

HERITAGE IMPACT ASSESSMENT REPORT:  
PROPOSED OPEN CAST COLLIERY ON  
PORTION 9 OF DRIEFONTEIN 338 JS,  
EMALAHLENI,  
MPUMALANGA PROVINCE

*Prepared by:* Xander Antonites (Consultant)

With contributions by S. Sutherland and M. Mouton

*Prepared for:* **Amber Earth (CLIENT)**

*Date:* 12 February 2022

## DECLARATION

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

- I am conducting all work and activities relating to the proposed mining area on PORTION 9 OF DRIEFONTEIN 338 JS, in an objective manner, even if this results in views and findings that are not favourable to the client.
- I declare that there are no circumstances that may compromise my objectivity in performing such work.
- I have the required expertise in conducting the specialist report and I will comply with legislation, including the relevant Heritage Legislation (National Heritage Resources Act no. 25 of 1999, Human Tissue Act 65 of 1983 as amended, Removal of Graves and Dead Bodies Ordinance no. 7 of 1925, Excavations Ordinance no. 12 of 1980), the Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment (SAHRA and the CRM section of ASAPA), regulations and any guidelines that have relevance to the proposed activity;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity.
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this declaration are true and correct.



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Signature of specialist  
February 2022

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## ABBREVIATIONS AND ACRONYMS

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

## EXECUTIVE SUMMARY

This report is the result of a Heritage Impact Assessment (HIA) conducted by Alexander Antonites for an open cast coal mine (30ha) which falls in a larger area of a proposed mining rights application (71.63ha) on PORTION 9 OF the farm DRIEFONTEIN 338 JS, Emalahleni, Mpumalanga Province.

The project area is approximately 5km southwest of the town Ermelo, located west of the R39 an adjacent the Duvha Power Station. A single site visit was conducted on 28 August 2020.

Project Title	Proposed Colliery on Portion 9 of Driefontein 338 JS
Project Location:	-25.951799, 29.356266
1:50 000 Map Sheet	2529 CD
Farm Portion / Parcel	Portion 9 of DRIEFONTEIN 338 JS
Magisterial District / Municipal Area	Emalahleni Local Municipality
Province	Mpumalanga Province

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

The study revealed that the project area has previously been severely impacted by agriculture activities. The ruins of a 20<sup>th</sup> century stone building (**UP-DRF-2529-01**) and the remains of demolished farm labourer quarters (**UP-DRF-2529-02**) were located on the western parts of the project area.

Monitoring of the development progress by an ECO is recommended during the planning and construction phases 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.

## HERITAGE SITE LOCATIONS

**Table 1: Summary of Heritage sites**

Site Code	Coordinates	Short Description	Mitigation Action
UP-DRF-2529-01	S25.958437° E29.349948°	Ruined farm outbuilding. Potentially less than 60 years.	Monitor activities in general vicinity.
UP-DRF-2529-01	-25.958986° 29.352787°	Mounds of building rubble. Potentially less than 60 years.	Monitor activities in general vicinity.

# Heritage Impact Assessment Report: Proposed Colliery on Portion 9 of Driefontein 338 JS, Emalahleni, Mpumalanga Province

**Dr Alexander Antonites**

PO Box 93  
Groenkloof  
Pretoria  
0027

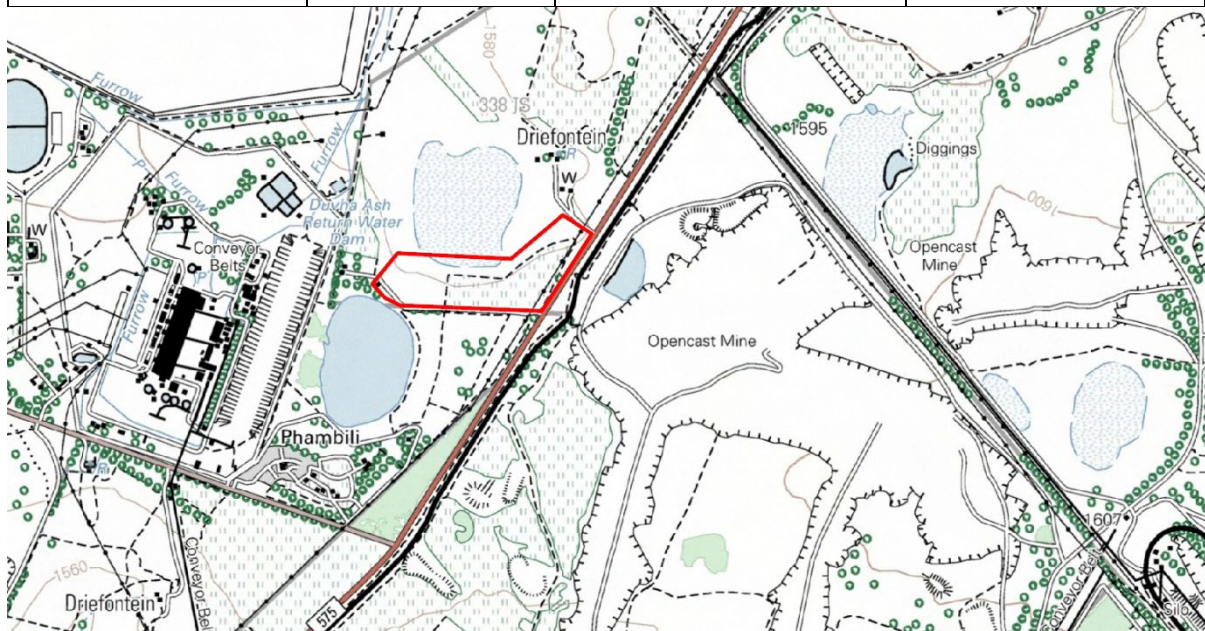
## 1 PROJECT BACKGROUND

Amber Earth appointed Alexander Antonites to undertake a heritage assessment on Portion Driefontein 338JS. The proposed mining and infrastructure covers 30ha of the 71.63ha portion. The project area located adjacent to the Dhuva power station west of the R575 road.

The size of the area under consideration necessitates a heritage impact assessment (HIA) in terms of section 38(1) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). A heritage assessment of the area earmarked for mining and infrastructure was conducted to identify sensitive heritage areas and to mitigate against future impacts on the heritage landscape.

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

Farm Name	Portion Number	21-SG Code	Property Owner
Driefontein 338 JS	9	TOJS00000000033800000	N/A



**Figure 1: Project alignment indicated on a 1:50 000 topographic map (2529DD).**



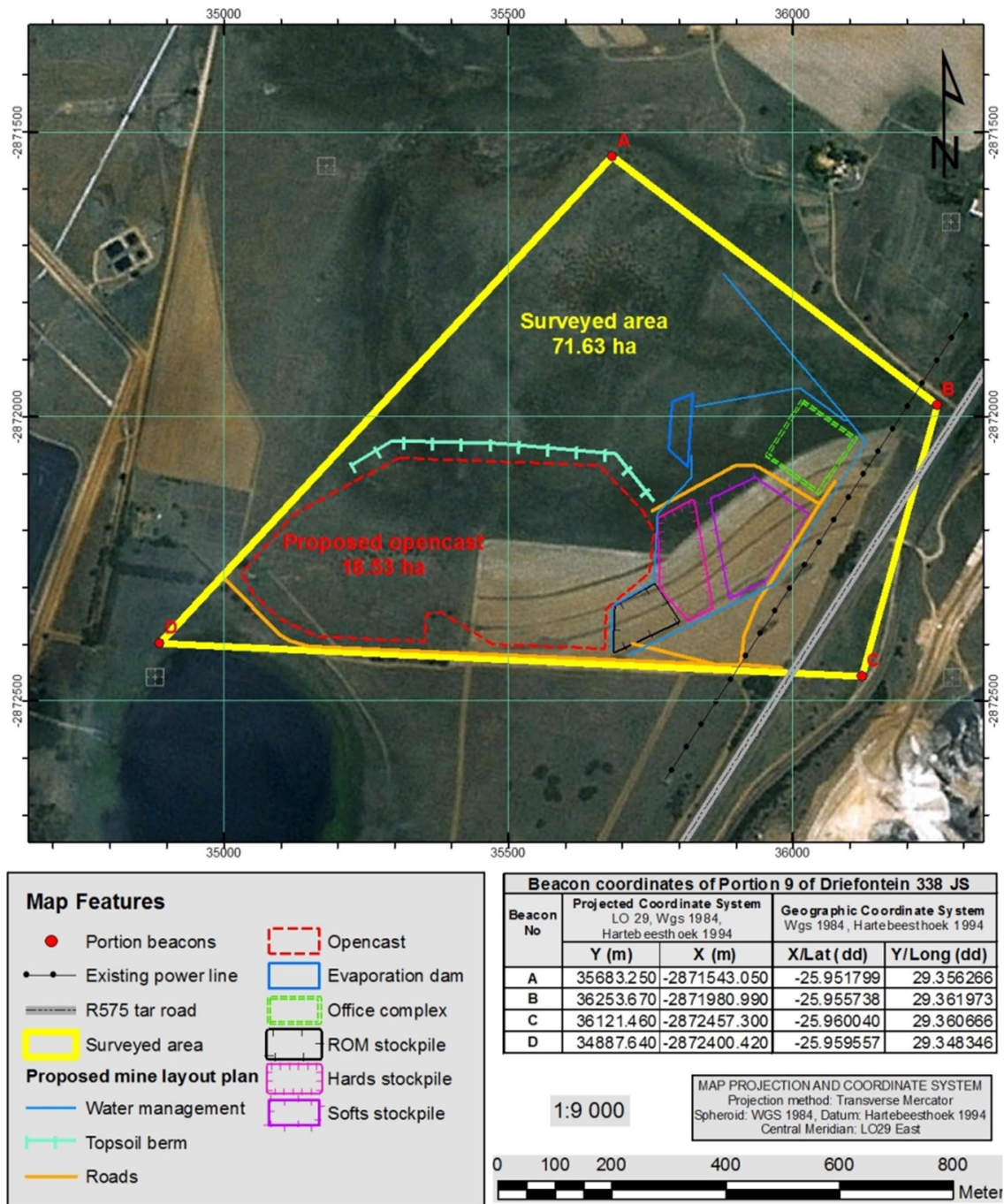


Figure 2: Project Area.

## 2 TERMS OF REFERENCE

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

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

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

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

### 2.1 HERITAGE LEGISLATION, CONSERVATION AND MANAGEMENT

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

#### 2.1.1 *Heritage Bodies*

The South African Heritage Resources Agency (SAHRA) is an agency within the Department of Sport, Arts and Culture tasked with an overall legislative mandate to identify, assess, manage, protect, and promote heritage resources in South Africa. SAHRA is mandated to coordinate the identification and management of the national estate. The aims are to introduce an integrated system for the identification, assessment, and management of the heritage resources and to enable provincial and local authorities to adopt powers to protect and manage them.

#### 2.1.2 *Legislation regarding archaeology and heritage sites*

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

##### **National Heritage Resources Act No 25 of 1999, section 35**

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

- Archaeological artifacts, structures and sites older than 100 years

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

The national estate includes the following:

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

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

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

*(NHRA 1999:58)*

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

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

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

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

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

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

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

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

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

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

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

- (a) ancestral graves
- (b) royal graves and graves of traditional leaders
- (c) graves of victims of conflict d. graves designated by the Minister
- (e) historical graves and cemeteries
- (f) human remains

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

### **National Environmental Management Act No 107 of 1998**

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

## **2.2 RATING OF SIGNIFICANCE**

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

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

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

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

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

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

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

**Table 3: Field rating of significance**

Significance	Rating Action
<b>No significance:</b> sites that do not require mitigation.	None
<b>Low significance:</b> 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
<b>Medium significance:</b> 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]
<b>High significance:</b> 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
<b>High significance:</b> Graves and burial places	4b. Locate demonstrable descendants through social consulting; obtain permits from applicable legislation, ordinances and regional by-laws; mitigation and or exhumation and reinternment [including 2a, 2b & 3]

### 3 STATEMENT OF SIGNIFICANCE AND IMPACT RATING

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

#### 3.1 DIRECT, INDIRECT AND CUMULATIVE EFFECTS

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

##### 3.1.1 Direct Impact Rating Criteria

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

###### Extent

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

###### Duration

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

**Magnitude severity**

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

**Probability**

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

**Impact Significance**

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

### 3.1.2 Direct Impact Weighting Matrix

Aspect	Description	Weight
Extent		
	Local	1
	Site	2
	Regional	3
Duration		
	Short term	1
	Medium term	3
	Long term	4
	Permanent	5
Magnitude/Severity		
	Low	2
	Medium	6
	High	8
Probability		
	Improbable	1
	Probable	3
	Highly Probable	4
	Definite	5
Impact Rating	Sum (Duration, Scale, Magnitude) x Probability	
Negligible	<10	
Low	<40	
Moderate	<60	
High	>60	



## 4 ARCHAEOLOGICAL AND HISTORICAL CONTEXT

### 4.1 OVERVIEW OF THE SOUTH AFRICAN ARCHAEOLOGICAL AND HISTORICAL CONTEXT

#### 4.1.1 Stone Age

In Southern Africa, the Stone Age is defined by the use of stone cobbles and flakes that have been modified into tools such as scrapers, points and hand axes. Our early ancestors such as *Homo ergaster* and early *Homo sapiens* first used these tools as much as 1.4 million years ago (Mitchell 2002:59). Stone technology would persist throughout the human species development right up to the arrival of iron using farming people in southern Africa some 2000 years ago. Changes in the stone tool technology over time allows different stone tool industries to be chronologically separated based on trends in tool design. This provides the useful partitioning of the entire Stone Age sequence into three broad phases outlined by Lombard et. al. (Lombard et al. 2012) below:

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

#### 4.1.2 Iron Age

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

Early Iron Age: AD 200 – 900  
Middle Iron Age: AD 900 – 1300  
Late Iron Age: AD 1300 – 1840

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

#### 4.1.3 Historical Period

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

## 5 ARCHAEOLOGICAL AND HISTORICAL CONTEXT OF THE PROJECT AREA.

Heritage assessments conducted between the years 1999 to 2021 in the areas in and around Emalahleni (Witbank) identified only sites, features and artifacts of heritage significance. The most prominent include, stone tool scatters, ceramics scatters, marked and unmarked burials, stone walling, historic farmhouses, cairns as well as formal and informal graveyards. Therefore, these are the kinds of features and artifacts one expects to find in this region of the Mpumalanga highveld.

### 5.1.1 Stone Age

The Mpumalanga province's most notable feature is the division between the interior plateau, also known as the Highveld, and the subtropical Lowveld. Numerous rivers merge into two main river systems – the Olifants river and the Komati River. These confluences created fertile landscapes that provided resources to early humans as early as 1.4 million years ago (Celliers 2015). This region is also rich in useful minerals like ochre, iron and copper, as well as what would later prove to be most useful – coal.

The Earlier and Middle Stone Age are poorly represented on Mpumalanga Highveld. Very few ESA and MSA sites exist in the eastern region of Mpumalanga. However, this may be attributed to the lack of systematic research conducted in the area and not necessarily as evidence that archaeological features are not present in the area. Regardless, infrequent habitation of the Highveld during the ESA and MSA is more evident apart from temporarily occupied open air sites. It is likely that the highveld area was abundant in food, water gathering locations and hunting opportunities, but less appropriate for settling due to the lack of shelter and availability of needed resources to construct stone tools (Celliers 2015). ESA stone tools are characteristically core tool-based technology, whereas MSA stone tools were constructed from prepared cores to make faceted platform flakes and flake-blades (van Schalkwyk 2006). Artefacts from the ESA and MSA are more often found along watercourses like the Vaal river or more sheltered areas like in the Magaliesburg. A few MSA artefacts were noted by Van Vollenhoven (1992) and Huffman (1999) closer to Emalahleni and Middleburg.

The Later Stone Age (LSA) are more frequent in the area than earlier industries. Several LSA sites have been found around Carolina and eManzana (Badplaas). Rock paintings have also been recorded at Carolina, eManzana, Machadodorp and Rietspruit near Emalahleni as well (Bergh 1995: 4-5). Individual artifacts from the LSA have been noted at sites in the region as well, but none of such significance that warranted further research.

### 5.1.2 Iron Age

Iron Age peoples began occupying southern Africa c. AD 300. One of the oldest Iron Age sites dates to AD 470 and is located at Broederstroom, just south of the Hartbeespoort dam. Having cultivated cereals like sorghum and millet, EIA communities relied on the summer rainfall season and were unlikely to settle in the more central interior highveld. Areas with rich alluvial soils near rivers, water and firewood were much more suited to their needs.

By the 16<sup>th</sup> century, warmer climates allowed farming communities to settle previously unsuitable regions, like the plains of the Free state and Mpumalanga Highveld (van Schalkwyk 2006: 6). However, by the 1800's, droughts and military tensions caused communities to leave the region. The Highveld region of Mpumalanga, specifically the Bankenveld region, witnessed the Difaqane wars during the last quarter of the 18<sup>th</sup> and first 30 years of the 19<sup>th</sup> century.

Difaqane (Sotho), or Mfecane ("the crushing" in Nguni) (Pelser 2020), was a series of battles fought between indigenous communities in the Highveld region of Mpumalanga (Lye 1967: 108). The conflicts were caused by the heightened competition for land and trade so groups like the Griquas and Shaka's Zulus launched attacks on other tribes in the region. The Difaqane led to large displacements of Sotho-Tswana clans because of Mzilikazi's Ndebele wreaking havoc in the region. Mzilikazi's impi probably moved through the area to the south of Witbank between 1821 and 1823 (Bergh 1999: 11). It is possible that the Ndebele may have established settlements in the Eastern Bankenveld in the regions between Emalahleni and Pretoria, but this has yet to be corroborated through research.

This troubling period resulted in Sotho-Tswana communities to establish larger, concentrated villages and due to the lack of trees in the area, they constructed settlements with stone. These kinds of stone walled sites can be seen in the Kriel and Bronkhorstspuit areas (Pelser et al. 2006).

During the same time as the Difaqane, the large northern migration of white settlers from the Cape was also taking place. Since the 1720's some missionaries and travellers found themselves on expeditions to the north, but this was the first major migration to occur (Cloete 2000). By the 1860's dense populations of white, Dutch-speaking settlers occupied the central Transvaal. The previously known Transvaal Province consists of the present-day Gauteng, Mpumalanga, Limpopo and a portion of the North West Province.

Later Iron Age sites are most likely related to the historical Sotho, Ndebele and Swati-speaking communities that settled in the region. Evidence of early mining activities and iron smelting are also present in the Mpumalanga Highveld. White farmers only settled in the area after 1850, specifically after the trading of land between the Swazi and the government of the South African Republic (ZAR) in 1853.

### 5.1.3 Historical period

By the onset of the 20<sup>th</sup> century, conflicts between the Boers and the British arose and resulted in a number of skirmishes on farms in the region. The farms included Oshoek (4 December 1901), Trigaardsfontein (10 December 1901), Witbank (11 January 1902) and Nelspan (26 January 1902). The battlefields, however do not usually do not contain structures, only artefacts like bullet casings (van Vollenhoven 2016). Additionally, in accordance with the British "scorched earth" policy, many structures and settlements erected by the Boers were destroyed during wartime in the Anglo Boer War which was waged between 1899 and 1902 (Cloete 2000).

Witbank (Emalahleni) was established around 1894 as the railway line connecting Pretoria and Maputo (previously Lorenzo Marques) passed near where the city is located today. The town was officially declared a township 1903 on the farm Swartbos that belonged to Jacob Taljaard at the time (Pistorius 2004). After the discovery of gold field on the Witwatersrand, the demand for cheap energy increased. Witbank was established after four collieries had already been established and productive since 1899.

Previous impact assessments conducted in the approximated 40 km radius vicinity of the project area (Huffman 1999, Celliers 2015, Pelsner 2016, 2021, van Schalkwyk 2006, 2009) show extensive mining and farming was practiced in this region. If any archaeological remains were present in this region. Remaining structures like stone-built farmsteads, dwellings, barns, graveyards and tombstones are likely remnants from this time period are often noted in the HIAs conducted in the region. Naude (2000) notes that the stone-built farmsteads are a unique feature of the regional architectural tradition in the southern African context. These features were often constructed from locally sourced stone ranging from sandstone, ferricrete, dolerite, granite, shale and slate. The core structures were often added on to as the family expanded or as required. Buildings like these and the one present on the Driefontein project area are disappearing under the weight of urban expansion and little study has been conducted on them.

## 6 PROJECT AREA

The total area applied mining rights has a footprint of 71.63ha of which the mining and related surface infrastructure will cover 30ha limited to the southern portion of the project area. The mining footprint is for the most part is set against the top and northern slope of an east-west bank that separates two wetlands. There are boulder outcrops in the western area of the project.

## 7 HERITAGE IMPACT ASSESSMENT

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

### 7.1 DESKTOP STUDY

The desktop study focussed on the relevant previous research conducted in the area based on previous reports, published material, aerial photographs, remote sensing data that has bearing on the immediate project area.

#### 7.1.1 *Heritage Reports*

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

#### 7.1.2 *Map data*

Historical and current topographical maps were consulted as sources of information on potential areas of significance. These were georeferenced in ArcGIS and Google earth with the project area superimposed.

#### 7.1.3 *Remote Sensing Data*

Historical and modern aerial and satellite imagery of the project area was studied to identify any heritage sites. Historical aerial imagery from the National Geo-spatial Information database from 1943, 1961, 1971, 1979 and recent Google Earth imagery between 2003 and 2022 were inspected. The remote sensing data was used to date historical activities and structures (refer to results below).

### 7.1.4 Published Research

Publication repositories were consulted for any published research that pertains to the project.

## 7.2 FIELD SURVEY

An archaeological foot survey of Portion 9 of Driefontein 338JS was conducted on 20 January 2022 by three archaeologists. The survey was conducted following standard archaeological practice of walking transects, spaced roughly 20m apart. The survey team used real time positioning in relation to the project by means of a mobile GIS application. Sites of interest and of the project area were handheld GPS (Garmin GpSMap 66S) and recorded using Datum WGS 84.

### 7.2.1 Limitations

#### **Access**

The project was accessed from the R575 using an old farm road entrance. To gain entry from the R575, a barbed wire fence boundary fence was cut with permission of the current landowner. No other access restrictions were encountered.

#### **Visibility**

Generally, the visibility at the time of the HIA site inspection (20 January 2022) was medium to low due to tall grass cover. Tree cover was mostly absent except around rocky outcrops. The project predominantly falls on Eastern Highveld Grassland (Mucina, Rutherford, and Powrie 2018).

#### **Previous Impact**

Historical aerial imagery and ground survey indicates that the proposed mining area has been impacted by agricultural activities. Plough zones are visible on the summit and slope areas.

The earliest aerial imagery available for the region is from 1943 and even at this early date, large portions the area was already used as ploughed farmland. The historical imagery indicates that ploughing is particularly concentrated on the eastern half of the project area.



Figure 3: Views from top of ridge looking (a) southwest and (b) west.



Figure 4: General views of northern parts of project area facing (a) northeast and (b) north.



Figure 5: Large areas under cultivation on 2019 imagery.



Figure 6: Aerial imagery from 1943 indicating historical farming areas and infrastructure.



Figure 7: Aerial imagery from 1961. Relatively pristine landscape with no visible archaeological features.



Figure 8: Aerial imagery from 1979. Earliest indication of UP-DRF-2529-01 in western corner and associated farmhouse and yard farther west, and outside the project area.



Figure 9: Project area in relation to current landscape.



## 7.3 RESULTS OF THE HERITAGE ASSESSMENT

LIA settlements and historical buildings are typically clearly discernible in remote sensed imagery, but close inspection of imagery from 1943 onwards failed to identify any visible trace of such sites.

### 7.3.1 Stone Age

No Stone Age material was found in the project area.

### 7.3.2 Iron Age

No Iron Age material was found in the project area.

### 7.3.3 Historical Sites

#### **Site: UP-DRF-2529-01**

UP-DRF-2529-01 represent the ruins of a building potentially older than 65 years. However, the building has very little heritage value due to severe deterioration, but also the extensive alterations that have been made to it. At present, trees and shrubs have sprouted inside the building and vagrants seems to be use it as a shelter. Large amounts of glass bottles have been dumped inside.

The structure is comprised by four rectangular spaces, of which only the southwestern seemed to have been roofed. The building seems to have undergone several phases of alteration as seen in the mix of building material and construction techniques.



Figure 10: UP-DRF-2529-01 with four areas/spaces on Google Eart image from 2015.

The oldest part of the structure is evidently Area 1, a 13x6m rectangular space. It was originally constructed from roughly dressed, coarse grained sandstone with a cement mortar.

It is the only room with a cement floor. Later alterations had been made to this space. These include the addition of several courses of clinker bricks to heighten the wall and adding a gable wall for a pitched roof. When adding the pitched roof, the brick coursing was capped with poured cement into which gum pole roof beams were placed. The inside of this room was also finished with a cement plaster during this alteration. An internal dividing wall from the similar clinker bricks was erected to create a ~2m x 5m room in the southeast corner. This internal room was capped with a poured concrete roof. The only windows are narrow slits – approximately 1m wide and 0.4m high. On the southern wall these are within the sandstone courses and capped with concrete lintels. There are four windows on the southern wall and one set in the eastern peak above the sandstone course. The only entrance is a ~3m wide doorway on the western wall with a metal rail for a sliding door still visible on the exterior wall above the entrance.

Area 2 is a sandstone square, set against the northern wall of Area 1 with a ~1.2m high wall on three sides. It is mostly collapsed. The coursing of this wall is not as neat as those in Space 1 and where their walls connect, the walls abut. This area was therefore evidently a later addition to Area 1. Other alterations include a cement cap poured over the on the sandstone top sandstone course, on top of which a course of cement bricks was added to extend the wall height.

Area 3 abuts the eastern wall of Area 2 and is a square space constructed with a variety of building materials. These include shaped and unshaped sandstone with a daga mortar, a wall cap of poured cement with fercrete aggregate, and poured cement doorways. The wall's daga mortar is very friable and eroding and has resulted in the poor preservation of the walling. The collapsed walls indicate that these were constructed with a rubble-fill technique with daga and gravel were used as the fill. A poured concrete cap on the wall likely served to strengthen the wall and prevent the daga fill from washing out. There seems to have been two entrances – one north facing and another east facing. Cement lintels were placed over these at a later stage and were not part of the original structure. The east facing doorway was constructed by pouring cement into a mould made from corrugated sheeting.

Area 4 is a rectangular area south of Area 3 and east of Area 1. It is demarcated by a low, ~20cm poured cement curb with holes in the cement likely for poles, every ~1.2m. This evidently served as the base for a fence.

The most likely interpretation of the building is that it served as roofed shed with animal pens (e.g. calves, lambs and small stock) and/or open storage area. It is likely linked to the farmhouse 230m to the west. While still visible on aerial images in 2020 on Google Earth, this building was evidently destroyed by mining operations on the adjacent parcel. No Heritage report have been lodged for this mining operation. Overall, UP-DRF-2529-01 is typical of vernacular architecture in that the alterations reflect functional response to the changing requirements and needs of the farmers.

Determining the date for the building is more difficult. The oldest part of the structure, Area 1, may date to the early- to mid-20<sup>th</sup> century. However, the evidence for a standing structure in the earliest images is ambiguous. While a white dot does indicate activities in the vicinity of UP-DRF-2529-01, this feature seems to be circular and could be a kraal or watering point. In addition, the 1961 edition of the 2527DD 1: 50 000 topo-map, indicates a windpump at the

same location but no standing structures. The earliest photos in which UP-DRF-2529-01 is clearly visible dates to 1971.

With the evidence available at hand, there is a possibility that an original structure is represented by Area 1. With the erection of the farmhouse on the adjacent parcel, during the mid-late 60s, UP-DRF-2529-01 was expanded by adding a pitched roof and Areas 2-4. Therefore, most of the building is less than 60 years old. The various and extensive alterations to the original building negates any heritage value that it may have.



Figure 11: Close-up of UP-DRF-2529-01 and UP-DRF-2529-01 on 1979 aerial imagery. Note historical farm buildings west of project area.



Figure 12a,b: Ruins of old farm outbuilding UP-2529-DRF-01 (a) looking west with modern refuse in foreground (b) looking east with single window slit in gable wall.



Figure 13: Area 1 of UP-2529-DRF-01 facing (a) towards the south east with gum pole visible in interior room wall and (b) facing towards the north with impressions left by gum poles on cement wall cap.



Figure 14: UP-2529-DRF-01 ith view of corase sandstone walls; (a) outside, facing north with cement lintel and (b) standing in Area 2, facing south showing northern wall of Area 1.



Figure 15: UP-2529-DRF-01 indicating (a) broken rubble fill wall in space 3 and (b) daga plaster and fill.



Figure 16: UP-2529-DRF-01 with (a) Room inside Area 1 and (2) collapsed walling to the north.



Figure 17: UP-2529-DRF-01 with (a) doorway into Area 3 showing with corrugated imprints in cement and (b) building rubble and corrugated asbestos roofing sheet north of the UP-2529-DRF-01.



Figure 18: UP-2529-DRF-01 with (a) interior brick wall of room in Area 1 and (b) low cement fence base.



Figure 19: Modern rubble dumped inside UP-2529-DRF-01.

#### **Site: UP-DRF-2529-02**

This site was identified in the field survey as mounds of building rubble. The current farm owner indicated that these were houses of farm labourers. It is difficult to put an exact age to these structures, however, the building material on the rubble mounds seems to indicate a relatively recent date. The 1971 images provide the earliest evidence for the presence of these features. These structures are absent in imagery dated after 1997. Evidently the houses were demolished at some stage between after 1979 since this is the last time, they are still visible.

At present, all that remain are mounds of building rubble. No cultural material were found on the surface around these mounds. Their demolished state means that they carry little to no heritage value. In addition, the historical aerial imagery seems to indicate that some of the

features could be younger than 60 years. In all, the dates and the destroyed state of the buildings means that no mitigation is needed.



Figure 20: Building from UP-DRF-2529-02.



Figure 21: Location of UP-DRF-2529-01 and UP-DRF-2529-02 in relation to spatial features visible in 1943 imagery. Note absence of structure where UP-DRF-2529-01 is located. Features north of UP-DRF-2529-02 could not be located on the ground but could be watering holes or rock outcrops and trees.

### 7.3.4 Graves and Burial Grounds

No graves or burial grounds were encountered during the survey. The current owner of the farm (whose family had lived there) stated that he is unaware of any graves.

## 7.4 PALEONTOLOGICAL SENSITIVITY

The project area falls within a Very High sensitivity zone which requires a field assessment and protocol for finds. This will be attached as additional documents to this report.

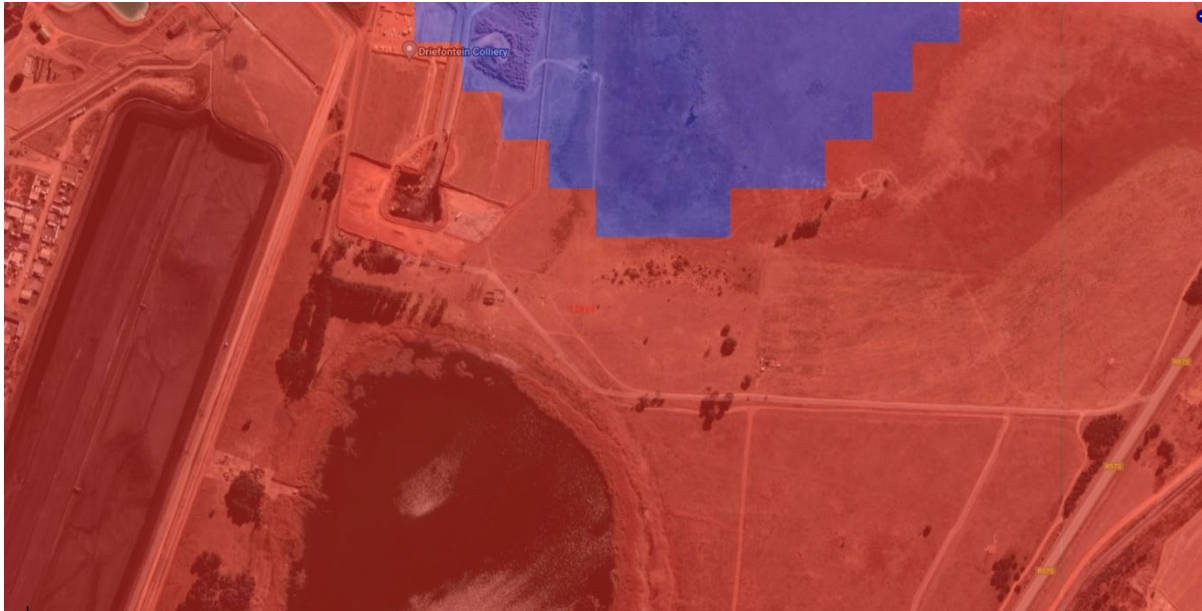


Figure 22: Paleontological sensitivity map.



**Table 4: Summary direct impact on heritage finds**

Site	Impact	Mitigation	Extent		Duration		Magnitude		Probability		Impact		Mitigation Measures to be Implemented
			Scale	Score	Scale	Score	Scale	Score	Scale	Score	Scale	Score	
<b>UP-DRF-2529-01</b>	Destruction	No Mitigation	Site	1	Permanent	5	High	8	Definite	5	High	70	Feature of low significance & large parts younger than 60 years. No mitigation beyond ECO monitoring
<b>UP-DRF-2529-02</b>	Destruction	No Mitigation	Site	1	Permanent	5	High	8	Definite	5	High	70	Feature of low significance & possibly younger than 60 years. No mitigation beyond ECO monitoring.

## 8 MANAGEMENT ACTIONS

The following management measures should be considered during mining rights application on Portion 15 of Rietspruit 437 IS.

SITES	UP-DRF-2529-01	
PROJECT COMPONENT/S	Within mine footprint	
POTENTIAL IMPACT	Destruction	
ACTIVITY RISK/SOURCE	Earth moving, excavation	
MITIGATION: TARGET/OBJECTIVE	Monitoring	
MITIGATION: ACTION/CONTROL	RESPONSIBILITY	TIMEFRAME
<b>Fixed Mitigation Procedure (required)</b>		
Site Monitoring	ECO	Monitor to identify if any sensitive material is unearthed during destruction.
PERFORMANCE INDICATOR	Successful monitoring	

SITES	UP-DRF-2529-02	
PROJECT COMPONENT/S	Within mine footprint	
POTENTIAL IMPACT	Destruction	
ACTIVITY RISK/SOURCE	Earth moving, excavation	
MITIGATION: TARGET/OBJECTIVE	Monitoring	
MITIGATION: ACTION/CONTROL	RESPONSIBILITY	TIMEFRAME
<b>Fixed Mitigation Procedure (required)</b>		
Site Monitoring	ECO	Monitor if any unmarked sensitive material is unearthed during construction.
PERFORMANCE INDICATOR	Successful monitoring	

## 9 RECOMMENDATION

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

1. **UP-DRF-2529-01** is a farm outbuilding – likely a shed. Precise dating of the building is difficult, but aerial imagery suggests an older structure with extensive alterations in the 1960s. The addition, the numerous alterations and severe degradation of the building means that it has very little heritage value in its current state. This assessment therefore finds that the building is of **low significance (2a)**. It was recorded and documented in the Phase I assessment and no further steps are needed other than monitoring by the ECO.
2. **UP-DRF-2529-01** are the remains of farm labourer quarters. These have previously been demolished and bulldozed and are only visible as mounds of building rubble. Surface material and aerial photos suggests an age less than 60 years. This date and the fact that the buildings and surrounding area have been bulldozed, means that UP-DRF-2529-01 carries **no significance (1)** as a heritage site. Regardless, it was recorded and documented in the Phase I assessment. Monitoring by the ECO is recommended.

## 10 CONCLUSION

Investigation of the Project Area 30ha project area on Portion 9 of Driefontein 338 JS identified two sites. These however respectively carry no (category 1 – no mitigation) and low (category 2a - recording) heritage significance. Since the area was settled in the past, monitoring of the area for sensitive heritage remains during construction is recommended.

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## Appendix 1: HERITAGE LEGISLATION BACKGROUND

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

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

The Act identifies heritage objects as:

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

With regards to activities on archaeological and heritage sites this Act states that:

“No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit by the relevant provincial heritage resources authority.” (34. [1] 1999:58)

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

- a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite.
- b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite.
- c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or
- d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects or use such equipment for the recovery of meteorites. (35. [4] 1999:58).”

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

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

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

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

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

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



## Appendix 2: MANAGEMENT AND MITIGATION ACTIONS

### A2.1 CATEGORIES OF SIGNIFICANCE

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

#### A2.1.1 Aesthetic value:

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

#### A2.1.2 Historic value:

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

#### A2.1.3 Scientific value:

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

#### A2.1.4 Social value

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

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

Formally protected sites:

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

Generally protected sites:

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

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

## A2.2 MITIGATION CATEGORIES

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

### A2.2.1 No further action / Monitoring

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

### A2.2.2 Avoidance

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

### A2.2.3 Mitigation

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

### A2.2.4 Compensation

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

### A2.2.5 Rehabilitation

Rehabilitation is considered in heritage management terms as an intervention typically involving the adding of a new heritage layer to enable a new sustainable use. It is not

appropriate when the process necessitates the removal of previous historical layers, i.e. restoration of a building or place to the previous state/period. It is an appropriate heritage management action in the following cases:

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

#### A2.2.6 Enhancement

Enhancement is appropriate where the overall heritage significance and its public appreciation value are improved. It does not imply creation of a condition that might never have occurred during the evolution of a place, e.g. the tendency to sanitize the past. This management action might result from the removal of previous layers where these layers are culturally of low significance and detract from the significance of the resource. It would be appropriate in a range of heritage contexts and applicable to a range of resources. In the case of formally protected or significant resources, appropriate enhancement action should be encouraged. Care should, however, be taken to ensure that the process does not have a negative impact on the character and context of the resource. It would thus have to be carefully monitored.