultural affinities, approximate age and significant features of the site;	Based on the small assemblage of stone tools it is not possible to accurately assign the artefacts to an industry but based on information for the stone age in the region the artefacts re possibly representative of the Post Howieson's Poort Industry and thus probably date to between 60 000 and 40 000 years ago (Lombard et. al. 2012).		
Photographs			

Figure 17: Southern view of engraved panel.

Figure 18: elongated grooves.

Figure 19: MSA flakes and undecorated ceramics.

Field Rating (Recommended grading or field significance) of the site:	Generally Protected A
Statement of Significance (Heritage Value)	Medium to High heritage significance

Impact evaluation of the proposed project on heritage resources

Nature: During the operation of the project an indirect visual impact is expected for the site. In addition, human traffic will be increased during construction and maintenance activities, and this can damage the resource.		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	**High (8)**	**Low (2)**

Probability	Probable (3)	Not Probable (2)
Significance	**60 (High)**	**16 (Low)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation: The site is located well outside of the development footprint of either alternative and no direct impact is foreseen on the site. However to protect the site from accidental damage it should be fenced off during construction and operation to protect the site against vandalism and damage. (Please refer to section 7 for full details on recommendations).		
Cumulative impacts: . N.A as no direct impact is foreseen on the site.		
Residual Impacts: Archaeological and cultural sites are non-renewable and impact on any archaeological context or material will be permanent and destructive.		

7. CONCLUSIONS AND RECOMMENDATIONS

The archaeology of the wider region has been recorded through several large scale CRM projects in the area (Huffman 2008, Huffman & van der Walt 2008, Huffman & van der Walt 2011, van Schalkwyk 2011, van Schalkwyk & Wahl 2014) and is characterised by Middle Stone Age sites representing what is called a Post Howieson's Poort Industry that date to between 60 000 and 40 000 years ago (Lombard et. al. 2012). These sites are associated with pans and ancient drainage systems throughout the larger study area. The remains of a few Iron Age cattle posts occur around pans to the north west of the current study area. These cattle posts were articulated with farming villages in the nearby Limpopo Valley. Ceramics from these sites (Huffman & van der Walt 2011) belong to a stylistic facies known as Letsibogo. This style dates to between 1550 AD and 1750 AD and was made by Sotho-Tswana people (Huffman 2007).

The area investigated for the proposed Thabametsi Coal-Fired Power Station and associated infrastructure is located in a hinterland without any drainage systems or pans. This water deficit for both people and livestock made the area unattractive for settlement in antiquity and a remarkable paucity of archaeological sites corresponds to findings of other heritage surveys in the area. More favourable environments existed at the Limpopo floodplain to the north, alluvial basins of the Mokolo and Lephalale Rivers to the south and the water rich Waterberg even further south.

The study area is however not void of heritage sites. Within the area investigated for the power station (on the farm Onbelyk) the demolished remains of two dwellings (Ruin 1 and 2) were identified. Ruin 2 was associated with a single grave of Hendrik Johannes van Wyk who passed away in 1959, it is therefore assumed that ruin 2 dates to the same period. Due to the extent of the destruction of the ruins they are of low heritage significance and based on the date from the associated grave are not older than 60 years and therefore not protected by legislation. Ruin 1 will be directly impacted on by the proposed development footprint while ruin 2 is located on the periphery of the development and a secondary impact is foreseen on the site. No further action is necessary for these sites but it must be kept in mind that sites like these may contain graves that has not been recorded. The recorded grave site of Mr van Wyk is also located on the periphery of the power station footprint and a secondary impact is foreseen on the site. The site is already fenced with an access gate and it is recommended that a buffer zone of 20 meters is kept around the site and demarcated by a fence. If the site is fenced off with a 20 m buffer zone the grave will be protected in situ, which will be the preferred option.

Three alternatives are proposed for the transmission lines, of which alternative 1 is the preferred option from a heritage point of view. The alternative does not impact on any recorded heritage resource where alternative 2 and 3 are aligned just to the east of Nelsonskop (also known as Koorn Kop) where

engravings of animal spoor, ceramics, stone walls and MSA artefacts occur. It is recommended that a heritage walk through must be conducted when the preferred alternative has been determined. Any heritage sites recorded then could be mitigated by micro adjustments of the tower positions. If option 2 or 3 is decided on certain management measures will have to be enforced to ensure the protection of heritage sites.

If any possible finds such as tool scatters, bone or fossil remains are exposed or noticed during construction, the operations must be stopped and a qualified archaeologist must be contacted to assess the find. If required, a permit must be obtained from SAHRA prior to impacting on any heritage resources.

Due to the subsurface nature of archaeological material and graves the possibility of the occurrence of unmarked or informal graves and subsurface finds cannot be excluded. If during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find.

No fatal flaws were identified during the AIA and subject to approval from SAHRA there is from an archaeological point of view no reason why the development should not proceed if the recommendations as made in this report are adhered to.

8. PROJECT TEAM

Jaco van der Walt, Project Manager

9. STATEMENT OF COMPETENCY

I (Jaco van der Walt) am a member of ASAPA (no 159), and accredited in the following fields of the CRM Section of the association: Iron Age Archaeology, Colonial Period Archaeology, Stone Age Archaeology and Grave Relocation. This accreditation is also valid for/acknowledged by SAHRA and AMAFA.

I have been involved in research and contract work in South Africa, Botswana, Zimbabwe, Mozambique and Tanzania as well as the DRC; and have conducted more than 300 AIAs since 2000.

10. REFERENCES

Aukema, J.1989. *Rain-making: a thousand year-old ritual?* South African Archaeological Bulletin 44: 70-72.

Biemond, W.M., 2005. The Iron Age sequence around a Limpopo River floodplain on Basinghall Farm, Tuli Block, Botswana, during the Second Millennium AD. Proceedings of the 12th Congress of the Pan African Archaeological Association for Prehistory and Related Studies, July, Gaborone, Botswana.

Deacon, H.J., Deacon, J. 1999. Human Beginnings in South Africa. David Philip, Cape Town.

Geskiedenisatlas van Suid-Afrika. Die vier noordelike provinsies. Edited by J. S. Bergh. 1999. Pretoria: J. L. van Schaik Uitgewers

Huffman, T.N., 1990. The Waterberg research of Jan Aukema. *South African Archaeological Bulletin* 45, 61-70.

Huffman, T.N. 2007. Handbook to the Iron Age. The archaeology of pre-colonial farming societies in Southern Africa. Pietermaritzburg: University of KwaZulu-Natal Press.

Huffman, T.N., Van der Walt, J. 2008. *Mafutha EBA: Cultural Heritage and Archaeology Report*. A field study prepared for Environmental Resources Management. Archaeological Resources Management, Johannesburg.

Huffman, T.N. Van der Walt, J. 2011. *Mafutha Heritage Report*. A field study prepared for Environmental Resource management, Sasol Technology, SRK Consulting and Sustainable Environmental Solutions. Archaeological Resources Management, Johannesburg.

Kuman, K., 1998. The earliest South African Industries. In: *Lower Palaeolithic Settlement of the Old World*. Eds by M.D. Petraglia and R. Korisetter, pp 151-186. Routledge Press, London.

Lombard, M. Wadley, L., Deacon, J., Wurz, S., Parsons, I., Mohapi, M., Swart, J. & Mitchell, P. 2012. *South African and Lesotho Stone Age sequence updated (I)*. South African Archaeological Bulletin 67(195): 120 - 144.

Lewis-Williams, J.D., 1981. *Believing and Seeing: Symbolic Meanings in southern San Rock Paintings*. Academic Press, London.

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

Mitchell, P., 2002. *The Archaeology of Southern Africa*. Cambridge University Press, Cambridge.

Mucina, L. & Rutherford,M.C. 2006. The vegetation map of South Africa, Lesotho and Swaziland. SANBI, Pretoria.

National Heritage Resources Act NHRA of 1999 (Act 25 of 1999)

Pistorius, J.C.C. 2007. *A Phase 1 Heritage Impact Assessment Study for the Eskom Mmamabula Delta Project near Lephalale in the Limpopo Province of South Africa*. Prepared for PBA International.

SAHRA Report Mapping Project Version 1.0, 2009

South African Heritage Information System 2013

Van der Walt, J. 2012. Archaeological Scoping Report for the proposed IPP Waterberg Powerstation, Lephalale, Limpopo Province. Unpublished report.

Van der Ryst, M.M.1998. *The Waterberg Plateau in the Northern Province, RSA, in the Later Stone Age.* British Archaeological Reports (BAR) International Series 715. Oxford.

Van der Ryst, M.M., 2006. *Seeking Shelter: Later Stone Age Hunters, Gatherers and Fishers of Oliboompoort in the western Waterberg south of the Limpopo*. Unpublished doctoral thesis, University of the Witwatersrand, Johannesburg

Van Schalkwyk, J.A. 2005. *Heritage Impact Scoping Report for the Proposed New Matimba B Power Station. Lephalale District, Limpopo Province.* An unpublished report by the National Cultural History Museum on file at SAHRA as: 2005-SAHRA-0106.

Van Schalkwyk, J.A. 2011. *Heritage Impact Assessment Report for the proposed establishment of the Exxaro PV Plant on the farm Nelsonskop, Lephalale, Limpopo Province*. Prepared for Savannah Environmental (Pty) Ltd.

Van Schalkwyk, L & Wahl, E. 2014. Draft Phase 1 Heritage Impact Assessment Report:Proposed Zonderwater Project Area, Lephalale Local Municipality, Waterberg District, Limpopo Province, South Africa

Volman, T.P. 1984. Early prehistory of southern Africa. In: Klein, R.G. (ed.) *Southern African Prehistoryand Palaeoenvironments*: 169-220. Rotterdam: Balkema

Wadley, L., 1987. *Later Stone Age Hunters and Gatherers of the southern Transvaal*. BAR International Series 380, Oxford.

Wits Archaeological Database