



PGS HERITAGE

HERITAGE IMPACT ASSESSMENT

**PROPOSED DER BROCHEN AMENDMENT PROJECT LOCATED ON CERTAIN
SECTIONS OF THE FARMS HELENA 6 JT, DER BROCHEN 7 JT AND MAREESBURG
8 JT, SOUTH OF STEELPOORT, GREATER TUBATSE LOCAL MUNICIPALITY,
GREATER SEKHUKHUNE DISTRICT COUNCIL, LIMPOPO PROVINCE**

Issue Date: 8 September 2019
Revision Number: 4
Project Number: 375HIA



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Declaration of Independence

The report has been compiled by PGS Heritage (Pty) Ltd, an appointed Heritage Specialist for SRK Consulting. The views stipulated in this report are purely objective and no other interests are displayed during the decision making processes discussed in the Heritage Impact Assessment.

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Report Title	Heritage Impact Assessment for the Proposed Der Brochen Amendment Project located on certain sections of the farms Helena 6 JT, Der Brochen 7 JT and Mareesburg 8 JT, south of Steelpoort, Greater Tubatse Local Municipality, Greater Sekhukhune District Council, Limpopo Province.		
Control	Name	Signature	Designation
Author	Polke Birkholtz		Project Manager / Heritage Specialist & Archaeologist

The heritage impact assessment report has been compiled taking into account the NEMA Appendix 6 requirements for specialist reports as indicated in the table below.

NEMA Regs (2014) - Appendix 6	Relevant section in report
Details of the specialist who prepared the report	Page iii and Section 1.2
The expertise of that person to compile a specialist report including a curriculum vita	Section 1.2 – refer to Appendix B
A declaration that the person is independent in a form as may be specified by the competent authority	Page ii of the report
An indication of the scope of, and the purpose for which, the report was prepared	Section 1
The date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3
A description of the methodology adopted in preparing the report or carrying out the specialised process	Section 3
The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure	Sections 5 & 6
An identification of any areas to be avoided, including buffers	Sections 6 & 8
A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Refer Figures 19 - 22
A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.3
A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Sections 7 & 8
Any mitigation measures for inclusion in the EMPr	Section 8
Any conditions for inclusion in the environmental authorisation	Section 8
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 8
A reasoned opinion as to whether the proposed activity or portions thereof should be authorised and	Executive Summary & Section 9
If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	
A description of any consultation process that was undertaken during the course of carrying out the study	Not applicable. No public participation process was undertaken by PGS Heritage.
A summary and copies if any comments that were received during any consultation process	Not applicable. See comment above.
Any other information requested by the competent authority.	Not applicable. No consultation with the heritage authorities has as of yet taken place.

EXECUTIVE SUMMARY

Introduction

PGS Heritage (Pty) Ltd was appointed by SRK Consulting (South Africa) Pty Ltd to undertake a Heritage Impact Assessment (HIA), which forms part of the environmental process for the proposed Der Brochen Amendment Project, located south of Steelpoort, Greater Tubatse Local Municipality, Greater Sekhukhune District Council, Limpopo Province.

General Desktop Study

An archaeological and historical desktop study was undertaken to provide a historical framework for the project area and surrounding landscape. This was augmented by an assessment of previous archaeological and heritage studies completed for the study area and surrounding landscape as well as an assessment of old aerial photographs. The desktop study revealed that the study area is located in surroundings characterised by a long and significant history.

Palaeontology

Ms. Elize Butler of Banzai Environmental (Pty) Ltd was commissioned to undertake a desktop Palaeontological Impact Assessment. Her report and findings are attached in full in **Appendix C**.

Ms. Butler found that the proposed development area is “...*is completely underlain by the Dwars River and Dsjate Subsuite, Rustenburg layered Suite, Bushveld Complex. These malific rocks of the Bushveld Complex is igneous in origin and thus unfossiliferous. The Palaeomap of SAHRIS also indicates that these rocks have a palaeontological significance of zero.*”

The palaeontological report concludes that it is “...***therefore considered that the construction and operation of the proposed Der Brochen Amendment Project near Lydenburg, Limpopo Province is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area. Thus, the construction and operation of the facility may be authorised as the whole extent of the development footprint is not considered sensitive in terms of palaeontological resources.***”

Fieldwork

The study area was assessed in the field by way of intensive walkthroughs of the proposed development footprint areas. The fieldwork was undertaken by an experienced team comprising one archaeologist/heritage specialist (Polke Birkholtz) and one fieldwork assistant (Derrick James). The fieldwork resulted in the identification of 57 archaeological and heritage sites. These identified archaeological and heritage sites comprise the following:

- Nine sites where graves and cemeteries were identified (DBAP 11, DBAP 16, DBAP 21, DBAP 25, DBAP 33, DBAP 43, DBAP 44, DBAP 51 & DBAP 52)
- A total of 25 sites comprising historic black homesteads where the risk for unmarked graves exist (DBAP 1, DBAP 3, DBAP 5, DBAP 6, DBAP 8, DBAP 10, DBAP 22, DBAP 23, DBAP 26, DBAP 27, DBAP 28, DBAP 29, DBAP 30, DBAP 31, DBAP 32, DBAP 37, DBAP 39, DBAP 40, DBAP 42, DBAP 45, DBAP 47, DBAP 54, DBAP 55, DBAP 56 & DBAP 57)
- Two sites comprising historic black homesteads (where the risk for unmarked graves exist) associated with confirmed graves and cemeteries (DBAP 9 & DBAP 19).
- Five sites comprising surface occurrences of Iron Age or historic potsherds (DBAP 17, DBAP 18, DBAP 20, DBAP 34 & DBAP 35)
- Two Iron Age stonewalled sites (DBAP 48 & DBAP 50)
- A multi-component site comprising Iron Age stonewalling as well as what appears to be a historic black homestead (DBAP 38)
- A multi-component site comprising a historic farmstead associated with two unmarked stillborn graves (DBAP 15)
- One Iron Age stonewalled site and/or historic black homestead associated with possible rock engravings (DBAP 2)
- One Stone Age site (DBAP 7)
- Two sites where adits, shafts, and workings relating to historic mining activities were identified (DBAP 12 & DBAP 13)

- Three sites where grinding surfaces with little associated cultural material or features were identified (DBAP 4, DBAP 24 & DBAP 46)
- One historic structure which may have been associated with the historic farmstead at DBAP 15 (DBAP 14)
- One site comprising a single stonewalled enclosure which may have been associated with the nearby Iron Age stonewalled sites (DBAP 49)
- One site comprising a single stonewalled enclosure which may have had a military association (DBAP 53)
- Two sites identified during a previous study undertaken by Samancor that could not be located during the present fieldwork. These sites appear to comprise a grave (DBAP 36) and a historic black homestead (DBAP 41)

Impact Assessment and Mitigation

An overlay of the identified archaeological and heritage sites over the proposed development footprint areas was made, which was used to assess the impact of the proposed development on these identified archaeological and heritage sites. Both pre-mitigation and post-mitigation impact assessments were undertaken. Please refer Chapter 7 for the impact assessment calculations. A series of site-specific mitigation measures are outlined in Chapter 8 of this report.

General Recommendations

The following general recommendations are made:

- All sites of Medium to High Significance not located close enough to the present development footprints to warrant site-specific mitigation, must be included in an overall conservation management plan.
- Should the development footprints change or be altered in any way, these changes must be assessed in the field by a heritage specialist/archaeologist before construction commences.

Conclusions

While the unmitigated impact of the proposed development is expected to result in a high negative impact in terms of the identified archaeological and heritage sites located here, these impacts can be suitably mitigated to acceptable levels by way of a range of mitigation measures outlined in this report. As a result, 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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1 INTRODUCTION

PGS Heritage (Pty) Ltd was appointed by SRK Consulting (South Africa) Pty Ltd to undertake a Heritage Impact Assessment (HIA), which forms part of the environmental process for the proposed Der Brochen Amendment Project, located south of Steelpoort, Greater Tubatse Local Municipality, Greater Sekhukhune District Council, Limpopo Province.

1.1 Scope of the Study

The aim of this HIA is to identify possible heritage sites and finds that may occur in the proposed development area and to assess the impact of the proposed development on these identified heritage sites. The study also aims to inform the developers to manage 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) (NHRA).

1.2 Specialist Qualifications

This HIA was compiled by PGS Heritage (Pty) Ltd. The staff at PGS Heritage (Pty) Ltd. has a combined experience of nearly 70 years in the heritage consulting industry and has extensive experience in managing HIA processes. PGS will only undertake heritage assessment work where the staff has the relevant expertise and experience to undertake that work competently. Polke Birkholtz, the project manager and author, is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist and is also accredited with the CRM Section of the same association. He has 18 years of experience in the heritage assessment and management field and holds a B.A. (cum laude) from the University of Pretoria specialising in Archaeology, Anthropology and History and a B.A. (Hons.) in Archaeology (cum laude) from the same institution.

1.3 Assumptions and Limitations

The following assumptions and limitations to this study exist:

- Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites, as

well as the density of vegetation cover found in some areas. As such, should any heritage features and/or objects not included in the present 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. In the event that any graves or burial places are located during the development, the procedures and requirements pertaining to graves and burials will apply as set out below.

1.4 Legislative Context

The identification, evaluation, and assessment of any cultural heritage site, artefact or finds 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

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

- i. GNR 982 (Government Gazette 38282, 14 December 2014) promulgated under the National Environmental Management Act (NEMA) Act 107 of 1998
 - a. Basic Assessment Report (BAR) – Regulations 19 and 23
 - b. Environmental Scoping Report (ESR) – Regulation 21
 - c. Environmental Impacts Assessment (EIA) – Regulation 23
 - d. Environmental Management Programme (EMPr) – Regulations 19 and 23
- 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 authorisation 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 any area within 10m of such representation;
- 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

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

- 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

Early Stone Age

The earliest archaeological phase identified in South Africa. It refers to the archaeology of the Stone Age, dating to between roughly 700 000 and 2 500 000 years ago.

Heritage

That which is inherited and forms part of the National Estate (historical places, objects, and 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

The archaeology of the last 1000 years up to the 1800s, 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

The study of fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and of any site which contains such fossilised remains or trace.

Study Area

The term study area refers to the area that is defined in Section 2.1 of this report.

Development Footprint Areas

Development footprint areas represent the actual development areas such as the TSF extension area.

Table 1 - Abbreviations

ABBREVIATION	DESCRIPTION
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resources Management
DEA	Department of Environmental Affairs
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment / Early Iron Age
EMPr	Environmental Management Programme Report
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
LSA	Later Stone Age
LIA	Late Iron Age
MIA	Middle Iron Age
MSA	Middle Stone Age
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Authority
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System

Refer to **Appendix A** for further discussion on heritage management and legislative matters.

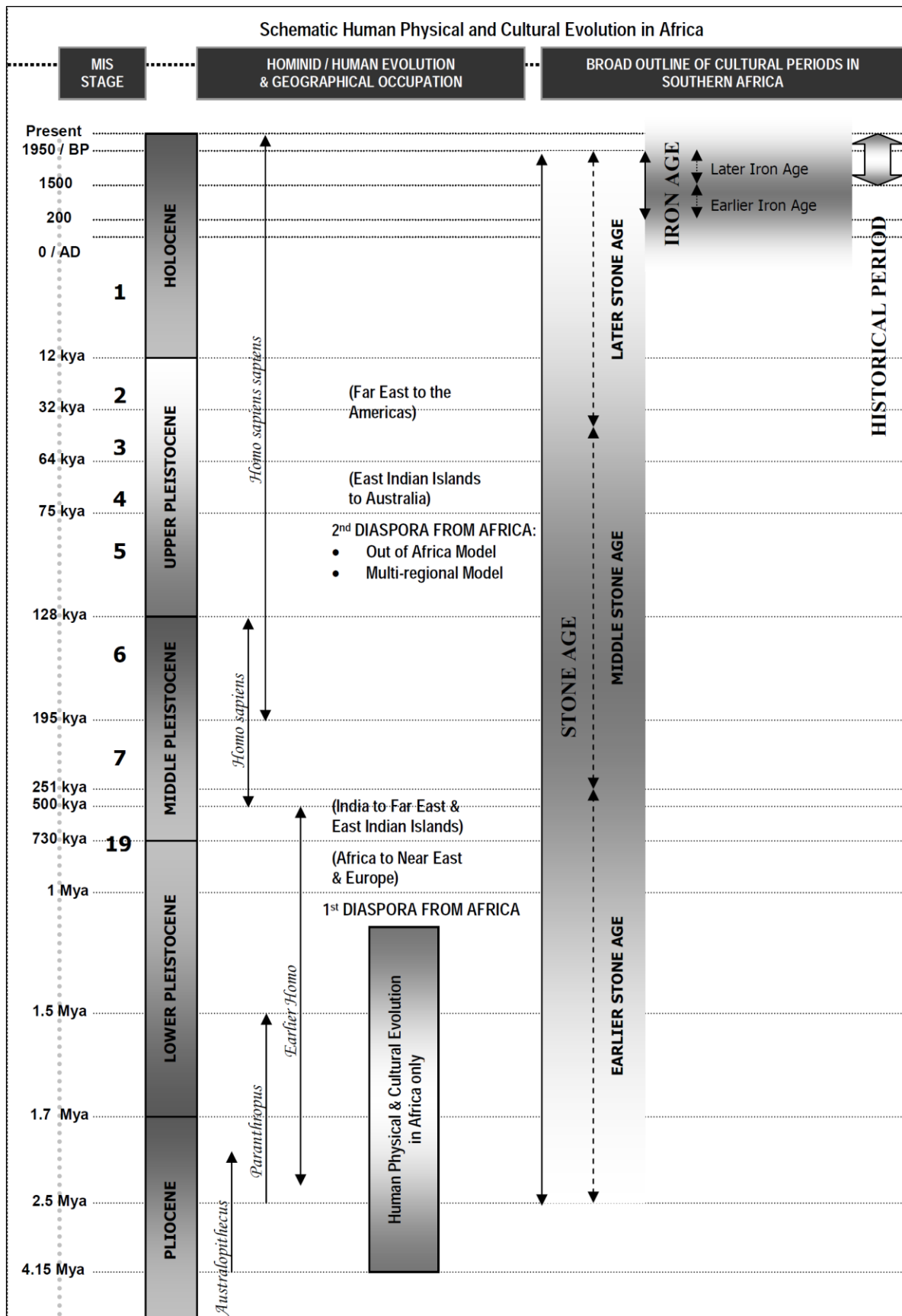


Figure 1 – Human and Cultural Timeline in Africa (Morris, 2008).

2 TECHNICAL DETAILS OF THE PROJECT

2.1 Site Location

Coordinates	Approximate Central Point: S 25.010944 E 30.110181
Location	The Der Brochen Project is located approximately 30 km south-southwest of the town of Steelpoort (approximately 40 km by road) and 35 km west of Mashishing (Lydenburg) (approximately 65 km by road). It is located in the Greater Tubatse Local Municipality and is situated within the Greater Sekhukhune District Municipality of the Limpopo Province.
Property	Sections of the farms Helena 6 JT, Der Brochen 7 JT and Mareesburg 8 JT.
Map Sheet	2530AA Draaikraal
Extent	Unknown

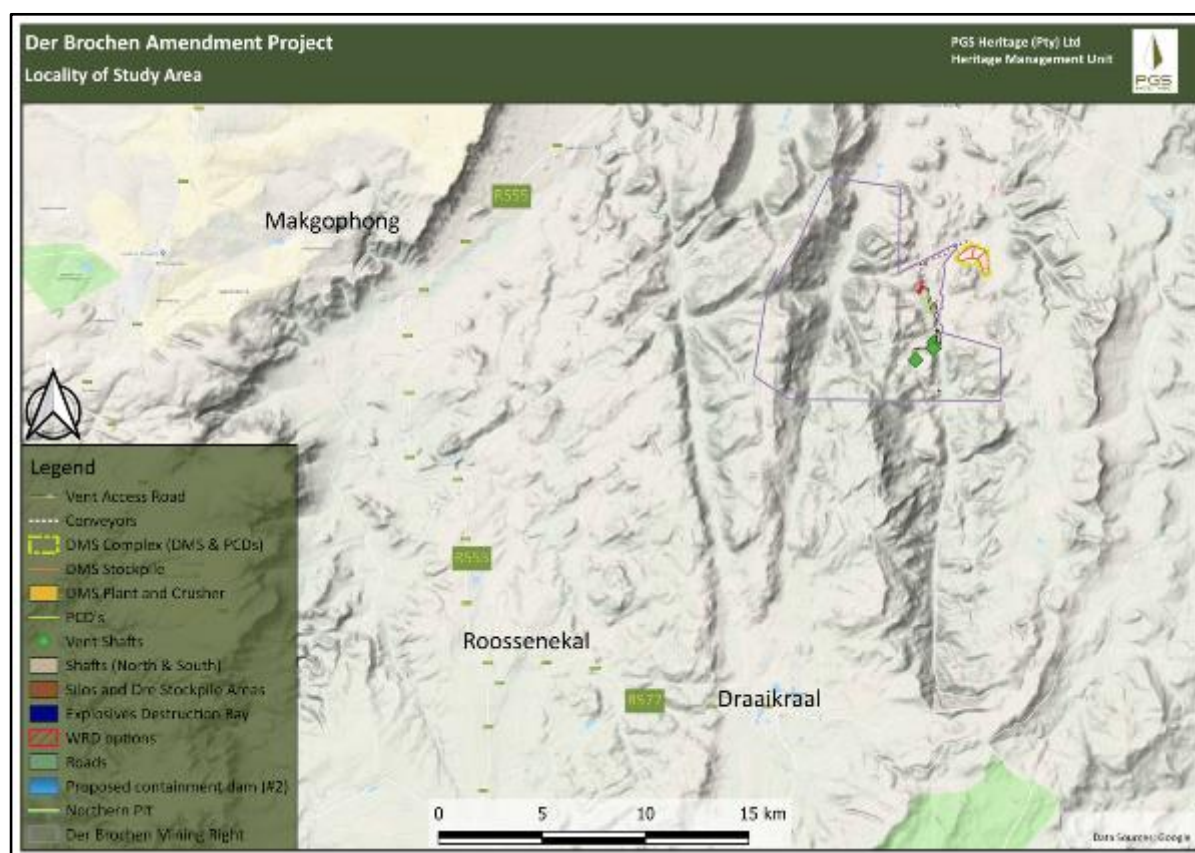


Figure 2 – Locality plan depicting the study area within its wider surrounding landscape. Map compiled by PGS Heritage.

2.2 Technical Project Description

The content of this section was provided by Ms. Estie Retief of SRK Consulting.

2.2.1 Introduction

SRK Consulting (South Africa) (Pty) Ltd (SRK) has been appointed by Anglo American Platinum (AAP) - Rustenburg Platinum Mines Limited (RPM) to undertake the integrated environmental authorisation process for its proposed Der Brochen Amendment Project in in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) and National Water Act, 1998 (Act No. 36 of 1998) (NWA).

2.2.2 Project Background

The Der Brochen Mine is a Platinum Group Metals Project owned by Rustenburg Platinum Mines Limited (RPM), a wholly owned subsidiary of Anglo American Platinum (AAP), and is located approximately 25 km south-west of the town of Steelpoort, and 40 km west of Mashishing (Lydenburg), in the Limpopo Province. The mine falls within the Greater Tubatse Local Municipality, under the jurisdiction of the Greater Sekhukhune District Municipality.

The Der Brochen Mine's mining right falls on the following farms:

- Richmond 370 KT;
- St George 2 JT;
- Hermansdal 3 JT;
- Hebron 5 JT;
- Helena 6 JT; and
- Der Brochen 7 JT.

In addition to the above-mentioned farms, RPM also holds the surface right to Portion 7 of the farm Mareesburg 8 JT on which the Mareesburg tailings storage facility (TSF), associated return water dams (RWDs) and tailings-return water pipeline are located, which forms part of the Der Brochen Mine operation.

The following activities and infrastructure are associated with the Der Brochen Mine, as authorised

through the Der Brochen Mine's approved Environmental Management Programmes (EMPrs) and Water Use Licences (WULs):

- **Existing facilities and activities:**

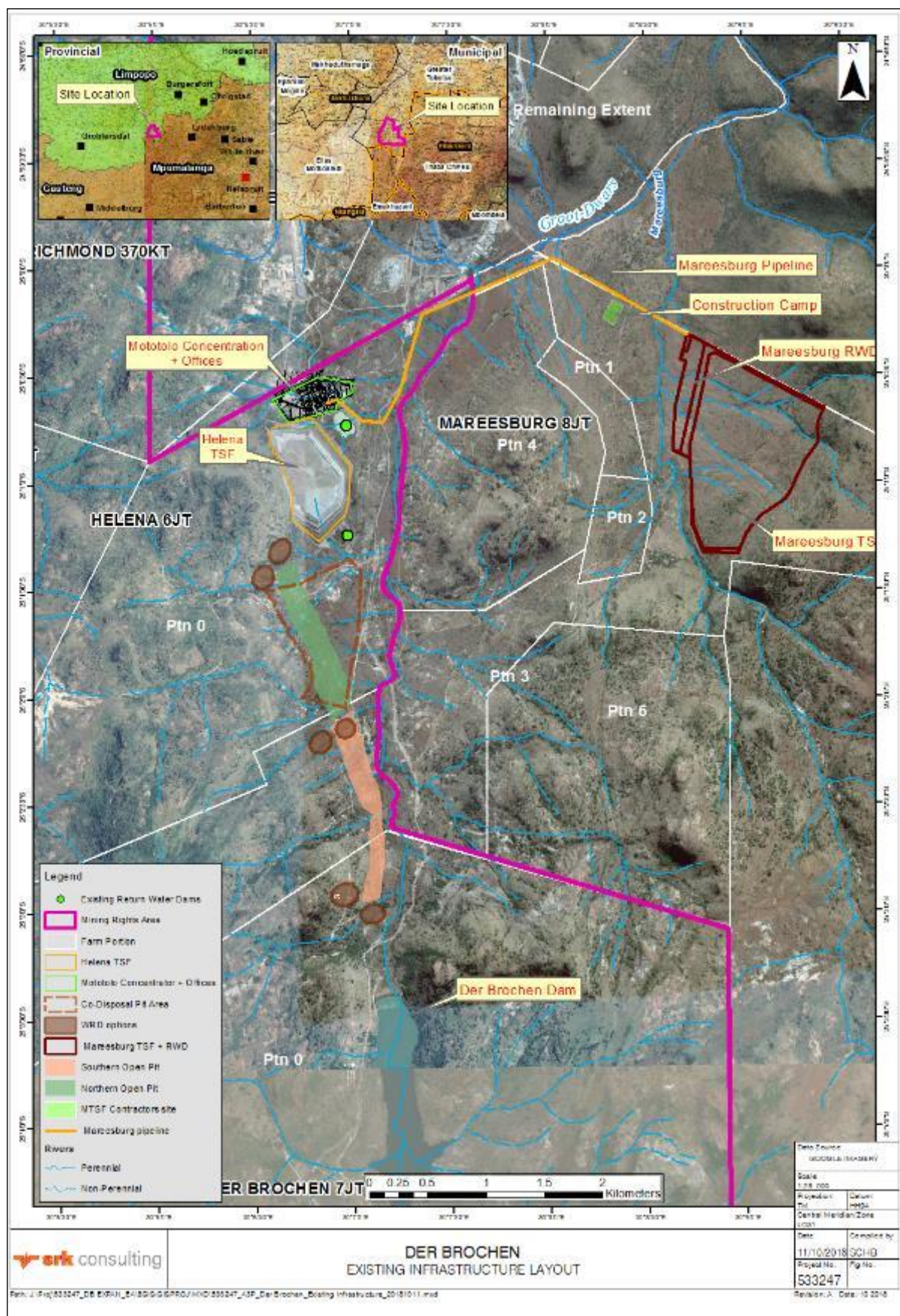
- Mototolo Concentrator;
- Helena TSF and two associated Return Water Dams (RWDs);
- Raising of the Helena Tailings Storage Facility (TSF);
- Mine offices (old farmhouse) and access roads;
- In-stream surface water monitoring weirs (five) with four of the weirs up and downstream within the Groot- and Klein Dwars Rivers supporting monitoring of the two authorised wellfields;
- Prospecting activities comprising of site preparation, drilling of prospecting boreholes, site rehabilitation and monitoring;
- Trial mining area on the Richmond farm (activity is completed, and the soil stockpile and waste rock dump are well vegetated);
- Abstraction of groundwater in support of mining from the Helena and Richmond licensed wellfields;
- Abstraction from Der Brochen Dam based on an existing lawful industrial allocation; and
- Monitoring of surface and groundwater.

- **Activities previously authorised, but which has not yet commenced:**

- The Helena and Richmond wellfields (only two of the authorised boreholes per wellfield currently in use);
- Helena and Richmond shafts and associated waste rock dumps;
- Two Open Pits (Northern and Southern Pits) and associated waste rock/overburden dumps and pollution control dam;
- Re-routing of a 132 kV powerline; and
- A Co-Disposal Facility (tailings disposal with a rock embankment in the north pit).

- **Authorised activities under construction:**

- Mareesburg TSF and associated Return Water Dams (RWDs); and
- Mareesburg tailings-return water pipeline system to Mototolo Concentrator.



2.2.3 Der Brochen Amendment Project – Project Description

It is the intention of RPM to amend the Der Brochen Mine's approved EMPr and associated Environmental Authorisation (EA) including updating their WUL to include the following:

- The construction of a buttress wall at the existing Helena TSF under emergency circumstances as well as the development of an additional filter press plant at the existing Mototolo Concentrator Plant;
- The Der Brochen Mine's updated topsoil management procedures; and
- The development and operation of the following additional mining related infrastructure as part of the mine's development strategy:
 - The South Decline Shaft with associated infrastructure, i.e. water management infrastructure;
 - The previously approved North Opencast Pit with associated infrastructure as previously approved in 2015, i.e. water management infrastructure and waste rock stockpiles;
 - Three up-cast ventilation shafts required for the underground workings associated with the South Decline Shaft;
 - A Dense Medium Separation (DMS) Plant to be located within the existing footprint area of the Mototolo Concentrator area;
 - A DMS Stockpile with associated water management infrastructure;
 - The conversion of the existing Mototolo chrome plant from a final tailings' arrangement to an interstage arrangement;
 - Additional Run of Mine stockpiles and associated silos;
 - Change houses & office complex to be located at the proposed South Decline Shaft area;
 - An explosive destruction bay area to be located near the proposed South decline shaft;
 - Staff accommodation facilities to be located near the Der Brochen Dam; and
 - Additional linear infrastructure, i.e.:
 - Two conveyor systems. One conveyor belt system will be constructed to connect the proposed South Decline Shaft with the proposed DMS Plant that will be located in the existing footprint area of the Mototolo Concentrator Plant, for the purpose of transporting ore from the South Decline Shaft to the plant area. Another conveyor belt system will be required to transport DMS material from the proposed DMS Plant to the proposed DMS Stockpile area. It is currently anticipated that the DMS conveyor system will run along the existing Mareesburg tailings pipeline system.

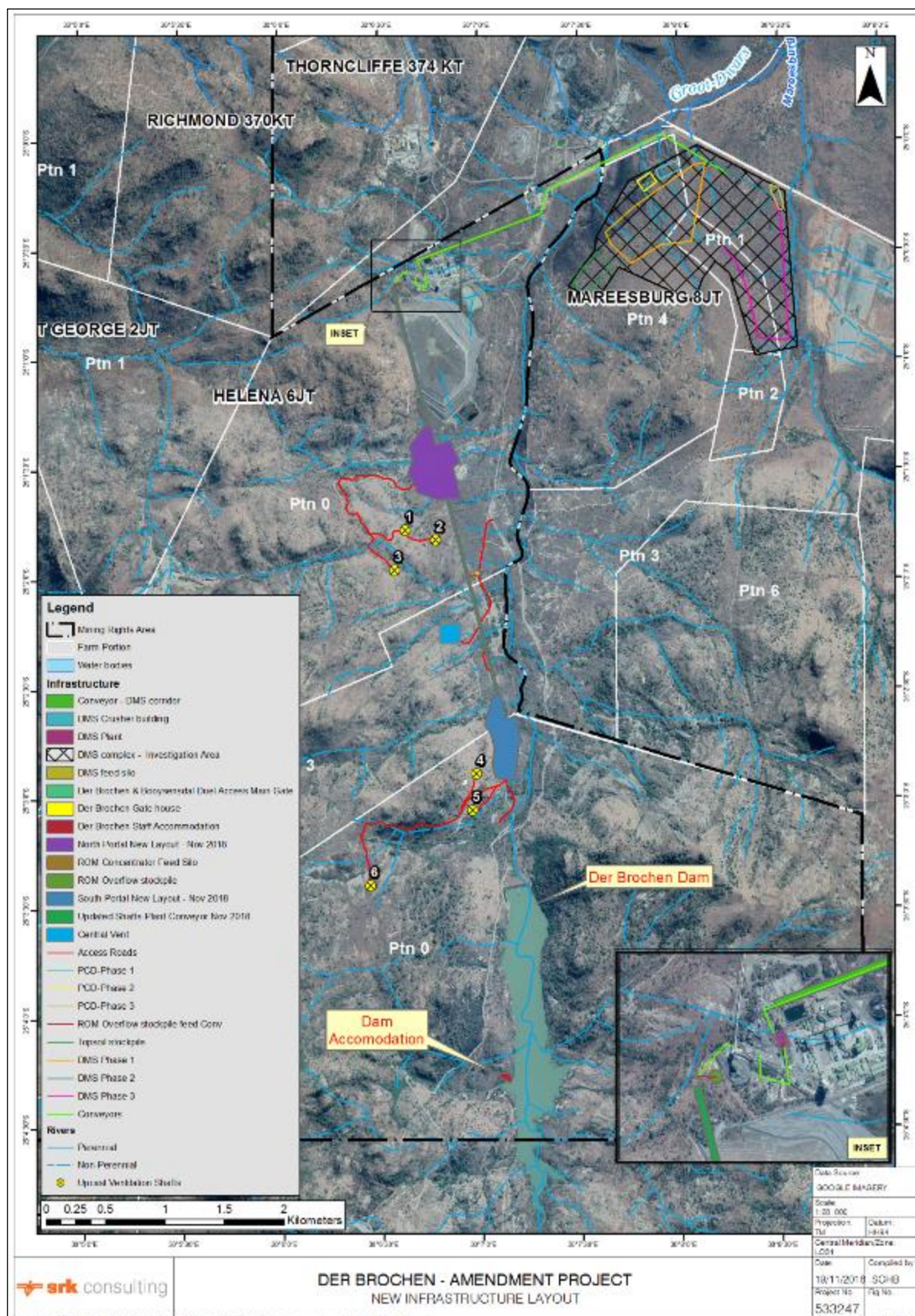


Figure 4 – Required infrastructure for the Der Brochen Mine Amendment Project. Figure supplied by SRK Consulting. Please note that the central ventilation area still depicted on this map, will no longer be required.

3 ASSESSMENT METHODOLOGY

3.1 Methodology for Assessing Heritage Site Significance

The HIA process consisted of three steps:

Step I – Desktop Study: An archaeological and historical background study was undertaken using available sources. This was augmented by an assessment of historic aerial photographs, which assisted with the identification of heritage sites. Previous archaeological and heritage studies from the study area and surroundings were also accessed using inter alia the South African Heritage Resources Information System (SAHRIS) of the South African Heritage Resources Agency (SAHRA).

Step II – Physical Survey: Intensive field surveys of the study area were primarily undertaken on foot by an experienced fieldwork team comprising one archaeologist and heritage specialist (Polke Birkholtz) accompanied by a fieldwork assistant (Derrick James). The fieldwork was aimed at locating and documenting sites falling within the proposed development area. The fieldwork was undertaken over the course of the following six fieldwork trips:

- 5 March – 9 March 2018
- 27 March – 29 March 2018
- 18 April 2018
- 20 August – 22 August 2018
- 20 November - 22 November 2018
- 28 January – 30 January 2019

Step III – The final step involved the recording and documentation of relevant heritage resources, the assessment of resources in terms of 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
- the 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 below).

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

As part of the integrated environmental authorisation process, various specialist studies will need to be undertaken in support of the Environmental Impact Assessment (EIA) and the development of the Environmental Management Programme (EMPr).

All specialists are required to assess each proposed activity/aspect of the Der Brochen Amendment Project in relation to the construction, operational, closure and decommissioning phases in order to identify the potential impacts that may be associated with such activity and to develop appropriate mitigation measures that can be implemented to reduce or eliminate the potential impacts identified.

The specialist will assess the potential impact identified according to the Impact Assessment Methodology described below. This Impact Assessment Methodology has been formalised by SRK to comply with the EIA Regulations of 2014 (as amended) promulgated under NEMA, which states the following:

An environmental impact assessment report must contain all information that is necessary for the competent authority to consider the application and to reach a decision, and must include – an assessment of each identified potentially significant impact, including –

- (i) cumulative impacts;*
- (ii) the nature, significance and consequence of the impact and risk;*
- (iii) the extent and duration of the impact and risk;*
- (iv) the probability of the impact and risk occurring;*
- (v) the degree to which the impact and risk can be reversed;*
- (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and*
- (vii) the degree to which the impact and risk can be mitigated.*

Based on the above, the Impact Assessment Methodology requires that each potential impact identified is clearly described (providing the nature of the impact) and be assessed in terms of the following factors:

- **extend** (spatial scale) - *will the impact affect the national, regional or local environment,*

or only that of the site?;

- **duration** (temporal scale) - *how long will the impact last?;*
- **magnitude** (severity) - *will the impact be of high, moderate or low severity?;* and
- **probability** (likelihood of occurring) - *how likely is it that the impact may occur?.*

To enable a scientific approach for the determination of the environmental significance (importance) of each identified potential impact, a numerical value has been linked to each factor.

Occurrence	Duration:	Probability:
	5 - Permanent	5 – Definite/don't know
	4 – Long-term (ceases with the operational life)	4 – Highly probable
	3 – Medium-term (5-15 years)	3 – Medium probability
	2 - Short-term (0-5 years)	2 – Low probability
	1 – Immediate	1 – Improbable
Severity		0 – None
	Extent/scale:	Magnitude:
	5 – International	10 - Very high/uncertain
	4 – National	8 – High
	3 – Regional	6 – Moderate
	2 – Local	4 – Low
	1 – Site only	2 – Minor
	0 – None	

Once the above factors had been ranked for each identified potential impact, the environmental significance of each impact can be calculated using the following formula:

$$\text{Significance} = (\text{duration} + \text{extend} + \text{magnitude}) \times \text{probability}$$

The maximum value that can be calculated for the environmental significance of any impact is 100. The environmental significance of any identified potential impact is then rated as either: high, moderate or low on the following basis:

- More than 60 significance value indicates a high (H) environmental significance impact;

- Between 30 and 60 significance value indicates a moderate (M) environmental significance impact; and
- Less than 30 significance value indicates a low (L) environmental significance impact.

In order to assess the degree to which the potential impact can be reversed and be mitigated, each identified potential impact will need to be assessed twice.

- Firstly, the potential impact will be assessed and rated **prior** to implementing any mitigation and management measures; and
- Secondly, the potential impact will be assessed and rated **after** the proposed mitigation and management measures have been implemented.

The purpose of this dual rating of the impact before and after mitigation is to indicate that the significance rating of the initial impact is and should be higher in relation to the significance of the impact after mitigation measures have been implemented.

In order to assess the degree to which the potential impact can cause irreplaceable loss of resources, the following classes (%) will be used and will need to be selected based on the specialist informed decision and discretion:

- 5 100% - Permanent loss
- 4 75% - 99% - significant loss
- 3 50% - 74% - moderate loss
- 2 25% - 49% - minor loss
- 1 0% - 24% - limited loss

Please note that the Loss of Resources aspect will not affect the overall significance rating of the impact.

In terms of assessing the cumulative impacts, specialists are required to address this in a sentence/ paragraph fashion as the spatial extent of the cumulative impacts will vary from project to project. Cumulative impact, in relation to an activity, means the impact of an activity that in itself may not be significant, but may become significant when added to the existing or potential impacts eventuating from similar or diverse activities or undertakings in the area.

4 CURRENT STATUS QUO

The study area is primarily situated in the valley of the Groot Dwarsrivier. As a result, it is located in an undulating landscape ranging from reasonably high ridges to more level areas.

While infrastructural development associated with existing mining activities is present in the study area and surroundings, significant components of the study area can still be described as reasonably undisturbed.

For the most part, the study area is located within the Sekhukhune Mountain Bushveld vegetation type. This vegetation type is characterised by “...dry, open to closed microphyllous and broad-leaved savanna on hills and mountain slopes that form concentric belts parallel to the northeastern escarpment. Open bushveld often associated with ultramafic soils on southern aspects. Bushveld on ultramafic soils contain a high diversity of edaphic specialists. Bushveld of mountain slopes generally taller than in the valleys, with a well-developed herb layer. Bushveld of valleys and dry northern aspects usually dense, like thicket, with a herb layer comprising many short-lived perennials. Dry habitats contain a number of species with xerophytic adaptations, such as succulence and underground storage organs. Both man-made and natural erosion dongas occur on footslopes of clays rich in heavy metals.” (www.sanbi.org). A number of these dongas were observed during the fieldwork.

In terms of geology, the Sekhukhune Mountain Bushveld vegetation type is associated with “...rocks mainly ultramafic intrusives of the lower, critical and main zones of the eastern Rustenberg Layered Suite of the Bushveld Igneous Complex (Vaalian). Three subsuites (zones), namely Croydon, Dwars River and Dsjate consist mainly of norite, pyroxenite, anorthosite and gabbro, and are characterised by localised intrusions of magnetite, diorite, dunite, bronzitite and harzburgite. Soils are predominantly shallow, rocky and clayey.” (www.sanbi.org).

A number of photographs will be depicted providing general views of the study area and the landscape within which it is located.



Figure 5 - General view of a section of the study area showing the undulating character of the landscape within which the study area is located.



Figure 6 – Another view of a section of the study area. The view shown in this image is across the valley of the Groot Dwarsrivier.



Figure 7 – Another view of a section of the study area. The view shown in this image is of a non-perennial stream and surroundings on the farm Mareesburg.



Figure 8 – General view of the Helena TSF. Existing mining infrastructure such as this TSF is found across the landscape within which the study area is located. Sections of the study area footprints are located in close proximity to the Helena TSF.

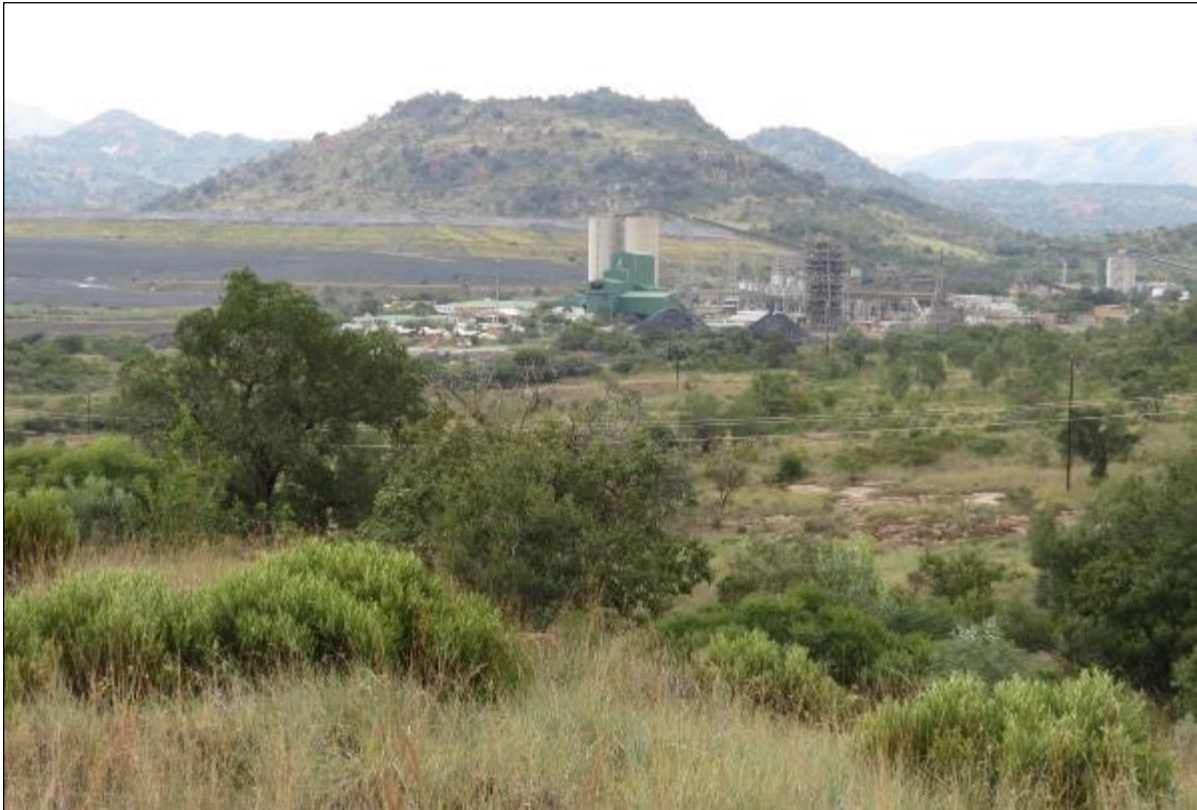


Figure 9 – General view of the Mototolo Concentrator. Sections of the study area footprints are located in close proximity to this concentrator.



Figure 10 – General view of a section of the study area. The Maresburg TSF which is currently under construction can be seen in the background on the right.

5 DESKTOP STUDY FINDINGS

5.1 Archaeological Overview of the Study Area and Surroundings

DATE	DESCRIPTION
The Study Area and Surroundings during the Stone Age	
The South African Stone Age is the longest archaeologically-identified phase identified in human history and lasted for millions of years.	
2.5 million - 250 000 years ago	<p>The Early Stone Age is the first and oldest phase identified in South Africa's archaeological history and comprises two technological phases. The earliest of these technological phases is known as Oldowan, which is associated with crude flakes and hammerstones and dates to some 2 million years ago.</p> <p>The second technological phase in the earlier stone age of Southern Africa is known as 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.</p> <p>No Early Stone Age sites are known to be located within the study area or its immediate surroundings.</p>
250 000 to 40 000 years ago	<p>The Middle Stone Age 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.</p> <p>A low-density surface scatter of Middle Stone Age lithics was identified during the present fieldwork (refer site DBE 6). Additionally, during an archaeological survey conducted in 2002, 'widely scattered' Middle Stone Age lithics were identified in the footprint area of the Mareesburg TSF (Huffman, 2002).</p>
40 000 years ago to the historic past	<p>The Later Stone Age is the third archaeological phase identified and is associated with an abundance of very small artefacts known as microliths. A well-known feature of the Later Stone Age is rock art in the form of rock paintings and engravings.</p> <p>No Later Stone Age sites are known to be located within the study area. This said a Later Stone Age site was identified on the farm Richmond 370 KT during an archaeological survey (Roodt, 2008). This site is located approximately 4.5km north-west of the present study area.</p>
The Study Area and Surroundings during the Iron Age	
The arrival of early farming communities during the first millennium, heralded in the start of the Iron Age for South Africa. The Iron Age is that period in South Africa's archaeological history associated with pre-colonial farming communities who practiced cultivation and pastoralist farming activities, metal working, cultural customs such as lobola and whose settlement layouts show the tangible representation of the significance of cattle (known as the Central Cattle Pattern) (Huffman, 2007).	
AD 450 – AD 750	The Mzonjani facies of the Kwale Branch of the Urewe Ceramic Tradition is

	<p>the earliest Iron Age presence for which archaeological evidence had been found in the surroundings of the study area. The key features on the decoration of the ceramics from this facies comprise punctuates on the rim and spaced motifs on the shoulder of the vessel (Huffman, 2007).</p> <p>No sites associated with the Mzonjani facies are known to be located within the study area or its immediate surroundings.</p>
AD 750 – AD 1000	<p>The Doornkop facies of the Happy Rest Sub-branch of the Kalundu Ceramic Tradition is the second Iron Age presence in the study area and surroundings. The key features on the decoration of the ceramics from this facies comprise multiple herringbone bands in neck (Huffman, 2007).</p> <p>No sites associated with the Doornkop facies are known to be located within the study area. However, during a heritage study of the farm Richmond 370 KT, Iron Age sites with probable Doornkop type pottery were identified (Roodt, 2008).</p>
AD 1000 – AD 1300	<p>The Eiland facies of the Happy Rest Sub-branch of the Kalundu Ceramic Tradition is the third Iron Age presence for which archaeological evidence had been found in the surroundings of the study area. The key features on the decoration of the ceramics from this facies comprise fine herringbone with ladder stamping (Huffman, 2007).</p> <p>No sites associated with the Eiland facies are known to be located within the study area. However, during an archaeological survey conducted in 2002 by Professor Tom Huffman, two Eiland sites were identified approximately 600m north of the closest point of the present study area (Huffman, 2002).</p>
AD 1000 – AD 1200	<p>The Klingbeil facies of the Happy Rest Sub-branch of the Kalundu Ceramic Tradition is the fourth Iron Age presence in the study area and surroundings. The key features on the decoration of the ceramics from this facies comprise triangles in neck bordered with slashes and punctuates on the shoulder of the vessels (Huffman, 2007).</p> <p>No sites associated with the Klingbeil facies are known to be located within the study area or its immediate surroundings.</p>
AD 1300 – AD 1500	<p>The Icon facies of the Moloko Branch of the Urewe Ceramic Tradition is the fifth Iron Age presence for which archaeological evidence had been found in the surroundings of the study area. The key features on the decoration of the ceramics from this facies comprise multiple incised bands separated by colour and lip decoration on bowls (Huffman, 2007).</p> <p>An Iron Age site with ceramics containing early Moloko decoration was identified during an archaeological survey for the proposed Mareesburg Joint Venture Mine (Matakoma, 2007). This site is located 2.5km south of the present study area components located on the farm Mareesburg 8 IT. Furthermore, during a heritage study of the farm Richmond 370 KT, Iron Age sites with Icon type pottery were identified (Roodt, 2008).</p>
AD 1650 - AD 1840	<p>The Marateng facies of the Moloko Branch of the Urewe Ceramic Tradition is the sixth Iron Age facies to be identified within the surroundings of the study area. The key features of the decoration used on the ceramics</p>

	<p>from this facies include incised arcades on upper shoulder separating black and red (Huffman, 2007). The Marateng facies can be associated with modern Pedi.</p> <p>During the present survey, Marateng pottery was identified at site DBE 7, which is located within the Helena Waste Rock Dump Alternative. Marateng sites were also identified during other surveys in the surroundings of the study area, and is expected to be found quite widespread in this area.</p>
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5.2 Aspects of the History of the Study Area and Surroundings

5.2.1 Late Iron Age and Historic Black Settlement

5.2.1.1 The situation during the early nineteenth century

According to Bergh (1999), the Pedi, Roka, Koni and Tau were settled in the wider region during the start of the nineteenth century. As confirmation of this, Schoeman (1997) indicates that when the Bapedi settled in the Sekhukhuneland region during the second half of the seventeenth century (Schoeman, 1997), a number of groups such as the Kwena, Roka, Koni and Tau had preceded them there.

The Kwena of Mongatane was the first of these groups to settle in this wider area. Upon reaching the Olifants River, they split up into two groups. The first of these was under the leadership of Masabela, who established the first permanent Sotho settlement in Sekhukhuneland. The second group under Kope, decided to proceed upstream along the Olifants River and subsequently established themselves near present-day Groblersdal. It was this second group under Kope that later became known as the BaKopa.

With time the Phasa, related to the group of Masabela, also moved into the Sekhukhuneland region. Although both these groups referred to themselves as the Roka, other groups of a similar name were also found here. After the settlement of the Roka, and by approximately 1700, various Koni and Tau groups also moved into the area.

5.2.1.2 Khumalo Ndebele

The Khumalo Ndebele of Mzilikazi was a Northern-Nguni group that moved out of KwaZulu-Natal during 1821. They first settled at the confluence of the Vaal and Olifants Rivers from where they moved further north and fought with the Ndzundza-Ndebele of Magodongo who resided near

present-day Stoffberg. The Ndzundza-Ndebele were defeated, and Mzilikazi and his followers settled temporarily in these parts (Bergh, 1999).

During their short residence in the area, the Khumalo-Ndebele attacked the Koni of Makopole in the vicinity of present-day Lydenburg, before attacking the Bapedi of Maroteng in 1822.

Mzilikazi then turned his attention to the area between the Olifants and Steelpoort Rivers, which was the heartland of the Bapedi. In the ensuing military activities, the Pedi paramount leader Phetedi, as well as most of his brothers, were killed. However, one of the brothers managed to escape northwards and survived. He was Sekwati.

Sekwati returned to the area in 1828 and settled at Phiring, from where he started to rebuild the Maroteng kingdom.

According to Smith (1969), the Khumalo-Ndebele stayed in the wider surroundings of the present study area for approximately a year, and during this time raided or destroyed much of the grain and livestock of the surrounding communities.

5.2.1.3 Bapedi

As mentioned before, the Bapedi settled in the Sekhukhuneland region during the second half of the seventeenth century (Schoeman, 1997).

During the later stages of the 1700s and early period of the 1800s, the Morateng group of the Bapedi became the most dominant force in the area, subjecting many of the other communities and groups. They reached their zenith during the rule of Thulare (ca. 1790 – ca. 1820).

Although the heartland of the BaPedi kingdom was the area between the Olifants and Steelpoort Rivers, their influence stretched much further than that. For example, the winter pasture of Sekwati was located in the areas directly to the east of the Steelpoort River.

5.2.2 Voortrekkers and the establishment of Ohrigstad and Lydenburg

In an effort to get further away from British influence, and at the same time closer to the market at

Delagoa Bay, the Voortrekker leader Andries Hendrik Potgieter together with a large following, moved from areas only recently established after the Great Trek such as Potchefstroom, Pretoria and the Magaliesberg to the vicinity of Ohrigstad. It is estimated that by August 1845, there were already a thousand Voortrekkers resident in the surroundings of Ohrigstad (Botha, 1958).



Figure 11 – Andries Hendrik Potgieter (Pienaar, 1990:136).

Attention now focused on the establishment of a town, and as early as 30 July 1845 a meeting was held at the new town named Ohrigstad. The meeting was aimed at reorganising the Voortrekker government and also establishing a new *Volksraad* (Botha, 1958).

The wider areas surrounding the town also became increasingly settled by the new arrivals. During the period between August 1845 and December 1847, a total of 406 individual farms were proclaimed.

Due to a number of reasons, including the prevalence of malaria, the settlement of Ohrigstad began to decline. As a result, the *Volksraad* came together on 19 September 1849 in the higher-lying town of Krugerspos and decided that a new town was to be established in a healthier area. On 20 September 1849, the decision was made to name the new town “Leidenburg”, and on 23 January 1850, the *Volksraad* in Potchefstroom decided that the new town was to be established on the farm Rietspruit (Botha, 1958:91).

The Lydenburg district was proclaimed as an independent state, namely the Republic of Lydenburg, on 17 December 1856 (Duvenage, 1966).

5.2.3 Relations between the Voortrekkers and Bapedi during Sekwati’s reign

In July 1845 the Voortrekker leader A.H. Potgieter negotiated a settlement with Sekwati. This settlement was aimed at allowing Potgieter’s followers to settle and establish farms in present-day Mpumalanga. However, relations turned sour when the *Volksraad* negotiated and made a separate agreement with the Swazi kingdom to allow white farmers to settle in the areas falling under Sekwati’s rule. Sekwati was very unhappy about this agreement in that he felt that as the Swazi never managed to subject him, he still had the only say in terms of the land in question.

Nonetheless, farmers started establishing farms over large parts near Ohrigstad and Lydenburg, as well as quite close to Sekwati’s residence and capital.

Although the initial stages (1845 to 1846) of contact between the Bapedi of Sekwati and the Boers was characterised by peace, this issue regarding the land negotiations started to have a negative impact on the relationship.

By August 1852, relations had so deteriorated that Potgieter led a commando against Sekwati. The commando, assisted by Black forces, was not able to defeat the Pedi at their Phiring stronghold and lay a siege around the town in an attempt to subjugate them. The siege also proved unsuccessful and the commando left. Although the military activities did not curtail the power and influence of Sekwati, he decided to relocate his capital to the more defensive Thaba Mosego in the Leolo Mountains.

Due to the failure of the military actions taken against Sekwati, as well as the secession of the

Lydenburg Republic in 1856, the Boers from these parts started making a strong motion in favour of a peaceful settlement with Sekwati. In October 1857, a commission was appointed to investigate the possible resolution of peace with the Pedi leader. Issues regarding land and boundaries were also to be discussed. On 17 November 1857, the Boers and Sekwati concluded a peace agreement. According to the terms of the agreement, the Steelpoort River was established as the boundary between the Bapedi and the Boer Republic. However, the agreement did not solve all the problems as it did not stipulate or rule on the issue of Boer farms already existing to the west of the Steelpoort River, nor did it indicate how far south the boundary of the Pedi land reached.

After the signing of the agreement, during the late 1850s, relative peace settled over the area. However, the 1860s and 1870s were characterised by friction between the Bapedi and the white farmers. These unfriendly relations worsened and culminated in open warfare during the latter part of the 1870s.

5.2.4 Relations between the Whites and Bapedi during Sekhukhune's reign

When Sekhukhune succeeded Sekwati as ruler of the Bapedi in 1861, his first priority was to strengthen his power base by eliminating or fighting any threats to his throne. Apart from the direct threats to his throne, Sekhukhune also felt threatened by a number of groups that used to be under Pedi influence. For example, both the Ndzundza-Ndebele and Bakopa started functioning independently from the Pedi during this time.

As a means of strengthening his position, Sekhukhune remained at peace with the Boers, and subsequently made an agreement with the Lydenburg Republic, which in effect upheld the same provisions contained in the 1857 agreement, with the exception that no ruling was made in terms of the Steelpoort River as the boundary.

During October 1863, Sekhukhune also sent Pedi forces to assist a Boer attack on the Ndzundza. However, the attack was a failure (Bergh, 1999).

Nevertheless, a number of factors again soured the relationship between the Bapedi and the whites (Bergh, 1999). During this time Sekhukhune sent some of his people to settle on the farms south and east of the Steelpoort River. In terms of the present study area, it is interesting to note that groups under Vroetepe and Marobele were sent to the banks of the Dwars Rivers to settle there to grow crops on the rivers' banks (Van Rooyen, 1950).

When a farmer named Jancowitz, who had bought a farm in the vicinity of Mafolofolo, was prohibited from marking the beacons on his property (or from collecting wood there) by followers of Sekhukhune's younger brother Johannes Dinkwanyane, Sekhukhune decided to send his warriors to assist his brother.

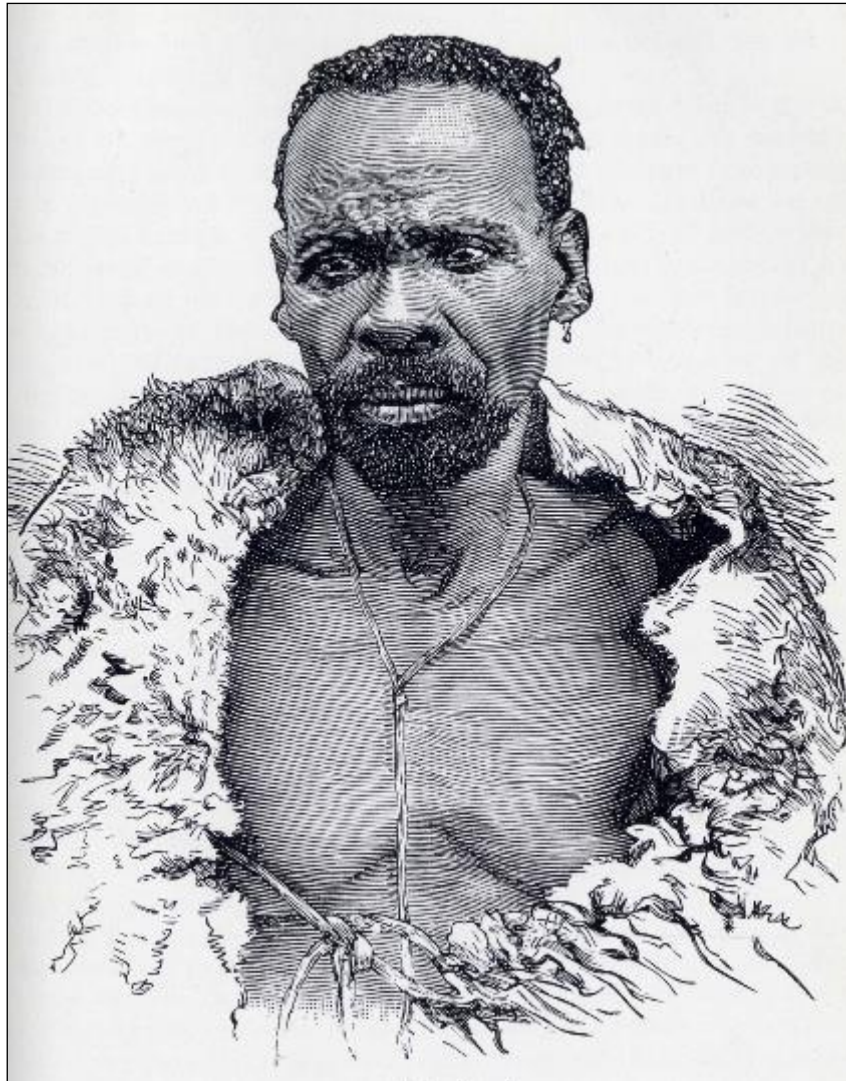


Figure 12 – Sekhukhune, ruler of the Bapedi (Grosskopf, 1957).

The Boers from the surrounding areas identified the incident as a threat and grouped themselves into lagers. They subsequently asked the government for assistance. On 16 May 1876, the *Volksraad* declared war on the Bapedi. After a number of successes, the forces of the Zuid-Afrikaansche Republiek attacked Tshate, the new capital of Sekhukhune. As the first attacks proved unsuccessful, the decision was made to place the town under siege. Although a peace agreement was signed on 16 February 1877, Sekhukhune was not in agreement with all of the provisions. The subsequent British annexation of Transvaal allowed Sekhukhune a measure of strategic space. Although negotiations

were undertaken with the new British authorities, the relations between the British and the Bapedi eventually resulted in the outbreak of war. The war ended in the attack on Sekhukhune's capital Tshate on 28 November 1879. Although Sekhukhune managed to escape, he was captured on 2 December 1879, and imprisoned at Pretoria (Bergh, 1999).

Most of the significant battles of the wars between the Bapedi of Sekhukhune and the Z.A.R. as well as the British authorities, such as the decisive Tshate battle of 28 November 1879, took place far away from the study area. However, during the war between the British forces and Sekhukhune's Bapedi of 1878-1879, a British territorial force known as the Diamond Field Horse had a military camp "...near Dwars River". The camp was situated in an area surrounded by hills and had a clear field of fire of approximately 300 to 400 yards around the camp. On 7 August 1878 the camp was attacked by a force of some 2000 men. Forty-eight head of cattle and fifty-two horses were captured by the attackers (Smith, 1966).

The exact locality of the camp is not known. While Smith (1966:24 & 25) describes it as being *"...about four miles on the Lydenburg side of Dwars River"*, it still does not give any indication from which point on the Dwars River the four miles is taken. Van Rooyen (1950) only states that the place where the Diamond Field Horse was attacked was close to the Steelpoort River. Although the camp, therefore, appears to be located some distance away from the study area, it at least indicates that the military activities during this period were not only restricted to the areas north of the Steelpoort River.

5.3 Farm Ownership Histories

5.3.1 Ownership History of the Farm Helena

The farm Helena 6 JT (previously Helena 220, before that St. Edmonds 220 and before that St. Edmonds 1177) was first inspected on 9 January 1871 by C. P. Malan. As was customary at the time, C.P. Malan was in all likelihood the local field cornet. The reason why the farm was named St. Edmonds is not presently clear. However, based on the use of the name Saint George for a neighbouring farm it would appear that the farm under discussion was named in honour of Saint Edmund the Martyr, the original pre-medieval patron saint of England who was later replaced by Saint George as the patron saint of England. It is however, unclear why such names would have been popular in the Transvaal Republic of the 1870s.

Although the farm was already inspected on 9 January 1871, it took roughly a year before it was transferred from government to its first owner. This transfer took place on 18 January 1872 and the farm's first recorded owner was Willem Fourie. Fourie remained in possession of St. Edmonds for little over a year, when on 24 February 1873 the farm was transferred to Edward Button.

Edward Button is well known as one of the earliest prospectors and miners in the then Transvaal Republic. He was born in May 1835 in Suffolk, England (National Archives, MHG, N41) and came to South Africa with his parents. His major accomplishment was the establishment of the first payable gold rush on the farm Eersteling as well as the creation of the first operating gold mine on the same farm during the early 1870s (Bulpin, 1956) (Fetherling, 1997). With money raised in England during a visit there in March 1872, Edward Button managed to float the Transvaal Gold Mining Company that was to mine for gold at Eersteling and also bought a 12-stamp battery and enough stone from Scotland to build a boiler house and chimney (Bulpin 1956). The mine was in production during the 1870s but did not yield as much gold as had been hoped for and barely paid the cost of the crushing facilities. It was closed during the First Boer War in 1880.



Figure 13

Edward Button, famous gold mining pioneer, was the owner of St. Edmonds between 1873 and 1875 (<http://www.S2a3.org.za/>).

From this short historical sketch of Edward Button, it is clear that he acquired St. Edmonds shortly after establishing the Transvaal Gold Mining Company as well as the gold mine at Eersteling. It seems more than likely that his objective with the acquisition of the farm would have been prospecting.

Edward Button held on to the farm for just over two years. On 30 July 1875, he transferred St. Edmonds to his wife Emily Mary Button, who may have been his wife. Emily Mary Button owned the farm until her death in 1913. On 13 December 1913, the farm was transferred from the estate of Emily Mary Button to six family members namely Lucy Emily Button, Lilian Maud Button, Hilda Margaret Button, Flora Blanche Appleyard Robbins (born Button), Elsie Clare Arbuckle (born Button) and Bertha Mildred Blake (born Button). The Button family sold the farm to Barend Leendert Geldenhuys on 14 October 1915. This transaction ended the 42-year long ownership of the farm by the Button family.

According to records contained on the website of the Genealogical Society of South Africa (www.eggsa.org), Barend Leendert Geldenhuys (16 December 1883 – 4 October 1951) was married to Helena Catharina Grobler (24 December 1885 – 19 December 1945). From this evidence, it would appear that the name of the farm St. Edmonds was changed to Helena in honour of the farm owner's wife namely Helena Catharina Geldenhuys (born Grobler). From available information, this name change took place before 1925.

On 3 November 1917 Barend Leendert Geldenhuys subdivided the farm by transferring one third to Pieter Benjamin Bresler, with the remaining two thirds still kept by him. This represented the first subdivision of the farm. On 28 July 1922, this division was officially registered with the farm subdivided in two portions with Portion A (600 morgens in extent) transferred to Pieter Benjamin Bresler and the Remaining Extent (1 214 morgens in extent) kept by Geldenhuys. No information is known about Bresler.

On 17 March 1925, the portion of the farm belonging to Bresler was transferred to Ludwig Wipplinger. The appearance of this name on the farm ownership record is noteworthy in that a person by this name was for many years the assistant to Hans Merensky, the famous prospector and discoverer of the world's richest platinum deposit known as the Merensky Reef (Machens, 2009). It would appear that this acquisition of a portion of the farm by the assistant of Hans Merensky must be understood in the light of Merensky's strategy in the months following his discovery of the Merensky Reef in 1924 to acquire as many options as possible on farms located along this reef.

On 14 July 1931, Barend Leendert Geldenhuys transferred his remaining extent of the farm Helena to Petrus Hendrik Du Preez. This is the first appearance in the farm ownership record of the name Du Preez. It is noteworthy to mention that it is believed to have been Petrus Hendrik du Preez who built the original farmstead on Helena. This farmstead is located outside of the present study area. Petrus Hendrik du Preez was born on 9 June 1878 in the town of Middelburg in the then Cape Colony. He married Anna Johanna Espach and the couple had twelve children. One of their children, Fredrika Isabella du Preez passed away on 14 May 1937 at the age of 20 and was buried near the farmstead. This further supports the strong association of Petrus Hendrik du Preez and his family with the farmstead under discussion. Petrus Hendrik du Preez remained in possession of the remainder of the farm until his death on 6 March 1963. Although Mr. Du Preez evidently built the farmstead under discussion, his death certificate and estate file indicate that by the time of his death he was living in the suburb of Pretoria North (National Archives, MHG, 1768/63).

On 24 August 1931 Portion A of the farm Helena was transferred from Ludwig Wipplinger to the oldest son of Petrus Hendrik du Preez, Johannes Christiaan Du Preez. J.C. du Preez did not hold on to the land for long and on 2 July 1934, he transferred his portion of the farm to the Land and Agriculture Bank of South Africa. On 24 October 1938, this farm portion was transferred to Nicolaas van der Walt, who 11 years later on 14 February 1949 transferred it to Jan Gabriel Lombaard.

After the death of Petrus Hendrik du Preez, the remaining extent of the farm Helena was transferred to his son Christoffel Philippus Petrus du Preez. On 28 December 1969 Christoffel Philippus Petrus du Preez passed away and his portion of the farm was transferred to his wife Anna Maria du Preez (born Theron) (National Archives, RAK, 2905). The death certificate of Christoffel Philippus Petrus du Preez indicates that he died in his house in Vanderbijlpark, and as a result also did not live on the farm Helena at the time (National Archives, MHG, 5113/70).

5.3.2 Ownership History of the Farm Mareesburg

The farm Mareesburg 8 JT was first inspected on 9 January 1871 by C. P Malan. As was customary at the time, C.P. Malan was in all likelihood the local field cornet. Incidentally, the farm was re-inspected by W.S. Frames in 1904.

Although the farm was already inspected on 9 January 1871, it took roughly seven months before it was transferred from government to its first owner. This transfer took place on 21 August 1871 and

the farm's first recorded owner was Gabriel Stephanus Maré. It is clear that the name of the farm Mareesburg is derived from this person. Maré remained in possession of the farm for approximately 42 years, when on 10 March 1913, one-half share in the farm was transferred from Gabriel Stephanus Maré and the estate of the late G.M.W. Maré (born Minnaar, formerly Pretorius) to Christiaan Daniel Pretorius, Roelof Johannes Minnaar, Jan Dirk Cochuis, Hendrik Joachim Johannes Espag, Philippus Petrus Maré, Jan Hendrik Maré and Paulus Johannes Maré.

On 25 May 1918, a 1/14th share in the farm was transferred from the estate of Jan Dirk Cochuis to Christiaan Daniel Pretorius.

On 12 July 1920, the other half share in the farm was transferred from Gabriel Stephanus Maré to Jacob Johannes du Preez, Philippus Petrus Maré, Jan Hendrik Maré, Paulus Johannes Maré, Gabriel Stephanus Maré and Magdalena Catharina Maré.

On 19 August 1932, a 1/14th share in the farm was transferred from the estate of Roelof Johannes Minnaar to John Christian Miller. On 29 March 1933, this same 1/14th share in the farm was transferred from John Christian Miller to Jacob Johannes du Preez.

On 9 August 1937, a 13/84th share in the farm was transferred from the estate of Paulus Johannes Maré to Gabriel Stephanus Maré, Tjaart Andries Maré, Paul Johannes Maré, Gert Hendrik Maré and Philippus Petrus Maré.

On 14 November 1945, a 1/14th share in the farm was transferred from Hendrik Joachim Johannes Espag to Johann Magdalena Espag.

On 24 December 1945, a 1/12th share in the farm was transferred from the estate of the late Jacob Johannes du Preez to Johannes Christiaan du Preez, Joachim Martinus du Plessis, Jacob Johannes du Preez, Gerhardus Petrus du Plessis and Hendrik Jacobus du Preez. On the same day, a 1/14th share in the farm was transferred from the estate of the late Jacob Johannes du Preez to Anna Maria du Plessis (National Archives, RAK, 2905).

5.3.3 Ownership History of the Farm Der Brochen

The farm Der Brochen 7 JT was first inspected on 10 January 1871 by C. P Malan. As was customary at

the time, C.P. Malan was in all likelihood the local field cornet. Incidentally, the farm was re-inspected by W.S. Frames in 1904.

Although the farm was already inspected on 10 January 1871, it took roughly ten months before it was transferred from government to its first owner. This transfer took place on 15 November 1871 and the farm's first recorded owner was Joseph Robertse. Robertse did not hold on to the farm very long, and five days later, on 20 November 1871, it was transferred to Carl Gustav Corten.

Three years later, on 24 April 1874, the farm was transferred from Carl Gustav Corten to John Ross Wilson. A few months later, on 2 December 1874, the farm was transferred from Wilson to James Ferguson. Ferguson held on to the farm for just under eight years, and on 30 October 1882, one one half share in the farm was transferred from James Ferguson to Anthony Goldschmidt and Charles Sonnenberg, trading as A. Goldschmidt & Co.

On 16 June 1888, the one-half share owned by A. Goldschmidt & Co. was transferred to Ludwig Henry Goldschmidt by an Order of Court. A few months later, on 30 November 1888, the same one-half share was transferred from Ludwig Henry Goldschmidt to Hermann Ludwig Eckstein (3 August 1847 – 16 January 1893) (National Archives, RAK, 3082). Eckstein immigrated to South Africa from Germany in 1882 and became manager of the Phoenix Diamond Mining Company at Du Toit's pan in Kimberly. In 1884 he joined the partnership of Jules Porges & Co which later became known as Wernher, Beit & Co. The company was intensively involved in the Barberton and De Kaap goldfields. In 1888 Eckstein started his own firm namely Hermann Eckstein and Co. Amongst many accomplishments, Eckstein is known to have established the Chamber of Mines in Johannesburg and acted as its president until 1892. He was also one of the leading role players in the mining development of the Witwatersrand and the Transvaal Republic. In 1903, a decade after his death, Eckstein's former partners made a gift to the City of Johannesburg of a portion of land known as the Sachsenwald. This land presently includes Saxonwold, Forest Town, Zoo Lake and the Johannesburg Zoo. At the time, the area which today encompasses the Johannesburg Zoo and Zoo Lake was known as the Hermann Eckstein Park in honour of this historic figure.

On 3 January 1889, the one-half share in the farm still owned by James Ferguson, was transferred to James Ferguson junior.

On 10 June 1892, the one-half share in the farm owned by Hermann Ludwig Eckstein, was transferred

to the Transvaal Consolidated Land & Exploration Company. The purchase amount for this one-half portion of the farm was no less than £50,000. This would represent an amount of more than R50 million rand today.



Figure 14 –The image on the left is a historic portrait of Hermann Ludwig Eckstein (Johannesburg City Council, 1986:15) whereas the photograph on the right depicts a plaque at the Johannesburg Zoo commemorating the gift by Wernher Beit & Co. as well as Max Michaelis of a portion of land in the name of Hermann Eckstein which led to the establishment of the Johannesburg Zoo.

The Transvaal Land & Exploration Company was registered in the Transvaal on 18 March 1892 (South African Mining Yearbook, 1941/2). At the time of its registration, the company held 1.4 million acres of mine claims and owned 32 gold mines (www.invaluable.com). The Transvaal Consolidated Land & Exploration Company became one of the significant players in the Transvaal Republic as a land company. By the end of the nineteenth century, the company owned as many as 656 farms in the Transvaal Republic (Bonner, 2002).

On 11 July 1902, the one-half share owned by James Ferguson junior was transferred to the Transvaal and Delagoa Bay Investment Company Limited.

On 12 March 1921, the one-half share that was transferred to the Transvaal Consolidated Land &

Exploration Company in 1892 for an amount of £50,000, was transferred to Frans Johannes Parsons for an amount slightly more than £1,687, which is a fraction of the 1892 amount. On 2 February 1927, this one-half share was transferred from Frans Johannes Parsons to the Transvaal and Delagoa Bay Investment Company Limited. On 14 February 1927, this same one-half share of the farm was transferred from the Transvaal and Delagoa Bay Investment Company Limited to the Transvaal Consolidated Land & Exploration Company.

This means that by 1927 the one-half of the farm Der Brochen was owned by the Transvaal and Delagoa Bay Investment Company Limited whereas the other one half share in the farm was owned by the Transvaal Consolidated Land & Exploration Company (National Archives, RAK, 2905).

5.4 Historic Overview of Mining within the Study Area

While platinum was first found in the Lydenburg District by J.A. Lombaard on his farm Maandagshoek 254 KT (old number 148) (roughly 60 km north of the present study area), it was Hans Merensky who identified the first platinum reef in South Africa and brought it to the attention of the world (Machens, 2009). With the assistance provided by Lombaard's cousins Schalk and Willem Schoeman, Merensky also discovered platinum south of the Steelpoort River. All these discoveries and investigations were made during August and September 1924 (National Archives, MNW, MM525/25).

The discovery of a platinum reef by Hans Merensky led to a mad rush by fortune seekers, prospectors and businessman from across the country to obtain options on farms where platinum was believed to be found.

In a report written by a Dr. Wagner (during or just before 1925) on the platinum fields of the Lydenburg District, he indicated that although the platinum reef had not yet been traced all the way from Maandagshoek to Dwarsrivier, it was clearly evident on the last mentioned farm. The report also stated that the outcrop stretched over Thorncliffe and continued for nearly 16 miles all the way to Sterkfontein. With the farm Thorncliffe located directly north of Helena, it is evident that platinum had already been discovered at Helena by this time.

In fact, according to a sworn statement held at the National Archives in Pretoria, platinum was discovered on the farm Helena by Lydenburg lawyer Cornelius Jansen Weilbach on 6 December 1924 (National Archives, MNW, 775, MM1037/25). This discovery was made by Weilbach during

prospecting activities undertaken on the Remainder of the farm Helena that was owned by Barend Leendert Geldenhuys. These prospecting activities were undertaken in terms of the consent provided by the minerals rights owned by Geldenhuys and Magtild Cecilia Weilbach, Cornelius Jansen Weilbach's wife. At the time, each of the two mineral rights owners of the remainder of the farm Helena held one-half share of the mineral rights to the said portion.



Figure 15 – Hans Merensky (16 March 1871 – 21 October 1952) (Machens, 2009).

On 17 January 1925 the Platinum Proprietary Company (of Lydenburg) Limited was established (South African Mining Yearbook, 1941/42) with Cornelius Jansen Weilbach as one of the directors. On 26 January 1925 an application for discoverers rights on the farm Helena was submitted. At this point, on 17 March 1925, the portion of the farm belonging to Bresler was transferred to Ludwig Wipplinger. On 28 April 1925, Cornelius Jansen Weilbach received 20 discoverer's claims on the farm Helena and on 10 September 1925 a beacon certificate was issued which defined the boundary of Weilbach's discoverer's rights on the farm. By 14 September 1925, the ownership of mineral rights for the farm Helena was registered in such a way that of the portion of the farm owned by Barend Leendert Geldenhuys one-half share of the mineral rights was owned by Geldenhuys while the

remaining half was owned by Magtild Cecilia Weilbach (born Schoeman). In turn, of the portion owned by Ludwig Wipplinger, one half share in the mineral rights of this portion were owned by Pieter Benjamin Bresler with the remaining half share owned by Magtild Cecilia Weilbach (born Schoeman). This means that by September 1925 Mrs. Weilbach owned one-half share in the mineral rights of the entire farm.

In an article published in *“Die Huisgenoot”* of 5 June 1925, G.P. Canitz describes a visit made by him to the Lydenburg platinum fields, including the workings on Dwarsrivier. The prospecting operations undertaken on Dwarsrivier are described in some detail by Canitz (1925). He indicates that the platinum reef ran halfway up along a big mountain range on the farm, and all along the reef tunnels and shafts were excavated and bored into the mountain. The ore was then taken to the Dwarsrivier camp where it was stamped and bagged. The final phase in the process was the panning of the fine ore in the Dwars River to evaluate the quality of the platinum. It can be expected that early prospecting operations on the farm Helena would have been conducted in the same way as was the case on the farm Dwarsrivier.



Figure 16 – This historic photograph taken in 1925 shows five unnamed platinum prospectors at their camp on the farm Dwarsrivier (National Archives, Photographs, TAB, 17509). While this camp is not believed to have been located anywhere near the present study area, this photograph does provide one with an idea as to the early platinum prospecting activities in this general vicinity.



Figure 17 – Sketch of the kitchen area at the Dwars River camp c. 1925 (Canitz, 1925:23).

Cornelius Jansen Weilbach subsequently ceded his discoverer's rights to the farm to the Platinum Proprietary Company (of Lydenburg) Limited, in which he was a director. This company owned the mineral rights to the farm Helena and by c. 1929 had undertaken a "*...considerable amount of work...on the Merensky Horizon...on Helena*" (Wagner, 1973: 303).

It is not known for how long the Platinum Proprietary Company conducted mining activities on Helena, but by the early 1940s, the company was still active on the farm. At the time the company directors were D.C. Greig, Herman Ohlthaver and Ludwig Wipplinger (South African Mining Yearbook, 1941/42). While Wipplinger had been the assistant to Hans Merensky, Ohlthaver was a friend of Merensky and with his business partner Gustav Becker often supported Merensky's prospecting expeditions financially (Machens, 2009).

The company name still appears in archival records dating to 1957 (National Archives, WLD, 936/1957), but not after this date. It would appear therefore that the Platinum Proprietary Company ceased to exist during the late 1950s.

5.5 Historic to Recent Settlement of Black People in the Study Area

During the current fieldwork, a reasonably high number of historic Pedi homesteads were identified. With the study area divided into white-owned farms since 1871, the relationship between these Pedi residents of the study area and the landowners during the historic to recent period is not presently certain. General historical information indicates that these Pedi homesteads may have been the homes of tenant farmers or farm workers, but this is of course not presently certain.

During a survey undertaken by Samancor in consultation with the Choma, Tsheshane and other families, homesteads and graves associated with the Choma and Tsheshane families were identified within the sections of the study area located on the farm Mareesburg 8 JT. Other families are known to be associated with homesteads from the study area components on the farms Helena 6 JT and Der Brochen 7 JT.



Figure 18 – Depiction of a historic Pedi homestead on the 1956 aerial photograph (National Geo-spatial Information, Aerial Photograph, 367_1956_02_4328). This homestead was identified within the study area and is included in this report as site DBAP 9.

5.6 Previous Archaeological and Heritage Studies from the Study Area and Surroundings

A search of the South African Heritage Resources Information System (SAHRIS) database revealed that a number of previous archaeological and heritage impact assessments had been undertaken within the surroundings of the study area. However, only one of these previous studies appears to have had a study area which including sections of the present study area. This study is discussed below:

- ***Huffman, T. & H.S. Schoeman. 2002. Archaeological Assessment of the Der Brochen Project, Mpumalanga***

A total of 25 archaeological and heritage sites were identified during this 2002 study. These identified sites included cemeteries, historic to recent Pedi homesteads, Iron age sites as well as Stone Age sites. Four of the sites identified by Huffman & Schoeman (2002) were also identified during the present fieldwork. These are included in this report as sites DBAP 9, DBAP 10, DBAP 21 and DBAP 22.

A number of archaeological and heritage impact assessments are known from the surroundings of the study area. None of the study areas assessed during these studies are located close to the present study area. Examples of these previous reports include the following:

- ***Pistorius, J. 2006. Phase 1 Heritage Impact Assessment Study for the Proposed New Everest North Platinum Mine in the Limpopo Province of South Africa***
- ***Van der Walt, J. & W. Fourie. 2007. Archaeological Impact Assessment for Proposed Mining Development on the farm Mareesburg 8 JT, District Steelpoort***
- ***Van der Walt, J. & J.P. Celliers. 2009. Archaeological Impact Assessment for a Proposed Water Pipeline and Access Route for the Booyseendal Platinum Mine, Steelpoort, Mpumalanga Province***
- ***Pistorius, J. 2011. Phase 1 Cultural and Heritage Impact Assessment Study for the Proposed Extension of Mining Operations (Project Fairway) at Everest Platinum Mine on parts of several adjoining farms in the Steenkampsberge between Roosenekal and Lydenburg in the Limpopo Province of South Africa***