INTIBANE COLLIERY

Proposed Coal Mining Activities on a Section of Portion 16 of the farm Vlakvarkfontein 213 IR, Victor Khanye Local Municipality, Mpumalanga Province.

Heritage Impact Assessment

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DECLARATION OF INDEPENDENCE

The report has been compiled by PGS Heritage, an appointed Heritage Specialist for Ferret Mining and Environmental Services (Pty) Ltd. The views stipulated in this report are purely objective and no other interests are displayed in the findings and recommendations of this Heritage Impact Assessment.

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Report Title	Heritage Impact Assessment for the proposed Intibane Colliery situated on a Section of Portion 16 of the farm Vlakvarkfontein 213 IR, Victor Khanye District Municipality, Mpumalanga Province.		
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EXPLANATION OF ABBREVIATIONS USED IN THIS DOCUMENT

Abbreviations	*Description*
AIA	Archaeological Impact Assessment
ASAPA	Association of Southern African Professional Archaeologists
CMP	Conservation Management Plan
CRM	Cultural Resource Management
EIA	Environmental Impact Assessment
EMPR	Environmental Management Programme Report
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
LIA	Late Iron Age
LSA	Later Stone Age
MSA	Middle Stone Age
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PGS	PGS Heritage
PHRA	Provincial Heritage Resources Authority
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System

EXECUTIVE SUMMARY

PGS Heritage was appointed by Ferret Mining and Environmental Services to undertake a Heritage Impact Assessment in terms of the proposed Intibane Colliery located on a Section of Portion 16 of the farm Vlakvarkfontein 213 IR, Victor Khanye Local Municipality, Mpumalanga Province.

An archival and historical desktop study was undertaken which was used to compile a historical layering of the study area within its regional context. This component indicated that the landscape within which the project area is located has a rich and diverse history.

The desktop study work was followed by a fieldwork component which comprised a walkthrough of the study area. At the time of the fieldwork, mining activities were already well in hand and as a result the focus in the fieldwork was placed on those areas not affected by the existing mining activities. A total of three heritage sites comprising two cemeteries and one structure were identified within the study area. The identified heritage sites were plotted on the mining development plan and as a result it was found that two of these sites are located within the opencast mining footprint areas with the third site located away from any of the proposed development areas. The impact risk of the proposed development on the heritage sites was established, and where required mitigation measures are proposed. In the table below the three heritage sites that were identified within the study area will be outlined. The table contains the significance levels of the respective sites as well as the required mitigation measures.

Table 1: Summarised List of Heritage Sites Identified within the Study Area

Site	Description	Heritage Significance	Coordinates	Mitigation
Site 1	Cemetery	High/Medium Local (GP. A)	S 26° 3' 52.3" E 28° 53' 20.5"	• The cemetery must be fenced with a 10m buffer area between the graves and the fence and another 10m buffer area on the outside of the fence kept clear of development. • A monitoring programme must be implemented. • Two poorly preserved headstones must be repaired by memorial specialists after permits to do so have been received.

Site 2	Grave	High/Medium Local (GP. A)	S 26° 3' 47.0" E 28° 53' 19.6"	• Grave relocation process (which is well in hand) must be completed. • Until such time that the grave can be exhumed, it must be fenced and a 10m buffer area on the outside of the fence kept clear of any development. The position of the fence must be indicated by a heritage specialist.
Site 3	Structure with possible presence of stillborn graves	High/Medium Local (GP. A)	S 26° 3' 55.7" E 28° 53' 8.4"	• The structure must be fenced and a 10m buffer area on the outside of the fence kept clear of any development. The position of the fence must be indicated by a heritage specialist. • If the in situ preservation of the site is not possible, further mitigation would be required.

Furthermore, a palaeontological desktop study was undertaken of the study area by Dr. Gideon Groenewald (Groenewald, 2013). This report found that the Intibane Colliery is underlain by Permian aged sedimentary rocks of the Vryheid Formation, Ecca Group of the Karoo Supergroup. The Vryheid Formation Consists predominantly of grey sandstone with interbedded prominent coal beds and lenses of shale and grit. The sediments are interpreted as having been deposited on a sandy shoreline, beyond which lay vast swamplands. The plant material that accumulated within these swamps formed the coal deposits that are mined today. The Vryheid Formation is known for containing an abundant assemblage of plant fossils and the mining of coal is by definition the mining of fossil plant material.

Due to the fact that the Vryheid Formation sediments and coal beds will only be exposed during the mining operations and associated infrastructure development, it is unlikely that fossils will be observed before the mining takes place. For this reason a medium palaeontological sensitivity is allocated to the study area.

It is recommended that:

1. The developer and the ECO of the mining project be made aware of the fact that coal mining is by definition the mining of fossil plant material.

2. The developer applies for a collection and destruction permit for plant fossils encountered during the mining operation.
3. The developer must employ a qualified palaeontologist to visit the present mining operations to record any fossils. The palaeontologist will look out for exceptionally well preserved fossils and collect representative samples of these fossils for further study at an appropriate institute such as the Bernard Price Institute for Palaeontology at WITS University.

The overall impact of the development on heritage resources is seen as acceptably low and impacts can be mitigated to acceptable levels. On the condition that the recommendations made in this report are adhered to, no heritage reasons can be given for the development not to continue.

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LIST OF APPENDICES

1 INTRODUCTION

PGS Heritage was appointed by Ferret Mining and Environmental Services to undertake a Heritage Impact Assessment which forms part of the Environmental Impact Assessment (EIA) and Environmental Management Programme (EMP) report. The study area is located on a Section of Portion 16 of the farm Vlakvarkfontein 213 IR, Victor Khanye Local Municipality, Mpumalanga Province.

1.1 Scope of the Study

The Heritage Impact Assessment aims to inform the Environmental Impact Assessment (EIA) in the development of a comprehensive Environmental Management Programme (EMP) to assist the mine in managing the discovered heritage resources in a responsible manner, in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

1.2 Specialist Qualifications

This Heritage Impact Assessment was compiled by PGS Heritage. Its staff has a combined experience of nearly 40 years in the heritage consulting industry and have extensive experience in managing Heritage Impact Assessment (HIA) processes. Mr. Polke Birkholtz, project manager and archaeologist, is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a professional archaeologist and is also a registered member of the Cultural Resource Management (CRM) Section of ASAPA. He has more than 15 years' experience in the industry. Dr Gideon Groenewald, who compiled the palaeontological desktop study, has a PhD in Geology from the Nelson Mandela Metropolitan University (1996) and the National Diploma in Nature Conservation from the University of South Africa (1990). He specialises in research on South African Permian and Triassic sedimentology and macrofossils with an interest in biostratigraphy, and palaeoecological aspects. He has extensive experience in the locating of fossil material in the Karoo Supergroup and has more than 20 years of experience in locating, collecting and curating fossils, including exploration field trips in search of new localities in the southern, western, eastern and north-eastern parts of the country. His publication record includes multiple articles in internationally recognized journals. Dr Groenewald is accredited by the Palaeontological Society of Southern Africa (society member for 25 years).

1.3 Assumptions and Limitations

- The mining activities on the mine commenced before the fieldwork was undertaken. As a result, PGS Heritage could only assess the undisturbed sections of the study area.
- This report uses the mine infrastructural layout plan as its study area boundary. As such, only the section of Portion 16 of the farm Vlakvarkfontein 213 IR that falls within the impact areas on this layout plan was assessed in the field.
- Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage sites located during the fieldwork do not necessarily represent all the heritage sites present within the area. Should any heritage features or objects not included in the inventory be located or observed, a heritage specialist must immediately be contacted. Such observed or located heritage features and/or objects may not be disturbed or removed in any way, until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well.

1.4 Legislative Context

The identification, evaluation and assessment of any cultural heritage site, artefact or find in the South African context is required and governed by the following legislation:

i. National Environmental Management Act (NEMA) Act 107 of 1998
ii. National Heritage Resources Act (NHRA) Act 25 of 1999
iii. Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
iv. Development Facilitation Act (DFA) Act 67 of 1995

The following sections in each Act refer directly to the identification, evaluation and assessment of cultural heritage resources.

i. National Environmental Management Act (NEMA) Act 107 of 1998
    a. Basic Environmental Assessment (BEA) – Section (23)(2)(d)
    b. Environmental Scoping Report (ESR) – Section (29)(1)(d)
    c. Environmental Impacts Assessment (EIA) – Section (32)(2)(d)
    d. EMP (EMP) – Section (34)(b)
ii. National Heritage Resources Act (NHRA) Act 25 of 1999
    a. Protection of Heritage Resources – Sections 34 to 36; and
    b. Heritage Resources Management – Section 38

iii. Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002

a. Section 39(3)

The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Section 34(1) of the NHRA states that "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…". The NEMA (No 107 of 1998) states that an integrated EMP should (23:2 (b)) "…identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage". In accordance with legislative requirements and EIA rating criteria, the regulations of SAHRA and ASAPA have also been incorporated to ensure that a comprehensive and legally compatible HIA report is compiled.

1.5 Terminology and Abbreviations

Archaeological resources

i. material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;

ii. rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including a 10m buffer area;

iii. wrecks, being any vessel or aircraft, or any part thereof which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;

iv. features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

Development

This means any physical intervention, excavation or action other than those caused by natural forces, which may according to the heritage agency result in a change to the nature, appearance or physical nature of a place or influence its stability & future well-being, including:

i. construction, alteration, demolition, removal or change in use of a place or a structure at a place;
ii. carrying out any works on or over or under a place;
iii. subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
iv. constructing or putting up for display signs or boards;
v. any change to the natural or existing condition or topography of land; and
vi. any removal or destruction of trees, or removal of vegetation or topsoil

Fossil

Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage

That which is inherited and forms part of the National Estate (historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

Heritage resources

This means any place or object of cultural significance

Later Stone Age

The archaeology of the last 20 000 years, associated with fully modern people.

Late Iron Age (Early Farming Communities)

The archaeology of the last 1000 years up to the 1800's associated with ironworking and farming activities such as herding and agriculture.

Middle Stone Age

The archaeology of the Stone Age, dating to between 20 000-300 000 years ago, associated with early modern humans.

Palaeontology

Any fossilised remains or fossil trace of animals or plants which lived in the geological past and any site which contains such fossilised remains or trace.

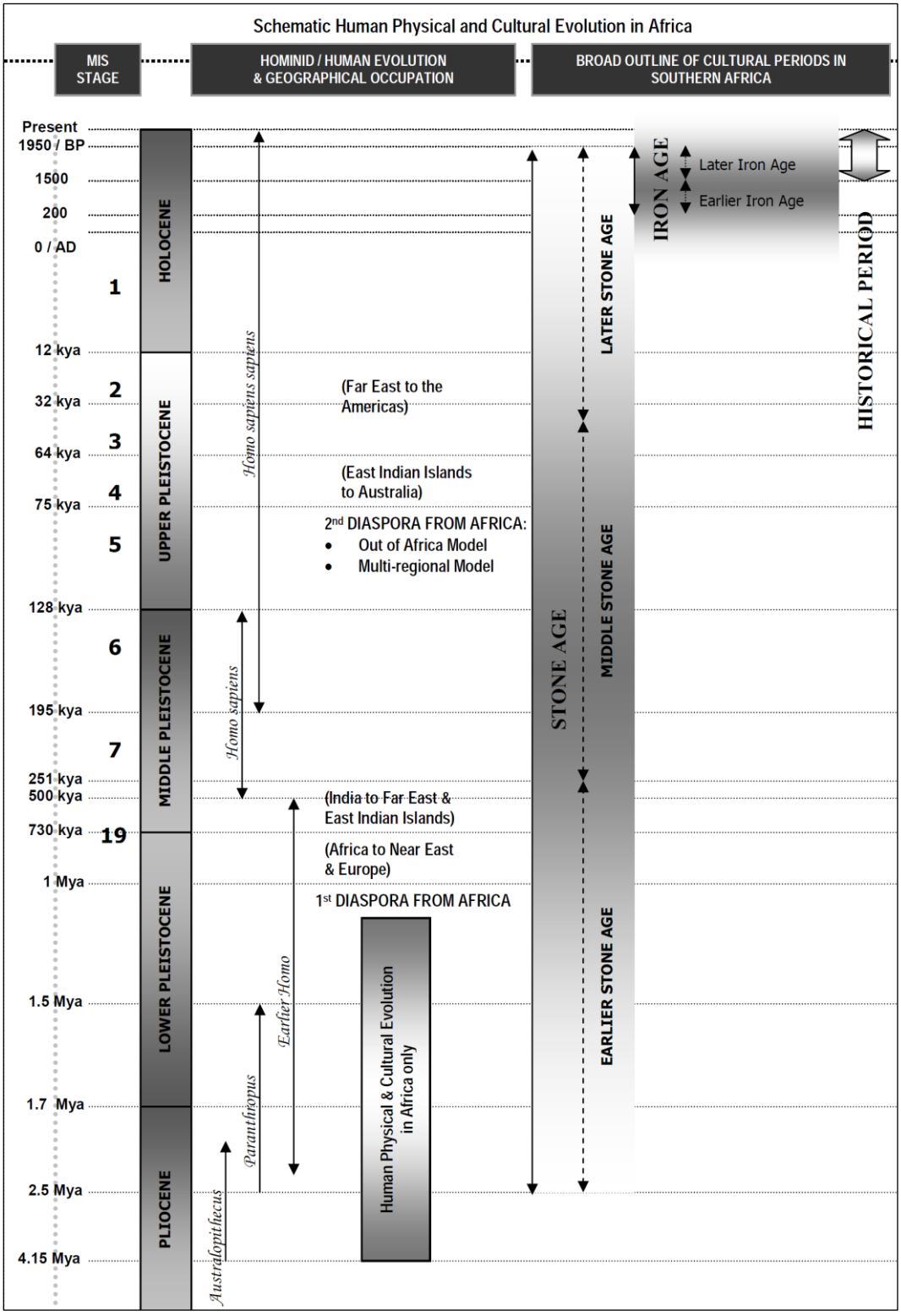


Figure 1–Human and Cultural Time line in Africa (Morris, 2008)

2 TECHNICAL DETAILS OF THE PROJECT

2.1 Site Location and Description

Coordinates	NW End: S26° 03' 27.3" E28° 53' 02.0" SE End: S26° 04' 00.4" E28° 53' 25.4" South 1: S26° 03' 58.8" E28° 53' 20.0" South 3: S26° 04' 01.5" E28° 53' 11.0" South 5: S26° 03' 56.6" E28° 52' 59.7"	NE End: S26° 03' 51.4" E28° 53' 30.5" SW End: S26° 03' 48.1" E28° 52' 55.1" South 2: S26° 03' 59.3" E28° 53' 13.6" South 4: S26° 04' 01.4" E28° 53' 05.3" Refer figure below.
Properties	Section of Portion 16 of the farm Vlakvarkfontein 213 IR, Victor Khanye Local Municipality, Mpumalanga Province.	
Location	The study area is located between Delmas and Kendal. It is situated roughly 21.2km north-east of the former and 6.7km west of the latter.	
Extent	The extent of the study area is roughly 61.1 hectares.	
Land Description	Topographically, the study area can be described as sloping at a slight angle towards the intermittent stream to the south. Extensive sections of the study area have been disturbed by mining activities.	

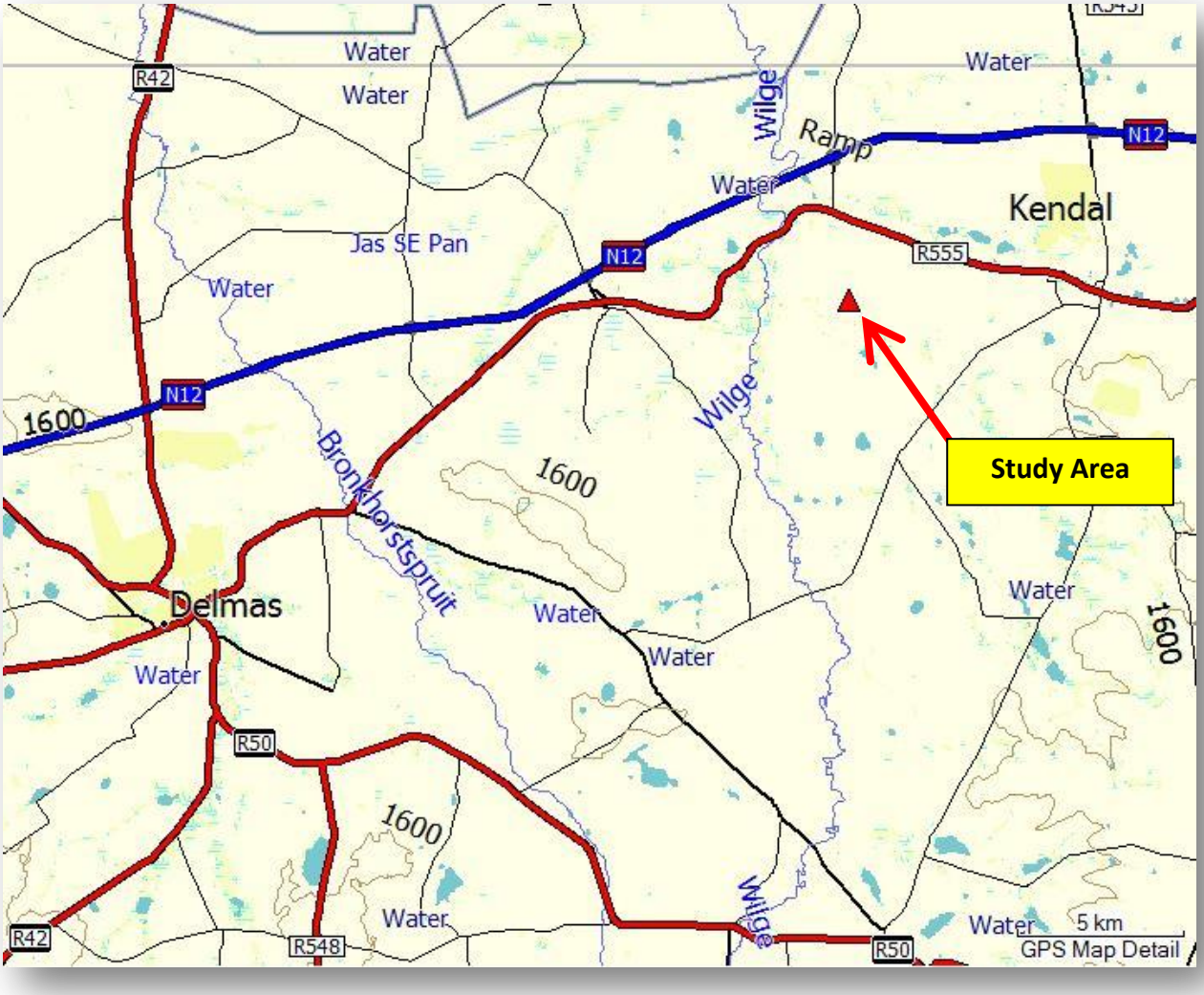


Figure 2–The boundaries of the overall study area depicted within its regional context.

2.2 Technical Project Description

The Intibane Colliery is undertaken by Wescoal Holdings Limited. As can be seen from the mining development layout plan depicted below, the Intibane Colliery project entails the following components:

- Opencast Mining Area - 18.96 hectares
- ROM Stockpile – 3.66 hectares
- Hard Overburden Dump – 3.64 hectares
- Soft Overburden Dump – 1.3 hectares
- Topsoil Dump – 0.91 hectares
- Pollution Control Dam – 0.71 hectares

The remainder of the impact area is made up of a number of smaller development components, comprising the following:

- Offices
- Office Parking
- Diesel Tanks
- Workshop
- Wash Bay
- Roads
- Weighbridge
- Storm Water Drains
- Pollution Drains

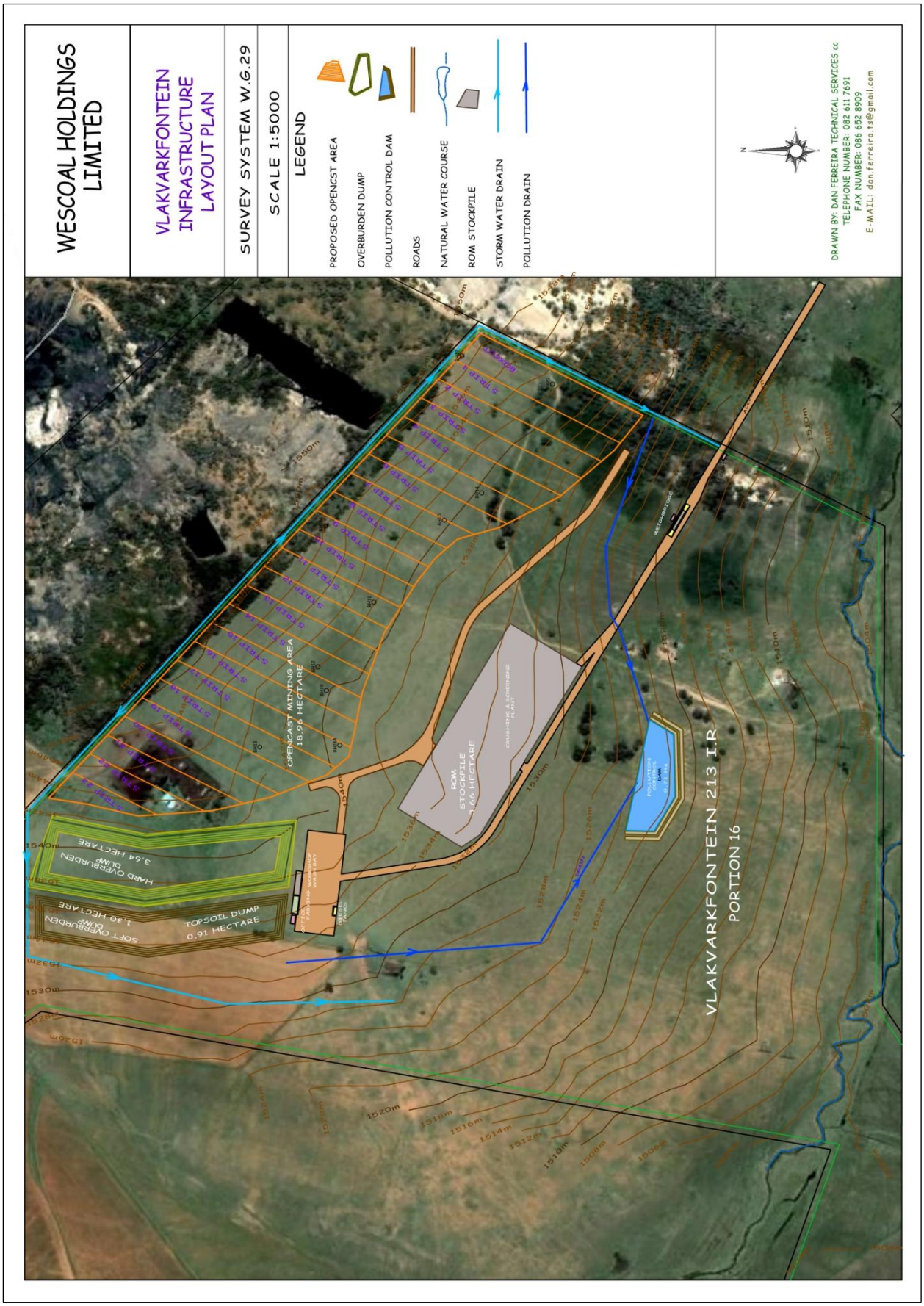


Figure 3–The mining development plan as supplied by the client. As described in the text this is the area that was assessed for the aims of this study.

3 ASSESSMENT METHODOLOGY

3.1 Methodology for Assessing Heritage Site Significance

This report was compiled by PGS Heritage for the proposed consolidation of the Western Limb EMPR of Aquarius Platinum. The applicable maps, tables and figures are included as stipulated in the NHRA (no 25 of 1999) and the National Environmental Management Act (NEMA) (no 107 of 1998). The HIA process consisted of three steps:

Step I – Literature Review: The background information to the field survey leans greatly on the archival and historical cartographic material assessed as part of the study as well as a study of the available literature. The available archaeological and heritage reports archived electronically on SAHRIS (South African Heritage Resources Information System) were also used as part of this component of the study.

Step II – Physical Survey: A physical survey was conducted on Friday, 22 February 2013; Thursday, 28 February 2013; Friday, 1 March 2013 as well as Tuesday, 9 July 2013. The survey was undertaken by a team comprising a professional archaeologist and field assistant and was undertaken on foot as well as by vehicle. It must be noted here that the aim of this report was never to conduct a walkthrough of the entire study but to rather focus the fieldwork on visiting the known sites as identified in previous archaeological and heritage impact assessment reports as well as those areas with the highest potential for containing archaeological sites (i.e. adjacent ridges or near water sources). Areas known to have been disturbed by past mining or agricultural activities were naturally avoided.

Step III – The final step involved the recording and documentation of relevant heritage resources, as well as the assessment of resources regarding the heritage impact assessment criteria and report writing, as well as mapping and recommendations.

The significance of heritage sites was based on five main criteria:

- site integrity (i.e. primary vs. secondary context),
- amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter)
    - Low - <10/50m2

    - Medium - 10-50/50m2
    - High - >50/50m2
- uniqueness and
- potential to answer present research questions.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows:

A - No further action necessary;
B - Mapping of the site and controlled sampling required;
C - No-go or relocate development position
D - Preserve site, or extensive data collection and mapping of the site; and
E - Preserve site

Site Significance

Site significance classification standards prescribed by the South African Heritage Resources Agency (2006) and approved by the Association for Southern African Professional Archaeologists (ASAPA) for the Southern African Development Community (SADC) region, were used for the purpose of this report (see **Table 3**).

Table 2: Site significance classification standards as prescribed by SAHRA

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	-	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)	-	High/Medium	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium	Recording before destruction
Generally Protected C (GP.C)	-	Low	Destruction

3.2 Methodology for Impact Assessment

In order to ensure uniformity, a standard impact assessment methodology has been utilised so that a wide range of impacts can be compared. The impact assessment methodology makes provision for the assessment of impacts against the following criteria:

- Significance;
- Spatial scale;
- Temporal scale;
- Probability; and
- Degree of certainty.

A combined quantitative and qualitative methodology was used to describe impacts for each of the aforementioned assessment criteria. A summary of each of the qualitative descriptors, along with the equivalent quantitative rating scale for each of the aforementioned criteria, is given in **Table 4**.

Table 3: Quantitative rating and equivalent descriptors for the impact assessment criteria

RATING	SIGNIFICANCE	EXTENT SCALE	TEMPORAL SCALE
1	VERY LOW	*Isolated corridor / proposed corridor*	Incidental
2	LOW	*Study area*	Short-term
3	MODERATE	*Local*	Medium-term
4	HIGH	*Regional / Provincial*	Long-term
5	VERY HIGH	*Global / National*	Permanent

A more detailed description of each of the assessment criteria is given in the following sections.

Significance Assessment

The significance rating (importance) of the associated impacts embraces the notion of extent and magnitude, but does not always clearly define these, since their importance in the rating scale is very relative. For example, 10 structures younger than 60 years might be affected by a proposed development, and if destroyed the impact can be considered as VERY LOW in that

the structures are all of Low Heritage Significance. If two of the structures are older than 60 years and of historic significance, and as a result of High Heritage Significance, the impact will be considered to be HIGH to VERY HIGH.

A more detailed description of the impact significance rating scale is given in **Table** 5 below.

Table 4: Description of the significance rating scale

RATING		DESCRIPTION
5	VERY HIGH	Of the highest order possible within the bounds of impacts which could occur. In the case of adverse impacts: there is no possible mitigation and/or remedial activity which could offset the impact. In the case of beneficial impacts, there is no real alternative to achieving this benefit.
4	HIGH	Impact is of substantial order within the bounds of impacts which could occur. In the case of adverse impacts: mitigation and/or remedial activity is feasible but difficult, expensive, time-consuming or some combination of these. In the case of beneficial impacts, other means of achieving this benefit are feasible but they are more difficult, expensive, time-consuming or some combination of these.
3	MODERATE	Impact is real but not substantial in relation to other impacts, which might take effect within the bounds of those which could occur. In the case of adverse impacts: mitigation and/or remedial activity are both feasible and fairly easily possible. In the case of beneficial impacts: other means of achieving this benefit are about equal in time, cost, effort, etc.
2	LOW	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts: mitigation and/or remedial activity is either easily achieved or little will be required, or both. In the case of beneficial impacts, alternative means for achieving this benefit are likely to be easier, cheaper, more effective, less time consuming, or some combination of these.
1	VERY LOW	Impact is negligible within the bounds of impacts which could occur. In the case of adverse impacts, almost no mitigation and/or remedial activity is needed, and any minor steps which might be needed are easy, cheap, and simple. In the case of beneficial impacts, alternative means are almost all likely to be better, in one or a number of ways, than this means of achieving the benefit. Three additional categories must also be used where relevant. They are in addition to the category represented on the scale, and if used, will replace the scale.
0	NO IMPACT	There is no impact at all - not even a very low impact on a party or system.

Spatial Scale

The spatial scale refers to the extent of the impact i.e. will the impact be felt at the local, regional, or global scale. The spatial assessment scale is described in more detail in **Table** 6.

Table 5: Description of the spatial significance rating scale

RATING		DESCRIPTION
5	Global/National	The maximum extent of any impact.
4	Regional/Provincial	The spatial scale is moderate within the bounds of possible impacts, and will be felt at a regional scale (District Municipality to Provincial Level). The impact will affect an area up to 50 km from the proposed site / corridor.
3	Local	The impact will affect an area up to 5 km from the proposed site.
2	Study Area	The impact will affect an area not exceeding the boundary of the study area.
1	Isolated Sites / proposed site	The impact will affect an area no bigger than the site.

Temporal/Duration Scale

In order to accurately describe the impact, it is necessary to understand the duration and persistence of an impact in the environment.

The temporal or duration scale is rated according to criteria set out in **Table** 7.

Table 6: Description of the temporal rating scale

RATING		DESCRIPTION
1	Incidental	The impact will be limited to isolated incidences that are expected to occur very sporadically.
2	Short-term	The environmental impact identified will operate for the duration of the construction phase or a period of less than 5 years, whichever is the greater.
3	Medium-term	The environmental impact identified will operate for the duration of life of the project.
4	Long-term	The environmental impact identified will operate beyond the life of operation of the project.
5	Permanent	The environmental impact will be permanent.

Degree of Probability

The probability or likelihood of an impact occurring will be outlined in **Table** 8 below.

Table 7: Description of the degree of probability of an impact occurring

RATING	DESCRIPTION
1	Practically impossible
2	Unlikely
3	Could happen
4	Very likely
5	It's going to happen / has occurred

Degree of Certainty

As with all studies, it is not possible to be 100% certain of all facts, and for this reason a standard "degree of certainty" scale is used, as discussed in **Table** 9. The level of detail for specialist studies is determined according to the degree of certainty required for decision-making. The impacts are discussed with regards to affected parties or environmental components.

Table 8: Description of the degree of certainty rating scale

RATING	DESCRIPTION
Definite	More than 90% sure of a particular fact.
Probable	Between 70 and 90% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	Between 40 and 70% sure of a particular fact, or of the likelihood of an impact occurring.
Unsure	Less than 40% sure of a particular fact or the likelihood of an impact occurring.
Can't know	The consultant believes an assessment is not possible even with additional research.

Quantitative Description of Impacts

To allow for impacts to be described in a quantitative manner, in addition to the qualitative description given above, a rating scale of between 1 and 5 was used for each of the assessment criteria. Thus the total value of the impact is described as the function of significance, spatial and temporal scale, as described below:

Impact Risk = (SIGNIFICANCE +*Spatial*+ Temporal) X Probability

3 5

An example of how this rating scale is applied is shown below:

Table 9: Example of Rating Scale

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Low	Local	Medium Term	Could Happen	**Low**
Impact on heritage structures	2	3	3	3	**1.6**

Note: The significance, spatial and temporal scales are added to give a total of 8, which is divided by 3 to give a criterion rating of 2.67. The probability (3) is divided by 5 to give a probability rating of 0.6. The criteria rating of 2.67 is then multiplied by the probability rating (0,6) to give the final rating of 1,6.

The impact risk is classified according to five classes as described in the table below.

Table 10: Impact Risk Classes

RATING	IMPACT CLASS	DESCRIPTION
0.1 – 1.0	1	Very Low
1.1 – 2.0	2	Low
2.1 – 3.0	3	Moderate
3.1 – 4.0	4	High
4.1 – 5.0	5	Very High

Therefore, with reference to the example used for heritage structures above, an impact rating of 1.6 will fall in the Impact Class 2, which will be considered to be a low impact.

4 CURRENT STATUS QUO

4.1 Description of Study Area

Mining activities had already commenced within the study area when this project was commenced. At the time of the fieldwork these mining activities were found to impact on sections of the study area. The mining components observed at the site during the fieldwork included pits, dumps, haul roads, drainage lines as well as a pollution control dam.

The undisturbed sections comprised patches of grassland with pockets of exotic trees in between. A wooded plantation area comprising exotic tree species is located directly north of the study area.

The study area is located on higher lying land and slopes gently down toward an intermittent stream on its southern end.

Figure 4 –General view of a section of the study area. Note the mining activities in progress.

5 DESKTOP STUDY FINDINGS

5.1 Archival and Historic Maps of the Study Area and Surrounding Landscape

5.1.1 Bethal Sheet of the Major Jackson Map

A section of the Bethal sheet from the Major Jackson Series is depicted below. This particular edition of the sheet was printed in April 1901 (National Archives, Maps, 3/559). Apart from a number of secondary roads crossing over the study area, no heritage features are depicted within it. However, the following observations can be made from the map:

- A single building is depicted directly south-east of the study area. This building may have been a farmstead and is marked in red.
- At the time the farm Vlakvarkfontein as it exists today consisted of two separate farms namely Vlakvarkfontein (old number 101) and Mooimeisjesfontein (old number 103).

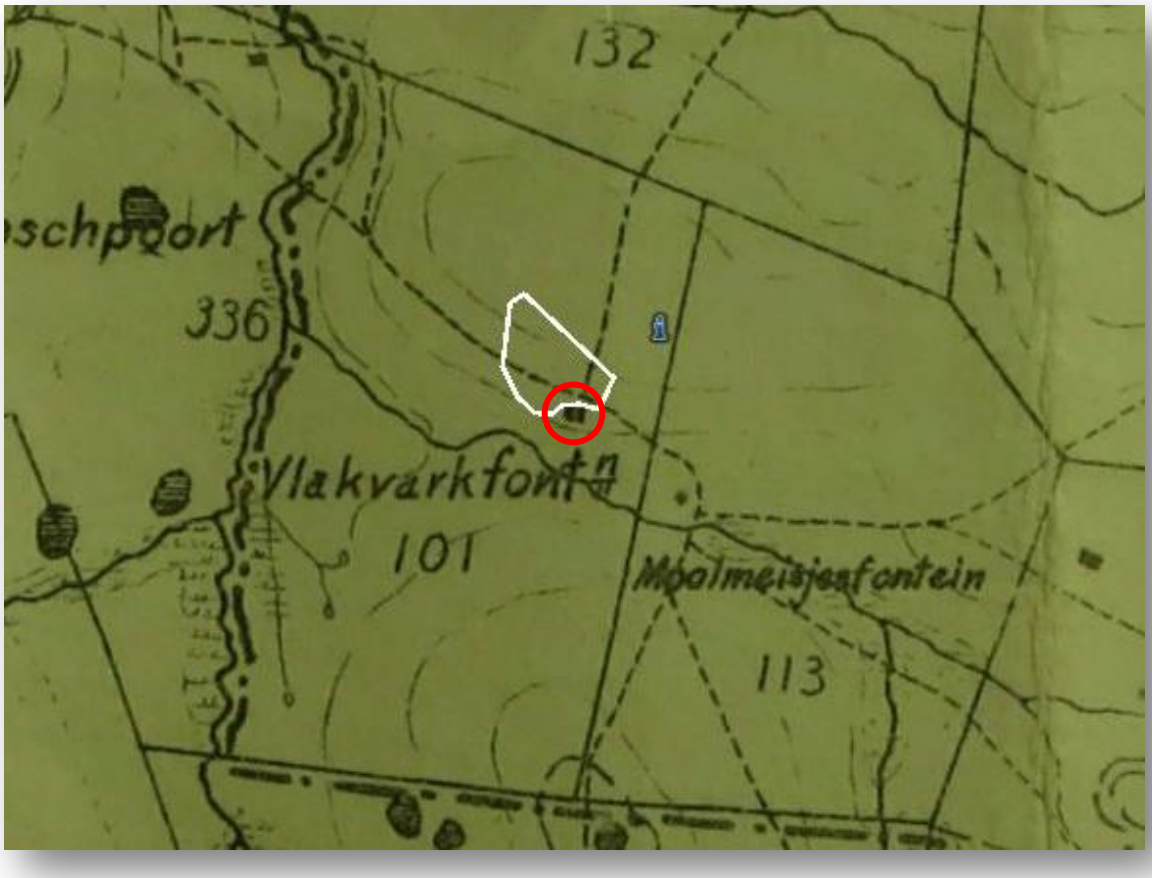


Figure 5 – Section from the Bethal sheet of the Major Jackson Series which dates to April 1902. The study area boundaries are shown in white.

5.1.2 Untitled Map

The map depicted below was found in an archival file (JUS, 560, 1852/30) without any indication of origin or exact age. However, the map's style conforms to a series of 1:125,000 scale topographical maps produced for the Free State and Transvaal areas during c. 1913. As the archival file itself dates to 1924, this map certainly predates this date. The following features are depicted on the map sheet for the area within the study area:

- Feature 1

  Two buildings are depicted here. These buildings appear to have formed part of a farmstead. No evidence for these buildings could be found during the fieldwork.

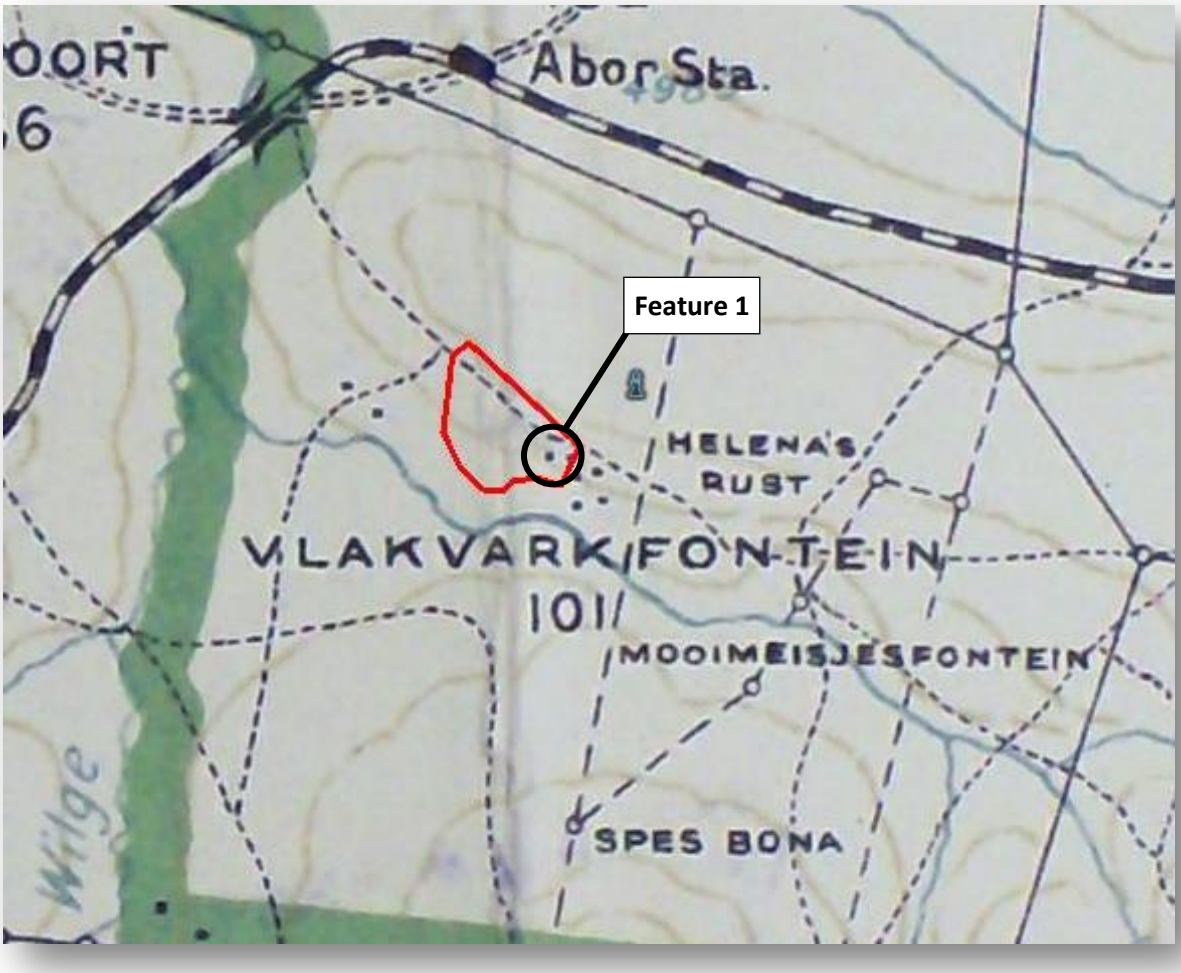


Figure 6 – Section from the untitled map sheet which possibly dates to 1913. The study area boundaries are shown in red.

5.1.3 First Edition of the 2628BB Topographical Sheet

The relevant section of the First Edition of the 2628BB Topographical Sheets is depicted below. The map was based on aerial photography undertaken in 1958 and was surveyed in 1965. It was drawn in 1966 by the Trigonometrical Survey Office and printed in the same year.

A total of four individual features with the potential of being heritage sites are depicted on the map. These features are discussed in detail below.

- Feature 1

  A cluster of six huts are depicted here. The hut symbols used on these old maps usually signify black homesteads. No evidence for these features could be found during the fieldwork.

- Feature 2

  One building is depicted here. It formed part of a cluster of two buildings, with the second building located outside of the present study area. In all likelihood this building formed part of a farmstead. No evidence for this building could be found during the fieldwork.

- Feature 3

  A single hut is depicted here. During the field survey the remains of a multi-roomed dwelling was identified in close proximity to where this hut is depicted. The identified structure is included in this report as Site 3.

- Feature 4

  A single hut is depicted here. This feature was not identified during the fieldwork.

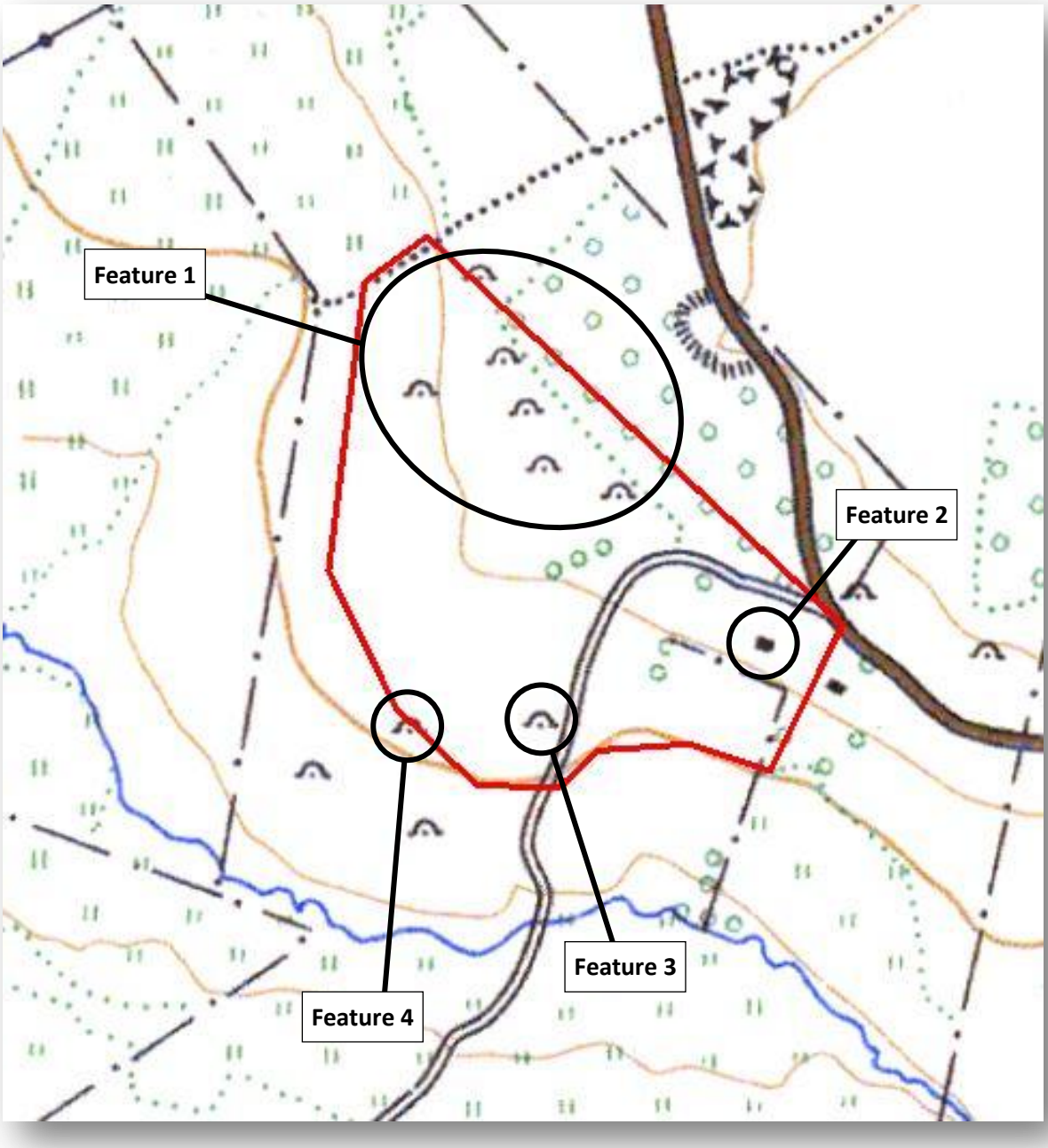


Figure 7 – Section from the First Edition of the 2628BB Topographical Sheet that was surveyed in 1965. The study area boundaries are shown in red.

5.2 Historic Overview of Study Area and Surrounding Landscape

DATE	DESCRIPTION
2.5 million to 250 000 years ago	The Earlier Stone Age is the first phase identified in South Africa's archaeological history and comprises two technological phases. The earliest of these is known as Oldowan and is associated with crude flakes and hammer stones. It dates to approximately 2 million years ago. The second technological phase is the Acheulian and comprises more refined and better made stone artefacts such as the cleaver and bifacial hand axe. The Acheulian dates back to approximately 1.5 million years ago. No Early Stone Age sites are known from the vicinity of the study area. However, this is in all likelihood rather due to a lack of research focus on the surroundings of the study area than a lack of sites.
250 000 to 40 000 years ago	The Middle Stone Age (MSA) is the second oldest phase identified in South Africa's archaeological history. This phase is associated with flakes, points and blades manufactured by means of the so-called 'prepared core' technique. No Middle Stone Age sites are known from the vicinity of the study area. However, this is in all likelihood rather due to a lack of research focus on the surroundings of the study area than a lack of sites.
40 000 years ago to the historic past	The Later Stone Age is the third archaeological phase identified and is associated with an abundance of very small artefacts known as microliths. No Later Stone Age sites are known from the vicinity of the study area. However, this is in all likelihood rather due to a lack of research focus on the surroundings of the study area than a lack of sites.
AD 1450 – AD 1650	The Uitkomst facies of the Blackburn Branch of the Urewe Ceramic Tradition represents the first Iron Age period to be identified for the surroundings of the study area. This facies can likely be dated to between AD 1650 and AD 1820. The decoration on the ceramics associated with this facies is characterised by stamped arcades, appliqué of parallel incisions, stamping as well as cord impressions and is described as a mixture of the characteristics of both Ntsuanatsatsi (Nguni) and Olifantspoort (Sotho). The Uitkomst facies (with the Makgwareng facies) is seen as the successors to the Ntsuanatsatsi facies. The Ntsuanatsatsi facies is closely related to the oral histories of the Early Fokeng and represent the earliest known movement of Nguni people out of Kwazulu-Natal into the inland areas of South Africa. In terms of this theory, the Bafokeng settled at Ntsuanatsatsi Hill in the present-day Free State Province. Subsequently, the BaKwena lineage broke away from the Bahurutshe cluster and crossed southward over the Vaal River to come in contact with the Bafokeng. As a result of this contact a Bafokeng-Bakwena cluster was formed, which moved northward and became further 'Sotho-ised' by coming into increasing contact with other Sotho-Tswana groups. This eventually resulted in the appearance of Uitkomst facies type pottery which contained elements of both Nguni and Sotho-Tswana speakers (Huffman, 2007). No sites associated with the Uitkomst facies are known from the surroundings

	of the study area.
AD 1700 – AD 1840	The Buispoort facies of the Moloko branch of the Urewe Ceramic Tradition is the next phase to be identified within the study area's surroundings. It is most likely dated to between AD 1700 and AD 1840. The key features on the decorated ceramics include rim notching, broadly incised chevrons and white bands, all with red ochre (Huffman, 2007).It is believed that the Madikwe facies developed into the Buispoort facies. The Buispoort facies is associated with sites such as Boschhoek, Buffelshoek, Kaditshwene, Molokwane and Olifantspoort (Huffman, 2007). No sites associated with the Buispoort facies are known from the surroundings of the study area.
AD 1821 – AD 1823	After leaving present-day KwaZulu-Natal the Khumalo Ndebele (more commonly known as the Matabele) of Mzilikazi migrated through the general vicinity of the study area under discussion before reaching the central reaches of the Vaal River in the vicinity of Heidelberg in 1823 (www.mk.org.za). Two different settlement types have been associated with the Khumalo Ndebele. The first of these is known as Type B walling and was found at Nqabeni in the Babanango area of KwaZulu-Natal. These walls stood in the open without any military or defensive considerations and comprised an inner circle of linked cattle enclosures (Huffman, 2007). The second settlement type associated with the Khumalo Ndebele is known as Doornspruit, and comprises a layout which from the air has the appearance of a 'beaded necklace'. This layout comprises long scalloped walls (which mark the back of the residential area) which closely surround a complex core which in turn comprises a number of stone circles. The structures from the centre of the settlement can be interpreted as kitchen areas and enclosures for keeping small stock. It is important to note that the Doornspruit settlement type is associated with the later settlements of the Khumalo Ndebele in areas such as the Magaliesberg Mountains and Marico and represent a settlement under the influence of the Sotho with whom the Khumalo Ndebele intermarried. The Type B settlement is associated with the early Khumalo Ndebele settlements and conforms more to the typical Zulu form of settlement. As the Khumalo Ndebele passed through the general vicinity of the study areas shortly after leaving Kwazulu-Natal, one can assume that their settlements here would have conformed more to the Type B than the Doornspruit type of settlement. It must be stressed however that no published information could be found which indicates the presence of Type B sites in the general vicinity of the study area. No sites associated with this period of the archaeological history of the surroundings of the study area are presently known.
1832	At the time a Zulu impi of King Dingane moved through the general vicinity of the study area on their way to attack the Matabele of Mzilikazi who were settled along the Magaliesberg Mountains (Bergh, 1999).

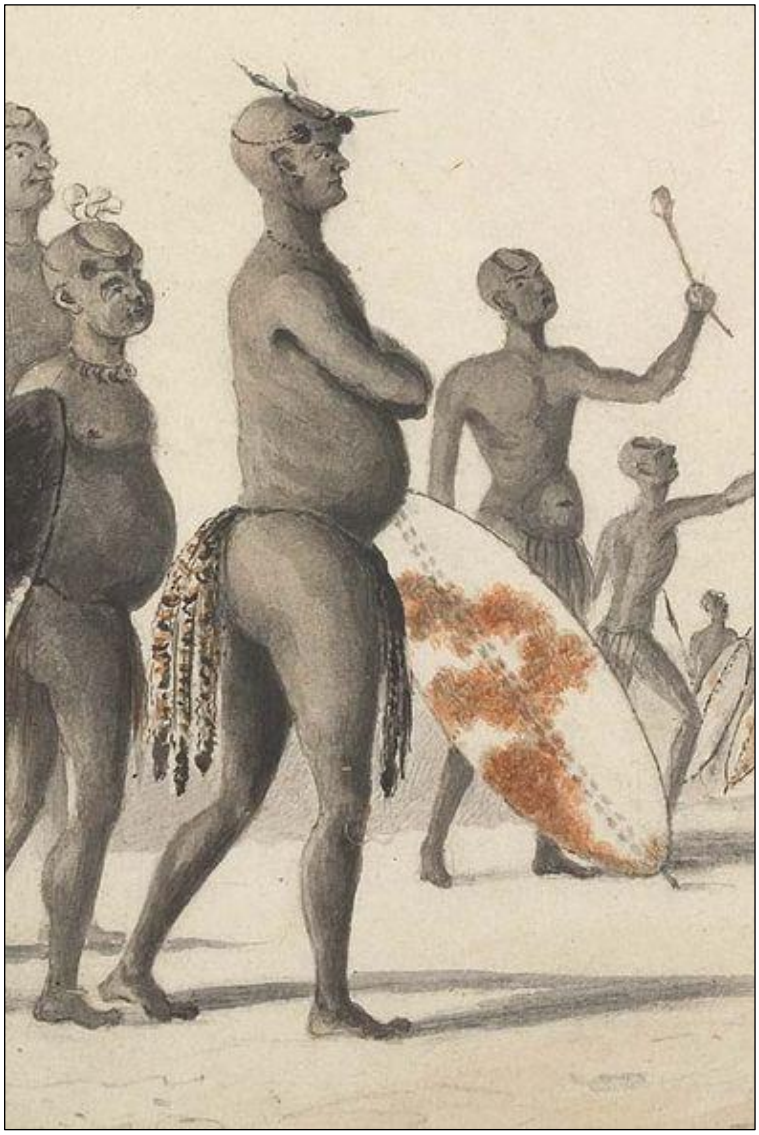


Figure 8

King Mzilikazi of the Matabele. This illustration was made by Captain Cornwallis Harris in c. 1838 (www.sahistory.org.za).

1836	The first Voortrekker parties started crossing over the Vaal River at the time. The earliest Voortrekker party to cross over the Vaal River was the one under the leadership of Louis Trichardt and Johannes Jacobus Janse van Rensburg. Although the exact route followed by the Trichardt-Van Rensburg party was not recorded, one suggestion is that they passed through the section of land in-between the Bronkhorst Spruit in the west and the Wilge River in the east (Bergh, 1999). The Wilge River and Bronkhorst Spruit are located roughly 1.8km and 17.8km west of the study area, which provides an indication of where the Voortrekker party travelled through the landscape in relation to the present study area.
1841 – 1850	These years saw the early establishment of farms by the Voortrekkers in the general vicinity of the study area (Bergh, 1999).
1845	Both the district and town of Lydenburg was established in this year (Bergh, 1999). The study area fell within the Lydenburg district at the time.
20 October 1864	The farm Vlakvarkfontein was inspected for the first time by C.A. van Niekerk, who in all likelihood was the local Veldkornet. The farm's first

	owner appears to have been Andries Jacobus Smit, but he only received the deed of grant on 18 January 1870 (RAK, 2927).
18 January 1865	The farm was divided in a western and eastern portion. The western portion was transferred from A.J. Smit to Zacharias de Beer whereas the eastern portion was transferred to Melchoir Jacobus Welmans. This eastern portion was already known at the time as Mooimeisjesfontein (RAK, 2927). It is worth noting that Willem Frederik Welmans, the son of Melchoir Jacobus Welmans, lies buried in the cemetery at Site 1. He passed away in 1876.
1872	The study area now fell within the district of Middelburg (Bergh, 1999). During this same year the general surroundings of the study area was visited by a geologist from Eastern Europe Woolf Harris. He visited the general vicinity of the study area in 1872 and identified coal in the Van Dyksdrift area. He is believed to have started the Maggie's Mine the following year (Falconer, 1990).
1872 – 1894	During this time a number of small coal mining operations were started in the general vicinity of Witbank, but as no railway line connected this area with the coal markets further to the west, it proved a difficult commercial undertaking. By 1889 there were four such coal mines Brugspruit Adit, Maggie's Mine, Steenkoolspruit and Douglas (Falconer, 1990). These mines were all located to the east of the present study area.
1893	A shop was opened on the farm Vlakvarkfontein by Alfred Harvey and George Schulze. They operated a general dealership and offered a variety of goods including clothes, cutlery, crockery, pots, buttons, mustard, beds, chairs, tables, medicine, mirrors, scales and so forth (CJC, 87, 1666). While the exact locality of this business is not presently known, an old corrugated iron shop was identified during a heritage survey of a portion of land north of the present study area. This identified site is located 1.6km north-west of study area (PGS Heritage, 2011). It seems likely for the identified building to be the shop that was operated by Harvey and Schulze. Incidentally, Alfred Thomas Harvey, the son of Alfred Harvey lies buried in the cemetery at Site 1. He passed away on 12 March 1899.
5 May 1894	On this day Jacobus Johannes Hermann, the owner of the western portion of the farm Vlakvarkfontein, applied for underground mining rights on a section of the farm (SS, R4734/94). This is the earliest record that could be found dealing with mining activities on the farm Vlakvarkfontein.
20 October 1894	On this day the railway line between Pretoria and Delagoa Bay (present-day Maputo) was completed near Balmoral located roughly 23.6km north-east of the study area. This event was very significant for the study area and surroundings as the completion of the line meant that the vast deposits of coal known to have existed in this area since the mid 19th century could now be commercially mined (Bulpin, 1989) and easily transported to the Witwatersrand gold mines and the populated centres of Pretoria and Johannesburg where they were most required.

January 1895	At the time a contract was entered into by the owners of a portion of the farm Vlakvarkfontein namely Jacobus Johannes Hermann and Mathys Johannes Hermann with a person only presently known as Mr. Jolly. This latter person was in all likelihood one John Jolly. The contract allowed Mr. Jolly to "...*prospect, dig for, and work coal*..." on predefined portions of the farm for a period of five years (Transvaal Law Reports, 1904). While the details of the case are not presently known, it would appear that a legal dispute developed after the war between Mr. Jolly and the beneficiaries of the estates of J.J. and M.J. Hermann, who had passed away in 1903 and 1904 respectively (RAK, 2927). It is not presently known to what extent the prospecting and mining activities of Jolly were undertaken at this early stage.
1896	A coal mine shaft was sunk in this year by one Samuel Stanfield. The shaft was sunk on the farm Witbank (Erasmus, 2004). During the same year the Kromfontein Coal Company appears to have been established, seemingly to mine coal on the farm Kromfontein (Gluckstein, 1903/4). The farm Kromfontein is located some 30.5km south-east of the present study area.
1899 – 1902	The South African War took place during this time. A number of events and activities during the war can be associated with the farm Vlakvarkfontein. These will be discussed in detail below.
1903	The town of Witbank was formally proclaimed (Erasmus, 2004).
1906	The town of Witbank received its first Health Board (Bulpin, 1989).
1906 - 1910	The railway line linking the Apex Junction (located between Boksburg and Brakpan) with Witbank was built during this time. The railway station at Argent likely dates from the same time (Birkholtz, 2008). This station is located 6.7km west of the present study area, whereas at its closest point the railway line is 1.9km north of the study area.
1907	The town of Delmas was laid out on the farm Witklip and comprised 192 residential stands, 48 smallholdings (of 4 hectares each) with a commange of 134 hectares. It was established by the owner of Witklip, Frenchman Frank Dumat (Erasmus, 2004). The name Delmas was derived from the French phrase '*de le mas*' which means 'of the small farm' (www.sa-venues.com). Delmas is located some 21.2km south-west of the present study area.
1909	In this year the government of the Transvaal Colony added roughly 5 500 hectares to the town of Delmas. This addition comprised 85 smallholdings of which each was roughly 64 hectares in extent (Erasmus, 2004).
June 1911	The Kendal Colliery commenced mining on the farm Heuwelfontein (Wybergh, 1922). This farm is located directly north-east of Vlakvarkfontein.
1912	At the time there was an existing coal mine on the farm Van Dyksput 214 IR named Abor Colliery (South African Department of Mines and Industries, 1912). By 1934 the mine had been abandobed and was reopened in 1939

	(The Mining Magazine, 1939). The farm Van Dyksput is located directly north of the farm Vlakvarkfontein.
1914	The town of Witbank became a municipality in this year (Bulpin, 1989).
February 1916	The United Colliery commenced mining on the farm Heuwelfontein (Wybergh, 1922). This farm is located directly north-east of Vlakvarkfontein.
1928	The town of Ogies was established (Erasmus, 2004).
1980	Reference is made to the Arbor Colliery which is located on the farm Vlakvarkfontein and which was already in existence at the time. No further information with regard to this mine could be found.

5.3 Significant Aspects Regarding the History and Archaeology of the Study Area

The overview of the history of the study area and surrounding landscape provided above has identified a number of historical aspects which can be associated with the farm Vlakvarkfontein 213 IR, although not necessarily with the study area. These historical facets will be discussed in more detail below.

5.3.1 The South African War and the farm Vlakvarkfontein

Five events which occurred during the South African War (1899-1902) can be associated with the farm Vlakvarkfontein 213 IR, although not necessarily with the study area as such. Of these, four were skirmishes and battles. With regard to these skirmishes and battles it is important to note that in most cases the farm Vlakvarkfontein represented a peripheral aspect to all these events but is nonetheless still worth mentioning here. As will be seen below the one exception to this is the skirmish of 17 October 1901 which took place on Mooimeisjesfontein, the eastern half of the farm Vlakvarkfontein 213 IR. Although the study area is located outside of the portion known as Mooimeisjesfontein, this skirmish was fought in its entirety on the farm Vlakvarkfontein.

5.3.1.1 The looting of the shop of Harvey and Schulze

As mentioned in the overview, a shop was opened on the farm Vlakvarkfontein by Alfred Harvey and George Schulze in 1893. Ever since the Jameson Raid of 1896 the relationship between Great Britain and the Zuid-Afrikaansche Republiek was fraught with tension. As the

century drew to a close, it became obvious to most that a war between the two countries was imminent. As a British subject, Alfred Harvey felt increasingly at ease and after death threats were received he decided to leave the farm for the safety of Natal. As Schulze was residing in Johannesburg, Harvey's departure meant that neither one of the two owners was on site managing the shop. Before departing on 20 September 1899, Harvey compiled a stock list of all the goods in the shop and entrusted the running of the business to a local farmer by the name of John Zielie (Zeiler?). Incidentally, the combined value of the stock held by the shop before Harvey's departure came to a total of £913.2.4 (CJC, 87, 1666).

On his return after the cessation of hostilities Harvey was shocked to find out that the shop was completely empty and that there was no money to be shown for the missing stock. Upon making enquiries Harvey established that John Zielie (Zeiler?) had left the farm at the end of 1899. Before leaving the farm, he had sold stock to the value of £60. However, on Harvey's return to the farm, Zielie (Zeiler) indicated that he had buried the money only for it to be dug up by unknown people. As a result he was unable to provide Harvey with the £60.

Furthermore, on 2 May 1901 (may be 1902) stock to the value of £236.3.2. was commandeered by one Oscar Forrsman who identified himself as the secretary for the Relief Committee of the Steenkoolspruit Ward and signed the list of commandeered stock in at Brugspruit, which is not far from where the Balmoral Consentration Camp was established. A number of relief committees existed during the war and they provided food and clothes to the women and children who were imprisoned in the concentration camps across the country. The stock was listed in a document by Forrsman, and the heading on the list indicates that the goods were taken from the shop of Miss Zeiler of Vlakvarkfontein ("...*de winkel van Mejuffrouw Zeiler van Vlakvarkfontein*...". This suggests that the wife (or daughter) of John Zeiler had taken over the management of the shop in his absence.

The remainder of the stock had been commandeered by Boer forces at unrecorded dates and by unrecorded individuals. During these occurrences the building was also damaged.

After the war Alfred Harvey submitted a compensation claim for war losses to the Office of the Resident Magistrate of Middelburg. After an investigation a total amount of £650 was paid to both Alfred Harvey and George Schulze (CJC, 87, 1666).

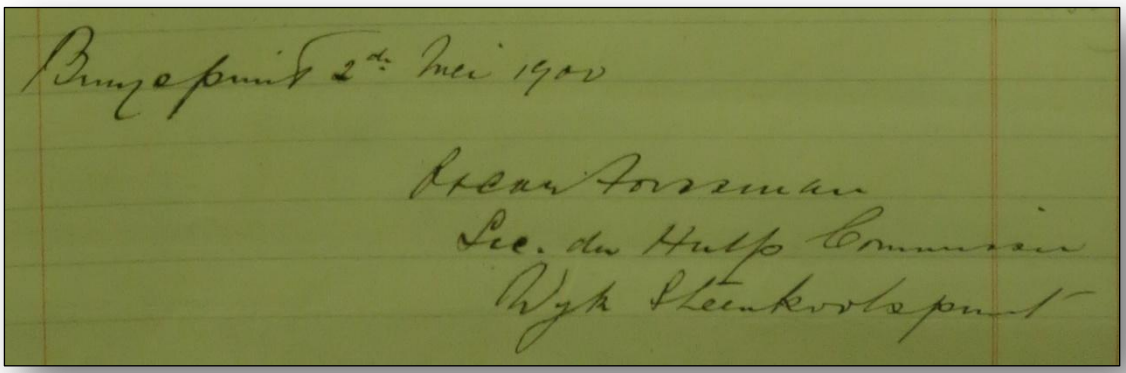


Figure 9 –Section from the document that was compiled by Oscar Forrsman (CJC, 87, 1666).

5.3.1.2 Known skirmishes from the vicinity of the study area

5.3.1.2.1 The skirmish of 23 July 1900

After the occupation of Pretoria by British forces on 5 June 1900 and the subsequent battle of Donkerhoek (Diamond Hill) on 11 and 12 June 1900, the Boer army under the command of General Louis Botha decided to leave their capital in British hands and retreat all along the Delagoa Bay railway line eastward. As part of the British follow-up operations, Lieutenant-General J.D.P. French left Pretoria on 19 July 1900. His cavalry force formed part of an overall British army which was following the retreating Boer forces toward the east.

On 21 July 1900 his outposts on Leeuwpoort Hiil (the farm Leeuwpoort is located directly north-west of Delmas) observed a Boer force of roughly a thousand men moving from a hill to the west of the farm Boschpoort towards a ridge on the farm Hekpoort. The farm Hekpoort 207 IR is located directly north of present-day Delmas and is situated 12.5km west of the present study area. This movement meant that the Boer force on Hekpoort was located directly across the Bronkhorst Spruit from the British force on Leeuwpoort. The British outposts also observed that the ridge on the farm Zondagsfontein was lightly held by the Boer forces.

On the morning of 22 July 1900 General French held a meeting with his brigadiers during which it was revealed that a Boer force of 5000 men with eight guns were ensconced at Bronkhorstspruit (some 30km to the north-west of the study area) whereas a second force of 1000 men with three guns was established on the ridges at Hekpoort directly opposite his position on Leeuwpoort Hill.

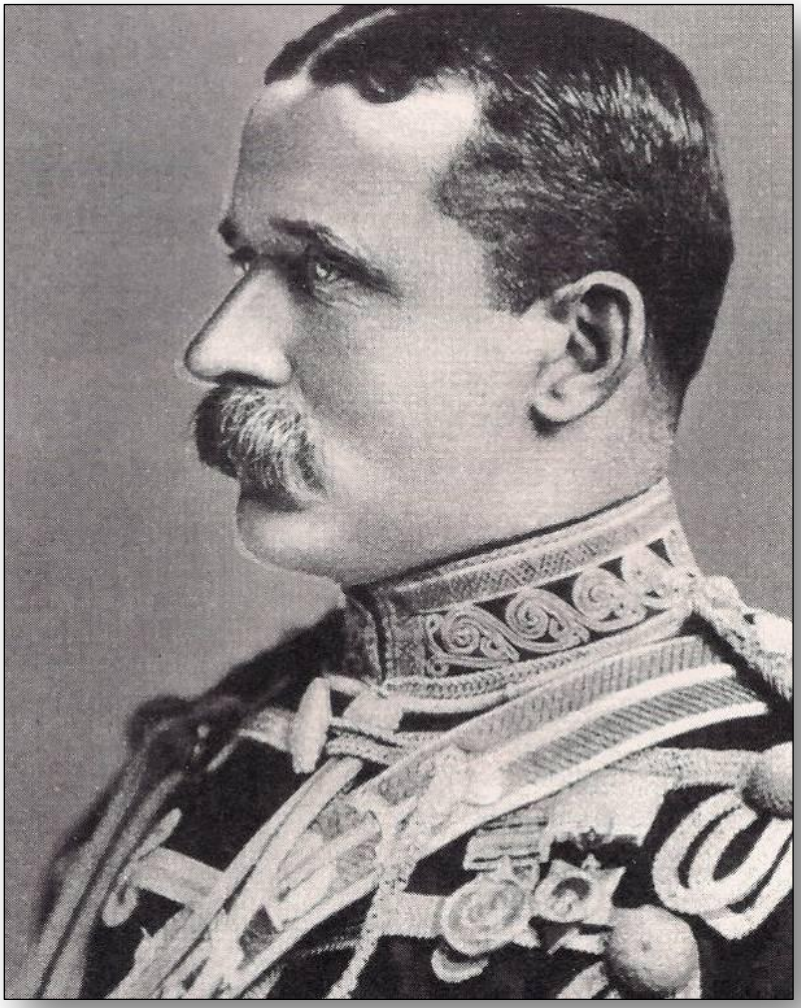


Figure 10 –Lieutenant-General J.D.P. French was the officer in charge of the British forces during the skirmish of 23 July 1900. This image was published in Changuion (2001:77 & 123).

On 23 July 1900 General French ordered an advance on the enemy positions. This advance comprised a three-pronged attack that was observed by General French from his position on Leeuwpoort Hill. The advance comprised the following:

- Brigadier-General J.R.P. Gordon with the 1st Brigade moved south-eastward to Dieplaagte where a good drift over the Wilge River was located. This farm is located 14km south of the present study area.
- Major-General J.B.B. Dickson with the 4th Brigade advanced in a north-eastern direction and within a few hours had reached the high ground on Zonderfontein without much opposition. This area is presently located on the farm Zonderfout 226 IR which is roughly 11.6km south-west of the present study area.

- Major-General E.T.H. Hutton's column moved eastward from Witpoort and reached the confluence of the Koffyspruit and Klipspruit which was crossed without opposition.

As a result of these advances, the Boer forces on Hekpoort divided into two with one segment comprising roughly 400 men retiring to the Boschpoort ridge directly east of the Wilge River. The farm Boschpoort 211 IR is located directly west of the farm Vlakvarkfontein. A second Boer group of roughly the same size abandoned their position on Zonderfontein and headed to Dieplaagte, evidently out of fear that Gordon's advance would cut them off from the drift located there.

General French now focussed his attention on the Boer position on the Boschpoort ridge and ordered Colonel E.A.H. Alderson and his mounted troops (which had formed part of Hutton's Column) to advance eastward from the farm Witklipbank He was supported by Hutton with a 5" gun who followed behind.

Meanwhile, from his position further south, Gordon also moved eastward. Dickson's column was now situated between that of Hutton and Gordon, and started advancing in a north-eastern direction toward the farm Schoongezicht. The farm Schoongezicht 225 IR is located directly south-west of Vlakvarkfontein on the western end of the Wilge River. As his column advanced they came under attack from a large Boer force of a thousand men supported by three guns on the Hekpoort ridge to the north. The Boer force subsequently fell back to a position on the farm Vlakvarkfontein, and surprised by Gordon's advance across Dieplaagte retreated toward the east. Dickson now advanced toward to the Wilge River where he had orders to bivouac on its western bank. The Boer forces had placed a 12 pounder gun on high ground to the south of Vlakvarkfontein and with both Dickson and Gordon in range started firing on them until nightfall. Meanwhile, from Dieplaagte Gordon pushed the Boer forces to the south-east. He subsequently crossed the river and occupied a commanding hill on the eastern bank of the river. Seeing this, the retreating Boer forces swerved off to the north-east and attempted to halt Gordon's advance by firing on him with three guns and a Vickers Maxim. Gordon responded in kind and managed to clear the surroundings of the drift of the enemy before bivouacking on the hill adjacent to it. By nightfall Dickson had reached his bivouac on the western bank of the Wilge River, Alderson held the drift across the Wilge River on the farm Boschpoort and Hutton was five miles to the south-west. General French and his headquarters bivouacked on the farm Vanggatfontein. The farm Vanggatfontein 250 IR is located 8.7km south-west of the study area.

The next morning it was found that the Boer forces had retreated, and General French and his men continued their pursuit of the retreating Boer army.

While the losses on Boer side are not known, the casualties on British side comprised the death of Lieutenant Elsworth of the Australian Horse.

5.3.1.2.2 The skirmish of 25 September 1901

On 25 September 1901 the Heidelberg Commando under the command of General Piet Viljoen was encamped on an unknown farm in the general vicinity of the study area. During the morning they were surprised by a British force of roughly 400 mounted men supported by a Vickers Maxim pom pom gun and an unknown artillery piece. The commando managed to organise an efficient counter attack by dividing into three groups of which two were commanded by General Viljoen and Kommandant Joachim Prinsloo. The third group had as member the 19-year old son of General Piet Viljoen, Henning Petrus Nicolaas Viljoen (1882 – 1902) who described the skirmish in his diary. During the counter attack the British were forced to flee. In the diary description of Henning Viljoen it is indicated that they chased the British force to the other side of the farm Vlakvarkfontein (Blake, 2012).

Figure 11 –A British pom pom gun in action during the South African War. This gun and men formed part of General French's forces (Goldmann, 1902). This is the type of pom pom gun which attacked the Heidelberg Commando on 25 September 1901.

5.3.1.2.3 The skirmish of 17 October 1901

On 17 October 1901 a skirmish took place between Boer and British forces on the farm Mooimesjesfontein, which is the name of the eastern half of the farm Vlakvarkfontein. All that is known about this skirmish is that it resulted in the death (on British side) of Major F.C. Minshull-Ford D.S.O. and trooper Mark Crampton who were both members of the South African Constabulary. They were buried on the farm Boschpoort 211 IR which is situated directly west of Vlakvarkfontein (TPS, 36, TA/42A/4823/4). These graves were later exhumed and reburied at the Rietfontein military cemetery near Hartebeespoort Dam.

During a heritage survey of a portion of the farm Boschpoort 211 IR by Marko Hutten (Hutten, 2011) a granite slab was identified which indicated the position of the spot where Minshull-Ford and Crampton had been buried. This memorial is located 4.7km north-west of the present study area. The memorial reads as follows:

"*ST. EDWARD'S CROWN*
IN MEMORY OF MAJ. I.C. MINSHULL-FORD AND
TRP. M. CRAMPTON OF THE S.A. CONSTABULARY WHO
WERE KILLED IN ACTION ON 17 OCTOBER 1901
AND BURIED NEAR THIS SPOT AND ARE NOW REINTERRED
AT RIETFONTEIN, DISTR. BRITS.
S.A. WAR GRAVES BOARD JULY 1972"

5.3.1.2.4 The skirmish of 27 January 1902

On 27 January 1902 a section of the Heidelberg Commando comprising 50 men (and including General Piet Viljoen and his son Henning Petrus Nicolaas Viljoen) was attacked in an unknown locality by a British force of roughly 300 men again supported by a Vickers Maxim pom pom gun and an unknown artillery piece. Although a strong counter attack was organised, the Boer commando was forced to flee and as a result were chased all the way to the farm Vlakvarkfontein (Blake, 2012).

The casualties on British side are not known, but the casualties on Boer side comprised three men who had sustained wounds (Blake, 2012).

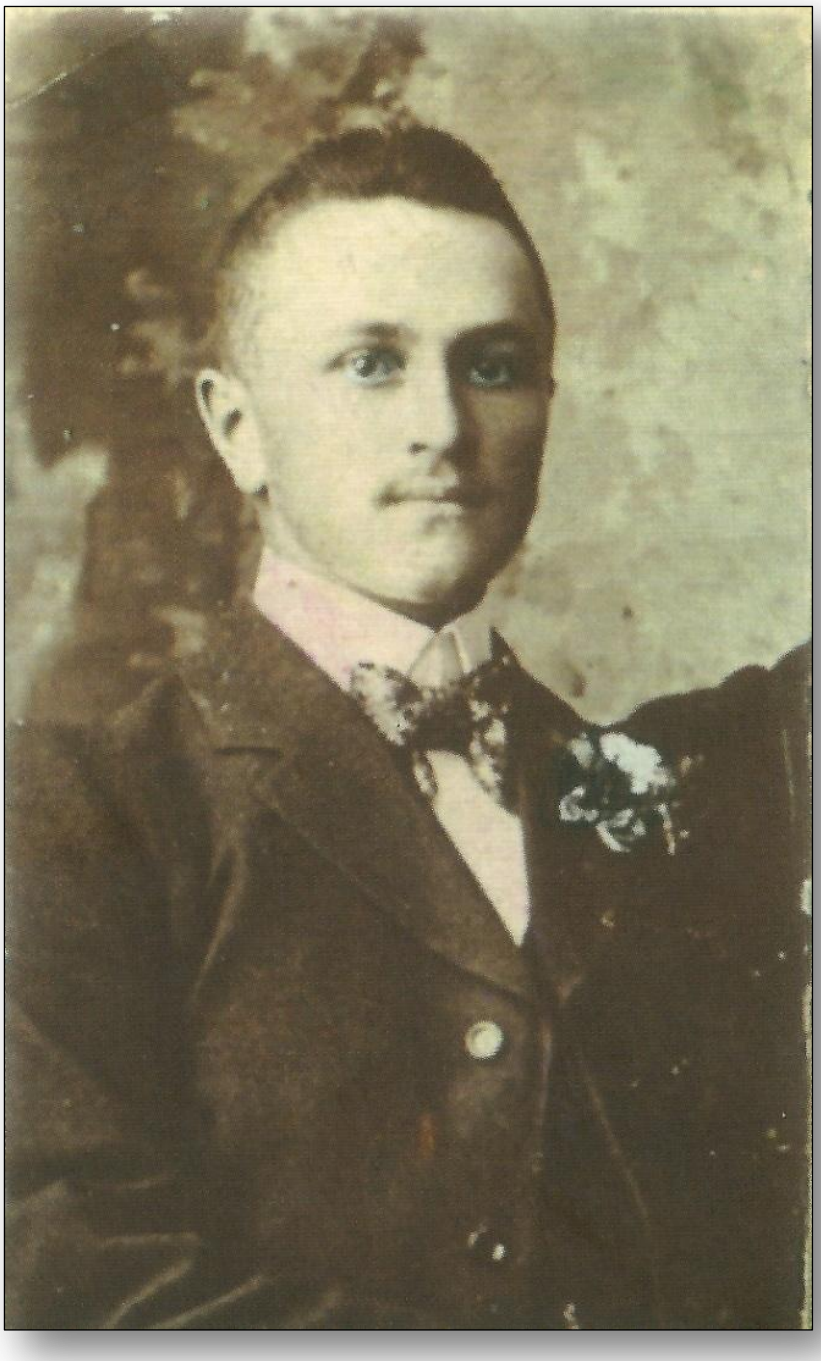


Figure 12 –Henning Petrus Nicolaas Viljoen who took part in the skirmishes of 25 September 1901 and 27 January 1902 (Blake, 2012). He described the two skirmishes in his diary which is kept at the National Archives in Pretoria.

5.3.2 History of Coal Mining within the farm Vlakvarkfontein

While coal mining activities from the wider landscape already commenced during the early 1870s (Maggie's Mine at Van Dyksdrift had been established in c. 1873), the earliest known record for coal mining and prospecting activities on the farm Vlakvarkfontein 213 IR took place during 1894. On 5 May 1894 the owner of the western portion of the farm Vlakvarkfontein, Jacobus Johannes Hermann, applied for underground mining rights on a section of the portion owned by him (SS, R4734/94).

The second known event in the history of coal mining on the farm Vlakvarkfontein occurred in January 1895. At the time a contract was entered into by the owners of a portion of the farm Vlakvarkfontein namely Jacobus Johannes Hermann and Mathys Johannes Hermann with a person only presently known as Mr. Jolly. It is possible that this latter person was one John Jolly, a businessman from Johannesburg who had been a director in various companies including the Premier Diamond Mine (Adams et.al, 2002). The contract allowed Mr. Jolly to "...*prospect, dig for, and work coal*..." on predefined portions of the farm for a period of five years (Transvaal Law Reports, 1904). While the details of the case are not presently known, it would appear that a legal dispute developed after the war between Mr. Jolly and the beneficiaries of the estates of J.J. and M.J. Hermann, who had passed away in 1903 and 1904 respectively (RAK, 2927).

It is not presently known to what extent the prospecting and mining activities of Jolly were undertaken at this early stage. Furthermore, it is also not presently known exactly where on the farm Vlakvarkfontein these activities were undertaken.

While no information is known about further mining activities during the late 19th and early 20th centuries, such activities must have taken place. This can be seen from the First Edition of the 2628BB Topographical Sheet that was based on aerial photography undertaken in 1958 and that was surveyed in 1965. This sheet depicts a mine heap directly north of the present study area but also depicts an old abandoned mine near the northern boundary of the farm.

In 1980 reference was also made to the Arbor Colliery which was located on the farm Vlakvarkfontein. No further information with regard to this mine could be found.

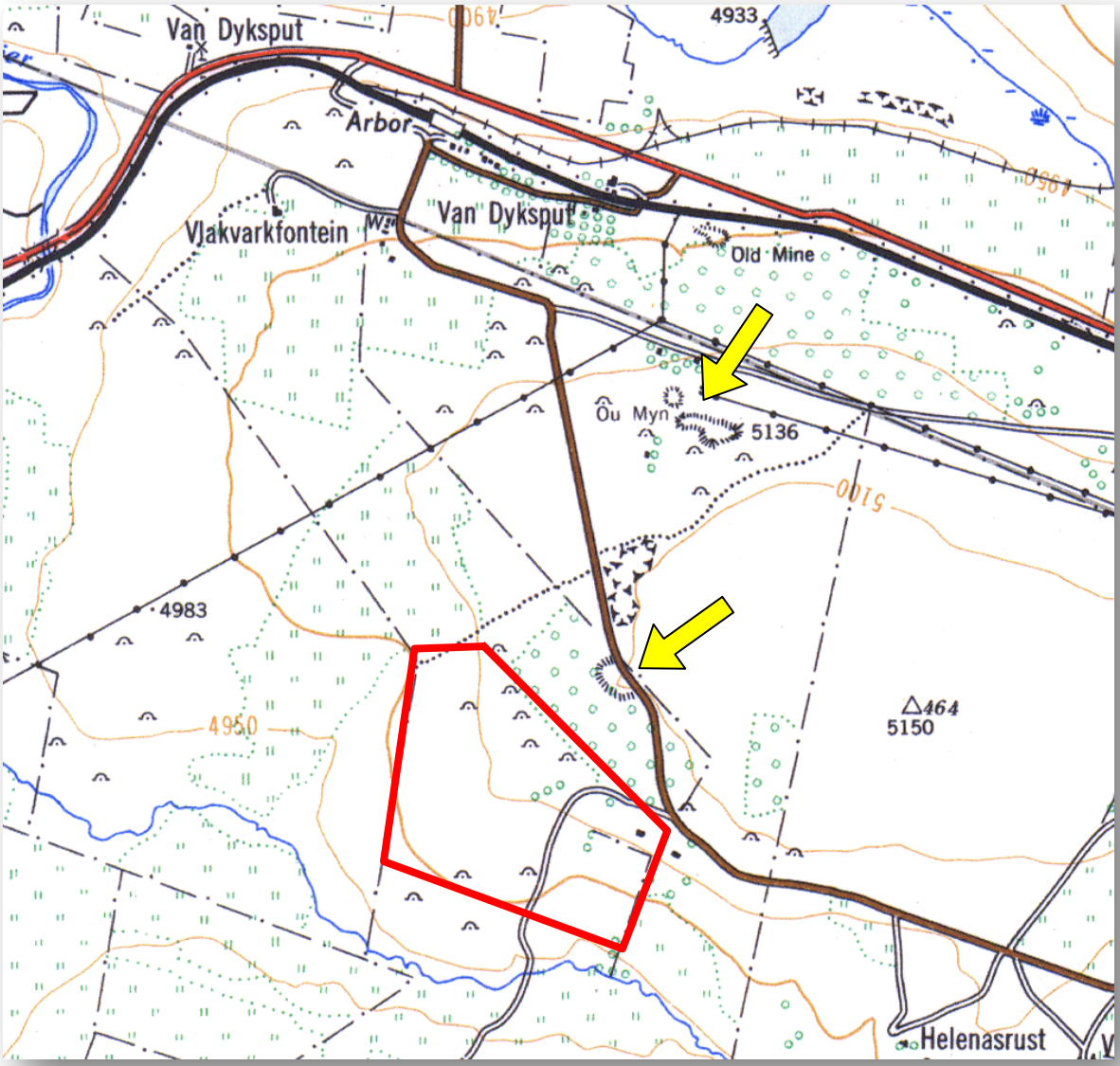


Figure 13 – Section from the First Edition of the 2628BB Topographical Sheet that was surveyed in 1965. Two old mines are shown within the farm Vlakvarkfontein. These are marked with yellow arrows, with the study area boundary in red.

6 SITES IDENTIFIED WITHIN THE STUDY AREA

A total of three heritage sites were identified during the fieldwork and numbered from Site 1 to Site 3. Only two heritage site types were identified within the study area namely Graves and Cemeteries (see Site 1 and Site 2) and secondly Historic Structures (see Site 3).

6.1 Site 1

Site Coordinates:

S 26° 3' 52.3"
E 28° 53' 20.5"

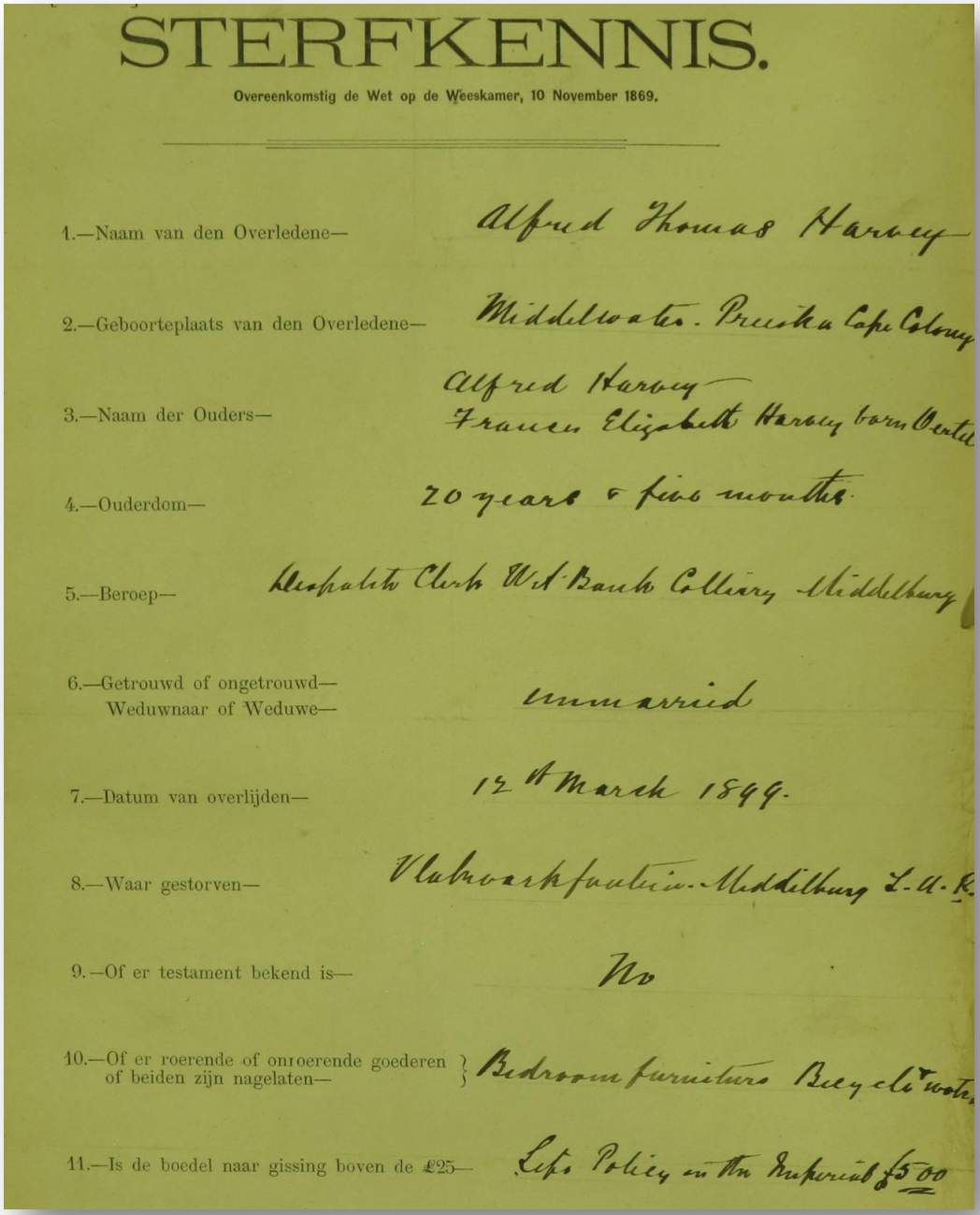
Site Description:

A cemetery is located here. It is associated with a small pocket of black wattle trees and is located in the general vicinity of the eastern end of the study area.

The cemetery is comprised of two distinct sections roughly 15m apart. The western section consists of a single grave of which the dressing is orientated along the east-west axis and which has a broken ornate sandstone headstone. The original pedestal of the headstone was still located on the western end of the grave with four fragments of the headstone observed on top of the grave. With some difficulty the following inscription could be deciphered:

IN MEMORY OF
ALFRED THOMAS
BORN 30
SEPTEMBER (??)
DIED 12 MARCH 1899 BELOVED
SON OF
ALFRED AND FRANCIS ELIZABETH
HARVEY BORN OERTEL

During the archival research undertaken as part of this study, the death certificate for Alfred Thomas Harvey was located (MHG, 16065). The death certificate indicates that the deceased was born at Middelwater in the vicinity of Prieska during November 1878 and was 20 years and 5 months old at the time of his death. The certificate also states that Alfred Harvey was employed as a dispatch clerk at the Witbank Colliery at the time of his death and that he passed away at the farm Vlakvarkfontein. The movable property of Alfred Thomas Harvey is indicated in an inventory from the same file as one bicycle (£10), a silver watch (£3), a bed and headrest (£2) as well as life insurance to the value of £500.



STERFKENNIS.

Overeenkomstig de Wet op de Weeskamer, 10 November 1869.

1.—Naam van den Overledene— Alfred Thomas Harvey

2.—Geboorteplaats van den Overledene— Middelwater. Prieska Cape Colony

3.—Naam der Ouders— Alfred Harvey
Frances Elizabeth Harvey born Oertel

4.—Ouderdom— 20 years & five months.

5.—Beroep— Despatch Clerk Wit Bank Colliery Middelburg

6.—Getrouwd of ongetrouwd—
Weduwnaar of Weduwe— unmarried

7.—Datum van overlijden— 12th March 1899.

8.—Waar gestorven— Vlakvarkfontein. Middelburg T.V.R.

9.—Of er testament bekend is— No

10.—Of er roerende of onroerende goederen of beiden zijn nagelaten— Bedroom furniture Bicycle Watch

11.—Is de boedel naar gissing boven de £25— Life Policy in the Imperial £500

Figure 14 – The death certificate for Alfred Thomas Harvey (MHG, 16065).

Figure 15 – The grave of Alfred Thomas Harvey.

Figure 16 – Closer view of a section of the broken headstone on the grave of Alfred Thomas Harvey. Scale is in centimetres.

The second section of the cemetery is located roughly 15m to the east of the grave of Alfred Thomas Harvey and comprises four graves buried in a single line adjacent to one another. Three of these graves have dressings of packed stone with the fourth grave containing a cement-lined dressing. One of the stone packed graves has an upright formal dressing of slate located on its western end with the inscription orientated toward the west. Furthermore, the cement-lined dressing has a cement headstone which had broken off and is lying face-up on the dressing. The inscription on the slate headstone reads as follows:

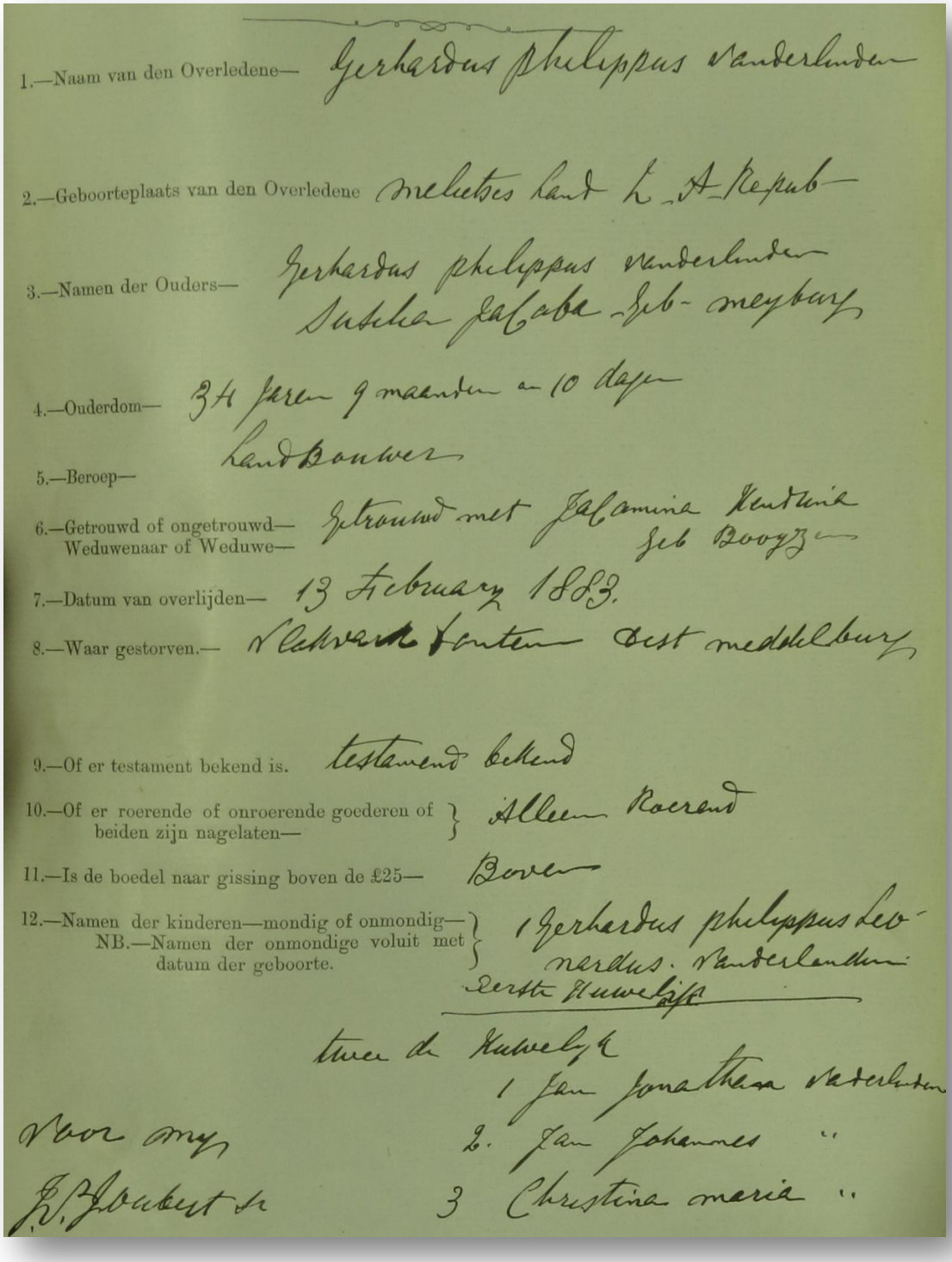
GRAFSTEEN
OVERLEDEN ZOON VAN MYN
M.J. WELMANS
WELLEM FREDEREK GEBORENEN
HET JAAR 1875 DEN 12 ZEPTEMBER
OVERLEDENDE 26 OKTOBER EN
HET JAAR 1876
GEZANG 22
VERS 1 RUST MYN ZIEL UW GOT IS KONING
HEELDE WERELD ZYN GEBIET ALLES WESSELT
OP ZYN WENKEN MAAR HY ZELF VERANDERT NIET
VERS 3 RUST MYN ZIEL UW GOT IS KONING WEES
TEVREDEN MET UW LOT ZIE HOE ALLES HIER
VERANDERT EN VERLANG ALLEEN NAAR GOT

The inscription on the cement headstone reads as follows:

HIER RUS
GERHARDUS
V.D. LINDE
GEBORE 3 MEI 1848
OVL.
13 FEBRUARIE 1883 PSALM 135

The death certificate for Gerhardus Philippus van der Linde was also located at the National Archives in Pretoria (MHG, 2225). At the time of his death Gerhardus van der Linde was a

farmer and had been married to Jacomina Hendrina (born Booyzen), who was his second wife. Van der Linde and his first wife, who evidently had passed away, had one child by the name of Gerhardus Philippus Leonardus. Three children were born from the second marriage namely Jan Jonathan, Jan Johannes and Christina Maria.


1.—Naam van den Overledene— Gerhardus Philippus Vanderlinden

2.—Geboorteplaats van den Overledene Melkbos Land L. A. Republ

3.—Namen der Ouders— Gerhardus Philippus Vanderlinden
Susanna Jacoba Geb. Meyburg

4.—Ouderdom— 34 Jaren 9 maanden en 10 dagen

5.—Beroep— Landbouwer

6.—Getrouwd of ongetrouwd— Weduwenaar of Weduwe— Getrouwd met Jacomina Hendrina Geb Booyzen

7.—Datum van overlijden— 13 February 1883.

8.—Waar gestorven.— Klapvark Fontein Dist Middelburg

9.—Of er testament bekend is. testament bekend

10.—Of er roerende of onroerende goederen of beiden zijn nagelaten— Alleen Roerend

11.—Is de boedel naar gissing boven de £25— Boven

12.—Namen der kinderen—mondig of onmondig—
NB.—Namen der onmondige voluit met datum der geboorte. 1 Gerhardus Philippus Leonardus Vanderlinden
Eerste Huwelijk
twee de Huwelijk
1 Jan Jonathan Vanderlinden
2. Jan Johannes "
3 Christina Maria "

Voor my
P. J. Joubert Sr

Figure 17 – The death certificate for Gerhardus Philippus van der Linde (MHG, 2225).

The estate papers for Gerhardus Philippus van der Linde were found in the same archival file as his death certificate. These papers indicate that at the time of his death Van der Linde had possessions to the value of roughly £137 which included one ox-wagon, nine oxen, two cows with one calf, one horse with two foals as well as a number of domestic items including tables, chairs, rifles, pots and the like. No mention is made in the estate papers of any property owned by Gerhardus van der Linde. Coupled with the fact that neither his name nor the Van der Linde name in general appear on the farm ownership history for Vlakvarkfontein, it seems likely that Van der Linde was a bywoner (sharecropper). Bywoners are well known socio-economic and demographic phenomena of late 19th century farm life in the Boer republics of the Orange Free State and Transvaal.

The tangible separation between the grave of an English person and the four graves of Afrikaans-speaking people seems to suggest that the two groups were not necessarily on friendly terms at the time. The section of the cemetery containing four graves was evidently established first with the grave of Alfred Thomas Harvey the last known grave buried in the cemetery. The time of Harvey's death, namely March 1899, is also significant in that tensions between the South African Republic and Great Britain had been steadily building since the ill-fated Jameson Raid of 1896. By March 1899 these tensions were at a fever pitch and seven months later, on 11 October 1899, war between the two countries was declared. As supportive evidence for the tensions between the two countries and more specifically the population groups within the South African Republic, Alfred Harvey, the father of the deceased, indicated in his compensation claim which he submitted after the war that in the period leading up to the outbreak of war he had felt increasingly at ease and had even received death threats. As a result he decided to leave the farm Vlakvarkfontein for the safety of Natal, and departed on 20 September 1899 (CJC, 87, 1666).

Site Significance:

All graves possess high levels of religious, cultural, emotional and legislative significance. As such, the site is of Generally Protected A (GP. A) or High/Medium Significance. This indicates that the site may not be impacted upon without prior mitigation.

Figure 18 – General view of the eastern section of the cemetery.

Figure 19 – The headstone on the grave of Gerhardus Philippus van der Linde.

Figure 20 – The headstone on the grave of Willem Frederik Welmans.

6.2 Site 2

Site Coordinates:

S 26° 3' 47.0"
E 28° 53' 19.6"

Site Description:

The site comprises an irregularly shaped stone concentration located at the base of a small copse of trees. According to the client a local resident has indicated that the grave of a Sangoma lies buried here. Apart from the stone concentration, no surface indication of a grave (i.e. headstone, surface grave goods) could be identified.

When the mining company realised that the site is located centrally within their coal mining area, they appointed PGS Heritage to undertake the relocation of the grave. Bilingual (English and isiZulu) site notices were placed at the site on Thursday, 23 May 2013 and bilingual (English and isiZulu) newspaper notices were published in the Daily Sun on Wednesday, 31 July 2013 and in the Streek News on Friday, 2 August 2013.

Discussions with local residents represented the third component of the social consultation process. The author of this report assisted by a translator Mr. Simon McGina spent some time in the vicinity of the mine on Friday, 19 July 2013 in an attempt to establish whether any families for the deceased could be identified. These consultations included discussions with Ms. Emily Skosana (born Mahlangu) and Mr. Phillip Ditsego who both have homesteads adjacent to the mine. Mr. Ditsego indicated that when he first arrived on the farm in 1968, the grave was already there. Ms. Skosana concurred and indicated that when she and her family arrived on the farm in 1988 the grave was already in existence. Neither one of the two families knew the identity of the deceased, nor where the family of the deceased may be found. They also confirmed that since the time when they first settled on the farm they have never seen anyone visiting the grave site.

At the present moment in time the site can be described as a possible grave with no direct confirmation for the existence of a grave obtained by way of the social consultation process undertaken above. However, in situations such as this the best practice is to adopt the worst

case scenario until sufficient contrary evidence is obtained. This worst case scenario is that a grave is indeed located here.

Site Significance:

As mentioned above, the site can be described as a possible grave. However, a worst case scenario is adopted within which the site is viewed as a grave site until sufficient evidence to the contrary is obtained.

All graves possess high levels of religious, cultural, emotional and legislative significance. As such, the site is of Generally Protected A (GP. A) or High/Medium Significance. This indicates that the site may not be impacted upon without prior mitigation.

Figure 21 – General view of the stone concentration.

6.3 Site 3

Site Coordinates:

S 26° 3' 55.7"
E 28° 53' 8.4"

Site Description:

The foundation remains of a homestead are situated here. It is associated with a number of black wattle trees. All that remains of the homestead are the low foundation walls of a multi-roomed dwelling with some cultural material in the form of glass and metal objects associated with the structure.

On the First Edition of the 2628BB Topographical Sheet a hut is indicated in close proximity to this feature. This map was surveyed in 1965 which indicates that the site was already in existence in 1965 and as a result is at least 48 years old.

Based on the information that is presently available, it would appear that the structure was built and used by black people, possibly black farm workers. Past experience has shown that in some cases stillborn babies were buried in close proximity to the homes of their parents and aspecially along the sides of the parents' dwelling. This seems to be especially true for older sites. As this site was abandoned some time ago, no direct information with regards to the presence (or not) of stillborn graves are presently available.

Site Significance:

Until such time that the presence of graves here has been confirmed or disproved, the site must be viewed as containing graves.

All graves have high levels of emotional, religious and in some cases historical significance. As such the site is of Generally Protected A (GP. A) or High/Medium Significance. This indicates that the site may not be impacted upon without prior mitigation. The mitigation measures to be undertaken for the site can be found below.

Figure 22 – General view of the site.

Figure 23 – Closer view of the site with sections of the structure's foundations evident.

7 IMPACT OF PROPOSED DEVELOPMENT ON HERITAGE RESOURCES

7.1 Risk Calculation for the Impact of the Proposed Development on Site 1

In this section the impact of the proposed development on the historic cemetery at Site 1 will be established.

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

$$\text{Impact Risk} = \frac{(4 + 3 + 5)}{3} \times \frac{3}{5}$$

IMPACT RISK = 3.2

Table 11: Risk Calculation for Development Impact on the Identified Historic Cemetery

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	High	Local	Permanent	Very likely	**High**
Impact on historic cemetery	4	3	5	4	**3.2**

7.2 Risk Calculation for the Impact of the Proposed Development on Site 2

This section deals with the impact of the proposed development on the grave at Site 2.

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

$$\text{Impact Risk} = \frac{(4 + 2 + 5)}{3} \times \frac{5}{5}$$

IMPACT RISK = 3.67

Table 12: Risk Calculation for Development Impact on the Identified Grave

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	High	Study Area	Permanent	Will Happen	**High**
Impact on	4	2	5	5	**3.67**

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
grave					

7.3 Risk Calculation for the Impact of the Proposed Development on Site 3

In this section the impact of the proposed development on the poorly preserved structure will be established first, after which the impact on the possible presence of graves associated with the structure will be calculated.

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

$$\text{Impact Risk} = \frac{(2 + 1 + 5)}{3} \times \frac{3}{5}$$

IMPACT RISK = 1.6

Table 13: Risk Calculation for Development Impact on the Identified Structure

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Low	Isolated	Permanent	Could Happen	**Low**
Impact on historic structure	2	1	5	3	**1.6**

Apart from the impact highlighted above, it is also necessary to discuss the possible presence of unmarked graves of stillborn infants in the homesteads of African tenant farmers. Through experience of similar sites and knowledge of cultural customs and traditions, it is known that stillborn babies and deceased infants occasionally were buried near or under the dwellings of African rural communities. These children were sometimes buried near the bedroom or kitchen of the dwelling, and were often buried directly outside of the structure against the wall. These burials were not marked, but were known to the immediate family.

Customs and traditions like these were common in the rural African communities during the early and later 20th century. It is therefore not only possible, but likely, that some of these structures may be associated with such infant remains.

In the calculation below, the impact of the proposed development on the possible infant graves associated with the abovementioned structure will be considered.

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

$$\text{Impact Risk} = \frac{(4 + 2 + 5)}{3} \times \frac{3}{5}$$

IMPACT RISK = 2.2

Table 14: Risk Calculation for Development Impact on the Possible Presence of Infant Burials

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	High	Study area	Permanent	Could Happen	**Moderate**
Impact on graves associated with homestead	4	2	5	3	**2.2**

7.3 Risk Calculation for the Impact of the Proposed Development on Site 3

From the above four calculations it is evident that the unmitigated development would have the following impacts:

- A high impact on the historic cemetery at Site 1. As a result mitigation measures are required. See Section 8 below.
- A high impact on the grave at Site 2. As a result mitigation measures are required. See Section 8 below.
- A low impact on the structure at Site 3. No mitigation measures are required.
- A moderate impact on the possible stillborn babies which may be buried in association with the structure at Site 3. Mitigation measures are required. See Section 8 below.

8 MITIGATION MEASURES AND GENERAL RECOMMENDATIONS

8.1 Mitigation Measures as Required by the Different Sites

8.1.1 Mitigation measures required for Site 1

As discussed above, the unmitigated impact of the proposed mining development will result in a high negative impact on the historic cemetery at Site 1. After the cemetery was first seen by the mine management, they made a decision to change their opencast mining footprint to allow for the in situ conservation of the cemetery. During the fieldwork of Friday, 10 May 2013 an on-site meeting took place between the author of this report and the mine manager. At the meeting it was decided that a fence will be erected around the graves, with a buffer of 10m kept open in between the graves and the fence. A further 10m buffer on the outside of the fence would be kept clear of any mining development. Apart from these measures agreed to at the mine, the following mitigation measures are also required

- A monitoring process must be undertaken with which any impacts on the cemeteries can be identified and acted upon. As mining has already commenced, it is strongly recommended for a heritage specialist to commence with the monitoring programme as soon as possible.
- As mentioned in the text, two of the formal headstones from the cemetery are in a poor state of preservation. It is recommended that the mine appoints a tombstone specialist with experience in old graves to fix and reconstruct the two poorly preserved headstones. As these graves are older than 100 years, a permit will be required from the South African Heritage Resources Agency before any work is undertaken on the two graves.

8.1.2 Mitigation measures required for Site 2

As discussed above, the unmitigated impact of the proposed mining development will result in a high negative impact on the grave at Site 2. As discussed elsewhere as well, the chance does exist for no grave to be located here though the only way to confirm this would be through excavation. The mining company has appointed PGS Heritage to relocate the grave from its present position to a nearby municipal cemetery. This process is well in hand and as a result the only mitigation measures required would be as follows:

- The grave must be fenced and a buffer area of at least 10m around the outside of the fence must be kept clear of any mining development or associated impacts until such time that the grave in question has been successfully exhumed. The position of the fence must be indicated in the field by the heritage specialist.

8.1.3 Mitigation measures required for Site 3

Site 3 is not impacted upon by any proposed development. Nonetheless, the site must be fenced and a 10m buffer area on the outside of the fence should be kept clear of any mining development or associated impacts. The position of the fence must be indicated in the field by the heritage specialist. However, should any impacts on the site be expected, the presence of stillborn graves here will have to be investigated by way of social consultation and archaeological excavation.

8.2 Mitigation Measures as Required for Palaeontology

The following recommendations are made in the palaeontological desktop study:

1. The developer and the ECO of the mining project be made aware of the fact that coal mining is by definition the mining of fossil plant material.
2. The developer applies for a collection and destruction permit for plant fossils encountered during the mining operation.
3. The developer must employ a qualified palaeontologist to visit the present mining operations to record any fossils. The palaeontologist will look out for exceptionally well preserved fossils and collect representative samples of these fossils for further study at an appropriate institute such as the Bernard Price Institute for Palaeontology at WITS University.

9 CONCLUSIONS

PGS Heritage was appointed by Ferret Mining and Environmental Services to undertake a Heritage Impact Assessment in terms of the proposed Intibane Colliery located on a Section of Portion 16 of the farm Vlakvarkfontein 213 IR, Victor Khanye Local Municipality, Mpumalanga Province.

An archival and historical desktop study was undertaken which was used to compile a historical layering of the study area within its regional context. This component indicated that the landscape within which the project area is located has a rich and diverse history.

The desktop study work was followed by a fieldwork component which comprised a walkthrough of the study area. At the time of the fieldwork, mining activities were already well in hand and as a result the focus in the fieldwork was placed on those areas not affected by the existing mining activities. A total of three heritage sites comprising two cemeteries and one structure were identified within the study area. The identified heritage sites were plotted on the mining development plan and as a result it was found that two of these sites are located within the opencast mining footprint areas with the third site located away from any of the proposed development areas. The impact risk of the proposed development on the heritage sites was established, and where required mitigation measures are proposed. In the table below the three heritage sites that were identified within the study area will be outlined. The table contains the significance levels of the respective sites as well as the required mitigation measures.

Table 15: Summarised List of Heritage Sites Identified within the Study Area

Site	Description	Heritage Significance	Coordinates	Mitigation
Site 1	Cemetery	High/Medium Local (GP. A)	S 26° 3' 52.3" E 28° 53' 20.5"	• The cemetery must be fenced with a 10m buffer area between the graves and the fence and another 10m buffer area on the outside of the fence kept clear of development. • A monitoring programme must be implemented. • Two poorly preserved headstones must be repaired by memorial specialists after permits to do so have been received.
Site 2	Grave	High/Medium Local (GP. A)	S 26° 3' 47.0" E 28° 53' 19.6"	• Grave relocation process (which is well in hand) must be completed. • Until such time that the grave can be exhumed, it must be fenced and a 10m buffer area on the outside of the fence kept clear of any development. The position of the fence must be indicated by a heritage specialist.

Site 3	Structure with possible presence of stillborn graves	High/Medium Local (GP. A)	S 26° 3' 55.7" E 28° 53' 8.4"	• The structure must be fenced and a 10m buffer area on the outside of the fence kept clear of any development. The position of the fence must be indicated by a heritage specialist. • If the in situ preservation of the site is not possible, further mitigation would be required.

Furthermore, a palaeontological desktop study was undertaken of the study area by Dr. Gideon Groenewald (Groenewald, 2013). This report found that the Intibane Colliery is underlain by Permian aged sedimentary rocks of the Vryheid Formation, Ecca Group of the Karoo Supergroup. The Vryheid Formation Consists predominantly of grey sandstone with interbedded prominent coal beds and lenses of shale and grit. The sediments are interpreted as having been deposited on a sandy shoreline, beyond which lay vast swamplands. The plant material that accumulated within these swamps formed the coal deposits that are mined today. The Vryheid Formation is known for containing an abundant assemblage of plant fossils and the mining of coal is by definition the mining of fossil plant material.

Due to the fact that the Vryheid Formation sediments and coal beds will only be exposed during the mining operations and associated infrastructure development, it is unlikely that fossils will be observed before the mining takes place. For this reason a medium palaeontological sensitivity is allocated to the study area.

It is recommended that:

1. The developer and the ECO of the mining project be made aware of the fact that coal mining is by definition the mining of fossil plant material.
2. The developer applies for a collection and destruction permit for plant fossils encountered during the mining operation.
3. The developer must employ a qualified palaeontologist to visit the present mining operations to record any fossils. The palaeontologist will look out for exceptionally well preserved fossils and collect representative samples of these fossils for further study at an appropriate institute such as the Bernard Price Institute for Palaeontology at WITS University.

The overall impact of the development on heritage resources is seen as acceptably low and impacts can be mitigated to acceptable levels. On the condition that the recommendations made in this report are adhered to, no heritage reasons can be given for the development not to continue.

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Historic Topographic Maps

The historic topographic maps used in this report were obtained from the Directorate: National Geo-spatial Information of the Department of Rural Development & Land Reform, Cape Town.

Google Earth

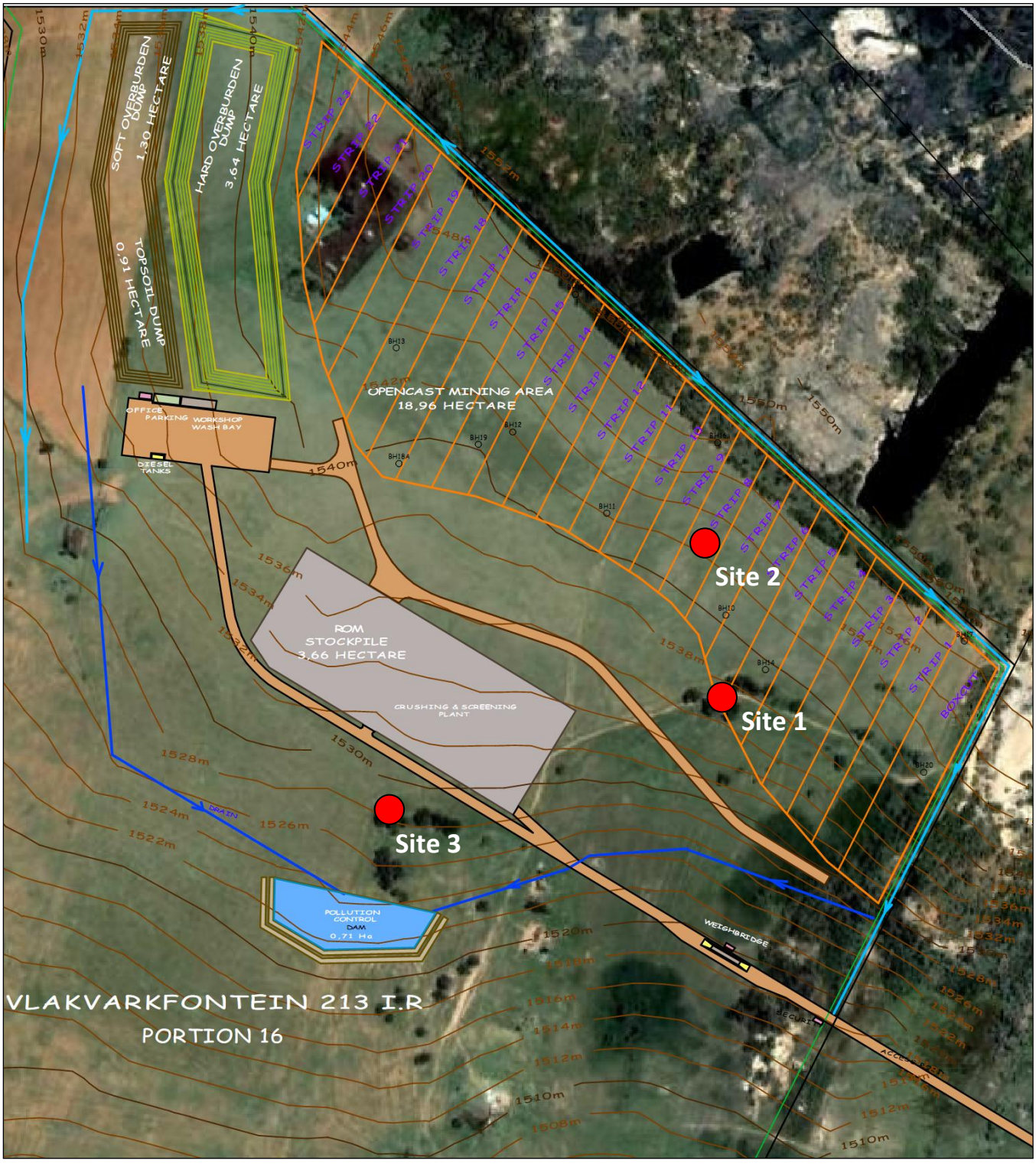
All the aerial depictions used in this report are from Google Earth.

Internet References

www.mk.org.za
www.sa-venues.com

Appendix A

SITE DISTRIBUTION MAP


SOFT OVERBURDEN DUMP
1,30 HECTARE
HARD OVERBURDEN DUMP
3,64 HECTARE
TOPSOIL DUMP
0,91 HECTARE
OPENCAST MINING AREA
18,96 HECTARE
OFFICE
PARKING
WORKSHOP
WASH BAY
DIESEL TANKS
ROM STOCKPILE
3,66 HECTARE
CRUSHING & SCREENING PLANT
POLLUTION CONTROL DAM
0,71 Ha
WEIGHBRIDGE
Site 1
Site 2
Site 3
VLAKVARKFONTEIN 213 I.R
PORTION 16

Appendix B

LEGISLATIVE REQUIREMENTS – TERMINOLOGY AND ASSESSMENT CRITERIA

General principles

In areas where there has not yet been a systematic survey to identify conservation worthy places, a permit is required to alter or demolish any structure older than 60 years. This will apply until a survey has been done and identified heritage resources are formally protected.

Archaeological and palaeontological sites, materials, and meteorites are the source of our understanding of the evolution of the earth, life on earth and the history of people. In terms of the heritage legislation, permits are required to damage, destroy, alter, or disturb them. Furthermore, individuals who already possess heritage material are required to register it. The management of heritage resources is integrated with environmental resources and this means that, before development takes place, heritage resources are assessed and, if necessary, rescued.

In addition to the formal protection of culturally significant graves, all graves which are older than 60 years and are not located in a cemetery (such as ancestral graves in rural areas), are protected. The legislation also protects the interests of communities that have an interest in the graves: they should be consulted before any disturbance takes place. The graves of victims of conflict and those associated with the liberation struggle are to be identified, cared for, protected and memorials erected in their honour.

Anyone who intends to undertake a development must notify the heritage resources authority and, if there is reason to believe that heritage resources will be affected, an impact assessment report must be compiled at the construction company's cost. Thus, the construction company will be able to proceed without uncertainty about whether work will have to be stopped if an archaeological or heritage resource is discovered.

According to the National Heritage Act (Act 25 of 1999 section 32) it is stated that:
An object or collection of objects, or a type of object or a list of objects, whether specific or generic, that is part of the national estate and the export of which SAHRA deems it necessary to control, may be declared a heritage object, including –

- 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;
- books, records, documents, photographic positives and negatives, graphic material, film or video or sound recordings, excluding those that are public records as defined in section 1 (xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996), or in a provincial law pertaining to records or archives; and
- any other prescribed category.

Under the National Heritage Resources Act (Act No. 25 of 1999), provisions are made that deal with, and offer protection to, all historic and prehistoric cultural remains, including graves and human remains.

Graves and cemeteries

Graves younger than 60 years fall under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925) as well as the Human Tissues Act (Act 65 of 1983) and are under the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the Office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning, or in some cases the MEC for Housing and Welfare. Authorisation for exhumation and reinternment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. In order to handle and transport human remains, the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

Graves older than 60 years, but younger than 100 years, fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act) as well as the Human Tissues Act (Act 65 of 1983) and are

under the jurisdiction of the South African Heritage Resources Agency (SAHRA). The procedure for Consultation regarding Burial Grounds and Graves (Section 36(5) of Act 25 of 1999) is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in the category located inside a formal cemetery administrated by a local authority will also require the same authorisation as set out for graves younger than 60 years, over and above SAHRA authorisation.

If the grave is not situated inside a formal cemetery but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws set by the cemetery authority must be adhered to.

Appendix C

PALAEONTOLOGICAL STUDY