



PGS HERITAGE

PROPOSED TOWNSHIP ESTABLISHMENT ON THE REMAINDER OF PORTION 8 OF THE FARM BOSCHOEK 103 JQ, BOSCHOEK, NORTH WEST PROVINCE

Heritage Impact Assessment

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Declaration of Independence

I, Polke Birkholtz, declare that –

- General declaration:
- I act as the independent heritage practitioner in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting heritage impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I will take into account, to the extent possible, the matters listed in section 38 of the NHRA when preparing the application and any report relating to the application;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not
- All the particulars furnished by me in this form are true and correct;
- I will perform all other obligations as expected from a heritage practitioner in terms of the Act and the constitutions of my affiliated professional bodies; and
- I realise that a false declaration is an offence in terms of regulation 71 of the Regulations and is punishable in terms of section 24F of the NEMA.

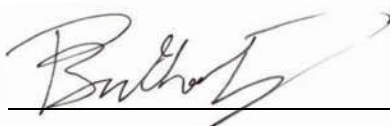
Disclosure of Vested Interest


- I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations;

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Report Title	Heritage Impact Assessment for the Proposed Township Establishment on the Remainder of Portion 8 of the Farm Boschoek 103 JQ, near Boschoek, North West Province		
Control	Name	Signature	Designation
Author	Polke Birkholtz		Archaeologist/Heritage Specialist/Project Manager – PGS Heritage

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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	Executive Summary, Sections 6 & 9
An identification of any areas to be avoided, including buffers	Executive Summary, Sections 6 & 9
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 to Figures 3 and Figure 23
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 5, 6, 7 & 8
Any mitigation measures for inclusion in the EMPr	Section 8
Any conditions for inclusion in the environmental authorisation	Sections 8 & 9
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Sections 8 & 9
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 Nkanivo Development Consultants Pty (Ltd) to undertake a Heritage Impact Assessment (HIA) for the Proposed Township Establishment of the Remainder of Portion 8 of the Farm Boschoek 103 JQ, Boschoek, North West Province. The study area falls under the Rustenburg Local Municipality and the Bojanala District Municipality, North West Province. The applicant is the Rustenburg Local Municipality.

General Desktop Study

An archival and historical desktop study was undertaken to provide a historic framework for the project area and surrounding landscape. This was augmented by a study of available historical and archival maps as well as an assessment of previous archaeological and heritage reports undertaken within and in the surroundings of the study area. The desktop study revealed that the surroundings of the study area is characterised by a long and significant history. The assessment of the available historical maps did not reveal the presence of any heritage features.

Fieldwork

The fieldwork component of the study was aimed at identifying tangible remains of archaeological, historical and heritage significance. The fieldwork was undertaken by way of walkthroughs by an experienced archaeological fieldwork team on Thursday, 12 November 2020. The fieldwork team consisted of an experienced archaeologist and heritage specialist (Polke Birkholtz) and fieldwork assistant (Derrick James).

It should be noted that the fieldwork was focused on those components of the study area where the development is proposed, namely the north-eastern sections of the study area. As these sections of the study area were found to be comprised of fenced and cleared stands that were established recently, no intensive walkthroughs of the development footprint area were possible. Some walkthroughs took place in pockets of this area where fewer stands have been demarcated. Additionally, Iron Age stonewalled sites that were remotely identified with Google Earth on the plateau to the south-west of the development footprint area, were also visited during the fieldwork.

Throughout the fieldwork, hand-held GPS devices were used to record the tracklogs showing the routes followed by the two archaeological fieldwork teams. All sites identified during the

fieldwork were photographically and qualitatively recorded, and their respective localities documented using a hand-held GPS device.

The fieldwork undertaken resulted in the identification of a total of ten (10) sites. These were numbered from BSCH 1 to BSCH 10. The prefix used in this numbering system was derived from the farm name, namely Boschkop 103 JQ. The identified sites comprised the following:

- **BSCH 1:** Late Iron Age Stonewalled Site;
- **BSCH 2:** Late Iron Age Stonewalled Site;
- **BSCH 3:** Late Iron Age Stonewalled Site
- **BSCH 4:** Poorly Preserved Late Iron Age Stonewalled Site;
- **BSCH 5:** Poorly Preserved Late Iron Age Stonewalled Site;
- **BSCH 6:** Cemetery consisting of four graves;
- **BSCH 7:** Poorly Preserved Late Iron Age Stonewalled Site;
- **BSCH 8:** Poorly Preserved Late Iron Age Stonewalled Site;
- **BSCH 9:** Poorly Preserved Late Iron Age Stonewalled Site;
- **BSCH 10:** Poorly Preserved Late Iron Age Stonewalled Site; and
- **BSCH 11:** Farmworker Dwellings where the Risk for Unmarked Graves Exist.

Impact Assessment and Mitigation

An overlay of the identified archaeological and heritage sites over the proposed development footprint areas was made 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.

Conclusions

The unmitigated impact of the proposed development is expected to result in Medium to High negative impacts in terms of the identified heritage fabric of the study area. However, if the mitigation measures proposed in this report are successfully completed, the impact of the proposed development on the identified heritage sites will be mitigated to Low negative impacts. 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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TERMINOLOGY AND ABBREVIATIONS

Archaeological resources

This includes:

- 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;
- 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;
- 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;
- 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 in the opinion of the heritage authority in any way result in a change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

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

Early Stone Age

The archaeology of the Stone Age between 700 000 and 2 500 000 years ago.

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 and can include (but not limited to) as stated under Section 3 of the NHRA,

- places, buildings, structures and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features of cultural significance;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds, and
- sites of significance relating to the history of slavery in South Africa;

Holocene

The most recent geological time period which commenced 10 000 years ago.

Late Stone Age

The archaeology of the last 30 000 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 iron-working and farming activities such as herding and agriculture.

Middle Stone Age

The archaeology of the Stone Age between 30 000-300 000 years ago, associated with early modern humans.

Palaeontology

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

Table 1 – List of abbreviations used in this report.

Abbreviations	Description
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
DWS	Department of Water and Sanitation
ECO	Environmental Control Officer
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
IAP	Interested and Affected Party
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Authority
PSSA	Palaeontological Society of South Africa
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency

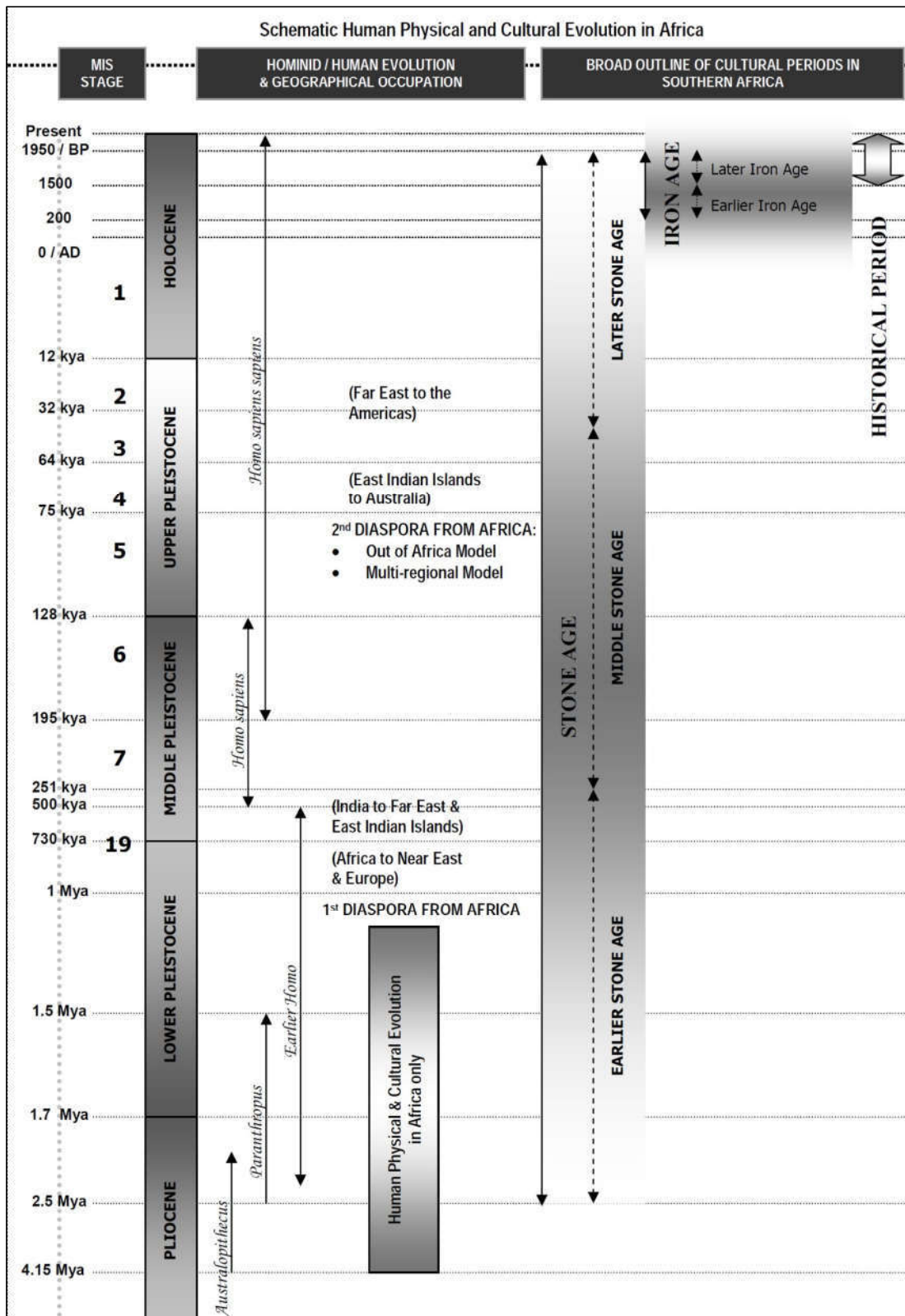


Figure 1 - Human and Cultural Timeline in Africa (Morris, 2008).

1 INTRODUCTION

PGS Heritage (Pty) Ltd was appointed by Nkanivo Development Consultants Pty (Ltd) to undertake a Heritage Impact Assessment (HIA) for the Proposed Township Establishment of the Remainder of Portion 8 of the Farm Boschoek 103 JQ, Boschoek, North West Province. The study area falls under the Rustenburg Local Municipality and the Bojanala District Municipality, North West Province. The applicant is the Rustenburg Local Municipality.

1.1 Scope of the Study

The aim of the study is to identify possible heritage sites and finds that may occur in the proposed study area.

The Heritage Impact Assessment aims to inform the EIA to assist the developer 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) (NHRA).

1.2 Specialist Qualifications

This HIA Report was compiled by PGS. The staff at PGS has a combined experience of nearly 90 years in the heritage consulting industry. PGS and its staff have extensive experience in managing HIA processes. PGS will only undertake heritage assessment work where they have the relevant expertise and experience to undertake that work competently.

The following individuals were involved with this study:

- Mr Polke Birkholtz, the project manager and principal heritage specialist, is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist and is also accredited with the Cultural Resources Management (CRM) Section of the same association. He has 20 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 regarding this study and report 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. In fact, due to the dense vegetation and steep topographic gradients found within the study area, it is highly likely that the presently identified heritage sites are not a complete record of all the archaeological and heritage resources located within the study area.

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, 1998 (NEMA) (Act No. 107 of 1998)
- ii. National Heritage Resources Act, 1999 (NHRA) (Act No. 25 of 1999)
- iii. Notice 648 of the Government Gazette 45421- General requirements for undertaking an initial site sensitivity verification where no specific assessment protocol has been identified.

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)
 - a. Basic Assessment Report (BAR) – Regulations 19 and 23
 - b. Scoping Report (ESR) – Regulation 21
 - c. Environmental Impacts Report (EIR) – Regulation 23
 - d. Environmental Management Programme (EMPr) – Regulations 19 and 23
- ii. National Heritage Resources Act (NHRA)
 - a. Protection of Heritage Resources – Sections 34 to 36
 - b. Heritage Resources Management – Section 38
- iii. Notice 648 of 2019

Although minimum standards for archaeological (2007) and palaeontological (2012) assessments were published by SAHRA, GN.648 of 2019 requires sensitivity verification for a site selected on the national web-based environmental screening tool for which no specific assessment protocol related to any theme has been identified. The requirements for this Government Notice (GN) is listed in Table 2 and the applicable section in this report noted.

Table 2 - Reporting requirements for GN648.

GN 648 of 2019	Relevant section in report	Where not applicable in this report
2.2 (a) a desktop analysis, using satellite imagery;	section 5.3	
2.2 (b) a preliminary on-site inspection to identify if there are any discrepancies with the current use of land and environmental status quo versus the environmental sensitivity as identified on the national web-based environmental screening tool, such as new developments, infrastructure, indigenous/pristine vegetation, etc.	section 4.1	-
2.3(a) confirms or disputes the current use of the land and environmental sensitivity as identified by the national web-based environmental screening tool;	section 5.5	-
2.3(b) contains motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity;	section 4.1	-

iv. The Regulations relating to the Management of Human Remains (GNR 363 of 2013 in Government Gazette 36473) promulgated under the National Health Act (Act No. 61 of 2003)

a. Exhumation and Reburial of Human Remains – Regulations 26, 27 and 28

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.

2 TECHNICAL DETAILS OF THE PROJECT

2.1 Locality

Study Area Coordinates	Northernmost point: S 25.499751 E 27.083064	Easternmost point: S 25.497783 E 27.088816
	Southernmost point: S 25.504507 E 27.071744	Westernmost point: S 25.504507 E 27.071744
Location	The study area is located within the Rustenburg Local Municipality and the Bojanala District Municipality. It is located near the village of Boschoek, approximately 24km north-west of Rustenburg, North West Province.	
Property	Remainder of Portion 8 of the Farm Boschoek 103 JQ.	
Topographic Map	2527AC & 2527CA	
Study Area Extent	The study area is approximately 15.81 hectares in extent	

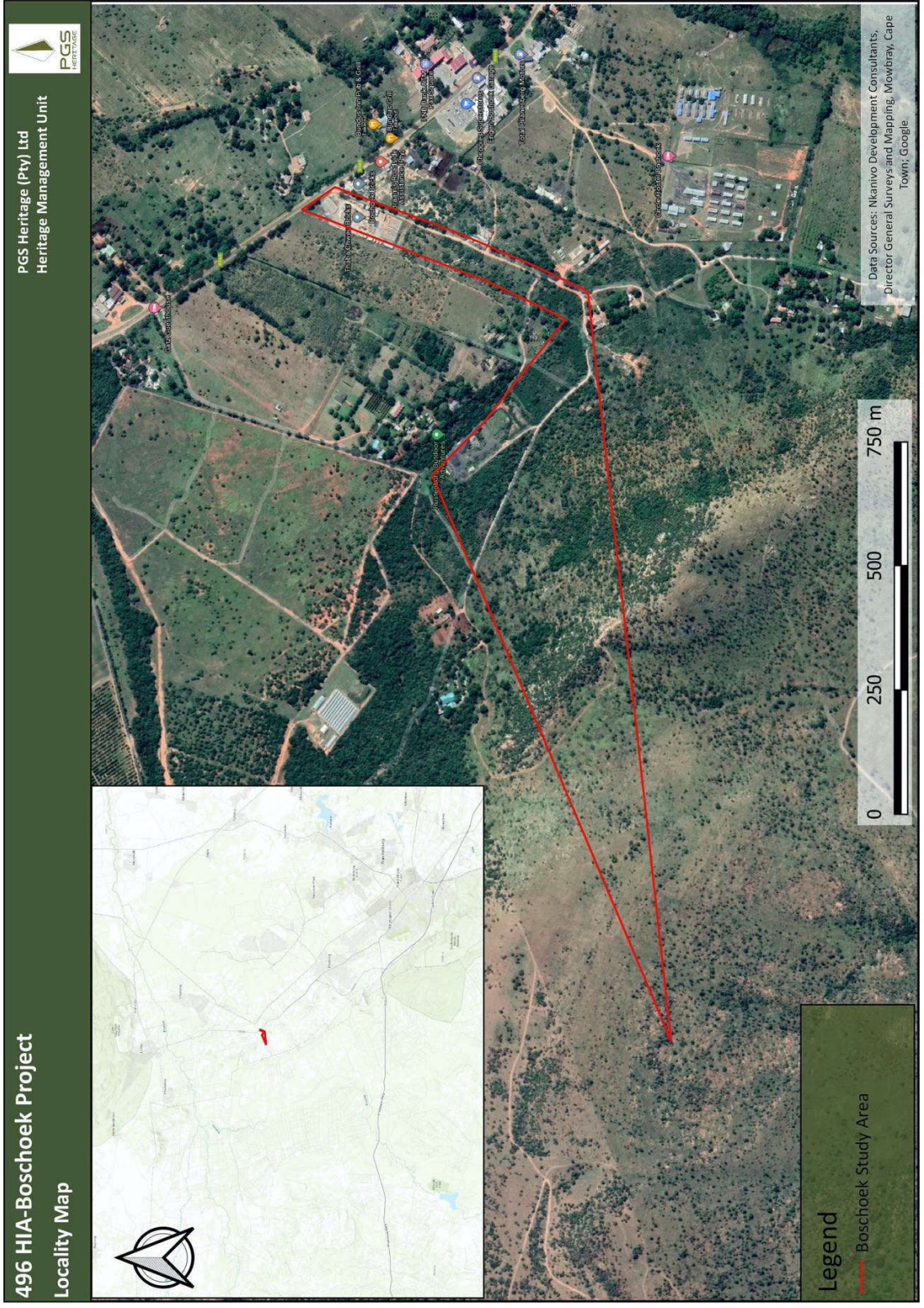


Figure 2 – Locality map depicting the study area within its surrounding landscape.

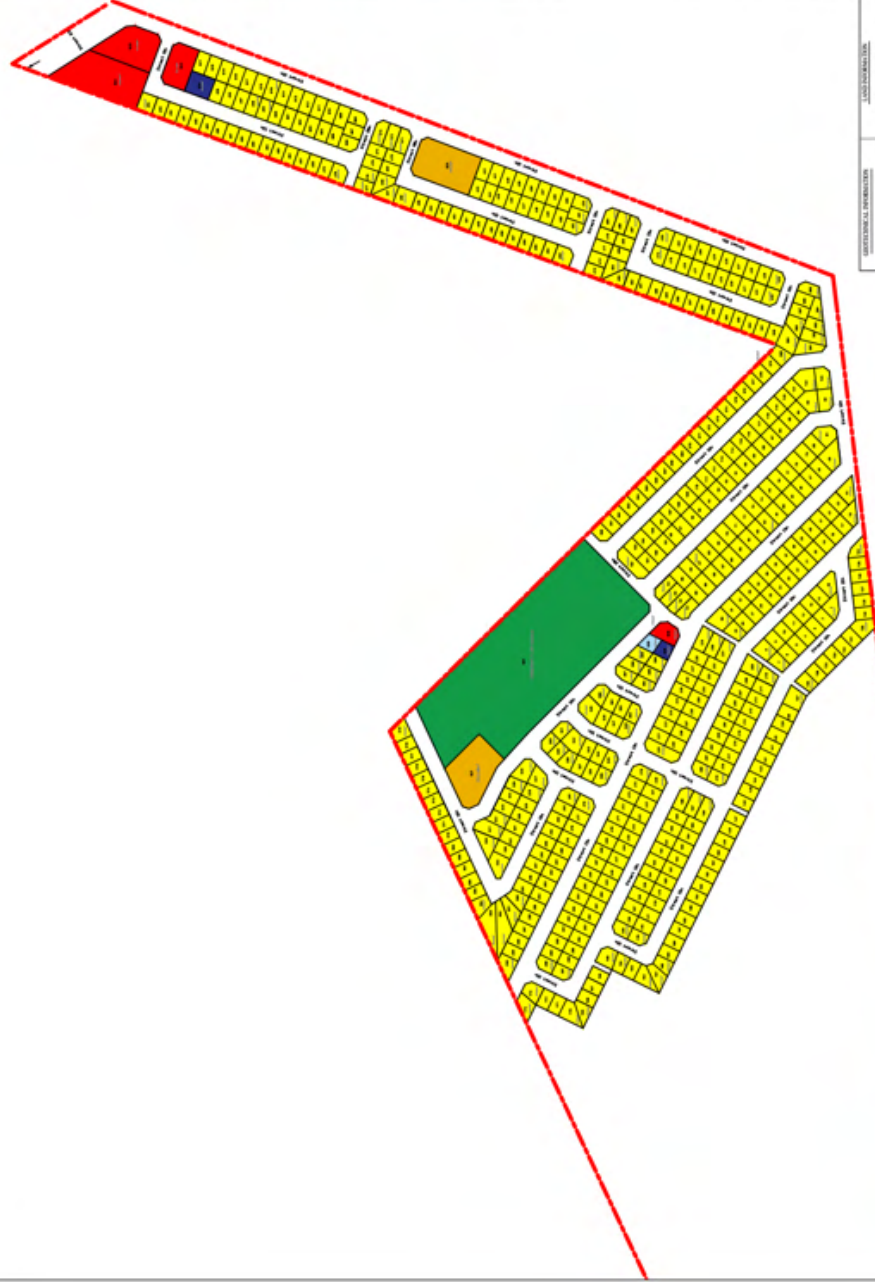
2.2 Technical Project Description

The Rustenburg Local Municipality has proposed a township to be situated/established on Portion 8 of the Farm Boschoek 103 JQ for the purpose of developing integrated and sustainable human settlement aimed at addressing the ever-increasing demand for housing. The project is meant to address housing challenges faced by farm dwellers within boundaries of the Municipality. It is meant to improve living condition of farm dwellers in the Rustenburg Local Municipality.

The development layout plan depicted below, proposes the following:

- 530 residential stands
- four business stands
- two stands zoned for educational purposes
- one stands zoned for place of worship
- two stands zoned for Municipal purposes
- 1 stand zoned for public open space

PROPOSED TOWNSHIP LAYOUT PLAN SITUATED ON PORTION 8 OF THE FARM BOSCHHOEK 103 JQ



ZONING	LAND USES	NO. OF EFF.	AREA (HA)	AREA (%)	NOTATION	
RESIDENTIAL 1	DWELLING UNIT	350	8,53	52,69	[Yellow Box]	
BUSINESS 1	RETAIL	4	8,42	2,65	[Red Box]	
INSTITUTIONAL	PLACE OF WORSHIP	1	8,05	8,52	[Blue Box]	
MUNICIPAL	MUNICIPAL	2	8,51	1,96	[Green Box]	
EDUCATIONAL	CHURCH	2	8,02	8,13	[Orange Box]	
PUBLIC OPEN SPACE	VAGANT	1	1,49	8,42	[Green Box]	
ROAD	STREET		5,18	32,83	[Red Box]	
TOTAL DEVELOPABLE AREA				58	15,51	100%

NOTES

1. All dimensions are approximate and subject to survey.
2. All dimensions are approximate and subject to survey.
3. All dimensions are approximate and subject to survey.
4. All dimensions are approximate and subject to survey.

BY: **E. M. W. BOSCHHOEK**

CLIENT: **BUSTENBERG LOCAL MUNICIPALITY**

CONSULTANTS: **DATE: SIGNATURE:**

DESIGNED BY: **NAME: SIGNATURE:**

CHECKED BY: **NAME: SIGNATURE:**

DATE: **DATE:**

LEGEND

- RESIDENTIAL 1
- BUSINESS 1
- INSTITUTIONAL
- MUNICIPAL
- EDUCATIONAL
- PUBLIC OPEN SPACE
- ROAD

SCALE

1: 375 (A0 Format)
1: 750 (A1 Format)
1: 1500 (A2 Format)
1: 3000 (A3 Format)
1: 6000 (A4 Format)

REGISTERED

1: 375 (A0 Format)
1: 750 (A1 Format)
1: 1500 (A2 Format)
1: 3000 (A3 Format)
1: 6000 (A4 Format)

Figure 3 – Proposed development layout plan. This plan was provided by the client.

3 ASSESSMENT METHODOLOGY

3.1 Methodology for Assessing Heritage Site Significance

This report was compiled by PGS Heritage for the Proposed Township Establishment on the Remainder of Portion 8 of the Farm Boschoek 103 JQ, Boschoek, North West Province. The applicable maps, tables and figures are included as stipulated in the NHRA and NEMA. The HIA process consisted of three steps:

Step I – Desktop Study: A detailed archaeological and historical overview of the study area and surroundings was undertaken. This work was augmented by an assessment of reports and data contained on the South African Heritage Resources Information System (SAHRIS). Additionally, an assessment was made of the available historic topographic maps. All these desktop study components were undertaken to support the fieldwork.

Step II – Field Survey: The fieldwork component of the study was aimed at identifying tangible remains of archaeological, historical and heritage significance. The fieldwork was undertaken by way of intensive walkthroughs of the study area. These intensive walkthroughs were undertaken by an experienced fieldwork team comprising Polke Birkholtz (archaeologist and heritage specialist) and Derrick James (fieldwork assistant). The fieldwork was undertaken on Thursday, 12 November 2020.

It should be noted that the fieldwork was focused on those components of the study area where the development is proposed, namely the north-eastern sections of the study area. As these sections of the study area were found to be comprised of fenced and cleared stands that were established recently, no intensive walkthroughs of the development footprint area were possible. Some walkthroughs took place in pockets of this area where fewer stands have been demarcated. Additionally, Iron Age stonewalled sites that were remotely identified with Google Earth on the plateau to the south-west of the development footprint area, were also visited during the fieldwork.

Throughout the fieldwork, hand-held GPS devices were used to record the tracklogs showing the routes followed by the members of the fieldwork team. All sites identified during the fieldwork were photographically and qualitatively recorded, and their respective localities documented using a hand-held GPS device.

Step III – Report: 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 ASAPA for the Southern African Development Community (SADC) region, were used for the purpose of this report (see **Table 3**).

Table 3 – Site significance classification 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)	Grade 4A	High/Medium	Mitigation before destruction
Generally Protected B (GP.B)	Grade 4B	Medium	Recording before destruction
Generally Protected C (GP.C)	Grade 4D	Low	Destruction

3.2 Methodology for Impact Assessment

The impact significance rating process serves two purposes: firstly, it helps to highlight the critical impacts requiring consideration in the management and approval process; secondly, it shows the primary impact characteristics, as defined above, used to evaluate impact significance.

Where possible, mitigation measures will be provided to manage impacts. In order to ensure uniformity, a standard impact assessment methodology will be utilised so that a wide range of impacts can be compared with each other. 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 4: Quantitative rating and equivalent descriptors for the impact assessment criteria

RATING	SIGNIFICANCE	EXTENT SCALE	TEMPORAL SCALE
1	VERY LOW	Proposed site	Incidental
2	LOW	Study area	Short-term
3	MODERATE	Local	Medium/High-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

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, the magnitude (i.e. the size) of area affected by atmospheric pollution may be extremely large (1 000 km²) but the significance of this effect is dependent on the concentration or level of pollution. If the concentration is great, the significance of the impact would

be HIGH or VERY HIGH, but if it is diluted it would be VERY LOW or LOW. Similarly, if 60 ha of a grassland type are destroyed the impact would be VERY HIGH if only 100 ha of that grassland type were known. The impact would be VERY LOW if the grassland type was common. A more detailed description of the impact significance rating scale is given in **Table 5** below.

Table 5: 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 are 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 6: Description of the 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 impacts possible and will be felt at a regional scale (District Municipality to Provincial)
3	Local	The impact will affect an area up to 10 km from the proposed site.
2	Study Site	The impact will affect an area not exceeding the Eskom property.
1	Proposed site	The impact will affect an area no bigger than the ash disposal site.

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 scale is rated according to criteria set out in **Table 7**.

Table 7: 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/High term	The environmental impact identified will operate for the duration of life of facility.
4	Long term	The environmental impact identified will operate beyond the life of operation.
5	Permanent	The environmental impact will be permanent.

Degree of Probability

Probability or likelihood of an impact occurring will be described as shown in **Table 8** below.

Table 8: 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 in terms of affected parties or environmental components.

Table 9: 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.
Don't know	The consultant cannot, or is unwilling, to make an assessment given available information.

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:

$$\textbf{Impact Risk} = (\text{SIGNIFICANCE} + \text{Spatial} + \text{Temporal}) \times \text{Probability}$$

3
5

An example of how this rating scale is applied is shown in **Table 10**.

Table 10: Example of Rating Scale

Impact	Significance	Spatial Scale	Temporal Scale	Probability	Rating
	Low	Local	Medium/High-term	Could Happen	
Impact to heritage	2	3	3	3	1.6

Note: The significance, spatial and temporal scales are added to give a total of 8, that is divided by 3 to give a criteria 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 11** below.

Table 11: 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 air quality 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 General Description of the Study Area

The study area is located south-west of the main road leading through the town of Boschoek. Its far north-eastern section is currently used as a brickyard. The study area's north-eastern sections are largely level and for this reason represent the focus of the proposed development. Leading in a south-western direction from these more level areas, the study area rises steeply against one of the foothills of the Magaliesberg Mountains. South-west of this steep-sided hill a small plateau is located, before rising into another hill toward the study area's south-western corner.

The property is currently informally occupied. At the time of the fieldwork, almost the entire section of the study area located north-east of the steep-sided hill comprised cleared and fenced stands with small corrugated iron structures erected on numerous stands. The majority of the stands was cleared of vegetation and stones, with the cleared stones used to build low boundary walls around the edges of the stands and to pack around the bases of trees that were earmarked to be kept. The balance of cleared stone was placed in stone piles found scattered across this landscape.

Apart from the use of the north-eastern component of the study area for the informal establishment of stands, a section of this area was also used for the crushing, screening and washing of chrome. Additionally, a couple of burrow pits is also located within this component of the study area.

In terms of vegetation, the study area is located within the Gold Reef Mountain Bushveld vegetation type, which is described as “...*rocky hills and ridges often west-east trending with more dense woody vegetation often on the south-facing slopes associated with distinct floristic differences...Tree cover elsewhere is variable. Tree and shrub layers are often continuous. Herbaceous layer is dominated by grasses...*” (www.sanbi.org). Sections of the study area are characterised by reasonably dense vegetation, which made the fieldwork sometimes difficult.

In terms of geology and soils, the Gold Reef Mountain Bushveld vegetation “...*consists predominantly of quartzites, conglomerates and some shale horizons of the Magaliesberg, Daspoort and Silverton Formations (Vaalian Pretoria Group) and the Hospital Hill, Turffontein and Government Subgroups (Randian Witwatersrand Supergroup). Soils are shallow, gravel lithosols of the Mispah and Glenrosa forms...*” (www.sanbi.org).

Existing surrounding land uses associated with the project area include the following:

- Farming, especially citrus;
- Businesses associated with the town of Boschoek; and
- Guest houses and hostels.



Figure 4 – General view into the north-east showing the more level areas of the study area. The small corrugated iron structures and cleared stands from the informal occupation of the property can be seen. In the background, near the top centre of the photograph, the brickfield that is located on the far north-eastern end of the study area is visible.



Figure 5 – Closer view of a section of the level areas from within the study area. The cleared stands and associated corrugated iron structures can be seen. This photograph was also taken in a north-eastern direction.



Figure 6 – Another closer view of a section of the level areas from within the study area. Again, the cleared stands and associated corrugated iron structures can be seen. This photograph was also taken in a north-eastern direction.



Figure 7 – This view from within the study area depicts one of the corrugated iron structures in the foreground. A section of the study area is visible in the back.



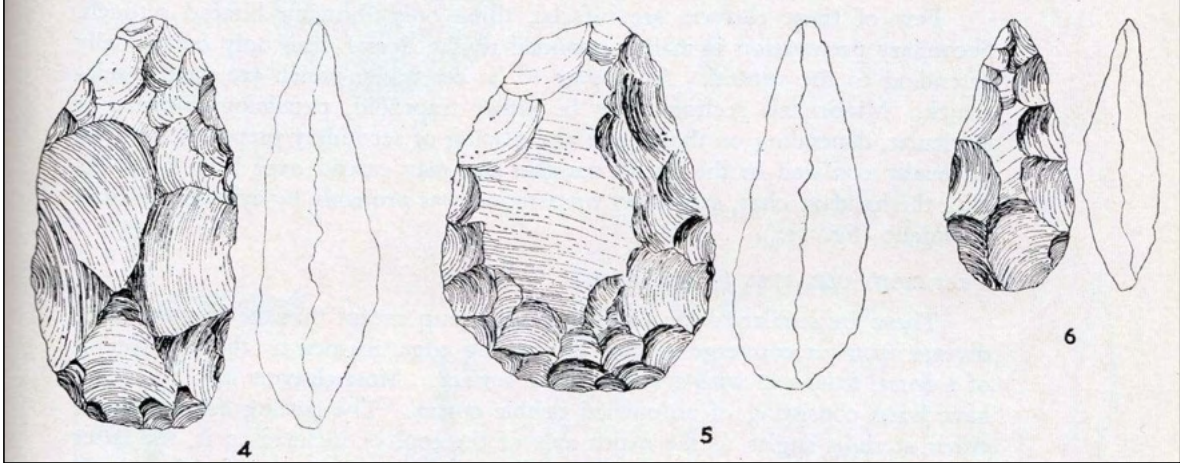
Figure 8 – View from within the study area showing some of the cleared stands. Note the fencing around the stands. Some of the small corrugated iron structures can be seen in the back.



Figure 9 - General view across the plateau located in the south-western section of the study area. The level areas of the study area depicted in the previous photographs are located on the other side of this steep-sided hill.

5 DESKTOP STUDY FINDINGS

5.1 Archaeological and Historical Overview of the Study Area and Surroundings

DATE	DESCRIPTION
2.5 million to 250 000 years ago	<p>The Earlier Stone Age is the first and oldest 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.</p>
	
<p>Figure 10 – Example of Early Stone Age Later Acheulian handaxes. These handaxes were identified at Blaaubank near Rooiberg. Cropped section of an illustration published in Mason (1962:199).</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>
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.</p>
AD 350 – AD 650	<p>The Bambata facies of the Benfica Sub-Branch of the Kalundu Ceramic Tradition represents the earliest known Iron Age period within the surroundings of the study area. The decoration on the ceramics from this facies is characterised by "...fine decoration, multiple bands and cross-hatching on long rim, alternating blocks of stamped and incised lines in neck." (Huffman, 2007:215).</p>
AD 1000 – AD 1300	<p>The Eiland facies of the Kalundu Ceramic Tradition represents the fourth known Iron Age period within the surroundings of the study area. The decoration on the ceramics from this facies is characterised by "...fine herringbone with stamping." (Huffman, 2007:221).</p>
1500 AD – 1700 AD	<p>The Olifantspoort facies of the Moloko Branch of the Urewe Ceramic Tradition is the second Iron Age facies to be identified within the surroundings of the study area. The Olifantspoort facies can likely be dated to between AD 1500 and AD 1700. The key features of the decoration used on the ceramics from</p>

	<p>this facies include multiple bands of fine stamping or narrow incision separated by colour (Huffman, 2007).</p> <p>The type site for this facies is located on the farm Olifantspoort 328 JQ, which is situated approximately 38km south-east of the present study area.</p> <p>After an archaeological team under Professor R.J. Mason of the University of the Witwatersrand identified a number of stonewalled settlements on the farm Olifantspoort by using aerial photographs, archaeological field research and excavations were undertaken during 1971 at eight of these sites located on the farm Olifantspoort as well as another site located on an adjacent farm. These sites were numbered 20/71, 21/71, 26/71, 27/71, 28/71, 60/71, 61/71, 62/71, 64/71 and 65/71. The focus of the research turned to Site 20/71 which proved to be a very large stonewalled site. A total of 85 huts as well as a number of middens were excavated here during the 1971 season alone. As many as 80 individual rock engraving panels were identified in the vicinity of the site. These engravings all depict settlement plans (Mason, 1973). A copper mine was also identified on the farm (Steel, 1987). In the following year sites 2/72 and 29/72 were added and researched, with sites 38/73 and 47/73 added the year after. A few years later in 1984 an Olifantspoort site was identified at Broederstroom and in 1985 another Olifantspoort site was identified at Ifafi (Huffman, 2007).</p> <p>The Olifantspoort facies holds an important position in the sequence of the Moloko or Sotho-Tswana group. The earliest facies to be associated with the Moloko is the Icon facies (AD 1300 – 1500), with sites found across large sections of what is today the Limpopo Province. The Icon facies resulted in three different and parallel Iron Age facies, namely the Madikwe facies (AD 1500 – 1700) (which in turn led to the Buispoort facies between AD 1700 and 1850), the Letsibogo facies (AD 1500 – 1700) and thirdly the Olifantspoort facies. The Olifantspoort facies developed into the Thabeng facies (AD 1700 – 1850) (Huffman, 2007). It is therefore evident that the Olifantspoort facies represents a key pillar in our understanding of the origins and sequence of the Sotho-Tswana people of today (Huffman, 2007).</p>
1500 AD – 1700 AD	<p>The Madikwe facies of the Blackburn Branch of the Urewe Ceramic Tradition represents the next phase in the Iron Age of the study area and surroundings. This facies can likely be dated to between AD 1500 and AD 1700. The decoration on the ceramics associated with this facies is characterised by multiple bands of cord impressions, incisions, stabs and punctates separated by colour (Huffman, 2007).</p> <p>As indicated above, the Madikwe facies represents one of three parallel Iron Age facies which had developed from the original Moloko facies known as Icon. As such, the Madikwe facies was the contemporary of the Olifantspoort and Letsibogo facies, and developed into the Buispoort facies (AD 1700 – AD 1850) (Huffman, 2007).</p>
1650 AD – 1820 AD	<p>The Uitkomst facies of the Blackburn Branch of the Urewe Ceramic Tradition represents another Iron Age period 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 and cord impressions and is described as a mixture of the characteristics of both Ntsuanatsatsi (Nguni) and Olifantspoort (Sotho) (Huffman, 2007).</p> <p>The type-site is Uitkomst Cave, which is situated some distance south-east of the study area. The site was excavated by Professor R.J. Mason of the University of the Witwatersrand as part of a project to excavate five cave sites in the Witwatersrand-Magaliesberg area. These five sites are Glenferness, Hennops River, Pietkloof, Zwartkops and Uitkomst. Uitkomst was chosen as the type site for the particular Iron Age material excavated at these sites as the</p>

Uitkomst deposit was found to be well stratified and the site “...illustrates the combination of a certain kind of pottery with evidence for metal and food production and stone wall building found at the open sites...” (Mason, 1962:385).

The Uitkomst pottery is viewed as a combination of Ntsuanatsatsi and Olifantspoort, and 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 people and represents the earliest known movement of Nguni people out of Kwazulu-Natal into the inland areas of South Africa. Regarding this theory, the Bafokeng settled at Ntsuanatsatsi Hill in the present-day Free State Province. Subsequently, the BaKwena lineage had broken 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. According to this theory, this eventually resulted in the appearance of Uitkomst facies type pottery which contained elements of both Nguni and Sotho-Tswana speakers (Huffman, 2007). Huffman states that that the Uitkomst facies is directly associated with the Bafokeng (Huffman, 2007). However, it worth noting that not all researchers agree with this preposition of the Bafokeng origins. In their book on the history of the Bafokeng, Bernard Mbenga and Andrew Mason indicate that the research of Prof. R.J. Mason and Dr. J.C.C. Pistorius “...would indicate that the Bafokeng originated from the Bahurutshe-Bakwena-Bakgatla lineage cluster. Tom Huffman holds a different view...” (Mbenga & Mason, 2010).

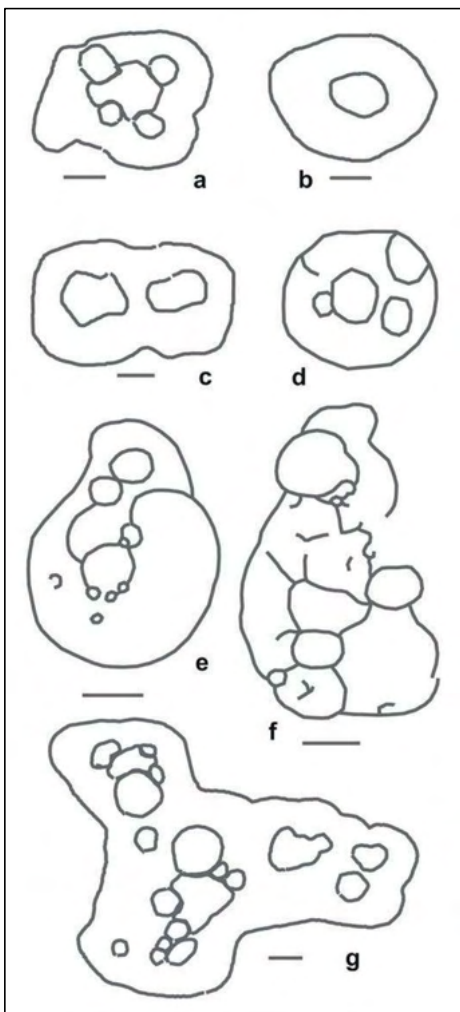


Figure 11

Examples of so-called Group I settlements as published by Sadr & Rodier (2012:3). The settlement layout as depicted in illustration ‘b’ provides an example of a simple Type N settlement which has the appearance of a ‘fried egg’. Illustration ‘a’ provides one example of a more elaborate Type N settlement. The settlement layouts as depicted in this figure can be associated with the Ntsuanatsatsi facies and the Bafokeng as well.

1700 AD – 1840 AD

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 Buffelshoek, Kaditshwene, Molokwane and Olifantspoort (Huffman, 2007). Molokwane is the nearest of these sites to the study area, and is located on the farm Selonskraal 317 JQ some 19.5km to the south by south-west (Pistorius, 1992).

During the early 1980s, Dr. J.C.C. Pistorius conducted archaeological excavations at Molokwane. His research was aimed at "...proving that the site's settlement style is representative of the settlement system of historical and contemporary Sotho-Tswana villages (metse) in its ground plan, composition and settlement layout." (Pistorius, 1992:1). The available oral history was also assessed in this research, which revealed that Molokwane was the home of the Bakwena Bamodimosa Bammatau from c. 1600 AD to the early 1800s (Pistorius, 1992).

The research at Molokwane focussed on a settlement unit named SEL 1. This settlement unit is comprised of three main spatial features, namely an outer scalloped wall (where the dwellings of the settlement were located), a centrally located cluster of enclosures and kraal complexes (that is enclosed by the outer scalloped wall) and lastly the intervening space between the outer scalloped wall and the centrally located cluster of enclosures (Pistorius, 1992).

A number of excavations were also undertaken, which focussed on the settlement unit at SEL 1. The excavations focussed on all three spatial features of SEL 1 as outlined above. The excavations yielded pottery (including intact vessels), iron tools, bone tools, stone artefacts, clay figurines, ochre figurines and beads (Pistorius, 1992).

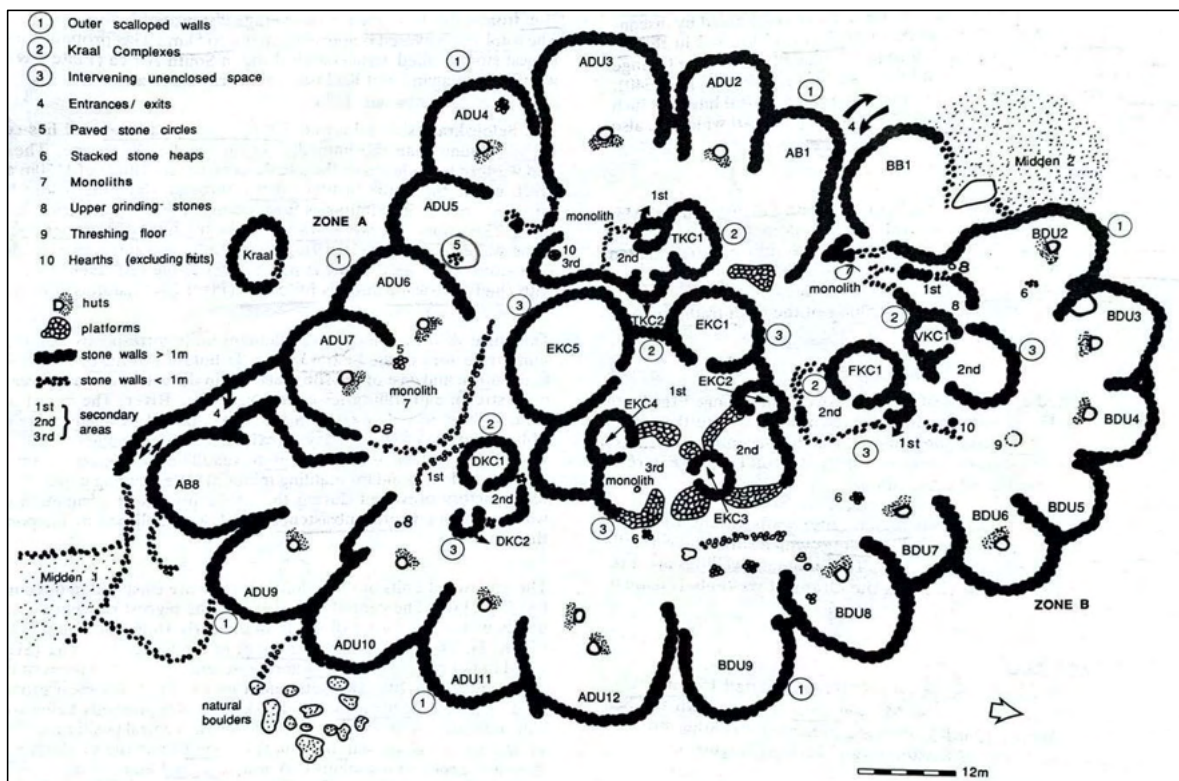


Figure 12 – Layout plan of settlement unit SEL 1 at Molokwane as recorded by Pistorius (1992:18).

c. 1650 – c. 1700	<p>During this time the Bathlako were living in proximity to the area today known as Cullinan, east of Pretoria. During the second half of the seventeenth century Kgosi Thatwe, the Bathlako chief, dispatched a reconnaissance party to the west of his chiefdom to assess the grazing conditions there. His sons Leema, Matutu and Modisane subsequently established themselves at Pharami (Boschoek) before settling along the Toelanie River near Pella.</p> <p>As the present study area is located on the farm Boschoek, the indication that the Bathlako lived at this farm during the late 17th century, is very interesting.</p> <p>At Pella the chiefdom was split with Leema and his followers establishing the Bathlako ba Leema chiefdom and Matutu and his followers establishing the Bathlako ba Leemana chiefdom. In turn, the ancestors of the Batlounq moved to Mabjanatsiri near the present day farm Grootwagendrift 233 JP, situated roughly 11.7 km west by north-west of the present study area (Breutz, 1957).</p> <p>Later, the son of Matutu, namely Seutlwane moved with his followers to Maseletsane on the northern end of the Pilwe Hills (Breutz, 1957). The northern end of the Pilwe Hills is situated roughly 17.6km north-west of the present study area.</p>
Early 1700s	<p>At the time, and possibly for some time before this date, the area surrounding present-day Rustenburg would have been occupied by the Bafokeng and the Tlokwa people (Hall et al., 2008). Mbenga and Mason (2010) indicate that Prof. R.D. Coertze estimation was that the Bafokeng had settled in the vicinity of Rustenburg at the end of the 17th century. Their land at the time stretched from the “...Ngwaritsi (Selons) River to the west, the Bakwena-ba-Mogopa to the east, the Magaliesberg to the south and the Kgetleng (Elands) River to the north (Mbenga & Mason, 2010: 7). From this description it is evident that at the time, the study area formed part of the land of the Bafokeng.</p>
1750s	<p>During the mid eighteenth century the Batlokwa ba ga Sedumedi under Kgosi Mosima Tsele moved from Tlokwe (in proximity to present-day Potchefstroom) to the Pilanesberg. They settled at Bote, which is presently located on the farm of Houwater 54 JQ in the Pilanesberg National Park (Hall et.al., 2008) (Anderson, 2009). While at Bote, Mosima passed away and was succeeded by Monaheng (Hall et.al., 2008) (Anderson, 2009). The farm Houwater is located 20.6 km north of the present study area.</p> <p>At roughly the same time, the son of Seutlwane, namely Mabe, moved with his followers from Maseletsane on the northern end of Pilwe Hill to Mothoutlung situated on the present day farm Palmietfontein 208 JP (Breutz, 1953), some 18km north-west of the present study area.</p>
Late 1700s	<p>During the reign of kgosi Sekete IV the Bafokeng had “...relations of conflict...” with their Batswana neighbours (Mbenga & Mason, 2010).</p>
1760 – 1770	<p>As a result of the conflict between the Bafokeng and its neighbours (including the Batlokwa ba ga Sedumedi), Kgosi Monaheng moved with his people from Bote to Itlholanoga (Hall et.al., 2008) (Anderson, 2009). They remained here from 1760 to 1770 (Anderson, 2009).</p> <p>Itlholanoga is believed to be located on the present day farm Doornhoek 91 JQ. Sections of both the Pilanesberg National Park and Sun City are located on this farm. The farm is located 14.3km north of the present study area.</p> <p>During the 1980s, Professor Revil Mason of the University of the Witwatersrand excavated a stonewalled Iron Age site on the hills above Sun City named Site 33/81. Mason (1986:688) describes the site as follows “...on the crest of a ridge about 150 metres vertically above the Sun City workers’ residences, on the radio tower hill...the Site 33/81 complex is in two parts. The main part covers</p>

	<p><i>an area of about 250 x 250 metres on the upslope edge of the road. The second part is a line of three separate structures extending for 300 metres on the north-west corner of the main part.”</i></p> <p>Professor Revil Mason excavated seven ash heaps and nine huts at the site, and recovered 69 decorated potsherds, 338 undecorated potsherds, one drilled ceramic pendant, 15 dagga pipes, six conical figurines, one cattle figurine, one sliding door trackway, one iron arrowhead, two iron fragments, two slag bits and two shell beads (Mason, 1986). The decorated ceramics recovered by Mason could be identified as Uitkomst and Buispoort pottery (Huffman, 2007) (Mason, 1986). Mason (1986) was able to date the site to AD 1800 using C¹⁴ dating that was obtained from samples recovered from Ash Heaps 3 and 7. He associated both the ceramics and settlement layout of the site with Kaditshwene and suggested that the site may have been built by Sotho-Tswana people associated with the Hurutshe group.</p> <p>Professor Tom Huffman (2007) of the University of the Witwatersrand mapped the same complex in 2005 and identified a multi-component site comprising Molokwane walling associated with Buispoort pottery as the second more recent occupation with Uitkomst pottery found in middens associated with the remnants of earlier walling from a previous occupation. Huffman (2007) concludes that the Kgatla were responsible for the Molokwane walling whereas the Tlokwa can most likely be associated with the earlier walling.</p>
1780 – 1785	<p>The Batlokwa ba ga Sedumedi chiefdom moved from Itlholanoga to Mankwe in c. 1780. The settlement of Mankwe coincided with the rule of Kgosi Taukobong. Mankwe is located on the farm Zwaarverdiend 234 JP. This farm is situated 7.5km north-west of the present study area.</p>

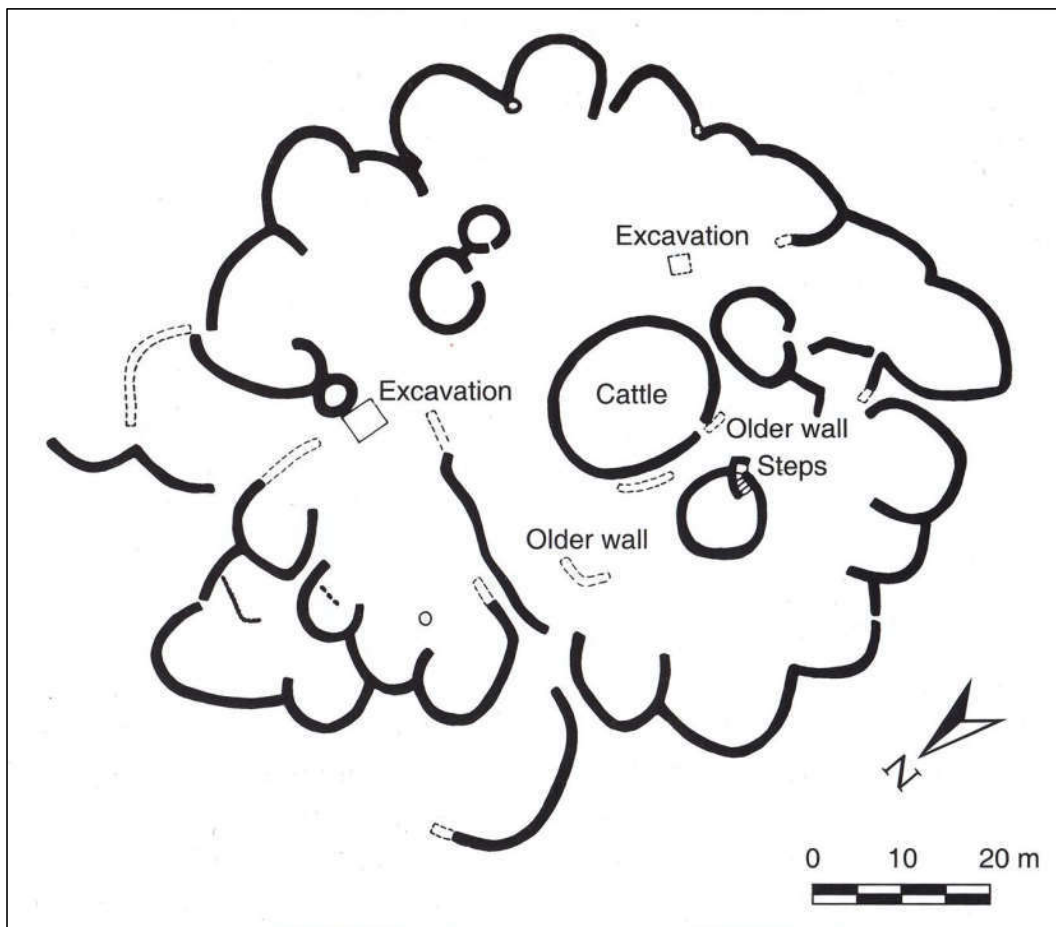


Figure 13 – Layout plan of Itlholanoga as recorded by Huffman (2007:438).

<p>1785 – 1815</p>	<p>In c. 1785 Kgosi Taukobong led the Batlokwa ba ga Sedumedi chiefdom from Mankwe to Maruping, which is located in the Pilwe Hills (Anderson, 2009).</p> <p>A succession battle during the early nineteenth century split the Tlokwa chiefdom in two, with Kgosi Molefe and his followers fleeing 30 miles to the west to establish themselves at Kolontwaneng (present day farm Grootfontein 225 JP). Molefe and his followers established the Batlokwa ba ga Bogatsu at Kolontwaneng.</p> <p>Meanwhile, the balance of the Batlokwa ba ga Sedumedi remained at the Pilwe Hills until 1815 (Anderson, 2009).</p>
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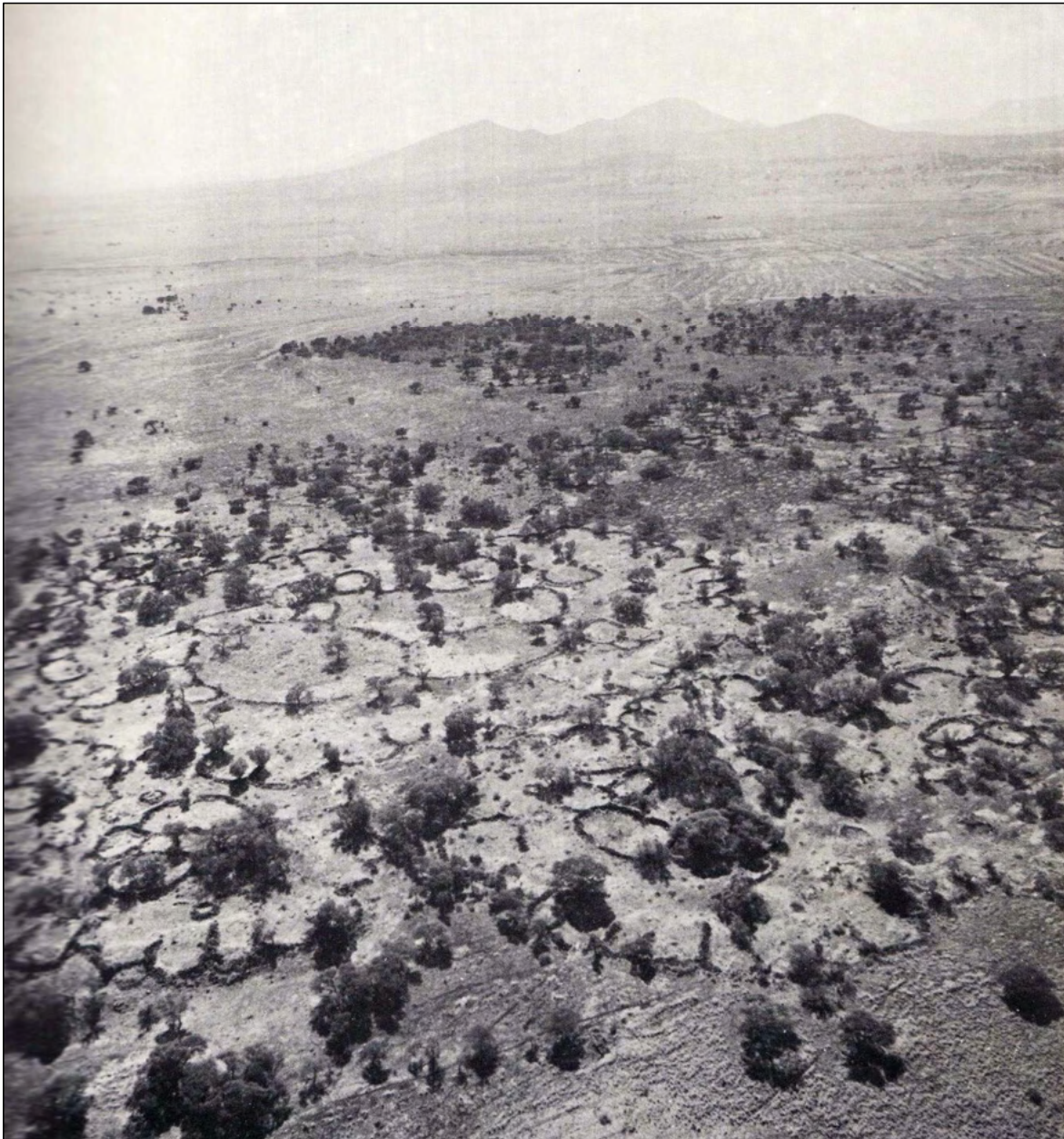


Figure 14 – This aerial view of Marothodi was taken by Professor Revil Mason (1986:3).

<p>1815</p>	<p>Under its new leader Bogatsu, the Batlokwa chiefdom moved to Marothodi in 1815. Marothodi is located on the present day farms of Bultfontein 204 JP,</p>
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	<p>Diamant 206 JP and Vlakfontein 207 JP. Of these, the latter farm is situated nearest to the present study area at a distance of 19.7 km to the north-west.</p> <p>While the chief moved to Marothodi, a section of the Batlokwa ba ga Sedumedi remained behind in the Pilwe Hills (Anderson, 2009).</p> <p>During the 1980s, the Eskom Land Survey Department identified a Late Iron Age stonewalled megasite at Vlakfontein, to the west of the Pilanesberg. Professor Revil Mason of the University of the Witwatersrand carried out an initial assessment of the site (Mason, 1986). Between 2002 and 2008, the site was excavated by Dr Mark Anderson for his Doctoral Thesis at the University of Cape Town (Anderson, 2009).</p> <p>Anderson (2009:326-327) states that the “...excavation at Marothodi has confirmed that the dominant ceramic style associated with the Tlokwa in the early 19th century is representative of the Uitkomst facies, which is part of the Fokeng cluster. In the ceramic sequence...Uitkomst is derived from Nstuanatsatsi, demonstrating the link between the Marothodi Tlokwa and the first group of Bantu speakers to cross the Vaal River from KwaZulu-Natal in the south-east. These early Fokeng originated among Northern Nguni people (Huffman, 2007).</p> <p>The presence of Nguni characteristics at Marothodi further underscores the association of the site with the Tlokwa. These characteristics include the central placement of the middens within the homestead as well as the intermittent capping of these middens using soil. Anderson (2009:327) adds that “Marothodi must be understood against an historical backdrop somewhat different to those of the neighbouring aggregated towns inhabited by ‘typical’ western Tswana in the region, such as the Kwena at Molokwane and the Hurutshe at Kaditshwene. Instead, we glimpse a process of ‘Tswana-isation’ somewhere along their journey north-westward, possibly soon after their arrival in the Pilanesberg, which eventually resulted in the cultural expression we see at Marothodi in the early 19th century. While Uitkomst remains the dominant ceramic expression at Marothodi, a trajectory of increasing interaction with other regional communities is represented in elements of imported Buispoort pottery appearing in the assemblages, and in the adoption of a western Tswana worldview so vividly demonstrated in the culturally driven organisation of settlement space and commodity production.”</p> <p>The research at Marothodi also revealed a significant emphasis on metal production, and especially copper. With copper possibly valued high enough to be exchanged for cattle, the large cattle enclosures at Marothodi may have been the result of trade with other communities (Anderson, 2009).</p>
c. 1820	<p>During the reign of Bogatsu the Batlokwa became embroiled in another conflict with the Bafokeng. As a result, the Bafokeng, under its chief Moseletsane, marched on the Batlokwa at Pilwe and Marothodi. The Tlokwa met the Bafokeng on the plain to the west of the Pilwe Hills where the Bafokeng chief was eventually captured and executed by the Batlokwa (Anderson, 2009).</p>
c. 1823	<p>The Batlokwa ba ga Sedumedi remained at Marothodi until c. 1823 when they moved to present-day Botswana (Anderson, 2009).</p>
1827 - 1832	<p>The Khumalo Ndebele (Matabele) of Mzilikazi established themselves along the Magaliesberg Mountains, having moved here from the central Vaal River. In c. 1832 the Khumalo Ndebele moved to the Marico River (Bergh, 1999).</p> <p>Dr. J.CC Pistorius interpreted a number of settlement features that he identified some 19.9km south-east of the present study area, as a Matabele settlement (Pistorius, 1996a & 1996b).</p>

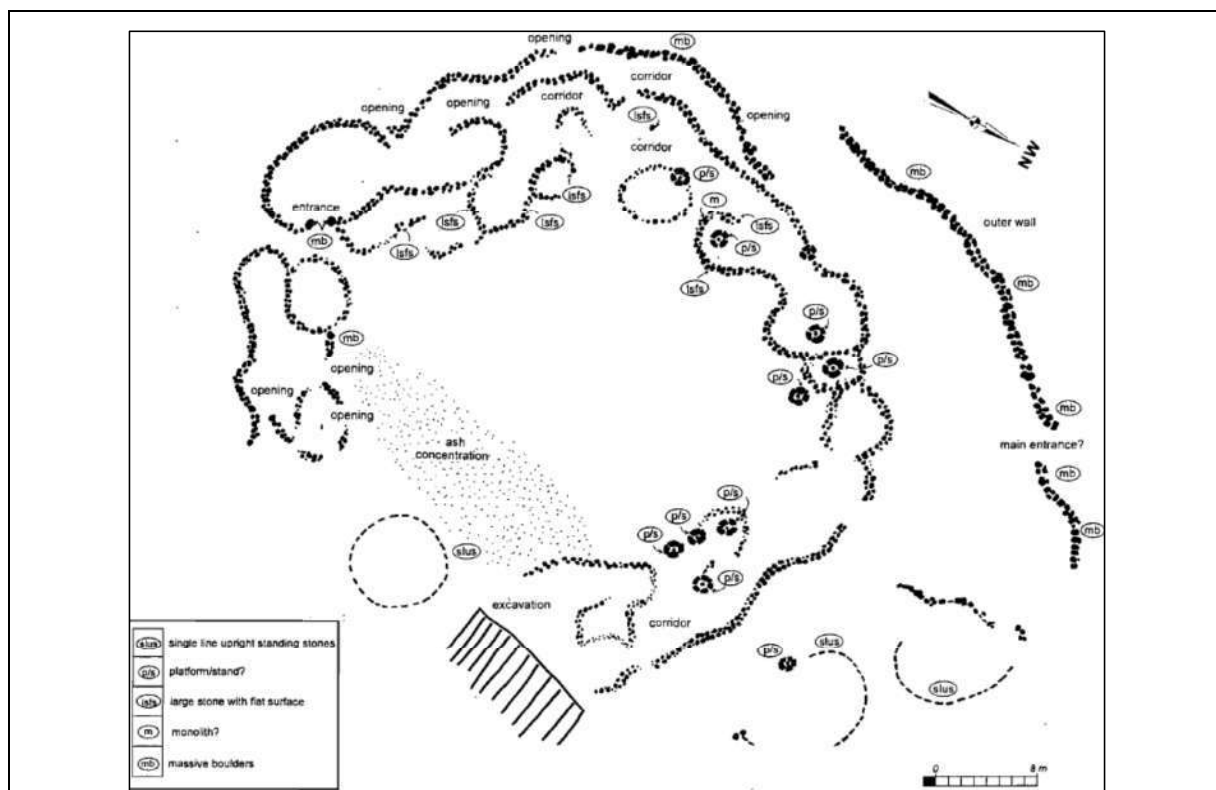


Figure 15 – One of the units from the Matabele settlement which Dr. Pistorius identified (1996b:51).

1829 - 1837	During this period, a number of expeditions led by explorers, missionaries, hunters and adventurers travelled through the general surroundings of the study area. These included the expeditions of Robert Schoon & William McLuckie (1829), Robert Moffat (1829), Andrew Smith (1835) and Cornwallis Harris (1836-1837) (Pistorius, 1996a).
1836	The first Voortrekker parties started crossing the Vaal River (Bergh, 1999).
Late 1830s – Early 1840s	<p>These years saw the early establishment of farms by the Voortrekkers in the general vicinity of the study area (Bergh, 1999). One of these Voortrekkers was Stephanus Johannes Paulus (Paul) Kruger, who was President of the Zuid-Afrikaansche Republiek between 1883 and the end of the South African War in 1902. His family formed part of the Voortrekkers who settled in these parts during this time and, in 1841 at the age of 16, Kruger himself became an owner of a farm (Waterkloof) near Rustenburg. He would eventually own a large number of farms in the Rustenburg area, including Boekenhoutfontein 260 JQ (located roughly 2km south-east of the present study area). From the 1860s, President Paul Kruger used the farm Boekenhoutfontein as his home away from Pretoria. His house is still preserved on this farm, and is located 7km south-east of the present study area.</p> <p>During this period the first contacts between the black people residing in the Rustenburg area at the time (including the Bafokeng) and white people took place. According to Bergh (2005) these early contacts resulted in the setting aside of land by the Voortrekker leadership for the Bafokeng people. This land appears to have included the farms Boekenhoutfontein 260 IQ (located roughly 2km south-east of the present study area), Turffontein 262 IQ (located 6 km south-east of the present study area) and possibly Kookfontein 265 IQ (10.8km south-east of the study area) as well (Bergh, 2005).</p> <p>Mbenga (1997) indicates that the relationship between the Voortrekkers and the Bakgatla were initially also amicable. However, within a short period the relationship between the Voortrekkers and the black groups living in the area</p>

around Rustenburg became increasingly strained. For example, Bergh (2005) states that the Bafokeng were eventually dispossessed of their farms. The system of unpaid labour enforced by the Voortrekkers on the local black groups would certainly have deteriorated the relationship further. See for example Morton (1992).



Figure 16 – President Paul Kruger, used to have a country residence at the nearby farm Boekenhoutfontein (Raath, 2007:338).

1851	Both the district and town of Rustenburg were established in this year (Bergh, 1999). The study area fell within the Rustenburg district at the time.
10 February 1859	The very first Reformed Church (Gereformeerde Kerk) was established in South Africa on this day. The church was established under a Syringa tree in Church Street, Rustenburg. The stump of this tree was proclaimed as a National Monument in 1951 (Bergh, 1999). This tree is located 24.2km south-east of the present study area. Incidentally, the Anglican Church of Rustenburg was proclaimed a National Monument in 1972 and the Dutch Reformed Church of Rustenburg was proclaimed a National Monument in 1979.
Early 1860s	After 1861, Tshomankane Pilane moved with a significant section of the Bakgatla ba ga Kgafela from Saulspoort (on the north-eastern end of what is today known as the Pilanesberg National Park) to establish himself at a place known as Bopitiko (Breutz, 1953). While some authors indicate that Bopitiko is located on the present day farm Doornhoek 91 JQ (Maree, 1966), others (Breutz, 1953) (Schapera, 1965) indicates that Bopitiko was located on the farm

	presently known as Ledig 90 JQ. These farms are both situated approximately 14km north of the study area.
1862	In 1862 Henry Gonin arrived in the Rustenburg District to establish a missionary station for the Dutch Reformed Church. His first mission station was established on the farm Welgeval 171 JQ (Morton, 1992), which is presently located within the Pilanesburg National Park and is located roughly 11.8k north-west of the present study area.
1867	Hermannsburg missionary Hermann Wenhold established the Kana mission station amongst the Bafokeng. At the time the mission station was established on the farm Tweedepoort 283 JQ (Bergh, 2005). This farm is situated roughly 20.7km east by south-east of the study area.
December 1869	The Kana mission station was moved from the farm Tweedepoort 283 JQ to the farm Reinkoyalskraal 278 JQ (Bergh, 2005). This new location for the Kana Mission Station is located 17.6km south-east of the study area.



Figure 17 – Photograph taken in 1887 of Kgosi Mokgatle and his sons (Mbenga & Manson, 2010).

1860s – 1870s	<p>With the assistance provided by German missionary Christoph Penzhorn of the Hermannsburg Missionary Society, Kgosi Mokgatle and the Bafokeng bought a number of farms in proximity to Rustenburg (Bergh, 2005). These acquisitions were an attempt by the Kgosi and the Bafokeng to procure land that had been theirs before the arrival of the first white people.</p> <p>Mbenga & Manson (2010) states that the Bafokeng acquired a total of 24 farms during the second half of the 19th century. Of these, the closest farms to the present study area are Turffontein 262 JQ (located 6 km south-east of the present study area), Doornspruit 106 JQ (located 6.5km east of the present study area) and Klein Doornspruit 108 JQ (roughly 7.9 km north-east of the present study area) and (Bergh, 2005).</p>
1880-1881	<p>The First Boer War (also known as the First War of Independence) took place during this time. The most significant aspect of the war for the town of Rustenburg would have been the besiegement of a company of 2nd Battalion Royal Scots Fusiliers by Boer forces. The siege lasted for 93 days (Wulfsohn, 1992). While the earthwork fort in which the British forces were besieged does not exist anymore, its present location would have been the corner of Kerk and Von Wielligh Streets. This position is some 34km south-east of the present study area (Wulfsohn, 1992).</p>
1899 - 1902	<p>The South African War took place during these years. While no skirmishes or battles are known from within the study area, a number of events and activities associated with the war from the surroundings of the study area are known.</p> <p>In early 1900 for example, a group of men from Rustenburg were called upon to establish a laager on the drift over the Elands River “...<i>on the present day main road to Sun City...</i>” (Wulfsohn, 1992:68). This was to prevent an invasion into Rustenburg by the Bakgatla from Saulspoot and Bechuanaland. The men holding the drift included W.T. Dawes, August Schoch, J.S. (Sammy) Mundel and Philip Brink (Wulfsohn, 1992). The position of this drift (if it still existed today) is roughly 11.7km north by north-west of the present study area.</p> <p>During the war years the Bakgatla from Saulspoot and Bechuanaland under Kgosi Linchwe I (the son of Kgamanyane Pilane) actively resisted and fought the Boer Commandos and also raided Boer farms across the present-day North West and Gauteng Provinces as far as south of Rustenburg (some sources even indicate that the Kgatla regiments raided farms in the Pretoria District as well). While no clear victors in the fight for the land north of the Elands River emerged, the Bakgatla succeeded in harassing and attacking the Boer forces to the extent that the far north-western areas of the Transvaal Republic were largely left unmanned and unoccupied by Boer forces during much of the war, and especially so as the war progressed. While numerous skirmishes would have taken place around the Pilanesberg as a result of the tug of war between the Boers and Bakgatla, two pitched battles did occur in this area namely at Janskop and Draaiberg (Morton, 1992). These battlefields are located on the northern and north-western ends of the Pilanesberg, and as a result some distance from the present study area.</p> <p>Apart from the drift over the Elands River, another highly strategic point from the surroundings of the study area during the war years was Boschoek Nek. Situated roughly 2.6km north-west of the present study area, this topographic feature represented one of only a few passes through the Magaliesberg Mountains. The strategic importance of the nek was not realised at first by the British authorities, with the Boer forces utilising it with impunity on numerous occasions to move men across the mountain range. Even as late as 21 May 1902, reports were received by the British Command in Rustenburg that a group of 30 Boers had crossed over the nek from the west to carry out raids on the Kana Mission Station and Magatostad (Wulfsohn, 1992).</p>

This said, Boschoek Nek was at least temporarily occupied by several British units during the guerrilla phase of the war. For example, on 9 June 1901, General Dixon occupied the nek with a force comprising three infantry battalions, several batteries of artillery and numerous mounted horsemen. Boschoek Nek was again held by Colonel Allenby and his men during September 1901 (Wulfsohn, 1992).

The Staff Diaries of the Rustenburg District provide further insight into war-time events which occurred in the surroundings of the study area. For example, on 6 February 1902 a patrol of Imperial Yeomanry commanded by Captain Johnstone and accompanied by a group of Burgher Scouts under a British Intelligence Officer left Rustenburg for the Pilaansberg. The Burgher Scouts were tasked with the construction of a line of blockhouses. Upon completing this task, the Imperial Yeomanry returned to Rustenburg, arriving safely on 16 February 1902 with valuable information on Saulspoort and the Pilaansberg. The Burgher Scouts remained behind on the farm Palmietfontein (Wulfsohn, 1992) As mentioned elsewhere, this latter farm is located roughly 18km north-west of the study area.


Other recorded events include the returning to Rustenburg of a column under the command of Colonel Colenbrander on 10 March 1902 from a patrol of the Elands River beyond Boschhoek (Rustenburg Staff Diary, March 1902). While the details of this patrol are not known, it would have been carried out in the immediate surroundings of the study area.

Also, on 21 March 1902, Captain Johnstone, in command of a patrol of Imperial Yeomanry, as well as Lieutenant Haigh of the Field Intelligence Department, returned to Rustenburg from the Pilaansberg (Rustenburg Staff Diary, March 1902). The reason for their visit to the Pilaansberg is not known, nor is the route that was followed by this column.



Figure 18

Colonel Colenbrander, who led a British column on a patrol of the Elands River beyond Boschhoek (Creswicke, 1902: 76).

1902	<p>At the end of the South African War the Rustenburg District was divided into three wards, namely Swartruggens, Hex River and Elands River. The study area now fell within the Elands River Ward of the Rustenburg District (Bergh, 1999). During this time, Ramono, the brother of Linchwe I, was installed as kgosi of the Bakgatla ba ga Kgafela living in the then Transvaal (Tlou & Campbell, 1997).</p>
1914 -1915	<p>In 1914 the South African government under General Louis Botha decided to assist Great Britain in its war with Germany. A number of Boer leaders were not happy about this turn of events, and when General Koos de la Rey was killed at a roadblock in Johannesburg emotions reached a boiling point and a Boer rebellion broke across the then Transvaal and Free State. This was also true for the wider surroundings of the study area. On 6 and 7 November 1914, for example, a force of 18 rebels attacked the Pilanesberg Police Station, which at the time was held by a single policeman, Constable Petrus Paulus Jacobus (Piet) Botha. The attack did not succeed (Wulfsohn, 1989). While the exact location of this police station is not presently known, Mr Wulfsohn indicates that it was near Sun City.</p>
<p>Figure 19</p> <p>Dr. Hans Merensky, the geologist who discovered the platinum reef at Rustenburg (Machens, 2009).</p>	
1924	<p>In this year the famous geologist Hans Merensky was shown a sample of platinum ore that a Mr. Andries Lombard had found near Lydenburg. Merensky managed to trace a platinum reef all along the outer edge of the Bushveld Complex from Lydenburg to Rustenburg. This reef was to be known as Merensky Reef (Carruthers, 2007).</p> <p>The discovery of the Bushveld Complex was of extensive economic significance for South Africa. As indicated by Wikipedia, the Bushveld Igneous Complex "...contains the world's largest reserves of platinum-group-metals</p>

	<p><i>(PGMs) – platinum, palladium, osmium, iridium, rhodium, and ruthenium – along with vast quantities of iron, tin, chromium, titanium and vanadium.”</i></p> <p>The complex was traced along two zones or belts, known as the Western and Eastern Belt. The Western Belt is of significance for the present study. The relevant government survey reports and later studies all indicate that the Western Belt “...extends for about 100 miles as follows: from Brits towards Rustenburg and then northwards, skirting the Pilanesberg on its western side and continuing almost as far as the Crocodile River.” See for example The Official Year Book of the Union (1938:862).</p> <p>The identification of the Bushveld Igneous Complex inter alia between Rustenburg and the west of the Pilanesberg, meant that the surroundings of the study area were increasingly prospected and mined in the years after 1924.</p>
December 1924	<p>A branch line was opened between Rustenburg and Boschhoek (Higginson, 2014). This development would have stimulated mining exploration and development in areas around Boschhoek.</p> <p>At the time, the Boschhoek railhead would have been located roughly 1.3 km east by north-east of the study area.</p>
April 1929	<p>In April 1929, E.R. Schoch published his “<i>Notes on the Nickel and Copper Deposits in the Norite Complex of the Pilansberg, District Rustenburg, Transvaal</i>” in the Journal of the South African Institute of Mining and Metallurgy. This, and other attempts at prospecting and exploring the mineral wealth of the areas to the west of the Pilanesberg, would have stimulated the mineral development of the wider surroundings of the study area.</p>
August 1936	<p>Palmiet Chrome (Pty) Ltd was established in August 1936. It owned 3,807 morgen of chrome rights on the farm Palmietfontein 208 JP (South African Mining Yearbook, 1941/2), situated some 18km north-west of the present study area.</p>
15 January 1938	<p>Rustenburg Chrome Mines (Pty) Ltd was established on this day and at the time held options on the farm Vogelstruisnek 173 JP (South African Mining Yearbook, 1941/2), situated roughly 27km north-west of the present study area.</p>
1966	<p>In 1966 the Apartheid government forcibly relocated the Bakubung ba Ratheo from Molotestad near Boons (roughly 54km south-east of the present study area) to the farms Wydhoek, Ledig and Koedoesfontein. When Bophutatswana was established a decade later, these farms were handed over to the Bantustan (www.wikipedia.org). See also Historia (2000) and De Satgé (2006). The nearest of these farms to the study area is Koedoesfontein, which is located approximately 12.6km north by north-west of the study area.</p>
6 December 1977	<p>The South African government granted independence to Bophutatswana on 6 December 1977 (www.wikipedia.org).</p>
1977	<p>The Pilanesberg National Park was established in 1977 and during its early years was managed by the then Agricultural Development Corporation of Bophutatswana (Carruthers, 2011).</p>
7 December 1979	<p>The Sun City resort was opened on this day and at the time fell within the Bantustan of Bophutatswana (www.wikipedia.org).</p>

5.2 Archival and Historical Maps

An assessment of available archival and historical maps was undertaken as a way to establish a historic layering for the study area. These historic maps are also valuable resources in identifying possible heritage sites and features located within the study area.

5.2.1 First Editions of the 2527AC and 2527CA Topographic Sheets

This section deals with the First Editions of the 2527AC and 2527CA Topographical Sheets. The details of these two sheets are as follows:

- The 2527AC HEYSTEKRAND sheet was based on aerial photography undertaken in 1961, was surveyed in 1963 and drawn in 1964 by the Trigonometrical Survey Office; and
- The 2527CA RUSTENBURG (WEST) sheet was based on aerial photography undertaken in 1963, was surveyed in 1968 and drawn in 1969 by the Trigonometrical Survey Office.

Overlays of the study area over these map sheets are provided in the image below. The following observations can be made from this overlay:

- No heritage sites or features such as buildings, graves and monuments are depicted within the study area boundaries;
- The far north-eastern section of the study area had a telephone and telegraph line running through it; and
- The immediate surroundings of the study area were characterised by farming activities along the level areas. These farming activities comprised cultivated lands and were associated with farmsteads and farmworker dwellings. Additionally, a number of shops are depicted along the main road through Boschoek.

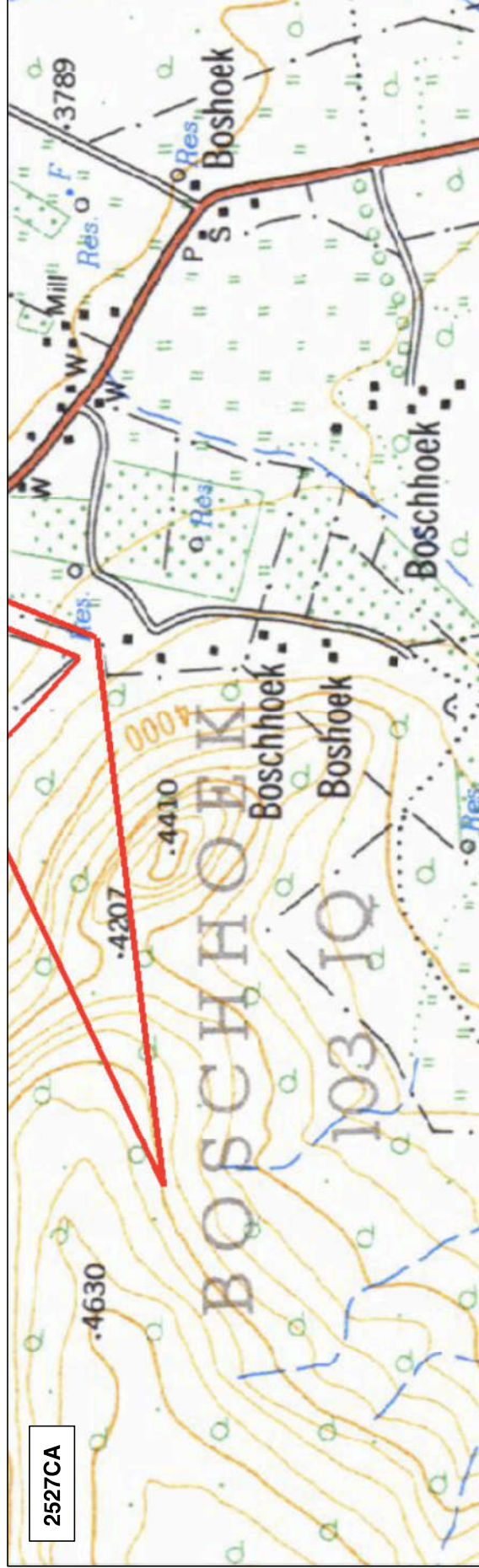
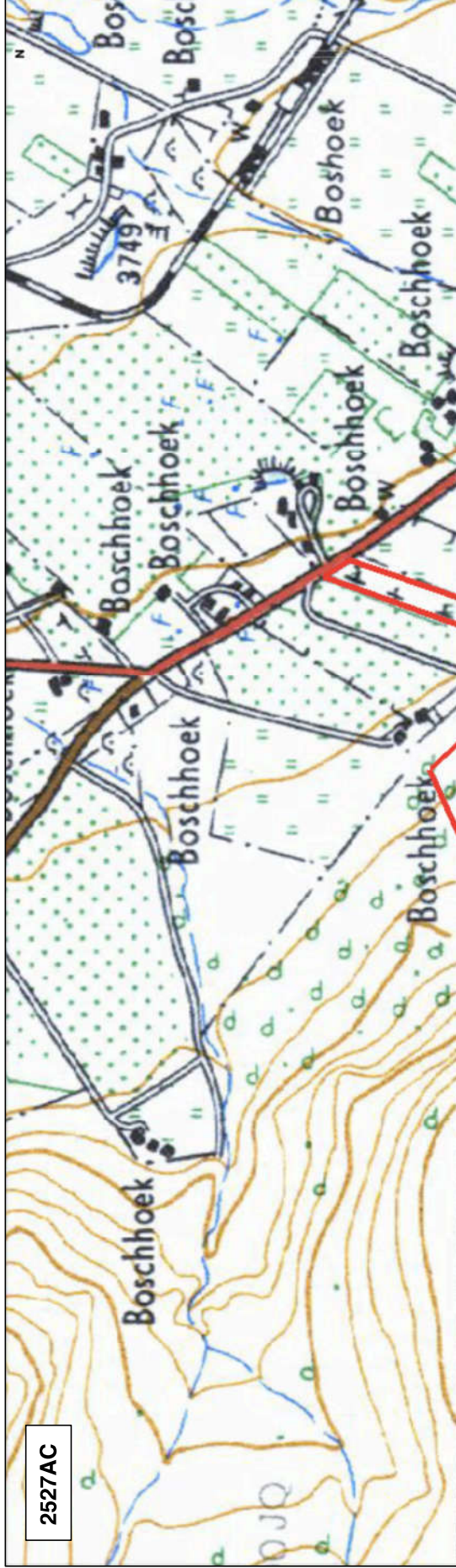


Figure 20 – Detail view of the depiction of the study area on the First Editions of the 2527AC (top) and 2527CA (bottom) Topographical Map Sheets.

5.3 Previous Heritage Impact Assessment Reports from the Study Area and Surroundings

An assessment of the South African Heritage Resources Information System (SAHRIS) of SAHRA was undertaken to establish whether any previous archaeological and heritage impact assessments had identified any archaeological and heritage sites within, or in close proximity, to the present study area footprints.

This assessment has revealed that one previous study was undertaken within the present study area, which identified one cemetery. Additionally, a number of studies have also been undertaken in the immediate surroundings of the study area, with various heritage and archaeological site types identified.

All these previous studies located on the SAHRIS system will be briefly discussed in chronological order below. The previous study that was undertaken within the present study area will be discussed first. In each case, the results of each study are shown in bold.

The following previous study was undertaken within the present study area:

- MNGOMEZULU, M. 2015. Phase 1 Heritage Impact Assessment for Section 24G Rectification Process and Water Use License Application for the Chrome Crushing, Screening and Washing plant on Portion 8 of the Farm Boshoek 103 JQ in Rustenburg, Bojanala Platinum District Municipality, North West Province. **One cemetery was identified during the fieldwork.** The cemetery that is included in this report as site BSCH 6 was also identified during this 2015 study. At the time, the cemetery also consisted of four graves. SAHRIS Case ID: 8140.

The following studies have been undertaken in the immediate surroundings of the present study area:

- PISTORIUS, J.C.C. 2003. A Heritage Impact Assessment (HIA) for SA Ferrochrome's New Proposed Expansion Operations in Boschhoek, North of Rustenburg in the North-West Province of South Africa. **The fieldwork resulted in the identification of a number of features and sites. However, only a grave and the remains of old mining activities were considered to be of any significance.** SAHRIS MAPID: 01069.
- PISTORIUS, J.C.C. 2014. Heritage Baseline Report for the Proposed Boshoek Smelter on Portions of the Farms Boshoek 103 JQ, Bultfontein 259 JQ, Boekenhoutfontein 260 JQ and Stellite 255 JQ. **Two graveyards and three single graves were identified during the study.** The nearest of these sites to the present study area is the graveyard GY01

which is located approximately 1km east by north-east of the present study area. SAHRIS CaseID: 5526.

- COETZEE, F. 2015. Cultural Heritage Assessment for the Amendment to the Environmental Management Programme for the Proposed Tailings Storage Facility (TSF) and Associated Infrastructure at Royal Bafokeng Platinum Styldrift Mine Complex, Rustenburg Local Municipality, Bojanala District Municipality, North West Province. **No historical or archaeological resources or graves were uncovered during this assessment.** SAHRIS CaseID: 7030.

5.4 Palaeontology

This section was compiled by the author and not by a palaeontological specialist. According to the Palaeontological Sensitivity Map of SAHRIS, the study area is comprised of both grey and orange areas. This said, the development footprints are only proposed in the areas indicated to be of insignificant (grey) palaeontological sensitivity. As such no palaeontological studies are required.

The different palaeontological sensitivities that are defined on the Palaeontological Sensitivity Map of SAHRIS, is outlined in the table below.

Table 12: Palaeontological Sensitivities and Required Actions

Colour	Sensitivity	Required Action
RED	VERY HIGH	Field assessment and protocol for finds is required.
ORANGE/YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study, a field assessment is likely.
GREEN	MODERATE	Desktop study is required.
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required.
GREY	INSIGNIFICANT/ZERO	No palaeontological studies are required.
WHITE/CLEAR	UNKNOWN	These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

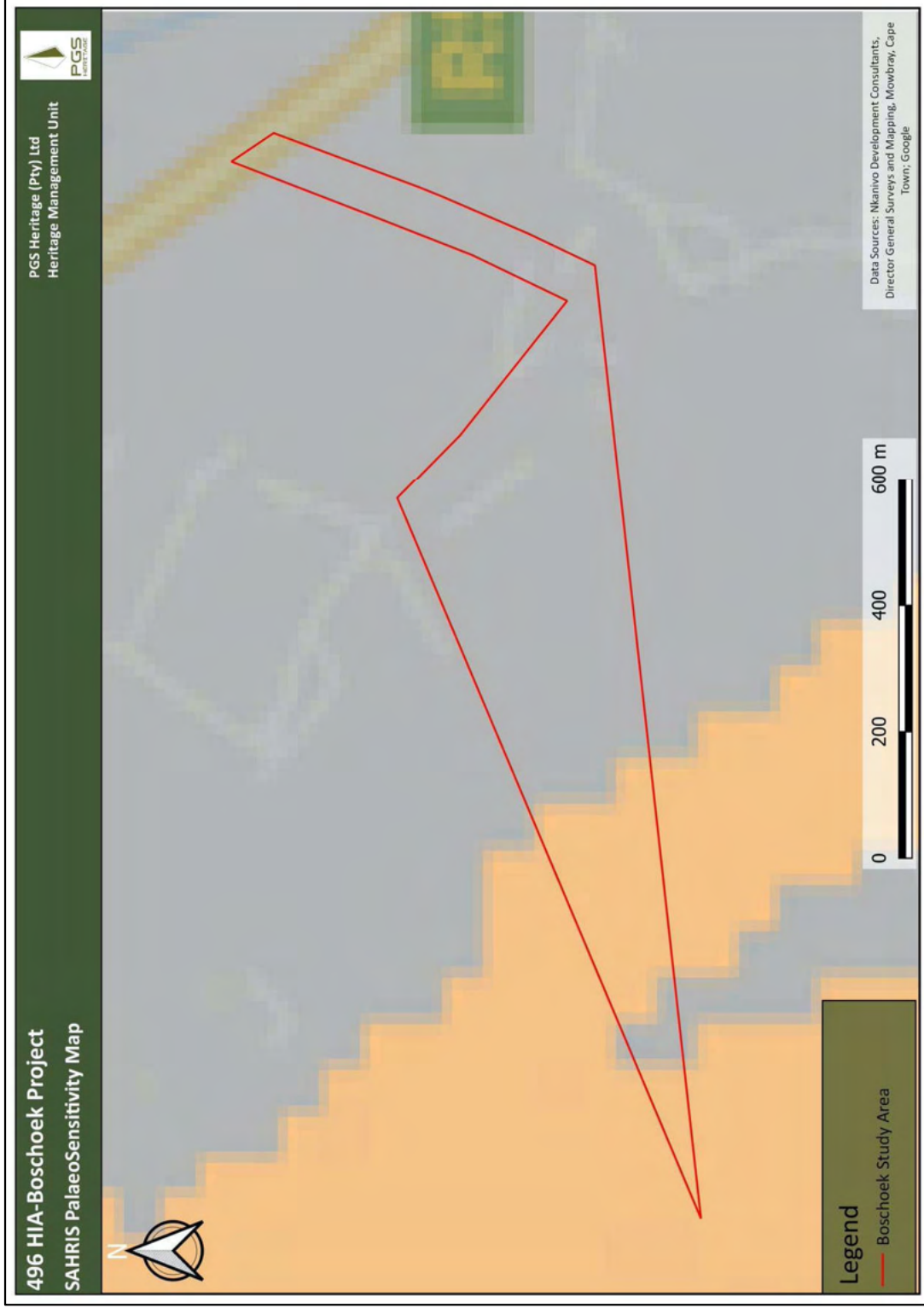


Figure 21 - Extract of the 1:250 000 SAHRIS PalaeoMap map (Council of Geosciences). Approximate location of the proposed development is indicated in red.

6 FIELDWORK FINDINGS

6.1 Introduction

The fieldwork component of the study was aimed at identifying tangible remains of archaeological, historical and heritage significance. The fieldwork was undertaken by way of walkthroughs by an experienced archaeological fieldwork team on Thursday, 12 November 2020. The fieldwork team consisted of an experienced archaeologist and heritage specialist (Polke Birkholtz) and fieldwork assistant (Derrick James).

It should be noted that the fieldwork was focused on those components of the study area where the development is proposed, namely the north-eastern sections of the study area. As these sections of the study area were found to be comprised of fenced and cleared stands that were established recently, no intensive walkthroughs of the development footprint area were possible. Some walkthroughs took place in pockets of this area where fewer stands have been demarcated. Additionally, Iron Age stonewalled sites that were remotely identified with Google Earth on the plateau to the south-west of the development footprint area, were also visited during the fieldwork.

Throughout the fieldwork, hand-held GPS devices were used to record the tracklogs showing the routes followed by the two archaeological fieldwork teams. All sites identified during the fieldwork were photographically and qualitatively recorded, and their respective localities documented using a hand-held GPS device.

The fieldwork undertaken resulted in the identification of a total of ten (10) sites. These were numbered from BSCH 1 to BSCH 10. The prefix used in this numbering system was derived from the farm name, namely Boschkop 103 JQ.

The distribution of these identified sites in relation to the study area boundaries is shown on one of the maps appearing below.

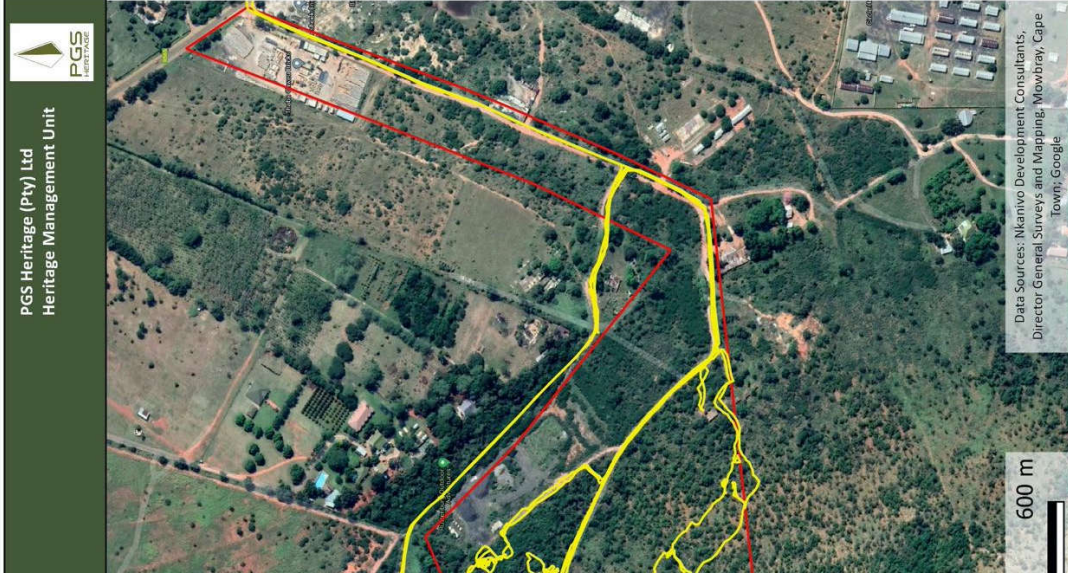


Figure 22 – Google Earth image depicting the tracklogs that were recorded in the field. The study area boundaries are depicted in red.



Figure 23 – Google Earth image depicting the tracklogs that were recorded in the field. The study area boundaries are depicted in red.

6.2 Heritage Sites identified during the Fieldwork

6.2.1 BSCH 1

GPS Coordinates:

S 25.502490

E 27.077565

Type: Late Iron Age Stonewalled Site

Description:

A Late Iron Age stonewalled site was identified on a small plateau. Although it is densely overgrown with vegetation, the site layout appears to consist of a medium-sized oval enclosure that is partially encircled by an enclosing wall. A small to medium sized circular enclosure is located a few meters outside (and to the northj) of the enclosing wall.

No middens could be identified, although this may be as a result of the dense grass cover found across the site. One undecorated potsherd was observed in the space between the central and outer walling.

The site is located in proximity to two other Late Iron Age stonewalled sites, and must be associated with these other sites. In fact, it seems likely that all the Late Iron Age stonewalled sites identified within the study area formed part of a single Late Iron Age stonewalled settlement.

Significance:

The site is reasonably well preserved and forms part of a larger Late Iron Age stonewalled settlement. Based on information that is presently available, the site is deemed to be of **Generally Protected B (GP. B) or Medium Significance**.

Site Extent:

The site is approximately 100m x 65m in extent.

Impact Assessment and Mitigation:

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures.



Figure 24 - General view of site BSCH 1. The enclosing stonewall can be seen in the foreground.



Figure 25 - Closer view of a section of walling from the site. The scale is in 10cm increments.

6.2.2 BSCH 2

GPS Coordinates:

S 25.503321

E 27.078554

Type: Late Iron Age Stonewalled Site

Description:

A Late Iron Age stonewalled site was identified on a small plateau. Although it is densely overgrown with vegetation, the site layout appears to consist of a cluster of two or three small to medium-sized circular enclosures that are attached to each other and partially encircled by an enclosing wall.

No middens or cultural material could be identified, although this may be as a result of the dense grass cover found across the site.

The site is located in proximity to two other Late Iron Age stonewalled sites, and must be associated with these other sites. In fact, it seems likely that all the Late Iron Age stonewalled sites identified within the study area formed part of a single Late Iron Age stonewalled settlement.

Significance:

The site is reasonably well preserved and forms part of a larger Late Iron Age stonewalled settlement. Based on information that is presently available, the site is deemed to be of **Generally Protected B (GP. B) or Medium Significance**.

Site Extent:

The site is approximately 80m x 80m in extent.

Impact Assessment and Mitigation:

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures.



Figure 26 - General view of site BSCH 2. The position of the centrally located cluster of stonewalled enclosures is marked.



Figure 27 - Closer view of a section of walling from the site. The scale is in 10cm increments.

6.2.3 BSCH 3

GPS Coordinates:

S 25.502446

E 27.078429

Type: Late Iron Age Stonewalled Site

Description:

A Late Iron Age stonewalled site was identified on a small plateau. Although it is densely overgrown with vegetation, the site layout appears to consist of a medium to large circular enclosure with two or more attached smaller enclosures.

No middens or cultural material could be identified, although this may be as a result of the dense grass cover found across the site.

The site is located in proximity to two other Late Iron Age stonewalled sites, and must be associated with these other sites. In fact, it seems likely that all the Late Iron Age stonewalled sites identified within the study area formed part of a single Late Iron Age stonewalled settlement.

Significance:

The site is reasonably well preserved and forms part of a larger Late Iron Age stonewalled settlement. Based on information that is presently available, the site is deemed to be of **Generally Protected B (GP. B) or Medium Significance**.

Site Extent:

The site is approximately 50m x 50m in extent.

Impact Assessment and Mitigation:

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures.



Figure 28 - General view of a section of walling from site BSCH 3. This section of walling is from the medium to large circular enclosure. The scale is in 10cm increments.



Figure 29 – View along a section of walling from the same medium to large circular enclosure. The scale is in 10cm increments.

6.2.4 BSCH 4

GPS Coordinates:

S 25.501130

E 27.082671

Type: Poorly Preserved Late Iron Age Stonewalled Site

Description:

A poorly preserved Late Iron Age stonewalled site was identified within one of the newly cleared stands. All that remains of the site is a small to medium circular stonewalled enclosure.

Despite the fact that the surface of the stand within which the site was identified was cleared, no middens or cultural material could be identified,

The site is located in proximity to other poorly preserved Late Iron Age stonewalled sites, and must be associated with these other sites. In fact, it seems likely that all the Late Iron Age stonewalled sites identified within the study area formed part of a single Late Iron Age stonewalled settlement.

Significance:

The site is poorly preserved with only one circular enclosure still evident. Based on information that is presently available, the site is deemed to be of **Generally Protected C (GP. C)** or **Low Significance**.

Site Extent:

The site is approximately 30m x 30m in extent.

Impact Assessment and Mitigation:

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures.



Figure 30 - General view of the small to medium circular enclosure identified at site BSCH 4. The scale is in 10cm increments.



Figure 31 – Closer view of a section of stonewalling from the site. The scale is in 10cm increments.

6.2.5 BSCH 5

GPS Coordinates:

S 25.500939

E 27.080524

Type: Poorly Preserved Late Iron Age Stonewalled Site

Description:

A poorly preserved Late Iron Age stonewalled site was identified in-between some of the newly cleared stands. All that remains of the site are a few small sections of stonewalling.

No middens or cultural material could be identified in association with the stonewalled sections.

The site is located in proximity to other poorly preserved Late Iron Age stonewalled sites, and must be associated with these other sites. In fact, it seems likely that all the Late Iron Age stonewalled sites identified within the study area formed part of a single Late Iron Age stonewalled settlement.

Significance:

The site is poorly preserved with only small sections of stonewalling still evident. Based on information that is presently available, the site is deemed to be of **Generally Protected C (GP. C)** or **Low Significance**.

Site Extent:

The site is approximately 30m x 30m in extent.

Impact Assessment and Mitigation:

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures.



Figure 32 - General view of a small section of stonewalling from site BSCH 5. The scale is in 10cm increments.

6.2.6 BSCH 6

GPS Coordinates:

S 25.500367 E 27.082757	S 25.500381 E 27.082813
S 25.500432 E 27.082745	S 25.500464 E 27.082826

Type: Cemetery

Description:

A cemetery comprising four graves was identified here. The coordinates provided in the table above were taken to define the boundary of the cemetery.

The grave dressings from all four the graves consist of oval and rectangular stone-packed dressings. No formal headstones were observed on any of the graves. As a result, no details regarding the deceased (such as names, date of death etc.) are depicted on any of the graves.

This cemetery was also identified during a Heritage Impact Assessment for a proposed chrome crushing, washing and screening plant (Mngomezulu, 2015). This report states that the cemetery dates from the 1990s and can be associated with the Maboyane and Makgakge families.

Significance:

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**.

Site Extent:

The site is approximately 20m x 20m in extent.

Impact Assessment and Mitigation:

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures.



Figure 33 - General view of the cemetery at site BSCH 6. The scale is in 10cm increments.



Figure 34 – Closer view of some of the grave goods that were placed on the graves. The scale is in 10cm increments.

6.2.7 BSCH 7

GPS Coordinates:

S 25.503093

E 27.083641

Type: Poorly Preserved Late Iron Age Stonewalled Site

Description:

A poorly preserved Late Iron Age stonewalled site was identified within one of the newly cleared stands. All that remains of the site is a small to medium circular stonewalled enclosure.

Despite the fact that the surface of the stand within which the site was identified was cleared, no middens or cultural material could be identified,

The site is located in proximity to other poorly preserved Late Iron Age stonewalled sites, and must be associated with these other sites. In fact, it seems likely that all the Late Iron Age stonewalled sites identified within the study area formed part of a single Late Iron Age stonewalled settlement.

Significance:

The site is poorly preserved with only one circular enclosure still evident. Based on information that is presently available, the site is deemed to be of **Generally Protected C (GP. C)** or **Low Significance**.

Site Extent:

The site is approximately 25m x 25m in extent.

Impact Assessment and Mitigation:

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures.



Figure 35 - View along a section of walling from the small to medium circular enclosure identified at site BSCH 7. The scale is in 10cm increments.

6.2.8 BSCH 8

GPS Coordinates:

S 25.502439

E 27.082884

Type: Poorly Preserved Late Iron Age Stonewalled Site

Description:

A poorly preserved Late Iron Age stonewalled site was identified in-between some of the newly cleared stands. All that remains of the site are a few small sections of stonewalling.

No middens or cultural material could be identified in association with the stonewalled sections.

The site is located in proximity to other poorly preserved Late Iron Age stonewalled sites, and must be associated with these other sites. In fact, it seems likely that all the Late Iron Age stonewalled sites identified within the study area formed part of a single Late Iron Age stonewalled settlement.

Significance:

The site is poorly preserved with only small sections of stonewalling still preserved. Based on information that is presently available, the site is deemed to be of **Generally Protected C (GP. C)** or **Low Significance**.

Site Extent:

The site is approximately 20m x 20m in extent.

Impact Assessment and Mitigation:

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures.



Figure 36 - General view of a small section of stonewalling from site BSCH 8. The scale is in 10cm increments.

6.2.9 BSCH 9

GPS Coordinates:

S 25.502073

E 27.082081

Type: Poorly Preserved Late Iron Age Stonewalled Site

Description:

A poorly preserved Late Iron Age stonewalled site was identified in-between some of the newly cleared stands. All that remains of the site is a medium-sized circular stonewalled enclosure.

No middens or cultural material could be identified in association with the circular stonewalled enclosure.

The site is located in proximity to other poorly preserved Late Iron Age stonewalled sites, and must be associated with these other sites. In fact, it seems likely that all the Late Iron Age stonewalled sites identified within the study area formed part of a single Late Iron Age stonewalled settlement.

Significance:

The site is poorly preserved with only one medium-sized stonewalled enclosure still evident. Based on information that is presently available, the site is deemed to be of **Generally Protected C (GP. C) or Low Significance**.

Site Extent:

The site is approximately 25m x 25m in extent.

Impact Assessment and Mitigation:

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures.



Figure 37 - General view of of site BSCH 9.

6.2.10 BSCH 10

GPS Coordinates:

S 25.501357

E 27.081144

Type: Poorly Preserved Late Iron Age Stonewalled Site

Description:

A poorly preserved Late Iron Age stonewalled site was identified within one of the newly cleared stands. All that remains of the site are two small circular enclosures with associated stonewalling.

Despite the fact that the surface of the stand within which the site was identified was cleared, no middens or cultural material could be identified,

The site is located in proximity to other poorly preserved Late Iron Age stonewalled sites, and must be associated with these other sites. In fact, it seems likely that all the Late Iron Age stonewalled sites identified within the study area formed part of a single Late Iron Age stonewalled settlement.

Significance:

The site is poorly preserved with only two small circular enclosures still evident. Based on information that is presently available, the site is deemed to be of **Generally Protected C (GP. C)** or **Low Significance**.

Site Extent:

The site is approximately 30m x 30m in extent.

Impact Assessment and Mitigation:

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures.



Figure 38 - General view of site BSCH 10.



Figure 39 – Closer view of one of the small circular enclosures identified at the site. The scale is in 10cm increments.

6.2.11 BSCH 11

GPS Coordinates:

S 25.501357

E 27.081144

Type: Farmworker Dwellings with Possible Risk for Unmarked Graves

Description:

A cluster of farmworker dwellings was identified here. This cluster is comprised of at least seven individual structures, some of which are located on the adjacent property. The structures were all constructed of cement brick.

Past experience has shown that in some cases babies and infants were buried in unmarked contexts in close proximity to such dwellings and especially along the sides of the parents' dwelling. As this site was abandoned, no direct information with regards to the presence (or not) of such graves are currently available.

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. However, the presence of graves at this site is not confirmed. As such the site is of **Generally Protected B (GP. B)** or **Medium Significance**. This indicates that the site may not be impacted upon without prior mitigation.

Site Extent:

The site is approximately 50m x 40m in extent.

Impact Assessment and Mitigation:

See Chapter 7 for impact assessment calculations and Chapter 8 for required mitigation measures.



Figure 40 - General view of two of the structures from site BSCH 11.



Figure 41 – Closer view of one of the structures from site BSCH 11.

7 IMPACT OF PROPOSED DEVELOPMENT ON HERITAGE

7.1 General Observations

In this section, an assessment will be made of the impact of the proposed development on the identified heritage sites.

The following general observations will apply for the impact assessment undertaken in this report:

- The impact assessment methodology of PGS Heritage (Pty) Ltd will be utilised in this section. This methodology is outlined and explained in more detail in **Section 3.2** of this report.
- Heritage sites assessed to have a low heritage significance are not included in these impact risk assessment calculations. The reason for this is that sites of low significance will not require mitigation. These sites are BSCH 4, BSCH 5, BSCH 7, BSCH 8, BSCH 9 and BSCH 10. This said, please note that as it appears very likely for these six sites to have formed part of a single Late Iron Age stonewalled site, a combined impact assessment will be undertaken on these six sites to assess the cumulative impact of the proposed development on the entire Iron Age site.
- Sites BSCH 1, BSCH 2 and BSCH 3 are located some distance outside of the development footprint areas. As a result, no impact is expected from the proposed development on these site. This means that no impact assessment will be undertaken for these sites.

7.2 Risk Calculation for the Unmitigated Impact of the Proposed Development

7.2.1 Risk Calculation for the Unmitigated Impact of the Proposed Development on BSCH 6

In this section the unmitigated impact of the proposed development on the cemetery at site BSCH 6 will be assessed. According to the proposed development layout plan, this cemetery is located within an area that is demarcated for municipal use. However, at present it is not certain where the identified cemetery is located within this municipal use stand.

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

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

IMPACT RISK = 2.2

Table 13 - Risk Calculation for the Unmitigated Development Impact on BSCH 6

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	High	Regional/Provincial	Medium Term	Could Happen	Moderate
Unmitigated Impact on BSCH 6	4	4	3	3	2.2

This calculation has revealed that the unmitigated impact risk of the proposed development on site BSCH 6 falls within Impact Class 3, which represents a Moderate Impact Risk. **Mitigation would be required.**

7.2.2 Risk Calculation for the Unmitigated Impact of the Proposed Development on BSCH 11

In this section the unmitigated impact of the proposed development on site BSCH 11 will be assessed. This site comprises farmworker dwellings where the risk for unmarked graves exist. According to the proposed development layout plan, this site is located within an area earmarked for residential development. As a result, the site will be destroyed by the proposed development.

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

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

IMPACT RISK = 2.4

Table 14 - Risk Calculation for the Unmitigated Development Impact on BSCH 11

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Medium	Regional/Provincial	Permanent	Could Happen	Moderate
Unmitigated Impact on BSCH 11	3	4	5	3	2.4

This calculation has revealed that the unmitigated impact risk of the proposed development on site BSCH 11 falls within Impact Class 3, which represents a Moderate Impact Risk. **Mitigation would be required.**

7.2.3 Risk Calculation for the Unmitigated Impact of the Proposed Development on BSCH 4, BSCH 5, BSCH 7, BSCH 8, BSCH 9 and BSCH 10

In this section the unmitigated impact of the proposed development on these six sites will be assessed. These sites are comprised of poorly preserved Late Iron Age stonewalled sites. Although the impacts on these poorly preserved sites on an individual basis can be considered low, the likelihood exists for these sites to have formed part of a single Late Iron Age stonewalled site. It is also possible for subterranean archaeological features and middens to be associated with such a site as well. The impact assessed below can therefore be seen as a cumulative impact.

According to the proposed development layout plan, all these sites are located within areas earmarked for residential development. As a result, the sites will be destroyed by the proposed development.

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

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

IMPACT RISK = 2.4

Table 15 - Risk Calculation for the Unmitigated Development Impact on Late Iron Age Sites

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Low	Regional/Provincial	Permanent	Could Happen	Moderate
Unmitigated Impact on LIA sites	2	4	5	3	2.2

This calculation has revealed that the unmitigated impact risk of the proposed development on sites BSCH 4, BSCH 5, BSCH 7, BSCH 8, BSCH 9 and BSCH 10 falls within Impact Class 3, which represents a Moderate Impact Risk. **Mitigation would be required.**

7.3 Risk Calculation for the Post-Mitigation Impact of the Proposed Development

7.3.1 Risk Calculation for the Post-Mitigation Impact of the Development on BSCH 6

In this section the post-mitigation impact of the proposed development on the cemetery at site BSCH 6 will be assessed.

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

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

IMPACT RISK = 1.47

Table 16 - Risk Calculation for the Post-Mitigation Development Impact on BSCH 6

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	High	Regional/Provincial	Medium Term	Unlikely	Low
Post-Mitigation Impact on BSCH 6	4	4	3	2	1.47

This calculation has revealed that the post-mitigation impact risk of the proposed development on site BSCH 6 falls within Impact Class 2, which represents a Low Impact Risk.

7.3.2 Risk Calculation for the Post-Mitigation Impact of the Development on BSCH 11

In this section the post-mitigation impact of the proposed development on site BSCH 11 will be assessed. This site comprises farmworker dwellings where the risk for unmarked graves exist.

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

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

IMPACT RISK = 1.6

Table 17 - Risk Calculation for the Post-Mitigation Development Impact on BSCH 11

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Medium	Regional/Provincial	Permanent	Unlikely	Low
Post-Mitigation Impact on BSCH 11	3	4	5	2	1.6

This calculation has revealed that the post-mitigation impact risk of the proposed development on site BSCH 11 falls within Impact Class 2, which represents a Low Impact Risk.

7.3.3 Risk Calculation for the Post-Mitigation Impact of the Proposed Development on BSCH 4, BSCH 5, BSCH 7, BSCH 8, BSCH 9 and BSCH 10

In this section the post-mitigation impact of the proposed development on these six sites will be assessed. These sites are comprised of poorly preserved Late Iron Age stonewalled sites.

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

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

IMPACT RISK = 1.47

Table 18 - Risk Calculation for the Post-Mitigation Development Impact on Late Iron Age Sites

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Low	Regional/Provincial	Permanent	Could Happen	Low
Post-Mitigation Impact on LIA sites	2	4	5	3	1.47

This calculation has revealed that the post-mitigation impact risk of the proposed development on sites BSCH 4, BSCH 5, BSCH 7, BSCH 8, BSCH 9 and BSCH 10 falls within Impact Class 2, which represents a Low Impact Risk.

8 REQUIRED MITIGATION MEASURES

8.1 Introduction

In this chapter, required mitigation measures for each of the sites affected by the proposed development will be outlined. As shown in **Chapter 7**, mitigation would be required for the following:

- BSCH 6;
- BSCH 11; and
- The cumulative impact on the single Late Iron Age stonewalled site associated with sites BSCH 4, BSCH 5, BSCH 7, BSCH 8, BSCH 9 and BSCH 10.

8.2 Required Mitigation Measures

8.2.1 Mitigation Measures required for site BSCH 6

The impact significance calculations undertaken in **Chapter 7** have shown that the significance of the unmitigated impact of the proposed development on this cemetery is estimated to be of Medium Significance. As a result, mitigation measures are required for these sites. The following mitigation measures are required:

- The cemetery and boundary as defined by the four sets of coordinates outlined in the site description must be centrally located in the stand that is earmarked for municipal use;
- The cemetery must be fenced and the fence must include a lockable gate; and
- The municipal stand must be large enough to allow for a 30m buffer area around the site.

8.2.2 Mitigation Measures required for site BSCH 11

The impact significance calculations undertaken in **Chapter 7** have shown that the significance of the unmitigated impact of the proposed development on this cemetery is estimated to be of Medium Significance. As a result, mitigation measures are required for these sites. The following initial mitigation measure is required:

- A social consultation process to assess whether any local residents or the wider public is aware of the presence of graves at these sites.

Depending on the outcome of the social consultation process, three different outcomes would be the result, namely:

- Outcome 1: The social consultation absolutely confirms that no graves are located here.

- Outcome 2: The social consultation absolutely confirms that graves are located here.
- Outcome 3: The social consultation does not yield any confident results.

The following mitigation measures would be required for sites falling under Outcome 1:

- No further grave-related mitigation would be required.

The following mitigation measures would be required for sites falling under Outcome 2:

- A grave relocation process must be undertaken;
- A detailed social consultation process, at least 60 days in length, comprising the attempted identification of the next-of-kin in order to obtain their consent for the relocation;
- Bilingual site and newspaper notices indicating the intent of the relocation.
- Permits from all the relevant and legally required authorities;
- An exhumation process that keeps the dignity of the remains and family intact;
- An exhumation process that safeguards the legal rights of the families and applicant; and
- The process must be done by a reputable company well versed in the mitigation of graves.

The following mitigation measures would be required for sites falling under Outcome 3:

- Test excavations to physically confirm the presence or absence graves;
- If no evidence for graves is found, the site will fall within Outcome 1 as outlined above. This means that no further mitigation measures would be required; and
- If evidence for graves is found, the site will fall within Outcome 2 as outlined above. This means that a full grave relocation process must be implemented.

Additionally, the following mitigation measures must be undertaken for the site:

- All structures and site layouts must be recorded using standard survey methods. The end result would be a site layout plan for this site.
- A mitigation report must be compiled for these sites within which all the mitigation measures and its findings will be outlined. The recorded drawings from the previous item must also be included in this mitigation report.
- The completed mitigation report must be submitted to the relevant heritage authorities.

8.2.3 Mitigation Measures required for the Late Iron Age Stonewalled Site associated with sites BSCH 4, BSCH 5, BSCH 7, BSCH 8, BSCH 9 and BSCH 10

The impact significance calculations undertaken in **Chapter 7** have shown that the significance of

the unmitigated impact of the proposed development on this cemetery is estimated to be of Medium Significance. As a result, mitigation measures are required for these sites.

The following mitigation measures are required:

- A watching brief/archaeological monitoring programme must be undertaken by an experienced archaeologist during the site establishment/construction stage of the project in case any subterranean archaeological middens and material associated with the Late Iron Age site are uncovered.

The definition of an archaeological/paleontological monitoring programme is a formal program of observation and investigation conducted during any operation carried out for non-archaeological reasons. This will be within a specified area or site on land, inter-tidal zone or underwater, where there is a possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report.

The purpose of a monitoring programme is:

- To allow, within the resources available, the preservation by recording of archaeological/historical resources, the presence and nature of which could not be established (or established with sufficient accuracy) in advance of development or other potentially disruptive works;
- To provide an opportunity, if needed, for the watching archaeologist to signal to all interested parties, before the destruction of the material in question, that an archaeological/historical find has been made for which the resources allocated to the watching brief itself are not sufficient to support treatment to a satisfactory and proper standard;
- A monitoring programme is not intended to reduce the requirement for excavation or preservation of known or inferred deposits or burials, and it is intended to guide, not replace, any requirement for contingent excavation or preservation of possible deposits or burials; and
- The objective of the monitoring is to establish and make available information about the archaeological/historical resources existing on a site.

Should subterranean middens be uncovered during the monitoring process, and if it is not possible to preserve these *in situ*, an archaeological rescue excavation process must be undertaken (See **Appendix A**).

9 CONCLUSIONS AND RECOMMENDATIONS

9.1 Introduction

PGS Heritage (Pty) Ltd was appointed by Nkanivo Development Consultants Pty (Ltd) to undertake a Heritage Impact Assessment (HIA) for the Proposed Township Establishment of the Remainder of Portion 8 of the Farm Boschoek 103 JQ, Boschoek, North West Province. The study area falls under the Rustenburg Local Municipality and the Bojanala District Municipality, North West Province. The applicant is the Rustenburg Local Municipality.

9.2 General Desktop Study

An archival and historical desktop study was undertaken to provide a historic framework for the project area and surrounding landscape. This was augmented by a study of available historical and archival maps as well as an assessment of previous archaeological and heritage reports undertaken within and in the surroundings of the study area. The desktop study revealed that the surroundings of the study area is characterised by a long and significant history. The assessment of the available historical maps did not reveal the presence of any heritage features.

9.3 Fieldwork

The fieldwork component of the study was aimed at identifying tangible remains of archaeological, historical and heritage significance. The fieldwork was undertaken by way of walkthroughs by an experienced archaeological fieldwork team on Thursday, 12 November 2020. The fieldwork team consisted of an experienced archaeologist and heritage specialist (Polke Birkholtz) and fieldwork assistant (Derrick James).

It should be noted that the fieldwork was focused on those components of the study area where the development is proposed, namely the north-eastern sections of the study area. As these sections of the study area were found to be comprised of fenced and cleared stands that were established recently, no intensive walkthroughs of the development footprint area were possible. Some walkthroughs took place in pockets of this area where fewer stands have been demarcated. Additionally, Iron Age stonewalled sites that were remotely identified with Google Earth on the plateau to the south-west of the development footprint area, were also visited during the fieldwork.

Throughout the fieldwork, hand-held GPS devices were used to record the tracklogs showing the routes followed by the two archaeological fieldwork teams. All sites identified during the fieldwork were photographically and qualitatively recorded, and their respective localities documented using a hand-held GPS device.

The fieldwork undertaken resulted in the identification of a total of ten (10) sites. These were numbered from BSCH 1 to BSCH 10. The prefix used in this numbering system was derived from the farm name, namely Boschkop 103 JQ. The identified sites comprised the following:

- **BSCH 1:** Late Iron Age Stonewalled Site;
- **BSCH 2:** Late Iron Age Stonewalled Site;
- **BSCH 3:** Late Iron Age Stonewalled Site
- **BSCH 4:** Poorly Preserved Late Iron Age Stonewalled Site;
- **BSCH 5:** Poorly Preserved Late Iron Age Stonewalled Site;
- **BSCH 6:** Cemetery consisting of four graves;
- **BSCH 7:** Poorly Preserved Late Iron Age Stonewalled Site;
- **BSCH 8:** Poorly Preserved Late Iron Age Stonewalled Site;
- **BSCH 9:** Poorly Preserved Late Iron Age Stonewalled Site;
- **BSCH 10:** Poorly Preserved Late Iron Age Stonewalled Site; and
- **BSCH 11:** Farmworker Dwellings where the Risk for Unmarked Graves Exist.

9.4 Impact Assessment and Mitigation

An overlay of the identified archaeological and heritage sites over the proposed development footprint areas was made 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.

9.5 Conclusions

The unmitigated impact of the proposed development is expected to result in Medium to High negative impacts in terms of the identified heritage fabric of the study area. However, if the mitigation measures proposed in this report are successfully completed, the impact of the proposed development on the identified heritage sites will be mitigated to Low negative impacts. 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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10.2 Unpublished Sources

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PISTORIUS, J.C.C. 2003. A Heritage Impact Assessment (HIA) for SA Ferrochrome's New Proposed Expansion Operations in Boschhoek, North of Rustenburg in the North-West Province of South Africa.

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10.3 Historical Topographic Maps

All the historic topographical maps used in this report were obtained from the Directorate: National Geo-spatial Information of the Department of Rural Development and Land Reform in Cape Town.

10.4 Internet

www.angloboerwar.com

www.sahistory.org.za

www.sanbi.org

www.wikipedia.org

10.5 Google Earth

At least some of the aerial depictions of the study area were obtained using Google Earth.

Appendix A
HERITAGE MANAGEMENT GUIDELINES

1. General Management Guidelines

1. The National Heritage Resources Act (Act 25 of 1999) states that, any person who intends to undertake a development categorised as-
 - (a) the construction of a road, wall, transmission line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
 - (b) the construction of a bridge or similar structure exceeding 50m in length;
 - (c) any development or other activity which will change the character of a site-
 - (i) exceeding 5 000 m² in extent; or
 - (ii) involving three or more existing erven or subdivisions thereof; or
 - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
 - (d) the re-zoning of a site exceeding 10 000 m² in extent; or
 - (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

In the event that an area previously not included in an archaeological or cultural resources survey is to be disturbed, the SAHRA needs to be contacted. An enquiry must be lodged with them into the necessity for a Heritage Impact Assessment.

2. In the event that an additional heritage assessment is required, it is advisable to utilise a qualified heritage practitioner, preferably registered with the Cultural Resources Management Section (CRM) of the Association of Southern African Professional Archaeologists (ASAPA). This survey and evaluation must include:
 - (a) The identification and mapping of all heritage resources in the area affected;
 - (b) An assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6 (2) or prescribed under section 7 of the National Heritage Resources Act;
 - (c) An assessment of the impact of the development on such heritage resources;
 - (d) An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;

- (e) The results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;
 - (f) If heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
 - (g) Plans for mitigation of any adverse effects during and after the completion of the proposed development.
3. In the event that a possible find is discovered during construction, the following steps must be taken:
- (a) All activities must be halted in the area of the discovery and a qualified archaeologist contacted;
 - (b) The archaeologist needs to evaluate the finds on site and make recommendations towards possible mitigation measures;
 - (c) If mitigation is necessary, an application for a rescue permit must be lodged with SAHRA; and
 - (d) After mitigation, an application must be lodged with SAHRA for a destruction permit. This application must be supported by the mitigation report generated during the rescue excavation. Only after the permit is issued may such a site be destroyed.
4. In the case where a grave is identified during construction, the following measures must be taken:
- a. Upon the accidental discovery of graves, a buffer of at least 20 meters should be implemented;
 - b. If graves are accidentally discovered during construction, activities must cease in the area and a qualified archaeologist be contacted to evaluate the find;
 - c. To remove the remains, a permit must be applied for from SAHRA and other relevant authorities. The local South African Police Services must immediately be notified of the find; and
 - d. Where it is recommended that the graves be relocated, a full grave relocation process that includes a comprehensive social consultation must be followed. Such a grave relocation process must include the following:
 - (i) A detailed social consultation process that aims to trace the next-of-kin and obtain their consent for the relocation of the graves, that will be at least 60 days in length;
 - (ii) Site notices indicating the intent of the relocation;
 - (iii) Newspaper notices indicating the intent of the relocation;

- (iv) Permits from the relevant permitting authorities, including the local authority; the Provincial Department of Health; the South African Heritage Resources Agency (SAHRA) (if the graves are older than 60 years or unidentified and thus presumed older than 60 years) etc.
- (vii) An exhumation process that keeps the dignity of the remains intact;
- (viii) The whole process must be done by a reputable company that is well versed in relocations; and
- (ix) The exhumation process must be conducted in such a manner as to safeguard the legal rights of the families as well as that of the mining company.

PGS Heritage can be contacted on the way forward in this regard.

Table 19: Roles and responsibilities of archaeological and heritage management.

ROLE	RESPONSIBILITY	IMPLEMENTATION
A responsible specialist needs to be allocated and should attend all relevant meetings, especially when changes in design are discussed, and liaise with SAHRA.	The client	Archaeologist and a competent archaeological support team
If chance finds and/or graves or burial grounds are identified during construction or operational phases, a specialist must be contacted for evaluation.	The client	Archaeologist and a competent archaeological support team
Comply with defined national and local cultural heritage regulations on management plans for identified sites.	The client	Environmental Consultancy and the Archaeologist
Consult the managers, local communities and other key stakeholders on mitigation of archaeological sites.	The client	Environmental Consultancy and the Archaeologist
Implement additional programs, as appropriate, to promote the safeguarding of our cultural heritage.	The client	Environmental Consultancy and the Archaeologist
If required, conservation or relocation of burial grounds and/or graves according to the applicable regulations and legislation.	The client	Archaeologist, and/or competent authority for relocation services
Ensure that recommendations made in the Heritage Report are adhered to.	The client	The client
Provision of services and activities related to the management and monitoring of significant archaeological sites.	The client	Environmental Consultancy and the Archaeologist
After the specialist/archaeologist has been appointed, comprehensive feedback reports should be submitted to relevant authorities during each phase of development.	Client and Archaeologist	Archaeologist

Appendix B
Project team CV's

Name: Polke Doussy Birkholtz

Date & Place of Birth: 9 February 1975 – Klerksdorp, North West Province, South Africa

Place of Tertiary Education & Dates Associated:

Institution: University of Pretoria

Qualification: BA (Cum Laude) - Bachelor of Arts Specializing in Archaeology, History & Anthropology

Date: 1996

Institution: University of Pretoria

Qualification: BA Hons (Cum Laude) - Bachelor of Arts with Honours Degree Specializing in Archaeology

Date: 1997

Qualifications:

BA - Degree specialising in Archaeology, History and Anthropology

BA Hons - Professional Archaeologist

Memberships:

Association of Southern African Professional Archaeologists (ASAPA)

Professional Member of the CRM Section of ASAPA

Overview of Post Graduate Experience:

1997 – 2000 – Member/Archaeologist – Archaeo-Info

2001 – 2003 – Archaeologist/Heritage Specialist – Helio Alliance

2000 – 2008 – Member/Archaeologist/Heritage Specialist – Archaeology Africa

2003 - Present – Director / Archaeologist / Heritage Specialist – PGS Heritage

Languages: English: Speak, Read & Write & Afrikaans: Speak, Read & Write

Total Years' Experience: 19 Years

Experience Related to the Scope of Work:

- Polke has worked as a **HERITAGE SPECIALIST / ARCHAEOLOGIST / HISTORIAN** on more than 300 projects and acted as **PROJECT MANAGER** on almost all of these projects.

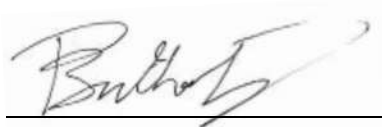
His experience includes the following:

- Development of New Sedimentation and Flocculation Tanks at Rand Water's Vereeniging Pumping Station, Vereeniging, Gauteng Province. Heritage Impact Assessment for *Greenline*.
- EThekweni Northern Aqueduct Project, Durban, KwaZulu-Natal. Heritage Impact Assessment for *Strategic Environmental Focus*.
- Johannesburg Union Observatory, Johannesburg, Gauteng Province. Heritage Inventory for *Holm Jordaan*.
- Development at Rand Water's Vereeniging Pumping Station, Vereeniging, Gauteng Province. Heritage Impact Assessment for *Aurecon*.
- Comet Ext. 8 Development, Boksburg, Gauteng Province. Phase 2 Heritage Impact Assessment for *Urban Dynamics*.
- Randjesfontein Homestead, Midrand, Gauteng Province. Baseline Heritage Assessment with Nkosinathi Tomose for Johannesburg City Parks.
- Rand Leases Ext. 13 Development, Roodepoort, Gauteng Province. Heritage Impact Assessment for *Marsh*.
- Proposed Relocation of the Hillendale Heavy Minerals Plant (HHMP) from Hillendale to Fairbreeze, KwaZulu-Natal. Heritage Impact Assessment for *Goslar Environmental*.
- Portion 80 of the farm Eikenhof 323 IQ, Johannesburg, Gauteng Province. Heritage Inventory for *Khare Incorporated*.
- Comet Ext. 14 Development, Boksburg, Gauteng Province. Heritage Impact Assessment for *Marsh*.
- Rand Steam Laundries, Johannesburg, Gauteng Province. Archival and Historical Study for *Impendulo and Imperial Properties*.
- Mine Waste Solutions, near Klerksdorp, North West Province. Heritage Inventory for *AngloGold Ashanti*.
- Consolidated EIA and EMP for the Kroondal and Marikana Mining Right Areas, North West Province. Heritage Impact Assessment for *Aquarius Platinum*.
- Wilkoppies Shopping Mall, Klerksdorp, North West Province. Heritage Impact Assessment for the *Center for Environmental Management*.
- Proposed Vosloorus Ext. 24, Vosloorus Ext. 41 and Vosloorus Ext. 43 Developments, Ekurhuleni District Municipality, Gauteng Province. Heritage Impact Assessment for *Enkanyini Projects*.
- Proposed Development of Portions 3, 6, 7 and 9 of the farm Olievenhoutbosch 389 JR, City of Tshwane Metropolitan Municipality, Gauteng Province. Heritage Impact Assessment for *Marsh*.

- Proposed Development of Lotus Gardens Ext. 18 to 27, City of Tshwane Metropolitan Municipality, Gauteng Province. Heritage Impact Assessment for *Pierre Joubert*.
- Proposed Development of the site of the old Vereeniging Hospital, Vereeniging, Gauteng Province. Heritage Scoping Assessment for *Lekwa*.
- Proposed Demolition of an Old Building, Kroonstad, Free State Province. Phase 2 Heritage Impact Assessment for *De Beers Consolidated Mines*.
- Proposed Development at Westdene Dam, Johannesburg, Gauteng Province. Heritage Impact Assessment for *Newtown*.
- West End, Central Johannesburg, Gauteng Province. Phase 1 Heritage Impact Assessment for the *Johannesburg Land Company*.
- Kathu Supplier Park, Kathu, Northern Cape Province. Heritage Impact Assessment for *Synergistics*.
- Matlosana 132 kV Line and Substation, Stilfontein, North West Province. Heritage Impact Assessment for *Anglo Saxon Group* and *Eskom*.
- Marakele National Park, Thabazimbi, Limpopo Province. Cultural Resources Management Plan for *SANParks*.
- Cullinan Diamond Mine, Cullinan, Gauteng Province. Heritage Inventory for *Petra Diamonds*.
- Highveld Mushrooms Project, Pretoria, Gauteng Province. Heritage Impact Assessment for *Mills & Otten*.
- Development at the Reserve Bank Governor's Residence, Pretoria, Gauteng Province. Archaeological Excavations and Mitigation for the *South African Reserve Bank*.
- Proposed Stones & Stones Recycling Plant, Johannesburg, Gauteng Province. Heritage Scoping Report for *KV3*.
- South East Vertical Shaft Section of ERPM, Boksburg, Gauteng Province. Heritage Scoping Report for *East Rand Proprietary Mines*.
- Proposed Development of the Top Star Mine Dump, Johannesburg, Gauteng Province. Detailed Archival and Historical Study for *Matakoma*.
- Soshanguve Bulk Water Replacement Project, Soshanguve, Gauteng Province. Heritage Impact Assessment for *KWP*.
- Biodiversity, Conservation and Participatory Development Project, Swaziland. Archaeological Component for *Africon*.
- Camdeboo National Park, Graaff-Reinet, Eastern Cape Province. Cultural Resources Management Plan for *SANParks*.
- Main Place, Central Johannesburg, Gauteng Province. Phase 1 Heritage Impact Assessment for the *Johannesburg Land Company*.
- Modderfontein Mine, Springs, Gauteng Province. Detailed Archival and Historical Study for *Consolidated Modderfontein Mines*.
- Proposed New Head Office for the Department of Foreign Affairs, Pretoria, Gauteng Province. Heritage Impact Assessment for *Holm Jordaan Group*.

- Proposed Modification of the Lukasrand Tower, Pretoria, Gauteng Province. Heritage Assessment for IEPM.
 - Proposed Road between the Noupoort CBD and Kwazamukolo, Northern Cape Province. Heritage Impact Assessment for *Gill & Associates*.
 - Proposed Development at the Johannesburg Zoological Gardens, Johannesburg, Gauteng Province. Detailed Archival and Historical Study for *Matakoma*.
- Polke's **KEY QUALIFICATIONS:**
 - Project Management
 - Archaeological and Heritage Management
 - Archaeological and Heritage Impact Assessment
 - Archaeological and Heritage Fieldwork
 - Archival and Historical Research
 - Report Writing
- Polke's **INFORMATION TECHNOLOGY EXPERIENCE:**
 - *MS Office – Word, Excel, & Powerpoint*
 - *Google Earth*
 - *Garmin Mapsource*
 - *Adobe Photoshop*
 - *Corel Draw*

I, Polke Doussy Birkholtz, hereby confirm that the above information contained in my CV is true and correct.



PD Birkholtz

28 September 2020

Date