HERITAGE IMPACT ASSESSMENT REPORT: BADHOPE 22 KV POWERLINE ON PARCEL 687 OF BARKLEY WEST, BARKLEY WEST AREA, NORTHERN CAPE PROVINCE

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Prepared for: **Kantey & Templer Consulting Engineers**

Date: 21 July 2021

DECLARATION

I, **Alexander Antonites**, declare that:

- I am conducting all work and activities relating to the proposed construction of a 22kV powerline on Parcel 687 of Barkley West, in an objective manner, even if this results in views and findings that are not favourable to the client.

- I declare that there are no circumstances that may compromise my objectivity in performing such work.

- I have the required expertise in conducting the specialist report and I will comply with legislation, including the relevant Heritage Legislation (National Heritage Resources Act no. 25 of 1999, Human Tissue Act 65 of 1983 as amended, Removal of Graves and Dead Bodies Ordinance no. 7 of 1925, Excavations Ordinance no. 12 of 1980), the Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment (SAHRA and the CRM section of ASAPA), regulations and any guidelines that have relevance to the proposed activity;

- I have not, and will not engage in, conflicting interests in the undertaking of the activity.

- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;

- All the particulars furnished by me in this declaration are true and correct.

Signature of specialist
September 2020

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ABBREVIATIONS AND ACRONYMS

Abbreviation/Acronym	Description
ASAPA	Association for South African Professional Archaeologists
AIA	Archaeological Impact Assessment
BP	Before Present
BCE	Before Common Era
BGG	Burial Grounds and Graves
CSF	Correctional Services Facility
CRM	Culture Resources Management
DPW	Department of Public Works
DWS	Department of Water and Sanitation
ECO	Environmental Control Officer
EIA	Early Iron Age (also Early Farmer Period)
EIA	Environmental Impact Assessment
EFP	Early Farmer Period (also Early Iron Age)
ESA	Earlier Stone Age
GDS	Green Drop System
GIS	Geographic Information Systems
HIA	Heritage Impact Assessment
ICOMOS	International Council on Monuments and Sites
LFP	Later Farmer Period (also Later Iron Age)
LIA	Later Iron Age (also Later Farmer Period)
LSA	Later Stone Age
MIA	Middle Iron Age (also Early later Farmer Period)
MSA	Middle Stone Age
NHRA	National Heritage Resources Act No.25 of 1999, Section 35
PFS	Pre-Feasibility Study
PHRA	Provincial Heritage Resources Authority
SAHRA	South African Heritage Resources Association
YCE	Years before Common Era (Present)

EXECUTIVE SUMMARY

Project Title	Badhope Farm 22 kV powerline, Barkley West Area, Northern Cape Province
Project Location:	S26.566289°/ E29.933877°;
1:50 000 Map Sheet	2824CB Mataleng
Farm Portion / Parcel	BARKLEY WEST TOWN
Magisterial District / Municipal Area	Dikgatlong Local Municipality
Province	Northern Cape Province

This report is the result of a Heritage Impact Assessment (HIA) conducted by Antonites (PI), Hopf and Fletcher (Research Assistants) on 25 March 2021 with a follow up survey by Antonites on 5 July. The proposed project is for the erection of a 22kV powerline. Two alignment options have been proposed: a southern (Option 1) and northern (Option 2) route. Construction activities include excavating holes, 220mm wide and 1.8m deep in which poles will be erected. The project area is approximately 3km north west of the town Barkley West in the Northern Cape Province. The proposed powerline runs north of the R31 road and south of the Barkley West-Winters Rush railroad.

The larger landscape is a sensitive heritage zone and contains Early, Middle and Later Stone Age sites, Late Iron Age stone walled sites as well as buildings and locations of historical significance. A heritage assessment of the project area was conducted to identify any sensitive heritage sites/areas and to mitigate against future impacts on the heritage landscape.

The study revealed that the parts of the project area had previously been severely impacted by earthmoving and sand mining/quarrying activities and access roads. These activities exposed a low-density scatter of stone tools and debitage approximately 1m below the surface within the footprint of Option 1. This scatter will be missed by pylons and given the severely disturbed context and low density of observed formal tools.

Option 2 (northern alignment) is therefore preferred. If Option 1 (southern alignment) is taken, then monitoring of the development progress by an ECO is recommended during the planning and construction phases. Regardless of which alignment route is taken, any subsurface palaeontological, archaeological or historical material, or burials be exposed

during construction activities, all activities should be suspended, and the archaeological specialist should be notified immediately.

HERITAGE SITE LOCATIONS

Table 1: Summary of Heritage sites

Site Code	Coordinates	Short Description	Mitigation Action
UP-BW-2824CB-01	S28.517396° E24.473674°	Stone Age artefact scatter	Only impacted for Option 1. Monitor excavation activities in project area.

Heritage Impact Assessment Report: Badhope 22 kV powerline on Parcel 687 of Barkley West, Barkley West Area, Northern Cape Province

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1 PROJECT BACKGROUND

Kantey & Templer Consulting Engineers appointed Alexander Antonites to undertake a heritage assessment on unproclaim Barkley West townland. The proposed development is a 22v powerline between and existing Eskom line and new farming infrastructure. The project area is located approximately 3km northwest of the town Barkley West, north of the R31 (Delportshoop Road) road and south of the Barkley West-Winters Rush railroad running.

As per Eskom, the project scope will involve minimal construction/earth works and disturbance. Excavation will be limited to the installation of poles which will require digging of 220mm by 1.8m deep holes where 11m wood poles will be installed and will be secured by concrete and installation of the power lines. Poles will be spaced 120m apart. No planned access roads to be created and only existing roads will be used.

The size of the area under consideration (~2.5km) necessitates a heritage impact assessment (HIA) in terms of section 38(1) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). Two options have been proposed: Option 1 is a southern route that runs mostly parallel to the R31. Option 2 is a northern route which follows Barkley West-Winters Rush railroad. A heritage assessment of the entire extent of the proposed alignments (2.5km) with a 100m buffer was conducted to identify sensitive heritage areas and to mitigate against future impacts on the heritage landscape.

Table 2: The affected properties and details of the property owners

Farm Name	Parcel Number	21-SG Code	Property Owner
Barkley West	687	C00700010000068700000	N/A

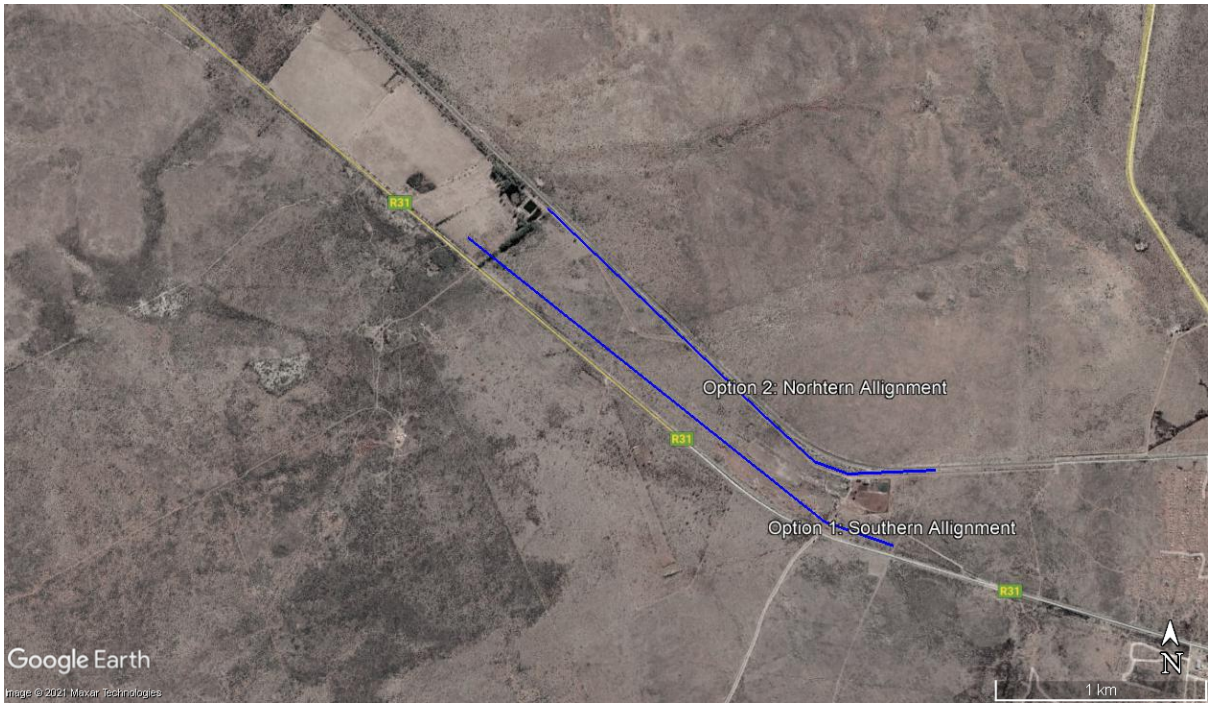

Figure 1: Project alignments on Google Earth imagery dated to 2021.

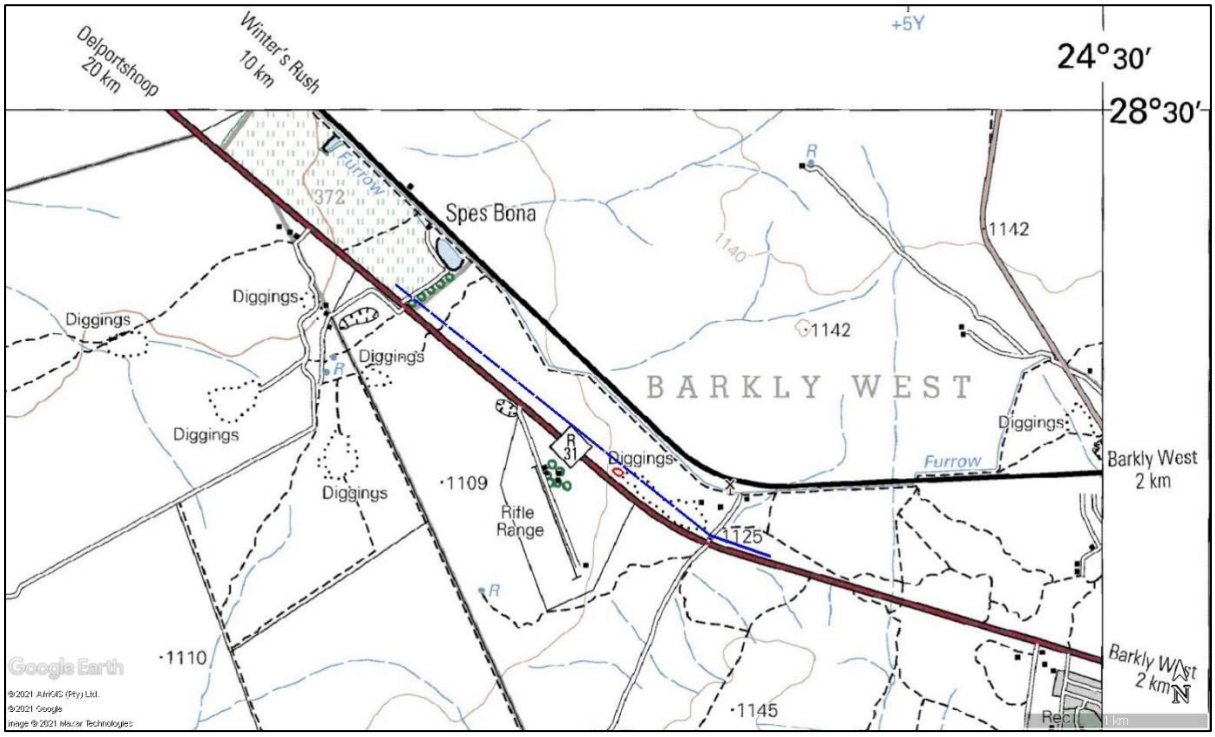

Figure 2: Project alignment indicated on 1:50 000 map (2824CB Mataleng).

2 TERMS OF REFERENCE

The heritage component of the EIA is set out in the National Environmental Management Act (Act 107 of 1998) and section 38 of the National Heritage Resources Act (NHRA; Act 25 of 1999).

The NHRA protects all structures and features older than 60 years, archaeological sites and material and graves as well as burial sites. This legislation ensures that developers implement measures to limit the potentially negative effects that the development could have on heritage resources.

Legislation determines defines the terms of reference for heritage specialists as the following:

- To provide a detailed description of all archaeological artefacts, structures (including graves) and settlements that may be affected (if any);
- Assess the nature and degree of significance of such resources within the area;
- Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;
- Assess and rate any possible impact on the archaeological and historical remains;
- within the area, which may emanate from the proposed development activities;
- Propose possible heritage management measures if such action is necessitated by the development;
- Liaise and consult with the South African Heritage Resources Agency (SAHRA and/or PHRA).

2.1 HERITAGE LEGISLATION, CONSERVATION AND MANAGEMENT

Heritage Resources are any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities, and history. It includes sites, structures, places, natural features, and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic, or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

2.1.1 Heritage Bodies

The South African Heritage Resources Agency (SAHRA) is an agency within the Department of Sport, Arts and Culture tasked with an overall legislative mandate to identify, assess, manage, protect, and promote heritage resources in South Africa. SAHRA is mandated to coordinate the identification and management of the national estate. The aims are to

introduce an integrated system for the identification, assessment, and management of the heritage resources and to enable provincial and local authorities to adopt powers to protect and manage them.

2.1.2 Legislation regarding archaeology and heritage sites

The following Acts has direct bearing on Heritage resource protection and management process:

National Heritage Resources Act No 25 of 1999, section 35

The National Heritage Resources Act No 25 of 1999 (section 35) defines protected cultural heritage resources as:

- Archaeological artifacts, structures and sites older than 100 years.
- Ethnographic art objects (e.g., prehistoric rock art) and ethnography.
- Objects of decorative and visual arts.
- Military objects, structures and sites older than 75 years.
- Historical objects, structures and sites older than 60 years.
- Proclaimed heritage sites.
- Graveyards and graves older than 60 years.
- Meteorites and fossils.
- Objects, structures and sites of scientific or technological value.

The national estate includes the following:

- Places, buildings, structures and equipment of cultural significance;
- Places to which oral traditions are attached or which are associated with living heritage;
- Historical settlements and townscapes;
- Landscapes and features of cultural significance;
- Geological sites of scientific or cultural importance;
- Archaeological and paleontological importance;
- Graves and burial grounds;
- Sites of significance relating to the history of slavery;
- Movable objects (e.g. archaeological, paleontological, meteorites, geological specimens, military, ethnographic, books etc.).

In terms of activities carried out on archaeological and heritage sites the Act states that:

> *"No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit by the relevant provincial heritage resources authority."*
>
> *(NHRA 1999:58)*

No person may, without a permit issued by the responsible heritage resources authority:

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

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

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

(d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects or use such equipment for the recovery of meteorites. (35. [4] 1999:58)."

No person may, without a permit issued by SAHRA or a provincial heritage resources agency:

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

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

(c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) and excavation equipment, or any equipment which assists in the detection or recovery of metals (36. [3] 1999:60)."

Human Tissue Act of 1983 and Ordinance on the Removal of Graves and Dead Bodies of 1925

Graves and burial grounds are commonly divided into the following subsets:

(a) ancestral graves

(b) royal graves and graves of traditional leaders

(c) graves of victims of conflict d. graves designated by the Minister

(e) historical graves and cemeteries

(f) human remains

Graves 60 years or older are heritage resources and fall under the jurisdiction of both the National Heritage Resources Act and the Human Tissues Act of 1983. However, graves younger than 60 years are specifically protected by the Human Tissues Act (Act 65 of 1983) and Ordinance on Excavations (Ordinance no. 12 of 1980) as well as any local and regional provisions, laws and by-laws. Such burial places also fall under the jurisdiction of the National Department of Health and the Provincial Health Departments. Approval for the exhumation and re-burial must be obtained from the relevant Provincial MEC as well as the relevant local authorities.

National Environmental Management Act No 107 of 1998

This Act (Act 107 of 1998) states that a survey and evaluation of cultural resources must be done in areas where development projects, that will change the face of the environment, will be undertaken. The impact of the development on these resources should be determined and proposals for the mitigation thereof are made. Environmental management should also take the cultural and social needs of people into account. Any disturbance of landscapes and sites that constitute the nation's cultural heritage should be avoided as far as possible and where this is not possible, the disturbance should be minimized and remedied.

2.2 RATING OF SIGNIFICANCE

The National Heritage Resources Act (Act 25 of 1999) also stipulates the assessment criteria and grading of archaeological sites. The following categories are distinguished in Section 7 of the Act:

Grade I: Heritage resources with qualities so exceptional that they are of special national significance.

Grade II: Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region.

Grade III: Other heritage resources worthy of conservation, and which prescribes heritage resources assessment criteria, as set out in Section 3(3) of the act.

Significance is influenced by the context and state of the archaeological site. Six criteria were considered following Kruger (2019):

- Site integrity
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures)
- Density of scatter (dispersed scatter)
- Social value
- Uniqueness
- Potential to answer current and future research questions.

The categories of significance were based on the above criteria the above and the grading system outlined in NHRA. It is summarised in Table 3.

Table 3: Field rating of significance

Significance	Rating Action
No significance: sites that do not require mitigation.	None
Low significance: sites, which may require mitigation.	2a. Recording and documentation (Phase 1) of site; no further action required. 2b. Controlled sampling (shovel test pits, auguring), mapping and documentation (Phase 2 investigation); permit required for sampling and destruction
Medium significance: sites, which require mitigation.	3. Excavation of representative sample, C14 dating, mapping and documentation (Phase 2 investigation); permit required for sampling and destruction [including 2a & 2b]
High significance: sites, where disturbance should be avoided.	4a. Nomination for listing on Heritage Register (National, Provincial or Local) (Phase 2 & 3 investigation); site management plan; permit required if utilised for education or tourism
High significance: Graves and burial places	4b. Locate demonstrable descendants through social consulting; obtain permits from applicable legislation, ordinances and regional by-laws; mitigation and or exhumation and reinternment [including 2a, 2b & 3]

3 STATEMENT OF SIGNIFICANCE AND IMPACT RATING

This section outlines the potential impact of risk situations and scenarios commonly associated with heritage resources management. Refer to Appendix 1: for guideline of the rating of impacts and recommendation of management actions for areas of heritage potential within the study area.

3.1 DIRECT, INDIRECT AND CUMULATIVE EFFECTS

Beyond the initial direct or primary impact, the HIA should also consider the potential indirect and cumulative impacts. Winter and Baumann (2005) define **direct or primary impacts** as those that occur at the same time and in the same space as the proposed activity. **Indirect effects** occur at a later stage or at a different place from the causal activity or may be impacts that occur as through a "complex pathway" (Winter and Baumann 2005, 24). **Cumulative effects** are a constellation of processes that are seemingly insignificant in isolation but have a significant cumulative effect on heritage resources (ibid.).

3.1.1 Direct Impact Rating Criteria

The criteria used for assessment of impacts is based on the guidelines set out by Winter and Baumann (2005) and Department of Environmental Affairs and Tourism (1998):

Extent

Local	Extend only as far as the footprint of the proposed activity/development
Site	Impact extends beyond the project footprint to immediate surrounds
Regional	within which development takes place, i.e. farm, suburb, town, community
National	Impact is on a national level

Duration

Short term	The impact will disappear with through mitigation or through natural processes
Medium term	The impact will last up to the end of the phases, where after it will be negated
Long term	impact will persist indefinitely, possibly beyond the operational life of the activity, either because of natural processes or by human intervention
Permanent	Permanent where mitigation either by natural process of by human intervention will not occur in such a way or in such a time span that the impact can be considered transient

Magnitude severity

Low	where the impact affects the resource in such a way that its heritage value is not affected
Medium	where the affected resource is altered but its heritage value continues to exist albeit in a modified way
High	where heritage value is altered to the extent that it will temporarily or permanently be damaged or destroyed

Probability

Improbable	where the possibility of the impact to materialize is very low either because of design or historic experience;
Probable	where there is a distinct possibility that the impact will occur
Highly	probable, where it is most likely that the impact will occur; or
Definite	where the impact will definitely occur regardless of any mitigation measures.

Impact Significance

Low	negligible effect on heritage – no effect on decision
Medium	where it would have a moderate effect on heritage and – influences the decision
High	high risk of, a big effect on heritage. Impacts of high significance should have a major influence on the decision
Very high	high risk of, an irreversible and possibly irreplaceable impact on heritage – central factor in decision-making

3.1.2 Direct Impact Weighting Matrix

Aspect	Description	Weight
Extent		
	Local	1
	Site	2
	Regional	3
Duration		
	Short term	1
	Medium term	3
	Long term	4
	Permanent	5
Magnitude/Severity		
	Low	2
	Medium	6
	High	8
Probability		
	Improbable	1
	Probable	3
	Highly Probable	4
	Definite	5
Impact Rating	Sum (Duration, Scale, Magnitude) x Probability	
Negligible		<20
Low		<40
Moderate		<60
High		>60

4 ARCHAEOLOGICAL AND HISTORICAL CONTEXT

4.1 OVERVIEW OF THE SOUTH AFRICAN ARCHAEOLOGICAL AND HISTORICAL CONTEXT

4.1.1 Stone Age

In Southern Africa, the Stone Age is characterised by technological industries that use stone that have been modified into tools such as scrapers, points, and hand axes. Early hominid species first used these tools as much as 2 million years ago (Mitchell 2002:59). Stone technology would persist throughout the human species development right up to the arrival of iron using farming people in southern Africa some 2000 years ago. Changes in the stone tool technology over time allows different stone tool industries to be chronologically separated based on trends in tool design. This provides the useful partitioning of the entire Stone Age sequence into three broad phases outlined by Lombard et. al. (Lombard et al. 2012) below:

Early Stone Age: 2 million – 200 000 years ago
Middle Stone Age: 300 000 – 20 000 years ago
Later Stone Age: 40 000 – <2 000 years ago

4.1.2 Iron Age

The advent of the Iron Age in southern Africa sees the widespread adoption of metallurgy, ceramics, and agriculture. The period is associated with farming communities who spoke Bantu languages and dates from around AD 350 up to the 1800s (Huffman 2007). The Iron Age has been divided into distinct periods. These periods, however, do not mark changes in technology (as is the case with the Stone Age) but rather signify changes in the social and political organisation of the Iron Age farmers. The three periods of the Iron Age are presented by Huffman (2007) as follows:

Early Iron Age: AD 200 – 1300
Middle Iron Age: AD 900 – 1300 (only in Limpopo Valley)
Late Iron Age: AD 1300 – 1840

The Iron Age is thus considered the period, which covers the unwritten history of precolonial farming communities and, as a chronological unit, ends with the contact between the Bantu farmers and European settlers.

4.1.3 Historical Period

The historical period is best regarded as a phase where historical sources can be reliably used to reconstruct past events. The earliest sources of historical data found in southern Africa take the form of oral accounts that were recorded by travellers and missionaries as they explored the interior of the country while later sources tend to be more formally constructed as literacy rates increased with more European settlers entering the region (Vollenhoven 2006:189).

4.2 ARCHAEOLOGICAL AND HISTORICAL CONTEXT OF THE PROJECT AREA

4.2.1 Stone Age

The Stone Age is particularly well represented in the Northern Cape with the province arguably hosting the most expansive array of stone tool technology spanning the Early (ESA), Middle (MSA), and Late (LSA) Stone Ages. The site at Wonderwerk cave – some 110km north west of the project area – has revealed a long sequence of occupation spanning these periods and is seen as a benchmark in understanding our deep past (Matenga, 2019). Closer to the project area (approx. 7km south east) is a notable site known as Canteen Kopje (originally Klipdrift) located on the south east edge of the town of Barkly West. Canteen Kopje was proclaimed a national monument in 1948 due to the immense amount of ESA Acheulean handaxes and cleavers recovered from the gravel layers exposed by diamond miners in the late 19th century. Later investigations of the site would reveal that the layers above the gravels, known as the Hutton Sands, hosted a Later Stone Age assemblage of microlithic stone tools (Forssman *et al*. 2010) indicating that the site was prominent point on the landscaped for at least 2 million years. The promulgation of the National Heritage Resources Act (No.25 of 1999) saw Canteen Kopje's status change to that of a grade II provincial heritage site. Other sites in the region that have been well researched for their ESA and MSA components include Pniel, Doornlaagte, and Rooidam (Beaumont & Morris 1990). Most known and researched Stone Age sites have tended to be located along one or another geological feature, such as a cave formation or river erosion. Several subsurface sites have been revealed through quarrying and prospecting activities, while more are being detected through the increased number of heritage impact surveys being conducted in the province (Beaumont 2012, Ryneveld 2005, Coetzee 2017).

Several LSA rock art sites are also to be found in the Northern Cape, detailing the full repertoire of media employed in the making of these ancient depictions. Examples of

paintings are to be found at the Wonderwerk cave, Kuruman Hills, Ghaap Escarpment amongst others dotting the Karoo (Kruger 2013). Petroglyphs (images engraved into the rock) are unique forms of rock art which persist largely in the interior of South Africa, especially around Kimberley and in the Karoo where exposed patches of glaciated andesite pavements (Morris 2020) provided the canvas for these works. Notable among these are the sites at Driekopseiland (where more than 3,600 petroglyphs have been recorded), the farm Nooitgedacht, Bushman's Fountain on the farm Rooipoort (over 4,500 petroglyphs recorded), as well as the Wildebeest Kuil 1 Rock Art site – declared a Provincial Heritage site in 2008 (Beaumont 2012, Kruger 2013, Matenga 2019.)

4.2.2 Iron Age

In the near 2000-year period that iron using farming communities have been present in southern Africa there is no evidence of them having penetrated the western central interior south of the Orange river (Humphreys 1976). This is largely due to insufficient levels of rainfall in the region to support a rain-fed agricultural economy (Maggs 1974). It is only during the Late Iron Age period, post A.D. 1600, that we begin to find archaeological evidence of stonewalled ruins belonging to Late Iron Age farmers settling in the north-eastern regions of the Northern Cape (Humphreys & Thackeray 1983).

The BaTswana stonewalled settlement site known as Dithakong is located to the north-east of Kuruman in an area that falls within the 381mm isohyet (Humphreys 1976) and contains several springs that would enable the support of an agricultural economy. LIA BaTswana groups, specifically the BaTlhaping, would continue to inhabit this region until contact with European settlers was made in the early 19th century (Humphreys 1976).

4.2.3 Historical period

The historical period for large parts of the Northern Cape can be characterised as a time of rapid change and upheaval as more groups began to enter the region competing for land and resources, particularly the provinces' soon-to-be discovered mineral wealth (Matenga 2019). The earliest historical accounts for the region are to be found in the oral and written testimonies of early hunters and missionaries as they ventured northward from the Cape colony. James Read of the London Missionary Society would establish a mission station at Kuruman in 1817 (Van Vollenhoven 2014) which would later be the home of the missionary Dr. Robert Moffat who would go on to translate and publish the first SeTswana bible. These early travellers, and later the *trekboere*, would encounter an established network of settled

BaTlhaping farming and Griqua herding communities that actively traded and exchanged goods north of the Orange river (Humphreys 1976).

The early 19th century would see the first of the major historical events entering the region as groups such as the BaTlokwa, BaFokeng, BaHlakwana and BaPhuting would arrive from the east having been displaced by the events of the *difaqane* or *Mfecane* (Matenga 2019; De Jong 2010). The ensuing period would see much inter-tribal raiding activity, compelling many of these groups to settle atop hills as easily defensible positions (Kruger 2019). Griqua herding communities began concentrating around the confluence of the Vaal and Orange rivers, establishing a town called Klaarwater (later renamed Griquatown), as they were pushed northward by the ever-expanding presence of trekboers searching for emancipation from the growing Cape colony to the south (Matenga 2019).

The discovery of diamonds at Hopetown in 1867 would bring much attention to the region with several groups vying for control of this newly discovered land of wealth. This would lead to disputes forming between the Transvaal and Orange Free State Boer republics, Griqua, Korana and BaThlaping groups, and the Cape colonial government. The ensuing diamond rush would see the establishment of the town of Kimberley in 1873 and in 1879 the diamond fields of what came to be known as Griqualand West were annexed to the Cape Colony (De Jong 2010).

Tensions between the Cape Colony and the two Boer Republics would eventually escalate into the Anglo-Boer War between 1899 and 1902. Kimberley and the regions surrounding would see much activity during these times as control of the diamond fields was eagerly sought out by the Boers. Kimberley was besieged by the Boers on the 14th of October 1899, just days after war was declared. The Boers established multiple redoubts and encampments around Kimberley in order to effect the siege, some of which have been identified north of Kimberley in the Dronfield Nature reserve (van Vollenhoven 2014). Multiple efforts were made by the British to relieve the siege with two notable battles taking place with Lord Methuen being repelled by the Boers at Magersfontein and Modder River. The 124-day long siege was broken on the 15th of February 1900 through the efforts of a cavalry division under Lieutenant-General John French while continuing the fight to the Battle of Paardeberg immediately after Kimberley was relieved (Kruger 2019).

5 PROJECT AREA

The project area is located on a piece of land north the R31 provincial road and south of the Barkley West - Winter's Rush trainline. Alignment Option 1 runs almost parallel to, and approximately 70m north of the existing R31 road. Alignment Option 2 runs along the servitude of the Barkley West - Winters Rush railway line. Several dirt access roads cut through the area. The project falls entirely on Kimberley Thornveld (Mucina, Rutherford, and Powrie 2018) with red-yellow apedal, freely drained soils covering the area.

6 HERITAGE IMPACT ASSESSMENT

Desktop and field-based research were conducted to ensure a high probability of recording heritage sites in the project area.

6.1 DESKTOP STUDY

The desktop study focussed on the relevant previous research conducted in the area based on previous reports, published material, aerial photographs, and remote sensing data.

6.1.1 Heritage Reports

Heritage reports on the SAHRIS database was consulted for other archaeological finds.

Thirteen heritage reports were accessed on the SAHRIS database which Identified archaeological finds within a 50km radius of the project area. Of these, five reports (Beaumont 2012, Coetzee 2017, Dreyer 2009, Fourie 2012, van Vollenhoven 2014) identified sites within a 25km radius of the survey area. The remaining reports identified sites west to north west (Matenga 2016; 2017; 2018a, Morris 2016; 2020, Kruger 2013) and north east (Matenga 2018b, Rossouw 2012; 2016). All reports apart from van Vollenhoven (2014), identified Stone Age material. Important finds include Fauresmith stone tool assemblages and Late Stone Age rock engravings on glacial pavements on the farm Nooitgedacht. These have been declared a provincial monument (Coetzee 2017). Only one Historical Iron Age Settlement was identified while the remains of historical buildings, burial grounds, and mining activities, along with the Koranna Mission Station on the farm Rooidam.

The heritage reports therefore point to the high probability of Stone Age material being present in the general project area with Iron Age and Historical period sites being a less likely occurrence.

6.1.2 Map data

Historical and current topographical maps were consulted as sources of information on potential areas of significance. These were georeferenced in ArcGIS and Google Earth with the project area superimposed. The analysis of map data did not identify any significant features in the immediate project area.

6.1.3 Remote Sensing Data

Historical and modern aerial and satellite imagery of the project area was studied to identify any heritage sites. Historical aerial imagery from the National Geo-spatial Information database from 1929, 1964, 1967, 1973, 1986 and 2001. Google Earth imagery from 2003-2020 were also inspected. No sites of interest were identified in these images.

6.1.4 Published Research

Publication repositories were consulted to identify any published research that pertains to the project. No published material that has direct bearing on the project area were identified.

6.2 FIELD SURVEY

An archaeological foot survey of the project area was conducted on 25 March 2021 by the PI and two research assistants to survey Option 1. A second survey was conducted by Antonites on 5 July to survey Option 2. Both The survey was conducted following standard archaeological survey practice. The survey covered the powerline footprint and a 100m buffer zone. Special attention was paid to the points where pylons will be erected.

The survey team used real time positioning in relation to the project by means of a mobile GIS application. Sites of interest and of the project area were photographed and recorded with a handheld GPS (Garmin e-Trex) recorded using Datum WGS 84.

6.2.1 Limitations

Access

The project was accessed from the R31. No access restrictions were encountered.

Visibility

The visibility at the time of the HIA site inspection varied between moderate to low with dense grass cover and minimal tree and shrub cover. In the eastern section of the project area, illegal refuse dumping covered large parts of the surface area, limiting visibility.

Previous Impact

Throughout the area north of the R31, evidence of earth moving is present. Some of these may relate to the construction of R31 whose surface is raised approximately 1m above the surrounding landscape. Some of the older burrow pits are visible on the 1964 aerial imagery

(Figure 8). During the twentieth century the R31 was also moved to its present location. The old road is still visible on old aerial imagery and was encountered during the field survey (Figure 8).

More recent earth moving and sand mining activities are clearly evident in the eastern portions of the project area around proposed Option 1. Here, an area of roughly 6.3ha has been mined to a depth that varies between 1m - 3m. This area has also been used as an illegal dumping ground in recent times.


Figure 3a, b: General views of area around alignment Option 1.


Figure 4a, b: General views of western parts of alignment Option 1(a) and service road bisecting both allignments (b).


Figure 5a, b: General view of placemnt of Option 2 next to railway line.


Figure 6a,b: General view of the area around Option 2.


Figure 7a, b: Sand mining/quarrying in eastern parts of Option 1.


Figure 8a, b: Sand mining/quarrying in eastern parts of project area.


Figure 9a, b: Illegal dumping in quarried area.

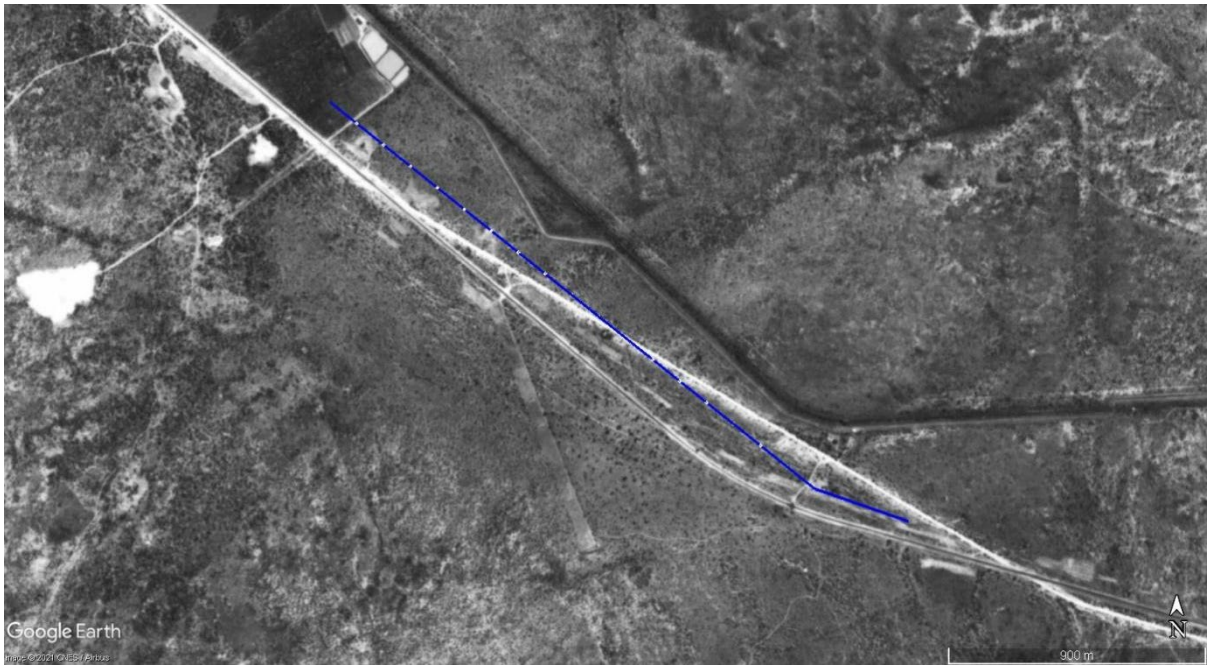

Figure 10: Aerial imagery from 25 April 1964. Showing R31 in its present location as well as old road that bisects the Option 1. Diggings are already present in project area.

Figure 11: Area affected by sand mining/quarrying in eastern portion of the project area affecting Option 1.

6.3 RESULTS OF THE HERITAGE ASSESSMENT

6.3.1 Stone Age

Site: UP-BW-2824-01
Coordinates: S28.517401°/ E24.473516°
Farm: Parcel 687 of Barkley West
50K Map Series: 2824CB Mataleng
Type: Artefact Scatter (formal stone tools and debitage)
Rating: **Low Significance (2a)**

One Stone Age artefact scatter (UP-BW-2824-01) was identified close to the eastern end of the powerline placement Option 1 (southern option). Sand mining/quarrying and present-day refuse dumping has significantly altered soils in this area (6.2.1 above). The materials are all on an exposed surface where quarrying activities had removed approximately 1m of soil. The spatial extent of the scatter is estimated to be roughly 20m x 10m.

The scatter has a general low density of formal tools. In the areas of highest density, estimates in the field ranged between 1-2 formal tools per square metre. Flakes and general debitage was more frequent, but still occurred at relatively low level (approximately 4-6/m^2). Inspection of the material suggests a mixed assemblage with unspecified Later Stone Age microlith debitage, Early Later Stone Blade blades, and a single pebble-core tool which could potentially date to the Early Stone Age.

In general, the impact of earth moving activities means the site is so poorly preserved, as to be almost non-existent. Although the scatter may extend into the surrounding soils that have not been excavated/disturbed, the sandy matrix of these deposits means that it will likely be a mixed assemblage in secondary context.

Figure 12: Early Later Stone Age Blade

Figure 13: Pebble Core tool (possible ESA).

Figure 14: Microlith debitage scatter

Figure 15: LSA debitage scatter

Figure 16: LSA debitage scatter

Figure 17: General view of UP-BW-2824CB-01 with cut made by quarrying visible in the background.

Figure 18: Refuse dumping adjacent to UP-BW-2824CB-01.

Figure 19: Location of UP-RTS-2629-01 in relation to alignment Option 1.

6.3.2 *Iron Age*
No Iron Age sites were found in the project area.

6.3.3 *Historical Sites*
No historical sites were found in the project area.

6.3.4 *Graves and Burial Grounds*
No graves were found in the project area.

6.4 PALEONTOLOGICAL SENSITIVITY
The project area falls in a paleontologically sensitive area (orange) as indicated on the SAHRIS Paleontological Sensitivity Map. According to this, a desktop assessment report is required. The report is attached to application as a separate document.

6.5 EVALUATION OF IMPACT

Archaeology

The study identified a single archaeological site (UP-BW-2824CB-0) of cultural significance. This site will only be affected if alignment Option 1 (southern route) is taken. Therefore, alignment option 2 (northern option along railroad) is preferred since not heritage remains were found along this route. However, UP-BW-2824CB-01is badly disturbed and of relatively low importance given the low frequency of formal tools, and the absence of in-situ deposits. In addition, the proposed 22kV powerline of Option 1 will skirt the artefact scatter and no poles will be dug in the area where tools were identified. As a result, expected impact on the archaeological landscape will be negligible.

Table 5: Summary direct impact on heritage finds

Placement Option	Site	Impact	Mitigation	Extent		Duration		Magnitude		Probability		Impact Rating		Mitigation Measures to be Implemented.
				Scale	Score	Scale	Score	Scale	Score	Scale	Score	**Scale**	**Score**	
Option 1	UP-BW-2824CB-01	Damage to archaeological site	Mitigated	Local	1	Medium	3	Low	2	Improbable	1	**Negligible**	**6**	Monitoring during construction Phase
			No Mitigation	Local	1	Medium	3	Low	2	Probable	3	**Negligible**	**18**	
Option 2	UP-BW-2824CB-01	None	Mitigated	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No mitigation needed
			No Mitigation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

7 MANAGEMENT ACTIONS

It is the opinion of this author that the following management measures should be considered during the construction of the 22kV powerline on Parcel 687 of Barkley West only if alignment Option 1 (southern route) is taken.

SITES	**UP-BW-2824CB-01**	
PROJECT COMPONENT/S	Unspecified	
POTENTIAL IMPACT	Destruction and/or damage to archaeological site if Option 1 is taken	
ACTIVITY RISK/SOURCE	Excavation of holes for powerline poles.	
MITIGATION: TARGET/OBJECTIVE	To prevent destruction of archaeological deposits	
MITIGATION: ACTION/CONTROL	**RESPONSIBILITY**	**TIMEFRAME**
Fixed Mitigation Procedure (required)		
Site Monitoring	ECO	Monitor as frequently as practically possible.
Preferred Mitigation		
Monitoring of the excavation of holes for powerline poles	Developer/ECO	During construction activities.
Alternative Mitigation (if preferred mitigation not feasible)		
Phase 2 Specialist Mitigation: Excavation and surface collection of artefacts	HERITAGE PRACTITIONER	Prior to the commencement of construction and/or earth-moving activities.
PERFORMANCE INDICATOR	Successful protection of archaeological deposits	

8 RECOMMENDATION

The following general recommendations are made based the impact assessment process:

1. Two alignment options have been provided. From an archaeological point of view, Option 2 (northern alignment along railroad) is preferred since Option 1 (southern alignment) bisects Stone Age site **UP-BW-2824CB-01**.
2. **UP-BW-2824CB-01** is a low-density Stone Age artefact scatter in the corridor of alignment Option 1. It has a heritage significance rating of **Low (2a).** The scatter was identified in an area where earthmoving activities has removed approximately 1m of soil. Artefact density is low with only a few formal tools identified. Inspection of the tools suggests that it is a mixed assemblage. Tools visible on the surface are out of context and of minimal scientific importance. Construction of the powerline along alignment Option 1 will have negligible impact on **UP-BW-2824CB-01**.
3. Since the possibility remains that undisturbed remains could be encountered during excavation of holes, monitoring by the ECO is recommended as a mitigation procedure.

9 CONCLUSION

Investigation of the Project Area located on Parcel 687 of Barkley West investigated two alignment options. Option 2 (northern alignment) is preferred since no heritage sites are located on this footprint. A single Stone Age artefact scatter of low significance (**UP-BW-2824CB-01**) 25m south of alignment of Option 1. Although the construction of the powerline will have a no/negligible impact on the archaeological site, monitoring of the excavation process is recommended to minimise impact and to report any new finds.

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APPENDIX 1: HERITAGE LEGISLATION BACKGROUND

A1.1 NATIONAL HERITAGE RESOURCES ACT NO 25 OF 1999, SECTION 35

According to the National Heritage Resources Act of 1999 a historical site is any identifiable building or part thereof, marker, milestone, gravestone, landmark or tell older than 60 years.

The Act identifies heritage objects as:

- objects recovered from the soil or waters of South Africa including archaeological and palaeontological objects, meteorites and rare geological specimens
- visual art objects
- military objects
- numismatic objects
- objects of cultural and historical significance
- objects to which oral traditions are attached and which are associated with living heritage
- objects of scientific or technological interest
- any other prescribed category

With regards to activities on archaeological and heritage sites this Act states that:
"No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit by the relevant provincial heritage resources authority." (34. [1] 1999:58)

"No person may, without a permit issued by the responsible heritage resources authority-

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

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

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

d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or

archaeological and palaeontological material or objects or use such equipment for the recovery of meteorites. (35. [4] 1999:58)."

"No person may, without a permit issued by SAHRA or a provincial heritage resources agency may -

a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves.
b) bdestroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority.

c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) and excavation equipment, or any equipment which assists in the detection or recovery of metals (36. [3] 1999:60)."

A1.2 HUMAN TISSUE ACT OF 1983 AND ORDINANCE ON THE REMOVAL OF GRAVES AND DEAD BODIES OF 1925

Graves 60 years or older are heritage resources and fall under the jurisdiction of both the National Heritage Resources Act and the Human Tissues Act of 1983. However, graves younger than 60 years are specifically protected by the Human Tissues Act (Act 65 of 1983) and the Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925) as well as any local and regional provisions, laws and by-laws. Such burial places also fall under the jurisdiction of the National Department of Health and the Provincial Health Departments. Approval for the exhumation and re-burial must be obtained from the relevant Provincial MEC as well as the relevant Local Authorities.

APPENDIX 2: MANAGEMENT AND MITIGATION ACTIONS

A2.1 CATEGORIES OF SIGNIFICANCE

Rating the significance of archaeological sites, and consequently grading the potential impact on the resources is linked to the significance of the site itself. The significance of an archaeological site is based on the amount of deposit, the integrity of the context, the kind of deposit and the potential to help answer present research questions. Historical structures are defined by Section 34 of the National Heritage Resources Act, 1999, while other historical and cultural significant sites, places and features, are generally determined by community preferences. The guidelines as provided by the NHRA (Act No. 25 of 1999) in Section 3, with special reference to subsection 3 are used when determining the cultural significance or other special value of archaeological or historical sites. In addition, ICOMOS (the Australian Committee of the International Council on Monuments and Sites) highlights four cultural attributes, which are valuable to any given culture:

A2.1.1 Aesthetic value:

Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria include consideration of the form, scale, colour, texture and material of the fabric, the general atmosphere associated with the place and its uses and also the aesthetic values commonly assessed in the analysis of landscapes and townscape.

A2.1.2 Historic value:

Historic value encompasses the history of aesthetics, science and society and therefore to a large extent underlies all of the attributes discussed here. Usually a place has historical value because of association with an event, person, phase or activity.

A2.1.3 Scientific value:

The scientific or research value of a place will depend upon the importance of the data involved, on its rarity, quality and on the degree to which the place may contribute further substantial information.

A2.1.4 Social value

Social value includes the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a certain group.

It is important for heritage specialist input in the EIA process to take into account the heritage management structure set up by the NHR Act. It makes provision for a 3-tier system of management including the South Africa Heritage Resources Agency (SAHRA) at a national level, Provincial Heritage Resources Authorities (PHRAs) at a provincial and the local authority. The Act makes provision for two types or forms of protection of heritage resources, i.e. formally protected and generally protected sites:

Formally protected sites:
- Grade 1 or national heritage sites, which are managed by SAHRA
- Grade 2 or provincial heritage sites, which are managed by the provincial HRA (MP-PHRA).
- Grade 3 or local heritage sites.

Generally protected sites:
- Human burials older than 60 years.
- Archaeological and palaeontological sites.
- Shipwrecks and associated remains older than 60 years.
- Structures older than 60 years.

With reference to the evaluation of sites, the certainty of prediction is definite, unless stated otherwise and if the significance of the site is rated high, the significance of the impact will also result in a high rating. The same rule applies if the significance rating of the site is low. The significance of archaeological sites is generally ranked into the following categories.

A2.2 MITIGATION CATEGORIES

The following provides a guideline of relevant heritage resources management actions in the conservation of heritage resources:

A2.2.1 No further action / Monitoring

Where no heritage resources have been documented, heritage resources occur well outside the impact zone of any development or the primary context of the surroundings at a development footprint has been largely destroyed or altered, no further immediate action is required. Site monitoring during development, by an ECO or the heritage specialist are often added to this recommendation in order to ensure that no undetected heritage\ remains are destroyed.

A2.2.2 Avoidance

This is appropriate where any type of development occurs within a formally protected or significant or sensitive heritage context and is likely to have a high negative impact. Mitigation is not acceptable or not possible. This measure often includes the change /

alteration of development planning and therefore impact zones in order not to impact on resources.

A2.2.3 Mitigation

This is appropriate where development occurs in a context of heritage significance and where the impact is such that it can be mitigated to a degree of medium to low significance, e.g. the high to medium impact of a development on an archaeological site could be mitigated through sampling/excavation of the remains. Not all negative impacts can be mitigated.

A2.2.4 Compensation

Compensation is generally not an appropriate heritage management action. The main function of management actions should be to conserve the resource for the benefit of future generations. Once lost it cannot be renewed. The circumstances around the potential public or heritage benefits would need to be exceptional to warrant this type of action, especially in the case of where the impact was high.

A2.2.5 Rehabilitation

Rehabilitation is considered in heritage management terms as an intervention typically involving the adding of a new heritage layer to enable a new sustainable use. It is not appropriate when the process necessitates the removal of previous historical layers, i.e. restoration of a building or place to the previous state/period. It is an appropriate heritage management action in the following cases:

- The heritage resource is degraded or in the process of degradation and would benefit from rehabilitation.
- Where rehabilitation implies appropriate conservation interventions, i.e. adaptive reuse, repair and maintenance, consolidation and minimal loss of historical fabric.
- Where the rehabilitation process will not result in a negative impact on the intrinsic value of the resource.

A2.2.6 Enhancement

Enhancement is appropriate where the overall heritage significance and its public appreciation value are improved. It does not imply creation of a condition that might never have occurred during the evolution of a place, e.g. the tendency to sanitize the past. This management action might result from the removal of previous layers where these layers are culturally of low significance and detract from the significance of the resource. It would be

appropriate in a range of heritage contexts and applicable to a range of resources. In the case of formally protected or significant resources, appropriate enhancement action should be encouraged. Care should, however, be taken to ensure that the process does not have a negative impact on the character and context of the resource. It would thus have to be carefully monitored.