



MIRA ENERGY (PTY) LTD: DOUBLE CIRCUIT 132KV POWERLINE FOR THE RHODES 1, RHODES 2, EAST 3, EAST 2 AND EAST PV PLANTS TO THE UMTU SUBSTATION NEAR HOTAZEL, JOE MOROLONG LOCAL MUNICIPALITY, JOHN TAOLO GAETSEWE DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE

Archaeological Impact Assessment



Prepared for: **Mira Energy (Pty) Ltd**

Prepared by: **Exigo Sustainability (Pty) Ltd**

ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) ON VARIOUS PORTIONS OF ON THE FARM RHODES 269, THE REMAINDER AND PORTION 2 OF THE FARM EAST 270, THE FARM KIPLING 271, THE REMAINDER OF THE FARM HOTAZEL 280, THE FARM UMTU 281 AND THE REMAINDER OF THE FARM OLIVE PAN 282 FOR THE PROPOSED DOUBLE CIRCUIT 132KV POWERLINE FOR THE RHODES 1, RHODES 2, EAST 3, EAST 2 AND EAST PV PLANTS TO THE UMTU SUBSTATION NEAR HOTAZEL, JOE MOROLONG LOCAL MUNICIPALITY, JOHN TAOLO GAETSEWE DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE.

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- 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, AMAFA 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;
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Signature of specialist

Company: Exigo Sustainability

Date: 15 August 2019

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EXECUTIVE SUMMARY

This report details the results of an Archaeological Impact Assessment (AIA) study subject to an Environmental Basic Assessment (BA) process for the proposed Rhodes & East Powerline Consolidated Project on Portions of the farm Rhodes 269, the remainder and Portion 2 of the Farm East 270, the Farm Kipling 271, the remainder of the farm Hotazel 280, the farm Umtu 281 and the remainder of the Farm Olive Pan 282 in the Joe Morolong Local Municipality and the John Taolo Gaetsewe District Municipality of the Northern Cape Province. The proposed project entails the construction of a double circuit 132kV powerline to connect the Rhodes 1, Rhodes 2, East 3, East 2 and East PV plants to the Umtu Substation near Hotazel. The report includes background information on the area’s archaeology, its representation in Southern Africa, and the history of the larger area under investigation, survey methodology and results as well as heritage legislation and conservation policies. A copy of the report will be supplied to the South African Heritage Resources Agency (SAHRA) and recommendations contained in this document will be reviewed.

Project Title	Rhodes & East Powerline Consolidated Project
Project Location	S27.190912° E22.948932°
1:50 000 Map Sheet	2722BB
Farm Portion / Parcel	Portions of the farm Rhodes 269, the remainder and Portion 2 of the Farm East 270, the Farm Kipling 271, the remainder of the farm Hotazel 280, the farm Umtu 281 and the remainder of the Farm Olive Pan 282
Magisterial District / Municipal Area	Joe Morolong Local Municipality and the John Taolo Gaetsewe District Municipality
Province	Northern Cape Province

A number of archaeological and historical studies have been conducted in the Kuruman area which points to a rich and diverse archaeological landscape. The heritage legacy of this area is mostly dominated by Stone Age and Colonial Period occurrences. However, the proposed corridor follows the existing Eskom “Hotazel - Heuningvlei” 132 kV power line and the Eskom “Hotazel - Umtu” 132 kV power line respectively and as such, vast areas included in the site survey scope have been altered and disturbed as a result of the existing power lines. Cognisance should nonetheless be taken of archaeological material that might be present in surface and sub-surface deposits along drainage lines and in pristine areas.

The following recommendations are made based on general observations in the proposed Rhodes & East Powerline Consolidated Project area.

- A low-density Middle Stone Age occurrence consisting out of single formal tools and scattered debris was documented along the banks of the Gamagara River along the proposed footprint area for the power line (**Site EXIGO-HZ280-SA01: S27.202998° E 22.921680°**). However, the site is of low scientific value due to the low lithic density and the general loss of context for the artefacts. Even though the impact on the site by the proposed activity is anticipated to be peripheral and permanent, the significance of the impact on the resource is considered to be low and this impact can be limited to a negligible impact by the implementation of mitigation measures (monitoring) for the sites, if / when required. As such, a careful watching brief monitoring process is recommended for development activities. Should any previously undetected surface of subsurface

- paleontological or archaeological material be exposed during development activities, all activities should be suspended and the archaeological specialist should be notified immediately.
- Considering the localised nature of heritage remains, the general monitoring of the development progress by an ECO or by the heritage specialist is recommended for all stages of the project. Should 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.
 - Since the intrinsic heritage and social value of graves and cemeteries are highly significant, these resources require special management measures. Should human remains be discovered at any stage, these should be reported to the Heritage Specialist and relevant authorities (SAHRA) and development activities should be suspended until the site has been inspected by the Specialist. The Specialist will advise on further management actions and possible relocation of human remains in accordance with the Human Tissue Act (Act 65 of 1983 as amended), the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), the National Heritage Resources Act (Act no. 25 of 1999) and any local and regional provisions, laws and by-laws pertaining to human remains. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burials.

Since heritage resources of low significance have been documented in the proposed Rhodes & East Powerline Consolidated Project footprint areas, no lasting impact on such resources is anticipated. No site-specific actions or any further heritage mitigation measures are recommended but the construction process should be monitored in order to avoid the destruction of previously undetected heritage remains. In the opinion of the author of this Archaeological Impact Assessment Report, the proposed Energy Rhodes & East Powerline Consolidated Project may proceed from a culture resources management perspective.

This report details the methodology, limitations and recommendations relevant to these heritage areas, as well as areas of proposed development. It should be noted that recommendations and possible mitigation measures are valid for the duration of the development process, and mitigation measures might have to be implemented on additional features of heritage importance not detected during this Phase 1 assessment (e.g. uncovered during the construction process).

NOTATIONS AND TERMS/TERMINOLOGY

Absolute dating: Absolute dating provides specific dates or range of dates expressed in years.

Archaeological record: The archaeological record minimally includes all the material remains documented by archaeologists. More comprehensive definitions also include the record of culture history and everything written about the past by archaeologists.

Artefact: Entities whose characteristics result or partially result from human activity. The shape and other characteristics of the artefact are not altered by removal of the surroundings in which they are discovered. In the Southern African context examples of artefacts include potsherds, iron objects, stone tools, beads and hut remains.

Assemblage: A group of artefacts recurring together at a particular time and place, and representing the sum of human activities.

Context: An artefact's context usually consists of its immediate *matrix*, its *provenience* and its *association* with other artefacts. When found in *primary context*, the original artefact or structure was undisturbed by natural or human factors until excavation and if in *secondary context*, disturbance or displacement by later ecological action or human activities occurred.

Cultural Heritage Resource: The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term 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.

Cultural landscape: A cultural landscape refers to a distinctive geographic area with cultural significance.

Cultural Resource Management (CRM): A system of measures for safeguarding the archaeological heritage of a given area, generally applied within the framework of legislation designed to safeguard the past.

Feature: Non-portable artefacts, in other words artefacts that cannot be removed from their surroundings without destroying or altering their original form. Hearths, roads, and storage pits are examples of archaeological features

Impact: A description of the effect of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.

Lithic: Stone tools or waste from stone tool manufacturing found on archaeological sites.

Matrix: The material in which an artefact is situated (sediments such as sand, ashy soil, mud, water, etcetera). The matrix may be of natural origin or human-made.

Midden: Refuse that accumulates in a concentrated heap.

Microlith: A small stone tool, typically knapped of flint or chert, usually about three centimetres long or less.

Monolith: A geological feature such as a large rock, consisting of a single massive stone or rock, or a single piece of rock placed as, or within, a monument or site.

Phase 1 CRM Assessment: An Impact Assessment which identifies archaeological and heritage sites, assesses their significance and comments on the impact of a given development on the sites. Recommendations for site mitigation or conservation are also made during this phase.

Phase 2 CRM Study: In-depth studies which could include major archaeological excavations, detailed site surveys and mapping / plans of sites, including historical / architectural structures and features. Alternatively, the sampling of sites by collecting material, small test pit excavations or auger sampling is required. Mitigation / Rescue involves planning the protection of significant sites or sampling through excavation or collection (in terms of a permit) at sites that may be lost as a result of a given development.

Phase 3 CRM Measure: A Heritage Site Management Plan (for heritage conservation), is required in rare cases where the site is so important that development will not be allowed and sometimes developers are encouraged to enhance the value of the sites retained on their properties with appropriate interpretive material or displays.

Provenience: Provenience is the three-dimensional (horizontal and vertical) position in which artefacts are found. Fundamental to ascertaining the provenience of an artefact is *association*, the co-occurrence of an artefact with other archaeological remains; and *superposition*, the principle whereby artefacts in lower levels of a matrix were deposited before the artefacts found in the layers above them, and are therefore older.

Random Sampling: A probabilistic sampling strategy whereby randomly selected sample blocks in an area are surveyed. These are fixed by drawing coordinates of the sample blocks from a table of random numbers.

Scoping Assessment: The process of determining the spatial and temporal boundaries (i.e. extent) and key issues to be addressed in an impact assessment. The main purpose is to focus the impact assessment on a manageable number of important questions on which decision making is expected to focus and to ensure that only key issues and reasonable alternatives are examined. The outcome of the scoping process is a Scoping Report that includes issues raised during the scoping process, appropriate responses and, where required, terms of reference for specialist involvement.

Site (Archaeological): A distinct spatial clustering of artefacts, features, structures, and organic and environmental remains, as the residue of human activity. These include surface sites, caves and rock shelters, larger open-air sites, sealed sites (deposits) and river deposits. Common functions of archaeological sites include living or habitation sites, kill sites, ceremonial sites, burial sites, trading, quarry, and art sites,

Stratigraphy: This principle examines and describes the observable layers of sediments and the arrangement of strata in deposits

Systematic Sampling: A probabilistic sampling strategy whereby a grid of sample blocks is set up over the survey area and each of these blocks is equally spaced and searched.

Trigger: A particular characteristic of either the receiving environment or the proposed project which indicates that there is likely to be an *issue* and/or potentially significant *impact* associated with that proposed development that may require specialist input. Legal requirements of existing and future legislation may also trigger the need for specialist involvement.

LIST OF ABBREVIATIONS

Abbreviation	Description
ASAPA	Association for South African Professional Archaeologists
AIA	Archaeological Impact Assessment
BP	Before Present
BCE	Before Common Era
BGG	Burial Grounds and Graves
CRM	Culture Resources Management
EIA	Early Iron Age (also Early Farmer Period)
EIA	Environmental Impact Assessment
EFP	Early Farmer Period (also Early Iron Age)
ESA	Earlier Stone Age
GIS	Geographic Information Systems
HIA	Heritage Impact Assessment
ICOMOS	International Council on Monuments and Sites
K2/Map	K2/Mapungubwe Period
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)
MRA	Mining Right Area
MSA	Middle Stone Age
NHRA	National Heritage Resources Act No.25 of 1999, Section 35
PFS	Pre-Feasibility Study
PHRA	Provincial Heritage Resources Authorities
SAFA	Society for Africanist Archaeologists
SAHRA	South African Heritage Resources Association
YCE	Years before Common Era (Present)

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1 BACKGROUND

1.1 Scope and Motivation

Exigo Sustainability (Pty) Ltd (Exigo) was commissioned by AGES Limpopo, on behalf of Mira Energy (Pty) Ltd to conduct an Archaeological Impact Assessment (AIA) study subject to an Environmental Basic Assessment (BA) process for the proposed Rhodes & East Powerline Consolidated Project in the Northern Cape Province. The rationale of this AIA is to determine the presence of heritage resources such as archaeological and historical sites and features, graves and places of religious and cultural significance in previously unstudied areas; to consider the impact of the proposed project on such heritage resources, and to submit appropriate recommendations with regard to the cultural resources management measures that may be required at affected sites / features.

1.2 Project Direction

Exigo's expertise ensures that all projects be conducted to the highest international ethical and professional standards. As archaeological specialist for Exigo Sustainability, Mr Neels Kruger acted as field director for the project; responsible for the assimilation of all information, the compilation of the final consolidated AIA report and recommendations in terms of heritage resources on the demarcated project areas. Mr Kruger is an accredited archaeologist and Culture Resources Management (CRM) practitioner with the Association of South African Professional Archaeologists (ASAPA), a member of the Society for Africanist Archaeologists (SAFA) and the Pan African Archaeological Association (PAA) as well as a Master's Degree candidate in archaeology at the University of Pretoria.

1.3 Project Brief

The Rhodes & East Powerline Consolidated Project occurs on Portions of the farm Rhodes 269, the remainder and Portion 2 of the Farm East 270, the Farm Kipling 271, the remainder of the farm Hotazel 280, the farm Umtu 281 and the remainder of the Farm Olive Pan 282 in the Joe Morolong Local Municipality and the John Taolo Gaetsewe District Municipality of the Northern Cape Province. The proposed project entails the construction of a double circuit 132kV powerline to connect the Rhodes 1, Rhodes 2, East 3, East 2 and East PV plants to the Umtu Substation near Hotazel over a distance of approximately **12.5km**.

The power line will consist of a series of steel and/or wood towers / structures supporting the electrical cables and a communication cable, to be installed approximately 200 - 260 m apart. The proposed structures will be between 18 m and 25 m high and the basement of each tower will have a footprint of approximately 2.5 m². The power line servitude will be 36 m wide (18 m from each side of the center line); the alignment will be assessment within the proposed corridor routes. An access road may be constructed within the power line servitude, for the construction and maintenance activities. The proposed 132 kV power line may be built and/or operates by Osalus Energy and/or Eskom. The construction may also entail interventions on the Eskom grid according to Eskom requirements.

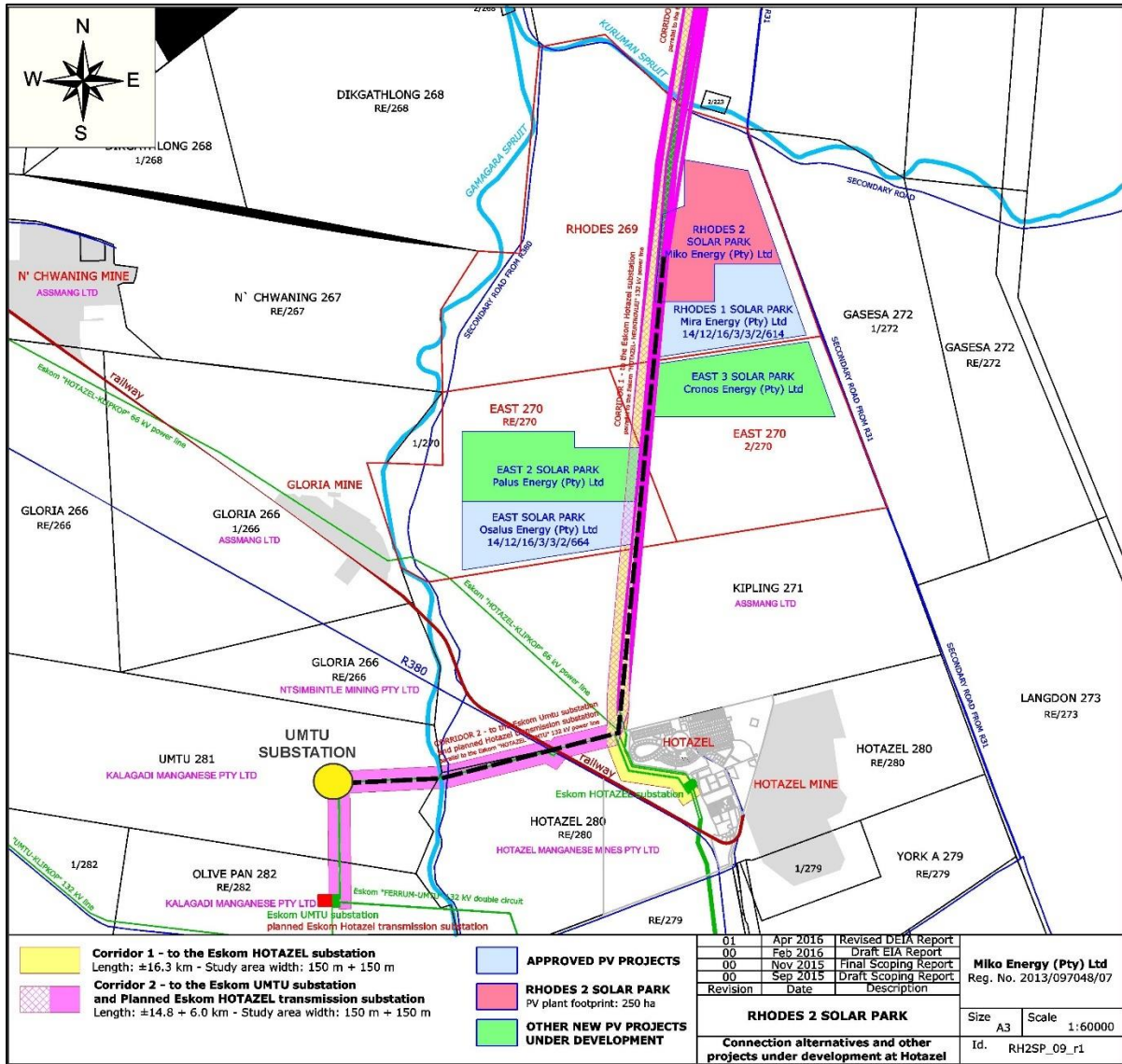


Figure 1-1: Aerial map indicating the locality and extent of the proposed Rhodes & East Powerline Consolidated Project. The proposed power line is indicated by the dotted black line.

1.4 Terms of Reference

Heritage specialist input into the Environmental Impact Assessment (EIA) process is essential to ensure that, through the management of change, developments still conserve our heritage resources. It is also a legal requirement for certain development categories which may have an impact on heritage resources. Thus, EIAs should always include an assessment of heritage resources. The heritage component of the EIA is provided for in the **National Environmental Management Act, (Act 107 of 1998)** and endorsed by section 38 of the **National Heritage Resources Act (NHRA - Act 25 of 1999)**. In addition, the NHRA protects all structures and features older than 60 years, archaeological sites and material and graves as well as burial sites. The objective of this legislation is to ensure that developers implement measures to limit the potentially negative effects that the development could have on heritage resources. Based hereon, this project functioned according to the following **terms of reference** for heritage specialist input:

- *Provide a detailed description of all archaeological artefacts, structures (including graves) and settlements which 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 emanating from the proposed development activities.*
- *Propose possible heritage management measures provided that such action is necessitated by the development.*
- *Liaise and consult with the South African Heritage Resources Agency (SAHRA). A Notification of Intent to Develop (NID) will be submitted to SAHRA at the soonest opportunity.*

1.5 CRM: Legislation, Conservation and Heritage Management

The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term 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.

1.5.1 Legislation regarding archaeology and heritage sites

The South African Heritage Resources Agency (SAHRA) and its provincial offices aim to conserve and control the management, research, alteration and destruction of cultural resources of South Africa. It is therefore vitally important to adhere to heritage resource legislation at all times.

a. National Heritage Resources Act No 25 of 1999, section 35

According to the National Heritage Resources Act No 25 of 1999 (section 35) the following features are protected as cultural heritage resources:

- a. Archaeological artefacts, structures and sites older than 100 years
- b. Ethnographic art objects (e.g. prehistoric rock art) and ethnography
- c. Objects of decorative and visual arts

- d. Military objects, structures and sites older than 75 years
- e. Historical objects, structures and sites older than 60 years
- f. Proclaimed heritage sites
- g. Grave yards and graves older than 60 years
- h. Meteorites and fossils
- i. Objects, structures and sites of scientific or technological value.

In addition, the national estate includes the following:

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

With regards to activities and work 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)

and

“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).”*

and

“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)."*

b. 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.

c. National Heritage Resources Act No 25 of 1999, section 35

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.

1.5.2 Background to HIA and AIA Studies

South Africa's unique and non-renewable archaeological and palaeontological heritage sites are 'generally' protected in terms of the National Heritage Resources Act (Act No 25 of 1999, section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority. Heritage sites are frequently threatened by development projects and both the environmental and heritage legislation require impact assessments (HIAs & AIAs) that identify all heritage resources in areas to be developed. Particularly, these assessments are required to make recommendations for protection or mitigation of the impact of the sites. HIAs and AIAs should be done by qualified professionals with adequate knowledge to (a) identify all heritage resources including archaeological and palaeontological sites that might occur in areas of developed and (b) make recommendations for protection or mitigation of the impact on the sites.

A detailed guideline of statutory terms and requirements is supplied in Addendum 1.

2 REGIONAL CONTEXT

2.1 Area Location

The proposed Rhodes & East Powerline Consolidated Project occurs north of the town of Deben and Hotazel on portions of the farm Rhodes 269, the remainder and Portion 2 of the Farm East 270, the Farm Kipling 271, the remainder of the farm Hotazel 280, the farm Umtu 281 and the remainder of the Farm Olive Pan 282 in the Joe Morolong Local Municipality and the John Taolo Gaetsewe District Municipality of the Northern Cape Province. The site is situated more or less 40km north-west of the town of Kuruman and the Sishen Mining Complex occurs approximately 30km southeast of the study area. The Kgalagadi Manganese Mine is situated directly west of Corridor 2. The R380 and R31 provincial roads routes south and south-west of the study area and the Nchwaning Manganese Mine occurs west of the study area. The region lies approximately 180km north-east of the Northern Cape town of Upington. The study areas appear on 1:50000 map sheet 2722BB (see Figure 2-1) and coordinates for the proposed project are as follows:

Northern Offset: S27.131490° E22.956219°

Centre Point: S27.190912° E22.948932°

Southern Offset S27.203715° E22.901636°

2.2 Area Description: Receiving Environment¹

The Northern Cape area around Kuruman, Kathu and Hotazel receives around 200-400 mm of rain in the summer months. The development site lies within the Savanna biome which is the largest biome in Southern Africa. It is characterized by a grassy ground layer and a distinct upper layer of woody plants (trees and shrubs). The most recent classification of the area by Mucina & Rutherford (2006) shows that the sites forms part of the Kathu Bushveld and Gordonia Duneveld vegetation types. The vegetation and landscape characteristics of the Kathu Bushveld include a medium-tall tree layer with dense stands of *Acacia erioloba* in places, but mostly an open woodland, while the shrub layer below. The landscape features of the Gordonia Duneveld vegetation type are mostly parallel dunes (3-8m in height) with an open shrubland woody structure and ridges of grassland. The geology of the region is underlain by rocks older than 1000 million years and the overburden consists mainly of geologically recent Kalahari sand, which in turn is un-fossiliferous. Some quartzites also occur on area on the landscape. Previous studies in the area indicated that the area is underlain more specifically by Proterozoic-aged rocks belonging to the Asbestos Hills Subgroup of the Transvaal Supergroup (Beaumont 2009). The Gamagara River transects the landscape west of the study area and the Kuruman River flows north along the northern periphery of the farm East and Rhodes. The Kuruman hills are located to the far east of the area.

2.3 Site Description

The properties subject to the proposed project occur on fairly flat terrain but the central portion of the study area around the Gamagara River is slightly contoured. The study area is moderately vegetated and covered in mostly deep soft red sands with little visible surface stone. The current land-use along the proposed power line corridors is mainly grazing by livestock and game, although the area closer to Hotazel is vacant land. Neighbouring farms are being used for livestock grazing and game farming, with mining to the west of the

¹ See Henning, B. 2014. **AN ENVIRONMENTAL REPORT ON THE ECOLOGY (FLORA AND FAUNA) FOR THE PROPOSED RENEWABLE ENERGY GENERATION PROJECT ON THE FARM RHODES 269, NORTHERN CAPE PROVINCE**

proposed corridors. The major land use of the study area as classified by the Environmental Potential Atlas of South Africa (2000) is vacant / unspecified land. The proposed corridor follow the existing Eskom “Hotazel - Heuningvlei” 132 kV power line and the Eskom “Hotazel - Umtu” 132 kV power line respectively and as such, vast areas included in the site survey scope have been altered and disturbed as a result of the existing power lines. There are no significant landscape features in the corridor footprints but the Kuruman River is situated north of the farm East and the Gamagara River bisects the study area. The Kgalagadi Manganese Mine forms the western boundary of the study area and the town of Hotazel is located to the east .

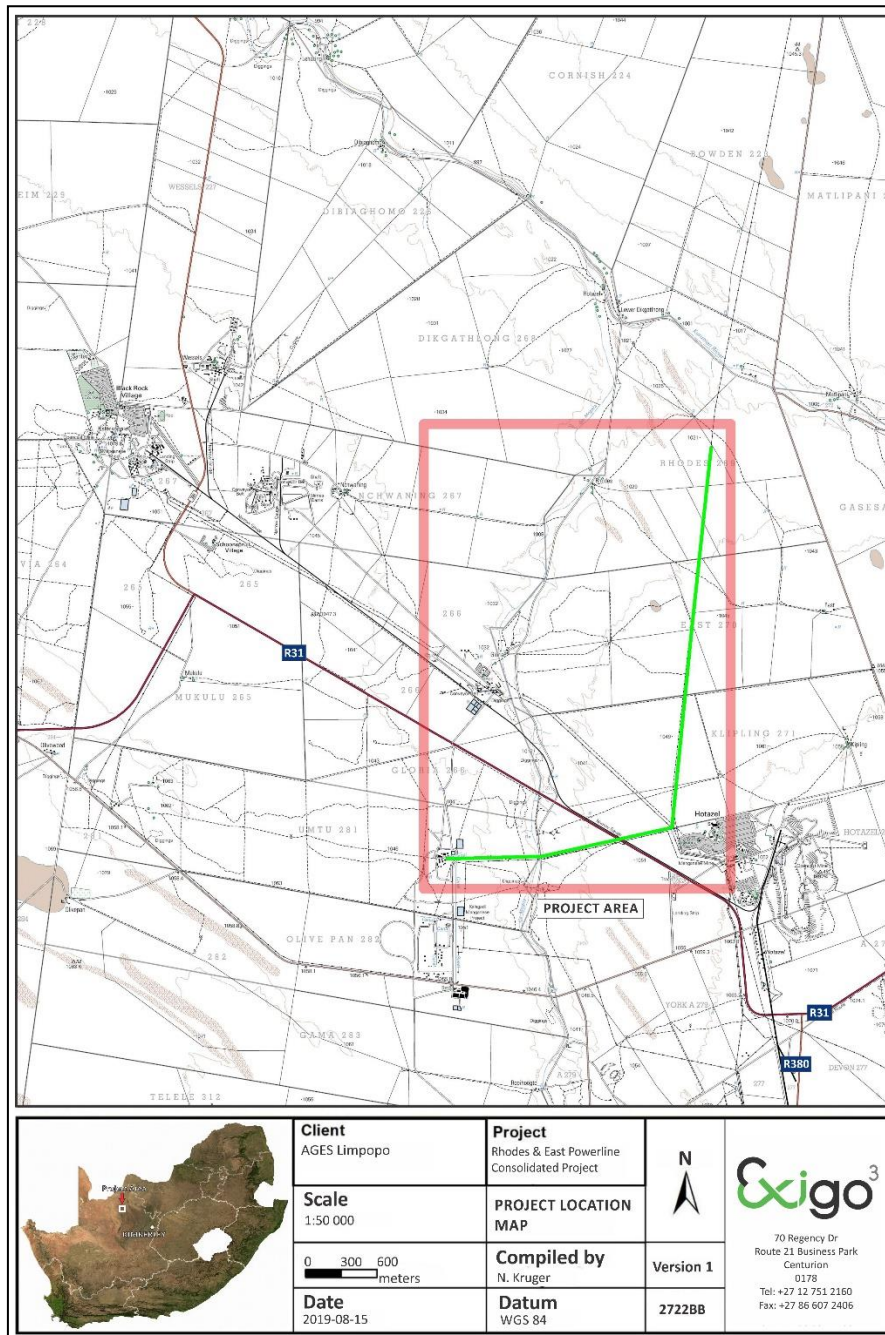


Figure 2-1: 1:50 00 Map representation of the location of the proposed Rhodes & East Powerline Consolidated Project (sheet 2722BB).

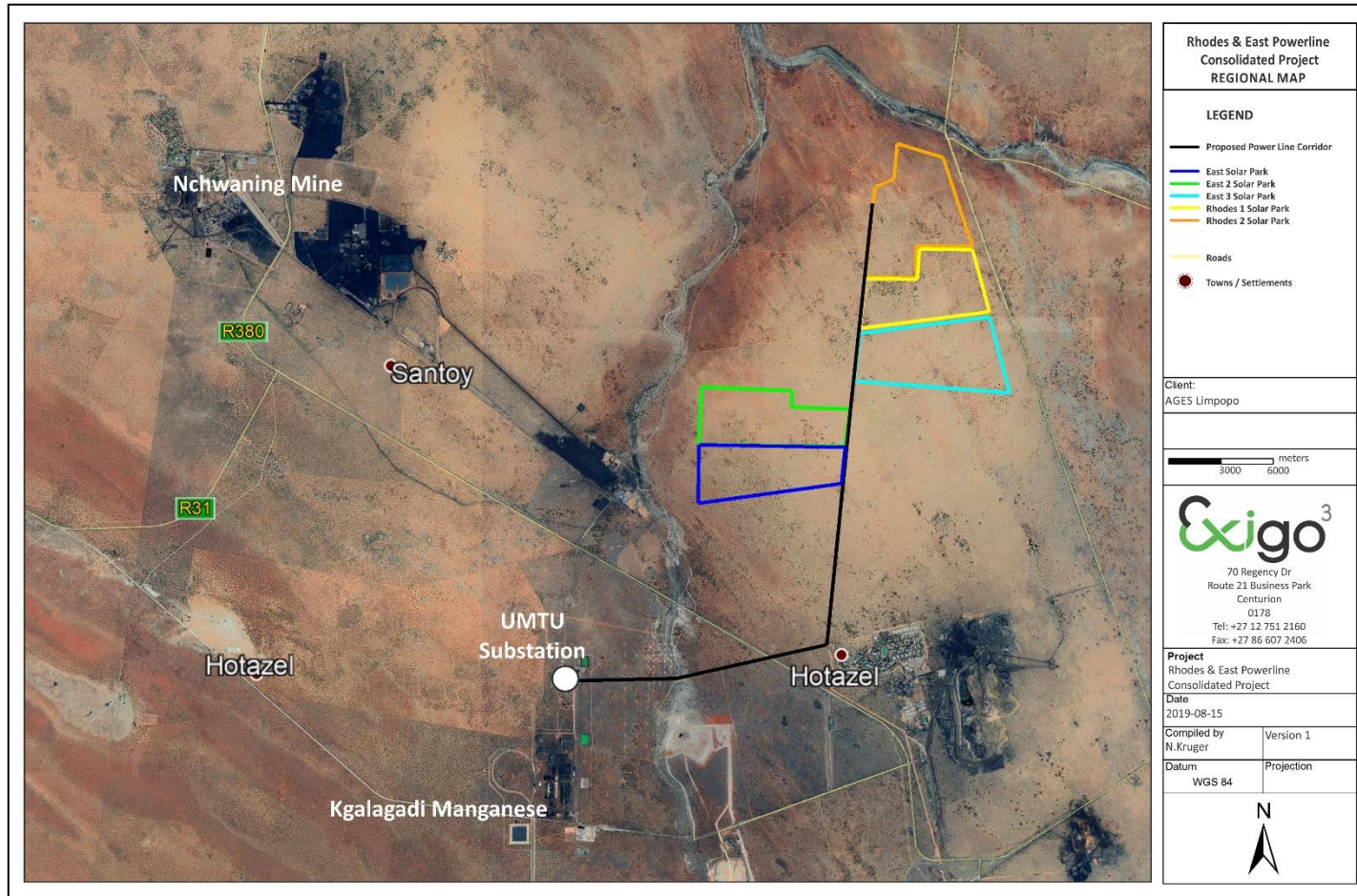


Figure 2-2: Aerial map providing a regional context for the proposed Rhodes & East Powerline Consolidated Project area.

3 METHOD OF ENQUIRY

3.1 Sources of Information

Data from detailed desktop, aerial and field studies were employed in order to sample surface areas systematically and to ensure a high probability of heritage site recording.

3.1.1 Desktop Study

The larger landscape around Kimberley has been well documented in terms of its archaeology and history. Numerous academic papers and research articles supplied a historical context for the proposed project and archival sources, aerial photographs, historical maps and local histories were used to create a baseline of the landscape's heritage. In addition, the study drew on available unpublished Heritage Assessment reports to give a comprehensive representation of known sites in the study area.

3.1.2 Aerial Survey

Aerial photography is often employed to locate and study archaeological sites, particularly where larger scale area surveys are performed. This method was applied to assist the foot and automotive site surveys where depressions, variation in vegetation, soil marks and landmarks were examined. Specific attention was given to shadow sites (shadows of walls or earthworks which are visible early or late in the day), crop mark sites (crop mark sites are visible because disturbances beneath crops cause variations in their height, vigour and type) and soil marks (e.g. differently coloured or textured soil (soil marks) might indicate ploughed-out burial mounds). Attention was also given to moisture differences, as prolonged dampening of soil as a result of precipitation frequently occurs over walls or embankments. In addition, historical aerial photos obtained during the archival search were scrutinized and features that were regarded as important in terms of heritage value were identified and if they were located within the boundaries of the project area they were physically visited in an effort to determine whether they still exist and in order to assess their current condition and significance. By superimposing high frequency aerial photographs with images generated with Google Earth as well as historical aerial imagery, potential sensitive areas were subsequently identified, geo-referenced and transferred to a handheld GPS device. These areas served as reference points from where further vehicular and pedestrian surveys were carried out.

3.1.3 Mapping of sites

Historical and current maps of the project area were examined. By merging data obtained from the desktop study and the aerial survey, sites and areas of possible heritage potential were plotted on these maps of the larger Mokopane area using GIS software. These maps were then superimposed on high definition aerial representations in order to graphically demonstrate the geographical locations and distribution of potentially sensitive landscapes.

3.1.4 Field Survey

Archaeological survey implies the systematic procedure of the identification of archaeological sites. Archaeological survey implies the systematic procedure of the identification of archaeological sites. An initial archaeological survey of the footprint of the proposed power line corridor was conducted in March 2014 and a later site inspection of additional sections was conducted in 2015. The process encompassed a systematic field survey in accordance with standard archaeological practice by which heritage resources are observed and documented. During the site survey, particular focus was placed on proposed infrastructure footprint areas provided to the specialist. GPS reference points identified during the aerial survey were also

visited and random spot checks were made (see detail in previous section). Using a Garmin GPS, the survey was tracked and general surroundings were photographed with a Samsung Digital camera. Real time aerial orientation, by means of a mobile Google Earth application was also employed to investigate possible disturbed areas during the survey.

3.1.5 General Public Liaison

Correspondence with the owner of the farm East provided information on the general history of the area, possible locations of heritage resources and brief commentaries on the recent history of the farm. A farm worker residing on the farm East who have been living on the farm for many decades, pointed to the fact that, according to his knowledge, no heritage resources was present on the footprint areas covering the farms Rhodes and East.

3.2 Limitations

3.2.1 Access

The farms Rhodes and East are accessed either directly via the R380 regional road, or from a small farm road routing along the Gamagara River. Access control is applied to the farm portions relevant to the assessment but no restrictions were encountered during the site visit as the author of this report was granted access by the owner of the farm.

3.2.2 Visibility

The surrounding vegetation in the study area is mostly comprised out of mixed grasslands and scattered trees with the occurrence of semi-arid succulents in places and visibility proved to be a constraint in certain areas. As such, the general visibility at the time of the AIA surveys (March 2014, March 2015) was moderate due to surface vegetation and obstruction (see Figures 3-1 to 3-10). In single cases during the survey sub-surface inspection was possible. Where applied, this revealed no archaeological deposits .



Figure 3-1: View of the study area at the northern offset of the proposed corridor for the power line.



Figure 3-2: View of the study area along the existing Hotazel - Heuningvlei ESKOM power line on the farm East..



Figure 3-3: View of the study area on a northern portion of the farm Hotazel.



Figure 3-4: View of the study area along the existing Hotazel - Heuningvlei ESKOM power line near the town of Hotazel.



Figure 3-5: View of sands and degraded surface cover along a side line connecting to the Hotazel - Heuningvlei ESKOM power line.



Figure 3-6: View of the Gamagara River where of the proposed corridor crosses the drainage line towards the Umtu substation.



Figure 3-7: View of general surroundings in the project area on a portion of the farm Rhodes.



Figure 3-8: View of the Umtu Substation and the southern offset of the proposed corridor.

3.2.3 Summary: Limitations and Constraints

The site survey for the Rhodes & East Powerline Consolidated Project AIA primarily focused around areas tentatively identified as sensitive and of high heritage probability (i.e. those noted during the aerial survey) as well as areas of high human settlement catchment. In summary, the following constraints were encountered during the site survey:

- **Survey Time and Extent:** Survey time proved to be a minor constraint due to the relatively large linear extent of the corridor footprint areas. Therefore, pedestrian site surveys focused around areas tentatively identified as sensitive (i.e. along drainage lines and those noted during the aerial survey) during aerial surveys.

- **Visibility:** Visibility constrained site identification in undisturbed areas with denser surface cover, as well as portions where vegetation is more pristine.

It should be noted that, even though it might be assumed that survey findings are representative of the heritage landscape of the project area for the Project, it should be stated that the possibility exists that individual sites could be missed due to the localised nature of some heritage remains as well as the possible presence of sub-surface archaeology. Therefore, maintaining due cognisance of the integrity and accuracy of the archaeological survey, it should be stated that the heritage resources identified during the study do not necessarily represent all the heritage resources present in the project area. The subterranean nature of some archaeological sites, dense vegetation cover and visibility constraints sometimes distort heritage representations and any additional heritage resources located during consequent development phases must be reported to the Heritage Resources Authority or an archaeological specialist.

3.3 Impact Assessment

For consistency among specialists, impact assessment ratings by Exigo Specialist are generally done using the Plomp² impact assessment matrix scale supplied by Exigo. According to this matrix scale, each heritage receptor in the study area is given an impact assessment (see Section 6.1.2).

4 ARCHAEO-HISTORICAL CONTEXT

4.1 The archaeology of Southern Africa

Archaeology in Southern Africa is typically divided into two main fields of study, the **Stone Age** and the **Iron Age** or **Farmer Period**. The following table provides a concise outline of the chronological sequence of periods, events, cultural groups and material expressions in Southern African pre-history and history.

Table 4-1 Chronological Periods across Southern Africa

Period	Epoch	Associated cultural groups	Typical Material Expressions
Early Stone Age 2.5m – 250 000 YCE	Pleistocene	Early Hominins: <i>Australopithecines</i> <i>Homo habilis</i> <i>Homo erectus</i>	Typically large stone tools such as hand axes, choppers and cleavers.
Middle Stone Age 250 000 – 25 000 YCE	Pleistocene	First <i>Homo sapiens</i> species	Typically smaller stone tools such as scrapers, blades and points.
Late Stone Age 20 000 BC – present	Pleistocene / Holocene	<i>Homo sapiens sapiens</i> including San people	Typically small to minute stone tools such as arrow heads, points and bladelets.
Early Iron Age / Early Farmer Period 300 – 900 AD (commonly restricted to the interior and north-east coastal areas of Southern Africa)	Holocene	First Bantu-speaking groups	Typically distinct ceramics, bead ware, iron objects, grinding stones.
Middle Iron Age (Mapungubwe / K2) / early Later Farmer Period 900 –	Holocene	Bantu-speaking groups, ancestors of present-day	Typically distinct ceramics, bead ware and iron / gold / copper objects, trade goods and

² Plomp, H.,2004

1350 AD (commonly restricted to the interior and north-east coastal areas of Southern Africa)		groups	grinding stones.
Late Iron Age / Later Farmer Period 1400 AD -1850 AD (commonly restricted to the interior and north-east coastal areas of Southern Africa)	Holocene	Various Bantu-speaking groups including Venda, Tsonga, Sotho-Tswana and Zulu	Distinct ceramics, grinding stones, iron objects, trade objects, remains of iron smelting activities including iron smelting furnace, iron slag and residue as well as iron ore.
Historical / Colonial Period ±1850 AD – present	Holocene	Various Bantu-speaking groups as well as European farmers, settlers and explorers	Remains of historical structures e.g. homesteads, missionary schools etc. as well as glass, porcelain, metal and ceramics.

4.2 Discussion: The Hotazel, Kuruman, Kathu Heritage Landscape

The history of the Northern Cape Province is reflected in a rich archaeological landscape, mostly dominated by Stone Age occurrences. However, Webley & Halkett (2008) have noted that there has been very little archaeological work undertaken north of Kuruman, but there are reports of rock engravings to the north of the town. Most of our knowledge of the archaeology of the region is largely dependent on the work undertaken by Humphreys & Thackeray (1983) to the south of Kuruman, and on the Ghaap escarpment, as well as that of Beaumont (1990). A number of Archaeological Impact Assessments (e.g. Beaumont, Morris, Kaplan, Becker & Kruger) have been done in the Kuruman area. Generally, numerous sites documenting Earlier, Middle and Later Stone Age habitation occur across the province, mostly in open air locales or in sediments alongside rivers or pans. In addition, a wealth of Later Stone Age rock art sites, most of which are in the form of rock engravings are to be found in the larger landscape. These sites occur on hilltops, slopes, rock outcrops and occasionally in river beds. Sites dating to the Iron Age occur in the north eastern part of the Province and environmental factors delegated that the spread of Iron Age farming westwards from the 17th century was constrained mainly to these areas. However, evidence of an Iron Age presence as far as the Upington area in the eighteenth century occurs in this area. Moving into recent times, the archaeological record reflects the development of a rich colonial frontier, characterised by, amongst others, a complex industrial archaeological landscape such as mining developments at Kimberley, which herald the modern era in South African history .

4.2.1 Palaeontology & Early History

Palaeontological assessments on areas around Kuruman note that the area is underlain by rocks older than 1000 million years, which makes them too old to contain hard-bodied fossils (e.g Beaumont 2009). This overburden consists mainly of un-fossiliferous Kalahari sand, which is relatively recent in geological age. An indurated calcareous layer frequently occurs at the interface of the sandy overburden and the rock beneath. This layer may contain fossil remains in more suitable localities, although none have been reported from such contexts in this area

4.2.2 The Stone Ages

According to archaeological research, the earliest ancestors of modern humans emerged some two to three million years ago. The remains of Australopithecine and *Homo habilis* have been found in dolomite caves

and underground dwellings in the Riverton Area at places such as Sterkfontein and Swartkrans near Krugersdorp. *Homo habilis*, one of the Early Stone Age hominids, is associated with Oldowan artefacts, which include crude implements manufactured from large pebbles. The Acheulian industrial complex replaced the Oldowan industrial complex during the Early Stone Age. This phase of human existence was widely distributed across South Africa and is associated with *Homo erectus*, who manufactured hand axes and cleavers from as early as one and a half million years ago. Middle Stone Age sites dating from as early as two hundred thousand years ago have been found all over South Africa. Middle Stone Age hunter-gatherer bands also lived and hunted in the Orange and Vaal River valleys. These people, who probably looked like modern humans, occupied campsites near water but also used caves as dwellings. They manufactured a wide range of stone tools, including blades and points that may have had long wooden sticks as hafts and were used as spears.

The landscape around the town of Kuruman is rich in archaeological material dating to Earlier and Middle Stone Ages. Sites such as Wonderwerk Cave, Kathu Pan and Kathu Townlands (see below) have yielded significant Stone Age assemblages that all inform on our general understanding of the technological sequences of the Stone Age in the Northern Cape (e.g. see Beaumont 2008; Morris 2006; Morris 2007; Dreyer 2007). In addition, a large amount of Middle and Later Stone Age sites have been documented across the landscape on calcrete lined pans and road cuttings.

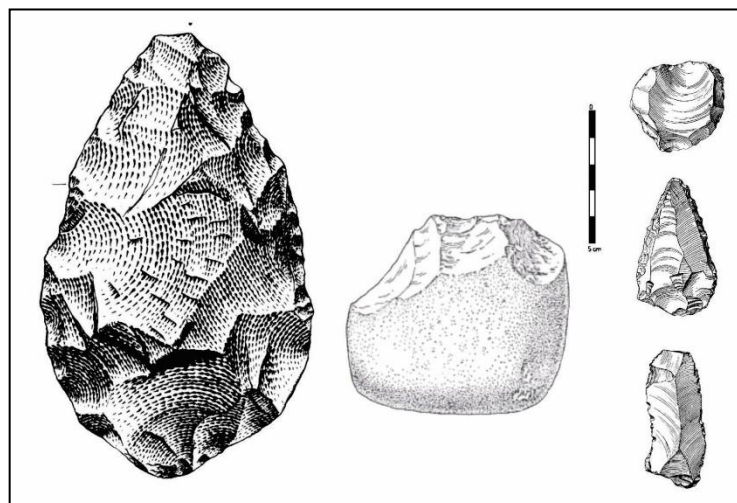


Figure 4-1: Typical ESA handaxe (left) and cleaver (center). To the right is a MSA scraper (right, top), point (right, middle) and blade (right, bottom).

4.2.3 Rock Markings and Art

Rock engravings are mostly situated in the semi-arid plateau with most of these engravings situated at the Orange – Vaal basin, Karoo and Namibia. The upper Vaal, Limpopo basin and eastern Free State regions have a small quantity of rock engravings as well. Generally, rock paintings exist at cave areas and rock engravings at open surface areas. The Cape interior consists of a technical, formal and thematic variation between and within sites (Morris 1988). Two major techniques existed namely the incised and pecked engravings. Morris (1988) indicated technical and formal characteristics through space and a sharp contrast exists between engravings positioned north of the Orange River that are mostly pecked and those in the Karoo where scraping was mostly used. According to Morris (1988) hairline engravings occur at the North and the South, but they are rare at the Vryburg region. Finger painting techniques mostly occur at the Kuruman Hills, Asbestos Mountains, Ghaap Escarpment, Langeberg, Koranaberg ranges, scattered sites at the Karoo and

the Kareeberge (Morris 1988). The development petroglyphs (i.e. carving or line drawing on rock) were associated with three different types of techniques, namely incised fine lines, pecked engravings and scraped engravings. According to Peter Beaumont the pecked and scraped engravings at the Upper Karoo are coeval (i.e. having the same age or date of origin) (Beaumont P B et al. 1989). Dating of rock art includes the use of carbonate fraction dating of ostrich eggshell pieces, dating of charcoal and ostrich eggshell at various rock art shelters. Unifacial points, double segments and thin – walled sherds may indicate the presence of the Khoikhoi at the Northern Cape during 2500 BP (years Before the Present) (Beaumont 1989).

4.2.4 The Iron Age Farmer Period

The beginnings of the Iron Age (Farmer Period) in southern Africa are associated with the arrival of a new Bantu speaking population group at around the third century AD. These newcomers introduced a new way of life into areas that were occupied by Later Stone Age hunter-gatherers and Khoekhoe herders. Distinctive features of the Iron Age are a settled village life, food production (agriculture and animal husbandry), metallurgy (the mining, smelting and working of iron, copper and gold) and the manufacture of pottery. Stone ruins indicate the occurrence of Iron Age settlements in the Northern Cape specifically at sites such as Dithakong where evidence exists that the Thlaping used to be settled in the Kuruman – Dithakong areas prior to 1800 (Humphreys 1976). Here, the assessment of the contact between the Stone Age, Iron Age and Colonial societies are significant in order to understand situations of contact and assimilation between societies. As an example, Trade occurred between local Thlaping Tswana people and the Khoikhoi communities. It means that the Tswana traded as far south as the Orange River at least the same time as the Europeans at the Cape (Humphreys 1976)..

4.2.5 Later History: Colonial Period and the Anglo Boer War

Areas south of Kuruman played a strategic role during the Anglo-Boer and towns such as Postmasburg, situated about 100km south of Kuruman, acted as an important link between the Boer forces from Transvaal to the Cape Colony south of the Orange River, providing ammunition and horses (Snyman 1985). The oral and written history of the Northern Cape pertaining to the last centuries is relatively abundant resulting from an assimilation of local folklore and Historical sources such as missionary accounts. The Historical period commenced when pioneers (in most cases, missionaries) arrived between the nineteenth century and early twentieth century, depending on the region. Later, larger populations established villages in the area, some of which are often still occupied today. During the 1930's some of the Tswana communities consisted of a wealth of cattle that could be used to gain capital and purchase additional land. The Khoisan and Khoikhoi communities were not so lucky, because they were mostly used as labourers at various Tswana and European households (Wylie 1989). The Northern Cape was subjected to a resettlement program during the apartheid years. Tswana families were divided into the men who had to live in a compound and the women who were sent to a relocation centre (Hallett 1984). Between 1960 and 1962 it was estimated that an average of 834,000 people were affected by the Group Areas Act (Hallett 1984). The farm East was proclaimed in 1914).

4.2.6 Other: Mining and Metallurgy

Surface occurrence of specularite (i.e. a variety of hematite) and prehistoric specularite workings are known to occur in the Northern Cape. One of these historic mines occurs at Doornfontein near Postmasburg, which dates to 1200 BP (Thackeray 1983). Specularite used to be transported in ostrich eggshells and pottery containers (Thackeray 1983). Various oral accounts indicate that Skeyfontein was visited by Khoi Herding people, Iron Age Tswana and San hunter – gatherers. More recently, asbestos mines were operated north-west of Kuruman on the farms Riries and Mt Vera during the 20th century

4.2.7 Significant Heritage Sites in this section of the Northern Cape Province

The Northern Cape has a wealth of pre-colonial archaeological sites (Beaumont & Morris 1990; Morris & Beaumont 2004). Archaeological sites in the vicinity of the Sishen Iron Ore Mine are not randomly scattered within the landscape and they occur either near water or close to local source of two highly-prized raw materials, specularite and jaspilite. Besides the Gamagara River where numerous low density artefact scatters occur, another regional water source occurs below superficial sands on the bedrock plains around Kathu, where water was contained at times that gradually filled up with stratified sediments often containing massive calcretes of Tertiary age. Large tracts are far more widespread, where archaeological traces are almost non-existent with very occasional specimens of the Later Stone Age on the sand surface and thin scatters of specimens from the Early Stone Age on calcrete below. Rock engravings previously occurred on the farms Bruce and Sishen, but as these were located in land that was to be mined, personnel of the McGregor Museum removed them prior to mining developments. At least two archaeological sites of note occur in the general landscape around the town of Kathu. As noted earlier, significant Stone Age sites occur in and around Kathu and on adjacent farms. These are subject to on-going archaeological research, primarily by Jayne Wilkins from the University of Toronto in Ontario, who has suggested the earliest stone-tipped spears yet found occur in the Kathu area. Archaeological sites of note occur in the general landscape around the town of Kuruman and include:

- *Kathu Pan*

This site, situated near the town of Kathu, is a shallow water pan about 30ha in extent. The site was extensively studied from 1974 to 1990 by Humpreys and Beaumont, amongst others. Kathu Pan is an extremely significant site as it represents the major industries of the Stone Age, more specifically two phases of the Earlier Stone Age, two phases of the Middle Stone Age, and more or less the entire Later Stone Age (Beaumont 1990). The site yielded large amounts of hand axes and faunal remains, including the concentrated remains of large mammal remains. More recently, research by Jayne Wilkins revealed a hoard of stone points, each between 4 and 9 centimeters long, that they think belonged to the earliest stone-tipped spears yet found. The stone points are the right shape and size for the job, and some have fractured tips that suggest they were used as weapons. Since stone points used on spears had been found only at sites that date back no more than 300 000 years, these discoveries in the 500 000-year-old deposits at Kathu is greatly significant. The abundance of Stone Age material at Kathu Pan can probably be attributed to the presence of a permanent water source at the pan.

- *Wonderwerk Cave*

One of the most important archaeological sites in the region is the world renowned long-sequence Wonderwerk Cave, formed originally as an ancient solution cavity in Dolomite rocks of the Kuruman Hills. The cave, situated between Danielskuil and Kuruman, contains up to 6 m depth of archaeological deposits reflecting human and environmental history through the Earlier, Middle and Later Stone Ages to the present. Rock art occurs in the form of parietal paintings within the first 40 metres from the entrance, possibly all less than 1000 years old, and small engraved stones found within the deposit, mainly from the Later Stone Age sequence where they date back some 10 500 years. The associations of older engraved or striated pieces have yet to be substantiated form of parietal paintings within the first 40 metres from the entrance, possibly all less than 1000 years old, and small engraved stones found within the deposit, mainly from the Later Stone Age sequence where they date back some 10 500 years. The associations of older engraved or striated pieces have yet to be substantiated.

- *Dithakong*

Important farmer period Iron Age remnants occur at the major Tswana town and pre-colonial stone-walled settlements of Dithakong. Local BaTlhaping communities claimed not to have known who had made or lived in this earlier town but archaeological investigations have established Tswana affinities in the earlier settlement which includes features indicative of frontier complexity at this south-western edge of Tswana expansion. Early traveller accounts refer to an impressively large town consisting of mud houses, traces of which have yet to be located archaeologically.

- *Moffat Mission Station and the Kuruman Mission*

Historically, Kuruman boasts one of the longest trajectories of African-colonial interaction centred on the nearly two-century old Moffat Mission. The Kuruman Mission was established by the London Missionary Society (LMS) in 1816 at Maruping near Kuruman where a town of about 10 000 Batswana were resident. Robert Moffat (1795-1887) arrived in Kuruman from Scotland in 1820, and soon organised permission from Chief Mothibi to relocate it to the present position at Seodin in the valley of the Kuruman River. From here he preached Christianity to the local people. Moffat laboured at the mission for 50 years, and his period is considered the “golden age” of missionary work amongst the Batswana. He was a man of considerable talents and oversaw the building of staff houses, a school house, store rooms, and the “cathedral of the Kalahari”, the great Moffat Church (1838) which can seat 800 people. The mission is also well-known as the first African home of Dr. David Livingstone. He arrived as an LMS missionary in 1841, and remained in contact with the mission due to his marriage to Moffat’s eldest daughter Mary.

- *Kathu Townlands*

This Provincial Heritage Site, covering an estimated area of 250 000 m² is located away from the Kathu pan on the outskirts of the town of Kathu. The site, excavated in 1982 and 1990, primarily displays a large Earlier Stone Age horizon in deposits up to a metre below surface. This deposit dates to the Acheul phase of the Earlier Stone Age. It is estimated that in total, the site holds more than 2 billion artefacts. This abundance of lithic debris could be ascribed to the protracted use of the high-grade banded ironstone outcrop in the area, as a raw material source (Beaumont 1990).

5 RESULTS: ARCHAEOLOGICAL SURVEY

5.1 The Off-Site Desktop Survey

The general landscape around the project area is primarily well known for its Stone Age and Colonial / Historical Period archaeology primarily related to the development of farming as well as the mining industry of the past century and resulting ruralization and industrialization. No particular reference to archaeological sites or features of heritage potential were recorded during an examination of literature thematically or geographically related to the project area. A careful analysis of historical aerial imagery and archive maps indicate that portions of the target property— and particularly areas subject to this assessment have been altered extensively where the existing Eskom “Hotazel - Heuningvei” 132 kV power line and the Eskom “Hotazel - Umtu” 132 kV power line respectively were constructed. No man-made structures were noted to be present in the project areas during the first part of the 20th century (see Figure 5-1).

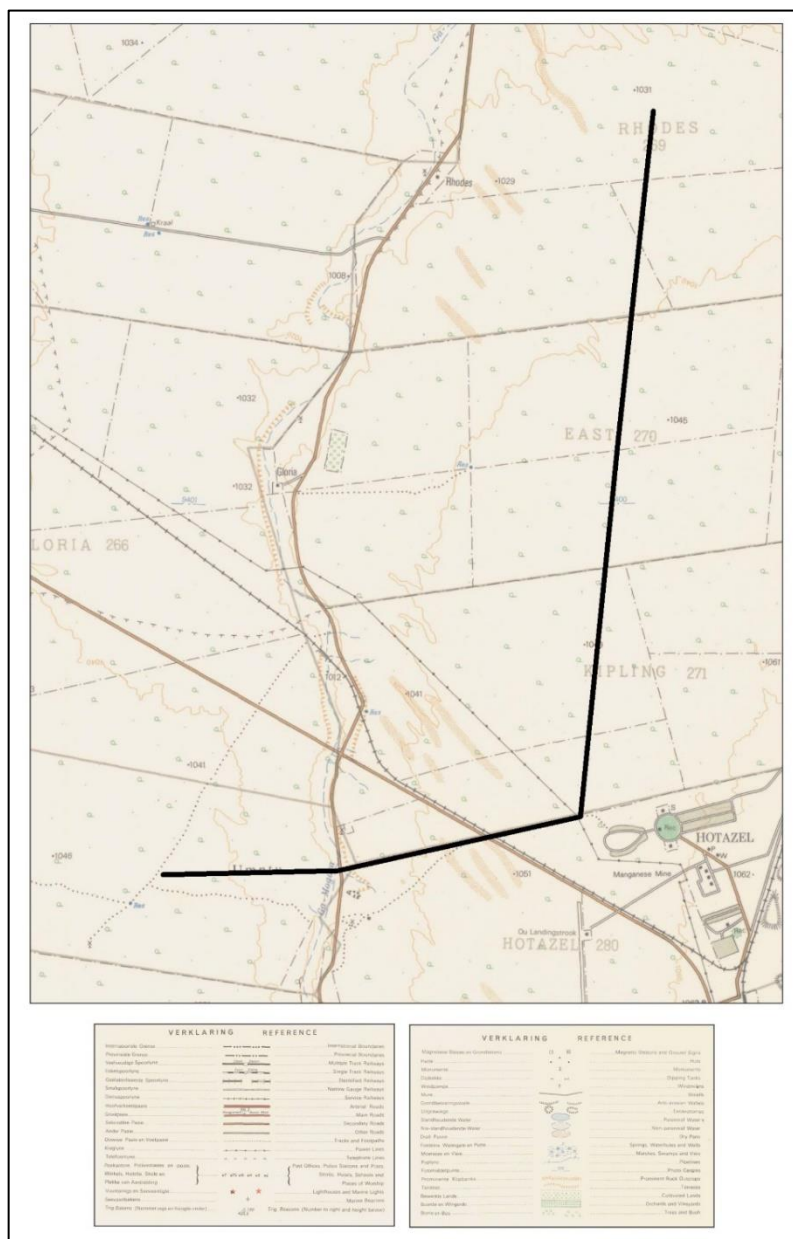


Figure 5-1: Historical topographic map of the location of the proposed power line corridor (black outline) dating to 1971. Note the general absence of man-made structures.

5.2 The Archaeological Site Survey

An analysis of historical aerial imagery and archive maps of areas subject to this assessment suggests a landscape which has been subjected to historical farming activities and the construction of the existing ESKOM powerline, possibly sterilising the area of heritage remains. This inference was confirmed during an archaeological site assessment whereby only a single site of heritage potential was encountered. The heritage resource was arbitrarily coded according to the farm name on which the site was located.

5.2.1 The Stone Age

A single Stone Age occurrence was identified in areas directly associated with the proposed power line corridor. It is highly likely that further Middle and Later Stone Age scatters will occur in the area, specifically along drainage lines and water sources. The density of the material scatter was arbitrarily estimated by placing a one-meter drawing frame, sub-divided into quadrants, on a randomly-selected area displaying higher amounts of surface lithics. By plotting the counts of all lithic elements present in the 1x1 metre square relative density per m² was established and rated on a scale of low (<10), medium (10-20) and high (>20). This method has been adapted as an expedient and non-invasive sampling technique that is particularly useful in value assessment of lithic occurrences during Phase 1 AIA's (see Van Der Ryst 2012).

- Site Exigo-HZ280-SA01: Middle Stone Age Occurrence S27.202998° E 22.921680°

A Middle Stone Age (MSA) occurrence indicated by a low density of lithics was observed along the eroded banks of the Gamagara River along the proposed power line corridor. The artefacts are mostly constituted out of debris flakes but single formals stone tools such as weathered points and broken blades, produced on fine grained specularite and jaspilite were recorded. Some of the tools display secondary retouch. Similar Stone Age scatters occur frequently in this area along major drainage lines, river banks and around water pans. The location of this Stone Age occurrence thus corresponds with a general regional Stone Age site distribution pattern where archaeological material in sub-surface deposits are exposed by surface precipitation and erosion, typically close to local sources of rare raw materials in lithic manufacture. As such, the deposition pattern and stratigraphy as observed at this site and elsewhere in erosion gullies and around pans imply that the lithic scatters in this landscape occur mainly as a single horizon within a shallow superficial limestone formation. Typologically, the artefacts can tentatively attribute to the Middle and Later Stone Ages when compared to similar recorded assemblages in the area and the larger landscape (e.g. Beaumont & Morris 1990). The site is of limited significance due to the general loss of artefact context and the low density of formal tools.



Figure 5-2: Detail of a blade core (left) and point (right) from Site EXIGO-HZ280-SA01. Note secondary retouch on the point..



Figure 5-3: Lithics on fine grained jasperlite from Site EXIGO-HZ280-SA01: two weathered points (image left), and a broken blade and debris flakes (image right).



Figure 5-4: View of degraded surface cover at Site EXIGO-HZ280-SA01 along the Gamagara River.

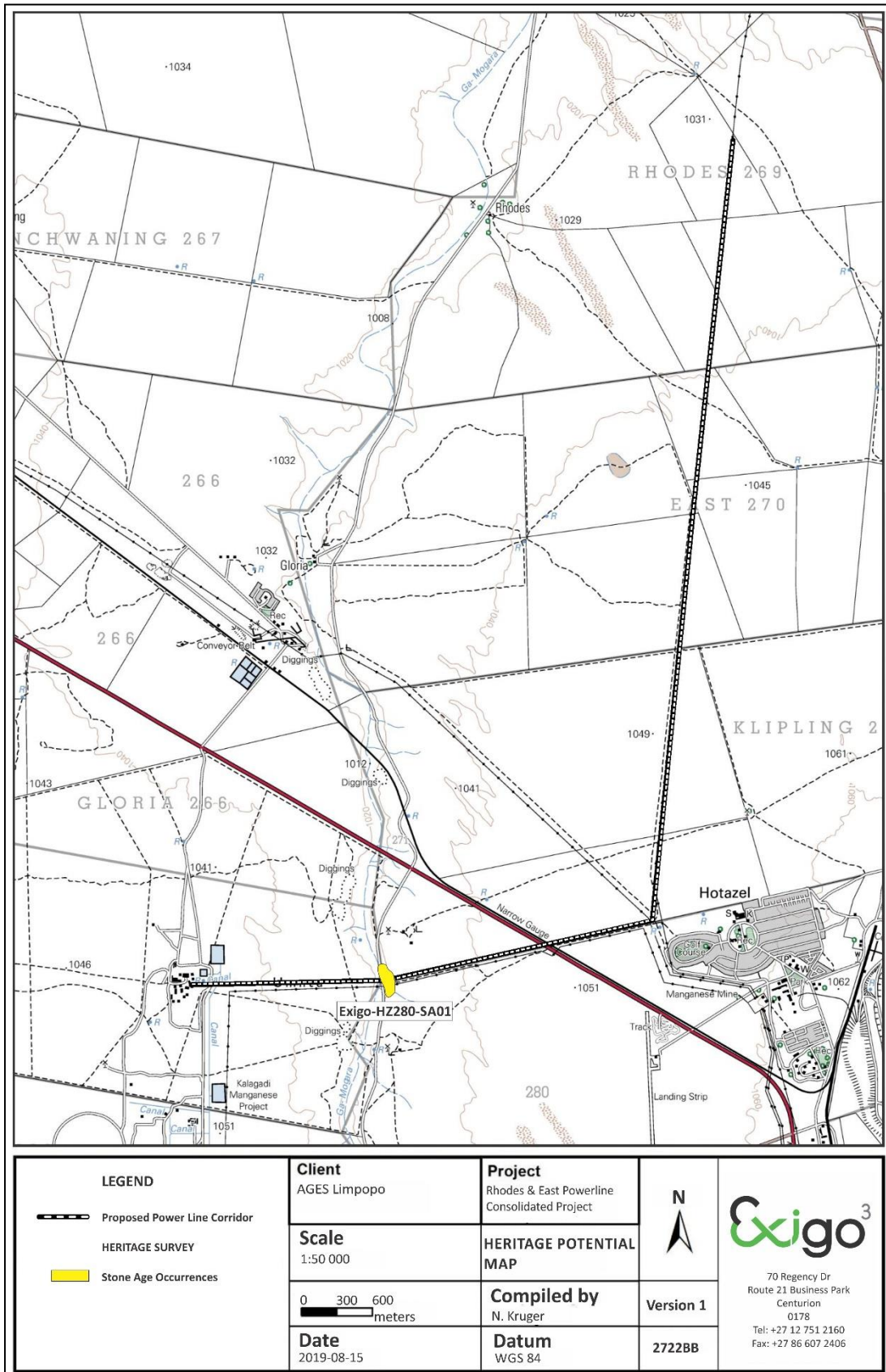


Figure 5-5: Aerial map indicating the location of the heritages site discussed in the text.

6 RESULTS: STATEMENT OF SIGNIFICANCE AND IMPACT RATING

6.1 Potential Impacts and Significance Ratings⁴

The following section provides a background to the identification and assessment of possible impacts and alternatives, as well as a range of risk situations and scenarios commonly associated with heritage resource management. A guideline for the rating of impacts and recommendation of management actions for areas of heritage potential within the study area is supplied in Section 10.2 of Addendum 3.

6.1.1 General assessment of impacts on resources

Generally, the value and significance of archaeological and other heritage sites might be impacted on by any activity that would result immediately or in the future in the destruction, damage, excavation, alteration, removal or collection from its original position, of any archaeological material or object (as indicated in the National Heritage Resources Act (No 25 of 1999)). Thus, the destructive impacts that are possible in terms of heritage resources would tend to be direct, once-off events occurring during the initial construction period. However, in the long run, the proximity of operations in any given area could result in secondary indirect impacts. The EIA process therefore specifies impact assessment criteria which can be utilised from the perspective of a heritage specialist study which elucidates the overall extent of impacts.

6.1.2 Direct impact rating

Direct or primary impacts on heritage resources occur at the same time and in the same space as the activity, e.g. loss of historical fabric through demolition work. **Indirect impacts or secondary impacts** on heritage resources occur later in time or at a different place from the causal activity, or as a result of a complex pathway, e.g. restriction of access to a heritage resource resulting in the gradual erosion of its significance, which is dependent on ritual patterns of access (refer to Section 10.3 in the Addendum for an outline of the relationship between the significance of a heritage context, the intensity of development and the significance of heritage impacts to be expected). The significance of the impacts were determined through a synthesis of the criteria below:

Probability: This describes the likelihood of the impact actually occurring.	
Improbable:	The possibility of the impact occurring is very low, due to the circumstances, design or experience.
Probable:	There is a probability that the impact will occur to the extent that provision must be made therefore.
Highly Probable	It is most likely that the impact will occur at some stage of the development.
Definite:	The impact will take place regardless of any prevention plans, and there can only be relied on mitigatory actions or contingency plans to contain the effect.
Duration: The lifetime of the impact	
Short term:	The impact will either disappear with mitigation or will be mitigated through natural processes in a time span shorter than any of the phases.
Medium term:	The impact will last up to the end of the phases, where after it will be negated.
Long term:	The impact will last for the entire operational phase of the project but will be mitigated by direct human action or by natural processes thereafter.
Permanent:	Impact that will be non-transitory. Mitigation either by man or natural processes will not occur in such a way or in such a time span that the impact can be considered transient.
Scale: The physical and spatial size of the impact	

⁴ Based on: Winter, S. & Baumann, N. 2005. *Guideline for involving heritage specialists in EIA processes: Edition 1.*

Local:	The impacted area extends only as far as the activity, e.g. footprint
Site:	The impact could affect the whole, or a measurable portion of the above mentioned properties.
Regional:	The impact could affect the area including the neighbouring residential areas.
Magnitude/ Severity: Does the impact destroy the environment, or alter its function.	
Low:	The impact alters the affected environment in such a way that natural processes are not affected.
Medium:	The affected environment is altered, but functions and processes continue in a modified way.
High:	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.
Significance: This is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.	
Negligible:	The impact is non-existent or unsubstantial and is of no or little importance to any stakeholder and can be ignored.
Low:	The impact is limited in extent, has low to medium intensity; whatever its probability of occurrence is, the impact will not have a material effect on the decision and is likely to require management intervention with increased costs.
Moderate:	The impact is of importance to one or more stakeholders, and its intensity will be medium or high; therefore, the impact may materially affect the decision, and management intervention will be required.
High:	The impact could render development options controversial or the project unacceptable if it cannot be reduced to acceptable levels; and/or the cost of management intervention will be a significant factor in mitigation.

The following weights were assigned to each attribute:

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

The significance of each activity is rated without mitigation measures and with mitigation measures for both construction and operational phases of the development.

The mitigation effect of each impact will be indicated without and with mitigation measures as follows:

- Can be reversed
- Can be avoided, managed or mitigated
- May cause irreplaceable loss of resources

The following table summarizes impacts to the heritage receptors within and in close proximity of the project areas:

The following table summarizes impacts to **Stone Age artefacts (Exigo-HZ280-SA01)** of **low** significance located within the project area.

NATURE OF IMPACT: Impacts could involve displacement or destruction of Stone Age artifacts in the project area.		
	Without mitigation	With mitigation
EXTENT	Local	Local
DURATION	Permanent	Permanent
MAGINITUDE	Minor	Minor
PROBABILITY	Probable	Negligible
SIGNIFICANCE	Low	Low
STATUS	Negative	Neutral
REVERSIBILITY	Non-reversible	Non-reversible
IRREPLACEABLE LOSS OF RESOURCES?	Yes	No
CAN IMPACTS BE MITIGATED?	N.A	
MITIGATION: Site monitoring by ECO.		
CUMULATIVE IMPACTS: No cumulative impact is anticipated.		
RESIDUAL IMPACTS: n/a		

6.2 Evaluation Impacts

A number of archaeological and historical studies have been conducted in the Kuruman area which points to a rich and diverse archaeological landscape. The heritage legacy of this area is mostly dominated by Stone Age and Colonial Period occurrences. However, the proposed corridor follows the existing Eskom "Hotazel - Heuningvlei" 132 kV power line and the Eskom "Hotazel - Umtu" 132 kV power line respectively and as such, vast areas included in the site survey scope have been altered and disturbed as a result of the existing power lines. Cognisance should nonetheless be taken of archaeological material that might be present in surface and sub-surface deposits along drainage lines and in pristine areas

6.2.1 Archaeology

Stone Age remains occur abundantly in the larger Kuruman landscape where locally available raw material for the manufacture of stone tools is available in the geological landscape. Similarly, scatters of Stone Age artefacts were observed in low densities in the project area. The fairly small numbers and disturbed context in which they were found means that the archaeological remains in the Study Area have been rated as having moderate-low archaeological significance. However, *in situ* Stone Age remains might occur in untransformed contexts around the project area.

6.2.2 Built Environment

The project area is situated near the town of Hotazel where a number of Historical Period buildings and features, monuments and heritage sites are to be found. However, no Historical structures or buildings occur in the project area and the general landscape has limited significance in terms of the built environment. No impact on the built environment or similar features is anticipated.

6.2.3 Cultural Landscape

The larger Kuruman and Kathu areas comprises a rich pre-colonial and colonial cultural landscape but, in many instances, properties demarcated by the project area have been transformed by agriculture and mining. The larger region has seen industrial development and the landscape in all its variation stretches over many kilometres, where the proposed project might add to a change in this rapidly developing landscapes' sense of place.

6.2.4 Graves / Human Burials Sites

No burial sites were noted in the project area. In the rural areas of the Northern Cape Province, graves and cemeteries often occur around farmsteads in family burial grounds but they are also randomly scattered around archaeological and historical settlements. The probability of informal human burials encountered during development should thus not be excluded. In addition, human remains and burials are commonly found close to archaeological sites; they may be found in "lost" graveyards, or occur sporadically anywhere as a result of prehistoric activity, victims of conflict or crime. It is often difficult to detect the presence of archaeological human remains in the landscape as these burials, in most cases, are not marked at the surface. Human remains are usually observed when they are exposed through erosion. In some instances, packed stones or rocks may indicate the presence of informal pre-colonial burials. Where human remains are part of a burial sites, it would need to be exhumed under a permit from either SAHRA (for pre-colonial burials as well as burials later than about AD 1500). Should any unmarked human burials/remains be found during the course of excavation/construction, work in the immediate vicinity should cease and the find must immediately be reported to the archaeologist, or the South African Heritage Resources Agency (SAHRA). Under no circumstances may burials be disturbed or remains removed until such time as necessary statutory procedures required for grave relocation have been met

6.3 Management actions

Recommendations for relevant heritage resource management actions are vital to the conservation of heritage resources. A general guideline for recommended management actions is included in Section 10.4 of Addendum 3.

OBJECTIVE: ensure conservation of heritage resources of significance, prevent unnecessary disturbance and/or destruction of previously undetected heritage receptors.

No specific action in terms of mitigation is required for Stone Age Occurrences (Exigo-HZ280-SA01) in the footprint areas of the Rhodes & East Powerline Consolidated Project. However, the following general procedure is required for these sites in order to avoid the destruction of previously undetected heritage remains:

PROJECT COMPONENT/S	All phases of construction and operation.		
POTENTIAL IMPACT	Damage/destruction of sites.		
ACTIVITY RISK/SOURCE	Digging foundations and trenches into sensitive deposits that are not visible at the surface.		
MITIGATION: TARGET/OBJECTIVE	To locate previously undetected heritage remains / graves as soon as possible after disturbance so as to maximize the chances of successful rescue/mitigation work.		
MITIGATION: ACTION/CONTROL	RESPONSIBILITY	TIMEFRAME	
Fixed Mitigation Procedure (required)			
Site Monitoring: Regular examination of trenches and excavations.	ECO	Monitor as frequently as practically possible.	
PERFORMANCE INDICATOR	Archaeological sites are discovered and mitigated with the minimum amount of unnecessary disturbance.		
MONITORING	Successful location of sites by person/s monitoring.		

7 RECOMMENDATIONS

A number of archaeological and historical studies have been conducted in the Kuruman area which points to a rich and diverse archaeological landscape. The heritage legacy of this area is mostly dominated by Stone Age and Colonial Period occurrences. However, the proposed corridor follows the existing Eskom “Hotazel - Heuningvlei” 132 kV power line and the Eskom “Hotazel - Umtu” 132 kV power line respectively and as such, vast areas included in the site survey scope have been altered and disturbed as a result of the existing power lines. Cognisance should nonetheless be taken of archaeological material that might be present in surface and sub-surface deposits along drainage lines and in pristine areas. The following recommendations are made based on general observations in the proposed Rhodes & East Powerline Consolidated Project area:

- A low-density Middle Stone Age occurrence consisting out of single formal tools and scattered debris was documented along the banks of the Gamagara River along the proposed footprint area for the power line (**Site EXIGO-HZ280-SA01: S27.202998° E 22.921680°**). However, the site is of low scientific value due to the low lithic density and the general loss of context for the artefacts. Even though the impact on the site by the proposed activity is anticipated to be peripheral and permanent, the significance of the impact on the resource is considered to be low and this impact can be limited to a negligible impact by the implementation of mitigation measures (monitoring) for the sites, if / when required. As such, a careful watching brief monitoring process is recommended for development activities. Should any previously undetected surface or subsurface paleontological or archaeological material be exposed during development activities, all activities should be suspended and the archaeological specialist should be notified immediately.
- Considering the localised nature of heritage remains, the general monitoring of the development progress by an ECO or by the heritage specialist is recommended for all stages of the project. Should 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.
- Since the intrinsic heritage and social value of graves and cemeteries are highly significant, these resources require special management measures. Should human remains be discovered at any stage, these should be reported to the Heritage Specialist and relevant authorities (SAHRA) and development activities should be suspended until the site has been inspected by the Specialist. The Specialist will advise on further management actions and possible relocation of human remains in accordance with the Human Tissue Act (Act 65 of 1983 as amended), the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), the National Heritage Resources Act (Act no. 25 of 1999) and any local and regional provisions, laws and by-laws pertaining to human remains. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burial.
- It is essential that cognisance be taken of the larger archaeological landscape of the area in order to avoid the destruction of previously undetected heritage sites. It should be stated that it is likely that further undetected archaeological remains might occur elsewhere in the Study Area along water sources and drainage lines, fountains and pans would often have attracted human activity in the past. Also, since Stone Age material seems to originate from below present soil surfaces in eroded areas, the larger landscape should be regarded as potentially sensitive in terms of possible subsurface deposits. Burials and historically significant structures dating to the Colonial Period occur on farms in the area and these resources should be avoided during all phases of construction and development, including the operational phases of the development.

In addition to these site-specific recommendations, careful cognizance should be taken of the following:

- As Palaeontological remains occur where bedrock has been exposed, all geological features should be regarded as sensitive.
- Water sources such as drainage lines, fountains and pans would often have attracted human activity in the past. As Stone Age material occur in the larger landscape, such resources should be regarded as potentially sensitive in terms of possible subsurface deposits.
-

8 GENERAL COMMENTS AND CONDITIONS

This AIA report serves to confirm the extent and significance of the heritage landscape of the proposed Rhodes & East Powerline Consolidated Project area. The larger heritage horizon encompasses rich and diverse archaeological landscapes and cognizance should be taken of heritage resources and archaeological material that might be present in surface and sub-surface deposits. If, during construction, any possible archaeological material culture discoveries are made, the operations must be stopped and a qualified archaeologist be contacted for an assessment of the find. Such material culture might include:

- Formal Earlier Stone Age stone tools.
- Formal MSA stone tools.
- Formal LSA stone tools.
- Potsherds
- Iron objects.
- Beads made from ostrich eggshell and glass.
- Ash middens and cattle dung deposits and accumulations.
- Faunal remains.
- Human remains/graves.
- Stone walling or any sub-surface structures.
- Historical glass, tin or ceramics.
- Fossils.

If such sites were to be encountered or impacted by any proposed developments, recommendations contained in this report, as well as endorsement of mitigation measures as set out by AMAFA, SAHRA, the National Resources Act and the CRM section of ASAPA will be required. It must be emphasised that the conclusions and recommendations expressed in this archaeological heritage sensitivity investigation are based on the visibility of archaeological sites/features and may not therefore, represent the area's complete archaeological legacy. Many sites/features may be covered by soil and vegetation and might only be located during sub-surface investigations. If subsurface archaeological deposits, artefacts or skeletal material were to be recovered in the area during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately (*cf. NHRA (Act No. 25 of 1999), Section 36 (6)*). It must also be clear that Archaeological Specialist Reports will be assessed by the relevant heritage resources authority (SAHRA).

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10 ADDENDUM 1: HERITAGE LEGISLATION BACKGROUND

10.1 CRM: Legislation, Conservation and Heritage Management

The broad generic term Cultural Heritage Resources refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term 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.

10.1.1 Legislation regarding archaeology and heritage sites

The South African Heritage Resources Agency (SAHRA) and their provincial offices aim to conserve and control the management, research, alteration and destruction of cultural resources of South Africa. It is therefore vitally important to adhere to heritage resource legislation at all times.

d. 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. This clause is commonly known as the "60-years clause". Buildings are amongst the most enduring features of human occupation, and this definition therefore includes all buildings older than 60 years, modern architecture as well as ruins, fortifications and Iron Age settlements. "Tell" refers to the evidence of human existence which is no longer above ground level, such as building foundations and buried remains of settlements (including artefacts).

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 and work 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)

and

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

- (d) *destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;*
- (e) *destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;*

- (f) *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*
- (g) *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)."*

and

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

- (h) *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;*
- (i) *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;*
- (j) *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)."*

e. 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.

10.1.2 Background to HIA and AIA Studies

South Africa's unique and non-renewable archaeological and palaeontological heritage sites are 'generally' protected in terms of the National Heritage Resources Act (Act No 25 of 1999, section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority. Heritage sites are frequently threatened by development projects and both the environmental and heritage legislation require impact assessments (HIAs & AIAs) that identify all heritage resources in areas to be developed. Particularly, these assessments are required to make recommendations for protection or mitigation of the impact of the sites. HIAs and AIAs should be done by qualified professionals with adequate knowledge to (a) identify all heritage resources including archaeological and palaeontological sites that might occur in areas of developed and (b) make recommendations for protection or mitigation of the impact on the sites.

The National Heritage Resources Act (Act No. 25 of 1999, section 38) provides guidelines for Cultural Resources Management and prospective developments:

"38. (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a

development categorised as:

- (a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- (b) the construction of a bridge or similar structure exceeding 50m in length;
- (c) any development or other activity which will change the character of a site:
 - (i) exceeding 5 000 m² in extent; or
 - (ii) involving three or more existing erven or subdivisions thereof; or
 - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- (d) the re-zoning of a site exceeding 10 000 m² in extent; or
- (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,

must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development."

And:

"The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(a): Provided that the following must be included:

- (k) The identification and mapping of all heritage resources in the area affected;
- (l) an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;
- (m) an assessment of the impact of the development on such heritage resources;
- (n) an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
- (o) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;
- (p) if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
- (q) plans for mitigation of any adverse effects during and after the completion of the proposed development (38. [3] 1999:64)."

Consequently, section 35 of the Act requires Heritage Impact Assessments (HIAs) or Archaeological Impact Assessments (AIAs) to be done for such developments in order for all heritage resources, that is, all places or objects of aesthetics, architectural, historic, scientific, social, spiritual, linguistic or technological value or significance to be protected. Thus any assessment should make provision for the protection of all these heritage components, including archaeology, shipwrecks, battlefields, graves, and structures older than 60

years, living heritage, historical settlements, landscapes, geological sites, palaeontological sites and objects. Heritage resources management and conservation.

10.2 Assessing the Significance of Heritage Resources

Archaeological sites, as previously defined in the National Heritage Resources Act (Act 25 of 1999) are places in the landscape where people have lived in the past – generally more than 60 years ago – and have left traces of their presence behind. In South Africa, archaeological sites include hominid fossil sites, places where people of the Earlier, Middle and Later Stone Age lived in open sites, river gravels, rock shelters and caves, Iron Age sites, graves, and a variety of historical sites and structures in rural areas, towns and cities. Palaeontological sites are those with fossil remains of plants and animals where people were not involved in the accumulation of the deposits. The basic principle of cultural heritage conservation is that archaeological and other heritage sites are valuable, scarce and *non-renewable*. Many such sites are unfortunately lost on a daily basis through development for housing, roads and infrastructure and once archaeological sites are damaged, they cannot be re-created as site integrity and authenticity is permanently lost. Archaeological sites have the potential to contribute to our understanding of the history of the region and of our country and continent. By preserving links with our past, we may not be able to revive lost cultural traditions, but it enables us to appreciate the role they have played in the history of our country.

- 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:

- *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.

- *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 some kind of influence by an event, person, phase or activity.

- *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.

- *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.

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; exhumation and reinterment [including 2a, 2b & 3]

Furthermore, the significance of archaeological sites was based on six main criteria:

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

2. SITE EVALUATION

2.1 Heritage Value (NHRA, section 2 [3]) High Medium Low

It has importance to the community or pattern of South Africa’s history or pre-colonial history.
 It possesses unique, uncommon, rare or endangered aspects of South Africa’s natural or cultural heritage.
 It has potential to yield information that will contribute to an understanding of South Africa’s natural and cultural heritage.
 It is of importance in demonstrating the principle characteristics of a particular class of South Africa’s natural or cultural places or objects.
 It has importance in exhibiting particular aesthetic characteristics valued by a particular community or cultural group.
 It has importance in demonstrating a high degree of creative or technical achievement at a particular period.
 It has marked or special association with a particular community or cultural group for social, cultural or spiritual reasons (sense of place).
 It has strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.
 It has significance through contributing towards the promotion of a local sociocultural identity and can be developed as a tourist destination.
 It has significance relating to the history of slavery in South Africa.
 It has importance to the wider understanding of temporal changes within cultural landscapes, settlement patterns and human occupation.

2.2 Field Register Rating

- National/Grade 1 [should be registered, retained]
- Provincial/Grade 2 [should be registered, retained]
- Local/Grade 3A [should be registered, mitigation not advised]
- Local/Grade 3B [High significance; mitigation, partly retained]
- Generally Protected A [High/Medium significance, mitigation]
- Generally protected B [Medium significance, to be recorded]
- Generally Protected C [Low significance, no further action]

2.3 Sphere of Significance High Medium Low

- International
- National
- Provincial
- Local
- Specific community

11 ADDENDUM 2: CONVENTIONS USED TO ASSESS THE SIGNIFICANCE OF HERITAGE

11.1 Site Significance Matrix

According to the NHRA, Section 2(vi) the **significance** of heritage sites and artefacts is determined by its aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to the uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these. The following matrix is used for assessing the significance of each identified site/feature.

11.2 Impact Assessment Criteria

The following table provides a guideline for the rating of impacts and recommendation of management actions for sites of heritage potential.

Significance of the heritage resource

This is a statement of the nature and degree of significance of the heritage resource being affected by the activity. From a heritage management perspective, it is useful to distinguish between whether the significance is embedded in the physical fabric or in associations with events or persons or in the experience of a place; i.e. its visual and non-visual qualities. This statement is a primary informant to the nature and degree of significance of an impact and thus needs to be thoroughly considered. Consideration needs to be given to the significance of a heritage resource at different scales (i.e. site-specific, local, regional, national or international) and the relationship between the heritage resource, its setting and its associations.

Nature of the impact

This is an assessment of the nature of the impact of the activity on a heritage resource, with some indication of its positive and/or negative effect/s. It is strongly informed by the statement of resource significance. In other words, the nature of the impact may be historical, aesthetic, social, scientific, linguistic or architectural, intrinsic, associational or contextual (visual or non-visual). In many cases, the nature of the impact will include more than one value.

Extent

Here it should be indicated whether the impact will be experienced:

- On a site scale, i.e. extend only as far as the activity;
- Within the immediate context of a heritage resource;
- On a local scale, e.g. town or suburb
- On a metropolitan or regional scale; or
- On a national/international scale.

Duration

Here it should be indicated whether the lifespan of the impact will be:

- Short term, (needs to be defined in context)
- Medium term, (needs to be defined in context)
- Long term where the impact will persist indefinitely, possibly beyond the operational life of the activity, either because of natural processes or by human intervention; or
- Permanent where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.

Of relevance to the duration of an impact are the following considerations:

- Reversibility of the impact; and
- Renewability of the heritage resource.

Intensity

Here it should be established whether the impact should be indicated as:

- 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; and
- High, where heritage value is altered to the extent that it will temporarily or permanently be damaged or destroyed.

Probability

This should describe the likelihood of the impact actually occurring indicated as:

- 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

Confidence

This should relate to the level of confidence that the specialist has in establishing the nature and degree of impacts. It relates to the level and reliability of information, the nature and degree of consultation with I&AP's and the dynamic of the broader socio-political context.

- High, where the information is comprehensive and accurate, where there has been a high degree of consultation and the socio-political context is relatively stable.
- Medium, where the information is sufficient but is based mainly on secondary sources, where there has been a limited targeted consultation

and socio-political context is fluid.

- Low, where the information is poor, a high degree of contestation is evident and there is a state of socio-political flux.

Impact Significance

The significance of impacts can be determined through a synthesis of the aspects produced in terms of the nature and degree of heritage significance and the nature, duration, intensity, extent, probability and confidence of impacts and can be described as:

- Low; where it would have a negligible effect on heritage and on the decision
- Medium, where it would have a moderate effect on heritage and should influence the decision.
- High, where it would have, or there would be a high risk of, a big effect on heritage. Impacts of high significance should

have a major

influence on the decision;

- Very high, where it would have, or there would be high risk of, an irreversible and possibly irreplaceable negative impact on heritage. Impacts

of very high significance should be a central factor in decision-making.

11.3 Direct Impact Assessment Criteria

The following table provides an outline of the relationship between the significance of a heritage context, the intensity of development and the significance of heritage impacts to be expected

HERITAGE CONTEXT	TYPE OF DEVELOPMENT			
	CATEGORY A	CATEGORY B	CATEGORY C	CATEGORY D
CONTEXT 1 High heritage Value	Moderate heritage impact expected	High heritage impact expected	Very high heritage impact expected	Very high heritage impact expected
CONTEXT 2 Medium to high heritage value	Minimal heritage impact expected	Moderate heritage impact expected	High heritage impact expected	Very high heritage impact expected
CONTEXT 3 Medium to low heritage value	Little or no heritage impact expected	Minimal heritage impact expected	Moderate heritage impact expected	High heritage impact expected
CONTEXT 4 Low to no heritage value	Little or no heritage impact expected	Little or no heritage impact expected	Minimal heritage value expected	Moderate heritage impact expected
NOTE: A DEFAULT "LITTLE OR NO HERITAGE IMPACT EXPECTED" VALUE APPLIES WHERE A HERITAGE RESOURCE OCCURS OUTSIDE THE IMPACT ZONE OF THE DEVELOPMENT.				
HERITAGE CONTEXTS	CATEGORIES OF DEVELOPMENT			
<p>Context 1: Of high intrinsic, associational and contextual heritage value within a national, provincial and local context, i.e. formally declared or potential Grade 1, 2 or 3A heritage resources</p> <p>Context 2: Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3B heritage resources.</p> <p>Context 3: Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3C heritage resources</p> <p>Context 4: Of little or no intrinsic, associational or contextual heritage value due to disturbed, degraded conditions or extent of irreversible damage.</p>	<p>Category A: Minimal intensity development</p> <ul style="list-style-type: none"> - No rezoning involved; within existing use rights. - No subdivision involved. - Upgrading of existing infrastructure within existing envelopes - Minor internal changes to existing structures - New building footprints limited to less than 1000m². <p>Category B: Low-key intensity development</p> <ul style="list-style-type: none"> - Spot rezoning with no change to overall zoning of a site. - Linear development less than 100m - Building footprints between 1000m²-2000m² - Minor changes to external envelop of existing structures (less than 25%) - Minor changes in relation to bulk and height of immediately adjacent structures (less than 25%). <p>Category C: Moderate intensity development</p> <ul style="list-style-type: none"> - Rezoning of a site between 5000m²-10 000m². - Linear development between 100m and 300m. - Building footprints between 2000m² and 5000m² - Substantial changes to external envelop of existing structures (more than 50%) - Substantial increase in bulk and height in relation to immediately adjacent buildings (more than 50%) <p>Category D: High intensity development</p> <ul style="list-style-type: none"> - Rezoning of a site in excess of 10 000m² - Linear development in excess of 300m. - Any development changing the character of a site exceeding 5000m² or involving the subdivision of a site into three or more erven. - Substantial increase in bulk and height in relation to immediately adjacent buildings (more than 100%) 			

11.4 Management and Mitigation Actions

The following table provides a guideline of relevant heritage resources management actions is vital to the conservation of heritage resources.

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.

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.

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.

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.

Rehabilitation

Rehabilitation is considered in heritage management terms as a 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.

Enhancement