Archaeological Impact Assessment

For the proposed Cuprum to Burchell and Burchell to Mooidraai 132KV Lines, Prieska, Northern Cape Province.

Prepared For

Savannah Environmental (Pty) Ltd

By

HERITAGE
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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

Savannah Environmental (Pty) Ltd, on behalf of Hamsa Engineering, appointed Heritage Contracts and Archaeological Consulting CC (HCAC) to conduct an Archaeological Impact Assessment for the proposed 132 kV power line between the Caprum Substation – Burchell Substation – Mooidraai Substation (approximately 95 km) within a 300 meter corridor. Two alternatives were also assessed (Burchell – Mooidraai alternative and the Burchell – Cuprum alternative). The proposed project is located between the town of Copperton and to the east of Prieska within the Siyathemba Municipality in the Northern Cape Province.

Closer to Copperton the study area is slightly undulating with several prominent quartzite ridges that is used as raw material for stone tools, other landscape features consist of ephemeral pans that will not be directly impacted by the proposed power lines. To the east of Prieska the study area is also undulating marked by gravel pavements, deflated Aeolian sand with the most prominent feature being the Brak River.

During the survey 11 Sites were recorded consisting of Stone Age scatters and abandoned farmsteads and outbuildings as well as a tree known as De Wet se Boom forming part of the cultural landscape. A background scatter of Stone Age material occur throughout the study area consisting of isolated and low density LSA and MSA artefacts.

Due to the numerous renewable energy developments in the area six CRM studies were conducted on the properties that the proposed power line traverses and the archaeology of the region is well recorded.

The impacts to heritage resources by the proposed development are not considered to be highly significant and the impact on archaeological and historical sites can very easily be mitigated by micro adjustments to the tower footprints in order to preserve sites in-situ.

The preferred alternative is to follow the existing power line from Mooidraai to Cuprum as long as the recommendations made in this report are adhered to. The impacts on heritage resources by this project are not considered to be high and with the correct mitigation both alternatives are acceptable.

If the recommendations as made in section 7 of this report are adhered to (subject to approval from SAHRA) there is, from an archaeological point of view, no reason why the development should not proceed.

General

Due to the subsurface nature of archaeological material and unmarked graves, the possibility of the occurrence of such 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/s.

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.*

Archaeological Consulting CC the full price for the work as agreed, shall be entitled to use for its own benefit and for the specified project only:

- The results of the project;
- The technology described in any report;
- Recommendations delivered to the Client.

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 250 000 years ago)

Middle Stone Age (~ 250 000 to 40-25 000 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

Heritage Contracts and Archaeological Consulting CC (HCAC) was appointed to conduct an Archaeological Impact Assessment for the proposed 132 kV power line between the Caprum Substation – Burchell Substation – Mooidraai Substation (approximately 95 km) within a 300 meter corridor. Two alternatives were also assessed (Burchell – Mooidraai alternative and the Burchell – Cuprum alternative).

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 background study that includes collection from various sources and consultations; Phase 2, the physical surveying of the study area on foot and by vehicle; Phase 3, reporting the outcome of the study.

During the survey 11 heritage sites were identified consisting of low density scatters of mainly LSA and MSA material as well as elements relating to the built environment and cultural landscape. 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 review.

1.1 Terms of Reference

Desktop study

Conduct a brief desktop study where information on the area is collected to provide a background setting of the archaeology that can be expected in the area.

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 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 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 Heritage 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 section s.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 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 Burchell-Caprum section is located on the following farms:

- Prieskas Poort 51
- Jackals Water 86
- Uitzigt 89
- Drielings Pan 101
- Bosjesmans Berg 67
- Nels Poortjie 103
- Vogelstruis Bult 104

The Burchell-Mooidraai section is located on the following farms:

- Erf 1
- Uitdraai 33
- Holsloot

The proposed power lines and alternatives are located north of the 357 provincial road between Copperton and Douglas (Figure 1). The preferred alternative follows the existing Eskom power line that traverses the site from east to west located in the northern portion of the farms with in the study area. The proposed alternatives follow the 357 in the southern portion of the study area. There are various drainage lines draining the study area and a major river, the Brak River. Several landscape features like pans, quartzite ridges and the "Doringberge" mountain range are located close to Prieska. The vegetation is predominantly Bushmanland Arid Grassland vegetation in the Nama-Karoo biome (Mucina & Rutherford 2006) which consists of Karoo scrub and grass and a few isolated *Acacia karoo* trees. Soils are mostly shallow on top of a calcrete layer with gravel distributed throughout the study area (Figure 2-5) apart from some areas with fairly deep Aeolian sand cover.

1.3.2. Location Map

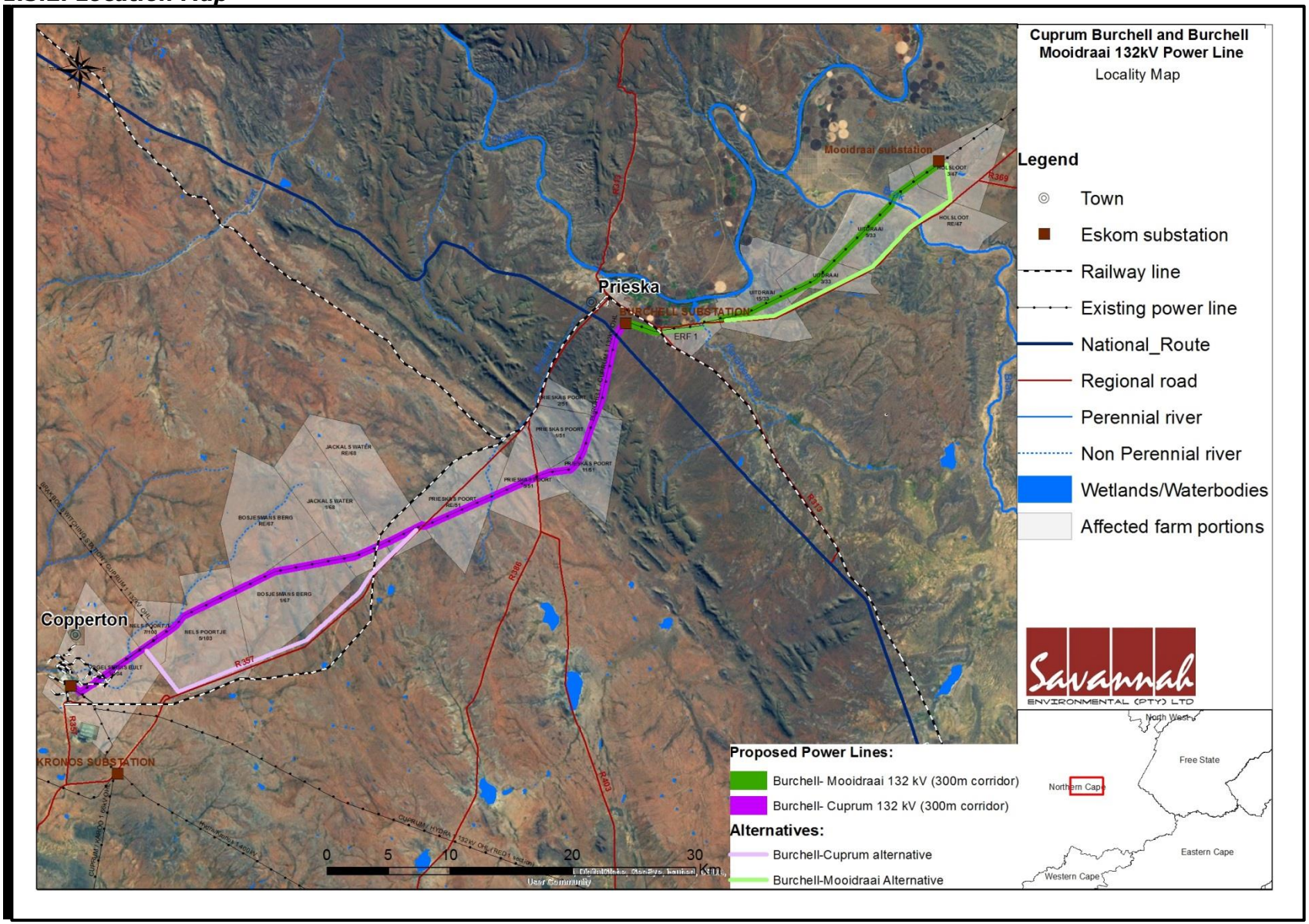

Figure 1: Locality map.

Figure 2. Site conditions in the western portion of the study area note the shallow Aeolian sand.

Figure 3. Gravel pavements that are characteristic of the study area.

Figure 4. Hard packed Aeolian sand on calcrete in the western portion of the study area.

Figure 5. Calcrete and gravel that is characteristic of the study area.

2. APPROACH AND METHODOLOGY

The aim of the study is to cover archaeological databases to compile a background of the archaeology that can be expected in 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, scanning existing records for archaeological sites, historical sites, graves, architecture (structures older than 60 years) of the area. The following approached was followed for the desktop study.

2.1.1 Literature Search
Utilising data for information gathering stored in the national archives and published reports relevant to the area. The aim of this is to extract data and information on the area in question.

2.1.2 Information Collection
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
The heritage team did consult with the farm owners where possible regarding graves or sites of archaeological and historical significance (refer to section 4).

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
Due to the nature of cultural remains, the majority of which occurs below surface, a field survey of the study area was conducted over 5 days, this is in addition to the work that was previously done on the farms Vogelstruisbult, Nelspoortjie and Bosjesmansberg (Wiltshire (2011), van der Walt (2012 & 2013). The study area was surveyed by means of vehicle and extensive surveys on foot. Access to the preferred alternative was obtained through the ESKOM service road for the existing power line The survey was aimed at covering as much of the alignment corridor, but also focused on specific areas on the landscape that would be more likely to contain archaeological and/or other heritage remains like drainage lines, rocky outcrops as well as slight elevations in the natural topography. Track logs of the areas covered are available on request.

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 sand cover and vegetation, and the possible occurrence of unmarked graves and other cultural material cannot be excluded. Only the proposed alignments and alternatives as indicated in the location map was surveyed, and not the entire farms the power line corridors traverse. It was not possible to get access to Portion 3 of the Uitdraai 33 and the remainder of Prieskas Poort 51 and these areas where not visited during the fieldwork. As Vogelstruisfontein was previously covered by Wiltshire (2011) this area was not covered again.

In the western and central section archaeological visibility was at its lowest due to moderate to deep red Aeolian sands and low bushes. The Aeolian sands that covered most of the recorded sites also hampered an accurate estimation of site density and site extent. Depending on erosion and movement of the sand these counts can vary to a large degree when the study area is revisited in future. It is assumed that information obtained for the wider region is accurate and applicable to this study. This report does not claim to have recorded every single artefact cluster due to the size of the study area and the widespread occurrence of cultural material throughout. Sufficient information was recorded to establish the cultural sequence of the area and to mitigate the anticipated impacts resulting from the development.

Although HCAC 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 upgrade of the Cuprum Mooidraai Burchell distribution line includes the construction of a new 132 Kv power line to replace the existing power line. The project includes the construction of a 132 Kv line for approximately 95 km between the Cuprum Substation, Burchell Substation and Mooidraai Substation. The power line will have a corridor of approximately 300 m. Pylons are single pole structures.

4. HISTORICAL AND ARCHAEOLOGICAL BACKGROUND OF THE STUDY AREA

4.1 Databases Consulted

SAHRIS

Jayson Orton (2012) conducted a study to the south west of the study area on the farm Hoekplaas and Wiltshire (2011) on portion 3 and 4 of the farm Nelspoortjie (now called Vogelstruisfontein). Van der Walt (2012 & 2013) conducted studies on Nelspoortjie and Bosjemansberg. Recently a study (Ndlovu & Magoma 2013) was conducted on the farm Prieskas Poort for Zinc prospecting but surprisingly found no Stone Age material. All the other studies recorded ESA, MSA and LSA artefacts scattered over the landscape with MSA and LSA sites centred around pans. Orton also recorded stone walled enclosures. To the east and north east of Prieska several studies were conducted (Beaumont 2008, van Schalkwyk 2011a,b,c Gaigher 2012, Murimbika 2012), Some of these studies were conducted on farms that the power line traverses and is summarised below these areas were revised as part of the current study.

Farm Name	***Assessed by***	***Proposed Power Line***
Vogelstruisfontein	Wiltshire 2011	Burchell - Cuprum
Nelspoortjie	Van der Walt 2012	Burchell - Cuprum & Burchell - Cuprum Alternative-
Bosjemansberg	Van der Walt 2013	Burchell - Cuprum & Burchell - Cuprum Alternative-
Prieskaspoort	Ndlovu & Magoma 2013	Burchell - Cuprum
ERF 1	Murimbika 2012	Burchell - Mooidraai
Holsloot	Geigher 2012	Burchell – Mooidraai & Burchell – Mooidraai Alternative

Genealogical Society and Google Earth Monuments

The Genealogical Society does not have any cemeteries on record within the proposed corridors. The monuments database at Google Earth have the British Stone fort on record within the town of Prieska dating to 1900.The power lines are located approximately 3km to the south of the fort and will not impact on any way on the site.

Consultations

Erf 1	Johan Badenhorst	Not aware of any sites
Farm 51/3	Alex Sandenbergh	Not aware of any sites
Farm 51/1 Farm 51/11	William Marais	Not aware of any sites
Farm 51/5	Dirk Wessels	Not aware of any sites
Farm 68(rem) Farm 68/1	Petro Steenkamp	Not aware of any sites
Farm 33 (rem)	Orffer Muller	Not aware of any sites
Farm 33/3	Tom Theron	Rock Engravings well north of the preferred alternative
Farm 51(rem)	J.P.C. Du Toit	"De Wet se boom"
Farm 47/3	Christa Muller	Not aware of any sites

4.2. A Brief History of Human Settlement And Black And White Interaction In The Study Area

In order to understand the historical context of a certain area, it is necessary to consider the geographic and climatic nature of the region in question. The town of Copperton is located in a region in South Africa known as the Upper Karoo. One gets a good idea of what the natural landscape in the Upper Karoo was like between the late 1700s and early 1800s when one reads the transcripts of some of the early European travellers who passed through the area. One C. J. Skead compiled a book in which many of these texts are assembled. In November 1900, the traveller W. Somerville wrote about the Groot Riviers Poort, or Prieskapoort, 10km south of Prieska and therefore not very far from Copperton. He noted that grasslands and thorn trees covered the landscape, but that no other tree was to be seen. When he neared the Orange River, he noted that the banks were covered with wood, but only along the margin of the river. These were mainly willow and karee trees. Along the tributary streams were thorn trees. (Skead 2009: 87)

Exactly one year later, One P. B. Borcherds wrote about the Grootrivierpoort at Prieska, making similar remarks about the flora as Somerville did. He also noted that the *poort* at the entrance to the Orange River was known by the "natives" under the name of t'Gariep. When this traveller passed along the banks of the Orange River near Prieska in the same year, he made notes on the Bushmen, who were still present in the area at that time. Regarding the manufacturing of bows and arrows by the Bushmen, he noted that the wood of the bow was of a type of tree commonly known as *caree boomen,* which was very tough and pliable. The arrows were made of a type of reed fairly common along all springs and river flowing there, known as *fluitjies riet*. The Bushmen apparently used the poison of venomous plants and poison extracted from the fangs of snakes to smear on their arrow points. These people also found sustenance in a type of small bulb, commonly called *mans uitjies* by the Khoikhoi, which were described to be the size of small marbles and not unpleasant in taste. (Skead 2009: 87-88)

In September 1822, W. J. Burchell passed through Prieska, as well as the area to the south and southwest thereof. Some 50km southwest of Prieska, he found a large muddy dam, which was situated in a very extensive hollow flat. This would become a lake in the rainy season. There was apparently still some clean water to be found. The area around this was hard and dry, and plentifully strewed with stones and low shrubs. Burchell passed through Prieska to the Orange River in the same month. He noted that none of the bushes exceeded a foot in height. Nearer to the Orange River, the travelling party found a group of Khoikhoi camped in a grove.

By 1903, Copperton was located in an area in which the annual rainfall measured between 10 and 20 inches, and was therefore quite arid. The farm area is located in a summer rainfall region. By the early 1900s, the Prieska district, in which Copperton would be located, could not be considered a very agriculturally active area. Only between 25 and 50 sheep were kept per square mile, and only between 2 and 5 heads of cattle. The area where Copperton was later founded would have been too dry and too far from the Orange River to allow for the growing of crops. (Burton 1903: 40; 256)

On 16 November 1991, an article was published in *Die Burger* with regards to the town Copperton. It was asserted that the old deserted Northern Cape mining town would be developed and populated as a "Volkstaatsdorp" (city state / Volkstaat town) by the Oranje Development Corps. It was said that Copperton would then be the second Volkstaat town in South Africa that had been developed exclusively to be inhabited by whites. Earlier that year, Orania had been developed as such a town. Though the town of Copperton had been abandoned at the time, a business centre, primary school, nursery school, an office development and a drive-in theatre had been developed. About 50% of the town's streets were tarred. (Anon 1991: 2)

In November 1991, the Weekend Argus also published an article regarding the development of Copperton as an Orania-like town. It was noted that the 300 hectares mine area near the town would be used for industrial development, and that agriculture, as well as light industry such as steel, rubber and textile industries, were expected to be developed in the town. It could not be ascertained whether this town was eventually developed in this way. (Anon 1991: 5)

In an article in the Patriot, dated December 1995, some background information is given on the history of the town of Copperton. This town is not very old, as it was only developed in 1972 with the establishment of a copper mine in the area. The mine closed in 1992, and Copperton was sold to a private person, on the condition that the houses in the town would be demolished. About 300 houses were broken down, when it was decided that some homes would be kept in order to develop a retirement town. These houses were apparently solidly built, with stone walls and sink roofs. It was noted that the area was very sparsely populated, and that the farmers in the area farmed with sheep. Next to the Orange River, corn, maize and grapes were planted. It was noted that the closest hospitals were located at Prieska, some 35 to 40 minutes' drive from Copperton, and linked with a tarred road. (Anon 1995: 4)

4.3. Stone Age Background

4.3.1. Stone Age Background of the study area

Beaumont *et al.* (1995: 240) observed that "thousands of square kilometres of Bushmanland are covered by a low density lithic scatter". These artefacts are generally very well weathered and mostly pertain to the ESA and MSA. Occasional LSA artefacts are also noted. What is noteworthy of the Northern Cape archaeological record is the presence of pans which frequently display associated archaeological material. Of interest here is the work of Kiberd (2001, 2005, 2006) who excavated Bundu Pan, some 25 to 30 km northwest of Copperton. The site yielded ESA, MSA and LSA horizons and the artefacts were accompanied by warthog and equid teeth to name a few (Beaumont *et al.* 1995).

Orton (2012) noted that to the northwest, west and southwest of Copperton sites have been investigated by Beaumont and colleagues (1995), Smith (1995a) and Parsons (2003, 2004, 2007, 2008) yielding LSA deposits. Work on these sites led to a distinction between hunter-gatherer and herder sites, based on stone artefact assemblages (Beaumont *et al.* 1995). All these Later Stone Age sites have very few, if any, organic items on them. The only organic material found on sites like these is fragments of ostrich eggshell probably belonging to broken water containers. Such flasks have been widely recorded across the Northern Cape (Morris 1994).

The archaeological importance of pans in the area are now well documented (Kiberd 2006, Wiltshire 2011, Orton 2012) and if any occur in the study area they could be of significance. Van der Walt (2012) recorded low densities of ESA, MSA and LSA scatters just west of the current study area and were given a field rating of low archaeological significance. However, several discrete MSA and LSA sites were also documented. Similar to the study by Orton (2012) a stone enclosure was also recorded as several sites with historic material during the 2012 study.

Most of the material expected for the study area is MSA in nature consisting of large flakes, radial and bipolar cores, points, end scrapers, large utilized and retouched blade tools, and utilized and retouched flakes. Raw material are expected to be predominantly in fine grained quartzite, hornfels, banded ironstone, chert and vein quartz based on the results of previous studies conducted in the area.

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 quarry extension 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 acknowledged 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 7 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 sites as per the impact rating methodology employed by Savannah environmental:

» 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

At the start of the survey Stone Age material was immediately noticed scattered in varying densities throughout the study area conforming to other studies as mentioned earlier. Therefor low density scatters (> 5 artefacts per m²) constitute background scatter and were not recorded. Scatters higher than 5 artefacts per m² were given site numbers and areas where quartzite and quartz outcrops were exploited were also recorded as sites (even though some of them might be of low heritage significance). Two ephemeral pans are located on the farm Bosjemansberg and were also recorded as sites due to the archaeological sensitivity of pans in the area (Kibberd 2006). Individual occurrences were not point plotted within the recorded sites however an attempt was made at determining site extent. The use of the term 'site' was entirely arbitrary and does not necessarily reflect a knapping, quarry or habitation site (unless otherwise stated).

The study area is characterised by gravel and hard packed (deflated) Aeolian sand on top of a calcrete layer (especially in the western portion of the study area). In these areas MSA tools on the locally available quartzite and quartz are found in abundance with LSA material on CCS. MSA artefacts consisted of large flakes, radial and bipolar cores, points, end scrapers, large utilized and retouched blade tools, and utilized and retouched flakes. Localised MSA quarries exploiting quartz outcrops, quartzite ridges, bedrock and boulders were also found. This is a widespread occurrence with numerous quarries recorded in the area (Wiltshire 2011; van der Walt 2012).
LSA tools (scrapers, retouched and utilised flakes, blades and small round cores) were found in comparatively fewer concentrations compared to the MSA tallies. Several isolated hand axes (e.g Figure 23 & 27) were recorded throughout the area, these artefacts are heavily weathered, rolled and patinated that may indicate their long exposure to the elements and corrosion and that they may not be in situ. Where the Aeolian sand (Figure 11 & 12) overlay the calcrete, artefact counts drastically drop although the odd tool was observed in these areas. In these areas vegetation is also much higher with grasses and shrubs standing 50-70 cm high hampering archaeological visibility. ESA, MSA and LSA artefacts are mixed and indicate that downward deflation had occurred in the study area.

The farm Prieskas Poort is very mountainous due to the 'Doring Berge" and only isolated tools were found in this area. The areas surrounding this mountain range is marked by deep Aeolian sands with very stone tools recorded on the surface. To the east of Prieska the area is marked by gravel pavements as well as deep Aeolian sands. No ESA was recorded in this area during the survey although isolated ESA artefacts were recorded by Murimbika (2012). MSA artefacts dominate the Stone Age component although LSA material was recorded on the farms Uitdraai and Holsloot.
Almost all of the assemblages to the west of Prieska are mixed, mainly consisting of MSA and LSA artefacts with some ESA artefacts recorded. The ESA and MSA are dominated by quartzite with the LSA component on CCS. A wider range of raw material is utilised to the east of Prieska where MSA are mostly on quartzite and to a lesser degree on banded Iron Stone and granite.

All recorded occurrences were given site numbers (Table 1). GPS points were taken at such places and selections of artefacts were photographed.

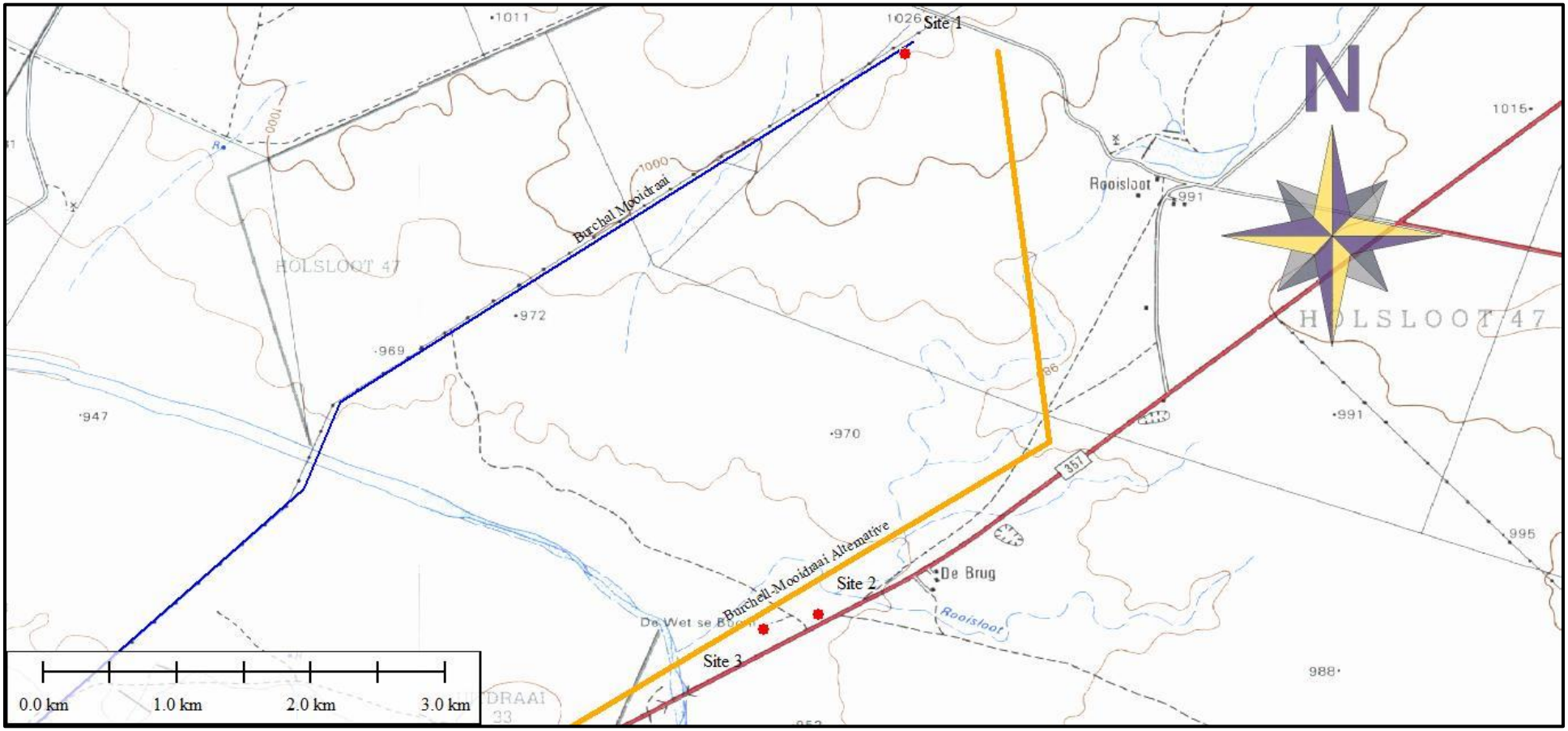

Figure 6. Site distribution map for the farm Holsloot.

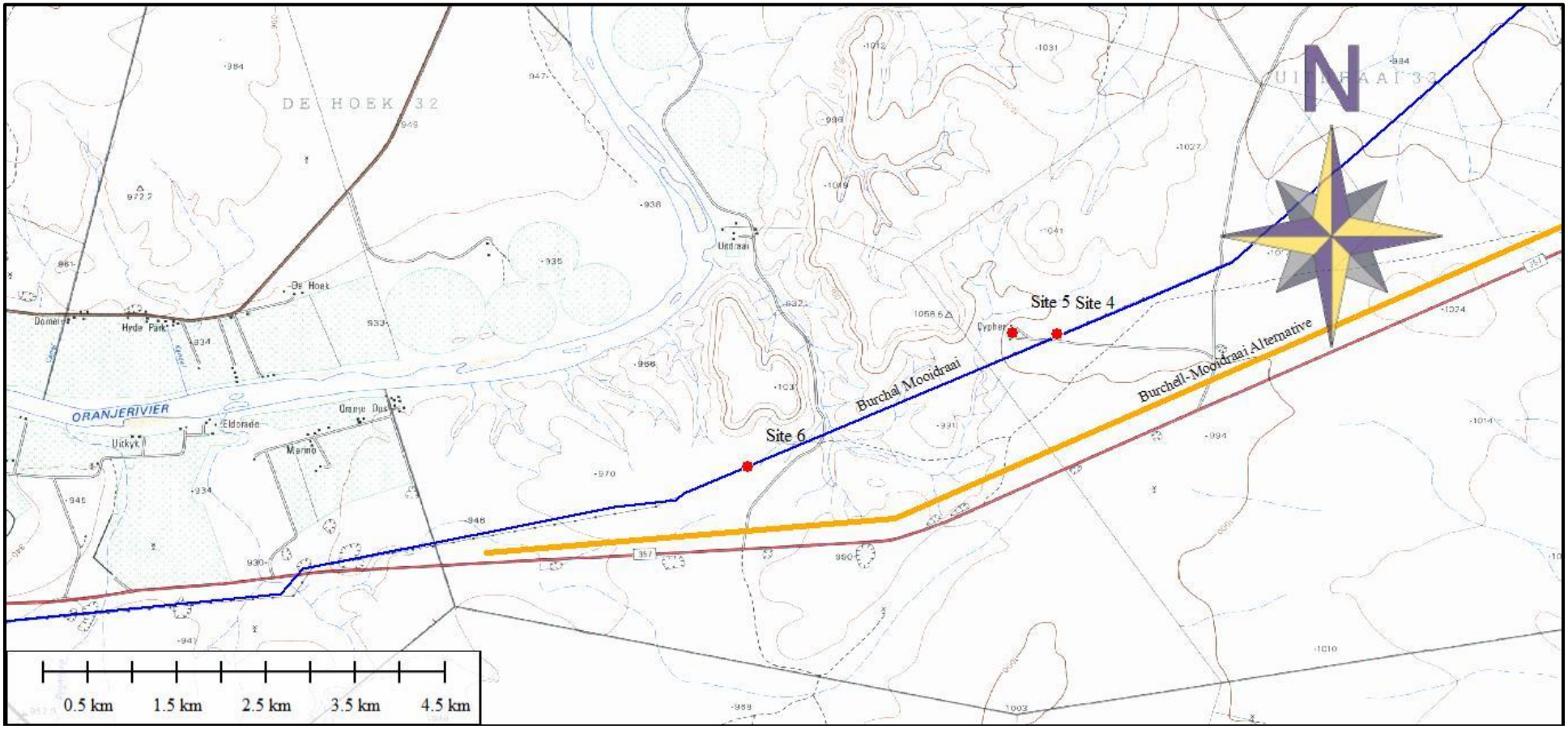

Figure 7: Site distribution map for the farm UItdraai.

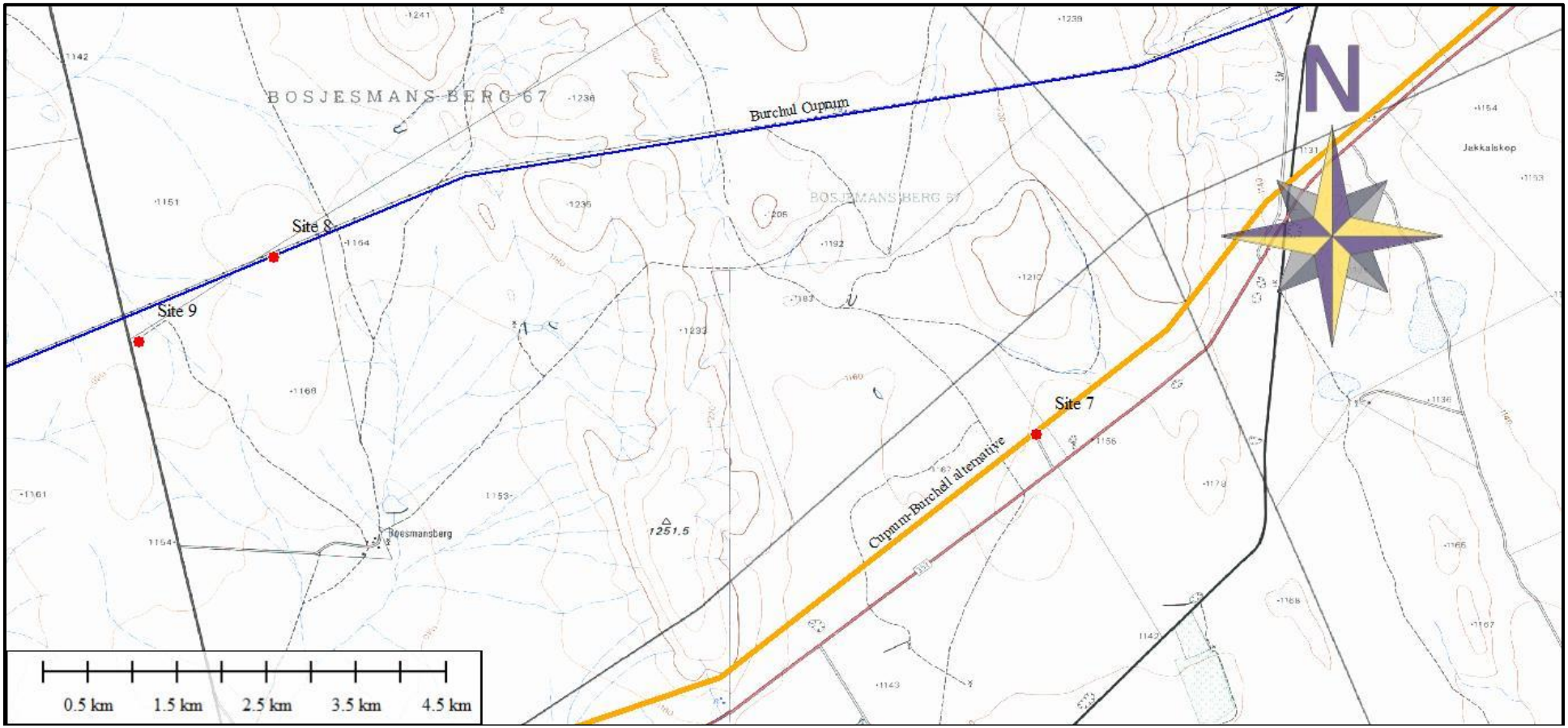

Figure 8: Site distribution map for the farm Bosjesmansberg.

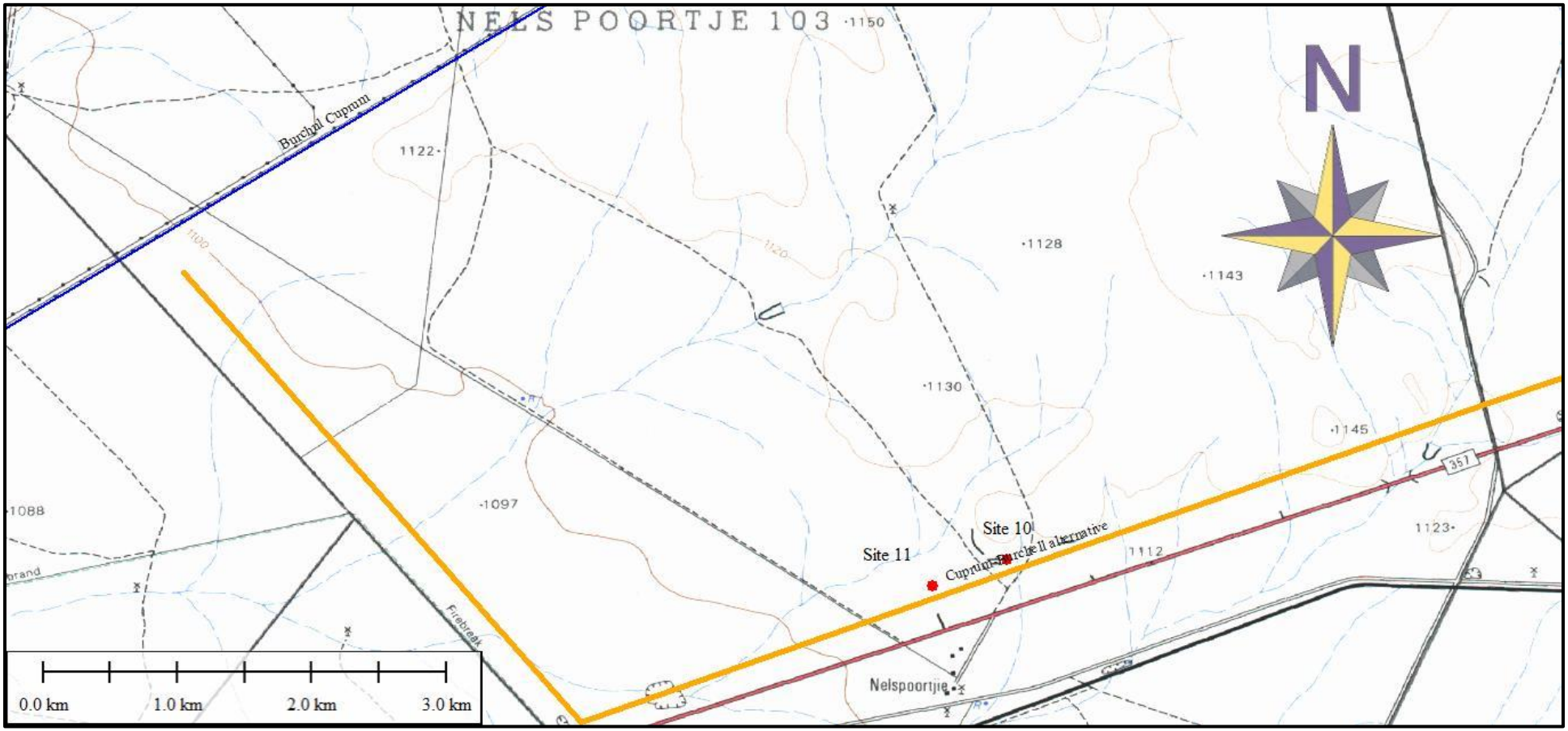

Figure 9: Site distribution map for the farm Nelspoortjie.

Figure 10. Aeolian sand cover in the eastern portion.

Figure 11. Aeolian sand in the western portion of the study area.

Figure 12. Gravel pavements on calcrete that characterise the study area.

Figure 13. Mountainous areas on the farm Prieskaspoort.

6.1. DESCRIPTION OF FINDS

6.1.1 Sites with Coordinates

Site Number	Type Site	Cultural Markers	Co ordinate
Site 1	MSA and LSA	Scatter of MSA and LSA on low hill.	S29 34 45.6 E23 01 55.3
Site 2	Historic/Recent	Ruin.	S29 37 00.3 E23 01 34.6
Site3	Historic	Tree referred to as 'De Wet se boom".	S29 37 03.9 E23 01 21.4
Site 4	MSA	Low density of MSA flakes. Pointed flakes, dorsal flaking.	S29 40 18.2 E22 54 36.2
Site 5	Historic/recent	Ruin.	S29 40 17.9 E22 54 20.0
Site 6	MSA and LSA	Mostly LSA with some MSA	S29 41 05.9 E22 52 44.1
Site 7	Historic/recent	Ruin.	S29 54 11.0 E22 31 49.0
Site 8	MSA and LSA	Rocky outcrop, LSA and MSA	S29 53 06.9 E22 27 13.2
Site 9	MSA quarry site	Quartzite outcrop with scar flaking. Low density of MSA flakes.	S29 53 37.7 E22 26 24.5
Site 10	Recent/Historical	Exploration trenches	S29 57 14.0 E22 25 09.3
Site 11	Stone Age	MSA and LSA eroding from under red dunes.	S29 57 20.3 E22 24 51.4

Site 1, Scattered MSA and LSA

Site 1 is located next to the Mooidraai substation close to the existing power line. MSA artefacts with a density of 3 -5 artefacts per m² are scattered over a large area (approximately 0.11ha). The site is characterised by red Aeolian sand on top of a calcrete layer. Most of the artefacts in this area consist of MSA flakes and blades with dorsal and lateral retouch, some pieces show signs of being utilised (Figure 14). Raw material for the MSA varies but is to a lesser extent on quartzite compared to the west close to Copperton. LSA are microlithic mostly on CCS.

As one moves to the west the sand cover increases and artefact counts drop, obscured by the sand cover.

Heritage significance: Generally Protected C (GP.C)

Site 2, Ruins.

The site consists of two small rectangular structures (Figure 15). Glass, metal and wire are scattered over the site. According to the farm owner Mr Jannie du Toit, these structures used to be the local post office with a central telephone line where people in the district came to make calls. The site is possibly older than 60 years

Heritage significance: Generally Protected B (GP.B)

Site 3, "de Wet se boom"

The site consists of a very large thorn tree (Figure 16) referred to as "de Wet se boom". The tree was used by General de Wet during the Boer war to have meetings under. According to locals he was cornered in this area by the British as the Brakriver and Orange River was in flood and a local farmer crossed the flooded river to warn him of the approaching British. The site is of high significance to locals.

Heritage significance: Generally Protected A (GP.A)

Site 4, **Surface scatter of MSA**

The area is marked by a widespread surface scatter of mostly MSA artefacts (Figure 17). Site density is approximately <3 per m² over an estimated area of 0.2ha.

Heritage significance: Generally Protected C (GP.C)

Site 5 and 7, Ruin.

Site 5 consists of an abandoned farmstead including a house, wind pump as well as other outbuildings (Figure 18). Glass and metal artefacts are found scattered over the site.

Site 7 consists of a rectangular stone walled cattle kraal and other infrastructure possibly an old farmhouse. It was not possible to visit the site due to access restrictions.

Heritage significance: Generally Protected B (GP.B)

Site 6, Scatter of LSA material

The site consist of a low to medium density of artefacts (2-3 per m²) mostly LSA but with a MSA component (Figure 19). The LSA component is microlithic and artefacts consist of unretouched flakes and

blades. MSA tools are made from dolerite with faceted butts. The site is found on an open patch in the natural vegetation exposed by sheet erosion on a small hill.

Heritage significance: Generally Protected C (GP.C)

Site 8 consists of a quartzite outcrop with MSA and LSA artefacts (Figure 20) scattered around it with an artefact density of approximately 4 per m². MSA tools is characterised by blades with dorsal retouch on locally available quartzite. The LSA component consists of blades, chunks, small cores on CCS.

Heritage significance: Generally Protected A (GP.A)

Site 9

The site consists of a blue-grey quartzite outcrop that is fairly low standing, approximately 40 cm above the surface, with some evidence of flake scarring (Figure 21). This may suggest a source for knapping material. A low density of MSA flakes (<2 per m²) are found scattered around this outcrop.

Heritage significance: Generally Protected B (GP.B)

Site 10

The site consists of exploration trenches where according to the farm owner, Mr Pieter Fourie (personal communication), exploration for copper was conducted after the 1930's.

The site will not be impacted on by the proposed development as no turbines or access routes are planned close to it.

Heritage significance: Generally Protected C (GP.C)

Site 11

The site consists of a low density scatter of artefacts (3 per m²) with a MSA and a possible LSA component with horizontal deflation. Artefacts consist of unretouched flakes, blades, radial cores mainly on quartz and quartzite. The artefacts are eroding out from under the red Aeolian sands.

Heritage significance: Generally Protected C (GP.C)

Figure 14: Dorsal and ventral views of artefacts at Site 1

Figure 15: Standing buildings at Site 2

Figure 16: "de Wet se boom" Site 3

Figure 17: Range of artefacts at Site 4

Figure 18: Structures at Site 5.

Figure 19: Range of raw material at Site 6.

Figure 20: Range of artefacts at Site 8.

Figure 21: Quartzite outcrop with flake scarring at Site 9.

Stone Age artefacts were observed in low densities over much of the study area where Quartzite strongly dominates the MSA component. Artefacts consist mostly of bipolar cores, large flakes and blades with faceted buts. The LSA component is mostly made from CCS and is micro lithic supporting an ascription to the LSA although some pieces might be macro lithic.

Impact evaluation of the proposed project on heritage resources

Sites 1, 4, 6 and 11.

Nature: During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.		
	Without mitigation	**With mitigation (Preservation/ excavation of site)**
Extent	Local (2)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (3)	Low (3)
Probability	Probable (3)	Probable (2)
Significance	**30 (Medium)**	**27 (Low)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	N.A	N.A
Can impacts be mitigated?	N.A	N.A
Mitigation: The occurrences are widespread in the general study area and have been sufficiently recorded in this report.		
Cumulative impacts: Archaeological sites are non-renewable and impact on any archaeological context or material will be permanent and destructive.		
Residual Impacts: The archaeology of the area is well recorded and this development will not have a high impact on the Stone Age background scatter of the area.		

Site 8 and 9

Nature: During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.		
	Without mitigation	**With mitigation (Preservation/ excavation of site)**
Extent	Local (2)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**39 (Medium)**	**30 (Low)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes unless sites can be preserved.
Can impacts be	Yes	Through preservation or

mitigated?		excavation/sampling of sites.
Mitigation: It is recommended that these two sites should be preserved in situ through micro adjustments of the pylon positions.		
Cumulative impacts: Archaeological sites are non-renewable and impact on any archaeological context or material will be permanent and destructive.		
Residual Impacts: The archaeology of the area is well recorded and this development will not have a high impact on the heritage resources if the recommendations in this report are adhered to.		

Site 2, 5 and 7.

Nature: During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position historical material or objects.		
	Without mitigation	**With mitigation (Preservation site)**
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Low (3)
Probability	Probable (3)	Probable (3)
Significance	**33 (Medium)**	30 (Medium)
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes unless sites can be preserved.
Can impacts be mitigated?	Yes	Through preservation or documentation of sites.
Mitigation*:* Micro adjustment of the pylon positions to ensure that buildings are preserved in Situ if this is not possible sites that will be impacted must be assessed by a conservation architect.		
Cumulative impacts*:* Archaeological and historical sites are non-renewable and impact on any historical building or material will be permanent and destructive.		
Residual Impacts*:* The residual impacts on the buildings are considered to be low.		

Site 10

Nature: During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position historical material or objects relating to the cultural landscape.		
	Without mitigation	**With mitigation (Preservation/ excavation of site)**
Extent	Local (2)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (3)	Low (3)
Probability	Probable (3)	Probable (2)
Significance	**30 (Medium)**	**27 (Low)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	N.A	N.A
Can impacts be mitigated?	N.A	N.A
Mitigation: No mitigation necessary the impact of the power line on this site is considered to be low.		
Cumulative impacts: N.A		
Residual Impacts: The development will not have a high impact on the recorded heritage resources.		

Site 3

Nature: During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological material or objects relating to the cultural landscape.		
	Without mitigation	**With mitigation (Preservation/ excavation of site)**
Extent	Local (2)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Low (3)
Probability	Probable (3)	Probable (3)
Significance	**39 (Medium)**	**27 (Low)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes unless sites can be preserved.
Can impacts be	Yes	Through preservation or

mitigated?		memorialisation of the site.
Mitigation: The tree is of high significance to the locals and must be preserved in situ.		
Cumulative impacts: Archaeological sites are non-renewable and impact on any historical context or material will be permanent and destructive.		
Residual Impacts: This site is of high local significance.		

7. CONCLUSIONS AND RECOMMENDATIONS

Stone Age material is found widespread across the study area but is mostly of low heritage significance. The main geographical characteristics of the study area are that, where the Aeolian sand overlay the calcrete, artefact counts drastically drop, where in sections where deflation of the sand occur Middle Stone Age (MSA) and Later Stone Age (LSA) material is found on the calcrete and gravel that is characteristic of the area, although Early Stone Age (ESA) have been recorded (e.g. van der Walt 2013, Murimbika 2012). The artefacts in the study area is mixed and from open-air scatters making it impossible to comment on ages and industrial affiliations without formal analysis of the material, however some tentative comments on the ages and cultural sequencing in the study area is possible and is discussed briefly below.

MSA artefacts were characterised by dorsal retouch and faceted platforms with large flakes, radial and bipolar cores, points, end scrapers, large utilized and retouched blade tools, and utilized and retouched flakes. To the west of Prieska raw material was predominant in locally available quartzite to the east raw material is mixed (quartzite, dolerite, banded iron Stone and CCS. A MSA quarry was recorded (Site 9) exploiting a quartzite outcrop. This is a widespread occurrence with numerous quarries recorded in the larger area (Wiltshire 2011; van der Walt 2012). The MSA in southern Africa date to about 20 thousand to 300 thousand years ago (Lombard et al 2011), without formal analysis it is not possible to assign the artefacts to a techno complex for accurate cultural sequencing.

LSA tools (scrapers, retouched and utilised flakes, blades and small round cores) were found in comparatively fewer concentrations compared to the MSA tallies. LSA tools are predominantly on CCS. Most of the pieces recorded relate to the manufacture of microlithic technologies that started about 8 thousand years ago in southern Africa and continued until recently (Lombard et al 2011.). Some pieces could, however, be associated with macrolithic phases within the Later Stone Age referred to as the Oakhurst (terminal Pleistocene/early Holocene non-microlithic) techno complex generally dating to about 7-12 thousand years ago.

From a cultural landscape and build environment perspective several derelict buildings were recorded (Site 2, 5 and 7) and a tree "referred to as de Wet se boom "(Site 3) within the 300 meter corridor that was assessed.

The impacts to heritage resources by the proposed development are not considered to be highly significant and the impact on archaeological and historical sites can very easily be mitigated by micro adjustments to the tower footprints in order to preserve sites in-situ. The Visual impacts to scenic routes and sense of place are slightly higher due to the proposed alternatives close proximity to the road and Site 3 but are still not assessed to be high from a heritage perspective but are assessed independently by a visual specialist as part of the EIA process.

Therefore the following recommendations are made

- For the Stone Age component that is widespread in the area and the very small physical footprint (relative to the extent of the site) – and therefore adverse effects –the 132 kV power line would have on the Stone Age occurrences as a whole. Site 8 & 9 preserved.
- On the farm Holfontein Site 3 must be preserved *in situ* .
- Any building affected by the power line will have to be assessed by a conservation architect and referred to Northern Cape PHRA. It must be kept in mind that sites like these might require destruction permits before they can be demolished.
- When the route alignment have been finalised the pylon positions must be subjected to a "walk down" prior to the construction phase.
- Although no pans were recorded in the power line corridors during this study, other studies (Kibberd 2006), Wiltshire (2011) and Orton (2012) indicated the high archaeological significance associated with pans in the area and if any occur in the proposed corridors they must be marked as no-go areas with at least a 50 meter buffer zone from the edge of the pans.

» It is recommended that the Cuprum - Burchell – Mooidraai option is used as it follows an existing power line and the impact will be localised however with the correct mitigation in place both alternatives (Burchell – Cuprum and Burchell to Mooidraai) are satisfactory.

Due to the subsurface nature of archaeological material and unmarked 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.

If the recommendations as made in section 7 of this report are adhered to (subject to approval from SAHRA) there is from an archaeological point of view no reason why the development should not proceed

Chance finds procedure

This procedure applies to the construction company's employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the construction, operations or closure phases of this project, any person employed by the construction company, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

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, Tanzania and the DRC; having conducted more than 300 AIAs since 2000.

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