



PGS HERITAGE

Proposed Expansion of the Rustenburg Chrome Mine on the Farm Rietfontein 338JQ, Brakspruit 299 JQ, Klipfontein 300 JQ and Spruitfontein 341 JQ near Kroondal, Rustenburg Local Municipality, Bojanala District Municipality, North West Province.

Heritage Impact Assessment

Template Number	Document Number	Revision	Date
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REVISION HISTORY

Version	Issue Date	Description of Changes
01	08/10/2025	First draft
02	24/10/2023	Amended First Draft
03	02/12/2025	Client corrections and Comments

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Specialist Declaration for assessments undertaken for application for authorisation in terms of the National Environmental Management Act (Act 107 of 1998) as amended and the Environmental Impact Assessment Regulations (Government Notice 982, Government Gazette 38282, 4 December 2014) as amended

I, Daniel Tasker declare that –

- I act as the independent specialist in this application;
- I am aware of the procedures and requirements for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (Act 107 of 1998) as amended, when applying for environmental authorisation which were promulgated in Government Notice 320 (Government Gazette 43110, 20 March 2020) and in Government Notice 1150 (Government Gazette 43855, 30 October 2020).
- 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 the specialist report relevant to this application, 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 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;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of the Environmental Impact Assessment Regulations (Government Notice R982, Government Gazette 38282, 4 December 2014) as amended and is punishable in terms of section 24F of the National Environmental Management Act (Act 107 of 1998).
- I will take into account, to the extent possible, the matters listed in section 38 of the National Heritage Resources Act (Act 25 of 1999) when preparing the application and any report relating to the application.

HERITAGE CONSULTANT:

PGS Heritage (Pty) Ltd

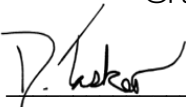
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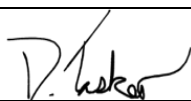

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ACKNOWLEDGEMENT OF RECEIPT

Report Title	Heritage Scoping report for the Proposed Expansion of the Rustenburg Chrome Mine on the Farm Rietfontein 338JQ, Brakspruit 299 JQ, Klipfontein 300 JQ and Spruitfontein 341 JQ near Kroondal, Rustenburg Local Municipality, Bonjala District Municipality, North West Province.		
Control	Name	Signature	Designation
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SIGNATURE: _____

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This Heritage Impact Assessment report has been compiled considering the Environmental Impact Assessment Regulations (Government Notice 982, Government Gazette 38282, 4 December 2014) Appendix 6 as amended by Government Notice 326 (Government Gazette 40772, 7 April 2017) requirements for specialist reports as indicated in the table below:

Requirements Environmental Impact Assessment Regulations (Government Notice 982, Government Gazette 38282, 4 December 2014) Appendix 6 as amended	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 Environmental Management Program	Section 6
(l) Any conditions for inclusion in the Environmental Assessment	Section 6
(m) Any monitoring requirements for inclusion in the Environmental Management Program or Environmental Assessment	Section 6
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and (n)(iA) A reasoned opinion regarding the acceptability of the proposed activity or activities; and	Section 6 and 7
(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 Environmental Management Program, 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 HIA or PIA

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EXECUTIVE SUMMARY

PGS Heritage (Pty) Ltd (PGS) was appointed by EIMS (Pty) Ltd (EIMS) to undertake a Heritage Impact Assessment (HIA) that forms part of the Scoping and Environmental Impact Assessment (EIA) and Basic Assessment (BA) processes for the proposed Rustenburg Chrome Mine expansion on the on the Farms Rietfontein 338JQ, Brakspruit 299 JQ, Klipfontein 300 JQ and Spruitfontein 341 JQ near Kroondal, Rustenburg Local Municipality, Bonjala District Municipality, North West Province.

As indicated by the South African Heritage Resources Information System (SAHRIS) 1:250000 palaeontological map rating of Insignificant/Zero palaeontological sensitivity; palaeontological assessment was not required.

The study identified 56 heritage features and resources, mostly forming part of a larger Late Iron Age (LIA) occupation of the koppie and consist of both varying density pottery scatters graded as IIIB/IIIC to Not Conservation Worthy (NCW) and LIA walling graded as IIIB. Additionally, an Early Stone Age (ESA) scatter, a clay and stone built homestead with possible infant burials and extensive historical stone walling, where the stones used to build it were robbed from the LIA settlement, were documented as well.

Previous studies in the footprint have also identified various other heritage resources including: two cemeteries/graveyards, historical infrastructure, a historical homestead, a past community settlement, an ungraded heritage site, Middle Stone Age (MSA) stone tool scatters and further LIA occupation of the koppie located in the study area. Desktop analysis further highlighted the greater extent of LIA walling around the koppie and fieldwork has indicated that further LIA walling is present at/near the koppie despite not being visible on satellite imagery.

During the impact assessment phase, the heritage data collected during the fieldwork was evaluated according to the heritage significance methodology in **Section 3** of this report and utilising the impact assessment methodology as contained in **Appendix A** to determine the potential impacts of the proposed layout on the heritage resources.

Mitigation and management measures are indicated in **Section 6** and **Table 9**. These recommendations must be incorporated into the Environmental Management Programme (EMPr) for approval by the Department of Mineral and Petroleum Resources (DMPR).

The greater extent of LIA walling comprises an extensive archaeological settlement and the proposed open cast pit extension (Area 3) falls within this larger settlement. Individual sites identified by this HIA forms part of this settlement and cannot be mitigated in isolation, but needs to be investigated in the context of what currently remains of the larger site as mentioned above (also refer: **Figure 30, Table 9: Heritage**

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Management Plan for EMP implementation. and **Appendix B**). Extensive areas of the larger site have also been destroyed and have been impacted on by mining activities increasing the significance of the heritage resources still in existence. Recommendations for the mitigation of sites in previous HIAs have also not been conducted and subsequent disturbance by mining activities of some of the sites have occurred. The following identified sites will be directly affected:

- Stone Age site: **Ex13** (lithic scatter) falls inside the Area 3 boundary.
 - Recommended mitigation is to document the site as part of this HIA. No further mitigation is required.
- Iron Age sites: **Ex08, Ex10, Ex12, Ex14, Ex16, Ex17, Ex18, Ex19, Ex20, Ex25, Ex27, Ex28, Ex29** and **Ex32** and previously documented (**Ft/005**) (Higgit, 2015 HIA) fall within the Area 3 boundary. Within the 50 m buffer zone for Area 3 sites **Ex06, Ex07, Ex09, Ex15, Ex21, Ex22, Ex23, Ex24, Ex31, Ex33** and the previously documented **Ft/006** (Higgit, 2015), as well as **Ex03** and **Ex04** historical kraal walling where LIA walling was reused, occur. **Ex05** and previously documented **Ft/003** and **Ft/004** (Higgit, 2015) are located within 100 m of the Area 3 boundary.
 - Recommended mitigation of these sites will entail documentation and mapping of the larger extensive Iron Age settlement and archaeological investigation of the individually identified sites listed after which a SAHRA destruction permit can be applied for.
- Historical homestead structure: **Ex34** where infant burials might be present is 57 m from the Area 3 boundary. The indicated 50 m buffer for this site overlaps with that of the Area buffer zone and the site is therefore affected by the proposed open cast pit expansion.

Recommended mitigation of this structure is archaeological investigation to determine whether burials are present and documentation of the structure itself. Should burials be found to be present the graves can be relocated following the process required by section 36 of the NHRA (with additional compliance to other applicable legislation) or the site can be managed with the implementation of a Heritage Management Plan (as indicated for BGG in **Table 9**).

Conclusion

It is the combined considered opinion of the heritage specialists that the proposed project will have a direct impact on several 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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ABBREVIATIONS AND TERMINOLOGY

Abbreviations	Description
AD	<i>Anno Domini</i>
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
BA	Basic Assessment
BGG	Burial Grounds and Graves
CFP	Chance Finds Procedure
CRM	Cultural Resource Management
DFFE	Department of Forestry, Fisheries and the Environment
DMPR	Department of Mineral and Petroleum Resources
EA	Environmental Authorisation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIMS	Environmental Impact Management Services (Pty) Ltd
EMPr	Environmental Management Programme
ESA	Early Stone Age
GN320	Government Notice 320 (Government Gazette 43110, 20 March 2020)
GN326	Government Notice 326 (Government Gazette 40772, 7 April 2017)
GN982	Government Notice 982 (Government Gazette 38282, 4 December 2014)
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
KNARIA	KwaZulu-Natal Amafa and Research Institute Act, 2018 (Act No. 5 of 2018)
KZN	Kwa-Zulu Natal
LCT	Large Cutting Tool
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
NCW	Non-Conservation Worthy
NEMA	National Environmental Management Act (Act 107 of 1998) as amended
NHA	National Health Act (Act 61 of 2003)
NHRA	National Heritage Resources Act (Act 25 of 1999) as amended
PGS	PGS Heritage (Pty) Ltd
PHRA	Provincial Heritage Resources Authority
PIA	Paleontological Impact Assessment
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System

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,

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- 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 10 m 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 Maritime Zones Act (Act 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which the South African Heritage Resources Agency 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 earlier stone age between 700 000 and 2 500 000 years ago (Refer **Figure 1**).

Fossil

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

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Heritage

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

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 National Heritage Resources Act (Act 25 of 1999) as amended,

- 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 12 000 years ago (Refer **Figure 1**).

Late Stone Age

The archaeology of the later stone age associated with fully modern people during the last 30 000 years (Refer **Figure 1**).

Late Iron Age (Early Farming Communities)

The archaeology of the last 1000 years up to the 1800's, associated with settled lifeways, iron-working and farming activities such as herding and agriculture (Refer **Figure 1**).

Middle Stone Age

The archaeology of the middle stone age between 30 000-300 000 years ago, associated with early modern humans (Refer **Figure 1**).

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.

Tracklogs

Movements during field survey documented by means of Global Positioning System.

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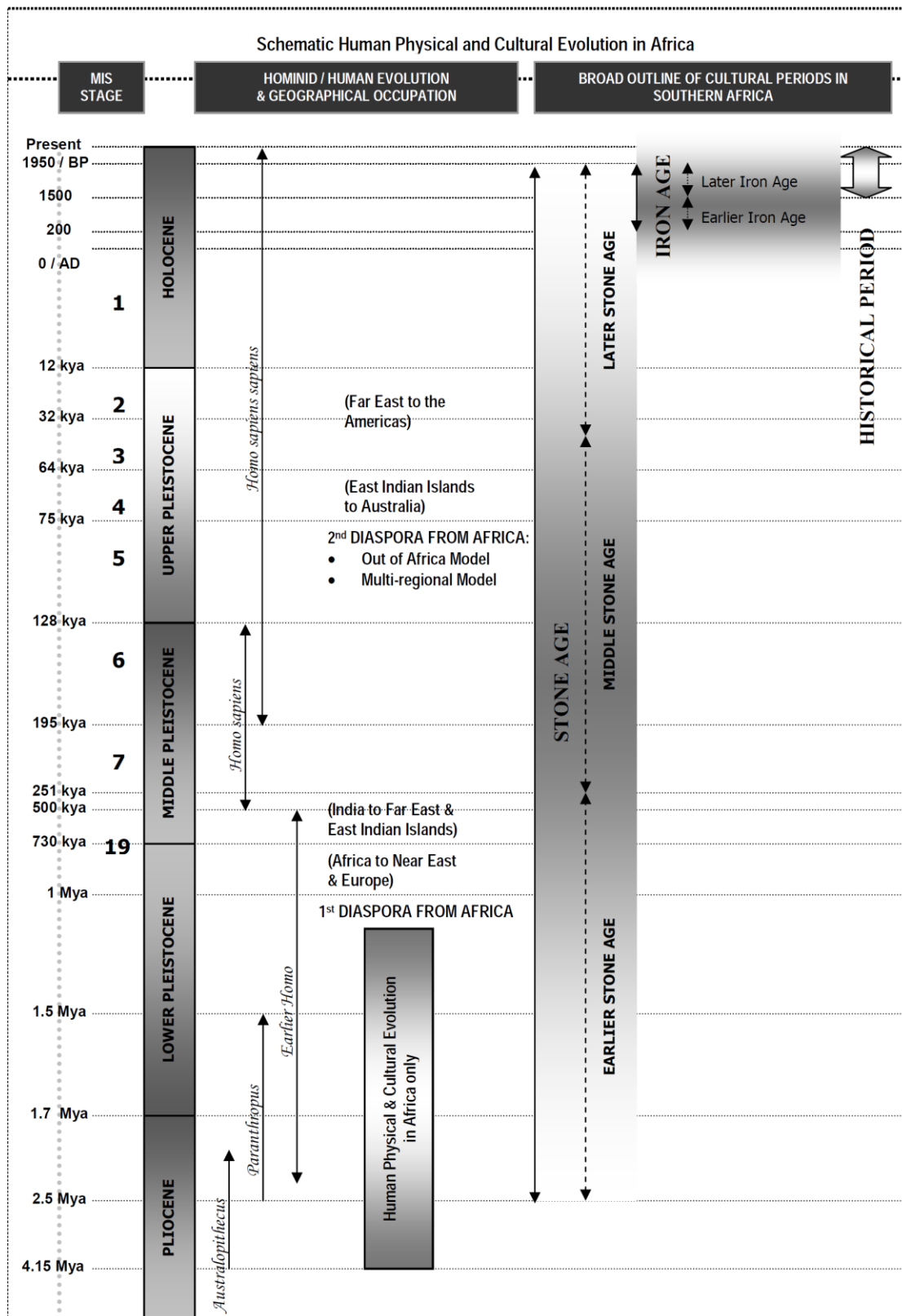


Figure 1 – Human and Cultural Timeline in Africa.

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1 INTRODUCTION

PGS Heritage (Pty) Ltd (PGS) was appointed by EIMS (Pty) Ltd (EIMS) to undertake a Heritage Impact Assessment (HIA) that forms part of the Scoping and Environmental Impact Assessment (EIA) and Basic Assessment (BA) processes for the proposed Rustenburg Chrome Mine expansion on the on the Farm Rietfontein 338JQ, Brakspruit 299 JQ, Klipfontein 300 JQ and Spruitfontein 341 JQ near Kroondal, Rustenburg Local Municipality, Bonjala District Municipality, North West Province.

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. The HIA aims to inform the EIA to assist the developer in managing the discovered heritage resources in a responsible manner, in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act (Act 25 of 1999) as amended (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.

Daniel Tasker, author of this report is a MSc (Archaeology) graduate from the University of the Witwatersrand, South Africa, specialising in the Stone Age. He is a registered professional archaeologist with the Association of Southern African Professional Archaeologists (ASAPA).

Coen Nienaber, the PGS Bio-archaeologist and Heritage Resources Unit Manager, have 17 years' experience in heritage resources management and is an internationally qualified and experienced bio-archaeologist that holds a BA Hons in Archaeology, a BSc Hons in Physical Anthropology and a MSc Environmental Management from the University of Pretoria and is registered with ASAPA as a Professional Archaeologist.

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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, amongst others the subterranean nature of some archaeological sites and existing vegetation cover. However, most of the study area was accessible for the fieldwork survey.

Fieldwork was also focussed on areas that were not previously disturbed by farming/mining, thus concentrating on areas with the highest potential to yield indications of the possible presence of heritage resources.

Therefore, should any heritage features and/or objects be located or observed outside the identified heritage sensitive areas during construction 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 as the heritage specialist has been able to make an assessment of the significance of the site (or material) in question. This also applies to Burial Grounds and Graves (BGG). If any BGG are located or observed during the course of the development, the procedures and requirements pertaining to BGG 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:

- Government Notice 320 (Government Gazette 43110, 20 March 2020) (GN 320) - general requirements for undertaking an initial site sensitivity verification where no specific assessment protocol has been identified,
- EIA Regulations (Government Notice 982 (Government Gazette 38282, 4 December 2014)) Appendix 6 (GN 982) as amended by Government Notice 326 (Government Gazette 40772, 7 April 2017) (GN 326),
- NHRA.

1.4.1 Government Notice 320 (Government Gazette 43110, 20 March 2020)

Although minimum standards for Archaeological Impact Assessment (AIA) (2007) and Paleontological Impact Assessment (PIA) (2012) were published by the South African Heritage Resources Agency (SAHRA), GN 320 requires sensitivity verification for a site, for which no specific assessment protocol related to any theme has been identified, on the national web based

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environmental screening tool. The requirements for GN 320 are listed in **Table 1** and the applicable section in this report noted.

Table 1: Reporting requirements for GN 320.

GN 320	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 4.1	
2.3(a) confirms or disputes the current use of the land and environmental sensitivity as identified by the national web-based environmental screening tool;	section 4.1	
2.3(b) contains motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity;	section 4.1	

1.4.2 Environmental Impact Assessment Regulations (Government Notice 982, Government Gazette 38282, 4 December 2014) Appendix 6 as amended by Government Notice 326 (Government Gazette 40772, 7 April 2017) requirements

This HIA report has been compiled considering the GN 326 Appendix 6 requirements for specialist reports.

1.4.3 Heritage screening - Department of Forestry, Fisheries and the Environment

A heritage screening was conducted by means of the Department of Forestry, Fisheries and the Environment (DFFE) National Web-based Environmental Screening Tool as required by GN 982.

DFFE issued guidelines in April 2025 concerning the application of the screening tool in relation to cultural heritage, archaeology, and palaeontological themes. The guidelines indicate that the "theme layer represents a limited number of known" heritage and palaeontological resources. These resources are widely distributed and may be present at any development site within South Africa. The guidelines state the following in terms of -

- HIA "Therefore, a Heritage Impact Assessment (HIA) must be undertaken for all developments, irrespective of the sensitivity shown on the archaeological and cultural heritage theme layer"

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- PIA “*Therefore, a Palaeontological Impact Assessments (PIAs) [sic] must be undertaken for all developments as per the PalaeoSensitivity Map provided on [South African Heritage Resources Information System] SAHRIS, irrespective of the sensitivity shown on the palaeontology theme layer.*”

The guidelines further stipulate the requirements for both an HIA and PIA must:

HIA	PIA
<ul style="list-style-type: none"> ▪ meet the requirements of section 38(3) of the NHRA or section 41(1) of the KwaZulu-Natal Amafa and Research Institute Act, 2018 (Act No. 5 of 2018) (KNARIA), should the development be in KwaZulu-Natal (KZN); ▪ must be undertaken by a qualified heritage specialist; ▪ be undertaken in line with GN 326 Appendix 6; and ▪ for HIA submitted to SAHRA the report must also comply with the requirements of the “2007 Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports”, accessible at https://sahris.sahra.org.za. 	<ul style="list-style-type: none"> ▪ meet the requirements of section 38(3) of the NHRA or section 41(1) of the KNARIA should the development be in KZN; ▪ must be undertaken by a qualified palaeontological specialist; ▪ be undertaken in line with GN 326 Appendix 6; and ▪ for PIA submitted to SAHRA, the report must comply with the requirements of the “2012 Minimum Standards: Palaeontological Components of Heritage Impact Assessments” [sic], accessible at https://sahris.sahra.org.za.

1.4.4 National Heritage Resources Act (Act 25 of 1999) as amended

- 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 Resources 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 National Environmental Management Act (Act 107 of 1998) as amended (NEMA) requires environmental authorisation from the environmental authority for certain activities that have been identified and must undergo an EIA or BA process. Similarly, section 38 of the 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 co-ordination 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 a HIA, it must be conducted as one of the EIA specialist studies.

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.

It must however be noted that if no environmental process is required, but the proposed development still triggers the requirements for and HIA under section 38(1) of the NHRA, SAHRA or the relevant provincial heritage authority will be the authorising authority. This entity could then require a full HIA taking into account the requirements for public participation and stakeholder engagement as stipulated by the regulations of the NHRA.

2 TECHNICAL DETAILS OF THE PROJECT

2.1 Locality

The proposed Rustenburg Chrome Mine expansion Open Cast Mine Expansion is located 5 km to the east of the town of Kroondal, 15 km east of Rustenburg, 11 km north-west of Marikana, 12 km south-west of Buffelspoort and just above the N4 National Highway in the North West Province (**Figure 2**).

2.1.1 Site Description

The application area is situated on the farm Rietfontein 338 JQ, Brakspruit 299 JQ, Klipfontein 300 JQ and Spruitfontein 341 with a footprint area of approximately 2 000 ha (**Figure 3**).

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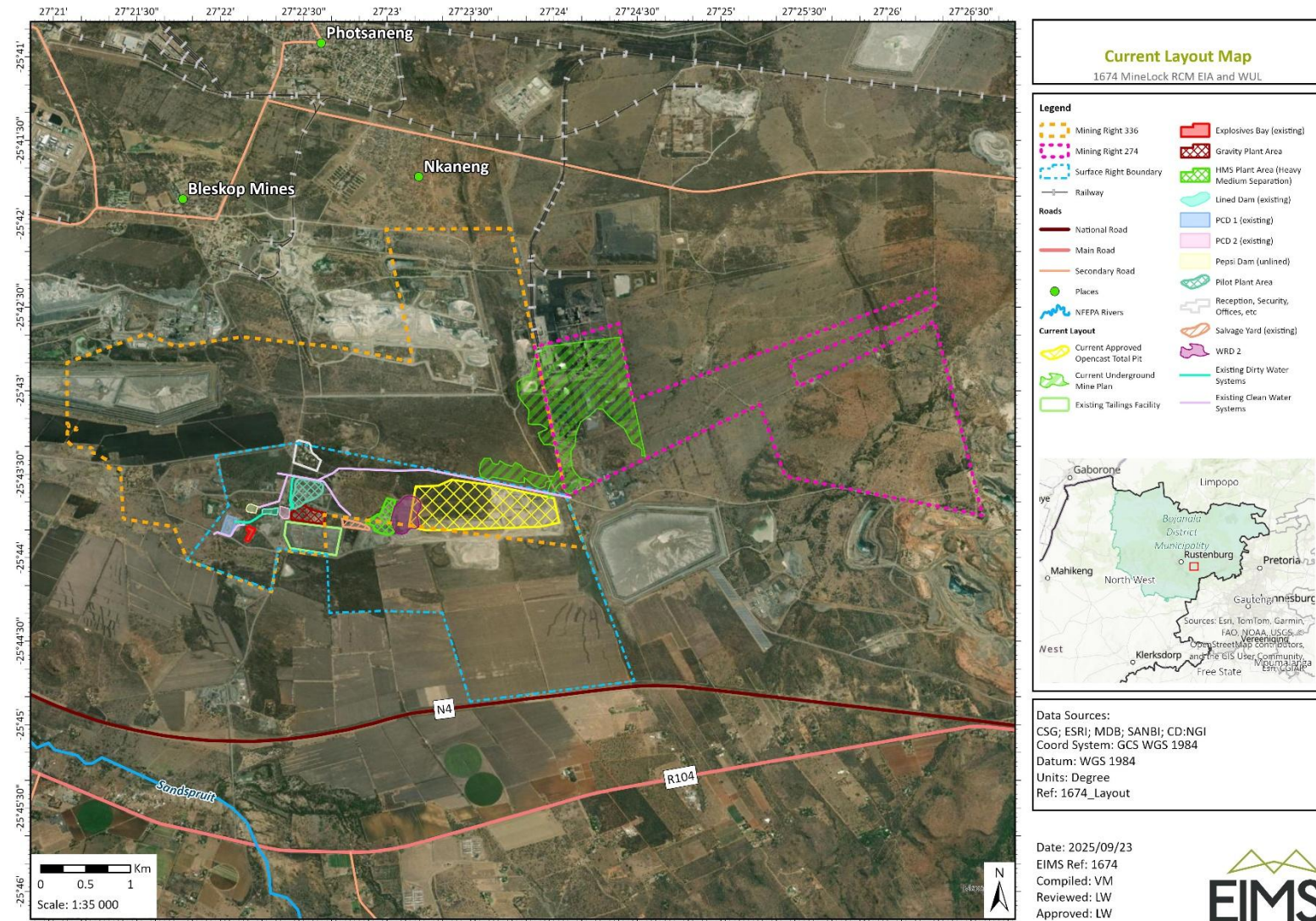


Figure 2 – Current mine layout of the study area with the regional location indicated (provided by EIMS).

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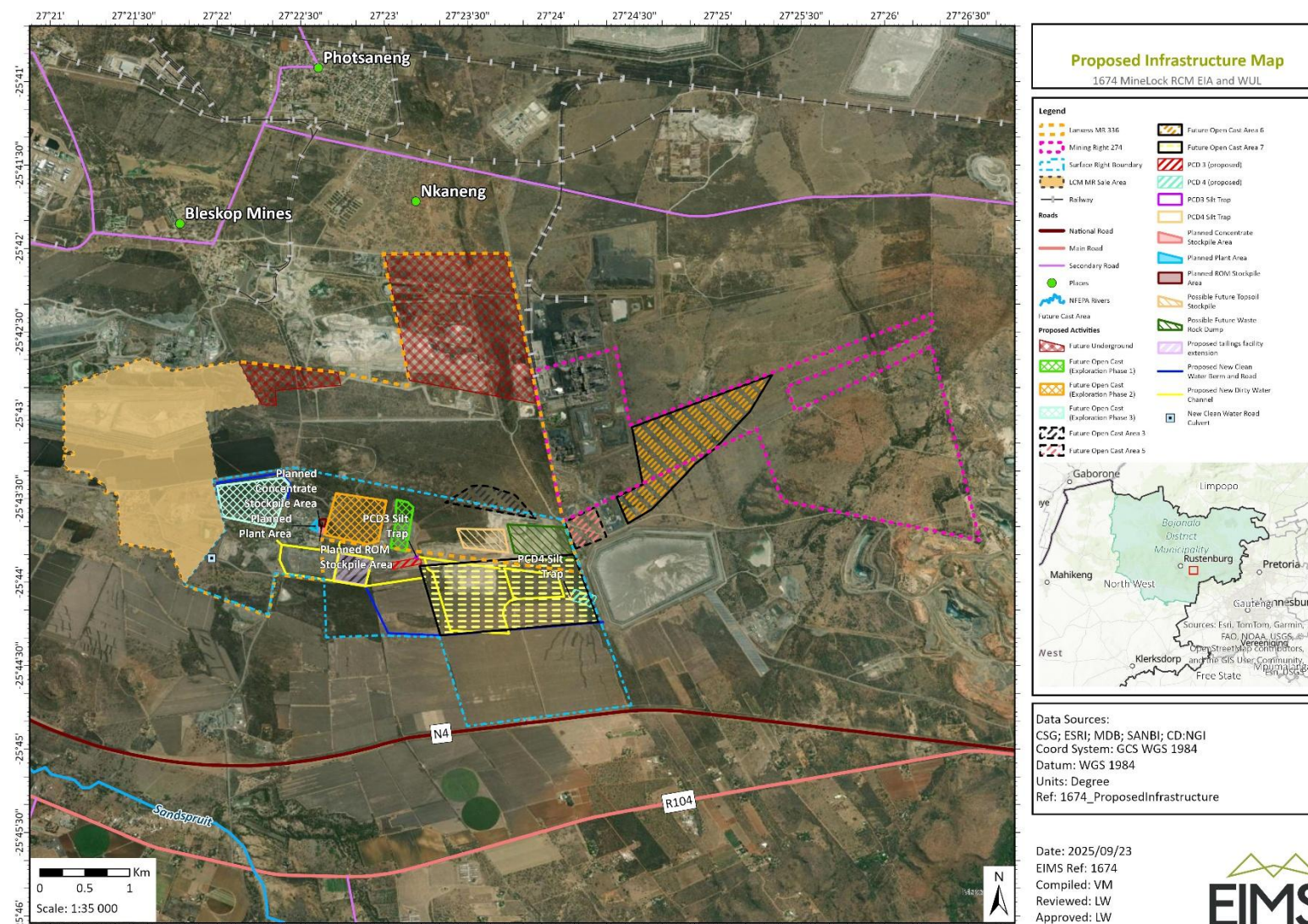


Figure 3 – Proposed infrastructure map (provided by EIMS).

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2.2 Technical Project Description

2.2.1 Project description

The following description was given by EIMS:

Rustenburg Chrome Mining (Pty) Ltd owns and operates the Rustenburg Chrome Mine and intends developing additional infrastructure and activities that has not previously been approved. This infrastructure includes, but not limited to, new opencast pits, new underground mining areas, new waste rock dumps and topsoil stockpiles, an extension to the existing tailings storage facility and associated stormwater management infrastructure consisting of new pollution control dams, clean and dirty water berms and channels. All the proposed activities will occur within the existing mining rights boundaries (Refer: **Figure 3**).

The current operations at Rustenburg Chrome Mine includes *inter alia*:

- Underground mining operations;
- Opencast mining areas;
- Rehabilitated Pepsi Dam, Lined Dam, 2 x existing Pollution Control Dams
- Tailings Storage Facility;
- Waste Rock Dump;
- Gravity plant area;
- Heavy Medium Separation plan.

The proposed project will entail development of *inter alia* the following:

- New Open-cast and Underground mining areas;
- New clean and dirty storm water drains/channels;
- Two New Pollution Control Dams;
- New Plant;
- New Tailings Storage Facility;
- New Waste Rock Dump;
- Topsoil stockpile;
- New Concentrate Stockpile Area;
- New Run of Mine Stockpile Area;
- New Plant; and Ancillary services

3 ASSESSMENT METHODOLOGY

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

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3.1 Methodology for Assessing Heritage Site significance

This HIA report was compiled by PGS for the proposed expansion. The applicable maps, tables and figures are included, as stipulated in the NHRA and NEMA. The HIA process consists of three steps:

Step I – Literature Review and initial site analysis: The background information to the field survey is informed by 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 a combination of vehicle and pedestrian access through the proposed project area by one qualified heritage specialist and one field assistant and was 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 reporting, 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)
 - Low - <10/50 m²
 - Medium - 10-50/50 m²
 - High - >50/50 m²
- 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

The applied site significance classification standards are based on the heritage classification of section 3 of the NHRA and developed for implementation according to the grading system approved by SAHRA for AIA. The updated classification and rating system as developed by Heritage Western Cape (HWC) (2021) was implemented in this report

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

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 a Provincial Heritage Authority (PHRA). 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 NHRA 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
Not Conservation Worthy (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

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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
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 NHRA 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	Low Significance

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Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
		measures, regardless of whether the site falls within a Conservation or Heritage Area. Internal alterations should not necessarily be regulated.	
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 and approved by the authority. Section 34 of the NHRA can even be lifted by HWC for structures in this category if they are older than 60 years.	No research potential or 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 A**.

4 CURRENT STATUS QUO

4.1 Site Description

The proposed Mine Expansion footprint area is characterised by flat grass land with bushy acacias, the Rustenburg Chrome Mine and a pronounced koppie. In the surrounds, much of the area is farmed and the current mine operation has a large fence around it. The aforementioned mine area consists of open pits, tailings and mining infrastructure with dirt roads that traverse the mines operation (**Figure 4** to **Figure 9**). About 60-70 percent of the mine's current surface authorisation area is developed.

The few instances of natural vegetation left are characterized by the Marikana Thornveld and is described in Mucina and Rutherford (2006:463) as:

“Distribution North-West and Gauteng Provinces: Occurs on plains from the Rustenburg area in the west, through Marikana and Brits to the Pretoria area in the east. Altitude about 1 050– 1 450 m.

Vegetation & Landscape Features Open Acacia karoo woodland, occurring in valleys and slightly undulating plains, and some lowland hills. Shrubs are more dense along drainage lines, on termitaria and rocky outcrops or in other habitat protected from fire.

Geology & Soils Most of the area is underlain by the mafic intrusive rocks of the Rustenburg Layered Suite of the Bushveld Igneous Complex. Rocks include gabbro, norite,

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pyroxenite and anorthosite. The shales and quartzites of the Pretoria Group (Transvaal Supergroup) also contribute. Mainly vertic melanic clays with some dystrophic or mesotrophic plinthic catenas and some freely drained, deep soils. Land types mainly Ea, Ba and Ae.”



Figure 4 – View from the centre of the property towards the northeast.



Figure 5 – View from the centre of the property towards the east.



Figure 6 – Tall grass pastures in the central western section of the property.



Figure 7 – View of north-eastern section of the property towards the N4.

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Figure 8 – View of watering hole in southern section of the proposed area.



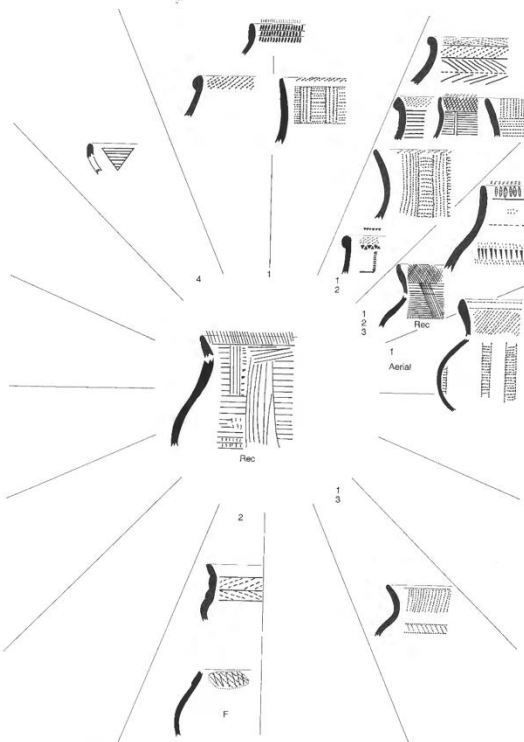

Figure 9 - Farmland south of the south-eastern tailings.

4.2 Overview of the study area and surrounding landscape

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 handaxe (e.g. Figure 10). The Acheulian dates to approximately 1.5 million years ago.</p> <p>While no immediate ESA occurrences are located close to the study area, the ESA site of Barberspan, in the North West Province, is located over 200 km south-east. Here ESA hominids are documented living next to permanent water sources in a water scarce environment (Caruana et al. 2020).</p>
250 000 to 40 000 years ago	<p>The Middle Stone Age (MSA) is the second oldest phase identified in South Africa's archaeological history. This phase is associated with flakes, points and blades manufactured by means of the so-called 'prepared core' technique. The</p>

Figure 10 – Example of Early Stone Age Later Acheulian handaxes. These handaxes were identified at Blaaubank near Rooiberg. Cropped section of an illustration published in Mason (1962:199).

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	MSA site of Olieboomspoort Shelter is over 200 km north of the study area which contains a large timespan of artefacts including Late Stone Age (LSA) and ESA occupations (Mason 1962).
40 000 years ago to the historic past	The LSA is the third archaeological phase identified and is associated with an abundance of very small artefacts known as microliths. Well documented sites such as Jubilee Shelter (38 km north) and Kruger Cave (13 km south) are known from the vicinity. In Kruger Cave many bone points and link shafts were excavated while ostrich egg shell bead production was also noted (Mason 1988). At Jubilee Shelter bone points begin to occur during the Oakhurst industry, 12 000 years ago (Wadley 1996).
AD 350 – AD 650	The Bambata facies (Figure 11 and Figure 12) of the Benfica Sub-Branch of the Kalundu Ceramic Tradition represents the earliest known Iron Age period within the surroundings of the study area. The decoration on the ceramics from this facies is characterised by “...fine decoration, multiple bands and cross-hatching on long rim, alternating blocks of stamped and incised lines in neck.” (Huffman, 2007:215).
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p><i>Figure 11 – Bambata Types (Huffman, 2007:214).</i></p> </div> <div style="text-align: center;">  <p><i>Figure 12 – Bambata pottery (Huffman, 2007:215).</i></p> </div> </div>	
AD 1000 – AD 1300	The Eiland facies (Figure 13 and Figure 14) of the Kalundu Ceramic Tradition represents the fourth known Iron Age period within the surroundings of the study area. The decoration on the ceramics from this facies is characterised by “...fine herringbone with stamping.” (Huffman, 2007:221).

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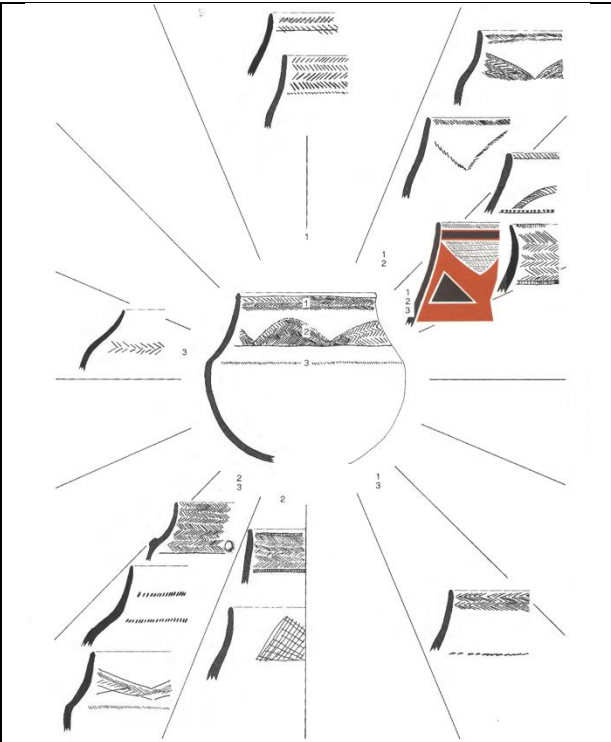


Figure 13 – Eiland types (Huffman, 2007:228).



Figure 14 – Eiland pottery (Huffman, 2007:229).

1500 AD – 1700 AD	<p>The Olifantspoort facies (Figure 15 and Figure 16) of the Moloko Branch of the Urewe Ceramic Tradition is the second Iron Age facies to be identified within the surroundings of the study area. The Olifantspoort facies can likely be dated to between AD 1500 and AD 1700. The key features of the decoration used on the ceramics from this facies include multiple bands of fine stamping or narrow incision separated by colour (Huffman, 2007).</p> <p>The type site for this facies is located on the farm Olifantspoort 328 JQ, which is situated approximately 12 km north-east of the present study area.</p> <p>The Olifantspoort facies holds an important position in the sequence of the Moloko or Sotho-Tswana group. The earliest facies to be associated with the Moloko is the Icon facies (AD 1300 – 1500), with sites found across large sections of what is today the Limpopo Province. The Icon facies resulted in three different and parallel Iron Age facies, namely the Madikwe facies (AD 1500 – 1700) (which in turn led to the Buispoort facies between AD 1700 and 1850), the Letsibogo facies (AD 1500 – 1700) and thirdly the Olifantspoort facies. The Olifantspoort facies developed into the Thabeng facies (AD 1700 – 1850) (Huffman, 2007). It is therefore evident that the Olifantspoort facies represents a key pillar in our understanding of the origins and sequence of the Sotho-Tswana people of today (Huffman, 2007).</p>
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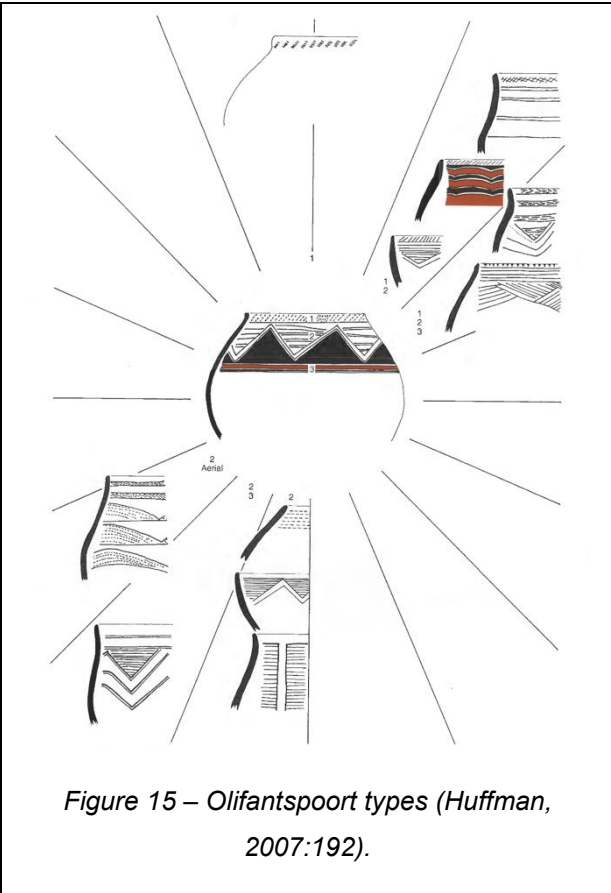


Figure 15 – Olifantspoort types (Huffman, 2007:192).



Figure 16 – Olifantspoort pottery (Huffman, 2007:193).

1500 AD – 1700 AD	<p>The Madikwe facies (Figure 17 and Figure 18) of the Blackburn Branch of the Urewe Ceramic Tradition represents the next phase in the Iron Age of the study area and surroundings. This facies can likely be dated to between AD 1500 and AD 1700. The decoration on the ceramics associated with this facies is characterised by multiple bands of cord impressions, incisions, stabs and punctates separated by colour (Huffman, 2007).</p> <p>As indicated above, the Madikwe facies represents one of three parallel Iron Age facies which had developed from the original Moloko facies known as Icon. As such, the Madikwe facies was the contemporary of the Olifantspoort and Letsibogo facies, and developed into the Buispoort facies (AD 1700 – AD 1850) (Huffman, 2007).</p>
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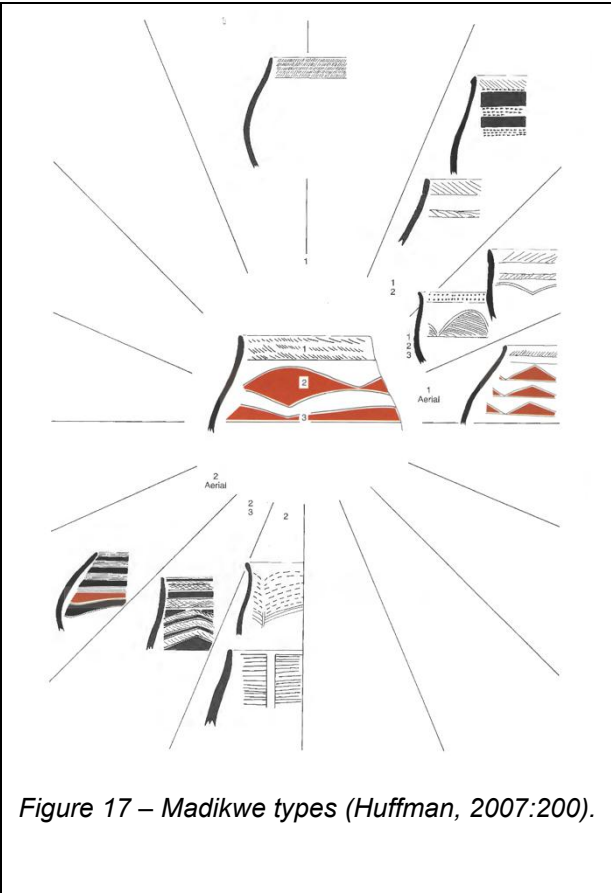


Figure 17 – Madikwe types (Huffman, 2007:200).



Figure 18 – Madikwe pottery (Huffman, 2007:201).

<p>1650 AD – 1820 AD</p>	<p>The Uitkomst facies (Figure 19 and Figure 20) of the Blackburn Branch of the Urewe Ceramic Tradition represents another Iron Age period identified for the surroundings of the study area. This facies can likely be dated to between AD 1650 and AD 1820. The decoration on the ceramics associated with this facies is characterised by stamped arcades, appliqué of parallel incisions, stamping and cord impressions and is described as a mixture of the characteristics of both Ntsuanatsatsi (Nguni) and Olifantspoort (Sotho) (Huffman, 2007).</p> <p>The Uitkomst pottery is viewed as a combination of Ntsuanatsatsi and Olifantspoort, and with the Makgwareng facies is seen as the successors to the Ntsuanatsatsi facies. The Ntsuanatsatsi facies (represented as “fried egg” patterned stone walling e.g. Figure 21) is closely related to the oral histories of the Early Fokeng people and represents the earliest known movement of Nguni people out of KZN into the inland areas of South Africa. Regarding this theory, the Bafokeng settled at Ntsuanatsatsi Hill in the present-day Free State Province. Subsequently, the BaKwena lineage had broken away from the Bahurutshe cluster and crossed southward over the Vaal River to encounter the Bafokeng. As a result of this contact a Bafokeng-Bakwena cluster was formed, which moved northward and became further ‘Sotho-ised’ by coming into increasing contact with other Sotho-Tswana groups. According to this theory, this eventually resulted in the appearance of Uitkomst facies type pottery which contained elements of both Nguni and Sotho-Tswana speakers (Huffman, 2007). Huffman states that that the Uitkomst facies is directly associated with the Bafokeng (Huffman, 2007). However, it worth noting that not all researchers agree with this preposition of the Bafokeng origins. In their book on the history of the Bafokeng, Bernard Mbenga and Andrew Mason indicate that the research of Prof. R.J. Mason and Dr. J.C.C. Pistorius “...would</p>
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indicate that the Bafokeng originated from the Bahurutshe-Bakwena-Bakgatla lineage cluster. Tom Huffman holds a different view...” (Mbenga & Mason, 2010).

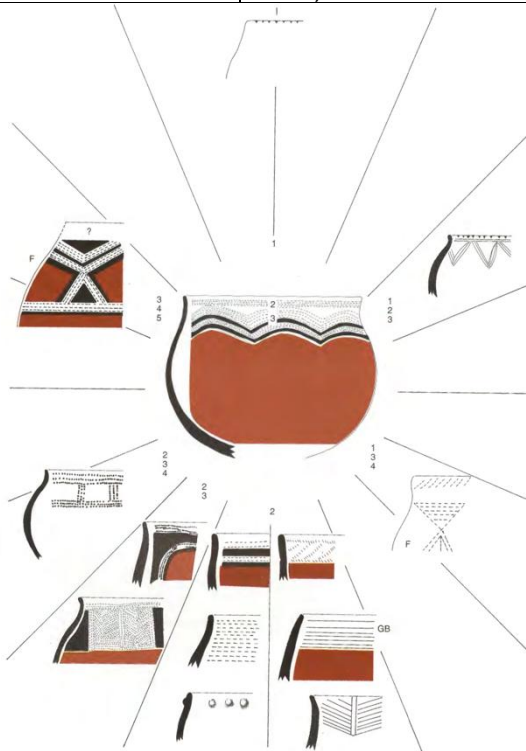


Figure 19 – Uitkomst types (Huffman, 2007:172).



Figure 20 – Uitkomst pottery (Huffman, 2007:173).

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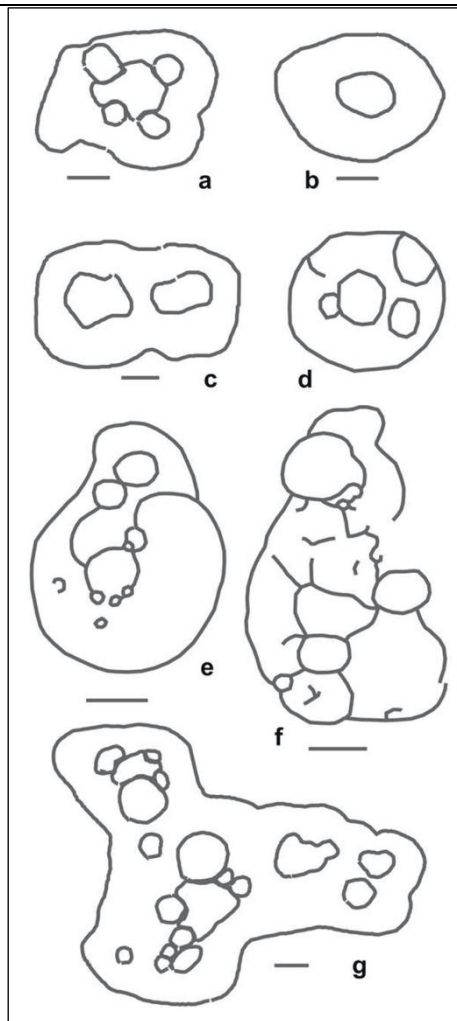
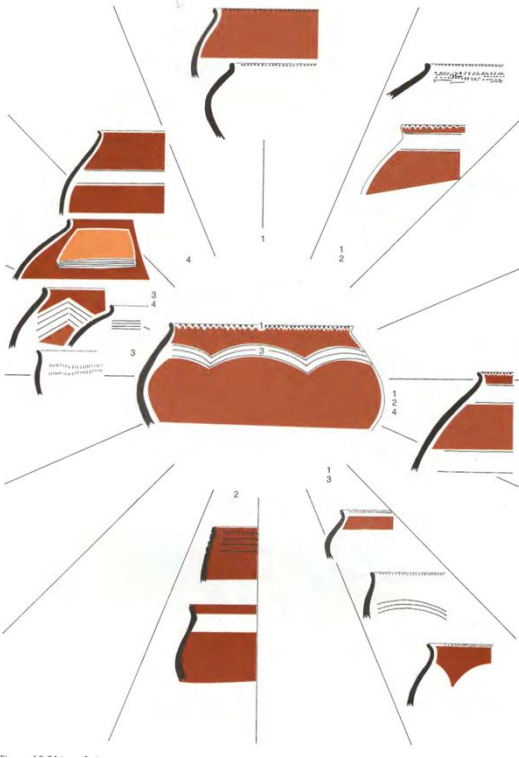



Figure 21 – Examples of so-called Group I settlements as published by Sadr & Rodier (2012:3). The settlement layout as depicted in illustration ‘b’ provides an example of a simple Type N settlement which has the appearance of a ‘fried egg’. Illustration ‘a’ provides one example of a more elaborate Type N settlement. The settlement layouts as depicted in this figure can be associated with the Ntsuanatsatsi facies and the Bafokeng as well.

1700 AD – 1840 AD	<p>The Buispoort facies (Figure 22 and Figure 23) of the Moloko branch of the Urewe Ceramic Tradition is the next phase to be identified within the study area’s surroundings. It is most likely dated to between AD 1700 and AD 1840. The key features on the decorated ceramics include rim notching, broadly incised chevrons and white bands, all with red ochre (Huffman, 2007).</p> <p>It is believed that the Madikwe facies developed into the Buispoort facies. The Buispoort facies is associated with sites such as Buffelshoek, Kaditshwene, Molokwane and Olifantspoort (Huffman, 2007). Molokwane is the nearest of these sites to the study area and is located on the farm Selonskraal 317 JQ some 19.5km to the North-West (Pistorius, 1992).</p> <p>During the early 1980s, Dr. J.C.C. Pistorius conducted archaeological excavations at Molokwane. His research was aimed at “...<i>proving that the site’s</i></p>
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	<p><i>settlement style is representative of the settlement system of historical and contemporary Sotho-Tswana villages (metse) in its ground plan, composition and settlement layout.” (Pistorius, 1992:1). The available oral history was also assessed in this research, which revealed that Molokwane was the home of the Bakwena Bamodimosa Bammatau from c. 1600 AD to the early 1800s (Pistorius, 1992).</i></p>
 <p><i>Figure 22 – Buispoort types (Huffman, 2007:204).</i></p>	 <p><i>Figure 23 – Buispoort pottery (Huffman, 2007:205).</i></p>
c. 1650 – c. 1700	<p>During this time the Bathlako were living in proximity to the area today known as Cullinan, east of Pretoria. During the second half of the seventeenth century Kgosi Thatwe, the Bathlako chief, dispatched a reconnaissance party to the west of his chiefdom to assess the grazing conditions there. His sons Leema, Matutu and Modisane subsequently established themselves at Pharami (Boschoek) before settling along the Toelanie River near Pella.</p> <p>At Pella the chiefdom was split with Leema and his followers establishing the Batlhako ba Leema chiefdom and Matutu and his followers establishing the Batlhako ba Leemana chiefdom. In turn, the ancestors of the Batlounng moved to Mabjanatsiri near the present-day farm Grootwagendrift 233 JP, situated roughly 62 km north-west of the present study area (Breutz, 1957).</p> <p>Later, the son of Matutu, namely Seutlwane moved with his followers to Maseletsane on the northern end of the Pilwe Hills (Breutz, 1957). The northern end of the Pilwe Hills is situated roughly 68km North-West of the present study area.</p>
Early 1700s	<p>At the time, and possibly for some time before this date, the area surrounding present-day Rustenburg would have been occupied by the Bafokeng and the Tlokwa people (Hall et al., 2008). Mbenga and Mason (2010) indicate that Prof. R.D. Coertze estimation was that the Bafokeng had settled in the vicinity of</p>


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	Rustenburg at the end of the 17 th century. Their land at the time stretched from the “...Ngwaritsi (Selons) River to the west, the Bakwena-ba-Mogopa to the east, the Magaliesberg to the south and the Kgetleng (Elands) River to the north (Mbenga & Mason, 2010: 7).
1750s	<p>During the mid eighteenth century the Batlokwa ba ga Sedumedi under Kgosi Mosima Tsele moved from Tlokwe (in proximity to present-day Potchefstroom) to the Pilanesberg. They settled at Bote, which is presently located on the farm of Houwater 54 JQ in the Pilanesberg National Park (Hall et.al., 2008) (Anderson, 2009). While at Bote, Mosima passed away and was succeeded by Monaheng (Hall et.al., 2008) (Anderson, 2009). The farm Houwater is located 64 km north-west of the present study area.</p> <p>At roughly the same time, the son of Seutlwane, namely Mabe, moved with his followers from Maseletsane on the northern end of Pilwe Hill to Mothoutlung situated on the present-day farm Palmietfontein 208 JP (Breutz, 1953).</p>
Late 1700s	During the reign of kgosi Sekete IV the Bafokeng had “...relations of conflict...” with their Batswana neighbours (Mbenga & Mason, 2010).
1760 – 1770	<p>As a result of the conflict between the Bafokeng and its neighbours (including the Batlokwa ba ga Sedumedi), Kgosi Monaheng moved with his people from Bote to Itlholanoga (Hall et.al., 2008) (Anderson, 2009). They remained here from 1760 to 1770 (Anderson, 2009).</p> <p>Itlholanoga is believed to be located on the present-day farm Doornhoek 91 JQ. Sections of both the Pilanesberg National Park and Sun City are located on this farm. The farm is located 65 km north-west of the present study area.</p>
1780 – 1785	The Batlokwa ba ga Sedumedi chiefdom moved from Itlholanoga to Mankwe in c. 1780. The settlement of Mankwe coincided with the rule of Kgosi Taukobong. Mankwe is located on the farm Zwaarverdiend 234 JP. This farm is situated 57 km north-west of the present study area.
1785 – 1815	<p>In c. 1785 Kgosi Taukobong led the Batlokwa ba ga Sedumedi chiefdom from Mankwe to Maruping, which is located in the Pilwe Hills (Anderson, 2009). A succession battle during the early nineteenth century split the Tlokwa chiefdom in two, with Kgosi Molefe and his followers fleeing approximately 50 km to the west to establish themselves at Kolontwaneng (present day farm Grootfontein 225 JP). Molefe and his followers established the Batlokwa ba ga Bogatsu at Kolontwaneng.</p> <p>Meanwhile, the balance of the Batlokwa ba ga Sedumedi remained at the Pilwe Hills until 1815 (Anderson, 2009).</p>
1815	<p>Under its new leader Bogatsu, the Batlokwa chiefdom moved to Marothodi in 1815. Marothodi is located on the present-day farms of Bultfontein 204 JP, Diamant 206 JP and Vlaktefontein 207 JP. Of these, the latter farm is situated nearest to the present study area at a distance of 119 km to the north-west.</p> <p>While the chief moved to Marothodi, a section of the Batlokwa ba ga Sedumedi remained behind in the Pilwe Hills (Anderson, 2009).</p>
c. 1820	During the reign of Bogatsu the Batlokwa became embroiled in another conflict with the Bafokeng. As a result, the Bafokeng, under its chief Moseletsane, marched on the Batlokwa at Pilwe and Marothodi. The Tlokwe met the Bafokeng on the plain to the west of the Pilwe Hills where the Bafokeng chief was eventually captured and executed by the Batlokwa (Anderson, 2009).
c. 1823	The Batlokwa ba ga Sedumedi remained at Marothodi until c. 1823 when they moved to present-day Botswana (Anderson, 2009).
1827 - 1832	The Khumalo Ndebele (Matabele) of Mzilikazi established themselves along the Magaliesberg Mountains, having moved here from the central Vaal River. In c. 1832 the Khumalo Ndebele moved to the Marico River (Bergh, 1999).

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	Dr. J.CC Pistorius interpreted a number of settlement features that he identified some 30 km north-west of the present study area, as a Matabele settlement (Pistorius, 1996).
1829 - 1837	During this period, a number of expeditions led by explorers, missionaries, hunters and adventurers travelled through the general surroundings of the study area. These included the expeditions of Robert Schoon & William McLuckie (1829), Robert Moffat (1829), Andrew Smith (1835) and Cornwallis Harris (1836-1837) (Pistorius, 1996).
1836	The first Voortrekker parties started crossing the Vaal River (Bergh, 1999).
Late 1830s – Early 1840s	<p>These years saw the early establishment of farms by the Voortrekkers in the general vicinity of the study area (Bergh, 1999). One of these Voortrekkers was Stephanus Johannes Paulus (Paul) Kruger, who was President of the Zuid-Afrikaansche Republiek between 1883 and the end of the South African War in 1902. His family formed part of the Voortrekkers who settled in these parts during this time and, in 1841 at the age of 16, Kruger himself became an owner of a farm (Waterkloof) near Rustenburg. He would eventually own a large number of farms in the Rustenburg area, including Boekenhoutfontein 260 JQ (located roughly 48 km north-east of the present study area).</p> <p>During this period the first contacts between the black people residing in the Rustenburg area at the time (including the Bafokeng) and white people took place. According to Bergh (2005) these early contacts resulted in the setting aside of land by the Voortrekker leadership for the Bafokeng people. This land appears to have included the farms Boekenhoutfontein 260 IQ, Turffontein 262 IQ (located 44 km north-west of the present study area) and possibly Kookfontein 265 IQ (39 km north-west of the study area) as well (Bergh, 2005). Mbenga (1997) indicates that the relationship between the Voortrekkers and the Bakgatla were initially also amicable. However, within a short period the relationship between the Voortrekkers and the black groups living in the area around Rustenburg became increasingly strained. For example, Bergh (2005) states that the Bafokeng were eventually dispossessed of their farms. The system of unpaid labour enforced by the Voortrekkers on the local black groups would certainly have deteriorated the relationship further. See for example Morton (1992).</p>
1851	Both the district and town of Rustenburg were established in this year (Bergh, 1999).
Early 1860s	After 1861, Tshomankane Pilane moved with a significant section of the Bakgatla ba ga Kgafela from Saulspoort (on the north-eastern end of what is today known as the Pilanesberg National Park) to establish himself at a place known as Bopitiko (Breutz, 1953). While some authors indicate that Bopitiko is located on the present-day farm Doornhoek 91 JQ, others (Breutz, 1953) (Schapera, 1965) indicates that Bopitiko was located on the farm presently known as Ledig 90 JQ. These farms are both situated approximately 65 km north-west of the study area.
1862	In 1862 Henry Gonin arrived in the Rustenburg District to establish a missionary station for the Dutch Reformed Church. His first mission station was established on the farm Welgeval 171 JQ (Morton, 1992), which is presently located within the Pilanesburg National Park and is located roughly 62 km north-west of the present study area.
1867	Hermannsburg missionary Hermann Wenhold established the Kana mission station amongst the Bafokeng. At the time the mission station was established on the farm Tweedepoort 283 JQ (Bergh, 2005). This farm is situated roughly 30 km west of the study area.

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December 1869	The Kana mission station was moved from the farm Tweedepoort 283 JQ to the farm Reinkoyalskraal 278 JQ (Bergh, 2005). This new location for the Kana Mission Station is located 33 km north-west of the study area.			
	 <p><i>Figure 24 – Photograph taken in 1887 of Kgosi Mokgatle and his sons (Mbenga & Manson, 2010).</i></p>			
1860s – 1870s	<p>With the assistance provided by German missionary Christoph Penzhorn of the Hermannsburg Missionary Society, Kgosi Mokgatle (Figure 24) and the Bafokeng bought a number of farms in proximity to Rustenburg (Bergh, 2005). These acquisitions were an attempt by the Kgosi and the Bafokeng to procure land that had been theirs before the arrival of the first white people.</p> <p>Mbenga & Manson (2010) states that the Bafokeng acquired a total of 24 farms during the second half of the 19th century. Of these, the closest farms to the present study area are Turffontein 262 JQ (located 48 km north-west of the present study area), Doornspruit 106 JQ (located 45 km west of the present study area) and Klein Doornspruit 108 JQ (roughly 61 km north-west of the present study area) (Bergh, 2005). The residence of Chief August Mokgatle is also situated about 10 km north of the survey area (Coetzee 2008).</p>			
1880-1881	<p>The First Boer War (also known as the First War of Independence) took place during this time. The most significant aspect of the war for the town of Rustenburg would have been the besiegement of a company of 2nd Battalion Royal Scots Fusiliers by Boer forces. The siege lasted for 93 days (Wulfsohn, 1992). While the earthwork fort in which the British forces were besieged does not exist anymore, its present location would have been the corner of Kerk and</p>			

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	<p>Von Wielligh Streets. This position is some 26 km north-west of the present study area (Wulfsohn, 1992).</p>
1899 - 1902	<p>The South African War took place during these years. While no skirmishes or battles are known from within the study area, a number of events and activities associated with the war from the surroundings of the study area are known.</p> <p>In early 1900 for example, a group of men from Rustenburg were called upon to establish a laager on the drift over the Elands River “...on the <i>present-day main road to Sun City</i>...” (Wulfsohn, 1992:68). This was to prevent an invasion into Rustenburg by the Bakgatla from Saulspoort and Bechuanaland. The men holding the drift included W.T. Dawes, August Schoch, J.S. (Sammy) Mundel and Philip Brink (Wulfsohn, 1992). The location of this drift is roughly 62 km north-west of the present study area.</p> <p>During the war years the Bakgatla from Saulspoort and Bechuanaland under Kgosi Linchwe I (the son of Kgamanyane Pilane) actively resisted and fought the Boer Commandos and also raided Boer farms across the present-day North West and Gauteng Provinces as far as south of Rustenburg (some sources even indicate that the Kgatla regiments raided farms in the Pretoria District as well). While no clear victors in the fight for the land north of the Elands River emerged, the Bakgatla succeeded in harassing and attacking the Boer forces to the extent that the far north-western areas of the Transvaal Republic were largely left unmanned and unoccupied by Boer forces during much of the war, and especially so as the war progressed. While numerous skirmishes would have taken place around the Pilanesberg as a result of the tug of war between the Boers and Bakgatla, two pitched battles did occur in this area namely at Janskop and Draaiberg (Morton, 1992). These battlefields are located on the northern and north-western ends of the Pilanesberg, and as a result some distance from the present study area.</p> <p>Apart from the drift over the Elands River, another highly strategic point from the surroundings of the study area during the war years was Boschoek Nek. Situated 52 km north-west of the present study area, this topographic feature represented one of only a few passes through the Magaliesberg Mountains. The strategic importance of the nek was not realised at first by the British authorities, with the Boer forces utilising it with impunity on numerous occasions to move men across the mountain range. Even as late as 21 May 1902, reports were received by the British Command in Rustenburg that a group of 30 Boers had crossed over the nek from the west to carry out raids on the Kana Mission Station and Magatostad (Wulfsohn, 1992).</p> <p>This said, Boschoek Nek was at least temporarily occupied by several British units during the guerrilla phase of the war. For example, on 9 June 1901, General Dixon occupied the nek with a force comprising three infantry battalions, several batteries of artillery and numerous mounted horsemen. Boschoek Nek was again held by Colonel Allenby and his men during September 1901 (Wulfsohn, 1992).</p> <p>Other recorded events include the returning to Rustenburg of a column under the command of Colonel Colenbrander on 10 March 1902 from a patrol of the Elands River beyond Boschhoek. While the details of this patrol are not known, it would have been carried out in the immediate surroundings of the study area.</p>
1902	<p>At the end of the South African War the Rustenburg District was divided into three wards, namely Swartruggens, Hex River and Elands River. The current study area fell within the Elands River Ward of the Rustenburg District (Bergh, 1999). During this time, Ramono, the brother of Linchwe I, was installed as</p>

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	kgosi of the Bakgatla ba ga Kgafela living in the then Transvaal (Tlou & Campbell, 1997).
1914 -1915	In 1914 the South African government under General Louis Botha decided to assist Great Britain in its war with Germany. A number of Boer leaders were not happy about this turn of events, and when General Koos de la Rey was killed at a roadblock in Johannesburg emotions reached a boiling point and a Boer rebellion broke across the then Transvaal and Free State. This was also true for the wider surroundings of the study area. On 6 and 7 November 1914, for example, a force of 18 rebels attacked the Pilanesberg Police Station, which at the time was held by a single policeman, Constable Petrus Paulus Jacobus (Piet) Botha. The attack did not succeed (Wulfsohn, 1989). While the exact location of this police station is not presently known, Mr Wulfsohn indicates that it was near Sun City.
1924	<p>In this year the famous geologist Hans Merensky was shown a sample of platinum ore that a Mr. Andries Lombard had found near Lydenburg. Merensky managed to trace a platinum reef all along the outer edge of the Bushveld Complex from Lydenburg to Rustenburg. This reef was to be known as Merensky Reef (Carruthers, 2007).</p> <p>The discovery of the Bushveld Complex was of extensive economic significance for South Africa. As indicated by Wikipedia, the Bushveld Igneous Complex “...contains the world’s largest reserves of platinum-group-metals (PGMs) – platinum, palladium, osmium, iridium, rhodium, and ruthenium – along with vast quantities of iron, tin, chromium, titanium and vanadium.”</p> <p>The complex was traced along two zones or belts, known as the Western and Eastern Belt. The Western Belt is of significance for the present study. The relevant government survey reports and later studies all indicate that the Western Belt “...extends for about 100 miles as follows: from Brits towards Rustenburg and then northwards, skirting the Pilanesberg on its western side and continuing almost as far as the Crocodile River.” See for example The Official Year Book of the Union (1938:862).</p> <p>The identification of the Bushveld Igneous Complex inter alia between Rustenburg and the west of the Pilanesberg, meant that the surroundings of the study area were increasingly prospected and mined in the years after 1924.</p>
December 1924	<p>A branch line was opened between Rustenburg and Boschhoek (Higginson, 2014). This development would have stimulated mining exploration and development in areas around Boschhoek.</p> <p>At the time, the Boschhoek railhead would have been located roughly 50 km north-west of the study area.</p>
April 1929	In April 1929, E.R. Schoch published his “ <i>Notes on the Nickel and Copper Deposits in the Norite Complex of the Pilansberg, District Rustenburg, Transvaal</i> ” in the Journal of the South African Institute of Mining and Metallurgy. This, and other attempts at prospecting and exploring the mineral wealth of the areas to the west of the Pilanesberg, would have stimulated the mineral development of the wider surroundings of the study area.
August 1936	Palmiet Chrome (Pty) Ltd was established in August 1936. It owned 3,807 morgen of chrome rights on the farm Palmietfontein 208 JP (South African Mining Yearbook, 1941/2), situated some 58 km north-west of the present study area.
15 January 1938	Rustenburg Chrome Mines (Pty) Ltd was established on this day and at the time held options on the farm Vogelstruisnek 173 JP (South African Mining Yearbook, 1941/2), situated roughly 77 km north-west of the present study area.

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1966	In 1966 the Apartheid government forcibly relocated the Bakubung ba Ratheo from Molotestad near Boons (roughly 32 km south of the present study area) to the farms Wydhoek, Ledig and Koedoesfontein. When Bophutatswana was established a decade later, these farms were handed over to the Bantustan (www.wikipedia.org). See also Historia (2000).
6 December 1977	The South African government granted independence to Bophutatswana on 6 December 1977 (www.wikipedia.org).
1977	The Pilanesberg National Park was established in 1977 and during its early years was managed by the then Agricultural Development Corporation of Bophutatswana (Carruthers, 2011).

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 BGG or archaeological sites present in the footprint area.

Historical topographic maps (1:50 000) and orthophotos for various years (1960 and 1968) 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 BGG. 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.

Figure 25 indicates several potential heritage features including mining infrastructure, shafts, huts and homesteads, trig beacons and farming infrastructure. No LIA walling is indicated, however, the orthophoto (**Figure 26**) indicates a large stone walled settlement on the eastern side of the koppie in the present study area and another on the northern side. Google satellite imagery for various years (2004-2025) indicates a vast network of LIA walling particularly on the southern and eastern side of the koppie during seasons with low vegetation cover (**Figure 27**). Overall, the progression of occupancy of the area during the Iron Age was succeeded by large-scale farming and eventually by mining, with each phase leaving its traces upon the landscape.

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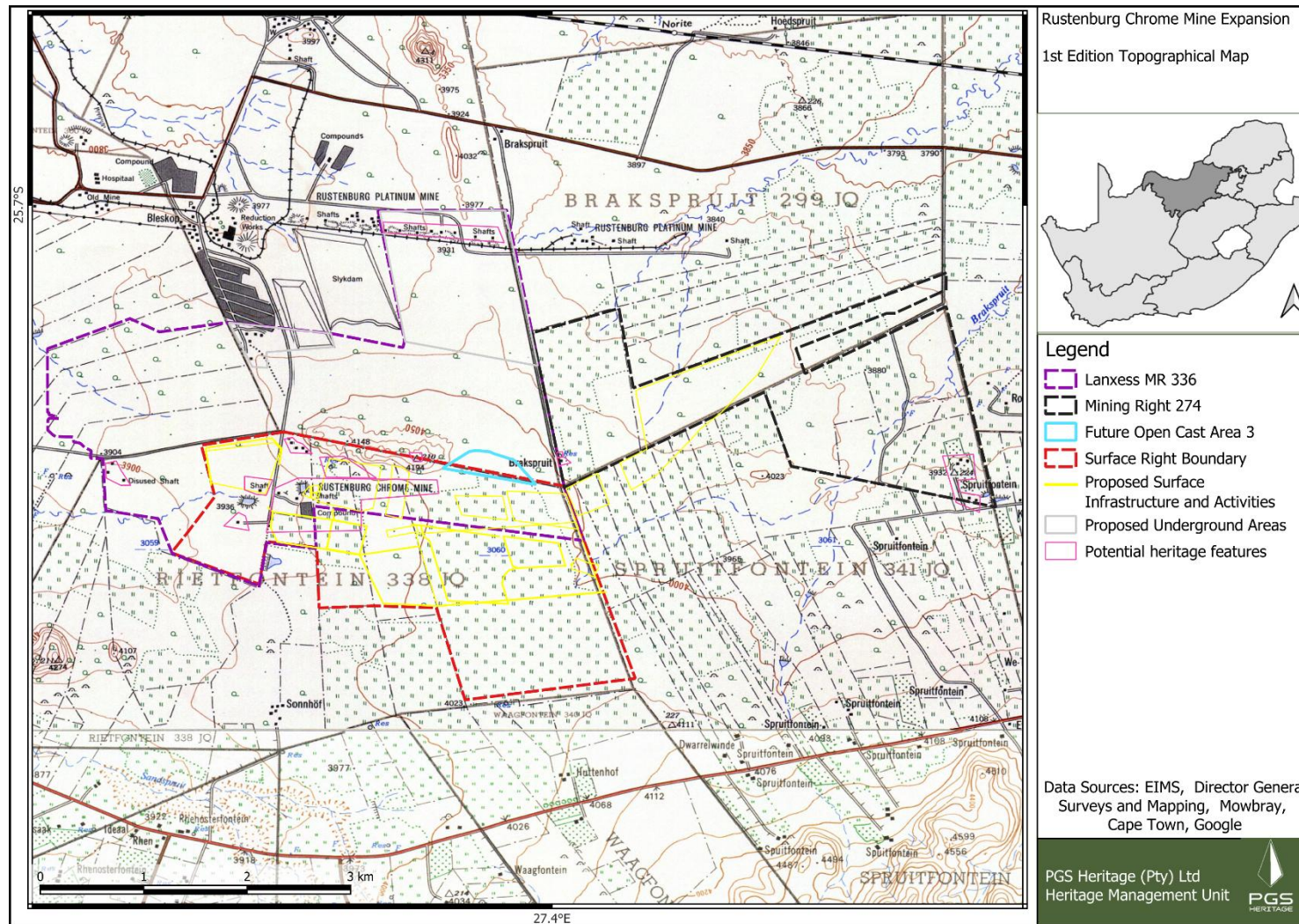


Figure 25 - First Edition topographical map 2527CB (1968) with potential heritage features highlighted in pink.

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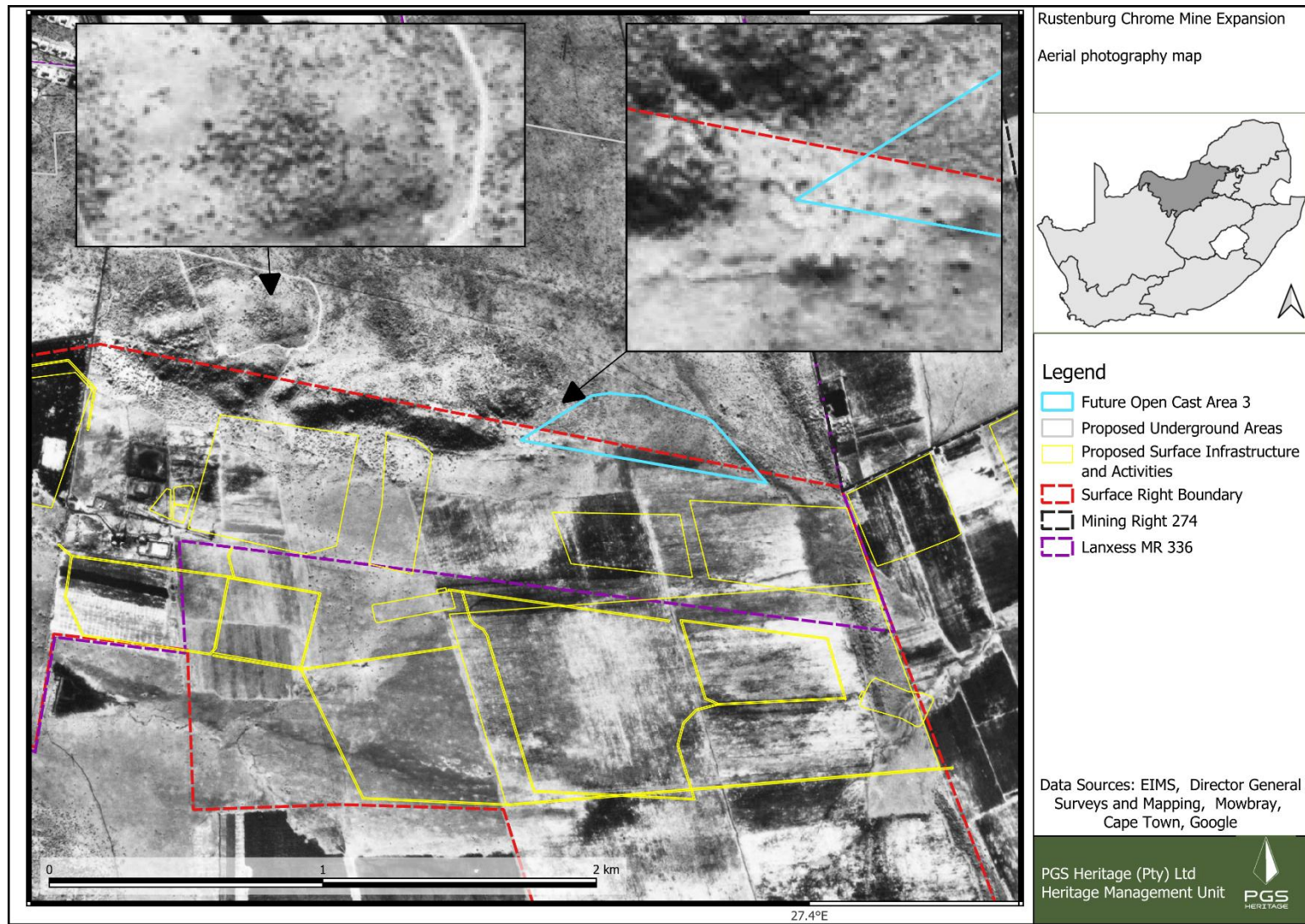


Figure 26 – Historical orthophoto (1960) of the area, with a zoomed in section of LIA walling visible on the eastern/northern side of the koppie.

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Figure 27 - Iron Age walling identified through satellite imagery.

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

A search of the SAHRIS database indicates 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:

- VAN SCHALKWYK, J., & PELSER, A. (1999). A Survey of Cultural Resources on the Farms Spruitfontein 341 JQ and Kafferskraal 342 JQ, Rustenburg District. Pretoria: National Cultural History Museum. **The study identified an extensive LIA site consisting of cattle kraals, terraces and other stone structures, a site with decorated pottery, grinding stones and hammer stones, foundations/remains of an old homestead/farmstead and two unmarked graves.**
- VAN SCHALKWYK, J., & PELSER, A. (2001). A survey of Cultural Resources on the farm Kroondal 304JQ, East of Rustenburg. Pretoria: National Cultural History Museum. **The study indicated the historical town of Kroondal (1889) and identified 3 sites with extensive LIA walling.**
- PISTORIUS, J.C.C. 2003. A Heritage Impact Assessment (HIA) for SA Ferrochrome's New Proposed Expansion Operations in Boschhoek, North of Rustenburg in the North-West Province of South Africa. **The study identified a number of features and sites. However, only a grave and the remains of old mining activities were considered to be of any significance.**
- COETZEE, F., 2008. Cultural Heritage Survey of the Farm Rietfontein 338JQ, Rustenburg District, North West Province. **A LIA settlement was recorded.**
- PELSER, A.J. 2013. A Report on a Heritage Impact Assessment for the proposed establishment of the Mmaditlhokwa cemetery on portion 122 of the Kafferskraal 342JQ, Rustenburg Magisterial district near Marikana North-West Province. **No heritage resources were identified during the study.**
- PISTORIUS, J.C.C. 2014. Heritage Baseline Report for the Proposed Boshhoek Smelter on Portions of the Farms Boschoek 103 JQ, Bultfontein 259 JQ, Boekenhoutfontein 260 JQ and Stellite 255 JQ. **2 graveyards and 3 single graves were identified during the study.** The nearest of these sites to the present study area is the graveyard GY01 which is located approximately 1 km north-east of the present study area.

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- COETZEE, F. 2014. Proposed Crushing and Screening Plant on the Farm Rietfontein 338JQ, Rustenburg District, North West Province. **6 possible graves and an unidentified heritage site were recorded.**
- COETZEE, F. 2015. Cultural Heritage Assessment for the Amendment to the Environmental Management Programme for the Proposed Tailings Storage Facility (TSF) and Associated Infrastructure at Royal Bafokeng Platinum Styldrift Mine Complex, Rustenburg Local Municipality, Bojanala District Municipality, North West Province. **No heritage resources were identified by this assessment.**
- HIGGIT, N., 2015. Heritage Scoping Report for Lanxess Chrome Mine: Section 102 Amendment. **6 Iron Age stonewall localities, a MSA stone tool scatter and a historical mine shaft (sunk in 1949) were identified by the study.** This report is located within the same area as the current study and is described further below.
- MNGOMEZULU, M. 2015. Phase 1 Heritage Impact Assessment for Section 24G Rectification Process and Water Use License Application for the Chrome Crushing, Screening and Washing plant on Portion 8 of the Farm Boshhoek 103 JQ in Rustenburg, Bojanala Platinum District Municipality, North West Province. **A cemetery was identified during the study.**
- VAN VOLLENHOVEN, A.C. 2016. A Report on a Cultural Heritage Impact Assessment for the Proposed Further Development on Portion 385 of the farm Waterkloof 305 JQ, Rustenburg, North-West Province. **During the study 3 buildings of heritage significance were identified.**
- VAN VOLLENHOVEN, A.C. 2017. A Report on a Cultural Heritage Impact Assessment for the Proposed Rustenburg x 31 Housing Development close to Rustenburg, North-West Province. **During the study no sites of heritage significance were identified.**
- ANGEL. J. 2023a. Proposed Boshhoek Solar PV Cluster Boshhoek Solar 1 On Portion 0 of the farm Rhenosterdoorns 531, portion 1 and 18 of the farm Zwaarverdiend 234, portion 1 of the farm Elandsfontein 102 and the farm Onderstepoort 98, within the Rustenburg Local Municipality and the Bojanala District Municipality in the North West Province. **During the study no heritage resources were identified.**

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- ANGEL. J. 2023b. Proposed Boshhoek Solar PV Cluster Boshhoek Solar 2 On Portion 2, 11 and 12 of the farm Rhebokhoek, portion 18 of the farm Zwaarverdiend 234, portion 1 of the farm Elandsfontein 102 and the farm Onderstepoort 98, within the Rustenburg Local Municipality and the Bojanala District Municipality in the North West Province. **2 recent stone-built structures and a mixed archaeological site were identified by the study.**
- ANGEL. J. 2023c. Proposed Boshhoek Solar PV Cluster Boshhoek Solar 3 On Portion 1, 2 and 4 of the farm Zwaarverdiend 234 within the Rustenburg Local Municipality and the Bojanala District Municipality in the North-West Province. **During the study eleven heritage features and resources were identified consisting of a burial ground, 6 Iron Age sites, 3 Stone Age sites and a mixed context archaeological site.**
- TASKER. D., 2024. Clover Alloys proposed mining of chrome, on the farm Rietfontein 338 JQ, near Rustenburg, North-West Province. **During the study twenty-one heritage features and resources were identified. These consist of two burial grounds with approximately 6 graves and twenty-eight graves respectively, 10 Iron-Age ruins, a site with historical infrastructure, 6 localities with recent historical homestead structures, and 2 low significance archaeological sites.**
- VAN VOLLENHOVEN, A.C. 2024. A Report on a Heritage Impact Assessment for the Proposed Chrome Washing Plant on the Remaining Portion of Portion 8 (Portion of Portion 2) of the Farm Rietfontein 338 JG, Rustenburg Local Municipality, Bojanala Platinum District Municipality, North West Province, Republic of South Africa. **No sites of heritage significance were identified.**
- TASKER. D., 2025. A National Environmental Management Act (Act 107 of 1998) as amended Section 24G Application on the Existing Rietfontein Chrome Wash Plant and Proposed Plant Expansion on the Farm Rietfontein 338JQ, near Kroondal, Rustenburg Local Municipality, Bonjala District Municipality, North West Province. **During the study 6 heritage features were identified. The features consisted of a disturbed Iron Age site on a low koppie, a pottery scatter, a lithic scatter and 2 historical homesteads. Additionally, a large Iron Age occupation was noted in the general area.**

4.2.3 Heritage screening

A heritage screening was conducted by means of the DFFE National Web-based Environmental Screening Tool as required GN 982. According to the heritage screening report, the project area has a Low Heritage Sensitivity with small patches of Very High and High (**Figure 28**). The fieldwork has shown that a number of archaeological and heritage resources were present in the area and

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thus have a higher rating than the original screening rating. This is in part due to the low resolution of the available data that the screening data is based on.

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4.2.4 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

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**).

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 findings¹

The fieldwork was conducted between 5-7 March 2025 and 22-23 September by a PGS field team. Their movement on site was tracked by means of Global Positioning System (GPS) indicated as tracklogs on the map in **Figure 29**. Field description forms were collected with ArcGIS Survey123 in field software.

During the initial fieldwork in March a total of 26 heritage features and resources were identified (**Figure 30**), forming part of a larger LIA occupation of the koppie in the proposed development area and consist of both varying density pottery scatters graded as IIB/IIIC to NCW (**Oc01-a, Oc01-b, Oc01-c, Oc01-d, Oc01-e, Oc01-f, Oc01-g, Oc01-m, Oc01-n, Oc01-o, and Oc01-p**) and LIA

¹ Site in this context refers to a place where a heritage resource is located and not a proclaimed heritage site as contemplated under section 27 of the NHRA.

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walling (**Oc01-h, Oc01-i, Oc01-j, Oc01-k, Oc01-l, Oc01-q, Oc01-r, Oc01-s, Oc01-t, Oc01-u, Oc01-v, Oc01-w, Oc01-x, Oc01-y** and **Oc01-z**) graded as a IIIB.

During the follow-up fieldwork in September, an additional 33 heritage features were identified. 29 of these features were identified as LIA walling sites (**Ex03, Ex05, Ex06, Ex07, Ex08, Ex09, Ex10, Ex11, Ex12, Ex13, Ex14, Ex15, Ex16, Ex17, Ex18, Ex19, Ex20, Ex21, Ex22, Ex23, Ex24, Ex25, Ex27, Ex28, Ex29, Ex30, Ex31, Ex32, Ex33** and **Ex35**) of varying degrees of preservation all forming part of a larger LIA occupation of the koppie, graded as IIB. Additionally, probable stone packed graves (**Ex01**) graded as IIIA, An ESA lithic scatter (**Ex13**) graded as IIIC, a historical homestead (**Ex34**), with a possibility of infant burials being present, graded as IIIB, and extensive historical walling (**Ex03** and **Ex04**) where the building stones were reused from the LIA site complex were documented.

Numerous studies (Van Vollenhoven 2014; Higgitt 2015; Tasker 2024) have also identified various other heritage resources including: two graveyards (**Clo01** and **Clo15**), historical mining infrastructure (A mine shaft sunk in 1949 (**De01**), and a reservoir - **Clo14**), a historical homestead (**Clo13**), a past community settlement (**Clo12a, Clo12b, Clo12c, 12d** and **Clo12e**), an ungraded heritage site, MSA stone tool scatters (**Ft/001, Clo06** and **Clo11**) and further LIA occupation of the koppie in the study area (**Ft/002, Ft/003, Ft/004, Ft/005, Ft/006, Ft/007, Clo02, Clo03, Clo04, Clo05, Clo07a, Clo07b, Clo08a, Clo08b, Clo09** and **Clo10**), as well as beyond the koppie (**67, 68** and **69**) (Refer: **Figure 30**). Desktop analysis (**Figure 25; Figure 26; Figure 27**) further highlights the extent of LIA walling around the koppie and fieldwork has indicated that additional LIA walling is present, despite not being visible on satellite imagery. Historical mapping has also revealed a historical trigonometry beacon (**De02**) within the study area.

With the current project layout; LIA sites **67, 68, 69** are not located near any surface infrastructure and are therefore not at any risk of impact/disturbance by the currently proposed infrastructure. Additionally, for **Clo15**, a cemetery in the mining area that has already been fenced off by the mine, no impacts are foreseen.

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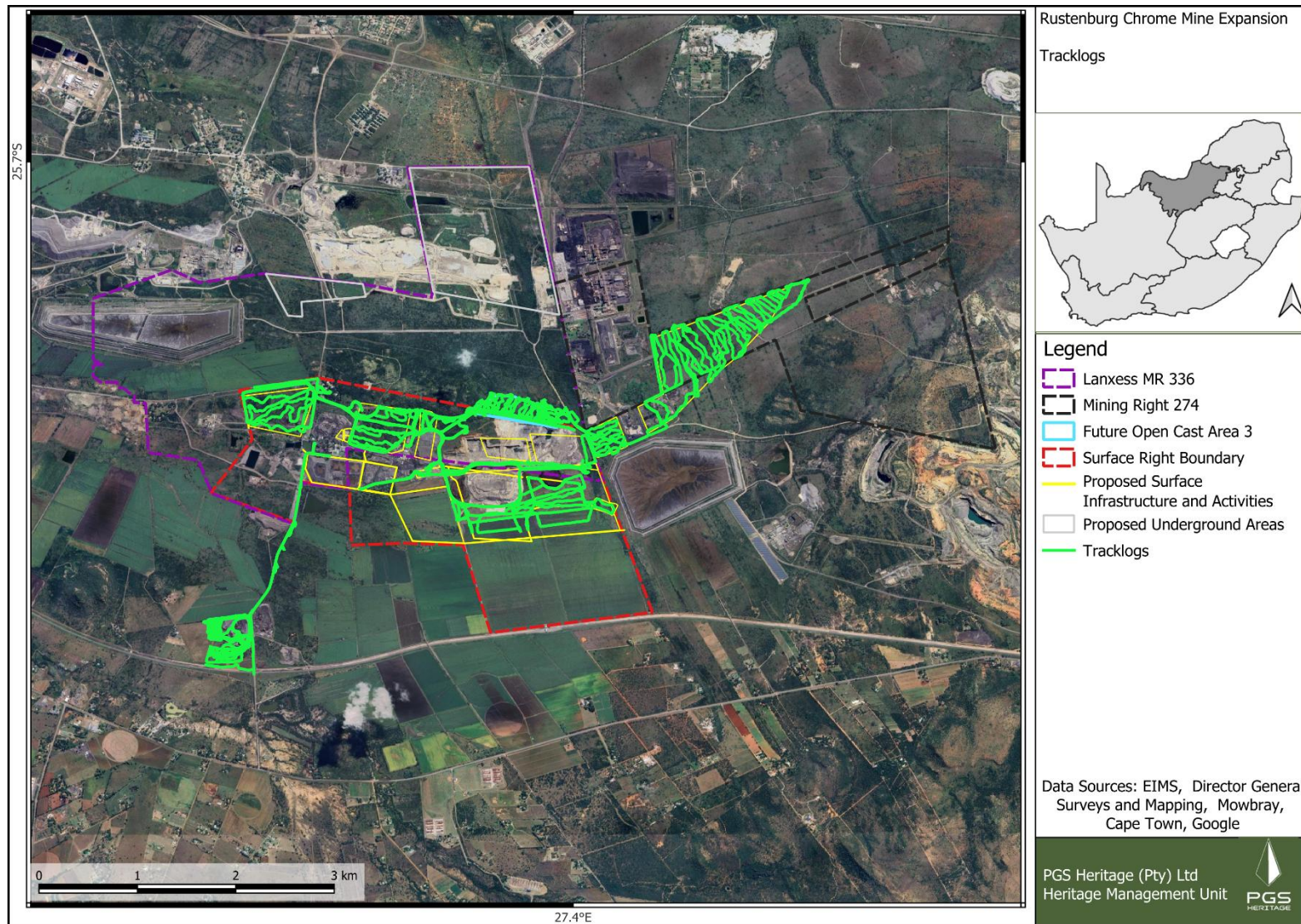


Figure 29 - Fieldwork tracklogs (track in green).

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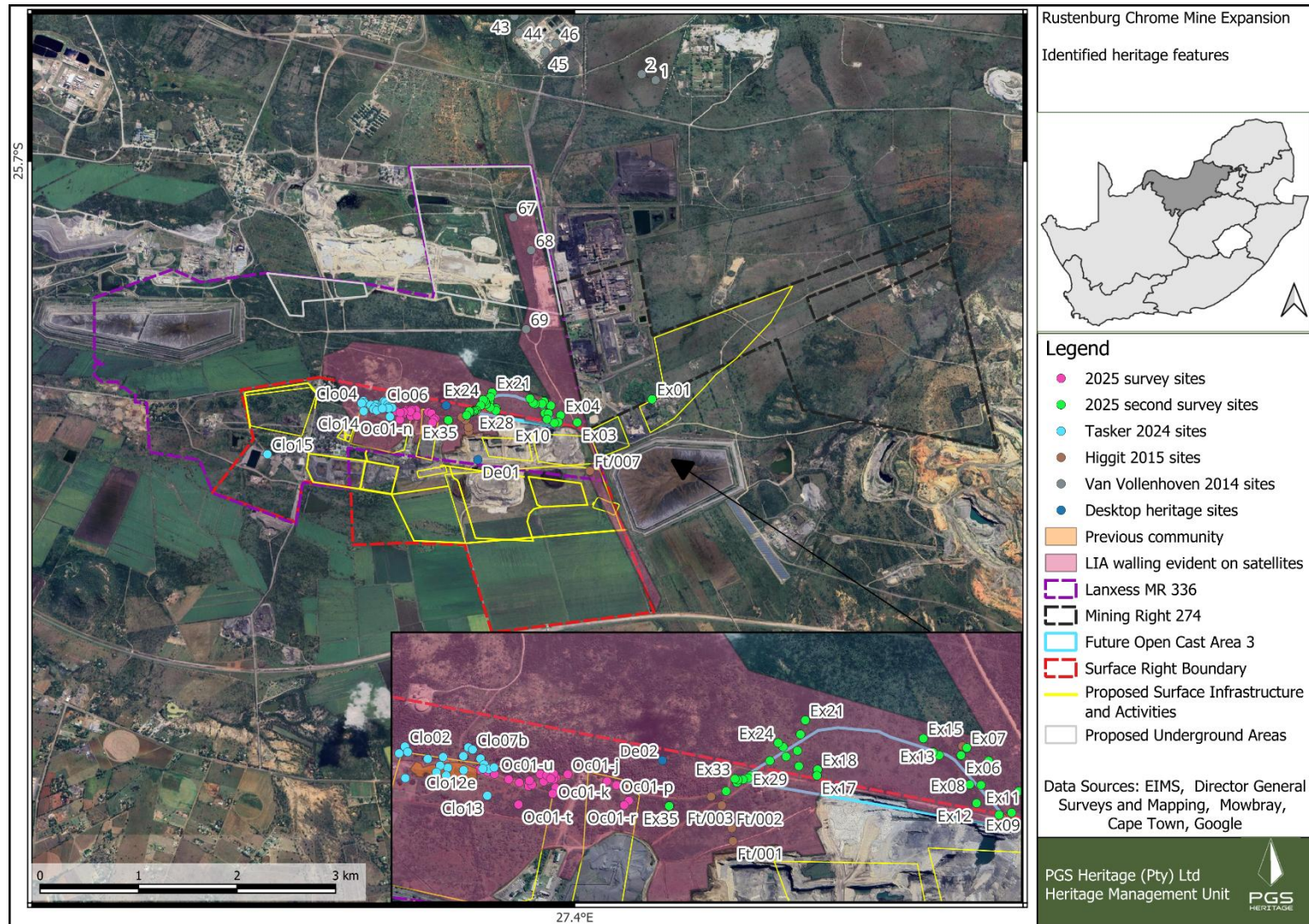


Figure 30 - Identified heritage resources within the development area.

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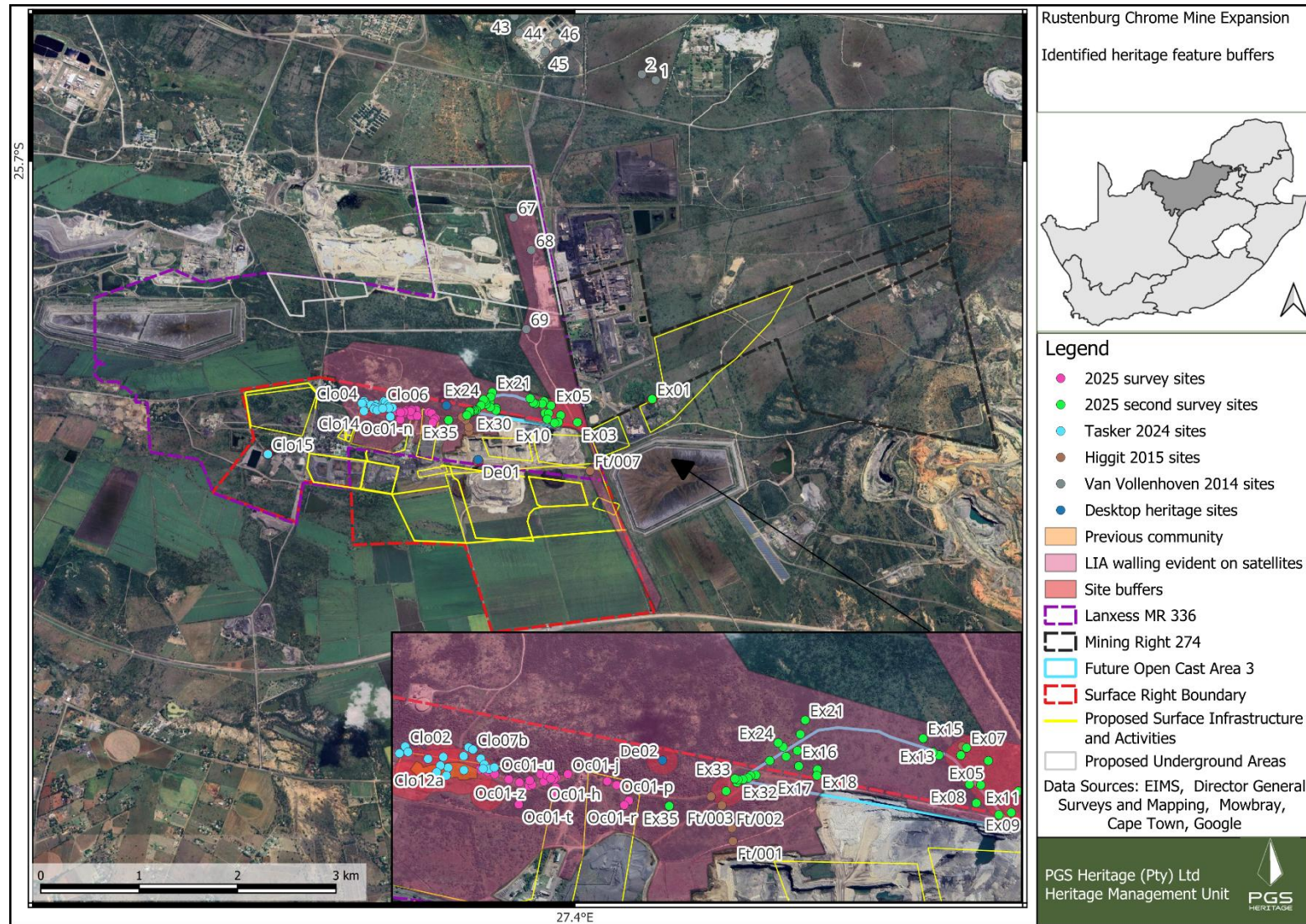


Figure 31 - Identified heritage site buffers in red, Iron Age site complex in pink and a zoomed in map of area 3.

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4.4 Palaeontology

A Palaeontological Assessment is not required despite the DFFE Screening Tool indicating a Medium palaeontological sensitivity (**Figure 32**), the SAHRIS 1:250000 palaeontological map rates the area as having Insignificant/Zero palaeontological sensitivity (**Figure 33**) therefore, requiring no further action.

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Screening Report Map

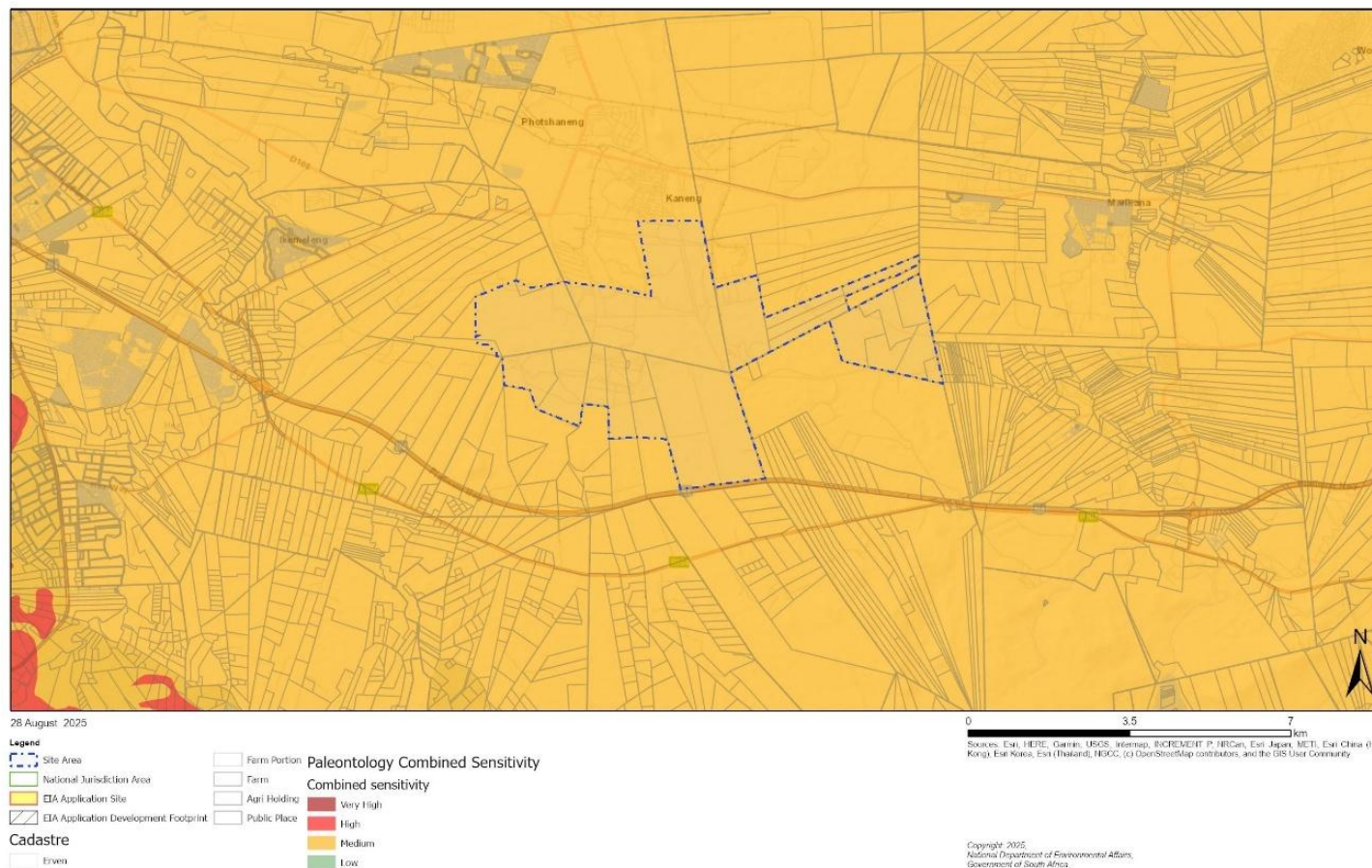


Figure 32 - The DFFE screening tool's indication of a medium palaeontological sensitivity of the development area.

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Figure 33 - Zoomed in map of the proposed development area with a grey (Insignificant/Zero) SAHRIS palaeontological sensitivity indicated.

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5 IMPACT ASSESSMENT

The impact assessment rating is based on the rating scale as contained in **Appendix A** where raw tabular data of the heritage impacts according to EIMS methodology can be seen as well.

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

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.

5.1.1 Burial grounds and graves

The BGG at sites **Clo01** and **Clo15**, as well as the possible burials at **Clo12**, **Clo13**, **Ex01** and **Ex34** have a high local heritage significance with IIIA heritage grading. The project can potentially have a HIGH 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 recent historical structures identified during the fieldwork (**Clo12**, **Clo13**, **Ex34**, **Clo14**, **De01** and **De02**) is calculated as having a HIGH/MEDIUM-LOW significance before and LOW after the implementation of the proposed mitigation measures.

5.1.3 Archaeological resources

The 56 LIA archaeological sites (**Oc01-a-z**; **Ft002-Ft006**; **67-69**; **Clo02**, **Clo03**, **Clo04**, **Clo05**, **Clo07a-b**, **Clo08a-b**, **Clo09**, **Clo10**; **Ex03**, **Ex05**, **Ex06**, **Ex07**, **Ex08**, **Ex09**, **Ex10**, **Ex11**, **Ex12**, **Ex13**, **Ex14**, **Ex15**, **Ex16**, **Ex17**, **Ex18**, **Ex19**, **Ex20**, **Ex21**, **Ex22**, **Ex23**, **Ex24**, **Ex25**, **Ex27**, **Ex28**, **Ex29**, **Ex30**, **Ex31**, **Ex32**, **Ex33** and **Ex35**) have a medium local heritage significance with a IIIB heritage grading. The possibility of the archaeological resources impacted by the proposed project

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cannot be excluded and the project can potentially have a HIGH impact without and LOW with mitigation.

5.1.4 Palaeontology

The HIA notes that the paleontological significance and potential of the geology of the area is rated as low to zero.

5.2 Impact assessment summary table

Implementing the impact assessment methodology as supplied by EIMS:

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Table 6 provides a quantitative assessment of the impacts of the proposed project, while **Table 7** provides a summary of the findings.

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Table 6: Impact Table – Archaeology.

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
Oc01-a-z/ Ft002 - Ft006/ 67-69 Clo02 Clo03 Clo04 Clo05 Clo07 a-b Clo08 a-b Clo09 Clo10 Ex03 Ex05 Ex06 Ex07 Ex08 Ex09 Ex10 Ex11 Ex12 Ex13 Ex14 Ex15 Ex16 Ex17 Ex18	LIA Archaeological sites	Proposed project	Construction	-1	3	5	2	5	5	-21,25	-1	1	5	1	5	1	-3	High	1	3	1,25	-3,75

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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
Ex19 Ex20 Ex21 Ex22 Ex23 Ex24 Ex25 Ex27 Ex28 Ex29 Ex30 Ex31 Ex32 Ex33 Ex35																						
Ex03 Ex04	Historical kraal walling made from LIA walling	Proposed project	Construction	-1	2	5	2	5	5	-17,5	-1	1	5	1	5	1	-3	High	1	3	1,25	-3,75
Clo12 Clo13 Ex34	Historical homesteads with potential infant burial	Proposed project	Construction	-1	3	5	2	5	4	-17	-1	1	5	1	5	1	-3	High	1	3	1,25	-3,75
Clo01 Clo15	Graveyards	Proposed project	Construction	-1	3	5	2	5	4	-17	-1	1	5	1	5	1	-3	High	1	3	1,25	-3,75
Ex01	Possible Graves	Proposed project	Construction	-1	3	5	2	5	4	-17	-1	1	5	1	5	1	-3	High	1	3	1,25	-3,75
Clo14 De01	Mining Infrastructure	Proposed project	Construction	-1	2	5	2	5	4	-14	-1	1	5	1	5	1	-1	High	1	1	1,00	-1,00

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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
De02	Historical infrastructure	Proposed project	Construction	-1	2	5	2	5	2	-7	-1	1	5	1	5	1	-1	High	1	1	1,00	-1,00

Table 7: Impact table summary – Description and assessment of impacts

Impact	Phase	Pre-mitigation Impact	Post-mitigation Impact	Final Significance
LIA archaeological sites	Construction	High	Low	Low
Historical kraal walling made from LIA walling	Construction	High	Low	Low
Historical homesteads with potential infant burial	Construction	High	Low	Low
Graveyards	Construction	High	Low	Low
Possible Graves	Construction	High	Low	Low
Mining Infrastructure	Construction	High	Low	Low
Historical infrastructure	Construction	Medium to low	Low	Low

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6 MANAGEMENT RECOMMENDATIONS AND GUIDELINES

The following section must be read in conjunction with **Table 9** of this report.

6.1 Construction and operation phases

The project will encompass a range of activities during the construction phase, including ground clearance, establishment of construction camp areas and small-scale infrastructure development associated with the project.

It is possible that cultural material will be exposed during construction and may be recoverable, keeping in mind delays can be costly during construction, 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. It is also possible that substantial alterations will be implemented during this phase of the project, and these must be catered for. 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 Finds Procedure (CFP) 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 Environmental Control Officer (ECO) as well as team leaders in the identification of heritage resources and artefacts **during the implementation of the Environmental Management Programme (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.
- 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 a contingency plan so that operations could move elsewhere temporarily while the materials and data are recovered.

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- 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 context 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 BGG
- Iron Age artefacts
- Stone Age concentrations

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 8** gives guidelines for lead times on permitting.

Table 8: 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 – heritage practitioner/archaeologist and SAHRA	3 months
Documentation, excavation and archaeological report on the relevant site	Service provider – heritage practitioner/archaeologist	3 months
Handling of chance finds – BGG/Human Remains	Service provider – heritage practitioner/archaeologist and SAHRA	2 weeks
Relocation of BGG affected by the development	Service provider – heritage practitioner/archaeologist, SAHRA, Local and Provincial Government	6 months

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6.5 Heritage Management Plan for Environmental Management Programme

Table 9: 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)
1. Legal Compliance							
General project area	Implement a chance to find procedures in case where possible heritage finds are uncovered.	Construction	During construction	Applicant ECO Heritage practitioner/Archaeo logist	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 BGG, Clo01 and Clo15 and possible BGG Clo12, Clo13, Ex01 and Ex34, should be retained and avoided with a buffer zone of 50 m 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 section 36 of the NHRA and its regulations as well as the National Health Act (Act 61 of 2003) (NHA) and its regulations.	Construction	During Construction	Applicant ECO) Heritage practitioner/Archaeo logist	Monthly	Ensure compliance with relevant legislation and recommendations from SAHRA under section 36 and 38 of NHRA	ECO Monthly Checklist/Report
Historical Structures	Clo12, Clo13, Ex34, Clo14, De01 and De02 to be avoided with a 50 m buffer . If the structures are to be altered or demolished it will require a permit from the North West Provincial Heritage Resources Authority (PHRA) in accordance with section 34 of the NHRA.	Pre-construction	After the approval of the Environmental Authorization (EA) and before construction occurs	Applicant ECO Heritage practitioner/Archaeo logist		Ensure compliance with relevant legislation and recommendations from SAHRA under section 35, 36 and 38 of the 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)
1. Legal Compliance							
	If graves are discovered, 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 Section 36 of the NHRA and its regulations as well as the NHA and its regulations.						
Archaeological sites	The LIA site complex as indicated in Figure 30 must be retained with a 50 m buffer or a Phase II mitigation process must be enacted. Here isolated sites will not be analysed but instead the entire site complex. Archaeological mitigation permits will be applied for under SAHRA and only after the Phase II report was submitted can destruction permits be applied for. Additionally, monitoring during site clearing in a 50 m radius from the identified archaeological LIA site complex through the implementing of an archaeological watching brief	Construction	Construction	Applicant Heritage practitioner/Archaeologist SAHRA Relevant PHRA	Monthly	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 of the NHRA	Report after construction
Palaeontological resources	If fossil remains or trace fossils are discovered during any phase of construction, either on the surface or exposed by excavations the ECO in charge of these developments 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 can be carried out by a palaeontologist	Construction	During Construction	Applicant ECO	Monthly	Ensure compliance with relevant legislation and recommendations from SAHRA under section 36 and 38 of the NHRA	ECO Monthly Checklist/Report

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7 CONCLUSIONS AND RECOMMENDATIONS

The HIA identified various heritage resources within the study area including archaeological resources and BGG which are rated as having a high heritage significance and will require further mitigation work before the project can continue.

The study identified 56 heritage resources, mostly forming part of a larger LIA occupation of the koppie and consist of both varying density pottery scatters graded as IIIB/IIIC to NCW and LIA walling graded as IIIB. Additionally, an ESA scatter, a clay and stone built homestead with possible infant burials and an expansive extent historical stone walling, where the stones used to build it were robbed from the LIA settlement, were documented.

Previous studies in the footprint have also identified various other heritage resources including: two cemeteries or graveyards, historical infrastructure, a historical homestead, a past community settlement, an ungraded heritage site, MSA stone tool scatters and further LIA occupation of the koppie located in the study area. Desktop analysis further highlighted the greater extent of LIA walling around the koppie and fieldwork has indicated that LIA walling is present at/near the koppie despite not being visible on satellite imagery.

7.1 Historical Structures

During the survey several historical structures were found including a historical homestead (**Ex34**) with possible infant burials being present, graded as IIIB, and extensive historical stone walling (**Ex03** and **Ex04**) where the building stones were reused from the LIA site complex were documented.

Numerous previous studies (Higgit 2015; Tasker 2024) have also identified various other historical sites, such as historical mining infrastructure (a mine shaft sunk in 1949 (**De01**), a reservoir **Clo14**), a historical homestead (**Clo13**), a past community settlement (**Clo12a**, **Clo12b**, **Clo12c**, **12d** and **Clo12e**) and desktop analysis has revealed a trigonometry beacon (**De02**), that is older than 60 years. All historical structures are protected under Section 34 of the NHRA and as such should be avoided by a 50 m buffer or sufficient mitigation would require a permit from the North West PHRA. If graves are discovered, 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 Section 36 of the NHRA and its regulations as well as the NHA and its regulations.

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7.2 Archaeological Sites

During the initial fieldwork in March a total of 26 heritage features and resources were identified (**Figure 30**), forming part of a larger LIA occupation of the koppie in the proposed development area and consist of both, varying density pottery scatters graded as IIIB/IIIC to NCW (**Oc01-a, Oc01-b, Oc01-c, Oc01-d, Oc01-e, Oc01-f, Oc01-g, Oc01-m, Oc01-n, Oc01-o, and Oc01-p**) and LIA walling (**Oc01-h, Oc01-i, Oc01-j, Oc01-k, Oc01-l, Oc01-q, Oc01-r, Oc01-s, Oc01-t, Oc01-u, Oc01-v, Oc01-w, Oc01-x, Oc01-y and Oc01-z**) graded as a IIIB.

During the follow-up fieldwork in September, an additional 32 heritage features were identified. 29 of these features were identified as LIA walling sites (**Ex03, Ex05, Ex06, Ex07, Ex08, Ex09, Ex10, Ex11, Ex12, Ex14, Ex15, Ex16, Ex17, Ex18, Ex19, Ex20, Ex21, Ex22, Ex23, Ex24, Ex25, Ex27, Ex28, Ex29, Ex30, Ex31, Ex32, Ex33 and Ex35**) with varying degrees of preservation all forming part of a larger LIA occupation of the koppie, graded as IIB.

Numerous studies (Van Vollenhoven 2014; Higgitt 2015; Tasker 2024) have also identified various other LIA sites (**Ft/002, Ft/003, Ft/004, Ft/005, Ft/006, Ft/007, Clo02, Clo03, Clo04, Clo05, Clo07a, Clo07b, Clo08a, Clo08b, Clo09 and Clo10**) in the footprint.

NCW MSA scatters (**Ft/001, Clo06 and Clo11**) from previous studies, as well as newly documented **Ex13**, represent Stone Age occupation near the koppie. However, all concentrations of the past documented lithics have yet to produce sufficiently dense concentrations feasible for scientific study. The mitigation recommended here for **Ex13** is to be documented as part of this HIA due to its low scientific potential.

Archaeological resources are generally protected under Section 35 of the NHRA and should be avoided by a minimum 50 m buffer, if this is not feasible, a Phase II mitigation along with excavation and destruction permits must be completed before any work may commence.

7.3 Burial grounds and graves

During this survey, probable stone packed graves (**Ex01**) graded as IIIA, were documented. Tasker (2024) also identified various other grave sites (**Clo01 and Clo15**) within the footprint area.

Graves are protected under section 36 and 38 of the NHRA with a minimum 50 m buffer, if this is not feasible 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 section 36 of the NHRA and its regulations as well as the NHA and its regulations.

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7.4 Palaeontology

A Palaeontological Assessment was not necessary.

7.5 Mitigation measures

Mitigation measures are described in **Table 9** of this report.

Considering the current layout; LIA sites **67, 68, 69** are not located near any surface infrastructure and are therefore not at any risk of impact/disturbance by the currently proposed infrastructure. Additionally, for **Clo15**, a cemetery in the mining area that has already been fenced off by the mine, no impacts are foreseen. The current mine infrastructure has already disturbed part of the greater LIA site complex (in particular the northern boundary mine road and fence), seeing as the mine intends to expand further into the demarcated LIA stone walling areas, it must be realised that these isolated LIA stone walled structures and features sites cannot be mitigated individually. The entire site must be investigated as a whole and as such a full Phase II mitigation is recommended to document and investigate the site complex.

7.5.1 Mitigation of heritage resources affected by the proposed open cast pit expansion (Area 3)

The greater extent of LIA walling comprises an extensive archaeological settlement and the proposed open cast pit extension falls within this larger settlement. Individual sites identified by this HIA forms part of this settlement and cannot be mitigated in isolation, but needs to be investigated in the context of what currently remains of the larger site as mentioned above (also refer: **Figure 30, Table 9**: Heritage Management Plan for EMPr implementation. and **Appendix B**). Extensive areas of the larger site have also been destroyed and have been impacted on by mining activities increasing the significance of the heritage resources still in existence. Recommendations for the mitigation of sites in previous HIAs have also not been conducted and subsequent disturbance by mining activities of some of the sites have occurred. The following identified sites will be directly affected:

- Stone Age site: **Ex13** (lithic scatter) falls inside the Area 3 boundary.
 - Recommended mitigation is to document the site as part of this HIA. No further mitigation is required.
- Iron Age sites: **Ex08, Ex10, Ex12, Ex14, Ex16, Ex17, Ex18, Ex19, Ex20, Ex25, Ex27, Ex28, Ex29** and **Ex32** and previously documented (**Ft/005**) (Higgit, 2015 HIA) fall within the Area 3 boundary. Within the 50 m buffer zone for Area 3 sites **Ex06, Ex07, Ex09, Ex15, Ex21, Ex22, Ex23, Ex24, Ex31, Ex33** and the previously documented **Ft/006** (Higgit, 2015), as well as **Ex03** and **Ex04** historical kraal walling where LIA walling was reused,

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occur. **Ex05** and previously documented **Ft/003** and **Ft/004** (Higgit, 2015) are located within 100 m of the Area 3 boundary.

- Recommended mitigation of these sites will entail documentation and mapping of the larger extensive Iron Age settlement and archaeological investigation of the individually identified sites listed after which a SAHRA destruction permit can be applied for.
- Historical homestead structure: **Ex34** where infant burials might be present is 57 m from the Area 3 boundary. The indicated 50 m buffer for this site overlaps with that of the Area buffer zone and the site is therefore affected by the proposed open cast pit expansion.
 - Recommended mitigation of this structure is archaeological investigation to determine whether burials are present and documentation of the structure itself. Should burials be found to be present the graves can be relocated following the process required by section 36 of the NHRA (with additional compliance to other applicable legislation) or the site can be managed with the implementation of a Heritage Management Plan (as indicated for BGG in **Table 9**).

7.6 General

It is the combined considered opinion of the heritage specialists that the proposed project will have a direct impact on several 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 historical 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.

8.4 Internet

www.angloboerwar.com

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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

EIMS: IMPACT ASSESSMENT METHODOLOGY

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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 approach may be altered or substituted on a case by case basis if the specific aspect being assessed requires such- such instances require prior EIMS Project Manager approval. The broad approach to the significance rating methodology is to determine the significance (S) of an environmental risk or impact by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relating this to the probability/ likelihood (P) of the impact occurring. The S 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 S to determine the overall final significance rating (FS). The impact assessment will be applied to all identified alternatives.

a. Determination of Significance

The final significance (FS) of an impact or risk is determined by applying a prioritisation factor (PF) to the post-mitigation environmental significance. The significance 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.

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Table 1: Criteria for Determining Impact Consequence

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. Highly localised, limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property or site boundary, or the area within a few hundred meters of the site)
	3	Local (i.e. beyond the site boundary within the Local administrative boundary (e.g. Local Municipality) or within consistent local geographical features, or the area within 5 km of the site)
	4	Regional (i.e. Far beyond the site boundary, beyond the Local administrative boundaries within the Regional administrative boundaries (e.g. District Municipality), or extends into different distinct geographical features, or extends between 5 and 50 km from the site).
	5	Provincial / National / International (i.e. extends into numerous distinct geographical features, or extends beyond 50 km from the site).
Duration	1	Immediate (<1 year, quickly reversible)
	2	Short term (1-5 years, less than project lifespan)
	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/ operation/ decommissioning).
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, or affected environmental components are already degraded)
	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; or where change affects area of potential conservation or other value, or use of resources).
	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; or where change affects high conservation value areas or species of conservation concern)
	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; or disturbance to pristine areas of critical conservation value or critically endangered species)
Reversibility	1	Impact is reversible without any time and cost.

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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 very high time and cost.
5	Irreversible Impact.

Once the C has been determined, the significance 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.

It is noted that both environmental risks as well as environmental impacts should be identified and assessed. Environmental Risk can be regarded as the potential for something harmful to happen to the environment, and in many instances is not regarded as something that is expected to occur during normal operations or events (e.g. unplanned fuel or oil spills at a construction site). Probability and likelihood are key determinants or variables of environmental risk. Environmental Impact can be regarded as the actual effect or change that happens to the environment because of an activity and is typically an effect that is expected from normal operations or events (e.g. vegetation clearance from site development results in loss of species of concern). Typically the probability of an unmitigated environmental impact is regarded as highly likely or certain (management and mitigation measures would ideally aim to reduce this likelihood where possible). In summary, environmental risk is about what could happen, while environmental impact is about what does happen.

Table 2: Probability/ Likelihood Scoring

Probability	1	Improbable (Rare, the event may occur only in exceptional circumstances, the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <5% chance).
	2	Low probability (Unlikely, impact could occur but not realistically expected; >5% and <20% chance).
	3	Medium probability (Possible, the impact may occur; >20% and <50% chance).
	4	High probability (Likely, it is most probable that the impact will occur- > 50 and <90% chance).
	5	Definite (Almost certain, the impact is expected to, or will, occur, >90% chance).

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

$$S = C \times P$$

Table 3: Determination of Significance

Consequence	5- Very High ¹	5	10	15	20	25
	4- High	4	8	12	16	20
	3- Medium	3	6	9	12	15
	2- Low	2	4	6	8	10
	1- Very low	1	2	3	4	5

¹ In the event that an impact or risk has very high or catastrophic consequences, but the likelihood/ probability is low, then the resultant significance would be Low-medium. This does in certain instances detract from the relative importance of this impact or risk and must consequently be flagged for further specific consideration, management, mitigation, or contingency planning.

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		1- Improbable	2- Low	3- Medium/ Possible	4- High/ Probable	5- Highly likely/ Definite
		Probability				

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

Table 4: Significance Scores

S Score	Description
≤4.25	Low (i.e. where this impact is unlikely to be a significant environmental risk/ reward).
>4.25, ≤8.5	Low-Medium (i.e. where the impact could have a significant environmental risk/ reward).
>8.5, ≤13.75	High-Medium (i.e. where the impact could have a significant environmental risk/ reward).
>13.75	High (i.e. where the impact will have a significant environmental risk/ reward).

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

b. Impact Prioritization

Further to the assessment criteria presented in the section above, it is necessary to consider 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 impacts' post-mitigation significance (post-mitigation). This prioritisation factor does not aim to detract from the significance ratings but rather to focus the attention of the decision-making authority on the higher priority/significance issues and impacts. The PF will be applied to the post-mitigation significance 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.
	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.

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Irreplaceable Loss of Resources (LR)	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:

$$\text{Priority} = CI + LR$$

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 (FS), the PF is multiplied by the post-mitigation significance 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 higher significance).

Table 7: Final Environmental Significance Rating

Significance Rating	Description
<-25	Very High (Impacts in this class are extremely significant and pose a very high environmental risk. In certain instances these may represent a fatal flaw. They are likely to have a major influence on the decision and may be difficult or impossible to mitigate. Offset's may be necessary.
<-13.75 to -25	High negative (These impacts are significant and must be carefully considered in the decision-making process. They have a high environmental risk or impact and require extensive mitigation measures).
-8.5 to -13.75	Medium-High negative (i.e. Impacts in this class are more substantial and could have a significant environmental risk. They may influence the decision to develop in the area and require more robust mitigation measures).
<-4.25 to <-8.5	Medium- Low negative (i.e. These impacts are slightly more significant than low impacts but still do not pose a major environmental risk. They might require some mitigation measures but are generally manageable).

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Significance Rating	Description
-1 to -4.25	Low negative (i.e. Impacts in this class are minor and unlikely to have a significant environmental risk. They do not influence the decision to develop in the area and are typically easily mitigated.
0	No impact
1 to 4.25	Low positive
>4.25 to <8.5	Medium-Low positive
8.5 to 13.75	Medium-High positive
>13.75	High positive

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 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 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.
3/12/2024	Update impact criteria descriptions.	01
29/01/2025	Corrections to Significance class numbering	02

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Table 10 - Raw table data for heritage impacts as per EIMS methodology.

Responsibility	Identifier	Aspect	Impact	Alternative	Phase	Event	Pre-Nature	Pre-Extent	Pre-Duration	Pre-Magnitude	Pre-Reversibility	Consequence	Pre-Probability	Pre-Mitigation Significance Score	Pre-Mitigation Significance	Post-Nature	Post-Extent	Post-Duration	Post-Magnitude	Post-Reversibility	Post-Consequence	Post-Probability	Post-mitigation Significance Score	Post-Mitigation Significance	Confidence	Cumulative Impact	Irreplaceable loss	Priority Factor	Final score	Final Significance	Mitigation Measures
PG S	1	Archaeology	LIA archaeological sites	Existing and Proposed Infrastructure	Construction	Normal operations or events	-1	3	5	4	5	-4,25	5	-21,25	High -	-1	1	5	1	5	-3	1	-3	Low -	High	1	1	1,00	-3,00	Low -	The LIA site complex as indicated must be retained with a 50 m buffer or a Phase II mitigation process must be enacted. Here isolated sites will not be analysed but instead the entire site complex. Archaeological mitigation permits will be applied for under SAHRA and only after the Phase II report was submitted can destruction permits be applied for. Additionally, monitoring during site clearing in a 50 m radius from the identified archaeological LIA site complex through the implementing of an archaeological watching brief

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PG S	2	Archaeology	Historical kraal walling made from LIA walling	Existing and Proposed Infrastructure	Construction	Normal operations or events	-1	2	5	2	5	-3,5	5	-17,5	High -	-1	1	5	1	5	-3	1	-3	Low -	High	1	1	1,00	-3,00	Low -	The historical kraal walling (Ex03 and Ex04) built atop the LIA site complex as indicated in must be retained with a 50 m buffer or a Phase II mitigation process must be enacted. Here isolated sites will not be analysed but instead the entire site complex. Archaeological mitigation permits will be applied for under SAHRA and only after the Phase II report was submitted can destruction permits be applied for. Additionally, monitoring during site clearing in a 50 m radius from the identified archaeological LIA site complex through the implementing of an archaeological watching brief
	3	Archaeology	Historical homesteads with potential infant burial	Existing and Proposed Infrastructure	Construction	Normal operations or events	-1	3	5	4	5	-4,25	4	-17	High -	-1	1	5	1	5	-3	1	-3	Low -	High	1	1	1,00	-3,00	Low -	All BGG, Clo01 and Clo15 and possible BGG Clo12, Clo13, Ex01 and Ex34, should be retained and avoided with a buffer zone of 50 m as per SAHRA

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PG S	6	Archaeology	Mining Infrastructure	Existing and Proposed Infrastructure	Construction	Normal operations or events	-1	2	5	2	5	-3,5	4	-14	High -	-1	1	5	1	5	-3	1	-3	Low -	High	1	1	1,00	-3,00	Low -	<p>Clo12, Clo13, Ex34, Clo14, De01 and De02 to be avoided with a 50 m buffer.</p> <p>If the structures are to be altered or demolished it will require a permit from the North West Provincial Heritage Resources Authority (PHRA) in accordance with section 34 of the NHRA.</p> <p>If graves are discovered, 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 Section 36 of the NHRA and its regulations as well as the NHA and its regulations.</p>
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PG S	7	Archaeology	Historical infrastructure	Existing and Proposed Infrastructure	Construction	Normal operations or events	-1	2	5	2	5	-3,5	2	-7	Medium to low -	-1	1	5	1	5	-3	1	-3	Low -	High	1	1	1,00	-3,00	Low -	Clo12, Clo13, Ex34, Clo14, De01 and De02 to be avoided with a 50 m buffer. If the structures are to be altered or demolished it will require a permit from the North West Provincial Heritage Resources Authority (PHRA) in accordance with section 34 of the NHRA. If graves are discovered, 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 Section 36 of the NHRA and its regulations as well as the NHA and its regulations.

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APPENDIX B
SITE DESCRIPTION FORMS

Site coordinates		
site_nr	X	Y
Oc01-a	-25.72502	27.38105
Oc01-b	-25.72510	27.38132
Oc01-c	-25.72517	27.38154
Oc01-d	-25.72534	27.38200
Oc01-e	-25.72545	27.38235
Oc01-f	-25.72556	27.38265
Oc01-g	-25.72552	27.38276
Oc01-h	-25.72541	27.38314
Oc01-i	-25.72529	27.38354
Oc01-j	-25.72518	27.38392
Oc01-k	-25.72534	27.38346
Oc01-l	-25.72561	27.38353
Oc01-m	-25.72581	27.38343
Oc01-n	-25.72578	27.38406
Oc01-o	-25.72540	27.38520
Oc01-p	-25.72553	27.38551
Oc01-q	-25.72604	27.38591
Oc01-r	-25.72618	27.38576
Oc01-s	-25.72647	27.38560
Oc01-t	-25.72616	27.38232
Oc01-u	-25.72517	27.38303
Oc01-v	-25.72518	27.38338
Oc01-w	-25.72521	27.38325
Oc01-x	-25.72516	27.38347
Oc01-y	-25.72532	27.38337
Oc01-z	-25.72538	27.38268
Ex01	-25.72409	27.40785
Ex03	-25.72643	27.40027
Ex04	-25.72573	27.39858
Ex05	-25.72474	27.39760
Ex06	-25.72456	27.39671
Ex07	-25.72432	27.39689
Ex08	-25.72551	27.39699
Ex09	-25.72642	27.39835
Ex10	-25.72649	27.39794
Ex11	-25.72553	27.39736
Ex12	-25.72612	27.39721
Ex13	-25.72456	27.39600
Ex14	-25.72446	27.39580
Ex15	-25.72401	27.39548
Ex16	-25.72441	27.39139
Ex17	-25.72522	27.39202
Ex18	-25.72502	27.39204
Ex19	-25.72491	27.39143
Ex20	-25.72460	27.39102
Ex21	-25.72342	27.39164
Ex22	-25.72388	27.39149
Ex23	-25.72429	27.39092

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Ex24	-25.72416	27.39076
Ex25	-25.72474	27.39049
Ex27	-25.72520	27.39004
Ex28	-25.72522	27.38986
Ex29	-25.72530	27.38978
Ex30	-25.72535	27.38962
Ex31	-25.72544	27.38942
Ex32	-25.72536	27.38945
Ex33	-25.72533	27.38935
Ex34	-25.72572	27.38907
Ex35	-25.72621	27.38722

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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-a	-25.72502	27.38105	16 pieces of undecorated pottery and associated fragments of early recent material occurring in a 5 x 5 m radius. Mostly partially in-situ. Possibly representing a midden. Possibly exposed due to runoff from the koppie or from the grading of the road. This site is associated with the broader Iron Age occupation of the koppie.	Low local	Grade 3 - C (IIIC)

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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-b	-25.7251	27.38132	8 pieces of undecorated pottery including a rim-shard occurring in a 5 x 5 m radius. Possibly exposed due to runoff from the koppie or from the grading of the road. This site is associated with the broader	Low local	Grade 3 - C (IIIC)

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			Iron Age occupation of the koppie.		
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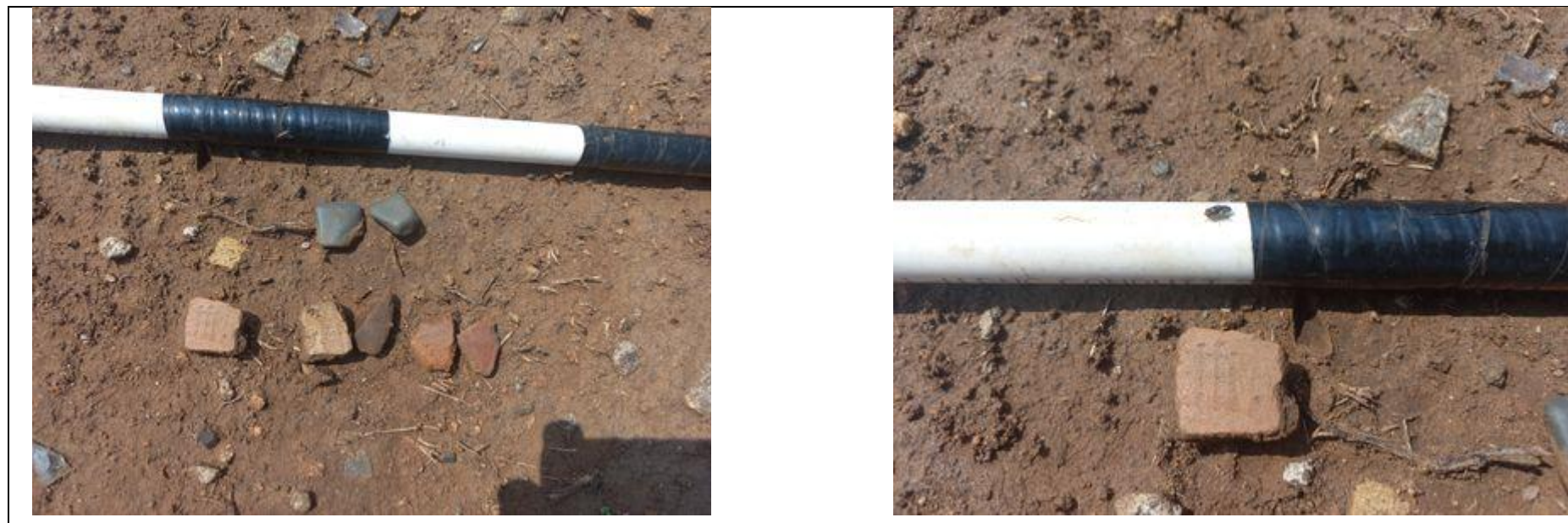


Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-c	-25.72517	27.38154	4 pieces of undecorated pottery, 1 piece with decoration (incised lines) and 2 stones with use wear found exposed on a 5 x 5 m section of a dirt road. Possibly exposed due to runoff from the koppie or	Low local	Grade 3 - C (IIIC)

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			from the grading of the road. This site is associated with the broader Iron Age occupation of the koppie.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-d	-25.72534	27.382	10 pieces of undecorated pottery found in a 5 x 5 m clearing in a dirt road. Possibly exposed due to runoff from the koppie or from the grading of the road. This site is associated with the broader	-	NCW

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			Iron Age occupation of the koppie.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-e	-25.72545	27.38235	6 pieces of undecorated pottery found in a 5 x 5 m section of a dirt road below the koppie. Possibly exposed due to runoff from the koppie or from the grading of the road. This site is associated with the broader Iron Age occupation of the koppie.	-	NCW

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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-f	-25.72556	27.38265	4 pieces of undecorated pottery found in a 5 x 5 m radius on an exposed piece of dirt road. Possibly exposed due to runoff from the koppie or from the grading of the road. This	-	NCW

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			site is associated with the broader Iron Age occupation of the koppie.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-g	-25.72552	27.38276	Pottery cluster. 32 pieces of pottery and animal bones in 3 x 3 m cluster, partially in-situ. Site is a potential midden exposed	Medium local	Grade 3 - B (IIIB)

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			at the surface due to the construction of a dirt road and fence. This site is associated with the broader Iron Age occupation of the koppie.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-h	-25.72541	27.38314	7 pieces of undecorated pottery and Iron Age walling that have been disturbed by road construction to the point where only the wall foundation is visible. This site forms part of the	Medium Local	Grade 3 - B (IIIB)

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			broader Iron Age occupation of the koppie.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-i	-25.72529	27.38354	Pottery cluster and weathered bone in a 5 x 5 m radius (up to 20 shards per m ²). In the larger area Iron Age wall foundations are present with a dirt road cutting through the site. This site forms part of the	Medium Local	Grade 3 - B (IIIB)

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			broader Iron Age occupation of the koppie.		
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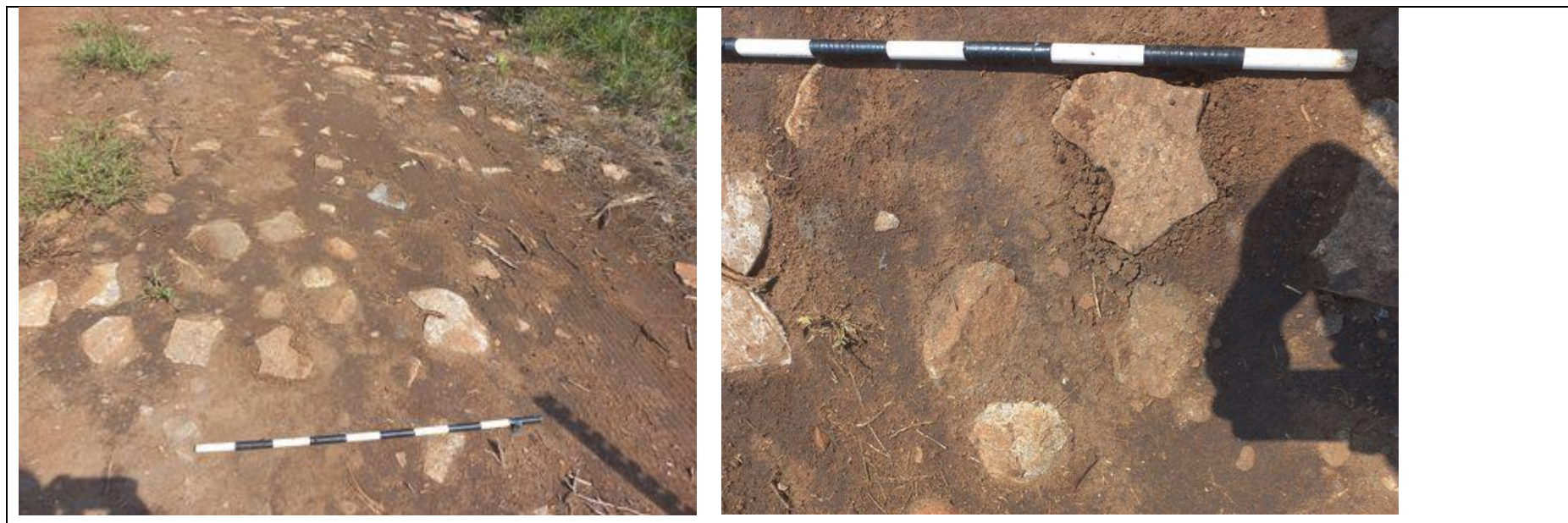
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-j	-25.72518	27.38392	Iron Age stone walling disturbed by road construction. Fragments of pottery present in a 10 x 10 m area associated with the walling. This site forms part of the broader Iron Age occupation of the koppie.	Medium Local	Grade 3 - B (IIIB)

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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-k	-25.72534	27.38346	Stone walling of undetermined extent and structure; due to vegetation overgrowth. This site forms part of the broader Iron Age occupation of the koppie.	Medium Local	Grade 3 - B (IIIB)

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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-I	-25.72561	27.38353	Stone walling of undetermined extent and structure; due to vegetation overgrowth. This site forms part of a broader Iron Age occupation of the koppie.	Medium Local	Grade 3 - B (IIIB)

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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-m	-25.72581	27.38343	5 pottery shards in a 5 x 5 m radius along the overgrown servitude for the powerline. A coin from 1968 is present, corresponding with the construction date of the powerlines. The pottery	-	NCW

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			scatter forms part of the broader Iron Age occupation of the koppie.		
					

Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-n	-25.72578	27.38406	2 pieces of pottery seen in a 5 x 5 m radius where construction of the pipeline next to the fence occurred. This site forms part of the	-	NCW

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			broader Iron Age occupation of the koppie.		
					

Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-o	-25.7254	27.3852	Pottery cluster 5 x 5 m in extent exposed by a dirt road below the koppie. Partially in-situ concentrations of up to 14 shards per m ² are present.	Low local	Grade 3 - C (IIIC)

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			This site forms part of the broader Iron Age occupation of the koppie.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-p	-25.72553	27.38551	6 pieces of undecorated pottery exposed by a dirt road below the koppie. This site forms part of the broader Iron Age occupation of the koppie.	-	NCW

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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-q	-25.72604	27.38591	In-tact Iron Age walling. Shape and size undetermined due to vegetation overgrowth. A stone cairn with a pottery shard is associated. Satellite imagery indicates a large expanse of walling	Medium Local	Grade 3 - B (IIIB)

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			in this area south of the koppie. This site forms part of the broader Iron Age occupation of the koppie.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-r	-25.72618	27.38576	In-tact Iron Age walling. Shape and size undetermined due to vegetation overgrowth. Satellite imagery indicates a large expanse of walling in this area south of the koppie as described for	Medium Local	Grade 3 - B (IIIB)


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			Oc18. This site forms part of the broader Iron Age occupation of the koppie.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-s	-25.72647	27.3856	In-tact Iron Age walling. Shape and size undetermined due to vegetation overgrowth. Satellite imagery indicates	Medium Local	Grade 3 - B (IIIB)

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			a large expanse of walling in this area south of the koppie as described for Oc18. This site forms part of the broader Iron Age occupation of the koppie.		
					

Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-t	-25.72616	27.38232	In-tact Iron Age walling. Shape and size	Medium Local	Grade 3 - B (IIIB)

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			undetermined due to vegetation overgrowth. Satellite imagery indicates a large expanse of walling in the area south-east and south-west of the koppie. This site forms part of the broader Iron Age occupation of the koppie.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-u	-25.72517	27.38303	In-tact Iron Age walling. Shape and size undetermined due to vegetation overgrowth. Previous studies of the koppie indicate a large expanse of walling in this area and specifically at the base of the koppie. This site forms part of the broader Iron Age occupation of the koppie.	Medium Local	Grade 3 - B (IIIB)

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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-v	-25.72518	27.38338	In-tact Iron Age walling, circular in shape. Definitive shape and size undetermined due to vegetation overgrowth. Previous studies of the koppie indicate a large expanse of walling in this	Medium Local	Grade 3 - B (IIIB)

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			area and specifically at the base of the koppie. This site forms part of the broader Iron Age occupation of the koppie.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-w	-25.72521	27.38325	In-tact Iron Age walling. Shape and size undetermined due to vegetation overgrowth. Previous studies of the koppie indicate a large expanse of walling in this area and specifically at the	Medium Local	Grade 3 - B (IIIB)

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			base of the koppie. This site forms part of the broader Iron Age occupation of the koppie.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-x	-25.72516	27.38347	In-tact Iron Age walling. Shape and size undetermined due to vegetation overgrowth.	Medium Local	Grade 3 - B (IIIB)

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			<p>However, a portion of the walling consisting of two parallel walls (1 m apart) was visible (probable cattle path). Previous studies of the koppie indicate a large expanse of walling in this area and specifically at the base of the koppie. This site forms part of the broader Iron Age occupation of the koppie.</p>		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-y	-25.72532	27.38337	Circular stone packed Iron Age walling. Vegetation overgrowth obscures part of the site. The current dirt road and fence have destroyed part of the site and only the foundations remains. Pottery fragments	Medium Local	Grade 3 - B (IIIB)

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			have also been exposed by the road that runs through the walling. Previous studies of the koppie indicate a large expanse of walling in this area and specifically at the base of the koppie. This site forms part of the broader Iron Age occupation of the koppie.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Oc01-z	-25.72538	27.38268	In-tact Iron Age walling. Shape and size undetermined due to vegetation overgrowth. Previous studies of the koppie indicate a large expanse of walling in this area and specifically at the base of the koppie. This site forms part of the broader Iron Age occupation of the koppie.	Medium Local	Grade 3 - B (IIIB)

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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex01	-25.72409	27.40785	Three possible stone-packed graves in a 10 x 10 m area. The first most distinct grave is 2 x 1 m and oriented east-west. Two other possible graves are present on the eastern and	High Local	Grade 3 - A (IIIA)

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			western side of the first grave. Both consist of small stone cairns.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex03	-25.72643	27.40027	Historical square stock enclosure stone walling that was built on top of Iron Age walling. Elements of both circular Iron Age walling and square historical walling are present. The historical	Medium Local	Grade 3 - B (IIIB)

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			walling most likely reused the previous Iron Age stone walling.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex04	-25.72573	27.39858	Stone walled square historical stock enclosure. Most likely the same as Ex03 in which Iron Age walling was robbed to make cattle enclosures.	Medium Local	Grade 3 - B (IIIB)

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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex05	-25.72474	27.3976	A 5 x 5 m collapsed stone walled structure - circular in shape. Next to the historical walling Ex04. This site forms part of the broader Iron Age occupation of the koppie.	Medium Local	Grade 3 - B (IIIB)

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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex06	-25.72456	27.39671	1.5 x 1.5 m stone packed Iron Age feature (possibly a grain bin). Collapsed inwards. On top of a rocky outcrop. This site forms part of the broader Iron Age occupation of the koppie.	Medium Local	Grade 3 - B (IIIB)

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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex07	-25.72432	27.39689	Numerous Iron Age stone packed walling structures utilizing both large natural boulders and smaller packed boulders. There are four in total; one 3 x 3 m, the largest 20 x 20 m, another 3 x 3 m and the	Medium Local	Grade 3 - B (IIIB)

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			second largest 15 x 5 m. The walling is collapsed but remains 80 cm in height in some places. This site forms part of the broader Iron Age occupation of the koppie.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex08	-25.72551	27.39699	A demolished Iron Age circular stone packed feature. A stacked pile of stones is seen as evidence for the dismantling of the structure. Just the flattened foundation of the walling is still visible. This site forms	Medium Local	Grade 3 - B (IIIB)

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			part of the broader Iron Age occupation of the koppie.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex09	-25.72642	27.39835	A 2 x 2 m stone packed circular structure on top of a rocky outcrop. The structure is 60 cm high with trees growing through it. This site forms part of the broader Iron Age occupation of the koppie.	Medium Local	Grade 3 - B (IIIB)

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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex10	-25.72649	27.39794	A 20 x 20 m Iron Age stone packed collapsed circular structure that was originally much larger, however the site has been disturbed. A fence cuts through the walling and on the other side is a road and open	Medium Local	Grade 3 - B (IIIB)

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			cast pit which have destroyed the rest of the Iron Age features comprising this structure. This site forms part of the broader Iron Age occupation of the koppie.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex11	-25.72553	27.39736	A possible grain bin of 1,5 x 1,5 m (disturbed) on top of a rocky outcrop. This site forms part of the broader Iron Age occupation of the koppie.	Medium Local	Grade 3 - B (IIIB)

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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex12	-25.72612	27.39721	A 2 x 2 m stone packed collapsed circular walling feature. This site forms part of the broader Iron Age occupation of the koppie.	Medium Local	Grade 3 - B (IIIB)

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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex13	-25.72456	27.396	A lithic scatter of 13 lithics found in a 5 x 5 m radius next to a rock outcropping (most likely moved there during ploughing). Large blanks over 10 cm for LCT production were noted meaning this assemblage	Low Local	Grade 3 - C (IIIC)

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			dates to the ESA. More lithics were noted in the area.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex14	-25.72446	27.3958	Disturbed circular stone walling. The feature has been razed and only the flattened foundation is still visible. The exact shape and size is unclear but it appears to be 15 x 15 m in size. A large natural	Medium Local	Grade 3 - B (IIIB)

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			boulder was used in its construction. This site forms part of the broader Iron Age occupation of the koppie.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex15	-25.72401	27.39548	A circular stone walled enclosure on a rocky outcrop. The degraded walling is indistinct but three shards of pottery were observed in the middle of the structure. This site forms part of the	Medium Local	Grade 3 - B (IIIB)

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			broader Iron Age occupation of the koppie.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex16	-25.72441	27.39139	A road/path was constructed by stacking rocks on either side, the rocks have subsequently collapsed. The road/path is 4 m wide. The straight walling exceeding 150 m in length is most likely cattle	Medium Local	Grade 3 - B (IIIB)

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			paths associated with the Iron Age settlement. This site forms part of the broader Iron Age occupation of the koppie.		
					

Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex17	-25.72522	27.39202	A 2 x 2 m collapsed circular Iron Age stone walled feature. This site forms part	Medium Local	Grade 3 - B (IIIB)

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			of the broader Iron Age occupation of the koppie.		
					


Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex18	-25.72502	27.39204	A 2 x 2 m collapsed circular Iron Age stone walled feature.	Medium Local	Grade 3 - B (IIIB)

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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex19	-25.72491	27.39143	This site is a razed Iron Age stone walled feature where only the foundation remains. The circular shape is still visible: approximately 40 x 40 m in extent. This site forms part	Medium Local	Grade 3 - B (IIIB)

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			of the broader Iron Age occupation of the koppie.		
					

Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex20	-25.7246	27.39102	A razed Iron Age stone walled structure where only the foundation remains. Walling remnants are present in a 30 x 30 m area but the overall shape is	Medium Local	Grade 3 - B (IIIB)

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			unclear. 12 pottery shards were also documented. In certain places 3 shards could be seen in a 50 x 50 cm area. One of the shards was decorated with small slashes. This site forms part of the broader Iron Age occupation of the koppie.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex21	-25.72342	27.39164	A 20 x 20 m demolished stone walled structure where only the foundations of the circular walling is still visible. A lower grinding stone and a piece of pottery are present on the surface. This site forms part of the	Medium Local	Grade 3 - B (IIIB)

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			broader Iron Age occupation of the koppie.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex22	-25.72388	27.39149	A 20 x 20 m area where a Iron Age circular stone walled structure was demolished. As such, only the foundation of the walling remains. This site forms part of the broader	Medium Local	Grade 3 - B (IIIB)

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			Iron Age occupation of the koppie.		
					

Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex23	-25.72429	27.39092	A 10 x 10 m Iron Age stone packed structure. The walling is more in tact than the walling further from the koppie but it is still collapsed (at only 40 cm	Medium Local	Grade 3 - B (IIIB)

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			high). This site forms part of the broader Iron Age occupation of the koppie.		
					

Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex24	-25.72416	27.39076	A large complex of walling extending to, and around, the koppie. Noticeable scalloping of the walling is evident. Walling appears	Medium Local	Grade 3 - B (IIIB)

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			intact and more than 1 m high. This site forms part of the broader Iron Age occupation of the koppie.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex25	-25.72474	27.39049	A 10 x 10 m stone packed circular Iron Age structure associated with Ex24 that extends into the open cast	Medium Local	Grade 3 - B (IIIB)


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			pit area. This site forms part of the broader Iron Age occupation of the koppie.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex27	-25.7252	27.39004	An Iron Age circular stone walled structure part of a larger site including Ex27-Ex33 (70 m linear extent). This site is part of the	Medium Local	Grade 3 - B (IIIB)

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			broader Iron Age occupation of the koppie.		
					

Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex28	-25.72522	27.38986	An Iron Age circular stone walled structure part of a larger site consisting of Ex27-Ex33 (70 m linear extent). This site is part of	Medium Local	Grade 3 - B (IIIB)

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			the broader Iron Age occupation of the koppie.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex29	-25.7253	27.38978	An Iron Age circular stone walled structure (10 x 10 m) part of a larger site consisting of Ex27-Ex33 (70 m linear extent). This site is part of the broader Iron Age occupation of the koppie.	Medium Local	Grade 3 - B (IIIB)

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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex30	-25.72535	27.38962	An Iron Age circular stone walled structure (20 x 20 m) part of a larger site consisting of Ex27-Ex33 (70 m linear extent). This site is part of the broader Iron Age occupation of the koppie.	Medium Local	Grade 3 - B (IIIB)

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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex31	-25.72544	27.38942	An Iron Age circular stone walled structure (20 x 20 m) part of a larger site consisting of Ex27-Ex33 (70 m linear extent). This site is part of the broader Iron Age occupation of the koppie.	Medium Local	Grade 3 - B (IIIB)

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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex32	-25.72536	27.38945	An Iron Age circular stone walled structure (10 x 10 m) part of a larger site consisting of Ex27-Ex33 (70 m linear extent). This site is part of the broader Iron Age occupation of the koppie.	Medium Local	Grade 3 - B (IIIB)

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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex33	-25.72533	27.38935	An Iron Age circular stone walled structure (10 x 10 m) part of a connected site of Ex27-Ex33 (70 m linear extent). This site is part of the broader Iron Age occupation of the koppie.	Medium Local	Grade 3 - B (IIIB)

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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex34	-25.72572	27.38907	A small section of stone with clay walling. 1 m high and 1,5 m wide. Feature is heavily overgrown obscuring the characteristics of this historical homestead.	Medium Local	Grade 3 - B (IIIB)

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			Infant burials may possibly be present.		
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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
Ex35	-25.72621	27.38722	Iron Age circular stone walled complex of eight separate structures extending 130 m along the southern side of the koppie. This site complex is part of the broader Iron Age occupation of the koppie.	Medium Local	Grade 3 - B (IIIB)

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APPENDIX C
PGS TEAM CVs

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DANIEL TASKER

Professional Archaeologist

PROFILE

Junior Archeologist- holds a Masters degree in Archaeology specialising in the Early Stone Age and is registered with the Association of Southern African Professional Archaeologists as a Professional Archaeologist.

My work focuses on the process of heritage management through Heritage Impact Assessments, mitigation projects and artefact analysis. I currently work all over South Africa on numerous projects.

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EDUCATION

University of the Witwatersrand

2014 - 2016

BA Degree - Majors in Archaeology and Geography

University of the Witwatersrand

2017

BSc Hon Archaeology, with GIS.

University of the Witwatersrand

2018 - 2020

MSc by research in Archaeology, specialising in the Early Stone Age. (Golden Key member)

WORK EXPERIENCE

PGS Heritage -

Junior Archaeologist

2023- present

I am responsible for conducting heritage and archaeological impact studies, material analysis and archaeological excavations.

The University of the Witwatersrand, Origins Centre - Museum Tour Guide

2016 - 2019

Tour guiding of the human origins across Africa.

PROFESSIONAL AFFILIATION

Accredited Professional Archaeologist

Association of Southern African Professional Archaeologists - Since 2018

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COEN NIENABER

Bio-Archaeologist and
Heritage Resources Unit
Manager

PROFILE

My professional career includes research, lecturing, consulting, heritage resources management and leading large-scale, international projects focused on graves and human remains in southern and eastern Africa and Europe as a humanitarian, conflict, and forensic archaeologist, specializing in bio-archaeology and archaeological geophysics.

I have taught aspects of archeology, bio-archaeology and forensic science and have co-supervised MSc student research at various South African and International universities and have published 28 peer reviewed papers and 6 book chapters.

I have worked in The Netherlands, The United Kingdom, Germany, Israel, Angola, Botswana, Namibia, Zimbabwe, Eswatini, Malawi and the Republic of South Africa.

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EDUCATION

University of Pretoria

BA Hon Archaeology - 1995

University of Pretoria

BA Hon Physical Anthropology - 1999

University of Pretoria

MSc Environmental Management - 2018

WORK EXPERIENCE

PGS Heritage – Bio-archaeologist and Heritage Resources Unit Manager

2025- present

Heritage Resources Management archaeologist responsible for heritage resources impact assessment, mitigation and bio-archaeology.

Netherlands Forensic Institute, Medical Investigation Team, Division Specialist Services and Expertise, Netherlands Ministry of Justice and Security - Forensic Archaeologist

2017 - 2025

Forensic archaeologist tasked with forensic case work as an accredited expert witness for Dutch Courts, continued education and research and development.

Bio-Archaeological Analysis and Archaeological Geophysics Unit, Business Enterprises at University of Pretoria - Lead consultant (Principal Investigator) and Unit Manager

2015 - 2017

Forensic Anthropology Research Centre University of Pretoria – Coordinator for Archaeology

2008 - 2015

Forensic archaeology and humanitarian projects involving human remains, repatriation, project management and implementation of grave relocation and heritage resource management projects, graves and archaeology research, community service and continued education.

Department of Anatomy University of Pretoria – First Technical Assistant, 1997 - 2008

Assistant for physical anthropology, paleoanthropology, archaeology, forensic archaeology, collections management, cultural resources management, grave relocation, repatriation, contract and project management, public participation and social consultation.

PROFESSIONAL AFFILIATION

ASAPA Accredited Professional Archaeologist - Association of Southern African Professional Archaeologists

ASSA – Association of Southern African Anatomists

EMFA – European Meeting on Forensic Archaeology

EAA – European Association of Archaeologists

NVFA - Dutch Association of Physical Anthropologists