

PHASE 1 HERITAGE IMPACT ASSESSMENT REPORT

PROPOSED RIETKOL MINING OPERATIONS VICTOR KHANYE LOCAL MUNICIPALITY NKANGALA DISTRICT MPUMALANGA

FOR: Jacana Environmental cc
P O Box 31675
Superbia, 0759

Frans Roodt
January 2017

Tel: (015) 2682620
083 770 2131
E-Mail: fransroodt2454@gmail.com



PostNet Suite 139
P/Bag X9700
POLOKWANE
0 7 0 0

Executive Summary

This report addresses the development of the proposed Rietkol Mining Operations. Rietkol is situated on various agricultural holdings on the Modder East Agricultural Holdings on the farms Olifantsfontein 196 IR and Rietkol 237 IR in the Victor Khanye Local Municipality, Mpumalanga Province.

- During the survey an informal graveyard was recorded. This must be relocated as it falls within the mining activity area. The correct legal procedures and protocols must be followed for this action.
- The area falls in the RED category of SAHRA's Palaeontological Sensitivity Map because of the underlying Vryheid formation, but it is argued that the geology of the specific project area consists of metamorphic quartzite rock and that it is unlikely that fossils will occur here. Nevertheless it is recommended that a suitably qualified palaeontologist be appointed should the mining activities in the open pit reach the Vryheid geological formation.
- A trigonometrical beacon is located in the project area. For the removal of this structure it is recommended that the office Chief Directorate: National Geo-spatial Information be consulted in order to establish the correct procedure for its removal
- No other significant heritage resources were observed in the project area.

From a heritage resources management point of view we have no objection with regard to the development

CONTENT

	Page
Executive summary	1
1. Introduction and terms of reference	3
1.1 Project description and location – Rietkol Mining Operations	3
1.2 Minerals to be mined	3
1.3 Activity description	4
1.4 Terms of reference	4
1.5 Terrain description	5
2. Relevant legislation	5
2.1 The National Heritage Resources Act (25 of 1999) (NHRA)	5
2.2 The Human Tissues Act (65 of 1983)	7
3. Methodology	7
3.1 Sources of information	7
3.2 Limitations	8
3.3 Categories of significance	8
3.4 Terminology	8
4. Baseline information	9
5. Results of the Survey	10
6. Discussion	12
7. Evaluation and statement of significance	12
8. Recommended Management and Mitigation measures	13
9. References	14
10 Maps and images (Figures 1 – 17)	15
List of Tables	
1 Property Description	3
2 Minerals to be mined	3
3 Significance criteria and rating	12
List of Figures	
1 Project coordinates and location – refer also to Figure 4.	15
2 Extract from 1:50 000 Topographical Map 2628BA. Note extensive ploughing of the area.	15
3 Geology of the Delmas area.	16
4 Project area in relation to Delmas	16
5 Project area with GPS tracking. Note that the entire area around the pan is ploughed.	17
6 View of quartzite outcrops – northern part.	18
7 View of quartzite outcrops - southern part.	18
8 Part of the informal graveyard.	19
9 Grave of an infant.	19
10 Ruin of homestead at recording 1.	20
11 Rock pile at recording 2.	20
12 The probably fowl-house ruin at recording 3.	21
13 Probable pigsty at recording 4.	21
14 Water trough and livestock pen at recording 5.	22
15 Homestead ruin at recording 6.	22
16 Trigonometrical beacon (No. 626) at recording 7.	23
17 Modern house on Holding 219.	23

1. INTRODUCTION AND TERMS OF REFERENCE

1.1 Project description and location – Rietkol Mining Operations

The proposed Rietkol Mining Operations (Rietkol) is situated on various agricultural holdings on the Modder East Agricultural Holdings on the farms Olifantsfontein 196 IR and Rietkol 237 IR in the Victor Khanye Local Municipality, Mpumalanga Province. The Rietkol Mining Right (MR) will be registered over an area of 65 ha covering 16 agricultural holdings, each approximately 4.1 ha in extent.

The MR area is situated in a mixed land use area approximately 9 km northwest of the town of Delmas and 5 km north of the Eloff hamlet as indicated in Figure 1 below.

Table 1: Property Description

Portion Number	Deed Number	Owner
Holding 209	T170081/2005	Johan Swart
Holding 210	T18943/2000	Hermanus Burger
Holding 211	T38311/1969	Willem Christoffel Meyer
Holding 212	T17475/1990	Henry William Diaz-Arundel
Holding 213	T171746/2005	Piet van der Walt
Holding 214	T33653/2007	Maria Johanna Henning
Holding 215	T2743/20003	Stefan Sokol
Holding 216	T116099/2006	Bheki Mthethwa
Holding 217	T82066/2006	Piet Kotze
Holding 218	T13542/1990	William Edwin Wocke
Holding 219	T13541/1990	William Edwin Wocke
Holding 220	T82066/2006	Piet Kotze
Holding 221	T82066/2006	Piet Kotze
Holding 222	T78652/2004	Piet Kotze
Holding 223	T85473/2004	Piet Kotze
Holding 224	T34277/1990	Petrus Johannes Naude
Total Size		64,7536

1.2 Minerals to be mined

The general mineral category to be mined is Silica. Table 2 details the key economic minerals within this category which are expected to be found in the MR area.

Table 2: Minerals to be mined

Type of Mineral expected to be found in Area	
Glass Sand (Silica) QG Type Q	Foundry Sand (Silica) (QF) Type Q
Silica sand (general) Q Type Q	Filling Sand (Silica) (QL) Type Q
Sand (general) QY Type I	Fuller's Earth (Clay) (CE) Type Cy
Silica Sand QD Type Q	Group (Clay) (CI) Type Cy
Clay (CA) Type Cy	Metallurgical Silica (QM) Type Q
Ball Clay (CL) Type Cy	Shale/Brick Clay(CS) Type Cy
Concrete Sand (QO) Type Q	Silcrete (Silica) (QS) Type Q
Building Sand (QB) Type Q	
Clay (general) (Cy) Type Cy	
Crusher Sand (Silica) (QC) Type Q	

1.3 Activity description

Rietkol is an opencast mine with an expected mining depth of 30 m. Mining will be phased in over three phases. The intention is to maintain a constant product stream and first develop the opencast pit, followed by the associated infrastructure including roads, stockpiles and plant and water holding facilities. The estimated Life of Mine (LoM) for Riekol is 26 years with a mineable resource of 9.9 Mt Run-of-Mine (RoM). The process design allows for the production of various products for the various inland markets.

Silica will be mined through an opencast bench mining method. The benches will be mined at a width of 60 metres and a height of 5 metres. Final mining depth will be 30 m below surface level. Vegetation and topsoil should be stripped approximately 30m ahead of the mining direction and available for active excavator mining. Drilling and blasting of the rock face will be conducted on a predetermined schedule in accordance with projected volumes of production and will be undertaken by blasts professionals and with the required safety procedure applied.

The mining method in the in-pit areas:

- Drilling operations commence in the direction of the mining operations;
- The holes are drilled, charged with explosives and blasted;
- Once the Silica is exposed, the loading and hauling of Silica commence;
- The blasted RoM is stockpiled with excavators; and
- Thereafter RoM transported to the crushing plant by means of haul trucks, with a loading capacity of approximately 23 tons.

A processing plant will consist of the following components and will be commissioned in phases and will be fully operational by year 7.

- Crushing;
- Washplant;
- Screening process;
- Screening with Hydro sizing process;
- Drier Plant; and
- Bag house facility.

Existing buildings on site will be utilised for Phase 1. The buildings will provide storage space for the machinery used on site as well as office space. It is envisaged that the building on Portion 215 will be utilised for this purpose until year 7. Thereafter various administrative and production facilities totalling 1635.5 m² will be constructed along with the plant including.

1.4 Terms of reference

Undertake a Phase 1 Heritage Impact Assessment and submit a specialist report, which addresses the following:

- Executive summary;
- Scope of work undertaken, assumptions and limitations;
- Methodology used to obtain supporting information;
- Overview of relevant legislation;
- Results of all investigations;

- Interpretation of information;
- Assessment of impacts (including cumulative impacts) associated with all the stages of the project (construction, operation, closure and post closure);
- Assessment of effectiveness of management measures proposed by the client;
- References.

1.5 Terrain description

The Demas area consists of undulating grassland with drainage lines and numerous pans/vlei's.

The proposed development terrain contains quartzite outcrops. Quartzite is a nonfoliated metamorphic rock composed almost entirely of quartz. It forms when quartz-rich sandstone is altered by the heat, pressure, and chemical activity of metamorphism. These conditions recrystallise the sand grains and the silica cement that binds them together. Quartz is the most common sand-forming mineral. If the particular sand deposit contains almost nothing but quartz, it is often called silica sand. Such sand deposits are said to be mature because other rock-forming minerals are already broken down by the weathering process leaving only the super-resistant quartz as a residue.

The Smallholdings area has been severely impacted on by residences, gardening and ploughing, while the southern part of the terrain contains a large pan and vlei area. Large areas have been ploughed.

2. RELEVANT LEGISLATION

Two sets of legislation are relevant for this study with regard to the protection of heritage resources and graves.

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

This Act established the South African Heritage Resources Agency (SAHRA) and makes provision for the establishment of Provincial Heritage Resources Authorities (PHRA). The Act makes provision for the undertaking of heritage resources impact assessments for various categories of development as determined by Section 38. It also provides for the grading of heritage resources (Section 7) and the implementation of a three-tier level of responsibilities and functions for heritage resources to be undertaken by the State, Provincial authorities and Local authorities, depending on the grade of the Heritage resources (Section 8).

In terms of the National Heritage Resources Act (1999) the following is of relevance:

Historical remains

Section 34(1) No person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

Archaeological remains

Section 35(3) Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to

the responsible heritage resources authority or to the nearest local authority or museum, which must immediately notify such heritage resources authority.

Subsection 35(4) 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 with the detection or recovery of metals or archaeological material or objects, or use such equipment for the recovery of meteorites.

Subsection 35(5) When the responsible heritage resources authority has reasonable cause to believe that any activity or development which will destroy, damage or alter any archaeological or palaeontological site is under way, and where no application for a permit has been submitted and no heritage resources management procedures in terms of section 38 has been followed, it may-

- (a) serve on the owner or occupier of the site or on the person undertaking such development an order for the development to cease immediately for such period as is specified in the order;
- (b) carry out an investigation for the purpose of obtaining information on whether or not an archaeological or palaeontological site exists and whether mitigation is necessary;
- (c) if mitigation is deemed by the heritage resources authority to be necessary, assist the person on whom the order has been served under paragraph (a) to apply for a permit as required in subsection (4); and
- (d) recover the costs of such investigation from the owner or occupier of the land on which it is believed an archaeological or palaeontological site is located or from the person proposing to undertake the development if no application for a permit is received within two weeks of the order being served.

Subsection 35(6) The responsible heritage resources authority may, after consultation with the owner of the land on which an archaeological or palaeontological site or meteorite is situated; serve a notice on the owner or any other controlling authority, to prevent activities within a specified distance from such site or meteorite.

Burial grounds and graves

Subsection 36(3)

- (a) No person may, without a permit issued by SAHRA or a provincial heritage resources authority-
- (c) 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; or
- (d) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in detection or recovery of metals.

Subsection 36(6) Subject to the provision of any law, any person who in the course of development or any other activity discovers the location of a grave, the existence of which was

previously unknown, must immediately cease such activity and report the discovery to the responsible heritage resources authority which must, in co-operation with the South African Police Service and in accordance with regulations of the responsible heritage resources authority-

- (a) carry out an investigation for the purpose of obtaining information on whether or not such grave is protected in terms of this Act or is of significance to any community; and
- (b) if such grave is protected or is of significance, assist any person who or community which is a direct descendant to make arrangements for the exhumation and re-interment of the content of such grave or, in the absence of such person or community, make any such arrangement as it deems fit.

Culture Resource Management

Subsection 38(1) Subject to the provisions of subsection (7), (8) and (9), any person who intends to undertake a development* ...

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

***development** means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in a change to the nature, appearance or physical nature of a place, or influence its stability and future well-being, including-

- (a) construction, alteration, demolition, removal or change of use of a place or a structure at a place;
- (b) carry out any works on or over or under a place*;
- (e) any change to the natural or existing condition or topography of land, and
- (f) any removal or destruction of trees, or removal of vegetation or topsoil;

****place** means a site, area or region, a building or other structure* ..."

****structure** means any building, works, device or other facility made by people and which is fixed to the ground ..."

2.2 The Human Tissues Act (65 of 1983)

This Act protects graves younger than 60 years. These 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.

3. METHODOLOGY

3.1 Sources of information

Most of the information was obtained through the field survey of the area supplemented by relevant literature and the internet. The SAHRIS database was consulted, but no case studies that would have an influence on this project were found. The topocadastral 1:50000 map and especially Google Earth was studied for signs of archaeological or historical sites. The study area was traversed on foot and by vehicle. Standard archaeological observation practices were followed. Aspects such as favorable geographical and ecological conditions were considered with regard to suitable habitation in the past and such places were inspected where potential heritage remains may be located. Locations of heritage remains were recorded by a handheld GPS and plotted on Google Earth. Heritage remains and the general conditions of the terrain were photographed with a NIKON Digital camera.

3.2 Limitations and assumptions

No limitations were experienced. It must be noted that most archaeological and palaeontological remains are subterranean and there is always a chance that such material may be exposed during earthworks.

3.3 Categories of significance

The significance of archaeological sites is ranked into the following categories.

1. No significance: sites that do not require mitigation.
2. Low significance: sites that <i>may</i> require mitigation.
3. Medium significance: sites that require mitigation and assessment.
4. High significance: sites that must not be disturbed at all or require special mitigation.

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. Grave and burial grounds are protected by Section 36 of the NHRA.

A crucial aspect in determining the significance and protection status of a heritage resource is often whether or not the sustainable social and economic benefits of a proposed development outweigh the conservation issues at stake. Many aspects must be taken into consideration when determining significance, such as rarity, national significance, scientific importance, cultural and religious significance, and not least, community preferences. When, for whatever reason the protection of a heritage site is not deemed necessary or practical, its research potential must be assessed and mitigated in order to gain data / information which would otherwise be lost. Such sites must be adequately recorded and sampled before being destroyed. These are generally sites graded as of low or medium significance.

3.4 Terminology

Early Stone Age:	Predominantly the Acheulean hand axe industry complex dating to \pm 1 Myr – 250 000 yrs. before present.
Middle Stone Age:	Various lithic industries in SA dating from \pm 250 000 yrs. - 22 000 yrs. before present.
Late Stone Age:	The period from \pm 22 000 yrs. to the contact period with either Iron Age farmers or European colonists.
Early Iron Age:	Most of the first millennium AD.
Middle Iron Age:	10 th to 13 th centuries AD.
Late Iron Age:	14 th century to colonial period. <i>The entire Iron Age represents the spread of Bantu speaking peoples.</i>
Historical:	Mainly cultural remains of western influence and settlement from AD 1652 onwards – mostly structures older than 60 years in terms of Section 34 of the NHRA.

Phase 1 assessment:	Scoping surveys to establish the presence of and to evaluate heritage resources in a given area.
Phase 2 assessment:	In depth culture resources management 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.
Sensitive:	Often refers to graves and burial sites although not necessarily a heritage place, as well as ideologically significant sites such as ritual / religious places. <i>Sensitive</i> may also refer to an entire landscape / area known for its significant heritage remains.

4. BASELINE INFORMATION

4.1 The Stone Age

The Stone Age covers most of southern Africa and the earliest consist of the Oldowan and Acheul artefacts assemblages. Oldowan tools are regularly referred to as “choppers”. Oldowan artefacts are associated with *Homo habilis*, the first true humans. In South Africa definite occurrences have been found at the sites of Sterkfontein and Swartkrans. Here they are dated to between 1.7 and 2 million years old. This was followed by the Acheulian technology from about 1.4 million years ago which introduced a new level of complexity. The large tools that dominate the Acheulian artefact assemblages range in length from 100 to 200 mm or more. Collectively they are called bifaces because they are normally shaped by flaking on both faces. In plan view they tend to be pear-shape and are broad relative to their thickness. Most bifaces are pointed and are classified as handaxes, but others have a wide cutting end and are termed cleavers. The Acheulian design persisted for more than a million years and only disappeared about 250 000 years ago. Here, too the Makapans Valley Site is referenced; especially the Cave of Hearths.

The change from Acheulian with their characteristic bifaces, handaxes and cleavers to Middle Stone Age (MSA), which are characterized by flake industries, occurred about 250 000 years ago and ended about 30 000 – 22 000 years ago. For the most part the MSA is associated with modern humans; *Homo sapiens*. MSA remains are found in open spaces where they are regularly exposed by erosion as well as in caves. Characteristics of the MSA are flake blanks in the 40 – 100 mm size range struck from prepared cores, the striking platforms of the flakes reveal one or more facets, indicating the preparation of the platform before flake removal (the prepared core technique), flakes show dorsal preparation – one or more ridges or arise down the length of the flake – as a result of previous removals from the core, flakes with convergent sides (laterals) and a pointed shape, and flakes with parallel laterals and a rectangular or quadrilateral shape: these can be termed pointed and flake blades respectively. Other flakes in MSA assemblages are irregular in form. Although the MSA has not been extensively studied in Mpumalanga, evidence for this period has been excavated from Bushman Rock Shelter (BRS) near Ohrigstad.

The change from Middle Stone Age to Later Stone Age (LSA) took place in most parts of southern Africa little more than about 20 000 years ago. It is marked by a series of technological innovations or new tools that, initially at least, were used to do much the same jobs as had been done before, but in a different way. Their introduction was associated with changes in the nature of hunter-gatherer material culture. The innovations associated with the Later Stone Age “package” of tools include rock art – both paintings and engravings, smaller stone tools, so small that the formal tools

less than 25mm long are called microliths (sometimes found in the final MSA) and Bows and arrows. There exists a general dearth of Stone Age research in Mpumalanga except for Heuningneskrans, north of Ohrigstad and Honingklip near Badplaas. Rock art is an important feature of the LSA and occurs where suitable rock faces are present.

4.2 The Iron Age

Heritage reports generally comment on a lack of data for Iron Age settlements within this region. Recorded sites occur further north and east in the areas of the Steelpoort valley, Lydenburg and Belfast. However, stonewalled settlements with corbelled stone huts have been recorded between Davel and Ermelo, first by Hoernle (1930). These are at coordinates S26°26'32" E29°47'35" & S26°27'20" E29°48'34" (the later documented by Hoernle), about 100km south-east-east from Delmas. They probably date from the AD1700's into the nineteenth century and are associated with ancestors of some Sotho groups. In the 17th century Muzi Ndebele may have traversed the study area (Huffman 2007).

4.3 The historical landscape

White settlers moved into the area during the mid-19th century. They were initially mostly self-sufficient, with their livelihood based on cattle/sheep farming and hunting. Lydenburg was established in 1849 and Pretoria was started in 1850, but Johannesburg only dates to the 1880s, after the discovery of gold.

The development of the Witbank Coalfield in the early 1900s necessitated a more direct rail link to allow its output to be supplied to its primary market on the Witwatersrand Goldfield. In 1906 a railway line was opened between Apex and Witbank, crossing the Witklip district where coal was discovered on Brakfontein, a farm belonging to Mr. N.C. Erasmus. In 1907 the surveyor, Ewan Curry, instructed by Frank Campbell Dumat, laid out the plan for the future township of Delmas on what was then the farm of Witklip. The name "Delmas" was taken from that of a small farm in France that had belonged to Dumat's grand father. The town's original layout consisted of 192 plots together with commonage of 138 hectares and 48 small holdings.

By 1909 The Delmas Estate & Colliery Company was mining for coal in the district. The same year the Transvaal Government acquired the adjacent farms of Strydpan and Stomiesfontein. The land belonging to these farms was divided into 85 holdings for white settlers. In 1917 a Health Committee was formed which was succeeded in 1944 by a Village Council. Delmas was officially proclaimed a town in 1954 and by 1965 had its own town council.

In addition to coal, high grade silica is also mined in the vicinity of Delmas (<http://on-the-rand.co.uk/Coalfields/Delmas.htm>)

5. RESULTS OF THE SURVEY

5.1 Palaeontology

Geologically, the proposed development lies on the edge of the Vryheid Formation of the Ecca Group, which contains the coal layers. It may contain plant fossils, especially in the shales above or below the coal. This area is coded red on SAHRA's Palaeo-sensitivity map. However, bearing in mind that the terrain consists of quartzite outcrops where the sandstones have been metamorphosed, it is highly unlikely that fossils will be present in the rock. The objective of the mining is to extract sand and therefore there is no reason to penetrate the shale or coal layers.

In addition, commenting on the general area in her palaeontology assessment report for the establishment of a 600 MW power plant and ash disposal facility at Delmas, Bamford (2013) states "...as the area has already been extensively disturbed by agriculture, quarrying and road developments, it is very unlikely that good fossil plants or invertebrates would be found". She recommends "Fossil plants will be associated with the coal but it is unlikely that they are of great importance. From the palaeontological point of view the proposed development can proceed".

5.2 Stone Age remains

Quartz is hard and was frequently used for stone tool making. Isolated Middle Stone Age flakes were noted on the outcrop just north of the pan, but no intact primary site or stone knapping site was found and no formal tools were observed. The terrain is not suitable for Rock Art as there are no large loose-standing boulders or rock overhangs which would facilitate rock art.

5.3 Iron Age

No Iron Age sites or cultural material was observed.

5.4 Graves and burials

An informal graveyard consisting of about 20 graves was recorded at coordinates S26°07'41.5" E28°36'32.2". Some of these graves are delineated by brick and mortar walls, whereas others are stone stacked. The graves are not maintained, are overgrown and some have been damaged by burrowing porcupines, while others have collapsed. Graves of both adults and children are present. None of the graves have headstones and no names could be discerned. The exact size of the graveyard and number of graves could not be determined accurately. The graves fall within the area demarcated for mining and access road.

5.5 The built environment

A number of ruins exist of the properties. They are numbered 1 – 6 on the Google image (Fig ?). Two of the ruins were homesteads (1 & 6), while the others relate to livestock and farming activities.

1. Ruins of a house and outbuilding constructed with a combination of fired clay bricks and cement blocks. Coordinates: S26°07'40" E28°36'37"
2. Stacked large stones in two groups, the one resembling the letter J. Probably from the adjacent ploughed field. Coordinates: S26°07'39.4" E28°36'22.8"
3. A structure that probably was a fowl-house. Coordinates: S26°07'37" E28°36'23.4"
4. A pigsty constructed with cement blocks. Coordinates: S26°07'35" E28°36'25.5"
5. Water trough and livestock pen. Coordinates: S26°07'31.8" E28°36'25.2"
6. Ruins of a house and outbuilding. The house was constructed with fired clay bricks and mortar and the outbuilding of stone. A water tank stand constructed of brick and mortar stands near the house. Coordinates: S26°07'29.8" E28°36'22.4"

All other buildings on the properties are modern.

Recording **7** is an old trigonometrical beacon (No. 626). Coordinates: S26°07'35.6" E28°36'30.3". The network of trigonometrical beacons on top of mountains and tall structures and buildings is known as a passive network since the beacon merely represents the position of the co-ordinate assigned to it and plays no role in updating or monitoring its position (<http://www.ngi.gov.za/index.php>).

6. DISCUSSION

Apart from the informal graveyard, no other significant heritage resources were recorded in the project area. No impact is expected on palaeological or archaeological remains. With regard to the built environment, the recorded ruins have no cultural significance – they contain no intrinsic design, architecture or pioneer building material and methods that require further assessment.

The informal graveyard is significant and will be impacted on by the development.

The trigonometrical beacon will also be impacted on. It is unclear what process should be followed if it is to be demolished. However, it is advised that the office of the Chief Directorate: National Geospatial Information (NGI) in the Department of Rural Development and Land Reform be informed.

7. EVALUATION AND STATEMENT OF SIGNIFICANCE

7.1 Significance criteria in terms of Section 3(3) of the National Heritage Resources Act.

Table 3: Significance criteria and rating

	Significance	Rating
1.	The importance of the cultural heritage in the community or pattern of South Africa's history (Historic and political significance)	Low
2.	Possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage (Scientific significance).	None
3.	Potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage (Research/scientific significance)	None
4.	Importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects (Scientific significance)	None
5.	Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group (Aesthetic significance)	None
6.	Importance in demonstrating a high degree of creative or technical achievement at a particular period (Scientific significance)	None
7.	Strong or special association with a particular community or cultural group for social, cultural or spiritual reasons (Social significance)	Low
8.	Strong or special association with the life and work of a person, group or organization of importance in the history of South Africa (Historic significance)	None
9.	The significance of the site relating to the history of slavery in South Africa.	None

7.2 ***Section 38(3) (c) An assessment of the impact of the development on such heritage resources.***

The development will have a negligible effect on heritage remains.

7.3 Section 38(3) (d) An evaluation of the impact of the development on heritage resources relative to the sustainable economic benefits to be derived from the development.

None of the recorded heritage remains within the direct mining area are uncommon, rare or unique. The sustainable economic benefits outweigh the conservation benefits.

7.4 Section 38(3) (e) The results of consultation with the communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources.

Social consultative process with landowners is ongoing.

7.5 Section 38(3)(f) If heritage resources will be adversely affected by the proposed development the consideration of alternatives.

No viable alternatives exist.

7.6 Section 38(3)(g) Plans for mitigation of any adverse effects during and after the completion of the proposed development.

Refer to recommendations for management and mitigation measures.

8 RECOMMENDATIONS FOR MANAGEMENT AND MITIGATION MEASURES

The following mitigation measures are recommended:

1. That the informal graveyard be relocated to a suitable area after consultation with the affected families. The correct legal procedures and protocols for consent and permitting must be followed.
2. That the office Chief Directorate: National Geo-spatial Information be consulted in order to establish the correct procedure for the removal of the trigonometrical beacon.
3. That a suitably qualified palaeontologist be appointed should the mining activities in the open pit reach the Vryheid geological formation.
4. No action is required for the demolished structures on the properties.

From a heritage resources management point of view we have no objection with regard to the development.

The discovery of undetected heritage remains must be reported to the archaeologist or the Heritage Authority.

9. REFERENCES

Bamford, M. 2013. Phase 1 Palaeontological Impact Assessment for the establishment of a 600 MW power plant and ash disposal facility at Delmas (Mpumalanga/Gauteng). Unpublished report.

Deacon, HJ and Deacon, J. 1999. Human Beginnings in South Africa. *Uncovering the Secrets of the Stone Age*. David Philip Publishers. Cape Town & Johannesburg.

Hoernle, R.F. 1930. The stone hut settlements on Tafelkop near Bethal. *Bantu Studies*. 4, pp217-233.

Huffman, T.N. 2007. Handbook to the Iron Age. *The archaeology of Pre-colonial Farming Societies in Southern Africa*. University of KwaZulu-Natal Press.

Pelser, A J. 2013. Report on a Phase 1 HIA for a proposed coal mine on portions 26, 46 & 47 of the farm Droogenfontein 242IR, Delmas District, Mpumalanga. Unpublished report.

PGS Heritage. 2014. Proposed Construction of Ash Disposal Facility for Kusile Power Station, Mpumalanga and Gauteng Provinces –heritage Impact Assessment. Unpublished report.

van Schalkwyk, J. 2014. Heritage Impact Assessment report for the proposed construction of a 44Kv substation and powerline, Delmas North, Mpumalanga Province. Unpublished report.

<http://on-the-rand.co.uk/Coalfields/Delmas.htm>



FRANS ROODT (BA Hons, MA Archaeology, Post Grad Dip. in Museology; UP)
Principal Investigator, ASAPA No. 120

10. MAPS AND IMAGES (Figures 1 – 17)



	Latitude	Longitude
A	-26.121861°	28.602412°
B	-26.124850	28.614225°
C	-26.130301	28.612811
D	-26.131955°	28.616618°
E	-26.141110°	28.612775°
F	-26.139026°	28.603269°
G	-26.128884°	28.600430°

Figure 1. Project coordinates and location –refer also to Figure 4.

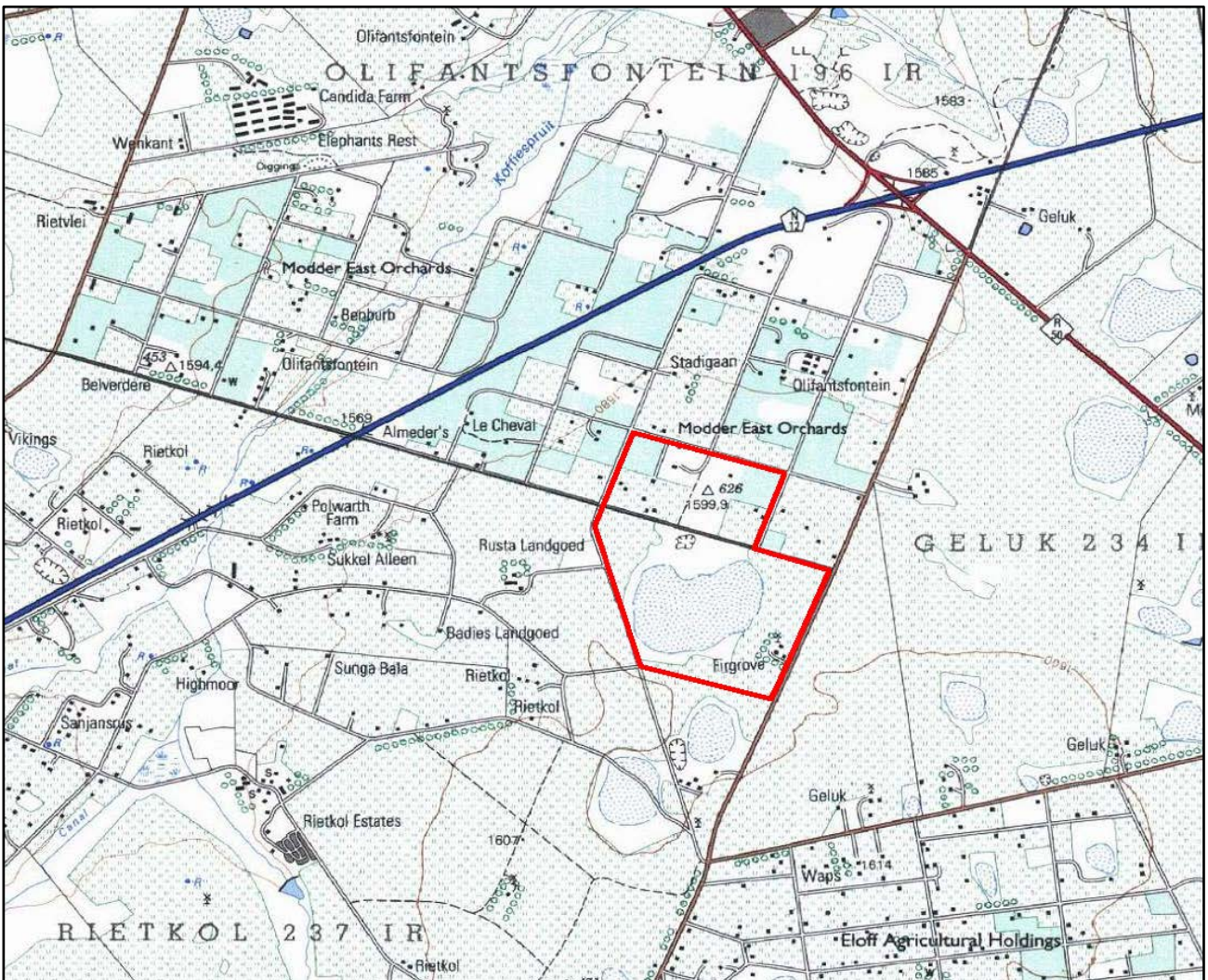


Figure 2. Extract from 1:50 000 Topographical map 2628BA. Note extensive ploughing of the area.

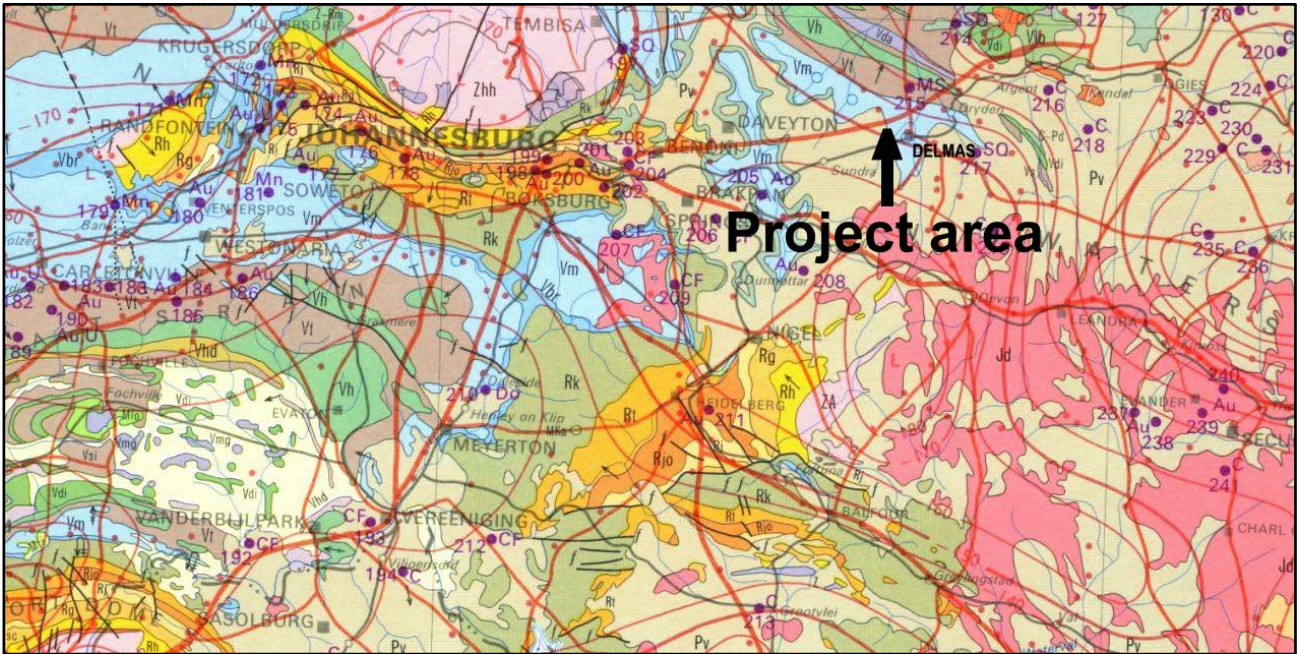


Figure 3. Geology of the Delmas area. Arrow marks the proposed development area. Vm (blue) marks Malmani dolomite area and Pv (tan) marks the Vryheid formation. Map from the Geological Survey, Pretoria; 1984, 1: 1 000 000 (from Bamford 2013).



Figure 4. Project area in relation to Delmas.



Figure 5. Project area with GPS tracking. Note that the entire area around the pan is ploughed.



Figure 6. View of quartzite outcrops – northern part.



Figure 7. View of quartzite outcrops - southern part.



Figure 8. Part of the informal graveyard.



Figure 9. Grave of an infant.



Figure 10. Ruin of homestead at recording 1.



Figure 11. Rock pile at recording 2.



Figure 12. The probably fowl-house ruin at recording 3.



Figure 13. Probable pigsty at recording 4.



Figure 14. Water trough and livestock pen at recording 5.



Figure 15. Homestead ruin at recording 6.



Figure 16. Trigonometrical beacon (No. 626) at recording 7.



Figure 17. Modern house on Holding 219.