



PGS
HERITAGE

Heritage Impact Assessment for the Proposed Motuoane Hennenman Part II EA Amendment Project

**On Farms Palmiet Fontein 229, Détente 744, Kriegers Kraal 708, Siberiasfontein 605 and Nooitgedacht
245, Lejweleputswa District Municipality, Freestate Province**

Heritage Impact Assessment

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+ 27 (0) 12 332 5305



+27 (0) 86 675 8077



contact@pgsheritage.co.za



PO Box 32542, Totiusdal, 0134

Offices in South Africa, Kingdom of Lesotho and Mozambique

Head Office:
906 Bergarend Streets
Waverley, Pretoria,
South Africa

Directors: HS Steyn, PD Birkholtz, W Fourie

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REVISION HISTORY

| Version | Issue Date | Description of Changes |
|---------|------------|-----------------------------|
| 01 | 31/01/2024 | First draft |
| 02 | 12/05/2024 | Revised after client review |
| | | |

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Declaration of Independence

- I, Jessica Angel, 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;

HERITAGE CONSULTANT:

PGS Heritage (Pty) Ltd

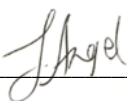
CONTACT PERSON:

Jessica Angel – Senior Archaeologist

Tel: +27 (0) 12 332 5305



Email: jessica@pgsheritage.co.za

SIGNATURE:



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ACKNOWLEDGEMENT OF RECEIPT

| | | | | |
|---------------------|--|---|---|--|
| Report Title | Heritage Impact Assessment - Motuoane Hennenman EA Amendment | | | |
| Control | Name | Signature | Designation | |
| Author | J Angel |  | PGS Heritage Senior Archaeologist | |
| Reviewer | W Fourie |  | PGS Heritage Principal Heritage Specialist | |

CLIENT: Environmental Impact Management Services (Pty) Ltd

CONTACT PERSON: Vukosi Mabunda
Email: vukosi@eims.co.za

SIGNATURE: _____

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The Heritage Impact Assessment Report has been compiled considering the National Environmental Management Act (Act No. 107 of 1998) (NEMA): Appendix 6 of the Environmental Impact Assessment (EIA) Regulations of 2014 (as amended, 2017) requirements for specialist reports as indicated in the table below.

| Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017 | Relevant section in report |
|--|---|
| 1.(1) (a) (i) Details of the specialist who prepared the report | Page ii of Report – Contact details and company |
| (ii) The expertise of that person to compile a specialist report including a curriculum vita | Section 1.2 – refer to Appendix C |
| (b) A declaration that the person is independent in a form as may be specified by the competent authority | Page ii of the report |
| (c) An indication of the scope of, and the purpose for which, the report was prepared | Section 1.1 |
| (cA) An indication of the quality and age of base data used for the specialist report | N/A |
| (cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change; | Section 5 |
| (d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment | Section 4.4 |
| (e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used | Appendix A and B |
| (f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives; | Section 4 |
| (g) An identification of any areas to be avoided, including buffers | Section 4 |
| (h) 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; | Section 4.3 |
| (i) A description of any assumptions made and any uncertainties or gaps in knowledge; | Section 1.3 |
| (j) A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment | Section 4 |
| (k) Any mitigation measures for inclusion in the EMPr | Section 6 |
| (l) Any conditions for inclusion in the environmental authorization | Section 6 |
| (m) Any monitoring requirements for inclusion in the EMPr or environmental authorization | Section 6 |
| (n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and | Section 6 and 7 |
| (n)(iA) A reasoned opinion regarding the acceptability of the proposed activity or activities; and | |
| (n)(ii) If the opinion is that the proposed activity, activities 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 | Section 6 |
| (o) A description of any consultation process that was undertaken during the course of carrying out the study | Informal consultation in fieldwork. |
| (p) A summary and copies if any comments that were received during any consultation process | Not applicable. To date no comments regarding heritage resources that require input from a specialist have been raised. |
| (q) Any other information requested by the competent authority. | Not applicable. |
| (2) Where a government notice by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply. | No protocols or minimum standards for HIAs or PIAs |

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EXECUTIVE SUMMARY

PGS Heritage (Pty) Ltd (PGS) was appointed by Environmental Impact Management Services (Pty) Ltd (EIMS) to undertake a Heritage Impact Assessment (HIA) that forms part of the Part II EA Amendment for the Motuoane Hennenman exploration right to assess the additional exploration activities of ten exploration boreholes and ~30km of nine new seismic transects within the approved Motuoane Hennenman Exploration Right Footprint on Farms Palmiet Fontein 229, Détente 744, Kriegers Kraal 708, Siberiasfontein 605 and Nooitgedacht 245, Lejweleputswa District Municipality, Freestate Province

A further standalone Palaeontological Impact Assessment (PIA) was completed for PGS by Dr Elize Butler of Banzai Environmental.

During the fieldwork a total of **eleven** heritage features and resources were identified (**Figure 39 - Figure 41**). These consist of **five** burial grounds (**MH001, MH003, MH007, MH010 and MH011**), **three** foundation remains (**MH002, MH006 and MH009**) of a stone-built structures or homestead, one midden (**MH004**), **one** kraal (**MH008**) and one grinding stone (**MH005**). See **Figure 42 - Figure 49** and the individual site descriptions as contained in **Appendix C**. The field description forms were collected with ArcGIS Survey123 in field software.

Historical Structures/homesteads and kraals

The stone built remains of structure **MH002** and **MH006** is possibly related to the depicted structures on the 1945 maps and most likely older than 60 years (Section 4.2.1). The structure remains themselves are not conservation worthy. However, it is associated with an earlier 20th century farm worker settlement and the possibility of stillborn burials around the structures must be considered. As per African custom stillborn children are buried against the outside wall/foundation or inside the house. The structures (**MH002, MH006 and MH009**) must then provisionally grade as Grade IIIA. All burial grounds and graves should be retained and avoided with a buffer zone of 30m as per SAHRA guidelines. If this is not possible, the graves could be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component, adhering to the requirements of s36 of the NHRA and its regulations as well as the National Health Act and its regulations. The kraal at **MH008** is not depicted on the first edition maps and is not considered conservation worthy.

Archaeological Site

The historical midden and grinding stone. Middens could contain still born burials and therefore provisionally graded as Grade IIIA. The grinding stone is not conservation-worthy.

Burial grounds and graves

Five burial grounds were located. All burial grounds and graves should be retained and avoided with a buffer zone of 30m as per SAHRA guidelines. If this is not possible, the graves could be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component,

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adhering to the requirements of s36 of the NHRA and its regulations as well as the National Health Act and its regulations.

MH001 – approximately 15-18 graves.

MH003 – approximately 2 graves.

MH007 – approximately 4 graves

MH010 – approximately 1 grave, possibly more

MH011 – approximately 1 grave, possibly more

Palaeontology

A site-specific field survey of the development footprint was conducted on foot and by motor vehicle on 12 September 2023. No fossiliferous outcrop was detected in the proposed development. This could be attributed to the lack of outcrops as well as the lush grassy vegetation in the area. Based on the site investigation as well as desktop research it is concluded that fossil heritage of scientific and conservational interest in the development footprint is rare.

Mitigation measures

Mitigation measures are described in **Table 11** of this report.

Conclusion

It is the combined considered opinion of the heritage specialists that the proposed project will not have a direct impact on the identified heritage resources, rated as being of low to high heritage significance.

With the implementation of recommended mitigation measures, the overall impact on heritage resources will be reduced to acceptable levels during the project activities.

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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

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Mineralised remains of plants, 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.

| Abbreviations | Description |
|---------------|-------------|
|---------------|-------------|

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| | |
|------------------|--|
| AIA | Archaeological Impact Assessment |
| ASAPA | Association of South African Professional Archaeologists |
| CRM | Cultural Resource Management |
| ECO | Environmental Control Officer |
| EIA practitioner | Environmental Impact Assessment Practitioner |
| EIA | Environmental Impact Assessment |
| ESA | Early Stone Age |
| GPS | Global Positioning System |
| HIA | Heritage Impact Assessment |
| I&AP | Interested & 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-G | Gauteng Provincial Heritage Resources Authority |
| PHS | Provincial Heritage Site |
| PSSA | Palaeontological Society of South Africa |
| SADC | Southern African Development Community |
| SAHRA | South African Heritage Resources Agency |

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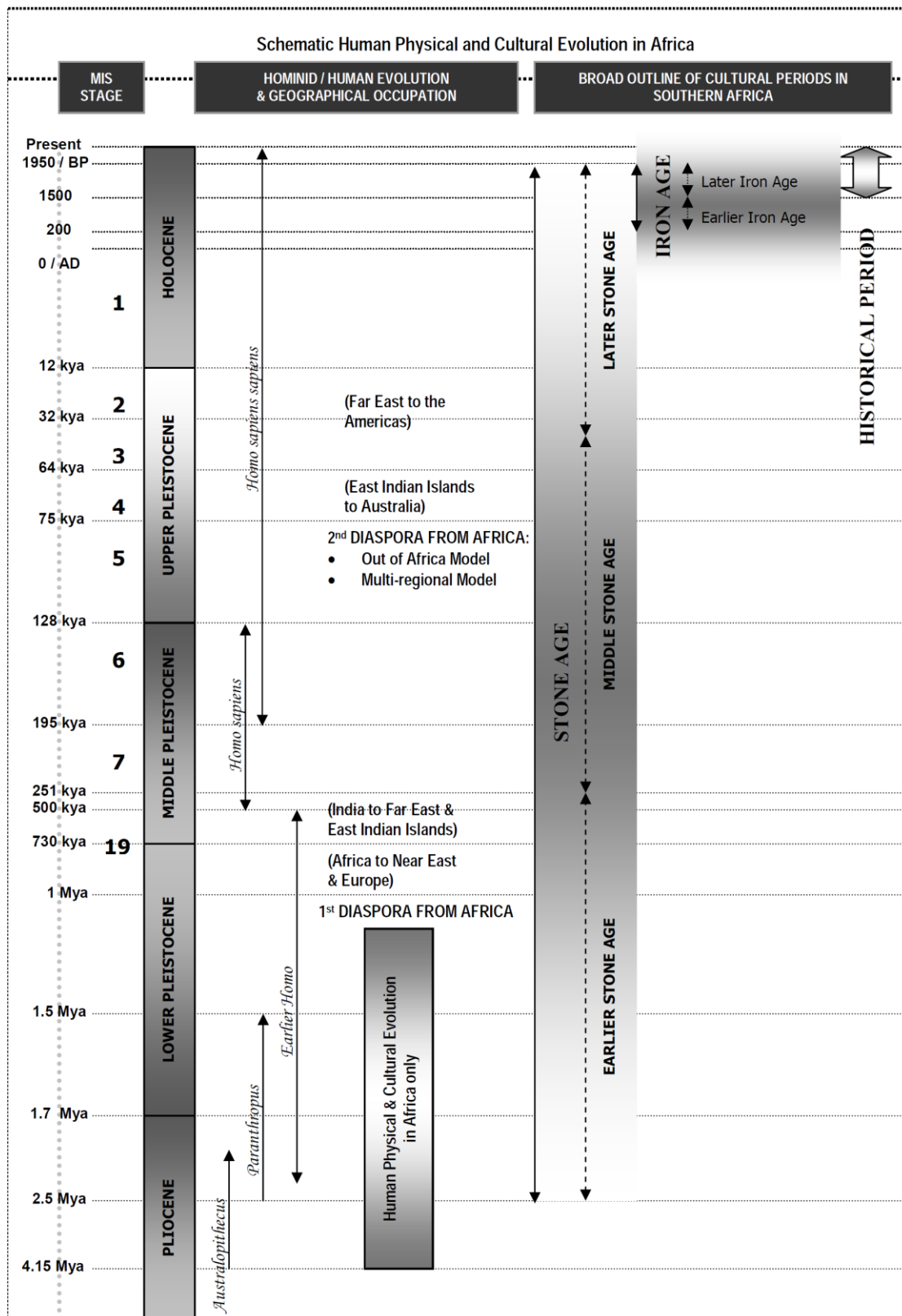


Figure 1 – Human and Cultural Timeline in Africa

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1 INTRODUCTION

PGS Heritage (Pty) Ltd (PGS) was appointed by Environmental Impact Management Services (Pty) Ltd (EIMS) to undertake a Heritage Impact Assessment (HIA) that forms part of the Part II EA Amendment for the Motuoane Hennenman exploration right to assess the additional exploration activities of ten exploration boreholes and ~30km of nine new seismic transects within the approved Motuoane Hennenman Exploration Right Footprint on Farms Palmiet Fontein 229, Détente 744, Kriegers Kraal 708, Siberiasfontein 605 and Nooitgedacht 245, Lejweleputswa District Municipality, Freestate Province

A further standalone Palaeontological Impact Assessment (PIA) was completed for PGS by Dr Elize Butler of Banzai Environmental.

1.1 Scope of the Study

The aim of the study is to identify heritage sites and finds that may occur in the proposed project area and propose the appropriate management measures based on their heritage significance and project impacts. The HIA informs the BA to assist the project in managing the discovered heritage resources in a responsible manner, 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 70 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.

Jessica Angel, the author of this report, is registered as a Professional Archaeologist with the Association of Southern African Professional Archaeologists (ASAPA). She has 10 years of experience in the heritage assessment field and holds a Master's degree (MSc) in Archaeology from the University of the Witwatersrand.

Wouter Fourie, the Project Coordinator and Archaeologist, is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist and is

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accredited as a Principal Investigator; he is further an Accredited Professional Heritage Practitioner with the Association of Professional Heritage Practitioners (APHP).

1.3 Assumptions and Limitations

Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites and existing vegetation cover. It should be noted most of the study area was accessible for the fieldwork survey.

Fieldwork was also focussed on area that was not previously ploughed or disturbed by farming activity, thus focussing on areas with the highest potential to yield heritage resources.

Therefore, should any heritage features and/or objects be located or observed outside the identified heritage sensitive areas during the project activities, a heritage specialist must be contacted immediately. 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. If 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 find in the South African context is required and governed by the following legislation:

- Notice 648 of the Government Gazette 45421- general requirements for undertaking an initial site sensitivity verification where no specific assessment protocol has been identified.
- National Environmental Management Act (NEMA), Act 107 of 1998 – Appendix 6
- National Heritage Resources Act (NHRA), Act 25 of 1999

1.4.1 Notice 648 of the Government Gazette 45421

Although minimum standards for archaeological (2007) and palaeontological (2012) assessments were published by SAHRA, GN.648 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) are listed in **Table 1** and the applicable section in this report noted.

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Table 1: Reporting requirements for GN648

| GN 648 | Relevant section in report | Where not applicable in this report |
|---|----------------------------|-------------------------------------|
| 2.2 (a) a desktop analysis, using satellite imagery; | Section 4.2 | |
| 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 4.2 | - |
| 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 4.2 | - |
| 2.3(b) contains motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity; | Section 4.2 | - |

1.4.2 NEMA – Appendix 6 requirements

The HIA report has been compiled considering the NEMA Appendix 6 requirements for specialist reports as indicated in the table below. For ease of reference, the table below provides cross-references to the report sections where these requirements have been addressed.

1.4.3 The National Heritage Resources Act

- National Heritage Resources Act (NHRA) Act 25 of 1999
 - Protection of Heritage Resources – Sections 34 to 36; and
 - Heritage Resources Management – Section 38

The NHRA is utilised as the basis for the identification, evaluation, and management of heritage resources and in the case of Cultural Resource Management (CRM) those resources specifically impacted on by development as stipulated in Section 38 of the NHRA. This study falls under Section 38(8) and requires comment from the relevant heritage resources authority.

Section 24(2) of the NEMA requires environmental authorisation from the environmental authority for certain activities that have been identified and must undergo an EIA or Basic Assessment (BA) process. Similarly, Section 38 NHRA lists specific development activities that require notice to the heritage resources authority to determine if an HIA process is necessary. Approval from the heritage authority is mandatory before proceeding with the development activities.

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To avoid redundancy and facilitate coordination between NEMA and NHRA requirements, Section 38(8) of the NHRA states that if the development activities listed in Section 38(1) require an EIA under NEMA, a separate HIA and approval from the heritage resources authority are unnecessary. However, the environmental authority must ensure that the heritage resources authority's requirements for HIA are fulfilled and that its comments and recommendations are considered before granting environmental authorisation.

Therefore, if a NEMA EIA is required for the development activities listed under Section 38 of the NHRA, separate HIA and EIA processes may not be followed, and different decisions may not be issued under NHRA and NEMA. The EIA process will be followed, and if the heritage resources authority requires HIA, it must be conducted as one of the EIA specialist studies¹.

The environmental authority must ensure that the heritage resources authority's requirements for the assessment are met. A separate heritage approval may not be issued, but the environmental authority must consider the heritage resources authority's comments and recommendations before granting or refusing environmental authorisation. All applicable documents, including the HIA report, the EIA report and the other supporting studies, will be submitted to SAHRA for Statutory Comment and Feedback, and to the Provincial Heritage Resources Authority (PHRA) for noting.

2 TECHNICAL DETAILS OF THE PROJECT

2.1 Locality

The proposed Motuoane Hennenman Exploration rights project area is located at:

-28.199234°, 26.947728° (North)

-28.236787°, 26.923654° (West)

-28.239222°, 26.948671° (South)

-28.224970°, 26.961268° (East)

The proposed boreholes are located at:

- RBD12 – -28.202600°, 26.946500°
- RBD13 – -28.218940°, 26.940820°
- RBD14 – -28.222879°, 26.938518°
- RBD15 – -28.204700°, 26.945900°
- RBD16 – -28.209126°, 26.944819°
- RBD17 – -28.226292°, 26.936677°
- RBD18 – -28.232374°, 26.933101°

¹ EIMS appointed PGS to complete the independent HIA process.

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- RSF2 – -28.269399°, 26.942799°
- Nooitgedacht M2 – -27.831187°, 26.881452°
- Wildskamp 5 – -27.837194°, 26.878139°

The seismic lines and boreholes RBD12-RBD18 occur approximately 6.6 km south of Kendal Power Station and approximately 14.5 km Southwest of Virginia, off the R73 regional route in the Lejweleputswa District Municipality, Free State (**Figure 3**). Borehole RSF2 occurs approximately 5 km further south along the R73 and boreholes Nooitgedacht M2 and Wildskamp 5 occurs approximately 30 km north of Virginia along the R34.

2.1.1 Site Description

The application area of seismic lines and boreholes RBD12-RBD18 is situated on the Farms Palmiet Fontein 229, Détente 744 and Kriegers Kraal 708, with a footprint area of approximately 411ha (**Figure 3**), Borehole RSF2 occurs of the farm Siberiasfontein 605, Borehole Nooitgedacht M2 on farm Nooitgedacht 245 and borehole Wildskamp5 on farm Erfinis 328.

2.2 Technical Project Description

2.2.1 Project description

Motuoane Energy (Pty) Ltd (hereafter referred to as Motuoane – the applicant) compiled and applied for an exploration right for hydrocarbons, in terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 – MPRDA, as amended) to the Petroleum Agency South Africa (PASA) in 2017. The approved Motuoane Hennenman project is located over an area of approximately 149 377 hectares (ha), covering various farms near the town of Hennenman, within the Free State Province, extending north from approximately Theunissen, north east towards Kroonstad, and east of Virginia and Hennenman. The local municipalities in which the proposed exploration area is located includes, Matjhabeng and Masilonyana, which are part of the Lejweleputswa District Municipality, and Moqhaka which is part of the Fezile Dabi District Municipality.

The original Environmental Application (EA) was released in July 2017 (ref: 12/3/315). However, the EA only addressed three drilling wells and neglected to take seismic factors into account. The applicant wishes to add nine more exploration boreholes (for a total of twelve drilling wells, including the initial three that were permitted) and around 30 km of new seismic transects.

A review of the National Environmental Management Act, 1998 (Act No. 107 of 1998, NEMA), Environmental Impact Assessment (EIA) Regulations, 2014 as amended revealed that the proposed additional activities require an amendment to the existing EA through a Part II Amendment process. Regulation 31 (Part 2) of the 2014 NEMA EIA Regulations states that:

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“An environmental authorisation may be amended by following the process prescribed in this Part if the amendment will result in a change to the scope of a valid environmental authorisation where such change will result in an increased level or nature of impact where such level or nature of impact was not (a) assessed and included in the initial application for environmental authorisation; or (b) taken into consideration in the initial environmental authorisation; and the change does not, on its own, constitute a listed or specified activity.”

As per sub-regulation (a) and (b) the proposed seismic activities and the cumulative impact of the additional ten drilling wells were not considered as part in the initial EIA process undertaken nor taken into consideration in the EA, therefore these (potential) impacts need to be assessed according to the change in level or nature of impact. Due to the fact that the amendments result in a change of scope, a Part 2 Amendment Process in terms of Regulation 31 of NEMA EIA Regulations of 2014 (as amended) is applicable and required to be followed.

The proposed Motuoane Hennenman Exploration Right project, if approved, will allow Motuoane to determine if there is an economically viable hydrocarbon resource available in the area. The exploration right will not provide the required authorisation for production activities to be undertaken. Any future intention to undertake production of hydrocarbons within the exploration right area would require a further application, investigation and public consultation process. A significant proportion of the comments/objections received to date involved the concern regarding “fracking” and associated water pollution and attempts were made to clarify and confirm that this application for exploration does not include any form of well stimulation which includes hydraulic fracking (“fracking”).

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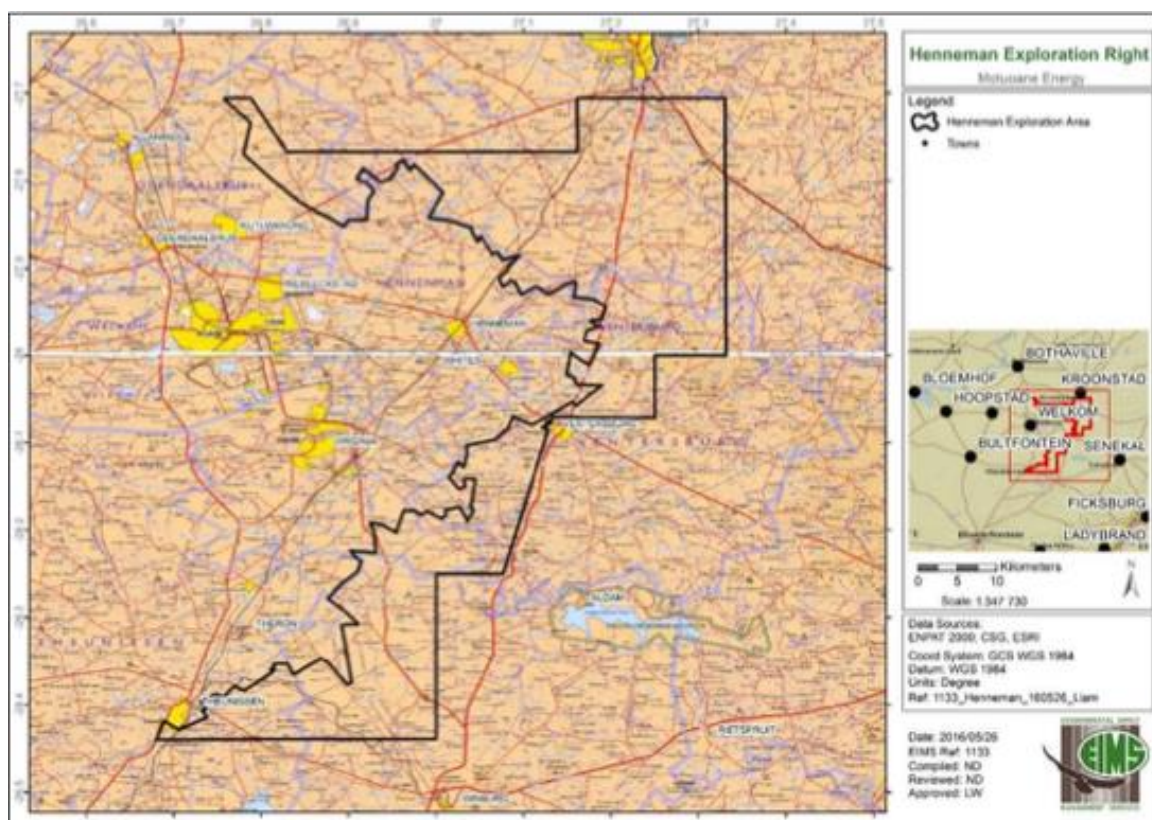
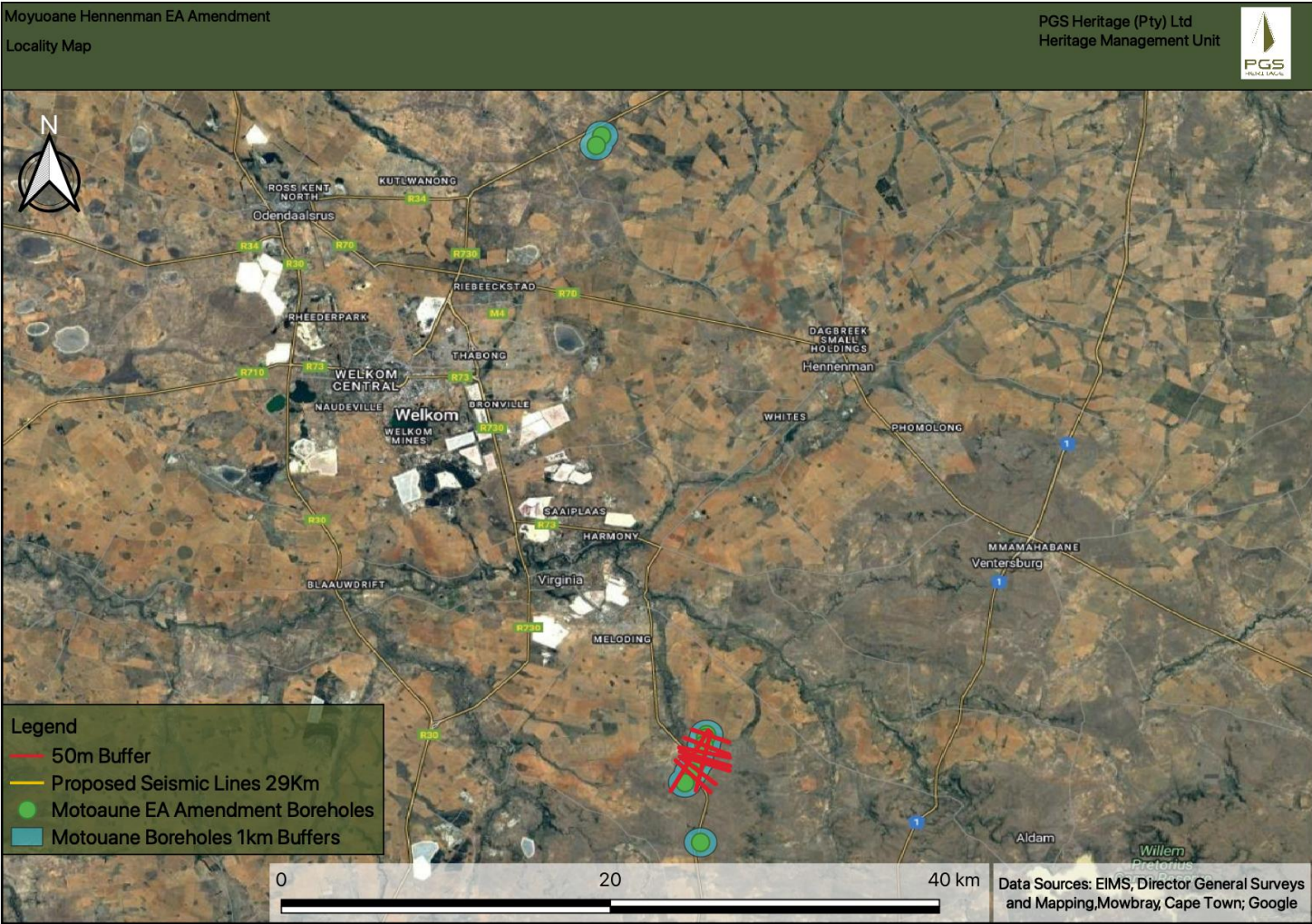


Figure 2 – Locality of the approved exploration right area from the 2017 EMP

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Figure 3 - Regional Locality of the current study area (red polygon)

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2.2.2 Scope of Work

EIMS is required to undertake a Part II NEMA EA Amendment for the proposed additional exploration activities associated with the Motuoane Hennenman Exploration Project.

The aims of the HIA are to firstly outline the findings of the desktop studies in relation to the overall exploration right area and secondly to identify heritage sites and finds that occur in the exploration footprint area currently proposed. The HIA informs the EIA in the development of a comprehensive EMPr to assist the exploration process in responsibly managing the identified heritage resources, to protect, preserve and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999) (NHRA)

3 ASSESSMENT METHODOLOGY

The section below outlines the assessment methodologies utilised in the study.

3.1 Methodology for Assessing Heritage Site Significance.

This HIA report was compiled by PGS for the proposed for the Motuoane Hennenman exploration right EA Amendment. The applicable maps, tables and figures are included, as stipulated in the NHRA (no 25 of 1999) and the National Environmental Management Act (NEMA) (No. 107 of 1998). The HIA process consists of three steps:

Step I – Literature Review and initial site analysis: The background information to the field survey relies greatly on the Heritage Background Research which was undertaken through archival research and evaluation of satellite imagery and topographical maps of the study area.

Step II – Physical Survey: A physical survey was conducted by pedestrian access through the proposed project area by two qualified heritage specialists (between 12th and 14th September 2023 for the seismic lines), and 15th – 17th January 2024 for the 10 boreholes, aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.

Step III – The final step involved the recording and documentation of relevant heritage resources identified in the physical survey, the assessment of these resources in terms of the HIA criteria and report writing, as well as mapping and constructive recommendations.

The significance of heritage sites is based on four 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)

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- Low - <10/50m2
- Medium - 10-50/50m2
- High - >50/50m2
- Uniqueness; and
- Potential to answer present research questions.

Impacts on these sites by the development will be evaluated as follows:

3.1.1 Site Significance

Site significance classification standards use is based on the heritage classification of s3 in the NHRA and developed for implementation keeping in mind the grading system approved by SAHRA for archaeological impact assessments. The update classification and rating system as developed by Heritage Western Cape (2016) is implemented in this report.

Site significance classification standards prescribed by the Heritage Western Cape Guideline (2016), were used for the purpose of this report (**Table 2** and **Table 3**).

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Table 2: Rating system for archaeological resources

| Grading | Description of Resource | Examples of Possible Management Strategies | Heritage Significance |
|---------|--|--|--|
| I | Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Langebaanweg (West Coast Fossil Park), Cradle of Humankind | May be declared as a National Heritage Site managed by SAHRA. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation. | Highest Significance |
| II | Heritage resources with special qualities which make them significant, but do not fulfil the criteria for Grade I status. Current examples: Blombos, Paternoster Midden. | May be declared as a Provincial Heritage Site managed by Provincial Heritage Authority. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation. | Exceptionally High Significance |
| III | Heritage resources that contribute to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register. | | |
| IIIA | Such a resource must be an excellent example of its kind or must be sufficiently rare. Current examples: Varschedrift; Peers Cave; Brobartia Road Midden at Bettys Bay | Resource must be retained. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation. | High Significance |
| IIIB | Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree. | Resource must be retained where possible where not possible it must be fully investigated and/or mitigated. | Medium Significance |
| IIIC | Such a resource is of contributing significance. | Resource must be satisfactorily studied before impact. If the recording already done (such as in an HIA or permit application) is not sufficient, further recording or even mitigation may be required. | Low Significance |
| NCW | A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate. | No further actions under the NHRA are required. This must be motivated by the applicant or the consultant and approved by the authority. | No research potential or other cultural significance |

Table 3: Rating system for built environment resources

| Grading | Description of Resource | Examples of Possible Management Strategies | Heritage Significance |
|---------|---|---|-----------------------|
| I | Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Robben Island | May be declared as a National Heritage Site managed by SAHRA. | Highest Significance |

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| Grading | Description of Resource | Examples of Possible Management Strategies | Heritage Significance |
|---------|---|--|---------------------------------|
| II | Heritage resources with special qualities which make them significant in the context of a province or region, but do not fulfil the criteria for Grade I status. Current examples: St George's Cathedral, Community House | May be declared as a Provincial Heritage Site managed by Provincial Heritage Authority. | Exceptionally High Significance |
| II | Such a resource contributes to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register. | | |
| IIIA | Such a resource must be an excellent example of its kind or must be sufficiently rare. These are heritage resources which are significant in the context of an area. | This grading is applied to buildings and sites that have sufficient intrinsic significance to be regarded as local heritage resources; and are significant enough to warrant that any alteration, both internal and external, is regulated. Such buildings and sites may be representative, being excellent examples of their kind, or may be rare. In either case, they should receive maximum protection at local level. | High Significance |
| IIIB | Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree. These are heritage resources which are significant in the context of a townscape, neighbourhood, settlement or community. | Like Grade IIIA buildings and sites, such buildings and sites may be representative, being excellent examples of their kind, or may be rare, but less so than Grade IIIA examples. They would receive less stringent protection than Grade IIIA buildings and sites at local level. | Medium Significance |
| IIIC | Such a resource is of contributing significance to the environs These are heritage resources which are significant in the context of a streetscape or direct neighbourhood. | This grading is applied to buildings and/or sites whose significance is contextual, i.e. in large part due to its contribution to the character or significance of the environs. These buildings and sites should, as a consequence, only be regulated if the significance of the environs is sufficient to warrant protective measures, regardless of whether the site falls within a Conservation or Heritage Area. Internal alterations should not necessarily be regulated. | Low Significance |
| NCW | A resource that, after appropriate investigation, has been determined to not have enough | No further actions under the NHRA are required. This must be motivated by the applicant | No research potential or |

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| Grading | Description of Resource | Examples of Possible Management Strategies | Heritage Significance |
|---------|--|--|-----------------------------|
| | heritage significance to be retained as part of the National Estate. | and approved by the authority. Section 34 can even be lifted by HWC for structures in this category if they are older than 60 years. | other cultural significance |

3.2 Methodology used in determining the significance of environmental impacts

The methodology used to determine the environmental impact significance was provided by EIMS and is explained in **Appendix B**.

4 CURRENT STATUS QUO

4.1 Site Description

The study area's vegetation is disturbed namely through two things: the first being cattle grazing and the other being sunflower farming in the northern portions. Besides these activities, most of the area remains undisturbed open grasslands with sporadic bushes and trees scattered across the landscape. Where the river intersects the landscape, denser thicket vegetation with large amounts of Acacia karroo can be seen.

In terms of region's vegetation, the study area is characterised by three vegetation types: The Central Free State Grassland (Dominant central portion throughout the study area), The Vaal-Vet Sandy Grassland (Northern and southern portion of the study area) and the Highveld Alluvial Vegetation (North-western portion of the study area) (Mucina and Rutherford, 2006).

"The Central Free State Grassland is distributed across the Free State and marginally into Gauteng occurring mostly between 1300-1640m above sea level. Sedimentary Mudstones and sandstones from the Beaufort Group and Karoo Supergroup create vertic, melanic and red soils, which in turn, create the suitable environment for undulating plains with short grasslands. Naturally, Themeda triandra is prominent on the landscape while Eragrostis curvula, E. chloromelas and dwarf karoo shrubs can be seen in degraded habitats. Overgrazed areas see Acacia karroo encroach the natural habitat."

"The Vaal-Vet Sandy Grassland is characterised by Aeolian and colluvial sand overlying sandstone, mudstone and shale of the Karoo Supergroup (mostly the Ecca Group). An important feature of the vegetation type is the dominance of Themeda triandra. In areas where heavy grazing and/or erratic

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rainfall occurs low cover of *T. triandra* associated with an increase in *Elionurus muticus*, *Cymbopogon pospischii* and *Aristida congesta* is evident.”

"Highveld Alluvial Vegetation "occurs within a flat topography supporting riparian thickets, which are mostly dominated by *Vachellia karroo*, accompanied by seasonally flooded grassland and distributed herb lands that are often dominated by alien plants. It is characterised by deep sand to clayey (but mostly coarse sand) alluvial soils developed over Quaternary alluvial (fluvial) sediments" (www.sanbi.org).

Existing surrounding land uses associated with the project area are mostly agricultural farming.

Overall, the accessibility of the project footprint area was fairly good. Several photographs below provide general views of the study area and the landscape within which it is located.



Figure 4 – View of the sunflower crops on the northern side of the proposed exploration area



Figure 5 – View of bushy vegetation near the river on the northern side of the exploration area



Figure 6 – General grassy vegetation on the western side of the exploration area



Figure 7 – View of cattle grazing areas in the central vicinity of the exploration area

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Figure 8 – View of open fields at Nooitgedacht M2



Figure 9 – View of grasslands near RSF2

4.2 Overview of the study area and surrounding landscape

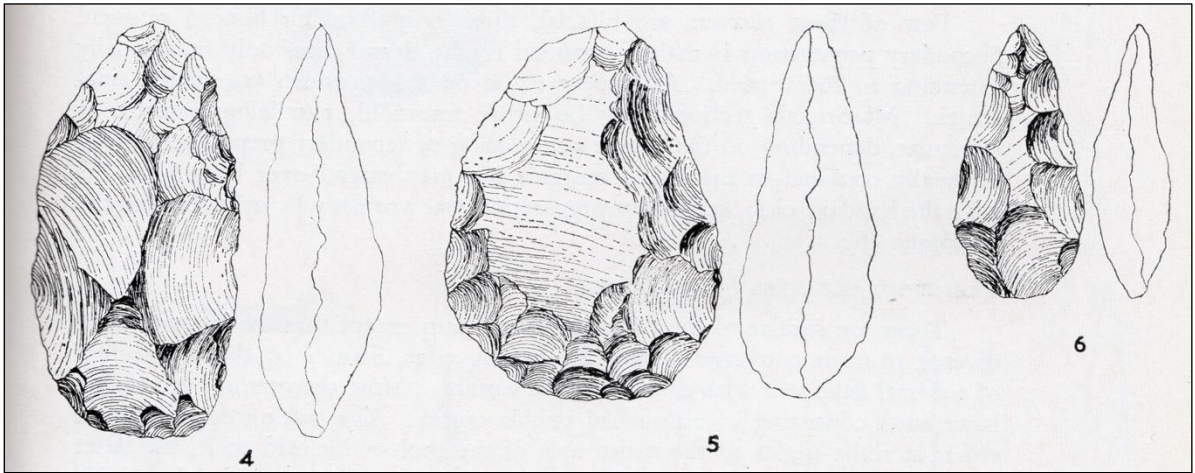
The high-level archival research focused on available information sources that were used to compile a general background history of the study area and surrounds.

The Free State has a rich archaeological and historical history going back millions of years and includes significant aspects such as Later Stone Age rock art, Battlefields and Iron Age stonewalled enclosures. The general surroundings of the study area became a melting pot of contact and conflict as it represents one of many frontiers where San hunter- gatherers, Nguni and Sotho-Tswana agro-pastoralists, Dutch Voortrekkers and British Colonists all came together. The ravages of war also swept across these plains, and in particular the South African War (1899-1902) as well as the Boer Rebellion (1914-1915).


It must be noted that such an overview, which is based on available literature and archival research, would necessarily reflect a bias toward a traditional white history of the region as this would have been the focus of publications and archival documents during the last 150 years.

| DATE | DESCRIPTION |
|---|-------------|
| The Study Area during the Stone Age | |
| Very little is known about the Stone Age archaeology of the study area and its immediate surroundings. In the wider surroundings, probably the most significant Stone Age is at Florisbad, located roughly 120 km south-west of the present study area. Closer to the study area, a number of Middle and Later Stone Age material in association with mammal fossil remains have been identified in erosion gullies along the Sand, Doring and Vet Rivers between Virginia and Theunissen (De Ruiter <i>et. al.</i> 2011). See also Rossouw (n.d.). | |

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| DATE | DESCRIPTION |
|---|---|
| 2.5 million to 250 000 years ago | <p>The Earlier Stone Age (ESA) 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>No information regarding ESA sites from the study area and surroundings was found.</p> |
|  | |
| <p><i>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).</i></p> | |
| >250 000 to 40 000 years ago | <p>The Middle Stone Age (MSA) is associated with flakes, points and blades manufactured by means of the prepared core technique. This phase is furthermore associated with modern humans and complex cognition (Wadley, 2013).</p> <p>During research fieldwork by the National Museum in Bloemfontein, ten sites were recorded where Middle Stone Age and/or Later Stone Age lithics were identified in association with mammal fossil remains from erosion gullies along the Sand, Vet and Doring Rivers (De Ruiter <i>et. al.</i> 2011). Most of these sites are located within a distance of 50 km of the present study area.</p> |
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| | <p><i>Figure 11 – Photograph of the archaeological field survey as published in De Ruiter et. al. (2011).</i></p> |
| 40 000 years ago to c. 1800s | <p>The Later Stone Age (LSA) is the third archaeological phase identified and is characterised by an abundance of very small stone tools known as microliths as well many rock art sites across the country. This period is associated with hunter-gatherers (San) as well as early pastoralists (Khoekhoe) and lasted up until - and in many cases a considerable number of years after – the arrival of Iron Age and European communities.</p> <p>Apart from the occurrence of Later Stone Age lithics along the Sand, Vet and Doring Rivers (see above), no other Later Stone Age sites are known from the surroundings of the study area. Similarly, no known rock art sites are known from the study area or its wider surroundings.</p> <p>During the field work a small amount of LSA flakes were located on the edges of the ploughed field. As these were less than 5 tools and exposed through ploughing, they were not recorded.</p> |
| The Study Area during the Iron Age | |
| <p>The arrival of early farming communities during the first millennium, heralded in the start of the Iron Age for South Africa. The Iron Age is that period in South Africa's archaeological history associated with pre-colonial farming communities associated with agricultural and pastoralist farming activities, metal working, cultural customs such as lobola as well as the tangible representation of the significance of cattle imprinted on their settlement layouts (known as the Central Cattle Pattern) (Huffman, 2007).</p> <p>According to the distribution map for Iron Age settlements on the Southern Highveld as published in Maggs (1976), the study area is located to the west of the known distribution of such Late Iron Age sites. It is therefore unlikely for any Late Iron Age sites to be located within the study area or its immediate surroundings. This surmise is largely supported by the distribution maps as published by Huffman (2007), albeit these latter distribution maps (which are based on known archaeological information) indicate that the study area is located very close to the periphery of two Iron Age facies. For the sake of completeness, these two Iron Age facies, known as Thabeng and Makgwareng, will be presented here.</p> | |

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| AD 1700 – AD 1840 | <p>The Thabeng facies of the Moloko Branch of the Urewe Tradition is one of the facies identified within the study area. The decoration on the ceramics associated with this facies is characterised by incised triangles, coloured chevrons and arcades. The Tlhaping at Dithakong, Rolong at Platberg and the Kubung from the Free State form a Southwestern Sotho-Tswana cluster that is associated with this Thabeng facies pottery and Type Z settlement layouts (Huffman, 2007).</p> <p>The Type Z settlements are one of the Late Iron Age stonewalled settlement types identified by Tim Maggs during his extensive archaeological research project on the Iron Age of the southern Highveld, which includes the present study area (Maggs, 1976). These sites are characterised by large primary enclosures enclosed by a 'discontinuous ring' of characteristic bilobial dwellings. Each of these bilobial dwellings comprises a hut at its front with a semi-circular courtyard at the back. With the area in front of the hut enclosed by a low stone wall and the courtyard at the back similarly enclosed by a smaller enclosure, the layout plan of these huts comprise two lobes, one larger than the other. The huts are defined by a ring of upright stones and are usually paved with flat stones. Unlike Type V settlements (see below), corbelled hut are rarely associated with these Type Z settlements, and appear to be the result of contact with the Type V settlements located to the east.</p> <p>While a number of Type Z sites are located within the vicinity of the study area, one of the more prominent ones is OXF1, located roughly 40 km east-by-northeast of the present study area and a short distance north-west of the town of Ventersburg. This site was excavated by Tim Maggs during the 1970s as part of his overall research project alluded to above (Maggs, 1976).</p> <p>In his conclusions on the history of his entire study area, Maggs (1976:317) states that "...the conclusion seems inescapable that the Kubung were the builders of Type Z. This conclusion could be put forward on the typological evidence alone, for the Kubung are the only known off-shoot of the Rolong to have settled in our area, and the Type Z industry was clearly the work of a group related to the Rolong."</p> |

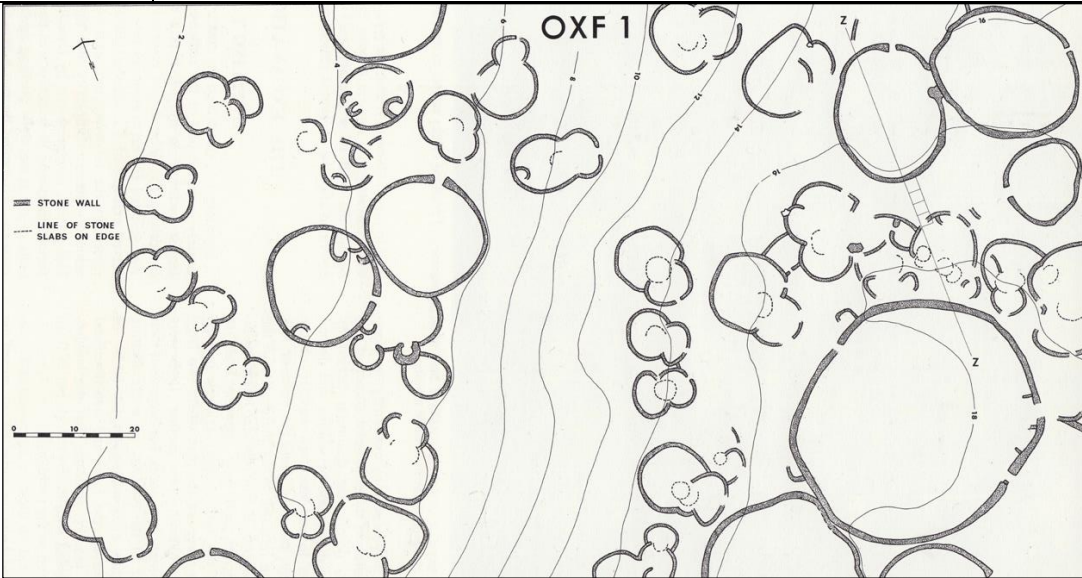
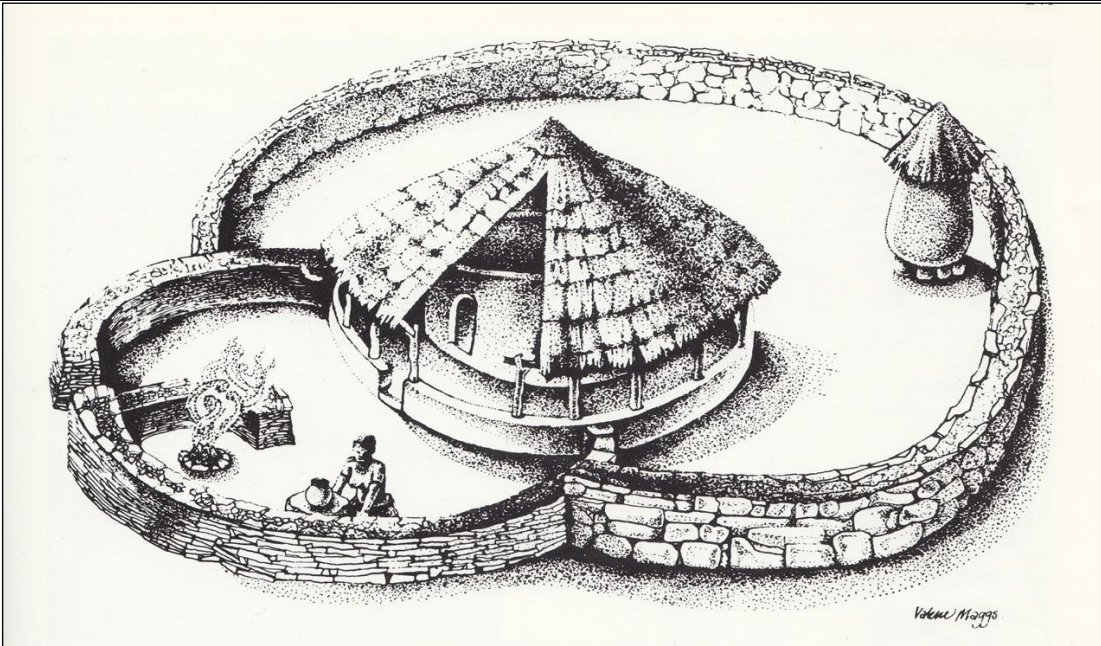

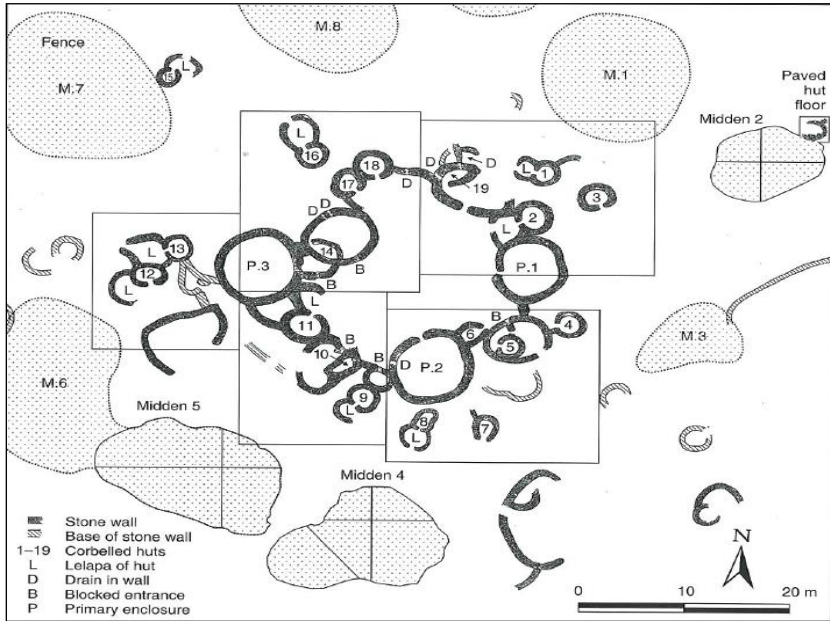


Figure 12 - This plan depicts the settlement layout of a typical Type Z site, and was recorded at site OXF 1 (Maggs, 1976:233).

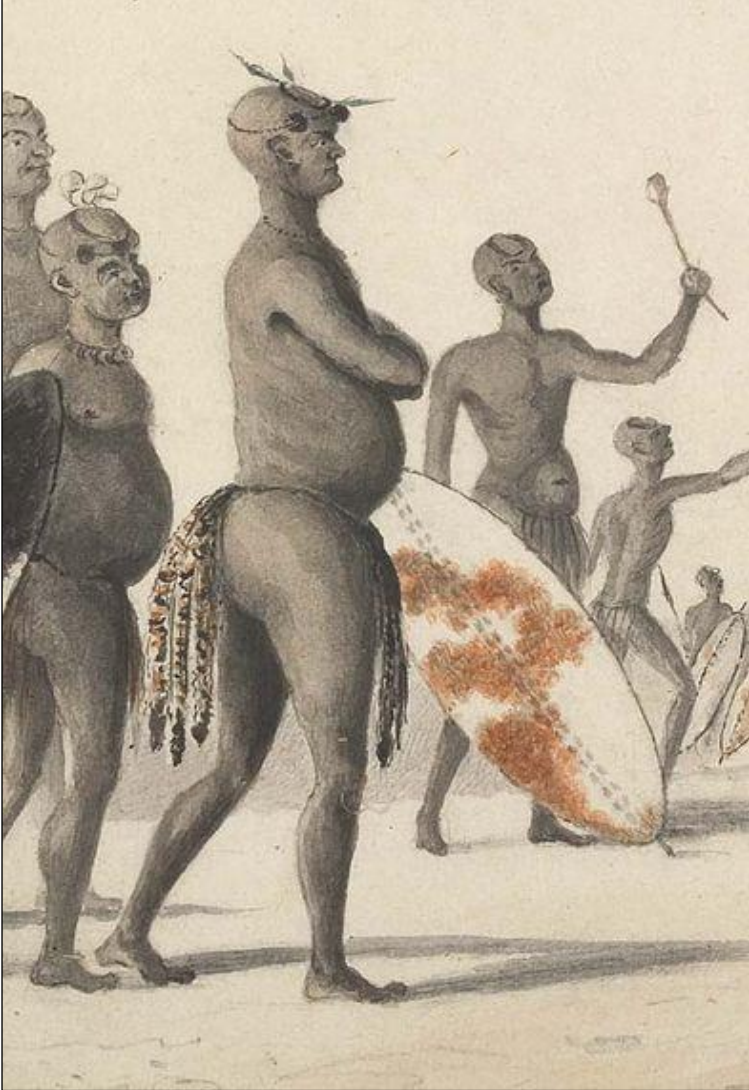
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| |  <p><i>Figure 13 – Artist's impression of a bilobial dwelling at site OXF 1. These bilobial dwellings represent a characteristic element of Type Z settlements (Maggs, 1976:241).</i></p> |
| AD 1700 – AD 1820 | <p>The Makgwareng facies of the Blackburn Branch of the Urewe Ceramic Tradition represents the next known Iron Age period within the surroundings of the study area. The decoration on the ceramics from this facies is characterised by finely stamped triangles, rim notching and appliqué (Huffman, 2007). This facies developed from Ntsuanatsatsi south of the Vaal River and can be associated with the Type V stone walling settlement type (Huffman, 2007), the name of which is derived from Vegkop (Maggs, 1976). Van Riet Lowe (1927) was one of the first to record these structures. Dreyer (1990) also conducted excavations on Type V Late Iron Age stonewalled settlements located a short distance south-west of Winburg.</p> <p>The Type V settlements comprise a core of cattle enclosures surrounded by beehive huts. Corbelled stone huts are associated with this walling type, and can be seen as characteristic. They are low stone huts located at the edge of the cattle enclosures and were where the boys herding the cattle often lived (Huffman 2007). As suggested by Huffman (2007), the corbelled huts were in fact beehive huts made of stone rather than grass and reeds. Furthermore, the presence of beehive huts at these sites necessarily indicates a Nguni association or origin with these settlements.</p> <p>Based in information presently available, the best known site of this type found within the surroundings of the study area, comprises a so-called “Early Sotho Settlement, Waterval, Sandrivierhoogte” that was originally declared a National Monument and which is now registered as a Provincial Heritage Site. The site is located 14 km east of the present study area. The site was proclaimed a national monument by virtue of a notice in the Government Gazette on 17 December 1982. In the declaration, the site is described as a ‘Leghoya Village’ comprising corbelled huts and stonewalls. The site has since been declared a Provincial Heritage Site in terms of the National Heritage Resources Act (www.sahra.org.za).</p> |


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| |  <p><i>Figure 14 – Corbelled stone huts associated with a Type V settlement (Huffman, 2007:39).</i></p>  <p><i>Figure 15 – Layout of a Type V Settlement (Huffman, 2007:38).</i></p> |
| 1820s | <p>Across the Southern Highveld, this period was characterised by warfare and unrest. Known as the Mfecane, these years of upheaval originated primarily in the migration of three Nguni groups from present day Kwazulu-Natal into the present day Free State as a result of the conquests of the Zulu under King Shaka. The three Nguni groups were the Hlubi of Mpangazitha, the Ngwane of Mawane and the Khumalo Ndebele (Matabele) of Mzilikazi.</p> <p>In c. 1821, the Hlubi migrated across the Drakensberg Mountains in a westerly direction (Maggs, 1976) and attacked the Tlokwa of MaNthatisi along the banks of the Wilge River. This river has its source near Harrismith and flows into the Vaal River where the Vaal Dam is located today. While it is not exactly certain where MaNthatisi's settlements would have been located (in all likelihood further south),</p> |

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| | <p>the Tlokwa fled westward as a result of the Hlubi attack and in turn attacked other groups in its path. This started a period of unrest and warfare, which rippled across the Highveld on both sides of the Vaal River (Legassick, 2010) (Lye and Murray, 1980).</p> <p>The Ngwane followed closely on the Hlubi and further augmented the unrest and warfare along the southern Highveld (Legassick, 2010). Although the effects of the migrations of the Hlubi and Ngwane would certainly have had a profound impact on the northern Free State, this was also the case in terms of the Khumalo Ndebele who would have played a significant role in the surroundings of the study area during this time.</p> <p>The Khumalo Ndebele (also known as the Matabele) were also forced to leave Kwazulu-Natal and between 1823 and 1827 settled along the central Vaal River (Bergh, 1999). Mzilikazi attacked a number of Sotho-Tswana groups and settlements and incorporated them into his kingdom. As a result, his activities would have had a definite impact on the northern Free State at the time.</p> |
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| <i>Figure 16 - King Mzilikazi of the Matabele. This illustration was made by Captain Cornwallis Harris in c. 1838 (www.sahistory.org.za).</i> | |
| The Early Colonial Period | |
| The early Colonial Period within the study area and surroundings was characterised by the arrival of newcomers to the Transoraniga. The first arrivals were the Griqua followed by white Trekboers, who for the most part practiced a nomadic pastoralist way of life and were small in number. During the 1830s a mass migration of roughly 2 540 Afrikaner families (comprising approximately 12 000 individuals) from the frontier zone of the Cape Colony to the interior of Southern Africa took place. The people who took part in this Great Trek were later to be known as Voortrekkers (Visagie, 2011). | |
| 1804 | The Griqua were of European and Khoikhoi descent, and although they had been present on the Orange River for some time, they only established themselves permanently north of the river in 1804 when they settled near present-day Danielskuil (Reader's Digest, 1994). |
| Early 1800s | During the early 1800s, frequent droughts forced white farmers from the Cape Colony to move with their livestock across the Orange River to look for better grazing. Initially, these Trekboers first obtained permission from the Cape authorities before departing across the frontier, however with time, increasing numbers of Trekboers moved across this river into the Transorangia (as it became known) without any prior permission (Schoeman, 1980). |
| Early 1836 | The first Voortrekker party of some 70 wagons crossed over the Orange River during early 1836. More groups followed and in terms of the surroundings of the study area, established themselves along the Vet River (Schoeman, 1980). Meintjies (1973) mentions that a Voortrekker party under Hendrik Potgieter arrived along the Vet River during this time. The grazing around the Vet River was not enough for all the livestock and animals of the Voortrekkers, so they split into smaller groups with one group establishing itself in May 1836 at Blaauwdrift, on the Zand River. Apart from this historic event, the closest known tangible evidence for the Voortrekkers to the study area was a fort which they built on the northern bank of the Zand River on the farm Du Preez Leger. The farm Du Preez Leger is located 20 km north west of the present study area. |
| 1837 - 1843 | In 1841 the town of Winburg was established on the banks of the Vet river. After the annexation of Natal by the British in 1843 and the subsequent dissolution of the Voortrekker Republic of Natalia, Winburg became the capital of the Voortrekkers in what is today known as the Free State (Erasmus, 2004). Winburg is located 30 km south-east of the study area. On 10 October 1968, an extensive Voortrekker Monument was opened near Winburg (www.artefacts.co.za). |
| |  <p><i>Figure 17 – Depiction of an ox wagon crossing a river during the Great Trek (Reader's Digest, 1994:116).</i></p> |


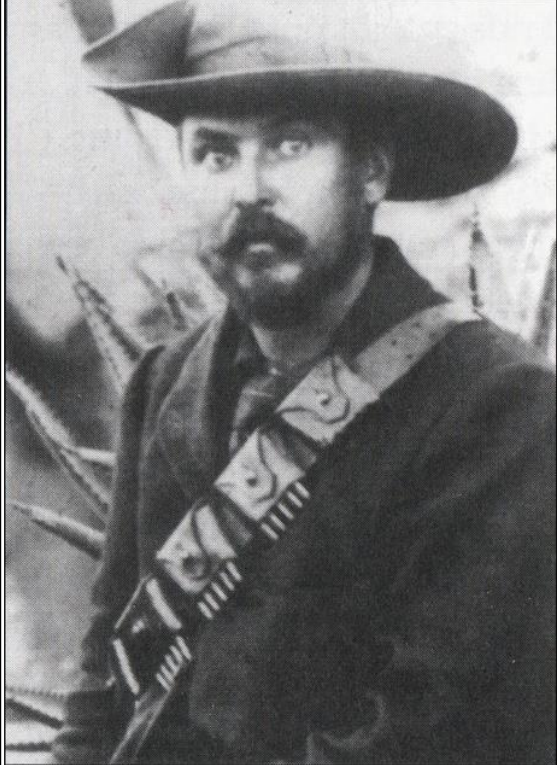
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| The Mid to Late Nineteenth Century | |
| 3 February 1848 | <p>The Orange River Sovereignty was proclaimed over the Transorangia by Great Britain and had its capital at the newly established town of Bloemfontein (www.wikipedia.org).</p> <p>The sovereignty came about after one-sided agreements that favoured the British Government had been reached between Great Britain on the one hand and King Moshesh of the Basotho and Adam Kok III of the Griqua on the other.</p> <p>Those Voortrekkers present in the Transorangia were completely by-passed by these agreements, which led to serious dismay and disappointment amongst them. In terms of the surroundings of the study area, the response of the Voortrekkers was to force the British magistrate at Winburg, one Thomas Biddulph, out of town and proclaim the Republic of Winburg (Reader's Digest, 1994).</p> |
| 16 January 1852 | <p>On 16 January 1852 the Sand River Convention was signed between the British Government and the Transvaal Boers. The British Government was represented by British Assistant Commissioners W.S. Hogge and C.M. Owen, whereas the Transvaal Boers were under the leadership of the Voortrekker hero of Blood/Ncome River, General Andries Pretorius.</p> <p>This convention formally recognised the existence and independence of the Boer Republic north of the Vaal River by the British Government. As a result, this agreement allowed for the creation of a Boer Republic, namely the <i>Zuid-Afrikaansche Republiek</i> (South African Republic) (Oberholster, 1972). The <i>Zuid-Afrikaansche Republiek</i> remained in existence until the end of the South African War in 1902.</p> <p>The site where the signing of the convention took place, was declared a monument and for many years was marked by a stone cairn and plaque (Oberholster, 1972). The present condition of the monument is not known.</p> <p>The site is located near the bridge where the N1 highway passes over the Sand River.</p> |
| 23 February 1854 | <p>The Orange River Convention was signed by representatives of Great Britain and the Boers, and resulted in the proclamation of the Boer Republic of the Orange Free State. The convention was signed at Bloemfontein (www.wikipedia.org).</p> <p>As with the proclamation of the Sovereignty, the Orange River Convention was again one-sided and did not obtain the blessing or inputs of all the major role-players in the Free State. While the Voortrekkers were excluded in 1848, the signing of the Orange River Convention in 1854 did the same to the Basotho and Griqua.</p> <p>For the next 48 years, the study area fell within the boundaries of the Boer Republic of the Orange Free State. Incidentally, the Orange River Convention is sometimes referred to as the Bloemfontein Convention.</p> |
| 1872 | <p>The town of Ventersburg was laid out on the farm Kromfontein in 1872. Kromfontein had originally belonged to one of the early Voortrekker leaders, namely Field-Cornet P.A. Venter. After his death in 1857, his son B.G. Venter allowed church services to be held in his father's homestead. The second Gereformeerde (Dopper) church north of the Orange River was also established at Kromfontein in 1859.</p> <p>The use of the farm for church services led to the establishment of a town. The new town was named after Field-Cornet P.A. Venter, and formal proclamation for Ventersburg took place in 1876 (Erasmus, 2004).</p> <p>Ventersburg is located 22 km north east of the present study boundaries.</p> |

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| 1890 | <p>Erasmus (2004) states that two American engineers were responsible for the original survey of sections of the proposed railway line between Bloemfontein and Johannesburg. On the farm Merriespruit they chiselled the name 'Virginia' on a boulder, presumably in honour of the American State of Virginia. When the railway line was built a few years later, the nearby railway siding was named Virginia and some years later, in 1954, the town of Virginia was also established.</p> <p>The Virginia railway siding is located 13.5 km north west of the present study area. The exact position of the chiselled boulder, if it still exists today, is not presently known.</p> |
| Early 1890s | <p>The railway line between Bloemfontein and Johannesburg was built during the early 1890s, and eventually reached Johannesburg during September 1891 and Pretoria in January 1892 (Schoeman, 1980). In terms of the study area, this railway line passed to its east and in this area was built from Smaldeel (present day Theunissen) to Theron, Welgelegen and Virginia.</p> |
| 9 November 1892 – 1899 | <p>The Driekopjes Diamond Mining Company was registered. One of the founding directors of the company was the man who would become synonymous with South African diamond mining and diamonds, Sir Thomas Major Cullinan.</p> <p>The "Driekopjes" in the name of the company referred to a farm of that name north-west of Kroonstad, where diamond mining was taking place. In June 1894 the Driekopjes Diamond Mining Company also acquired an interest in the farm Welgegund from the Van Rensburg Diamond Mining Syndicate. The farm Welgegund was located near the study area, and is presently known as the farm Driekoppies 422. No information could be found on this syndicate.</p> <p>A large number of diamonds were subsequently recovered from Welgegund. However all mining activities came to a halt with the South African War (1899 – 1902) (Helme, 1974).</p> |
| Mid 1890s | <p>During the mid 1890s two men arrived on the farm Aandenk to undertake prospecting work. Alexander Edward King Donaldson was a prospector and his associate Herbert Hinds an engineer. They excavated an 18-meter-deep shaft and took samples from their excavations for further testing and analysis. On their return journey to England, both men died when their ship, the Drummond Castle, wrecked at Ushant off France, and with it the samples they had brought from the Free State (www.sahra.org.za) (Felstar Publishers, 1968).</p> <p>The activities of these two men laid the foundation for the discovery and development of the Free State Goldfields. The farm Aandenk is located immediately south of Allanridge today, some 58 km north west of the present study area.</p> |
| 1899 | <p>The town of Odendaalsrust was officially established in 1899 when the Dutch Reformed Church chose the farm Kalkkuil for its new parish. The town was proclaimed a municipality in 1912. At the time, it only had about 40 houses, three shops and a hotel (Mayhew, 1982).</p> |
| The South African War (1899 – 1902) | |
| <p>The South African War was fought between the Boer Republics of the Transvaal and Free State on the one side and Great Britain on the other but is referred to as the South African War as the victims and participants of the war were not excluded to Britain or Boer alone.</p> <p>As will be discussed in more detail below, the march of Lord Roberts from Bloemfontein to Pretoria in May and June 1900 was especially significant in terms of the study area. In particular, the so-called Battle of Zand River (7 – 10 May 1900) was fought very close to the study area, with at least the movement of troops during the battle taking place across the study area.</p> | |


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| 13 March 1900 – 6 May 1900 | <p>Bloemfontein, the capital of the Boer Republic of the Orange Free, was occupied by the British Army under Lord Roberts on 13 March 1900. The Boer Republic of the Orange Free State was renamed the Orange River Colony.</p> <p>With the Republican forces of the Transvaal and Free State retreating northwards from Bloemfontein, Lord Roberts's eyes drifted further north, where the greatest prize of the war lay waiting, Pretoria. Lord Roberts and his staff strongly believed that once the capital of the <i>Zuid-Afrikaansche Republiek</i> fell, the war would be over. However, the success of the British Army required all focus on the immediate front, as the land between Bloemfontein and Pretoria was bisected by a myriad of rivers, dongas and hills, all strategically significant obstacles from where the Boer forces could implement a solid defence. The Boer forces standing between Lord Roberts and Transvaal capital were estimated by British Intelligence to comprise two main groups namely a force of between 5 000 to 6 000 burghers with 18 guns under General Louis Botha and a similarly large force in the surroundings of Kroonstad (Maurice & Grant, 1906).</p> <p>After departing from Bloemfontein, Lord Roberts's force was involved in a couple of successful actions on their way to Pretoria, including Brandfort (3 May 1900) and Vet River (4 - 6 May 1900). With the successful conclusion of the battle of Vet River, Lord Roberts and almost his entire army crossed over the river successfully, and by the evening of 6 May 1900 bivouacked at the small railway siding known as Smaldeel. The town of Theunissen is located here today and is roughly 30 km south of the present study area (Maurice & Grant, 1906).</p> <p>A short distance to the north lay the next, and far more daunting, obstacle on Lord Roberts's march to Pretoria, the Zand (or Sand) River. It was here, at this river, that General Louis Botha, the commanders-in chief of the Transvaal republican forces, was determined to halt Lord Roberts's march on Pretoria.</p> |
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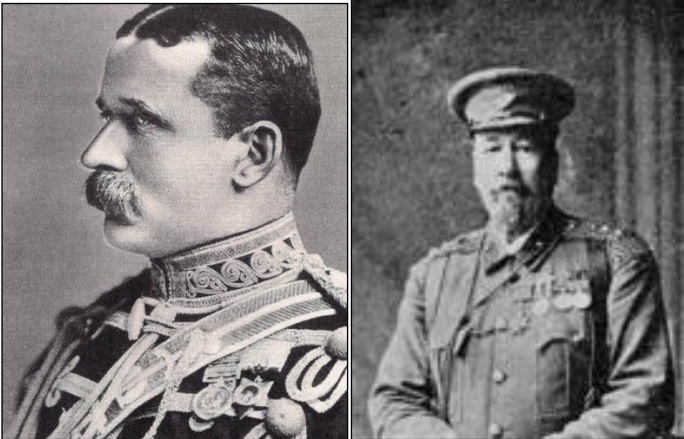
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| <i>Figure 18 – Lord Frederick Sleigh Roberts (left) and General Louis Botha (right). These two officers commanded the opposing forces at the Battle of Zand River (Changuion, 2001:77 & 117)</i> | |
| 7 – 10 May 1900 | <p>On 7 May 1900 a reconnaissance of the Zand River by General Edward Hutton indicated that the northern bank of the river was held by a force of roughly 6 000 Boers supported by two heavy and eight light pieces of artillery. These estimates provided by General Hutton allowed Lord Roberts to draw up a battle plan (Maurice & Grant, 1906).</p> <p>On the 9th of May 1900, Lord Roberts moved his army forward and established his headquarters at the Welgelegen Station. The movement of the British Army under Lord Roberts from a position a short distance of the study area at Smaldeel to a position a short distance east of it, suggests that the main component of Lord Roberts's force followed the railway line and in this way skirted around the study area.</p> <p>Lord Roberts's battle plan focussed on securing significant drifts that provides safe crossing of his infantry over the Zand River, and especially so Junction Drift, Merriespruit, Du Preez Leger Drift (located where the bridge on the road between Theunissen and Welkom crosses the river) and De Klerks Kraal Drift. For the purposes of this discussion, the events associated with the latter two of these drifts will be discussed in more detail below.</p> <p>On the morning of 9 May 1900, Lieutenant-Colonel Thomas William Porter with the 1s Cavalry Brigade departed from Smaldeel to reconnoitre the two drifts at Du Preez Leger and De Klerks Kraal. They were assisted in this task by Major-General J.B.B. Dickson with the 4th Cavalry Brigade. Meanwhile, at 11 am, Major-General John French with his advance guard reached Kalkoenkrans, a section of which farm is located within the present study area. At Kalkoenrkans, French received word from the reconnaissance units on the river that the Du Preez Leger Drift was not held by the enemy. Seizing the opportunity to outflank the Boer positions, French immediately ordered a squadron of the Scots Greys forward to take possession of the drift, and ordered the remainder of the 1st Cavalry Brigade to follow and assist in this task. The 4th Cavalry Brigade was left at Kalkoenkrans in support. By 15h30 that afternoon the Du Preez Leger Drift was occupied by the British force, with the De Klerks Kraal Drift was taken shortly thereafter. Incidentally, the other significant drifts on the river had also been taken with similar ease.</p> <p>On the morning of 10 May 1900, Lord Roberts's army advanced on the river. On its left flank (and the side closest to the study area) General French with the 1st Cavalry Brigade, the 4th Cavalry Brigade as well as Hutton's Mounted Infantry, crossed over the Du Preez Leger Drift from where they moved in a north-eastern direction.</p> <p>On the left centre of the front, the 3rd Cavalry Brigade and Henry's Mounted Infantry crossed over the drift at the railway line in proximity to present-day Virginia. The northern bank was occupied by 8 am that same morning.</p> <p>The crossing of the drifts further to the east was achieved with more difficulty, but the northern banks were also occupied a mere half an hour after the crossing over the Merriespruit Drift near the railway line.</p> |

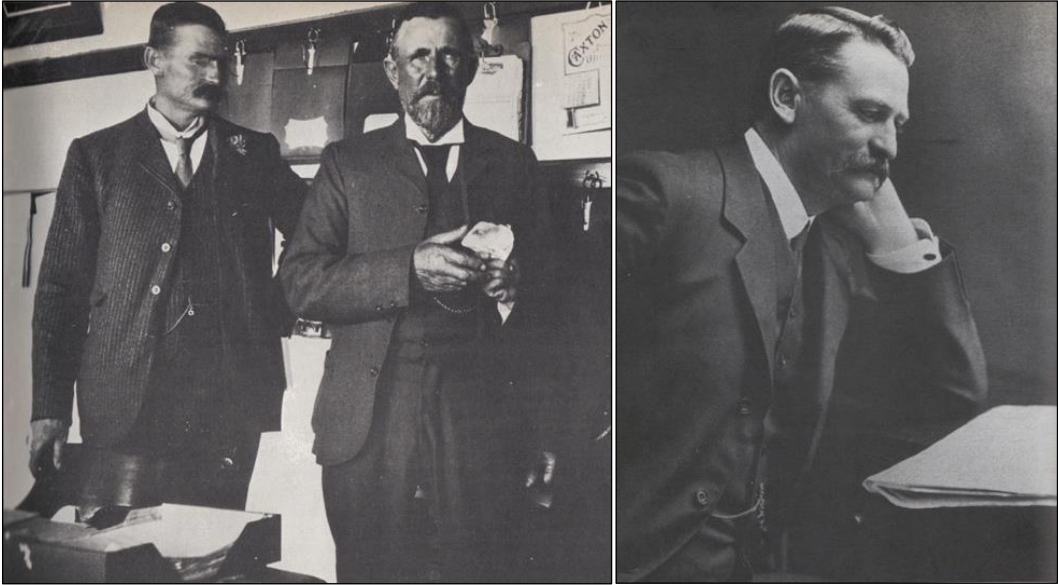
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| | <p>This meant that Lord Roberts's front comprising cavalry and mounted infantry units had successfully crossed over the Zand River early on the morning of 10 May 1900, without meeting any significant resistance. However, the fortunes of war were about to change for Lord Roberts.</p> <p>A patrol sent out by General French ran into a large Boer force of between 2 000 and 3 000 burghers moving down onto the centre of Lord Roberts's front at the Virginia Station. French ordered an attack by one squadron each from the 6th Inniskilling Dragoons, Scots Greys and Australian Horse and two troops from the 6th Dragoon Guards (Carabiniers). Their attack was focussed on the centre of the advancing Boer force on a ridge located on the farm Vredes Verdrag. Suffice to say that the battle raged for some time and the outcome was not at all clear until 14h00 that afternoon when the Boers abandoned the field of battle, allowing the British to occupy the ridge and proceed forward (Maurice & Grant, 1906).</p> <p>Further battles and actions took place to the east, near Junction Drift. However, by the afternoon of 10 May 1900, all the drifts had been successfully cleared and occupied to allow for the crossing of the Zand River by Lord Roberts's infantry (Maurice & Grant, 1906).</p> |
| |  <p><i>Figure 19 – Lord Roberts's infantry crossing the Zand River at the conclusion of the Battle of Zand River. This photograph was in all likelihood taken during the afternoon of 10 May 1900, after all the significant drifts across the river had been cleared by the cavalry and other units. The crossing and surrounding landscape are monitored by an observation balloon (see top right). It is not possible to identify the exact drift where this crossing took place, although the remnants of a bridge foundation structure can be seen in the river bed (Raath, 2007:351).</i></p> |


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| |  <p><i>Figure 20 - Two of the British officers at the Battle of the Zand River who were closely associated with the events within the study area, namely the occupation of the Du Preez Leger Drift on 9 May 1900 as well as the crossing of the drift on the morning of 10 May 1900. General John French (left) (Changuion, 2001:77) and Colonel Thomas William Porter (www.nzetc.victoria.ac.nz).</i></p> |
| | <p>After the fall of Pretoria on 5 June 1900 and the subsequent battles of Diamond Hill (11-12 June 1900) and Bergendal (21-27 August 1900), the Boer generals decided that the only way to proceed with the war would be the implementation of a completely different strategy, a strategy based on mobility by using smaller commandos to attack and harass the British on all fronts in what was to become known as guerrilla warfare. This style of warfare had significant successes, and extended the war for nearly another two years. However, these successes also came with significant losses as the war increasingly dragged the civilian population of the Boer Republics into the carnage of war.</p> <p>No skirmishes or battles associated with the guerrilla war are known from within the study area or its immediate surroundings. This said, the study area and surroundings, as with almost the entire South Africa, experienced the effects of guerrilla warfare.</p> <p>In retaliation to the new form of warfare, the British High Command devised a strategy of building extensive blockhouse lines across the country as a way of hindering the mobility of the Boer commandoes. By December 1900, points along the railway line north of Bloemfontein had been fortified with hastily constructed trenches shaded by roofs and defended by razor wire. The closest of these defensive works to the present study area was at Virginia,. Shortly thereafter, a number of key positions along the railway line north of Bloemfontein were significantly strengthened with the construction of multi-storey blockhouses.</p> <p>At Virginia, for example, a double storey stone blockhouse as well as one corrugated iron blockhouse were built (Hattingh & Wessels, 1997). Lord Kitchener, in particular, also implemented a strategy that was to become known as scorched earth whereby the Boer farms were burnt to the ground and the civilian population (both white and black) remaining on these farms forced into concentration camps. No details regarding the destruction of farms from within the study area are presently known. However, the destruction of farms during the guerrilla phase of the war would certainly have taken place within the study area as well.</p> |

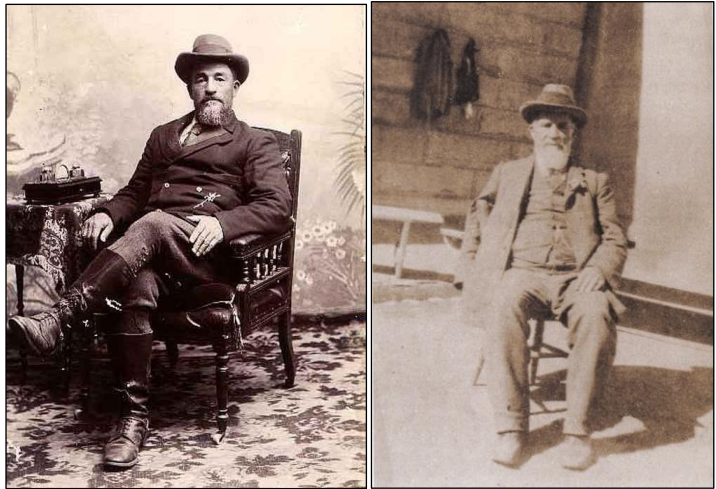
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| | <p>While no concentration camps existed within the study area, a surprising large number of such camps were located in the surroundings of the study area. Black concentration camps were located at Smaldeel, Virginia, Welgelegen and Winburg (Warwick, 1983). The closest white concentration camp to the study area was at Winburg, (www.angloboerwar.com).</p> <p>Untold hardship ensued in these concentration camps, and many women and children died as a result of exposure, inadequate nutrition and poor medical facilities. These camps resulted in the deaths of 27 926 white and 14 154 black people (www.sahistory.org.za).</p> |
| The Early Twentieth Century (1902 – 1913) | |
| October 1902 – November 1904 | <p>In October 1902, some months after the end of the South African War, the name of the Driekopjes Diamond Mining Company was changed to the New Driekopjes Diamond Mining Company, which still had Thomas Major Cullinan as one of its directors.</p> <p>Although work at the Driekopjes Mine north-west of Kroonstad resumed on a small scale during 1903 (in all likelihood work at Welgegund also continued), all work at the mine was permanently halted by November 1904. This was due to disappointing yields and as a result the company was liquidated shortly thereafter (Helme, 1974).</p> |
|  | |
| <p><i>Figure 21 – Sir Thomas Major Cullinan was one of the founding directors of the Driekopjes Diamond Mining Company, which acquired an interest in the farm Welgegund in 1894. In the historic photograph on the left he is shown shortly after the discovery of the Cullinan diamond (which is held by F. Wells) at the Premier Diamond Mining Company, of which he was the chairman. The photograph on the right depicts Cullinan in 1929 (Helme, 1974: 75 & 146).</i></p> | |
| 1904 | <p>After the South African War, renewed efforts were made to carry out gold prospecting work in the area.</p> <p>In 1904, a prospector named Archibald Megson arrived on the farm Aandenk, and the farmer showed him the trench where Alexander Edward King Donaldson and Herbert Hinds had looked for gold. It had been more than a decade since these two pioneers had prospected the same farm.</p> |

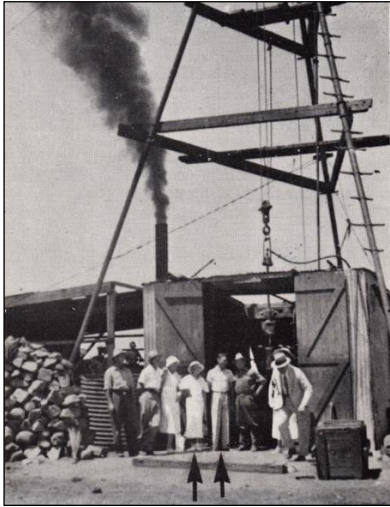
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| | <p>Megson opened up the old trench and continued with the excavations. At a depth of 30 meters, he found indications of gold and took a number of samples.</p> <p>Megson returned to Johannesburg with his samples and attempted to gain the interest of various mining houses and investors on the rand. However, with the rapid development and expansion of the Witwatersrand gold mining industry attracting all of the attention, no one seemed interested in possible gold discoveries so far away from Johannesburg (www.sahra.org.za).</p> |
| |  <p><i>Figure 22 – Archibald Megson standing in the prospecting trench on the farm Aandenk (Felstar Publications, 1968).</i></p> |
| August 1907 | In August 1907, the town of Theunissen was proclaimed. This proclamation followed on a petition by farmers living in proximity to Smaldeel Siding. The town was named in honour of Commandant Helgaardt Theunissen, who led the petition and had also been the leader of the local commando during the South African War. The town of Theunissen became a municipality in 1912 (Erasmus, 2004). |
| 1910 | At the time, the Driekoppies Diamond Mine at Welgegund comprised 50 claims (Johnson, 1910). Although no detailed information on these syndicates and companies could be obtained, it would appear that by this time the farm was prospected and mined by at least the Magnus Diamond Syndicate Limited as well as the Triumph Diamond Mining Company Limited. Based on this information, it would appear that the Magnus and Triumph entities in all likelihood took over at Welgegund after the liquidation of the New Driekopjes Mining Company in 1904. |
| 25 November 1911 | The Drie Koppie Diamond Mine Limited was formed on 25 November 1911 by W.G. Griffiths to acquire from the Magnus Diamond Syndicate Limited and the Triumph Diamond Mining Company Limited the farm Welgegund in the Winburg District (The Mining Manual and Mining Year Book, 1914). The later history of the diamond mine and mining activities at Welgegund could not be revealed by way of the desktop study. |
| The Boer Rebellion (1914 – 1918) | |
| At the end of the South African War (1899 – 1902), the Transvaal and Orange Free State republics lost their independence to the British Empire. In 1910, the Union of South Africa was established consisting of the Cape Colony, Natal, the Transvaal Colony and the Orange River Colony. General Louis Botha was appointed the Union's first prime minister and believed that South Africa's future would | |


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| | <p>be best served as part of the British Commonwealth. 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 rebellion broke out across the former Boer republics. This rebellion saw more than 11 000 Boer men under the leadership of some of the former Boer War generals such as De Wet, Maritz, Kemp and Beyers rebelling against the South African government and its armed forces under the leadership of former Boer War generals Louis Botha and Jan Smuts.</p> |
| 16 November 1914 | <p>In terms of the study area, the most notable event relating to the Boer Rebellion was the battle that occurred between the commando of General De Wet and the Government forces under the command of Colonel Enslin at the Virginia railway station on 16 November 1914. This battle followed on the defeat of De Wet's rebels at Mushroom Valley, south-east of Winburg, at the hands of General Louis Botha. De Wet and 2 000 rebels managed to escape from Mushroom Valley and followed the railway line north-eastwards towards the Virginia Station on the Zand River. De Wet wanted to cross over the railway line, and as a result, a fight ensued with Colonel Enslin's forces stationed at Virginia Station. General De Wet suffered a number of casualties and 50 of his men were also taken prisoner. After the battle, De Wet and his men followed the Zand River in a western direction and crossed over the river into the Transvaal Colony in proximity to Hoopstad (Union of South Africa, 1916).</p> |
| | <div data-bbox="523 981 1241 1467">  </div> <p><i>Figure 23 – The hardships experienced by General C.R. de Wet during the rebellion can be seen on these photographs. The one on the left shows De Wet shortly after the South African War (Van Schoor, 2007) with the image on the right depicting the general in the Bloemfontein prison after his capture late in 1914 (Langner & Raath, 2014:119).</i></p> |
| The Remainder of the Twentieth Century (1915 – Present Day) | |
| 1929 - 1933 | <p>Nearly 25 years after finding the first indications of gold on the farm Aandenk, Archibald Megson finally managed to raise the interests of possible investors in Johannesburg. In 1929, during a chance encounter with Joseph Freedman, Megson found a more welcoming response. Freedman introduced the prospector to Johannesburg attorney, Emmanuel Jacobson, and his friend Allan Roberts, a dental technician. Despite being interested in what the prospector had to say, it took almost</p> |


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| | <p>four years before Jacobson, Roberts and Megson travelled to the Free State (Shorten, 1970).</p> <p>Allan Roberts, who was an amateur prospector, was able to trace a conglomerate outcrop all along the farm Aandenk, and incorrectly identified it as part of the Upper Witwatersrand series. The two friends returned to Johannesburg and formed a syndicate comprising themselves, F.L. Marx, Dr. E.B. Woolf, Samuel Potter and Joseph Freedman. Freedman represented the interests of the old prospector Archibald Megson in the syndicate (Shorten, 1970).</p> <p>The syndicate acquired prospecting options on 31 farms in the area and the company Wit. Extensions Limited was established by the syndicate. On 23 October 1933, drilling commenced at a point roughly 80 m from Megson's trench on the same farm Aandenk. However, by February 1935 the drilling work had to be halted due to a lack of funds without any evidence for gold-bearing reefs identified. Many years later, it was estimated that if the two friends had only managed to deepen the hole by another 400 feet, they would have become very rich men and the discoverers of the Free State goldfields. Sadly, this was not to be their fate. Allan Roberts died in such poverty in 1939 and his friends had to pay for his funeral whereas Emmanuel Jacobson had to sell all his assets to survive (Shorten, 1970). Today, the town of Allanridge (named after Allan Roberts) and a monument to the west of the road between Welkom and Bothaville are all that is left of the dreams and expectations of these two mining pioneers.</p> |
| |  <p><i>Figure 24 - The first gold prospecting borehole in the Free State was sunk on the farm Aandenk between October 1933 and February 1935. The arrows indicate the positions of Allan Roberts and his wife (Felstar Publications, 1968:11).</i></p> |
| 1935 | <p>After the failure of Wit. Extensions Limited, an agreement was reached with the Anglo-French Exploration Company to continue prospecting work at Aandenk. However, instead of continuing deeper on the same borehole, the Anglo-French Exploration Company decided to rather deflect the borehole and no results were achieved. It was later estimated that if either one of these companies had deepened the borehole by only another 400 feet, payable gold would have been discovered (Shorten, 1970).</p> <p>The agreement between Wit. Extensions Limited and Anglo-French Exploration Company came to an end and the famous geologist Dr. Hans</p> |


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| | <p>Merensky acquired an interest in Wit. Extensions Limited. He subsequently carried out extensive prospecting work including the drilling of further boreholes. However, even these more extensive attempts by Merensky to find the Free State goldfields also failed (Shorten, 1970). Machens (2009) indicates that when news broke that the famous discoverer of inter alia South Africa's platinum reserves owned options in a company working on the Free State goldfields, the interest from investors and mining companies to this part of the Free State was further awakened.</p> |
| |  <p><i>Figure 25 – The famous geologist Dr. Hans Merensky, who had his role to play in the discovery of the Free State goldfields (Machens, 2009).</i></p> |
| 1 February 1937 – April 1939 | <p>After failing to discover any payable gold, Merensky sold his shares in Wit. Extensions to the Anglo American Corporation, who on 1 February 1937 established the West Rand Investment Trust. The trust also carried out an extensive drilling operation. The activities and interest of the Anglo American Corporation in this part of the Free State attracted the interest of other mining houses and investment companies, and prospecting options were taken out on a large number of farms from this area (Shorten, 1970).</p> |
| | <p>Despite all this interest, the first payable gold in the Free state was only identified in March 1939 during drilling operations by the African and European Investment Company on the farm Uitsig at a depth of 2 701 feet (Felstar Publishers, 1968). One month later, during April 1939, another discovery of payable gold was made on the farm St. Helena at a depth of 1 143 feet (Shorten, 1970).</p> <p>The discoveries of payable gold at Uitsig and St. Helena created significant excitement amongst mining companies and investors, and increasing numbers of prospecting options and eventually mines were acquired and developed. The Free State gold rush had begun.</p> |
| 1941 | <p>The first gold mining lease in the Free State was granted by the government of the Union of South Africa for the farm St. Helena in 1941, and the St. Helena Gold Mining Company was established to mine and develop the property (Felstar Publishers, 1968). A number of other gold mining companies were also established in a relatively short spate of time, including the Welkom Gold Mining Company, President Steyn Gold Mining Company and the President Brand Gold Mining Company.</p> |

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| |  <p><i>Figure 26 – The first mine shaft ever sunk along the Free State goldfields, namely the No. 3 Incline Shaft at the St. Helena Gold Mine (Felstar Publishers, 1968:151).</i></p> |
| 16 April 1946 | <p>The borehole of the Blinkpoort Gold Syndicate Limited on the boundary of the farms Geduld and Friedenheim, reached payable gold in 1946. On 16 April 1946 it was announced that the gold-bearing material retrieved at a depth of 3 922 feet from this borehole assayed at an impressive 1 252 dwts per ton which was unique in the history of golf prospecting and mining in South Africa, with averages usually in the region of 250 dwts per ton. This discovery led to further interest in the Free State goldfields (Felstar Publishers, 1968).</p> |
| 11 July 1946 – 15 April 1947 | <p>On 11 July 1946 an application was made by the land company of Sir Ernest Oppenheimer's Anglo American Corporation, namely the South African Township and Mining and Finance Corporation, for the establishment of a new town called Welkom. After some legal and procedural processes and debate between the township applicants and its opponents (including the Odendaalsrus Town Council), the application for the establishment of the town of Welkom was approved on 15 April 1947 (Felstar Publishers, 1968).</p> <p>William Backhouse designed the town as a garden city with a commercial centre built around a town square and traffic circles rather than stop streets or traffic lights. More than a million trees were also planted (Erasmus 2004).</p> |

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| |  <p><i>Figure 27 – This photograph of Welkom was taken during the 1960s, roughly ten years after its establishment (Felstar Publications, 1968:171).</i></p> |
| 1953 | <p>After gold was discovered in the area, Odendaalsrus became a prominent town in the Free State. A railway line was built from Allanridge to Odendaalsrus in 1953 and served the two Freddie's mines (Nienaber et al. 1982).</p> |
| 1954 | <p>Three of the six mines surrounding Welkom had reached production stage by 1954. These were the Welkom, Western Holdings and St. Helena Mines.</p> <p>During the same year, the town of Virginia was laid out on the banks of the Zand River. As indicated elsewhere, the name of this town was derived from the nearby railway station, which in turn was named this after two American engineers working on the line in 1890 had carved the name "Virginia" on a boulder from a nearby hill (Erasmus 2004).</p> |
| 1981 - 1987 | <p>Beisa Shaft (now the Beatrix West Section) was commissioned in 1981 to exploit uranium. The sinking of Beatrix 1 and 2 Shafts (now the Beatrix South Section) were also started at the time (www.sibanyegold.co.za).</p> <p>In 1984, the Beisa Uranium Mine was closed due to the low price of uranium at the time. In 1985 the Beatrix 1 and 2 Shafts were commissioned and exploration work commenced in proximity to the Beisa Mine on the farm Kalkoenkrans (www.sibanyegold.co.za).</p> <p>The sinking of two sub-vertical shafts and a ventilation shaft commenced at the Beisa Mine in 1987. During the same year this mine was renamed the Oryx Mine (www.sibanyegold.co.za).</p> |

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4.2.1 Archival and historical maps

The examination of historical data and cartographic resources represents a critical tool for locating and identifying heritage resources and in determining the historical and cultural context of the study area. Relevant topographic maps and satellite imagery were studied to identify structures, possible burial grounds or archaeological sites present in the footprint area.

Historical topographic maps (1:50 000) for various years (1945, 1947, 1954, 1975, 1997, 2007) were available for utilisation in the background study. These maps were assessed to observe the development of the area, as well as the location of possible historical structures and burial grounds. The study area was overlain on the map sheets to identify structures or graves situated within or immediately adjacent to the study area that could possibly be older than 60 years and thus protected under Section 34 and 36 of the NHRA.

The 2826BB Virginia map sheet was surveyed in 1945 and drawn by the Trigonometrical Survey Office, 1945.

The map showed only one area of heritage sensitivity. Five locations of hut features, most likely used for farm labour accommodation, all in the same area were depicted.

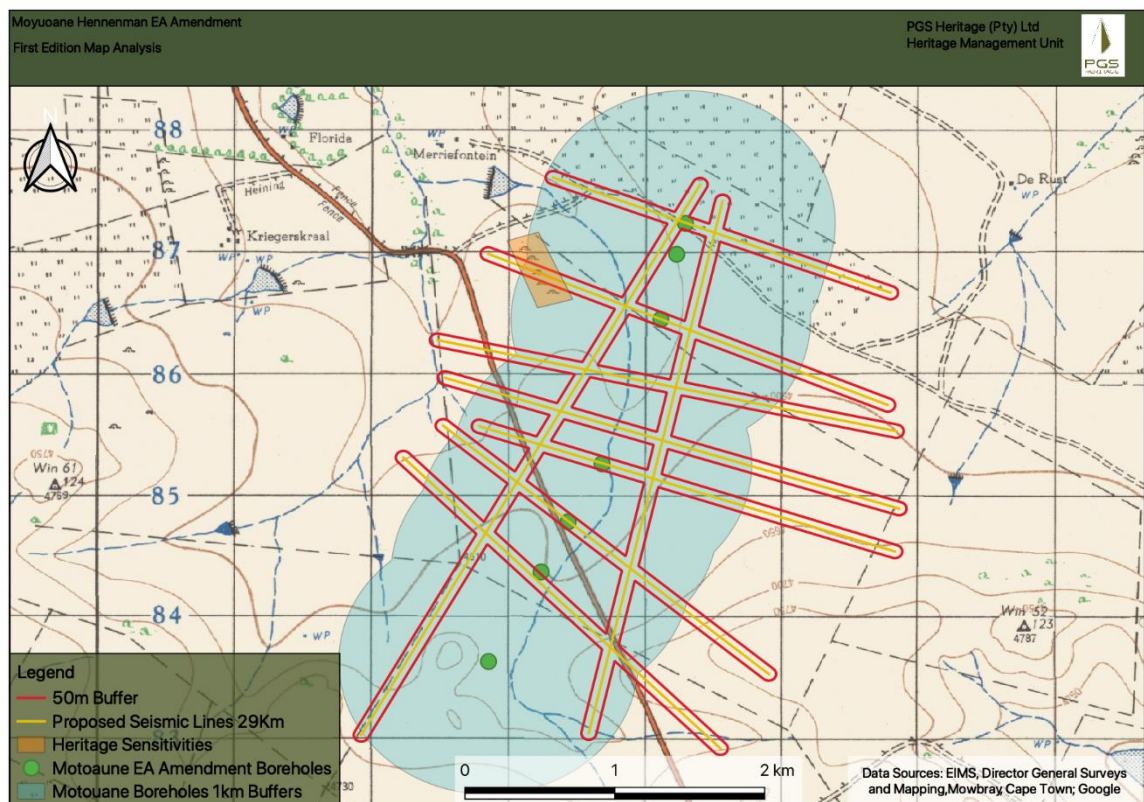


Figure 28 - First edition Virginia map sheet showing heritage sensitive areas.

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The 2726DD Braunzynekop map sheet was surveyed in 1945 and drawn by the Trigonometrical Survey Office, 1946.

The Maps showed two areas of heritage sensitivity. two locations of hut features, most likely used for farm labour accommodation, and a farmstead were depicted.

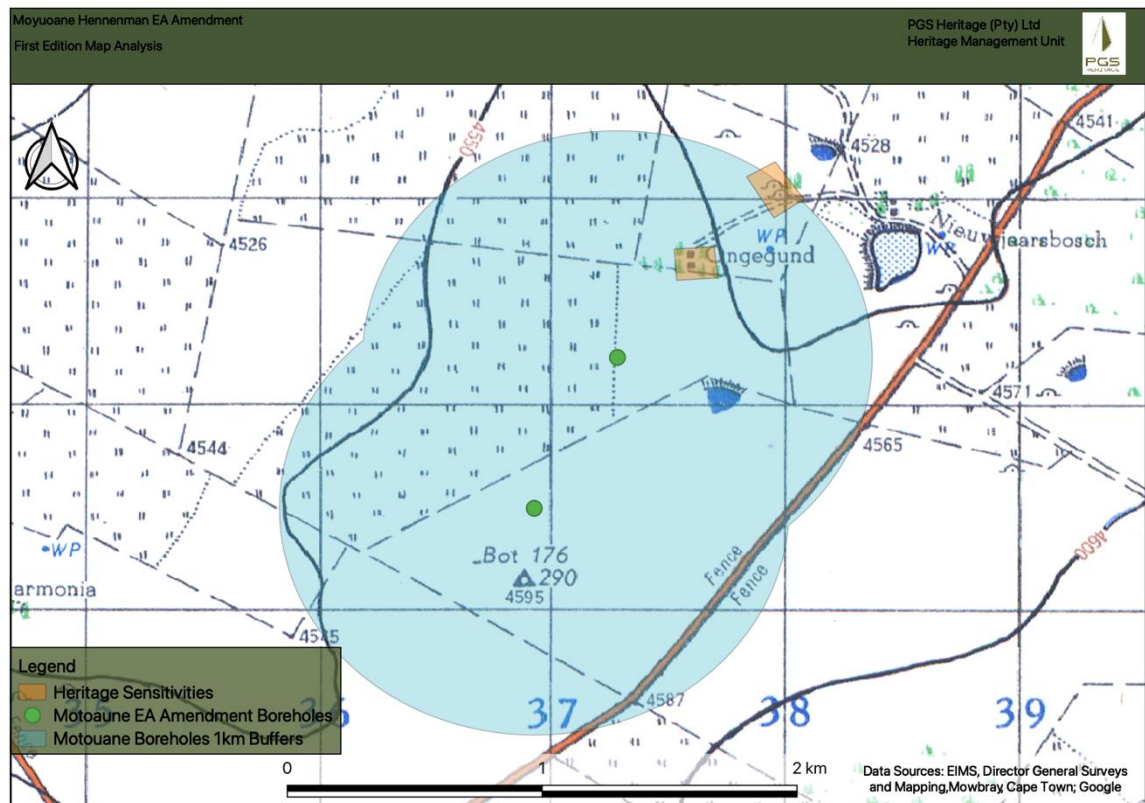


Figure 29 – First edition Braunzynekop map sheet showing heritage sensitive areas.

The 2826BD Theronkop map sheet was surveyed in 1947 and drawn by the Trigonometrical Survey Office, 1947.

The Maps showed two areas of heritage sensitivity. A farmstead and graveyard were depicted.

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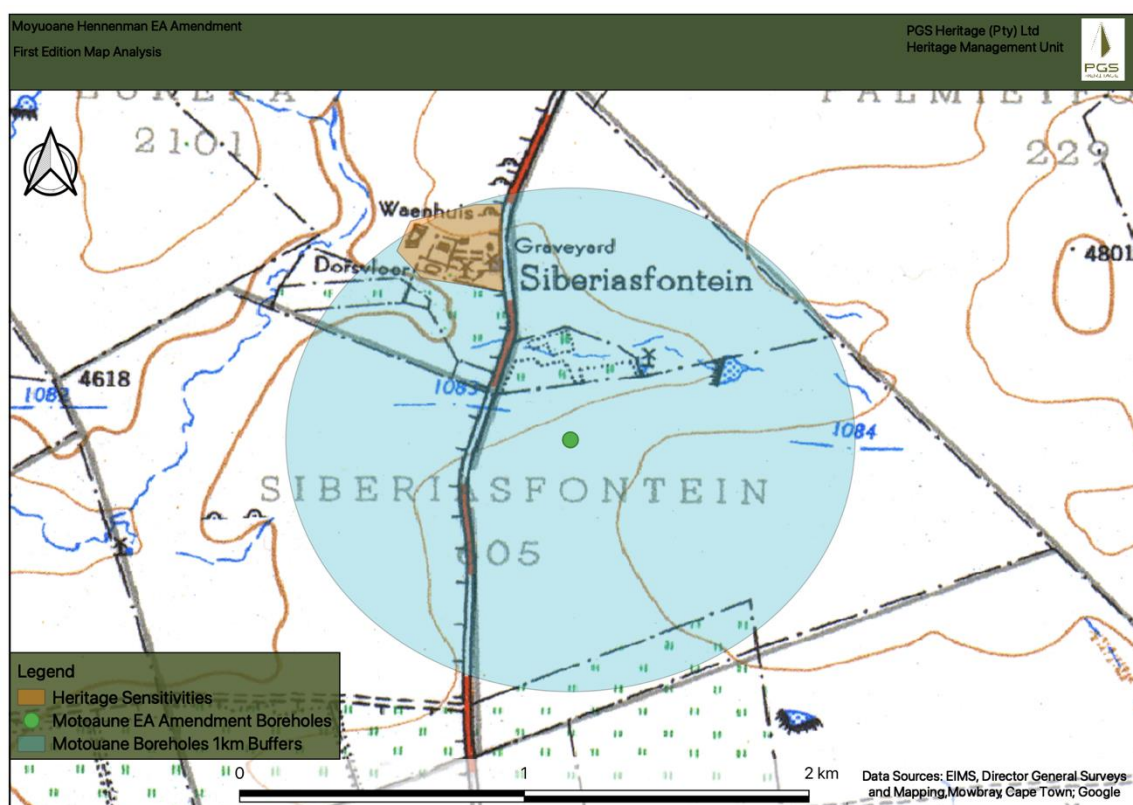


Figure 30 – First edition Theronoskop map sheet showing heritage sensitive areas.

4.2.2 Previous heritage impact assessment reports from the study area and surroundings

A search of the South African Heritage Resources Information System (SAHRIS) database revealed that several previous archaeological and heritage impact assessments had been undertaken within the surroundings of the study area. In each case, the results of each study are shown in bold. These previous studies are listed below in ascending chronological order:

- Birkholtz, P.D. 2017a. Heritage Impact Assessment for the Proposed Tetra4 Cluster 1 Gas Production Project. Prepared for EIMS. **The identified sites comprise the following: cemeteries, Stone Age sites, historic structures believed to be older than 100 years, historic structures believed to be older than 60 years, historical buildings of low significance, historic to recent sites with possible stillborn baby graves, possible grave sites and a site comprising a single lower grinder.**
- Birkholtz, P.D. 2017b. Heritage Audit Report for the Beatrix Mining Areas of Sibanye Gold, Between Welkom and Theunissen, Lejweleputswa District, Orange Free State Province. Prepared for Sibanye Gold (Pty Ltd). **A total of 66 heritage sites. These identified heritage sites comprise 9 graves or burial grounds, 30 historical structures believed**

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to be older than 60 years, of which 11 are believed to be older than 100 years, and 12 archaeological (Stone Age) sites. Sites where possible unmarked (infant) graves could occur were also identified (15). These sites include the remains of black homesteads. In terms of black African tradition, stillborn babies were often buried in unmarked graves underneath or adjacent to the homesteads of their parents.

- Dreyer, C. 2004a. First Phase Heritage/Archaeological Assessment of the Proposed Powerline Route at Phakisa Mine, Welkom, Free State. **No archaeological, cultural, or historical material was identified during the survey.**
- Dreyer, C. 2004b. Archaeological and Historical Investigation of the Graves at the Proposed Housing Developments near Thabong, Welkom, Free State. **One grave and several other stones protruding from the ground suggested that it was an old graveyard.**
- Dreyer, C. 2005. Archaeological and Historical Investigation of the Proposed New Filling Station at Virginia, Free State. **No archaeological, cultural, or historical material was identified during the survey.**
- Dreyer, C. 2007. First Phase Archaeological and Cultural Heritage Assessment of the Proposed New MTN Cell Phone Mast at Pumlani Cemetery, Thabong, Welkom, Free State. **No archaeological, cultural or historical material was identified during the survey.**
- Coetzee, F. 2008. Cultural Heritage Survey of the Proposed Phakisa Housing Development, Welkom, Free State. **No Stone Age or Iron Age settlements, structures, features, or artefacts were recorded during the survey. One site that consisted of a mine shaft and various associated buildings and structures that probably older than 60 years were identified. No impact on the site was envisaged.**
- Dreyer, C. 2008. First Phase Archaeological and Heritage Investigation of the proposed Oppenheimer Park Golf Estate, Welkom, Free State. **No archaeological, cultural, or historical material was identified during the survey due to the surface disturbance.**
- Dreyer, C. 2011. First Phase Archaeological and Heritage Investigation of the proposed Chicken Egg Production Developments at Mooidoorns 319, Welkom, Free State. **No archaeological, cultural, or historical material was identified during the survey due to the surface disturbance (ploughed fields).**

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- Van Ryneveld, K. 2013. Phase 1 Archaeological Impact Assessment for the Lebone Solar Farm, Onvewag RE/728 and Vaalkranz 2/220, Welkom, Free State, South Africa. Prepared for Enviroworks. **The report identified five sites: colonial period farming infrastructure, farmstead, cultural landscape, structure remains and railway bridge.**
- van Schalkwyk, J. 2014. Cultural Heritage Impact Assessment Report for the Proposed SANRAL Thabong Interchange Development, Welkom Region, Free State Province. **No archaeological, cultural, or historical material was identified during the survey.**
- Fourie, W. 2021. Heritage Impact Assessment for The Proposed Harmony FSS6 Reclamation Pipeline, Welkom, Free State Province. **No archaeological, cultural, or historical material was identified during the survey.**
- Kruger, N. 2021a. Archaeological Impact Assessment (AIA) On Portions Of The Farms Bloemhoek 509, Welgelegen 382, Mooi Uitzig 352, Florida 633, Le Roux 717 And Detente 744 For The Proposed Virginia Solar Park Power Lines Ba Project, Lejweleputswa District Municipality, Free State Province. **The study noted the remains of a later Historical Period settlement (possibly a farmworkers compound of houses). The site was poorly preserved and of medium to low significance.**
- Kruger, N. 2021b. Archaeological Impact Assessment (AIA) On Portions Of The Farm Blomskraal 216 For The Proposed Virginia 1, 2 & 3 Solar Parks Eia Project, Lejweleputswa District Municipality, Free State Province. **The survey was conducted approximately 20km east of the current study area. The study noted the remains of a large Iron Age occupation, several Historical Period settlements, and farmsteads, and three burial sites.**
- Van der Walt, J. 2013a. Archaeological Scoping Report for the Proposed Oryx Solar Energy Facility. Prepared for Savannah Environmental (Pty) Ltd. The study was conducted on Portion 2 of the farm Kalkoenkrans 225.
- Van der Walt, J. 2013b. Archaeological Impact Assessment for the Proposed Oryx Solar Energy Facility. Prepared for Savannah Environmental (Pty) Ltd. The survey was conducted on Portion 2 of the farm Kalkoenkrans 225. **The report identified three sites: informal cemetery and two derelict structures younger than 60 years and of little architectural value.**

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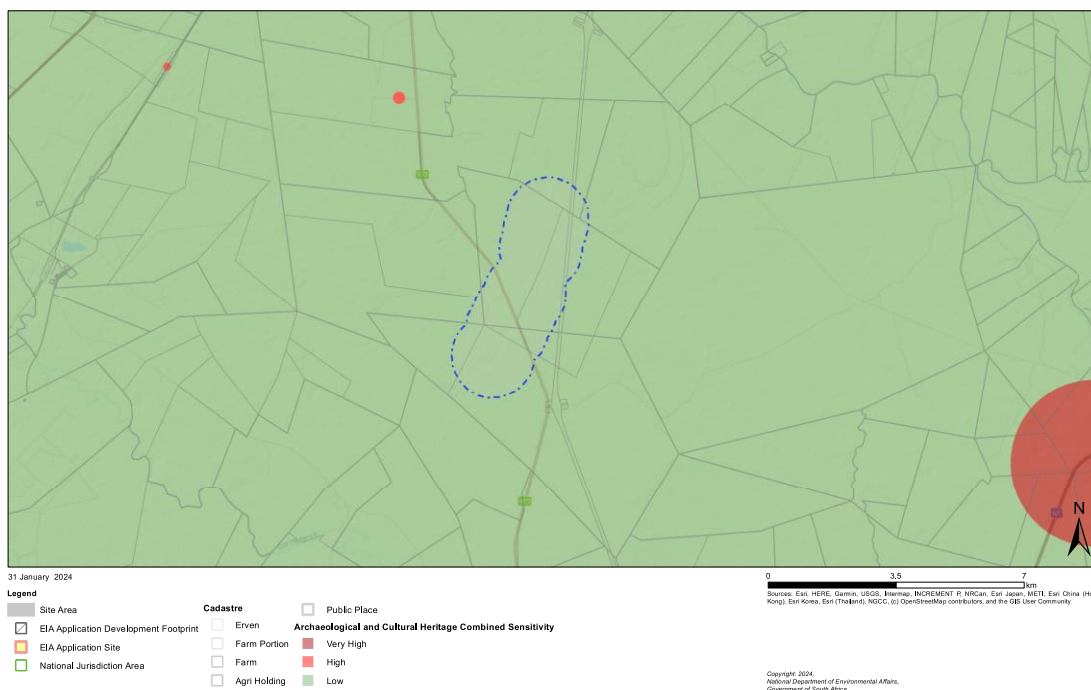


Figure 32 – Screening tool map indicating a low sensitivity rating for archaeology and heritage for boreholes RBD12-RBD18



Figure 33 – Screening tool map indicating a low sensitivity rating for archaeology and heritage for boreholes Nooitgedacht M2 and Wildskamp 5

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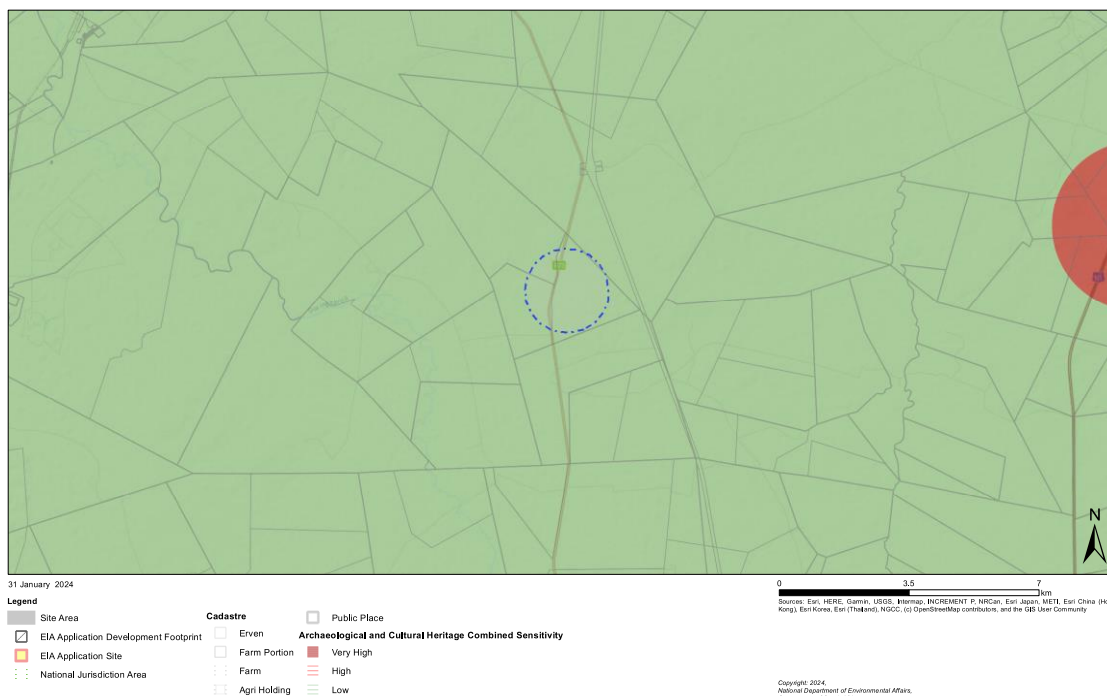


Figure 34 – Screening tool map indicating a low sensitivity rating for archaeology and heritage for borehole RSF2

4.2.4 Palaeontological screening

The Palaeontological Sensitivity generated by the National Environmental Web-Based Screening Tool indicates that the Sensitivity of the proposed development is Very High. Updated Geology (Council of Geosciences) refined the geology and indicates that the proposed development is underlain by alluvium, colluvium, eluvium, and gravel as well as the Balfour Formation (Adelaide Subgroup, Beaufort Group) and Jurassic dolerite (Groenewald *et al.*, 2014).

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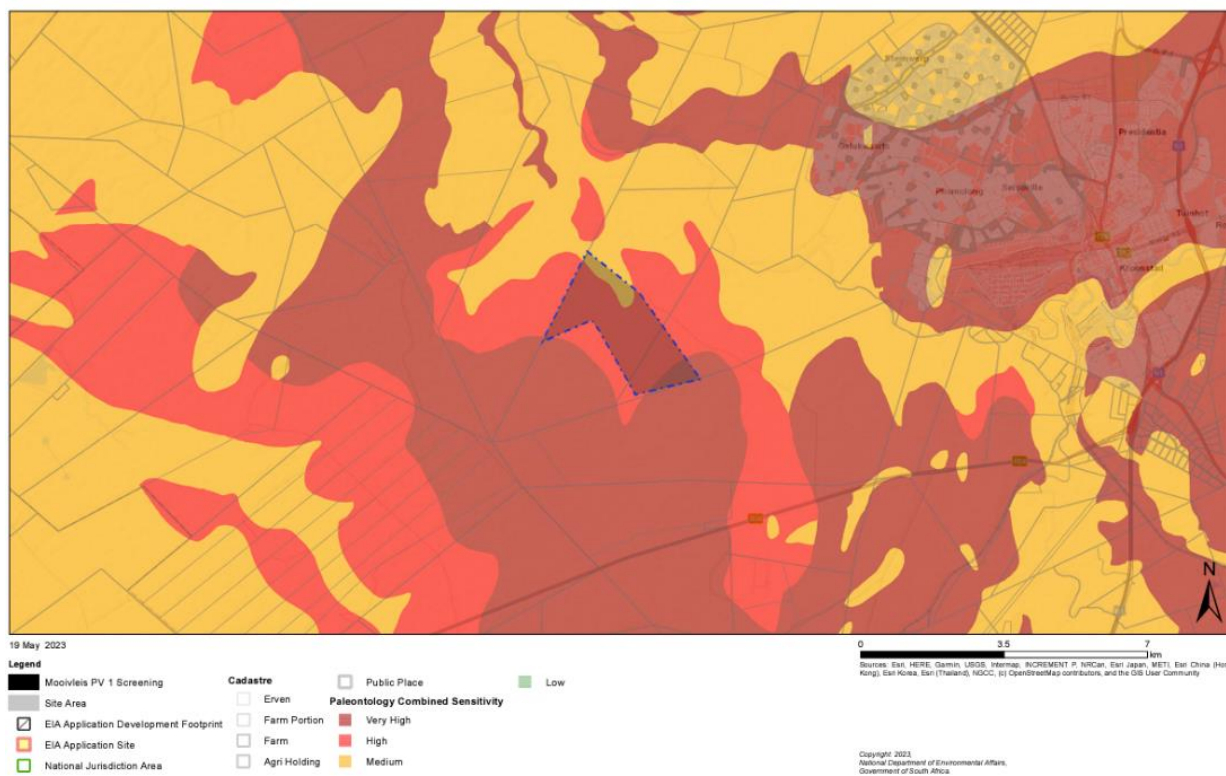


Figure 35 - Palaeontological Sensitivity of Study site by the National Environmental Web-based Screening Tool.

4.2.5 Heritage sensitivity

Analysis of maps and satellite imagery enabled the identification of possible heritage sensitive areas. By superimposition and analysis, it was possible to rate these structures according to age and thus their level of protection under NHRA. **Table 4** lists the possible tangible heritage sites identified in the vicinity of the study area and the relevant legislative protection.

Table 4: Tangible heritage site in the study area.

| Name | Description | Legislative protection |
|----------------|------------------------------|--|
| Archaeology | Older than 100 years | NHRA Sections 3 and 35 |
| Structures | Possibly older than 60 years | NHRA Sections 3 and 34 |
| Burial grounds | Graves | NHRA Sections 3 and 36 and MP Graves Act |

Additionally, evaluation of satellite imagery has indicated the following areas that may be sensitive from a heritage perspective. The analysis of the studies conducted in the area assisted in the development of the following landform type to heritage find matrix (**Table 5**).

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Table 5: Landform type to heritage find matrix

| LANDFORM TYPE | HERITAGE TYPE |
|---------------------------|--|
| Crest and foot hill | LSA and MSA scatters, LIA settlements |
| Crest of small hills | Small LSA sites – scatters of stone artefacts, ostrich eggshell, pottery and beads |
| Water holes/pans/rivers | MSA and LSA sites, LIA settlements |
| Farmsteads | Historical archaeological material |
| Ridges and drainage lines | LSA sites, LIA settlements |

4.3 Fieldwork findings²

The fieldwork was conducted on the 12th – 14th of September 2023 and 15th – 17th of January 2024 by a field team of PGS heritage. Their movement on site was tracked by GPS and a tracklog map can be seen in **Figure 36 - Figure 38**.

During the fieldwork a total of **eleven** heritage features and resources were identified (**Figure 39 - Figure 41**). These consist of **five** burial grounds (**MH001, MH003, MH007, MH010 and MH011**), **three** foundation remains (**MH002, MH006 and MH009**) of a stone-built structures or homestead, one midden (**MH004**), **one** kraal (**MH008**) and one grinding stone (**MH005**). See **Figure 42 - Figure 49** and the individual site descriptions as contained in **Appendix C**. The field description forms were collected with ArcGIS Survey123 in field software.

Historical Structures/homesteads and kraals

The stone-built remains of structure **MH002** and **MH006** is possibly related to the depicted structures on the 1945 maps and most likely older than 60 years (Section 4.2.1). The structure remains themselves are not conservation worthy. However, it is associated with an earlier 20th century farm worker settlement and the possibility of stillborn burials around the structures must be considered. As per African custom stillborn children are buried against the outside wall/foundation or inside the house. The structures (**MH002, MH006 and MH009**) must then provisionally grade as Grade IIIA. All burial grounds and graves should be retained and avoided with a buffer zone of 30m as per SAHRA guidelines. If this is not possible, the graves could be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component, adhering to the requirements of s36 of the NHRA and its regulations as well as the National Health Act and its regulations. The kraal at **MH008** is not depicted on the first edition maps and is not considered conservation worthy.

Archaeological Site

² Site in this context refers to a place where a heritage resource is located and not a proclaimed heritage site as contemplated under s27 of the NHRA.

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The historical midden and grinding stone. Middens could contain still born burials and therefore provisionally graded as Grade IIIA. The grinding stone is not conservation-worthy.

Burial grounds and graves

Five burial grounds were located. All burial grounds and graves should be retained and avoided with a buffer zone of 30m as per SAHRA guidelines. If this is not possible, the graves could be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component, adhering to the requirements of s36 of the NHRA and its regulations as well as the National Health Act and its regulations.

MH001 – approximately 15-18 graves.

MH003 – approximately 2 graves.

MH007 – approximately 4 graves

MH010 – approximately 1 grave, possibly more

MH011 – approximately 1 grave, possibly more

Due to the cultural and religious significance of burial grounds the sites have a high heritage significance and graded as Grade IIIA.

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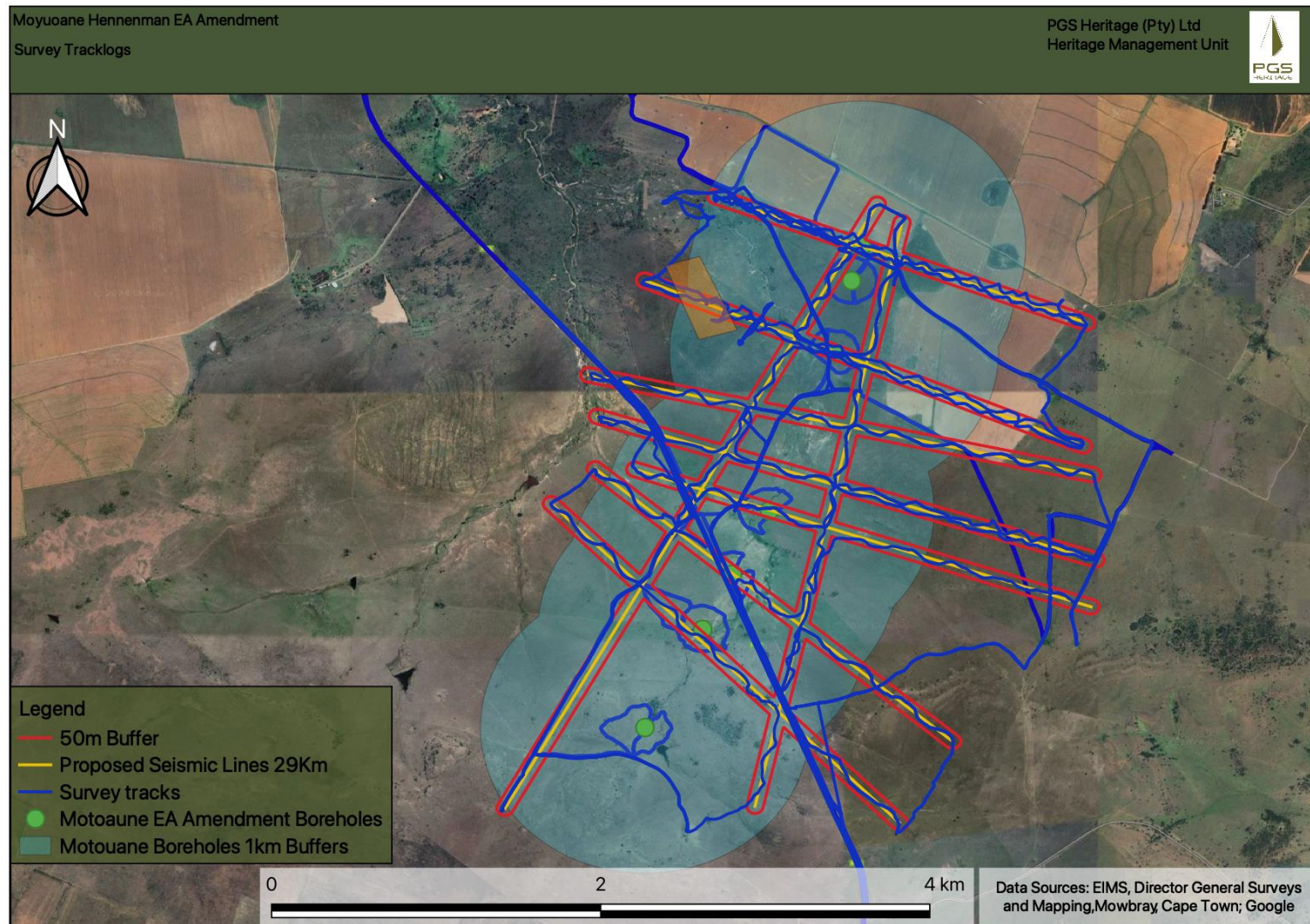


Figure 36 - Fieldwork tracklogs (track in blue, study area in red and yellow and green)

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Figure 37 – Fieldwork tracklogs for boreholes Nooitgedacht M2 and Wildskamp 5

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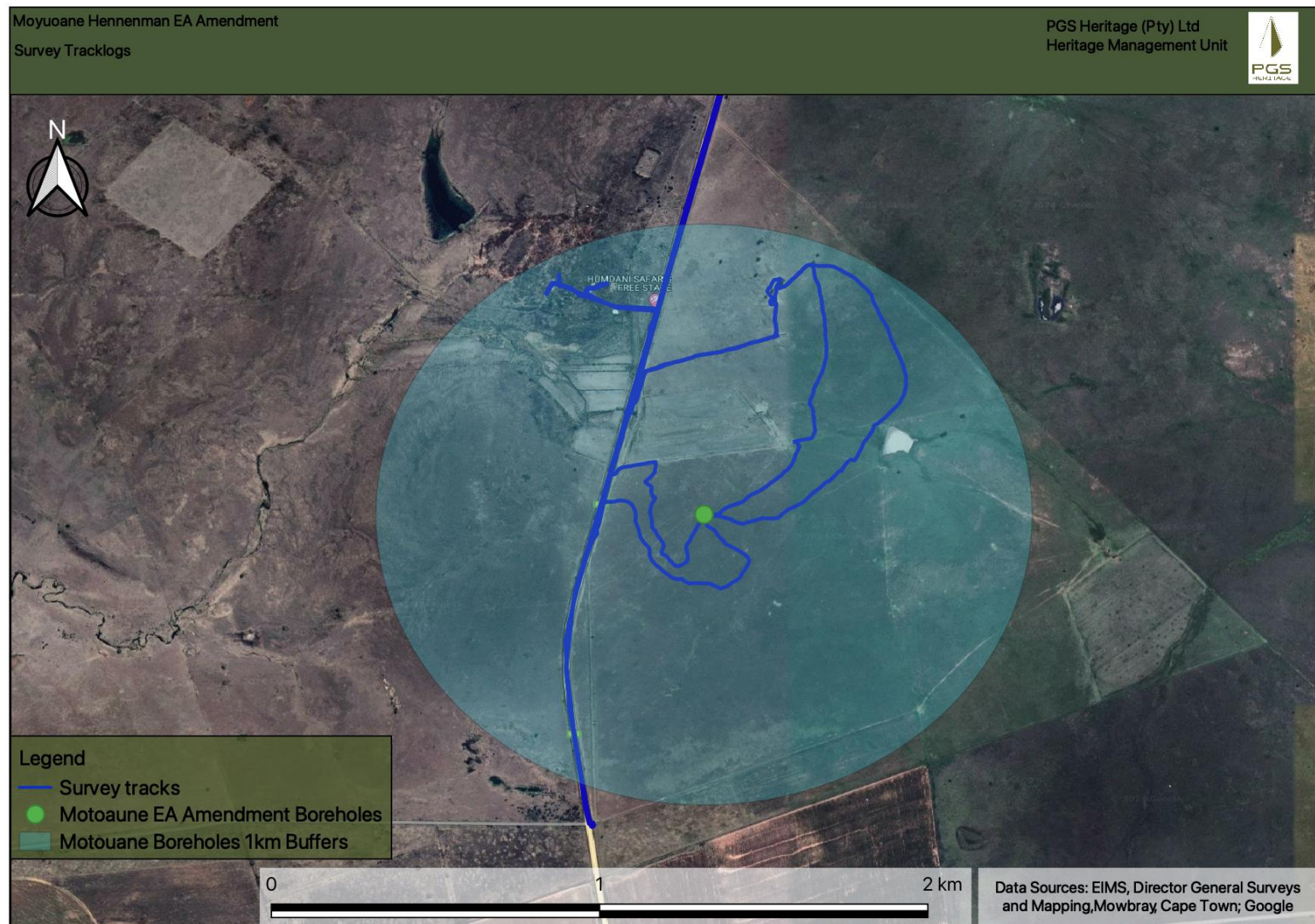


Figure 38 – Fieldwork tracklogs for borehole RSF2

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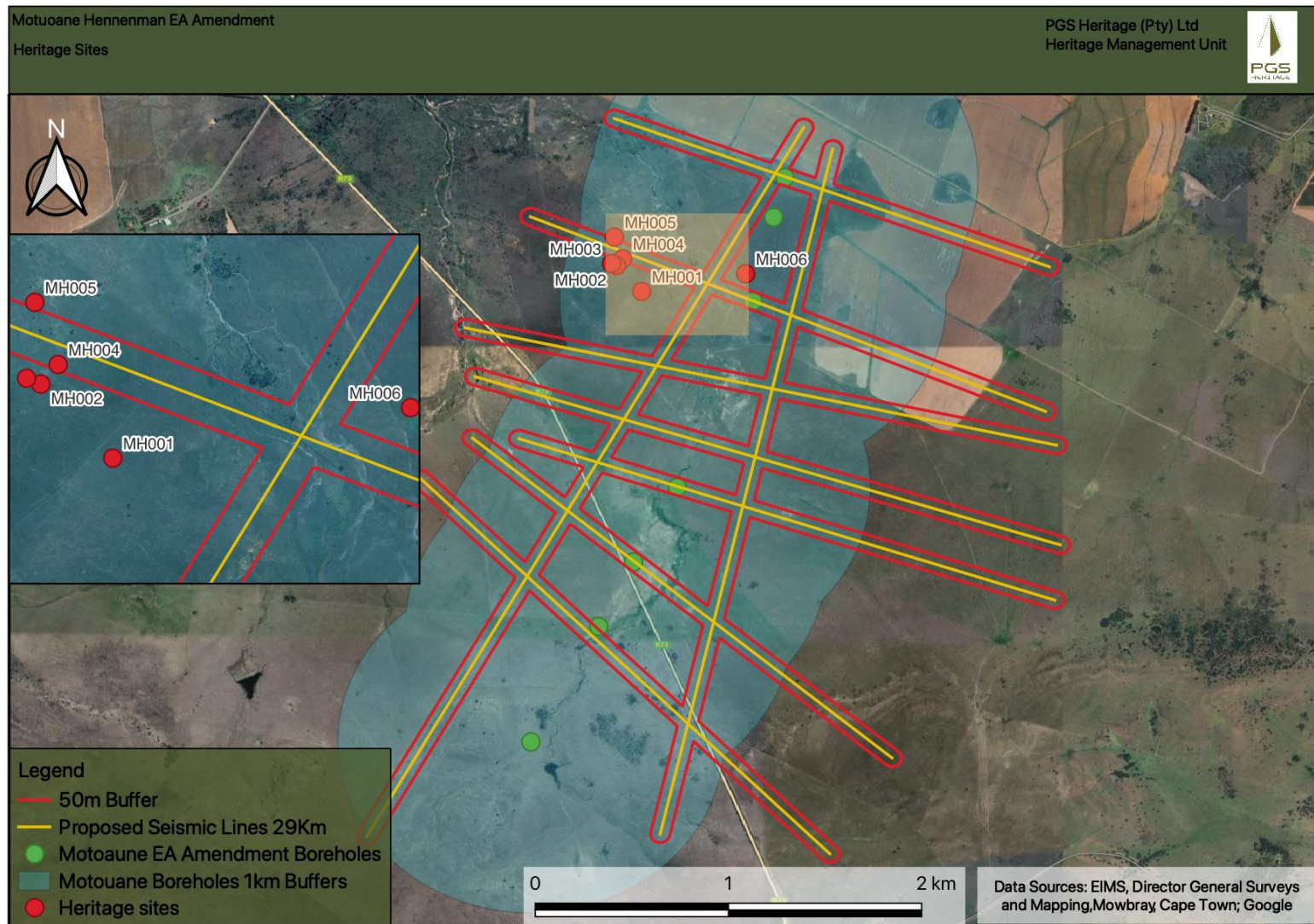


Figure 39 - Identified heritage resources within the exploration rights area.

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Figure 40 – Identified heritage resources within the buffer zone of boreholes Nooitgedacht M2 and Wildskamp 5

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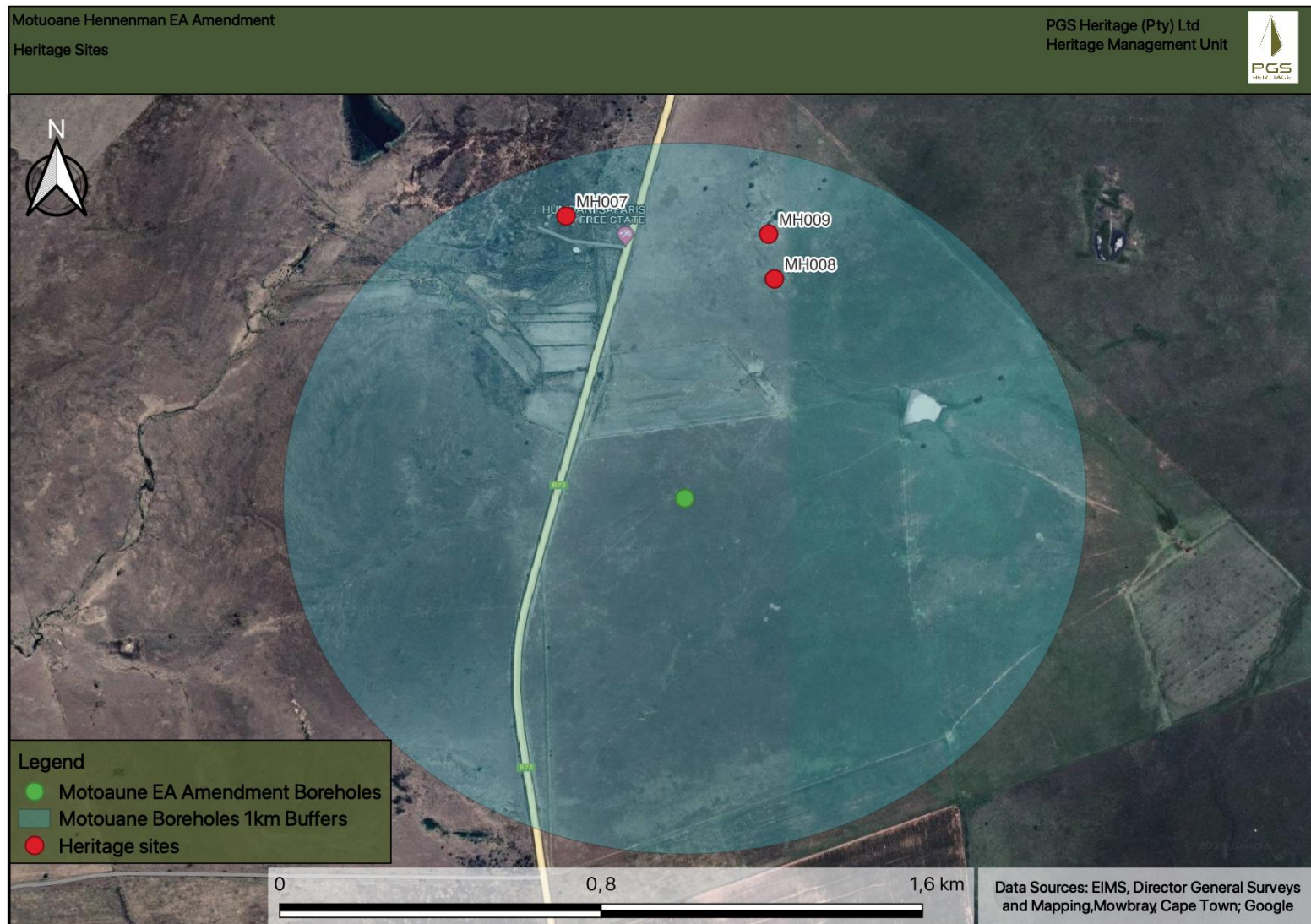


Figure 41 – Identified heritage resources within the buffer zone of borehole RSF2

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Figure 42 - View of the burial ground at MH001



Figure 43 – View of the head stone at MH001



Figure 44 - View of the burial ground at MH003



Figure 45 – Midden at MH004

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Figure 46 – Grinding stone at MH005



Figure 47 - Burial ground at MH007



Figure 48 - Burial ground at MH010

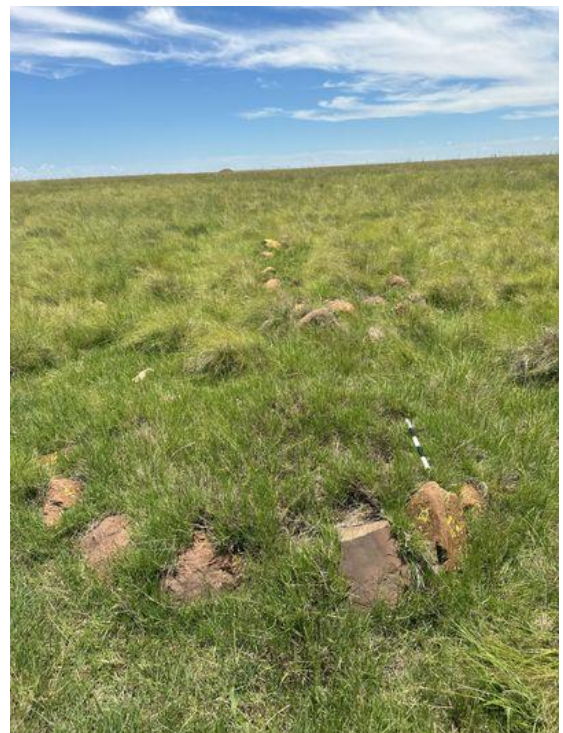


Figure 49 - Burialground at MH011

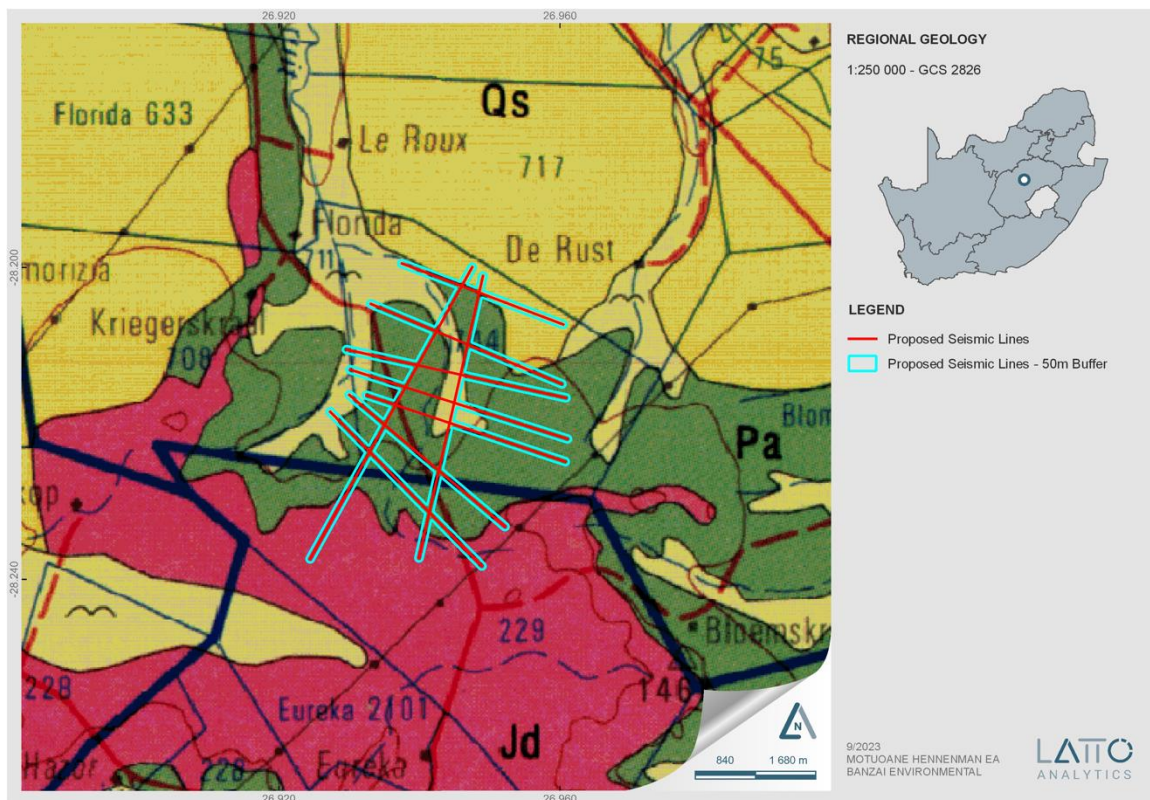
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4.4 Palaeontology

Banzai Environmental was appointed by PGS to conduct the PIA for the project area. According to this PIA (Butler 2023), the study area is underlain by Quaternary deposits, while the largest portion of the development is underlain by the Adelaide Subgroup (Beaufort Group, Karoo Supergroup). Jurassic dolerite is present in the southern portion of the development. The PalaeoMap of the South African Heritage Resources Information System (SAHRIS) indicates that the Palaeontological Sensitivity of Quaternary sediments is Moderate, that of the Adelaide Subgroup is Very High while the Palaeontological Sensitivity of Jurassic dolerite is Zero as it is igneous in origin and thus unfossiliferous (Almond and Pether, 2009; Almond et al., 2013). The Palaeontological Sensitivity generated by the National Environmental Web-Based Screening Tool indicates that the Sensitivity of the proposed development is Very High. Updated Geology (Council of Geosciences) refined the geology and indicates that the proposed development is underlain by alluvium, colluvium, eluvium and gravel as well as the Balfour Formation (Adelaide Subgroup, Beaufort Group) and Jurassic dolerite (Groenewald et al., 2014).

A site-specific field survey of the development footprint was conducted on foot and by motor vehicle on 12 September 2023. No fossiliferous outcrop was detected in the proposed development. This could be attributed to the lack of outcrops as well as the lush grassy vegetation in the area. Based on the site investigation as well as desktop research it is concluded that fossil heritage of scientific and conservational interest in the development footprint is rare. This is in contrast with the High Sensitivity allocated to the development area by the SAHRIS Palaeosensitivity Map and DFFE Screening Tool. A medium Palaeontological Significance has been allocated for the construction, operational and decommissioning phases of the development.

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Figure 51 - Extract of the 1 in 250 000 SAHRIS PalaeoMap (Council of Geosciences) indicating the proposed study area near Hennenman in the Free State

Table 6: Palaeontological Sensitivity according to the SAHRIS PalaeoMap (Almond et al, 2013; SAHRIS website (Butler, 2023)

| 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. |

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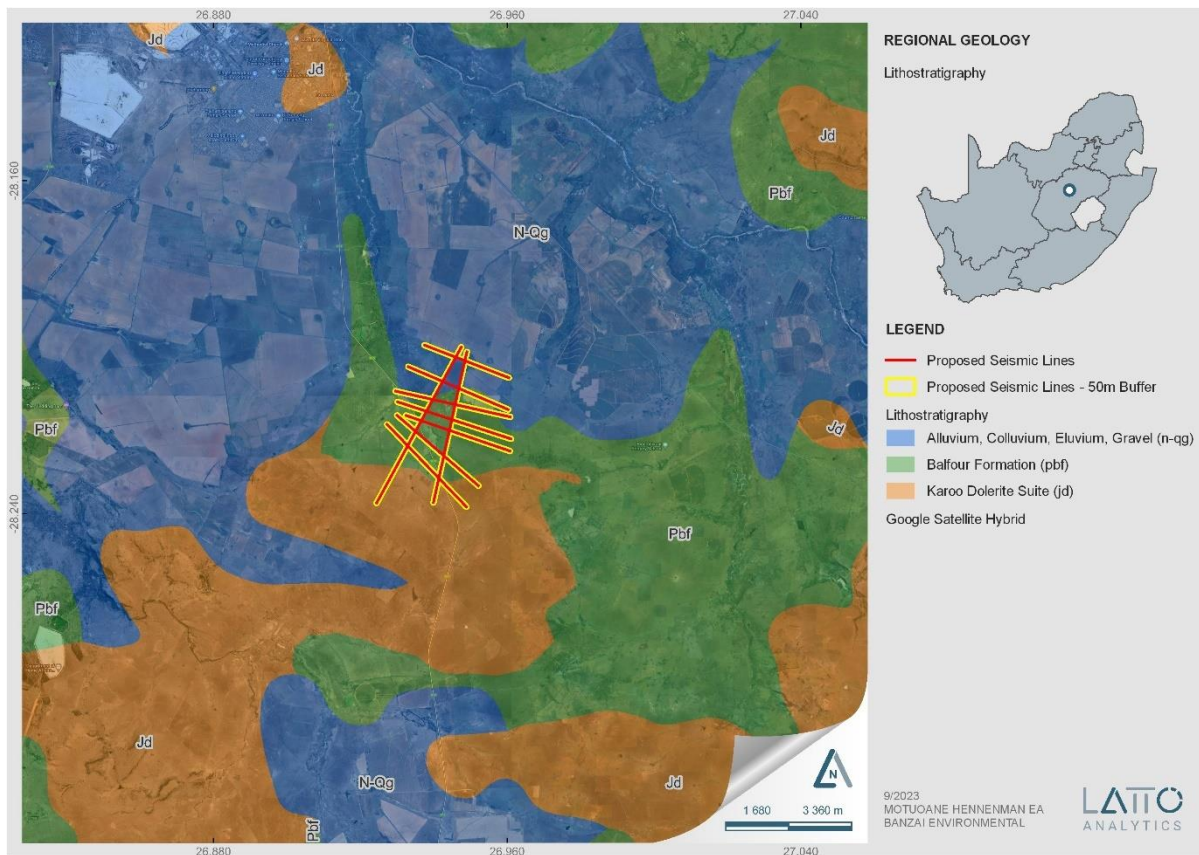


Figure 52 - Updated Geology (Council of Geosciences, Pretoria) of the proposed study area near Hennenman in the Free State indicates that the development is mostly underlain by alluvium, colluvium eluvium and gravel (n-qg), the Balfour Formation (pbf) as well as Karoo Dolerite (jd).

5 IMPACT ASSESSMENT

The impact assessment rating is based on the rating scale as contained in **Appendix B**.

The following section provides an analysis of the impact of the proposed project area on heritage resources identified within the Motuoane Hennenman exploration footprint.

5.1 Details of all alternatives considered.

This section describes alternative means of carrying out the operation and the consequences of not proceeding with the proposed project.

No alternatives are considered. The exploration area of interest is suitable from a heritage perspective.

The “no-go” alternative refers to the option of not going ahead with the proposed project. This will entail maintaining the current status quo with no impact from the project.

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5.1.1 *Burial grounds and graves*

The burial grounds at sites **MH001**, **MH003**, **MH007**, **MH010** and **MH011** have a HIGH local heritage significance with IIIA heritage grading. The possibility of the burial grounds being impacted by the proposed exploration cannot be excluded and the project can potentially have a MODERATE impact without mitigation. Implementation of the recommended management and mitigation measures can reduce the impact rating to LOW.

5.1.2 *Historical Structures*

The impact on the homesteads identified during the fieldwork is calculated as having a HIGH significance before and LOW significance after the implementation of the proposed mitigation measures.

The stone built remains of the structures **MH002** and **MH006** is possibly related to the depicted structures on the 1945 Virginia maps and most likely older than 60 years (**Section 4.2.1**). The structure remains themselves are not conservation worthy. However, they are associated with an earlier 20th century farm worker settlement and the possibility of stillborn burials around the structures (including site **MH009**) must be considered. As per African custom stillborn children are buried against the outside wall/foundation or inside the house. The structures (**MH002**, **MH006** and **MH009**) must then provisionally grade as Grade IIIA.

5.1.3 *Middens*

The midden located at **MH004** appears to be historical, however the possibility of infant burials cannot be excluded. The midden is therefor given a grade IIIA rating and should be avoided.

5.1.4 *Palaeontology*

As the No-Go Alternative considers the option of 'do nothing' and maintaining the status quo, it will have a Neutral impact on the Palaeontological Heritage of the development. The Cumulative impacts of the development near Kroonstad is medium pre- mitigation and Low post mitigation and falls within the considered sensitive in terms of palaeontological resources. It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils.

If fossil remains are discovered during any phase of construction, either on the surface or exposed by excavations the Chance Find Protocol must be implemented by the ECO/site manager in charge of these developments. These discoveries ought to be protected (if possible, in situ) and the ECO/site manager must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation (recording and collection) can be carry out by a palaeontologist.

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Preceding any collection of fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum standards for palaeontological impact studies suggested by SAHRA.

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5.2 Impact assessment summary table

Implementing the impact assessment methodology as supplied by the EIMS. **Table 7** and **Table 8** provides a quantitative assessment of the impacts of the proposed powerline options.

The pre-mitigation impact on the identified burial grounds and middens located within the footprint of the exploration area is calculated as MEDIUM negative and only focused during the operation of the seismic activities and proposed boreholes. Implementation of the recommended mitigation measures will reduce the impact to LOW positive.

The pre-mitigation impact on the identified structures located within the footprint of the exploration area is calculated as MEDIUM negative and only focused during the operation of the seismic activities and proposed boreholes. Implementation of the recommended mitigation measures will reduce the impact to LOW positive.

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Table 7: Impact Table – Burial grounds

| IMPACT DESCRIPTION | | | | Pre-Mitigation | | | | | | | Post Mitigation | | | | | | | | Priority Factor Criteria | | | |
|--------------------|----------------|---------------|-----------|----------------|--------|----------|-----------|---------------|-------------|-------------------|-----------------|--------|----------|-----------|---------------|-------------|--------------------|------------|--------------------------|--------------------|-----------------|-------------|
| Identifier | Impact | Alternative | Phase | Nature | Extent | Duration | Magnitude | Reversibility | Probability | Pre-mitigation ER | Nature | Extent | Duration | Magnitude | Reversibility | Probability | Post-mitigation ER | Confidence | Cumulative Impact | Irreplaceable loss | Priority Factor | Final score |
| 10.1.1 | Burial Grounds | Alternative 1 | Operation | -1 | 3 | 5 | 5 | 5 | 1 | -4,5 | 1 | 3 | 5 | 2 | 5 | 1 | 3,75 | High | 1 | 3 | 1,25 | 4,6875 |
| 10.1.2 | Midden | Alternative 1 | Operation | -1 | 3 | 5 | 5 | 5 | 1 | -4,5 | 1 | 3 | 5 | 2 | 5 | 1 | 3,75 | High | 1 | 3 | 1,25 | 4,6875 |

Table 8: Impact Table – Structures/homesteads

| IMPACT DESCRIPTION | | | | Pre-Mitigation | | | | | | | Post Mitigation | | | | | | | | Priority Factor Criteria | | | |
|--------------------|------------|---------------|-----------|----------------|--------|----------|-----------|---------------|-------------|-------------------|-----------------|--------|----------|-----------|---------------|-------------|--------------------|------------|--------------------------|--------------------|-----------------|-------------|
| Identifier | Impact | Alternative | Phase | Nature | Extent | Duration | Magnitude | Reversibility | Probability | Pre-mitigation ER | Nature | Extent | Duration | Magnitude | Reversibility | Probability | Post-mitigation ER | Confidence | Cumulative Impact | Irreplaceable loss | Priority Factor | Final score |
| 10.1.3 | Structures | Alternative 1 | Operation | -1 | 3 | 5 | 5 | 5 | 1 | -4,5 | 1 | 3 | 5 | 2 | 5 | 1 | 3,75 | High | 1 | 3 | 1,25 | 4,6875 |

Table 9: Impact Table – Palaeontology

| IMPACT DESCRIPTION | | | | Pre-Mitigation | | | | | | | Post Mitigation | | | | | | | | Priority Factor Criteria | | | |
|--------------------|---------------|---------------|--------------|----------------|--------|----------|-----------|---------------|-------------|-------------------|-----------------|--------|----------|-----------|---------------|-------------|--------------------|------------|--------------------------|--------------------|-----------------|-------------|
| Identifier | Impact | Alternative | Phase | Nature | Extent | Duration | Magnitude | Reversibility | Probability | Pre-mitigation ER | Nature | Extent | Duration | Magnitude | Reversibility | Probability | Post-mitigation ER | Confidence | Cumulative Impact | Irreplaceable loss | Priority Factor | Final score |
| 10.1.4 | Palaeontology | Alternative 1 | Construction | 1 | 1 | 5 | 2 | 5 | 4 | 13 | 1 | 1 | 5 | 1 | 3 | 2 | 5 | Medium | 2 | 3 | 1,38 | 6,875 |

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6 MANAGEMENT RECOMMENDATIONS AND GUIDELINES

The following section must be read in conjunction with **Table 11** of this report.

6.1 Construction and operational phases

The project will undertake seismic surveys on the exploration right near Hennenman, Free State. The seismic survey involves placing lines of geophones (small surface instruments) along the defined transects and then having a vibration source (usually a small truck with a vibration pad) drive along the transects sending out vibrations through the pad into the ground approximately every 10 meters. The process may encompass other activities during the survey phase, including ground clearance. The addition of ten new exploration boreholes as part of the exploration right for hydrocarbons are also included.

It is possible that cultural material will be exposed during the survey phase and may be recoverable, keeping in mind delays can be costly during project timelines, and as such must be minimised. Development surrounding infrastructure and construction of facilities results in significant disturbance, however foundation holes do offer a window into the past and it thus may be possible to rescue some of the data and materials. Although no construction is intended for the scope of the survey, ground clearance or movement of vehicles through the project area could disturb cultural heritage.

Temporary infrastructure developments, such as construction camps and laydown areas, are often changed or added to the project as required. In general, these are low impact developments as they are superficial, resulting in little alteration of the land surface, but still need to be catered for.

During the construction phase, it is important to recognize any significant material being unearthed, making the correct judgment on which actions should be taken. It is recommended that the following chance find procedure should be implemented.

6.2 Chance finds procedure

- A heritage practitioner / archaeologist should be appointed to develop a heritage induction program and conduct training for the ECO as well as team leaders in the identification of heritage resources and artefacts **during the implementation of the EMPr.**
- An appropriately qualified heritage practitioner / archaeologist must be identified to be called upon in the event that any possible heritage resources or artefacts are identified.
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities halted.

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- The qualified heritage practitioner / archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and the impact on the heritage resource.
- The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the materials and data are recovered.
- Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner / archaeologist.

6.3 Possible finds during construction

The study area occurs within a greater historical and archaeological site as identified during the desktop and fieldwork phase. Soil clearance for infrastructure as well as the proposed reclamation activities, could uncover the following:

- Historical structures and foundations
- unmarked burial grounds and graves
- Archaeological features (Iron Age or Stone Age)

6.4 Timeframes

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for collection or excavation of heritage resources and lead times must be worked into the construction time frames. **Table 10** gives guidelines for lead times on permitting.

Table 10: Lead times for permitting and mobilisation

| Action | Responsibility | Timeframe |
|--|---|-----------|
| Preparation for field monitoring and finalisation of contracts | The contractor and service provider | 1 month |
| Application for permits to do necessary mitigation work | Service provider – Archaeologist and SAHRA | 3 months |
| Documentation, excavation and archaeological report on the relevant site | Service provider – Archaeologist | 3 months |
| Handling of chance finds – Graves/Human Remains | Service provider – Archaeologist and SAHRA | 2 weeks |
| Relocation of burial grounds or graves in the way of the development | Service provider – Archaeologist, SAHRA, local government and provincial government | 6 months |

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6.5 Heritage Management Plan for EMPr implementation

Table 11: Heritage Management Plan for EMPr implementation

| Area and site no. | Mitigation measures | Phase | Timeframe | The responsible party for implementation | Monitoring Party (frequency) | Target | Performance indicators (monitoring tool) |
|--|---|--------------|---------------------|---|-------------------------------------|---|--|
| General project area | Implement a chance to find procedures in case where possible heritage finds are uncovered. | Construction | During construction | Applicant ECO Heritage Specialist | ECO (monthly / as or when required) | Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34-36 and 38 of NHRA | ECO Monthly Checklist/Report |
| Burial grounds and graves | All burial grounds and graves should be retained and avoided with a buffer zone of 30m as per SAHRA guidelines. If this is not possible, the graves could be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component, adhering to the requirements of s36 of the NHRA and its regulations as well as the National Health Act and its regulations. | Construction | During Construction | Applicant Environmental Control Officer (ECO) Heritage specialist | During survey. Monthly | Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA | ECO Monthly Checklist/Report |
| Historical Structures/ homesteads | As the structures are associated with an earlier 20 th century farm worker settlement, the possibility of stillborn burials around the structure must be considered. All burial grounds and graves should be retained and avoided with a buffer zone of 30m as per SAHRA guidelines. If this is not possible, the graves could be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component, adhering to the | Construction | During Construction | Applicant Environmental Control Officer (ECO) Heritage specialist | During survey. Monthly | Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA | ECO Monthly Checklist/Report |

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| Area and site no. | Mitigation measures | Phase | Timeframe | The responsible party for implementation | Monitoring Party (frequency) | Target | Performance indicators (monitoring tool) |
|----------------------|---|--------------|---------------------|---|------------------------------|---|--|
| | requirements of s36 of the NHRA and its regulations as well as the National Health Act and its regulations. | | | | | | |
| Palaeontology | <p>If fossil remains are discovered during any phase of construction, either on the surface or exposed by excavations the Chance Find Protocol must be implemented by the ECO/site manager in charge of these developments. These discoveries ought to be protected (if possible, <i>in situ</i>) and the ECO/site manager must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation (recording and collection) can be carry out by a paleontologist.</p> <p>Preceding any collection of fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum standards for palaeontological impact studies suggested by SAHRA.</p> | Construction | During construction | Applicant Environmental Control Officer (ECO) Palaeontological specialist | During survey. Monthly | Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 of NHRA | ECO Monthly Checklist/Report |

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7 CONCLUSIONS AND RECOMMENDATIONS

PGS Heritage (Pty) Ltd (PGS) was appointed by Environmental Impact Management Services (Pty) Ltd (EIMS) to undertake a Heritage Impact Assessment (HIA) that forms part of the Part II EA Amendment for the Motuoane Hennenman exploration project to assess the expansion of ten exploration boreholes and ~30km of nine new seismic transects within the approved Motuoane Hennenman Exploration Right Footprint on Farms Palmiet Fontein 229, Détente 744, Kriegers Kraal 708, Siberiasfontein 605 and Nooitgedacht 245, Lejweleputswa District Municipality, Freestate Province

A further standalone Palaeontological Impact Assessment (PIA) was completed for PGS by Dr Elize Butler of Banzai Environmental.

During the fieldwork a total of **eleven** heritage features and resources were identified (**Figure 39 - Figure 41**). These consist of **five** burial grounds (**MH001, MH003, MH007, MH010 and MH011**), **three** foundation remains (**MH002, MH006 and MH009**) of a stone-built structures or homestead, one midden (**MH004**), one kraal (**MH008**) and one grinding stone (**MH005**). See **Figure 42 - Figure 49** and the individual site descriptions as contained in **Appendix C**. The field description forms were collected with ArcGIS Survey123 in field software.

7.1 Historical Structures/homesteads and kraals

The stone built remains of structure **MH002** and **MH006** is possibly related to the depicted structures on the 1945 maps and most likely older than 60 years (Section 4.2.1). The structure remains themselves are not conservation worthy. However, it is associated with an earlier 20th century farm worker settlement and the possibility of stillborn burials around the structures must be considered. As per African custom stillborn children are buried against the outside wall/foundation or inside the house. The structures (**MH002, MH006 and MH009**) must then provisionally grade as Grade IIIA. All burial grounds and graves should be retained and avoided with a buffer zone of 30m as per SAHRA guidelines. If this is not possible, the graves could be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component, adhering to the requirements of s36 of the NHRA and its regulations as well as the National Health Act and its regulations. The kraal at **MH008** is not depicted on the first edition maps and is not considered conservation worthy.

7.2 Archaeological Site

The historical midden and griding stone. Middens could contain still born burials and therefore provisionally graded as Grade IIIA. The grinding stone is not conservation-worthy.

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7.3 Burial grounds and graves

Five burial grounds were located. All burial grounds and graves should be retained and avoided with a buffer zone of 30m as per SAHRA guidelines. If this is not possible, the graves could be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component, adhering to the requirements of s36 of the NHRA and its regulations as well as the National Health Act and its regulations.

MH001 – approximately 15-18 graves.

MH003 – approximately 2 graves.

MH007 – approximately 4 graves

MH010 – approximately 1 grave, possibly more

MH011 – approximately 1 grave, possibly more

7.4 Palaeontology

A site-specific field survey of the development footprint was conducted on foot and by motor vehicle on 12 September 2023. No fossiliferous outcrop was detected in the proposed development. This could be attributed to the lack of outcrops as well as the lush grassy vegetation in the area. Based on the site investigation as well as desktop research it is concluded that fossil heritage of scientific and conservational interest in the development footprint is rare.

7.5 Mitigation measures

Mitigation measures are described in **Table 11** of this report.

7.6 General

It is the combined considered opinion of the heritage specialists that the proposed project will not have a direct impact on the identified heritage resources, rated being of low to high heritage significance.

With the implementation of recommended mitigation measures the overall impact on heritage resources will be reduced to acceptable levels during the activities of the project.

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8.3 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.

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8.5 Google Earth

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

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APPENDIX A

ENVIRONMENTAL IMPACT METHODOLOGY

ENVIRONMENTAL IMPACT MANAGEMENT SERVICES (EIMS): IMPACT ASSESSMENT METHODOLOGY

| | | | | | | |
|---------------|---|----------------|---------|-------------|----|-------------|
| TITLE: | ENVIRONMENTAL IMPACT ASSESSMENT RATING PROCEDURE | DOC No: | PRO 106 | REV: | 00 | Page 2 of 7 |
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1. Purpose

The purpose of this procedure is to guide the undertaking of an impact and risk assessment process, as required under the regulations promulgated under the National Environmental Management Act (Act 107 of 1998 - NEMA).

2. Scope

This procedure provides the methodology to be applied to environmental impacts and risks identified during the Environmental Impact Assessment Process. The methodology ensures that consistent impact assessment rating is carried out that is legally compliant and aligned with EIMS's objective of providing a quality service.

3. References

GNR. 982 National Environmental Management Act (Act No. 107 of 1998): Environmental Impact Assessment Regulations, 2014 – hereafter referred to as the Regulations.

4. Additional Guidelines and References

| Guidelines and Reference Docs (not exhaustive – please verify with the applicable competent authority). | |
|--|----------|
| Compulsory Compliance: GNR. 982 National Environmental Management Act (Act No. 107 of 1998 - NEMA): Environmental Impact Assessment Regulations, 2014. | National |
| Companion Guideline for Implementation: Environmental Management Assessment Regulations, 2010 - GN 805/2012 (NEMA) | National |
| DEAT (2002) Impact Significance, Integrated Environmental Management, Information Series 5, Department of Environmental Affairs and Tourism (DEAT), Pretoria | National |

5. Definitions and Abbreviations

Refer to Chapter 1 of the Regulations.

6. Procedure

The impact significance rating methodology, as presented herein and utilised for all EIMS Impact Assessment Projects, is guided by the requirements of the NEMA EIA Regulations 2014 (as amended). The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/ likelihood (P) of the impact occurring. The ER is determined for the pre- and post-mitigation scenario. In addition, other factors, including cumulative impacts and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the overall significance (S). The impact assessment will be applied to all identified alternatives.

a. Determination of Environmental Risk

The significance (S) of an impact is determined by applying a prioritisation factor (PF) to the environmental risk (ER). The environmental risk is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and Reversibility (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$C = \frac{(E + D + M + R) * N}{4}$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 1 below.

Table 1: Criteria for Determining Impact Consequence

| Aspect | Score | Definition |
|--------|-------|------------|
|--------|-------|------------|

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| | | |
|-----------------------------|-----|---|
| Nature | - 1 | Likely to result in a negative/ detrimental impact |
| | +1 | Likely to result in a positive/ beneficial impact |
| Extent | 1 | Activity (i.e. limited to the area applicable to the specific activity) |
| | 2 | Site (i.e. within the development property boundary) |
| | 3 | Local (i.e. the area within 5 km of the site) |
| | 4 | Regional (i.e. extends between 5 and 50 km from the site) |
| | 5 | Provincial / National (i.e. extends beyond 50 km from the site) |
| Duration | 1 | Immediate (<1 year) |
| | 2 | Short term (1-5 years) |
| | 3 | Medium term (6-15 years) |
| | 4 | Long term (15-65 years, the impact will cease after the operational life span of the project) |
| | 5 | Permanent (>65 years, no mitigation measure of natural process will reduce the impact after construction) |
| Magnitude/ Intensity | 1 | Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected) |
| | 2 | Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected) |
| | 3 | Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way, moderate improvement for +ve impacts) |
| | 4 | High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease, high improvement for +ve impacts) |
| | 5 | Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease, substantial improvement for +ve impacts) |
| Reversibility | 1 | Impact is reversible without any time and cost. |
| | 2 | Impact is reversible without incurring significant time and cost. |
| | 3 | Impact is reversible only by incurring significant time and cost. |
| | 4 | Impact is reversible only by incurring prohibitively high time and cost. |
| | 5 | Irreversible Impact. |

Once the C has been determined, the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/ scored as per Table 2.

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Table 2: Probability Scoring

| | | |
|-------------|---|--|
| Probability | 1 | Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%), |
| | 2 | Low probability (there is a possibility that the impact will occur; >25% and <50%), |
| | 3 | Medium probability (the impact may occur; >50% and <75%), |
| | 4 | High probability (it is most likely that the impact will occur- > 75% probability), or |
| | 5 | Definite (the impact will occur), |

The result is a qualitative representation of relative ER associated with the impact. ER is therefore calculated as follows:

$$ER = C \times P$$

Table 3: Determination of Environmental Risk

| | | | | | | |
|-------------|---|---|----|----|----|----|
| Consequence | 5 | 5 | 10 | 15 | 20 | 25 |
| | 4 | 4 | 8 | 12 | 16 | 20 |
| | 3 | 3 | 6 | 9 | 12 | 15 |
| | 2 | 2 | 4 | 6 | 8 | 10 |
| | 1 | 1 | 2 | 3 | 4 | 5 |
| | | 1 | 2 | 3 | 4 | 5 |
| Probability | | | | | | |

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described in Table 4.

Table 4: Environmental Risk Scores

| ER Score | Description |
|----------|--|
| <9 | Low (i.e. where this impact is unlikely to be a significant environmental risk/ reward). |
| ≥9 ≤17 | Medium (i.e. where the impact could have a significant environmental risk/ reward), |
| >17 | High (i.e. where the impact will have a significant environmental risk/ reward). |

The impact ER will be determined for each impact without relevant management and mitigation measures (pre-mitigation), as well as post implementation of relevant management and mitigation measures (post-mitigation). This allows for a prediction in the degree to which the impact can be managed/mitigated.

b. Impact Prioritisation

Further to the assessment criteria presented in the section above, it is necessary to assess each potentially significant impact in terms of:

1. Cumulative impacts; and
2. The degree to which the impact may cause irreplaceable loss of resources.

To ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impact ER (post-mitigation). This prioritisation factor does not aim to detract from the risk ratings but rather to focus the attention of the

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decision-making authority on the higher priority/significance issues and impacts. The PF will be applied to the ER score based on the assumption that relevant suggested management/mitigation impacts are implemented.

Table 5: Criteria for Determining Prioritisation

| | | |
|---|------------|--|
| Cumulative Impact (CI) | Low (1) | Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change. |
| | Medium (2) | Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change. |
| | High (3) | Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/ definite that the impact will result in spatial and temporal cumulative change. |
| Irreplaceable Loss of Resources (LR) | Low (1) | Where the impact is unlikely to result in irreplaceable loss of resources. |
| | Medium (2) | Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited. |
| | High (3) | Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions). |

The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in Table 5. The impact priority is therefore determined as follows:

$$Priority = CI + LR$$

The result is a priority score which ranges from 2 to 6 and a consequent PF ranging from 1 to 1.5 (Refer to Table 6).

Table 6: Determination of Prioritisation Factor

| Priority | Prioritisation Factor |
|----------|-----------------------|
| 2 | 1 |
| 3 | 1.125 |
| 4 | 1.25 |
| 5 | 1.375 |
| 6 | 1.5 |

In order to determine the final impact significance, the PF is multiplied by the ER of the post mitigation scoring. The ultimate aim of the PF is an attempt to increase the post mitigation environmental risk rating by a factor of 0.5, if all the priority attributes are high (i.e. if an impact comes out with a high medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance).

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Table 7: Final Environmental Significance Rating

| Significance Rating | Description |
|---------------------|---|
| <-17 | High negative (i.e. where the impact must have an influence on the decision process to develop in the area). |
| ≥-17, ≤-9 | Medium negative (i.e. where the impact could influence the decision to develop in the area). |
| >-9, <0 | Low negative (i.e. where this impact would not have a direct influence on the decision to develop in the area). |
| 0 | No impact |
| >0, <9 | Low positive (i.e. where this impact would not have a direct influence on the decision to develop in the area). |
| ≥9, ≤17 | Medium positive (i.e. where the impact could influence the decision to develop in the area). |
| >17 | High positive (i.e. where the impact must have an influence on the decision process to develop in the area). |

The significance ratings and additional considerations applied to each impact will be used to provide a quantitative comparative assessment of the alternatives being considered. In addition, professional expertise and opinion of the specialists and the environmental consultants will be applied to provide a qualitative comparison of the alternatives under consideration. This process will identify the best alternative for the proposed project.

7. Responsibilities

It is the responsibility of each EIMS employee and each external Specialist appointed by EIMS to ensure that this procedure is carried out as described. All the personnel within the organization have the responsibility to report any deviations/changes from the procedures to management. This is to ensure that the necessary changes are documented after approval.

It is the responsibility of the senior/ junior consultant (as applicable) assigned with the task of report compilation to ensure that this methodology/ procedure is strictly applied. It is the responsibility of the assigned Senior Consultant or Quality Reviewer to review and verify that the procedure has been complied with, and such documented at the specified quality check intervals.

8. Records

| RECORD | STORAGE LOCATION | STORAGE SYSTEM | RESPONSIBLE PERSON | RETENTION PERIOD |
|---------------------------------------|--|-------------------------|--------------------|------------------|
| Significance Rating Input Spreadsheet | Project File - /Server/assignments/ Job#/Records | Electronic- Scanned PDF | Project Manager | 10 Years |

9. Record of Changes, Revisions and Cancellations


| RECORD OF CHANGES, REVISIONS AND CANCELLATIONS | | |
|--|---------------------------|---------|
| DATE | NATURE / DETAIL OF CHANGE | REV No. |
| | | |

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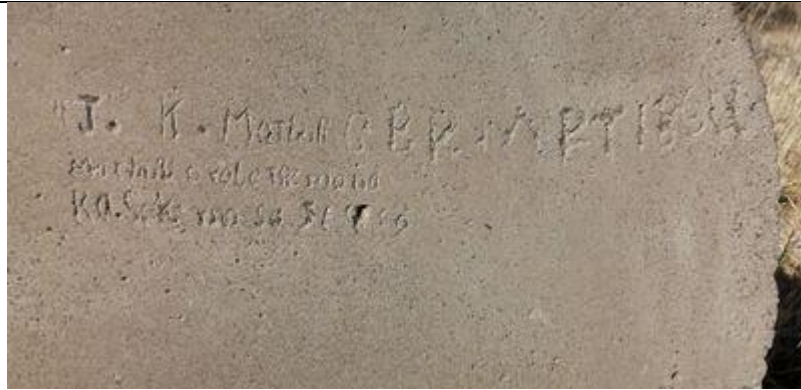
APPENDIX B
SITE DESCRIPTION FORMS

| Site coordinates | | |
|------------------|-----------|----------|
| site_nr | X | Y |
| MH001 | -28.20861 | 26.93894 |
| MH002 | -28.20725 | 26.93762 |
| MH003 | -28.20714 | 26.93736 |
| MH004 | -28.20689 | 26.93794 |
| MH005 | -28.20574 | 26.93751 |
| MH006 | -28.20768 | 26.94443 |
| MH007 | -28.26223 | 26.93978 |
| MH008 | -28.26383 | 26.94507 |
| MH009 | -28.26269 | 26.94493 |
| MH010 | -27.83521 | 26.87906 |
| MH011 | -27.8365 | 26.87872 |



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| Site Number | Coordinates | Brief Site Description | Significance |
|---|---------------------------|--|--------------------|
| MH001 | -28.20861 26.93894 | Stone packed burial ground, approximately 15-20 graves. Neglected, no signs of maintenance or clearing. Orientation is East to West. 4 graves with formal concrete headstones including inscriptions. All other graves have a bottom and top vertical stone markers. -La Sa Ro Mo Thuli 16-1-1955 48 Jear (so 1907 b.d.) -JK Mothuli - Martha Ramaholu Born 6-8-1856 Dead 16-12-1949 | Grade 3 - A (IIIA) |
|  | | | |





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| Site Number | Coordinates | Brief Site Description | Significance |
|--|---------------------------|--|--------------------|
| MH002 | -28.20725 26.93762 | Historical rock built rectangular structure. Collapsed. Only foundations of the structure remain. Possibly small homestead or kraal associated with the burial ground at MH001. The potential of still born burials must be considered. | Grade 3 - A (IIIA) |
| <div></div> | | | |

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| Site Number | Coordinates | Brief Site Description | Significance |
|--|---------------------------|--|--------------------|
| MH003 | -28.20714 26.93736 | 1-2 stone packed graves. 1 with a bottom grave marker. No headstones are present. The graves are orientated E to W. The site occurs within 20m of MH002. | Grade 3 - A (IIIA) |
| <div></div> | | | |

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| Site Number | Coordinates | Brief Site Description | Significance |
|--|---------------------------|---|--------------------|
| MH004 | -28.20689 26.93794 | Small midden near MH002 and MH003. Contains ash, glass, metal and ceramic. The potential of still born burials must be considered. | Grade 3 - C (IIIC) |
| <div></div> <div></div> | | | |

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| Site Number | Coordinates | Brief Site Description | Significance |
|-------------|---------------------------|--|--------------------|
| MH005 | -28.20574 26.93751 | Possible grinding stone. Clear use ware is indented into the stone. In the same vicinity of MH002,003,004. | Grade 3 - C (IIIC) |



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| Site Number | X | Y | Brief Site Description | Significance | Heritage Rating |
|-------------|-----------|----------|--|--------------|--------------------|
| MH006 | -28.20768 | 26.94443 | Stone wall foundations of a homestead. Stones are very scattered and no discernible shape can be seen. | | Grade 3 - A (IIIA) |

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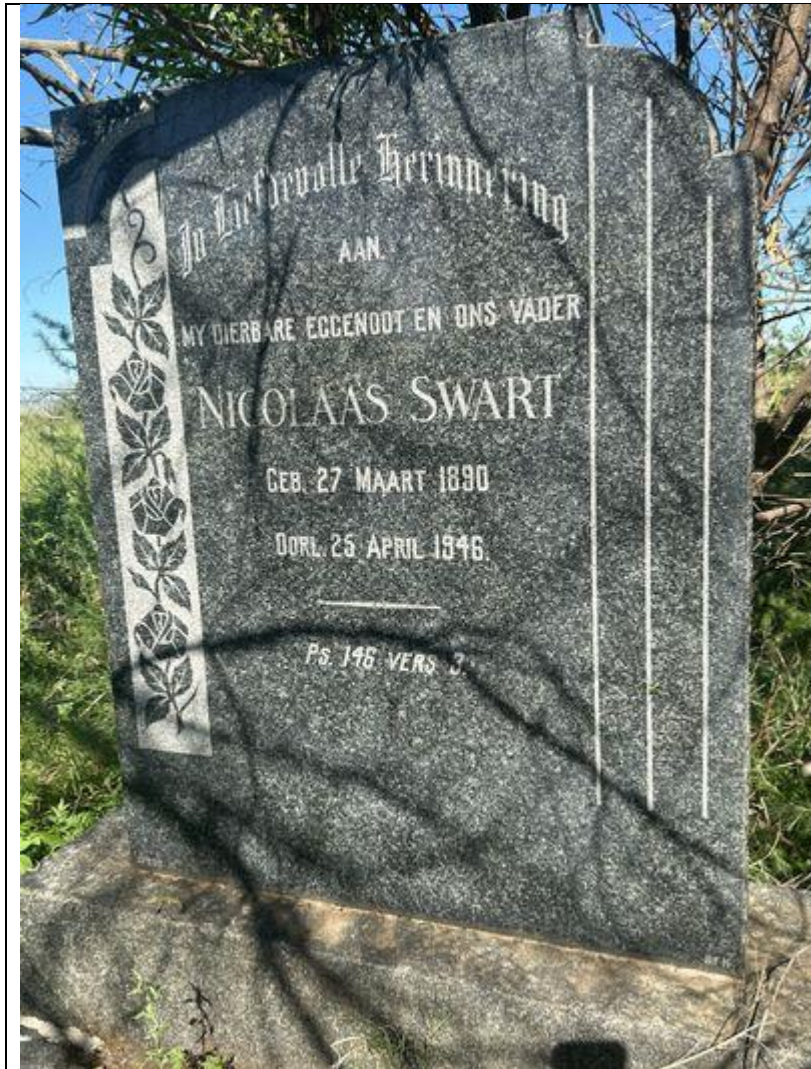


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| Site Number | X | Y | Brief Site Description | Significance | Heritage Rating |
|-------------|-----------|----------|---|--------------|--------------------|
| MH007 | -28.26223 | 26.93978 | Demarcated area which is heavily overgrown. One grave is visible. There does not appear to be more graves, but the thick vegetation makes it difficult to assess. One grave is a formal grave with granite headstone and frame. Nicolaas Swart 27 Maart 1890 - 26 April 1946. | | Grade 3 - A (IIIA) |

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Figure 54 - Burial ground at MH007

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| Site Number | X | Y | Brief Site Description | Significance | Heritage Rating |
|-------------|-----------|----------|--|--------------|--------------------|
| MH008 | -28.26383 | 26.94507 | Stone packed walled kraal, rectangular in shape. Mostly collapsed. | | Grade 3 - C (IIIC) |

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Figure 55 - Kraal at site MH008

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| Site Number | X | Y | Brief Site Description | Significance | Heritage Rating |
|-------------|-----------|----------|--|--------------|--------------------|
| MH009 | -28.26269 | 26.94493 | Several foundation remains of small homestead structures, square in shape. Approximately 7small structures about 3-5m in size. Metal objects scattered around. No sign of a definite midden. | | Grade 3 - A (IIIA) |

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Figure 56 - Foundation remains at site MH009

| Site Number | X | Y | Brief Site Description | Significance | Heritage Rating |
|-------------|-----------|----------|--|--------------|--------------------|
| MH010 | -27.83521 | 26.87906 | One single grave with metal marker. Joshua Barries 14-2-79. Current landowner states that a larger area was demarcated. Possibly more graves are present within this area. | | Grade 3 - A (IIIA) |

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Figure 57 - Single grave at site MH010

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| Site Number | X | Y | Brief Site Description | Significance | Heritage Rating |
|-------------|----------|----------|---|--------------|--------------------|
| MH011 | -27.8365 | 26.87872 | Three stone packed graves, possibly 4. One larger two possible child graves. All in a line vertically. Oriented east to west. No markers or formal dressings. | | Grade 3 - A (IIIA) |

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Figure 58 - Burial ground at site MH011

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APPENDIX C
PGS TEAM CVS

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PROFESSIONAL CURRICULUM VITAE FOR JESSICA ANGEL

Professional Archaeologist for PGS Heritage

Personal Details

- **Name:** Jessica
- **Surname:** Angel
- **Date of Birth:** 25-12-1983
- **Citizenship:** South African
- **Gender:** Female
- **Marital Status:** Single
- **Languages Spoken:** English and Afrikaans
- **Drivers Licence** Code B – competent 4x4 driver
- **First Aid** (Level 1)
- **Snake Handling and snake bite first aid** (March 2019. African Snakebite Institute – Johan Marias)

Education History

- **2002:** Matriculated from Northcliff High School with the following subjects: English, Afrikaans, Mathematics, Science, Biology and Art.
- **2005:** Completed BA at University of the Witwatersrand with Geography and Archaeology Majors.
- **2006:** Completed BSc Hons (Geography) at the University of the Witwatersrand with the following subjects: Environmental Management, Advanced Geographic Information Systems (GIS), Paleogeomorphology and Globalisation and Agro Food Restructuring.
- **2009 – 2013:** M.Sc Archaeology and Geography, with thesis title: *Mpumalanga Late Iron Age: Incorporating Geographic Information Systems (GIS) and Archaeological Data to Better Understand Spatial and Temporal Distribution of Past Societies*. (Graduated March 2014).

Employment History

- **2015 – current:** Senior Archaeologist – PGS Heritage
- **2012-2013:** Basic internship at PGS. Duties include gaining familiarity with gathering relevant background data, field surveys, exhumations and report writing.
- **2013:** Heritage work at NGT. Background research, report writing and ground surveys.
- **2011:** Research Assistant: GIS work for Prof Karim Sadr. Duties include: Google Earth survey work and digitising. (Sadr, K & Rodier, X. 2012. Google Earth, GIS and stone-walled structures in southern Gauteng, South Africa. *Journal of Archaeological Science* xxx: 1-9)

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Experience in the field of archaeology:

2012:

- First Phase Heritage Assessment. Belfast, Mpumalanga
- First Phase Heritage Assessment. Delareyville, Stone Age survey
- Heritage Assessment. Belfast Mpumalanga, Ndebele initiation site.

2013:

- Second Phase Impact Assessment. Pretoria East, Gauteng. Documentation and mapping the layout of an Iron Age site.
- Final Phase Impact Assessment. Grave Exhumation. Chlorkop, Gauteng
- First Phase Heritage Assessment. Belfast, Mpumalanga. Exxaro Paardeplaats Project.
- Grave Exhumation. Mafikeng. University of Pretoria research.
- First Phase Heritage Assessment. Port Nolloth, Namaqualand. Powerline.

2015

- Heritage inventory of the Ekuruleni area for Auracon
- Heritage Impact assessment, Heilbron, Freestate
- Second Phase Heritage Impact assessment. Documentation of an Iron age site, Rustenburg.
- Heritage Impact Assessment. Proposed Mining of the farm Zandvoort 10. Carolina, Mpumalanga. (SAHRIS CaseID:11952)
- Heritage Impact Assessment. The Rand en Dal Ext13 proposed development on Portion 29 of the Farm Paardeplaats117 IQ, Krugersdorp, Gauteng. (SAHRIS CaseID:7176)
- Heritage Impact Assessment. Proposed Jeanette Project. Welkom, Freestate.
- Heritage Impact Assessment. Proposed Sendawo 75MW Solar Photovoltaic (PV) Energy Facility. Vryburg, North West Province. (SAHRIS CaseID:9116)
- Heritage Impact Assessment. Proposed Tlisitseng 75MW Solar Photovoltaic (PV) Energy Facility. Lichtenburg, North West Province. (SAHRIS CaseID:9119)
- Second Phase Heritage Mitigation. Clanwilliam Dam Project. Clanwilliam, Western Cape. Heritage management and mitigation of 90 archaeological and historical sites that are to be impacted by the Raising of the Clanwilliam Dam wall. (Collections manager: three year contract).

2016

- Heritage Impact Assessment. Proposed Ngwedi Loop. Rustenburg, North West Province

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- Heritage Impact Assessment. Proposed N2 Bypass. Butterworth, Eastern Cape
- Heritage Impact. Sibanye Gold Proposed PV Plant. Westonaria, Gauteng
- Heritage Impact Assessment. Proposed City Parks Wetlands. Middle Soweto, Gauteng.
- Heritage Impact Assessment. Proposed Newtown Development. Pilgrimsrest, Mpumalanga.
- Heritage Impact Assessment. Proposed development of the Platberg Wind Energy Facility and supporting electrical infrastructure. Victoria West, Northern Cape. (SAHRIS CaseID:9301)
- Heritage Impact Assessment. Proposed Aletta and Eureka Wind Energy Facility (WEF). Copperton, Northern Cape. (SAHRIS CaseID:9810)
- Heritage Impact Assessment. Proposed upgrade of the Newlands Bulk Water Supply Scheme. East London, Eastern Cape.
- Heritage Impact Assessment, Leeuwbosch 44, Leeudoringstad, North West Province. Proposed construction of the 5MW Solar Photovoltaic (PV) Power Plant. (SAHRIS CaseID:10407)
- Heritage Impact Assessment, Wildebeestkuil 59, Leeudoringstad, North West Province. Proposed construction of the 5MW Solar Photovoltaic (PV) Power Plant.
- Heritage Impact Assessment. Proposed development of four Leeuwerberg Wind Farms for the Associated Grid Connection near Loeriesfontein, Northern Cape Province. (SAHRIS CaseID:12081, 12082, 12078, 12077)
- Heritage Fatal Flaw Assessment, for the inclusion in the Environmental Screening Investigation for the Proposed Arnot New Ash Disposal Facility, Mpumalanga.
- Heritage Walk Down and Management Plan. Upgrading of the 66KV Network to a 132KV Network in the Hotazel, Kuruman and Kathu Area, Northern Cape Province. Post Authorisation Walkdown from Mothibistad Substation to Sekgame Switching Station. (SAHRIS CaseID:11967)
- Heritage Screening of Portion 9 of the Farm Grootfontein 394 JR, Tswane, Gauteng.
- Second Phase Heritage Mitigation. Mitigation work required with respect to the heritage find PGS06 on the remainder of the farm number 469, Hay District (Registration division), Tsantsabane Local Municipality, Northern Cape Province, in respect to the ACWA Power Solar reserve, Redstone Solar Thermal Power Plant. (SAHRIS CaseID:10081)
- Second Phase Heritage Mitigation. Clanwilliam Dam Project. Continued from 2015

2017

- Heritage Impact Assessment for the Proposed Lanseria Outfall Sewer, Johannesburg. (SAHRIS CaseID:11397)
- Heritage Study. Proposed opencast Mining on the Farm Kwaggafontein 8 IT, near Carolina, Mpumalanga Province. (SAHRIS CaseID:11952)

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- Heritage Impact Assessment for the Proposed K60 Road Development, Rabie Ridge Gauteng.
- Heritage Impact Assessment. Kimberly Ekapa Mining Joint Venture 2.8 Slimes Pipeline Project, Kimberly, Northern Cape Province.
- Heritage Screening and Site Assessment. MTK 39/2015/16 Mintek Derelict and Ownerless Mines Rehabilitation Programme 2016-2019. Msauli Mine, Steelpoort Mine, Penge Mine, Langerdraai Mine and Uitkuik Mine.
- Heritage Impact Assessment. Proposed Phalandwa Extension Mine, Delmas, Mpumalanga.
- Site Assessment and Heritage Screening. Wadeville Extension 51. Township establishment and associated infrastructure development on Portion 273 and the remaining extent of Portion 267 on the Farm Klippoortjie 110 – IR. Ekurhuleni, Gauteng.
- Site assessment and Heritage Scoping. Proposed eMakhazeni Project near Belfast, Mpumalanga. (SAHRIS CaseID:12316)
- Heritage Impact Assessment. Proposed extension of the mining operations at the existing Ilima Colliery (Old Pembani Colliery), Near Carolina, Mpumalanga. (SAHRIS CaseID:12793)
- Heritage Impact Assessment. Proposed Mlonzi Golf Estate and Hotel, near Lusikisiki, Eastern Cape.
- Second Phase Heritage Mitigation. Clanwilliam Dam Project. Continued from 2015

2018

- Heritage Impact Assessment. Proposed Extension of the Mining Operations at the Existing Manungu Colliery, near Delmas, Mpumalanga.
- Heritage Impact Assessment. Proposed Mashishing Housing Development, Lydenburg, Mpumalanga. (SAHRIS CaseID:12999)
- Heritage Impact Assessment. Phase 1B1 Thornhill Housing Development, Port Alfred, Eastern Cape Province.
- Heritage Impact Assessment. Target to Freddie's Pipeline, Allanridge, Free State.
- Heritage Impact Assessment. Proposed Leslie Coal Mine near Leandra, Mpumalanga. (SAHRIS CaseID:12399)

2020

- Coega Zone 10, Coega IDZ, Eastern Cape Province. Colonial Period Phase 2 Mitigation Archaeological Excavation

2018 to 2023

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- Presently employed on the Polihali Dam Project in Lesotho as Collections Manager (5 year contract).

The Polihali Dam Project is a 2nd Phase CRM operation in mitigation of total inundation of a range of cultural sites, including extant, historical and Stone Age sites. Nine (9) APC and thirty one (31) LSA sites are earmarked for detailed survey and excavation.

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WOUTER FOURIE

Professional Heritage Practitioner

PROFILE

Project Manager and Principal Heritage Specialist holds a post-graduate degree in Archaeology and is registered with the Association of Southern African Professional Archaeologists as a Professional Archaeologist and is accredited as a Principal Investigator; he is further an Accredited Professional Heritage Practitioner with the Association of Professional Heritage Practitioners in South Africa.

My work focuses on heritage management through Heritage Impact Assessments, implementation of recommendations and large-scale heritage mitigation projects. I have worked, completed and implemented heritage projects in South Africa, Botswana, Mozambique, Mauritius, Zambia, Lesotho, and the Democratic Republic of the Congo.

CONTACT

PHONE NUMBER:

+27 82 851 3575
+258 84 774 6768

WEBSITE:

www.pgsheritage.com

EMAIL ADDRESS:

wouter@pgsheritage.com



EDUCATION

University of Pretoria

1993-1996

BA Degree - Majors in Archaeology, Anthropology and Geography

University of Pretoria

1997

BA Hon Archaeology, with further specialisation in environmental management.

University of Cape Town

2016 – present

MPhil Conservation of the Built Environment

WORK EXPERIENCE

PGS Heritage Group of Companies

(South Africa, Lesotho, Mozambique, and Portugal)

Director – Heritage Specialist

2003- present

I am actively involved in the management of the business and focus on marketing and new business for PGS, specifically the broader SADC region. Acting as heritage specialist in multidisciplinary teams

The University of the Witwatersrand - Project Manager – Archaeological Contracts Unit

2007-2008

Responsible for conducting heritage and archaeological impact studies, archaeological excavations and general management of the unit

Matakoma Consultants – Director – Heritage Specialist

2000 – 2008

Heritage specialist and Director responsible for heritage and archaeological impact studies

Randfontein Estate Gold Mine – Environmental Coordinator

Oct 1998- Feb 2000

Coordinating all environmental Rehabilitation work

Department of Minerals and Energy Environmental Officer

Oct 1997 – Sept 1998

PROFESSIONAL AFFILIATION

Accredited Professional Heritage Practitioner

Association of Professional Heritage Practitioners
Since 2014

Accredited Professional Archaeologist

Association of Southern African Professional Archaeologists –
Since 2001