The proposed recommencement of deposition on the Mponeng Lower Compartment Tailings Storage Facility on the farms Elandsfontein and Blyvooruitzicht, near Carletonville, in the Merafong City Local Municipality, West Rand District Municipality, Gauteng Province.

Heritage Impact Assessment

Template Number	Document Number	Revision	Date
PGS PJ REP 007 01	895HIA-001	4.1	02/02/2026

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REVISION HISTORY

Version	Issue Date	Description of Changes
1.0	04/07/2025	First draft
1.1	08/02/2025	Internal review
2.0	08/02//2025	Final draft
3.0	23/07/2025	Final
3.1	29/08/2025	Final Amended
4.0	21/01/2026	Updating of mapping of archaeological site MPnr1 and MPnr2
4.1	02/02/2026	Updating of final map indicating realignment of preferred route

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, Duncan Mclean 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

CONTACT PERSON: Duncan Mclean – Junior Archaeologist

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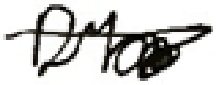
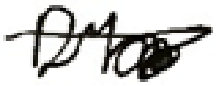
SIGNATURE: 

ACKNOWLEDGEMENT OF RECEIPT

Report Title	**The proposed recommencement of deposition on the Mponeng Lower Compartment Tailings Storage Facility on the farms Elandsfontein and Blyvooruitzicht, near Carletonville, in the Merafong City Local Municipality, West Rand District Municipality, Gauteng Province.**		
Control	**Name**	**Signature**	**Designation**
Author	D Mclean		PGS Heritage – Junior Archaeologist
Reviewer	C Nienaber		PGS Heritage - Bio-archaeologist and Heritage Resources Unit Manager
Reviewed	Wouter Fourie		Chief Executive Officer and Principal Heritage Specialist
Reviewed	V Mabunda		Client

CLIENT: **Environmental Impact Management Services (Pty) Ltd**

CONTACT PERSON: **Vukosi Mabunda**

Tel: 011 789 7170

Email: vukosi@eims.co.za

SIGNATURE: 

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 iii 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 B
(b) A declaration that the person is independent in a form as may be specified by the competent authority	Page iii 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 4.3
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Document provided by EIMS
(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 4.3
(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 4.3
(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	Section 6 and 7
(n)(iA) A reasoned opinion regarding the acceptability of the proposed activity or activities; and	
(n)(ii) If the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the 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

EXECUTIVE SUMMARY

PGS Heritage (Pty) Ltd was appointed by Environmental Impact Management Services (Pty) Ltd to undertake a Heritage Impact Assessment that forms part of the Environmental Impact Assessment for the proposed recommencement of deposition on Mponeng Lower Compartment Tailings Storage Facility on the farms Elandsfontein 115, Elandsfontein 144, and Blyvooruitzicht 116 in the Merafong City Local Municipality, West Rand District Municipality, Gauteng Province.

During the fieldwork, two features comprising one settlement unit (**MPnr1** and **MPnr2**) were identified within the study area; however, more sites adjacent to the study area were later identified utilising additional satellite imagery during post-fieldwork reviews. See Error! Reference source not found. and the individual site descriptions as contained in **Appendix B**. The field description forms were collected with ArcGIS Survey123™ in-field software.

Historical Structures

No historical structures were located.

Archaeological Site

Two archaeological sites were located, which consist of stonewalling (**MPnr1**) and stonewalling with possible kraals (**MPnr2**). Both sites are rated as having high significance and graded as **Grade IIIA**. Through further research and investigation of satellite imagery, it was identified that these sites are part of a larger group of stonewalling within the area, on which there has been very little research conducted within the archaeological fraternity to date. Through archival research and further comparisons, it is hypothesised that the baMare-a-Phogole were the most-likely inhabitants of the area from the 1500s to the 1820s. Furthermore, there are various stonewalling circles located adjacent to the study area which need to be taken into consideration.

Burial grounds and graves

No burial grounds or graves were located.

Mitigation measures

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

Conclusion

It is the combined considered opinion of the heritage specialists that the proposed pipeline route will have a **direct impact** (pre-mitigation) on several identified heritage resources rated as having **high heritage significance**. The alternative route, however, will **not impact** any known heritage resources. However, with the implementation of the recommended mitigation measures in **Table 11**, the overall impact on heritage resources will be reduced to acceptable levels during the project activities. Specifically for the preferred route with the realignment as depicted in **Figure 15**.

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ABBREVIATIONS AND TERMINOLOGY

Abbreviations	Description
AIA	Archaeological Impact Assessment
APHP	Association of Professional Heritage Practitioners
ASAPA	Association of South African Professional Archaeologists
BA	Basic Assessment
BCE	Before Common Era
BGG	Burial Ground and Graves
CE	Common Era
CFP	Chance Finds Procedure
CRM	Cultural Resource Management
CV	Curriculum Vitae
DFFE	Department of Forestry, Fisheries and the Environment
EA	Environmental Authorization
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIMS	Environmental Impact Management Services (Pty) Ltd
EMPr	Environmental Management Program
ESA	Early Stone Age
GN 320	Government Notice 320 (Government Gazette 43110, 20 March 2020)
GN 326	Government Notice 326 (Government Gazette 40772, 7 April 2017)
GN 982	Government Notice 982 (Government Gazette 38282, 4 December 2014)
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HDPE	High-Density Polyethylene
HWC	Heritage Western Cape
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
NCW	Not Conservation Worthy
NEMA	National Environmental Management Act (Act 107 of 1998) as amended
NHRA	National Heritage Resources Act (Act 25 of 1999) as amended
NWA	National Water Act
PDA	Paleontological Desktop Assessment
PGS	PGS Heritage (Pty) Ltd
PIA	Paleontological Impact Assessment
PHRA	Provincial Heritage Resources Authority
RWD	Return Water Dam
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
TSF	Tailings Storage Facility
WUL	Water Usage License

Archaeological resources

This includes:

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

- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency, and which is older than 100 years, including any area within 10m of such representation,
- wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the 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.

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 1800s, 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.

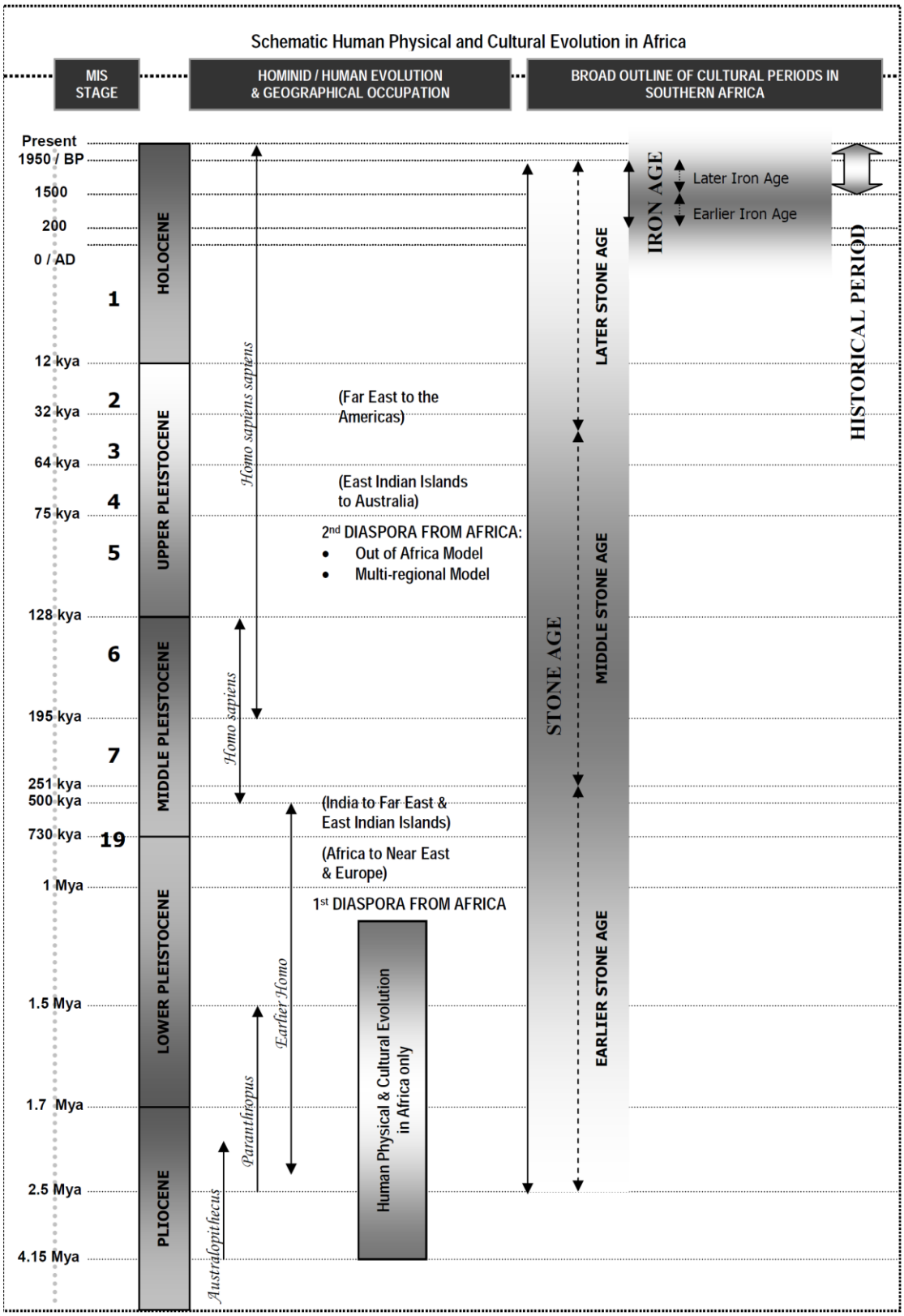


Figure 1 – Human and Cultural Timeline in Africa.

1 INTRODUCTION

PGS Heritage (Pty Ltd) (hereafter 'PGS') was appointed by Environmental Impact Management Services (Pty) Ltd (hereafter 'EIMS') to undertake a Heritage Impact Assessment (HIA) that forms part of the Environmental Impact Assessment (EIA) for the proposed recommencement of deposition on the Mponeng Tailings Storage Facility (TSF) which includes new pipelines on the farms Elandsfontein 115, Elandsfontein 115 portion 23, Elandsfontein 115 portion 5, Elandsfontein 144, Elandsfontein 144 portion 27, Blyvooruitzicht 116, and Blyvooruitzicht 116 portion 3 in the Merafong City Local Municipality, West Rand District Municipality, Gauteng 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.

Duncan Mclean, the author of this report, has been involved in archaeological fieldwork and excavations for the last three years. He holds an Honours Degree (BA Hons) in Archaeology from the University of Pretoria.

Coen Nienaber, the PGS Bio-archaeologist and Heritage Resources Unit Manager, is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist, is accredited as a Principal Investigator and is an internationally qualified and experienced bio-archaeologist.

Wouter Fourie, Principal Heritage Specialist, brings over 27 years of expertise in heritage resource management and has been a specialist consultant on numerous high-profile projects across Southern Africa, focusing on tailored heritage solutions for the mining, water, and oil and gas

sectors. He holds a BA (Honours) (Cum Laude) in Archaeology from the University of Pretoria and an MPhil in the Conservation of the Built Environment from the University of Cape Town. Accredited as a Professional Heritage Practitioner by the Association of Professional Heritage Practitioners (APHP), he is also recognised as a Professional Archaeologist by the Association of Southern African Professional Archaeologists (ASAPA). He holds CRM grading as a Principal Investigator in Grave Relocations, Iron Age and Stone Age archaeology and as a Field Director in Colonial Period Archaeology. Notably, Wouter is the first chair of ASAPA elected from the Cultural Resource Management (CRM) industry.

1.3 Assumptions and Limitations

Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to acknowledge 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 focused on areas that were not previously disturbed by farming/construction/mining/other activity, 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),
- National Heritage Resources Act No. 25 of 1999.

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 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 4.2	
2.3(a) confirms or disputes the current use of the land and environmental sensitivity as identified by the national web-based environmental screening tool;	section 4.3	
2.3(b) contains motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity;	section 4.3	

1.4.2 Environmental Impact Assessment Regulations (Government Notice 982, Government Gazette 38282, 4 December 2014) Appendix 6 as amended by GN 517 of 11 June 2021) requirements

This HIA report has been compiled considering the GN 517 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 South African Department of Forestry, Fisheries and the Environment (DFFE) National Web-based Environmental Screening Tool as required by GN 982**.**

The 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*".
- PIA "*Therefore, a Palaeontological Impact Assessments (PIAs)* [*sic*] *must be undertaken for all developments as per the PalaeoSensitivity Map provided on* SAHRIS [South African Heritage Resources Information System]*, 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**
▪ 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.	▪ 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.

According to the heritage screening report, the project area has a **Low Heritage Sensitivity** (**Figure 11**). The fieldwork has shown that some archaeological resources were present in the area and 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.

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.

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 recommencement of deposition on Mponeng Lower Compartment TSF is located 9,6 km south of Carletonville in the Merafong City Local Municipality, West Rand District Municipality, Gauteng Province (**Figure 2**).

2.1.1 Site Description

The application area is situated on the farms Elandsfontein 115, Elandsfontein 115 portion 23, Elandsfontein 115 portion 5, Elandsfontein 144, Elandsfontein 144 portion 27, Blyvooruitzicht 116, and Blyvooruitzicht 116 portion 3, with a footprint area of approximately 12km (**Figure 2**).

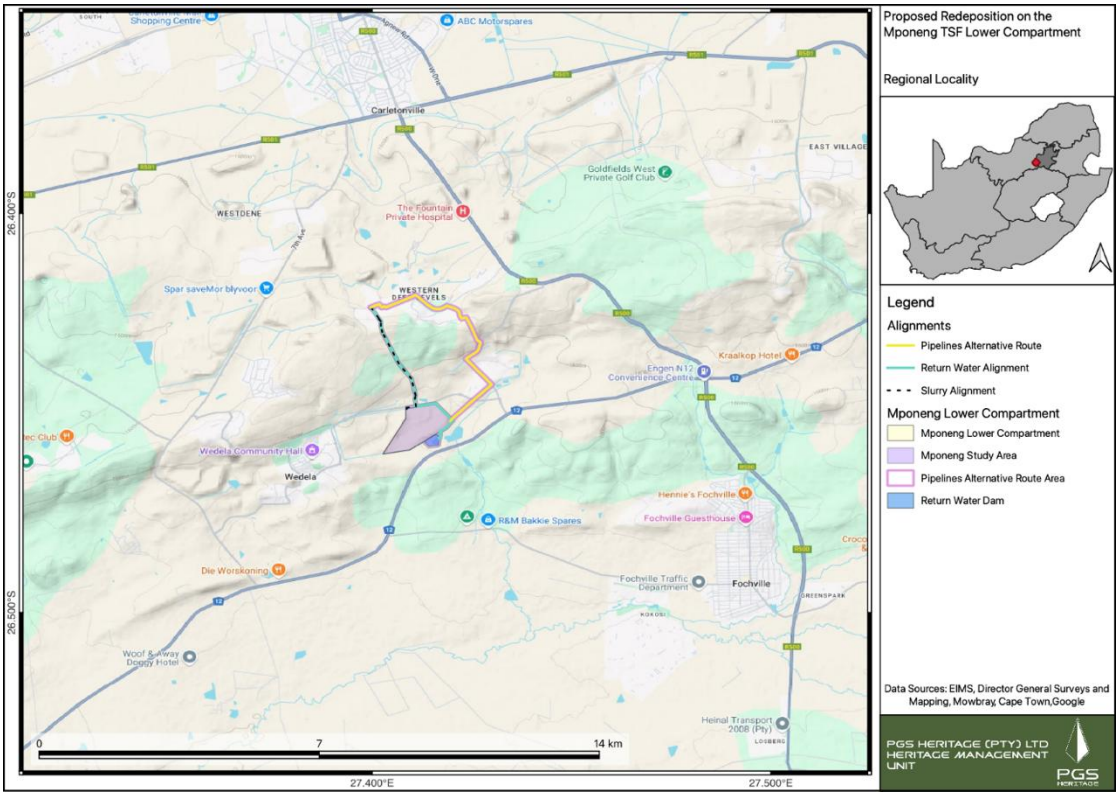


Figure 2 - Regional Locality of study area (demarcated).

2.2 Technical Project Description

2.2.1 Project description

- Harmony Gold Mining Company Limited (hereafter 'the applicant') has appointed EIMS as the Environmental Assessment Practitioner (EAP) to undertake the necessary

environmental authorisation and associated consultation processes. EIMS will compile and submit the required documentation in support of applications for:

- Environmental Authorisation (EA) in accordance with the NEMA- Listed activity/ies:
  - o GNR983 Listing Notice 1, Activities 10, 12, 19, 21D, and 21F.
  - o GNR984 Listing Notice 2, Activities 6 and 15; and
  - o GNR985 Listing Notice 3, Activities 12, 14, 23, and 26.

- Waste Management Licence in accordance with the requirements of the National Environmental Management: Waste Act- NEM:WA (Act 59 of 2008) - Listed activity/ies:
  - o GNR921 Categories A14, B7, B10 and B11.

- Water Use Licence (WUL) in accordance with the National Water Act – NWA (Act 36 of 1998) - Listed activity/ies: Section 21 (c), (g) and (i).

Additional listed activities and/or water uses may be identified during the process.

The applicant owns and operates a number of gold mines and plants in the West Wits region in the Gauteng Province. The Savuka Plant currently deposits tailings onto the Savuka 7a & 7b Tailings Storage Facilities (TSFs). However, these facilities are approaching their final and approved height, and the current planned Life of Mine (LOM) for the West Wits region exceeds the available deposition capacity of these TSFs. Accordingly, the applicant is undertaking a feasibility assessment to recommence deposition on the Mponeng TSF Lower Compartment.

The applicant is proposing to recommence deposition on the Mponeng Tailings Storage Facility Lower Compartment (hereafter ‘Mponeng TSF’). The Mponeng TSF is located at 26°27'11.18"S; 27°24'43.88"E. Mponeng Lower TSF is an existing TSF; however, the Mponeng Lower Compartment TSF is no longer in utilised and is currently being used as a holding dam, with a portion of it used as an authorised Landfill Facility. In order to redeposit on the Mponeng TSF from the Savuka Plant, slurry pipelines will need to be constructed from the Savuka Plant to the TSF. The proposed slurry and return water pipes extend from the south of Savuka Plant at the starting point 26°25'24.95"S; 27°23'58.94"E, extending southwards, parallel to each other until reaching the northern extent of Mponeng TSF where they split. Thereafter, the slurry pipeline extends west before connecting to Mponeng TSF while the return water pipeline extends east, then south around the TSF to the return water dam. There is an alternative slurry and return water pipeline route which extends to the east through Western Deep Levels, then south along Mponeng Gold Mine before heading to the west, where it connects to Mponeng TSF.

Additional Information

The Savuka tailings facility has reached the end of its lifecycle and is undergoing a short-term extension of two years. Following this period, tailings from Savuka will need to be diverted to an alternative facility. The Lower Compartment has been identified as a viable solution to accommodate tailings until the end of life of the Savuka plant and thereafter accommodate tailings from the Mponeng plant.

The Lower Compartment was previously licensed, commissioned, and operated, as noted during the site investigation and survey contours. Tailings were deposited up to 25m on the southern half of the footprint, but deposition was ceased after a natural spring was identified within the footprint. Harmony plans to re-commission the Lower Compartment after the spring is diverted to reduce groundwater contamination.

Design

The Mponeng Lower Compartment TSF will store approximately 43 Mt. It is anticipated to accommodate tailings deposition for a period of 10 years at a rate of 350 kilotonnes per month (ktpm). The end-of-life limiting factors considered were a rate of rise below 4 meters per annum and a final facility height of 60 meters, ensuring safe and sustainable deposition over the operational life of the facility.

The underflow material (coarse, dewatered tailings) is separated from the slurry by the hydrocyclones and deposited at the outer core. The overflow material (fine tailings and slurry water) is deposited in the basin.

The leachate collection system comprises a network of 110 mm and 160 mm perforated HDPE sub-soil drainage pipes installed within a graded gravel drainage layer, all enclosed in a geotextile separation fabric to prevent the migration of the tailings fines. Additionally, a toe blanket drain exists at the downstream toe of the facility, and a curtain drain is proposed to be constructed at the interface with the Mponeng Upper compartment.

At the upstream side of the footprint, two reverse filter packs are strategically positioned at the current existing spring and holding dam locations to serve as seepage interception points. These reverse filters comprise a thick waste rock layer with non-woven needle-punched geotextile encapsulating the drain. If the Lower Compartment footprint is dried out before construction works begin then the necessity of the filter packs will be reassessed.

All leachate drains discharge into trapezoidal concrete-lined channels within the existing paddocks. These channels will serve to collect and convey dirty water in a controlled manner, minimising seepage and preventing contamination of the surrounding environment. The channels will discharge into concrete silt traps before entering the RWD.

Supernatant water is decanted by a gravity penstock system through a flanged steel pipe encased in concrete. The penstock outfall pipe discharges water into the concrete-lined channels.

Previous hydrogeological studies have indicated very low seepage rates beneath and around the facility, primarily due to the low permeability of the bedrock and the presence of artesian conditions. Additionally, tailings have already been deposited on the proposed footprint below the level that a liner can be safely installed. For these reasons, Harmony prefers an unlined facility. However, should a liner be required in the future, this report includes a preliminary design and cost estimate for a lined option.

Table 2: Design Criteria.

PARAMETER	VALUE	SOURCE
TSF Design		
Pertinent Standards and Guidelines	SANS 10286	EcoE
Tailings Ore body	Gold	Harmony
Tailings Waste Classification	Type-3	EcoE — Based on other, similar Gold Tailings Projects.
Life of TSF	10 Years (minimum)	EcoE — Based on current LoM.
Deposition Rate	350 ktpm	Harmony (Current Savuka deposition rate).
Total Tailings Produced	43Mt (Current LoM)	EcoE — As per capacity assessment.
Total Volume	27.9 Mm3 (Current LoM)	EcoE — Calculated
Hazard Rating	High	EcoE — Annual report for the Upper compartment at similar height.
Deposition strategy	Upstream construction with hydrocyclone deposition	EcoE — Based on other, similar Gold Tailings Projects with a high RoR.
Particle size distribution	85% Passing 75 pm	Mponeng Upper Compartment Lab Test Results (23-2486-WMF-5-HARMONY MPONENG TSF 2024 ANNUAL REPORT).
Particle Specific Gravity	2.7 (t/m*)	Mponeng Upper Compartment Lab Test Results (23-2486-WMF-5-HARMONY MPONENG TSF 2024 ANNUAL REPORT) .
Dry density (average)	1.54 (t/m3)	EcoE — Triaxial tests done on Savuka tailings
Maximum Rate of Rise	4 m per annum	Capacity assessment.
Maximum TSF Height	60m	EcoE — To be confined with slope stability calculations.
Bench widths	8m	EcoE — Best Practice
Lift height	8m	EcoE — Best Practice

PARAMETER	VALUE	SOURCE
Interim side slopes	1 (V}:2.5 (H)	EcoE — Best Practice
Overall side slope	1 (V):3.5 (H)	EcoE — Best Practice
Stormwater Management Plan		
Temporary diversion structures during construction. 1:2 year	1:2 year	GNR 704
PARAMETER	**VALUE**	**SOURCE**
Stormwater diversion channels and their erosion protection.	1:50 year storm event / 72 hour drawdown from TSF and drain seepage outflow.	GNR 704
Penstock design	1:100 year 72-hour drawdown on top of TSF	Best practice
RWD sizing	1:50 year 24-hour storm event	GNR 704
RWD Lining	Type 3 waste	EcoE — Based on other, similar Gold Tailings Projects.
Groundwater Management		
Spring Water to be Diverted	1 611 m3 per annum	AngloGold Ashanti Limited EMP report (2009)
Embankment Stability / Earth	**quake Criteria**	
Earthquake Loading	1:2,475-year return period = 0.148 g (0.108 + 0.040 g) PGA (OBE) = 0.074 g (0.148 g / 2).	
	After construction: 1.30.	
	Static drained conditions:	
	1.50.	
	Short-term undrained	
	(peak) 1.30.	
Minimum Stability Factors of Safety	Short-term undrained earthquake: 1.10. Short-term undrained post-	Best Practice
(SANS 10286, 2022)	earthquake (liquefied):	
	1.10.	
	Damage and deformation	
	allowed (<freeboard	
	allowance)	
	- No release of tailings or	

PARAMETER	VALUE	SOURCE
	water.	

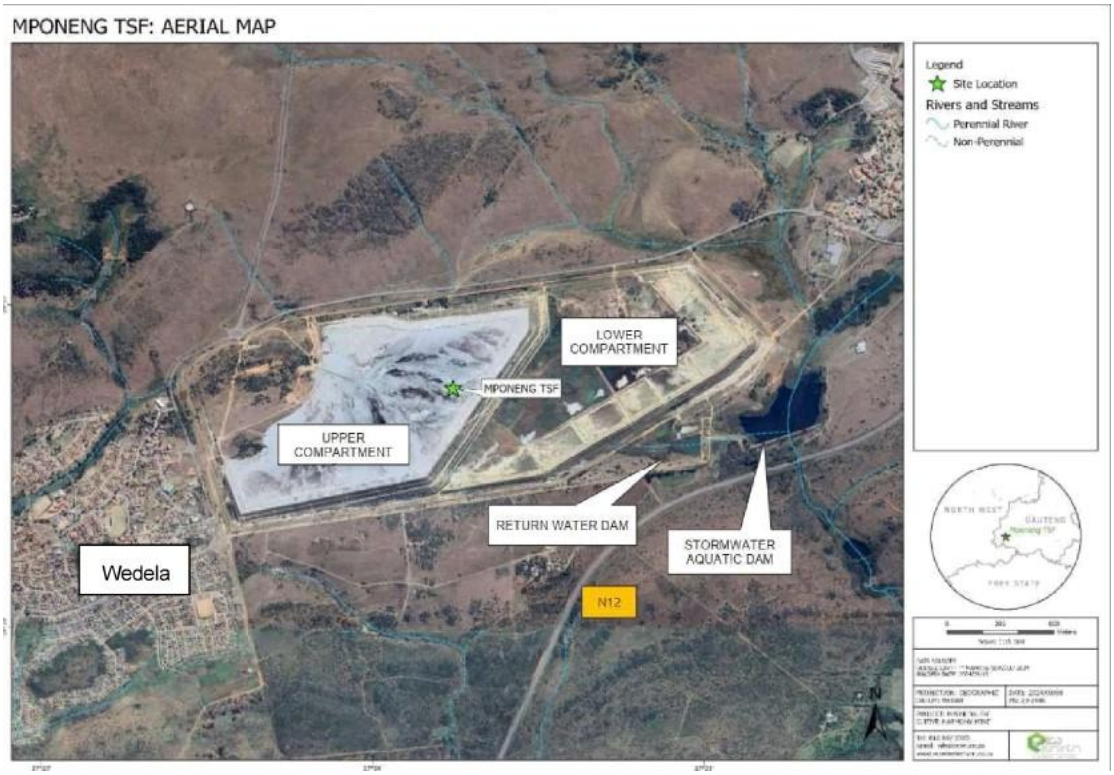


Figure 3 - TSF Locality and Layout Map (from ECOE).

2.2.2 Clean and Dirty Water Management

BASIS OF DESIGN AND LEGAL REQUIREMENTS

The surface water management infrastructure must be designed, managed, and operated to comply with the requirements contained in the NWA, Regulation no 7 of 1999 (GN 704):

- Clean and dirty water are to be separated as far as reasonably possible, with a dedicated clean and dirty water system.
- Polluted water, which includes seepage, must be contained within the dirty water system.
- The reuse (process water, dust suppression, etc.) of dirty water will be maximised within the mining area.
- Clean and dirty water systems must be designed, constructed, and maintained to ensure that these systems do not spill into each other more than once in 50 years.
- No residue deposit, dam, reservoir, or associated infrastructure may be located within the 1:100- year flood line of any watercourse, estuary, borehole, or well. This excludes monitoring boreholes.
- All dams will have a minimum freeboard of 0.8 metres.

CATCHMENT AREAS

The catchment areas were delineated based on the localised catchments that influence the extended TSF area and the clean water diversion controls required in and around the site.

2.2.3 Dirty Water Collection

Surface Water Conveyance

In support of the potential Water Use Licence Application (WULA) for the re-commissioning of the lower compartment, this study focuses solely on the direct infrastructure upgrades required on the lower TSF compartment to ensure regulatory compliance, particularly with respect to water management systems as prescribed under Government Notice 704 (GN704) of the National Water Act.

GN704 requires that all dirty water collection and conveyance systems associated with mining-related activities be designed to prevent seepage of polluted water and promote the reuse of water.

To achieve both regulatory compliance and cost efficiency, trapezoidal concrete-lined channels are planned to be installed within the existing, unlined paddocks. These channels will serve to collect and convey dirty water in a controlled manner, minimising seepage and preventing contamination of the surrounding environment. The channels will discharge into concrete silt traps before entering the RWD.

Importantly, this proposed system strategically utilises existing infrastructure to minimise capital expenditure. The outer paddock bund wall and the existing earth-lined solution trench, both of which are already in place and in suitable condition with minor repairs, will be repurposed to function as components of the clean and dirty water separation system. The bund wall acts as a physical barrier, delineating clean runoff areas from the TSF, while the existing solution trench will continue to serve as a means of intercepting and directing water away from the facility.

2.2.4 Leachate Collection

The leachate collection system has been set out to efficiently capture and convey leachate generated within the impoundment area, thereby reducing hydraulic head buildup and minimise seepage of contaminated water. This system plays a critical role in the environmental performance and geotechnical stability of the facility by promoting unsaturated conditions in the outer structural zone.

The leachate collection system comprises a high-permeability drainage layer, consisting of a network of perforated HDPE collector pipes embedded in free-draining gravel.

In addition to the leachate drainage network, the Lower Compartment of the TSF is equipped with a toe blanket drain at the downstream toe of the facility. This drain serves as a secondary seepage

control measure, capturing any leachate or seepage that migrates toward the outer limits of the impoundment. The toe blanket drain enhances the overall seepage control capacity of the TSF by providing an additional pathway for water interception before it can accumulate or emerge at the downstream slope, thereby reducing pore pressures and improving long-term slope stability.

To maintain geotechnical stability and minimise the risk of seepage-induced failure, an interface curtain drain will be installed along the slope separating the Upper Compartment from the proposed Lower Compartment of the TSF.

The curtain drain has been designed to intercept and convey seepage emerging from the advancing Lower Compartment tailings before it can migrate laterally into the previously deposited, more permeable materials of the Upper Compartment. The interface drain will reduce the risk of increased pore water pressures within the coarser tailings zone, reducing effective stress and possibly triggering localised instability.

It is envisaged that the initial construction will establish a 4-meter-high curtain drain at the slope interface. However, because tailings deposition in the Lower Compartment will continue throughout the TSF's operational life, the curtain drain will need to be progressively extended upward by the operational contractor.

At the upstream side of the footprint, two reverse filter packs are strategically positioned at the current existing spring and holding dam locations to serve as seepage interception points. These reverse filters comprise a thick waste rock layer with non-woven needle-punched geotextile encapsulating the drain. If the Lower Compartment footprint is be dried out, and time is allowed for the subsurface water to dissipate, before construction works begin then the necessity of the filter packs will be reassessed.

It should also be noted that the lower compartment currently has ten leachate collection outlet pipes that discharge into the existing unlined solution trenches. However, based on data from the HMS, no measurable flow has been recorded from these outlets for over a year. Therefore, it is proposed that these outlet points be intercepted and fitted with monitoring manholes. These manholes will be designed to either overflow or allow for controlled pumping into the solution trenches in the event that leachate accumulates within them.

2.2.5 Clean Water Diversion System

In addition to the repurposed clean water channels and berms discussed in Section 5.3.1 of the preliminary feasibility report, the spring water currently daylighting in the northern portion of the proposed footprint will also require diversion around the TSF.

Spring Diversion

A dedicated spring capturing and diversion system will be required prior to the installation of sub-surface drains. This system must be implemented on the upstream side of the currently active spring located along the northern boundary of the proposed lower compartment footprint. The purpose of this spring capturing system is to intercept and manage any clean groundwater emerging from the surrounding higher-elevation areas before it enters the TSF footprint. By doing so, it prevents this clean water from contributing to groundwater recharge beneath the tailings facility, which could otherwise elevate pore water pressures and compromise the integrity of not only the proposed lower compartment but also the foundation of the upper compartment toe.

As noted in Section 3.3 of the preliminary feasibility report, CGS Water and Environmental Consultants investigated the origin of the spring and provided preliminary recommendations for capturing and diverting the water around the facility. These measures include vertical shafts with horizontal drains. It was recommended by GCS in the January 2019 report that trial study be initiated where the spring is intercepted by borehole MB20 and a potential 2nd borehole about 20 to 50m to the north-east.

2.2.6 Return Water Dam

RWD Design

The current RWD does not have sufficient capacity to accommodate both current and future operational demands. Therefore, the existing dam will need to be enlarged to provide adequate capacity to contain the 1:50-year, 24-hour storm event above the mean operating level. The RWD is designated for the runoff, TSF pool drawdown, leachate, and sub-surface water of both the upper and lower compartments of the TSF. The RWD will be equipped with two silt traps (on the eastern and western sides of the dam, respectively) and an emergency spillway.

The RWD will be of the earth fill embankment type, with an upstream and downstream slope of 1:3 (V:H). To prevent seepage and groundwater contamination, the RWD will be constructed with a Class C performance barrier system. The RWD will also be provided with a minimum freeboard of 800 mm and an overflow spillway capable of safely passing the 1:100-year flood event.

A Class C performance barrier system has been opted for the RWD. The geomembrane was changed from a general Class C 1.5 mm HDPE to a 2 mm HDPE to improve the liner performance as well as to negate the use of a clay layer below. Due care should be taken when installing the barrier on top of the founding soil, which is to comply to SANS 10409 (2020), receiving face of reworked foundation soil.

Soilcrete as a ballast layer and soilcrete-filled geocells are to be placed on the floor and wall area, respectively. Care should be taken when placing these layers above the liner. An Electric Leak Location (ELL) survey has been specified for the covered geomembrane in the RWD by means of Dipole testing according to ASTM D7007 to ensure that no damage has been caused to the barrier system after installation.

RWD Sizing (Water Balance)

A water balance was conducted to ensure that the size of the dirty water management infrastructure is adequate and that the mine complies with the requirements set out in the National Water Act (NWA), Act 36 of 1998, as well as the regulations on water usage for mining activities stated in Government Notice Nr. GN704 dated June 1999.

The results of the water balance model are summarised below:

- Excess water in the RWD is at risk of overflowing into the downstream environment when both the Upper and Lower TSFs are operational, with the potential to degrade the surface and groundwater qualities of surrounding areas. Excess water from Mponeng operations must be sent to the Savuka Operations to ensure that the proposed RWD is adequately sized to accommodate all the dirty water inflows.
- The proposed capacity of Mponeng TSF RWD is 327,000 m3. This capacity is sufficient to contain all dirty water inflows without the dam spilling more than once in 50 years.
- Average of 3.03 Ml/day needs to be pumped back to the Savuka plant.
- Average of 6.16 Ml/day needs to be pumped back to the Mponeng plant.
-

Roughly 40% of the RWD capacity was allowed for the operating level of the RWD.

3 ASSESSMENT METHODOLOGY

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

3.1 Methodology for Assessing Heritage Site Significance

This HIA report was compiled by PGS for the proposed redeposition of the Mponeng TSF Lower Compartment and its associated pipelines. 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 heritage background research, which was undertaken through desktop and archival research, in addition to the 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 m^2
    - Medium - 10-50/50 m^2
    - High - >50/50 m^2
- 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

Site significance classification standards prescribed by the HWC Guideline (2016), were used for the purposes of this report (**Table 3** and **Table 4**).

Table 3: 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

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage 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

Table 4: 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

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
IIIC	Such a resource is of contributing significance to the environs. These are heritage resources which are significant in the context of a streetscape or direct neighbourhood.	This grading is applied to buildings and/or sites whose significance is contextual, i.e. in large part due to its contribution to the character or significance of the environs. These buildings and sites should, as a consequence, only be regulated if the significance of the environs is sufficient to warrant protective measures, regardless of whether the site falls within a Conservation or Heritage Area. Internal alterations should not necessarily be regulated.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough 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.

4 CURRENT STATUS QUO

4.1 Site Description

The proposed redeposition on the Mponeng Lower Compartment TSF and its associated new pipelines footprint area is characterised primarily by the Carletonville Dolomite Grassland, which is a specific type of grassland commonly associated with dolomite rock formations in which dolomite mounds, various grasses and thorn bushes are found (www.sanbi.org) (**Figure 4** and **Figure 5**). As the new pipeline runs along the majority of an already existing pipeline and its associated infrastructure, there are various in-use and demolished structures along the new pipeline's layout (Figure 4 to **Figure 7**). The existing TSF can also be seen from across the study area (**Figure 8**).

Figure 4 – A view of the typical dolomite grassland vegetation type with occasional thorn bushes and dolomite mounds.

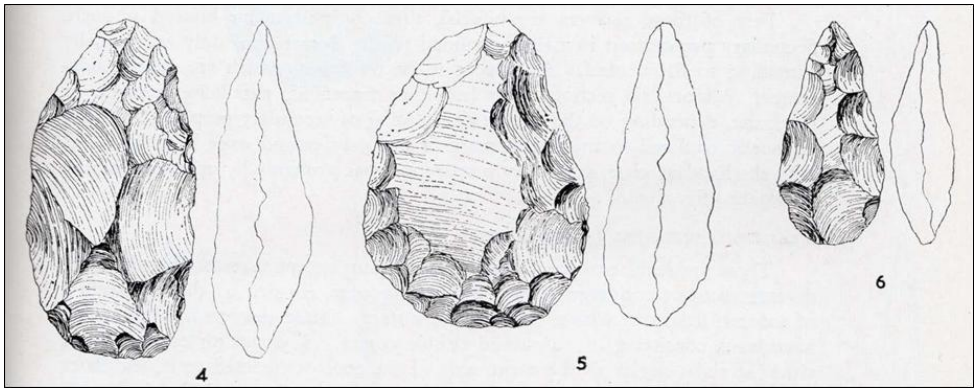
Figure 5 – View of both a dolomite mound on the right, as well as the already existing pipelines in the area on the left.

Figure 6 – Associated infrastructure with the existing TSF and pipelines.

Figure 7 – One of the connection points of the new pipeline to the existing TSF.

Figure 8 – View of the existing TSF in the background.

4.2 Overview of the study area and surrounding landscape

DATE	DESCRIPTION
2.5 million – 250 000 years ago	The Early Stone Age is the first and oldest phase identified in Southern Africa's archaeological history and comprises two technological phases. The earliest of these technological phases is known as Oldowan, which is associated with crude flakes and hammer stones and dates to approximately 2 million years ago. The second technological phase in the Earlier Stone Age of Southern Africa is known as the Acheulian and comprises more refined and better-made stone artefacts such as the cleaver and bifacial hand axe. The Acheulian phase dates to approximately 1.5 million years ago. One such site is the Sterkfontein Caves, located approximately 40km north-east of the study area. The Sterkfontein caves have also provided a wealth of knowledge on our previous Australopithecus and hominid ancestors through discoveries such as Mrs Ples and Little Foot (www.Maropeng.co.za). Isolated ESA artefacts (quartzite bifaces) have been reported 5–8 km north of Mponeng along the Wonderfontein Spruit *(Pistorius 2019; Hardwick 2018).*
 *Figure 9 - Examples of Early Stone Age Later Acheulian handaxes identified at Blaaubank near Rooiberg. Cropped section of an illustration published in Mason (1962:199).*	
250 000 to 40 000 years ago	The Middle Stone Age (MSA) dates to between 250 000 to 40 000 years BCE. MSA dates of around 250 000 BCE originate from sites such as Leopards Kopje in Zambia, while the late Pleistocene (125 000 BCE) yields several important dated sites associated with modern humans (Deacon & Deacon, 1999). The MSA is characterised by flake and blade industries, the first use of grindstones, wood and bone artefacts, personal ornaments, the use of red ochre, circular hearths and a hunting and gathering lifestyle.

DATE	DESCRIPTION
	Although no MSA sites are directly recorded within the Mponeng project footprint, material from this period is common along ridges and water sources in the Highveld and Gauteng regions
40 000 years ago, to the historic past	The Later Stone Age is the third phase identified in South Africa's archaeological history. It is associated with an abundance of very small stone artefacts known as microliths. In Southern Africa, the Later Stone Age is characterised by the appearance of rock art in the form of paintings and engravings. The Magaliesberg Mountains, located approximately 60km north-east of the study area, is well known for its Stone Age history, and especially so the Later Stone Age (Carruthers, 2000). Several researchers have undertaken excavations of these sites, including Professor Revil Mason, Mr Robbie Steel and Dr Lyn Wadley. The Later Stone Age sites from this area include open sites such as Xanadu as well as rock shelter and cave sites such as Kruger Cave and Jubilee Shelter (Bergh, 1999) (all >55km from the project area; no LSA rock-shelter sites have been recorded within the Mponeng lease). Additionally, Later Stone Age lithics were identified in the general surroundings of the study area during an archaeological survey undertaken by Van der Walt (2009).
The Study Area and Surroundings during the Iron Age – Early Farming Communities	
The arrival of early farming communities (EFC) during the first millennium, heralded in the start of the Iron Age in South Africa. The Iron Age is that period in South Africa's archaeological history associated with pre-colonial farming communities who practised cultivation and pastoralist farming activities, metal working, cultural customs such as lobola and whose settlement layouts show the tangible representation of the significance of cattle (known as the Central Cattle Pattern) (Huffman, 2007).	
CE 150 – CE 750	Early Iron Age ceramic facies can be identified within the vicinity of the study area. Firstly, the Bambata ceramic facies were identified at the site known as Jubilee Shelter in the Magaliesberg, which dates to between CE - CE and is associated with the Kalundu tradition though no settlements were ever found relating to these facies within the region (Wadley 1996). Secondly, the Mzonjani ceramic facies associated with the Urewe tradition can be found at the site known as Broederstroom, which is a settlement located in the Magalies Valley, which dates to between CE 450– CE 750 and is situated approximately 40km north northeast of the study area (Huffman 2007, Manson 1981, Wadley 1996). No EIA farmstead has been documented inside the TSF boundary; any pottery recovered during construction will be sampled under the chance-find protocol (Appendix A).
CE1000 – CE 1300	The Middle Iron Age in the surrounding area is represented by the Eiland ceramic facies, dating to between CE 1000 – CE 1300, and is associated with the Kalundu tradition (Evers 1988, Huffman 2007). Eiland ceramics

DATE	DESCRIPTION
	can also be found in the settlements of communities in the Limpopo valley that produce Mapungubwe facies ceramics. This hints at regional trade occurring across the Soutpansberg mountain range at sites like Mapungubwe and Mutamba (Antonites 2012, Calabrese 2007: 24). Hall (1981) has also identified the Eiland facies at Rooikrans in the Boschoffsberg valley and Rhenosterkloof 3 in the Sand River Valley. While a variation of the Eiland facies can also be found in southeastern Botswana and is known as the Broadhurst facies (Denbow 1981, Biemond 2017). The only recorded MIA find in the West Wits field is a surface shard of Eiland pottery on the farm Doornfontein 242 IQ, c. 12 km south-east of the TSF (Pistorius 2019).
CE 1550 – CE 1580	The Ndebele, an offshoot of the main Nguni-speaking peoples, began migrating to the Transvaal region. The main group of Transvaal Ndebele traces its ancestry to King Mhlanga, who settled at Emhlangeni or Mohlakeng in Sotho, which is now a suburb of Randfontein (van de Walt 2015). After the passing of Mhlanga, Musi Mhlanga's son assumed the position of King amongst the amaNdebele and soon after moved the amaNdebele northeast to what is today known as Pretoria (www.Britanica.com).
1600 – 1750	The origins of the Bakwena ba Mogôpa can be traced back to a place named Rathatheng, near the junction of the Marico and Crocodile (Odi or Oori) Rivers, where the Bakwena ba Mogôpa were known to have settled as early as CE1600. During the mid-seventeenth century, the Bakwena ba Mogôpa moved from Rathateng to Lokwadi (Zandrivierspoort) near the foot of the Phalane Mountains. During the first half of the eighteenth century, the Bakwena ba Mogôpa moved to the Mabjanamatswane Hills, north-east of modern-day Brits. The sphere of influence of the Bakwena ba Mogôpa during this time stretched from the Crocodile River in the west to the Apies River in the east and from the Pienaars River in the north to the Hennops River in the south (Breutz, 1953) (Mogapi, 1996).
1700	The Bapo ba Mogale, an early Nguni migrant group, resided along the banks of the Crocodile (Odi or Oori) river during this time (Breutz, 1953). Their settlements along the banks of this river would likely have been in the general surroundings of the present study area, albeit more likely along the western bank of the river than the eastern bank.

DATE	DESCRIPTION
	Within a few years, the Bapo ba Mogale moved in a western direction to the area known as Makolokwe (either the present-day farm Wolwekraal or the present-day farm Kareepoort) (Breutz, 1953).
1750 – Early 1800s	During the middle of the eighteenth century, the Bakwena ba Mogôpa moved from the Mabjanamatswane Hills in an eastern direction to settle at Mangwatladi (or Lengwatladi) east of the Apies River. They stayed here for several years, moving back to the Mabjanamatswane Hills. Bakwena ba Mogôpa later settled in this same area at Mamogaleskraal (Gwate) at the foot of a hill named Thaba ya Morena (Breutz, 1953) (Mogapi, 1996).
1817 – 1823	A Pedi force under Maleleku invaded the areas surrounding the Magaliesberg Mountains. After an unsuccessful attack against the Bakwena ba Mogôpa near the Apies River, the Pedi attacked the Bapo Mogale in the vicinity of Wolhuterskop. Although they were defeated as well, the Pedi managed to retire from the battle with many captured cattle as well as women and children who were enslaved during the battle. The heir to the Bapo throne, Mohale Mohale, was a child at the time, and although he was also almost captured in the battle, he was hidden in a kloof and managed to escape discovery. The name of the Magaliesberg Mountains is derived from Mohale Mohale's name (Breutz, 1953) (Carruthers, 2000).
1827 – 1832	The Khumalo Ndebele (Matabele) of Mzilikazi moved north from their settlements along the Vaal River into the surroundings of the study area and started attacking the communities residing here (Bergh, 1999). They crossed over the Magaliesberg Mountains at present-day Commandonek, and according to Carruthers (2000), first attacked the Bakwena ba Mogôpa settlement located near present-day Zilkaatsnek. Although the Kwena defended themselves against the Matabele onslaught over the course of three separate battles, they were defeated in the end. Their surrender to Mzilikazi came at a very high cost, with their chief More and his son Segwati both executed and all the Kwena cattle confiscated. Additionally, the Kwena men were forced to join the ranks of the Matabele army, and those who refused were "…impaled on stakes or had their ears and eyes removed." (Carruthers, 2000:240). Mzilikazi then attacked the Bopo at Wolhuterskop and dispersed them (Breutz, 1953). After the defeat of these and other groups living along the Magaliesberg Mountains, Mzilikazi and his Khumalo Ndebele settled themselves along the northern foothills of the mountains between 1827 and 1832. He had three royal residences built along the mountain range, their localities providing an estimate of the area controlled and settled by the Matabele

DATE	DESCRIPTION
	during these five years. The three Matabele royal residences were built at Kungwini (at the foot of the Wonderboom Mountain), Hlahlandlela (near present-day Rustenburg) and Dinaneni (near present-day Zilkaatsnek).
The Study Area and Surroundings during the Historical Period	
The Historical Period within the study area and surroundings commenced with the arrival of newcomers to this area. The first arrivals would almost certainly have been travellers, traders, missionaries, hunters, and fortune seekers. However, with time, this initial trickle was replaced by a mass flood of white immigrants during the 1830s, when a mass migration of roughly 2 540 Afrikaner families (comprising approximately 12 000 individuals) from the frontier zone of the Cape Colony to the interior of Southern Africa took place. The people who took part in this Great Trek were later to be known as Voortrekkers (Visagie, 2011). As the Historical Period carried on, the general surroundings of the study area underwent significant changes and development during the twentieth century, including extensive development in the form of gold and uranium mining, railway and transportation development as well as the establishment of nearby towns such as Krugersdorp.	
1836	The first Voortrekker parties started crossing over the Vaal River (Bergh, 1999).
1840s – 1850s	Increasing numbers of Voortrekkers started establishing themselves permanently in the general vicinity of the study area during this time (De Beer, 1975). During this period, the first contact between these new arrivals and the black people residing in this wider area took place. According to Bergh (2005), regarding the Rustenburg District located 80km northwest of the study area, these early contacts resulted in the setting aside of land by the Voortrekker leadership for some of the black groups, such as the Bafokeng. Mbenga (1997) also indicates that the relationship between the Voortrekkers and the Bakgatla was initially similarly amicable. However, within a short period, the relationship between the Voortrekkers and the black groups living in these areas 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). The permanent settlement of white farmers in the area resulted in the proclamation of individual farms and the establishment of permanent farmsteads.
1886	The city of Johannesburg was formally established in 1886 with the discovery of gold and the Witwatersrand reef on the farm Langlaagte.

DATE	DESCRIPTION
	The Randfontein Estates Gold Minning Company (Witwatersrand) Limited was established by J. B. Robinson shortly after the Witwatersrand gold rush, which started in 1886. Robinson had acquired his wealth from the Kimberly diamond fields and was later appointed mayor of Kimberly. Robinson laid claim to two areas which later became known as Langlaagte and Crown mines. Laanglaagte had proven to be a success producing 10 ounces per ton and, later, 5 ounces per ton. The success at Langlaagte lead to Robison procuring more farms in the area around Randfontein. Other prospectors such as Rhodes and Hans Sauer had turned down the Randfontein area (located approximately 40km from the study area) as there was an absence of 'red bar' found in the Witwatersrand sandstone formations and was thought to be indicative of the main reef. Though there are other reefs at greater depths, such as the black reef and conglomerate reef, which they were unaware of (Randfontein Gold Mining Company Limited 1989). In November 1886, Robinson started buying property for future mining ventures, and within a week, he had purchased a quarter of the farm Uitvalfontein, a sixth of the farm Randfontein and sections of Middelvlei, Gemsbokfontein, Anvlakte, Droogeheuwel and Rietfontein. Later Robison acquired the remainder of farms Randfontein and Uitvalfontein before buying Waterval. The land acquired by Robinson amounted to 12000 ha and contained approximately 11km of reef outcrop (Randfontein Gold Minning Company Limited 1989).
1889 – 1898	The Randfontein Estates Gold Mining Company, Witwatersrand Limited was only officially registered on March 7th, 1889, with Hermann Eckstein as the chairman and Maurice Marcus as Managing director. Later in 1889, James Brooks was appointed as managing director in place of Maurice Marcus. In 1891 James Brooks opened Leader Reef. This reef was extremely rich and was later known as the Randfontein Leader. In 1898 a second reef was identified to the west of Randfontein. The reef was traced by all the existing subsidiaries to the ground, which had not yet been claimed (Randfontein Gold Mining Company Ltd, 1989).
1899 – 1902	On 11 October 1899, war broke out between Britain and the two Boer republics of the Orange Free State and Transvaal (Zuid-Afrikaansche Republiek). The Magaliesberg Mountains had strategic significance to both sides because of its closeness to Pretoria (and Krugersdorp) as well as the fact that the main access routes between Pretoria and the western part of the old Zuid-Afrikaansche Republiek (including the town of Rustenburg) passed through its valleys. As a result, several skirmishes and battles took place in the wider surroundings As part of the so-called 'scorched earth' policy initiated by Lord Kitchener, many Boer farmhouses were destroyed. This would certainly

DATE	DESCRIPTION
	also have been true for the surroundings of the study area as well. Another aspect characteristic of the 'scorched earth' policy was the system of concentration camps (also referred to as refugee camps) in which Boer and Black women and children were held. The closest of any of these camps to the present study area was the one at Krugersdorp, which existed from 1901 to March 1902. (www.angloboerwar.com). Many of the mines on the rand closed, and their staff returned home. Then in November 1901, Pope Yeatman, the general manager of the Randfontein Estates Gold Mining Company, returned to South Africa to oversee the reopening of the mines and the installation of the new machinery which had come from Europe and the United States. (Randfontein Gold Mining Company Limited 1989). The Anglo-Boer War ended with the signing of the Peace Treaty of Vereeniging in May 1902. (www.angloboerwar.com).
1902	The South African War took place during this time. No evidence for specific battles or skirmishes from within the study area was found during the desktop study, although there is evidence that troops of both the British and the Boer forces were present throughout the general region, including the Carletonville/Westonaria area (van der Bergh, 2009) and the Krugersdorp/Randfontein area. However, evidence was found for a skirmish that took place on a *koppie* to the south of Carletonville/Westonaria. This incident was an ambush planned for the morning of 5 September 1900 by Commandant Danie Theron and his scouts and General Liebenberg, and members of the Potchefstroom Commando. A large British convoy comprising 1,000 men was expected to move from Johannesburg to Potchefstroom. However, the planned attack was derailed due to the unexplained absence of Genl. Liebenberg. Theron was apparently surprised by a British scouting force on a nearby hill. Nevertheless, he killed three British soldiers on the hill before firing on the British column, apparently as a bluff. The British forces started shelling the hill's summit with howitzers, and Theron was struck by shrapnel and killed. (Malan, 1939; Breytenbach, 1950). The British forces subsequently buried Theron on the border between the farms Buffelsdoorn and Elandsfontein with the three British soldiers who he had killed. Subsequently (In September 1900), Theron's body was exhumed by his men and buried in the Pienaar family cemetery on the farm Elandsfontein. After the war (on 10 March 1903 his men exhumed his body again and buried him next to the grave of his fiancé Hannie Neethling at Eikenhof, south of Johannesburg (Malan, 1939; Breytenbach, 1950).

DATE	DESCRIPTION
	In 1950 the Danie Theron Monument was unveiled on the ridge summit where he died. The monument was built with funds collected by the Voortrekker organisation (http://www.afrikanergeskiedenis.co.za/presidente/monumente-en-erfenisterreine/danie-theron-monument-gatsrand/).
1903 – 1905	The Krugersdorp Municipality was established in 1903, of which Randfontein was included and remained so until 1929, when it became an independent authority. In 1905 the first school was erected in Randfontein by the Transvaal administration, and the first two churches, one by the Anglican community and the other by the Methodists (Randfontein Gold Mining Company Limited 1989).
1906 – 1910	The railway line between Pretoria North and Rustenburg was constructed during this time (Bergh, 1999).
1914 – 1939	In 1914, the first world war broke out, leading to the mobilization of south African forces to invade German West Africa. Hostilities ceased in 1918, with approximately 700 soldiers from Randfontein seeing active service. Twenty-five years later, in 1939, the second world war broke out. This led to cutting ties with Germany and mobilising a voluntary brigade by Jan Smuts from regiments such as the Transvaal Scottish, of which many men resided in Randfontein (Randfontein Gold Mining Company Limited 1989).
1950– 1967	In 1950 Dr Nico Diederichs was elected as Randfontein's town representative in parliament. Later becoming state president. During this period, tests were carried out in Randfontein, showing that the bird reef contained uranium. This led to Randfontein Estates applying for a permit to become a uranium producer, which was granted in 1952. Randfontein Estates' workforce had diminished significantly from 27 000 men in 1935 to 1600 men in 1967, with only one headgear in operation. Randfontein 247 IQ was subdivided and later included in the expansion of the West Porges Township in 1967 (Randfontein Gold Mining Company Limited 1989).
1948 - 1959	Carletonville was named after Mr Guy Carleton Jones, an engineer from the Gold Fields Ltd mining company, who played a prominent role in discovering the West Wits gold field, which Carletonville forms a part of. Carletonville was laid out by West Witwatersrand Areas gold mining company on the farm Twyfelvlakte. Most of the mines were developed after the Second World War. The town was proclaimed in 1948 and became a municipality on July 1, 1959 (Bulpin 1986: 721).

4.2.1 Stonewalling within the General Area

The present-day study area is situated in-between Klipsriviersberg (75km east) and Potchefstroom (56km west). This is important to note, as there is Sotho-Tswana stonewalling in the general area, which consists commonly of Klipsriviersberg stonewalling (SWS: 18th – 19th century) in the Klipsriviersberg area and Type Z (18th – 19th century) stonewalling near Potchefstroom. Since the site sits in between these areas, there is a possible influence from both types of stonewalling. However, Sadr (2012: 3) suggests Type Z is typically located south of the Vaal River. The Klipsriviersberg stonewalling (also known as SWS) contains an outer wall which commonly includes scallops which demarcate back courtyards, small stock kraals, and contains more linear stonewalls in between households to demarcate such areas (Sadr 2012: 3). Type Z settlements are typically more distributed and can contain narrow entrances for defensive purposes (Huffman ***et al***. 2007).

Furthermore, there are Sotho-Tswana Iron Age stonewall ruins found 12km south of Carletonville, just outside Fochville, known as the Tlokwe Ruins. These ruins date to between the 1500s – 1820s. Based on the limited research conducted and available within the archaeological fraternity about Tolkwe, it is known that the people of the settlement grew sorghum and maize, and herded cattle within the region of the nearby fertile valley (Vorster 1969). When the Difaqane started and Mzilikazi pushed groups out of the area around the 1820s, the Sotho-Tswana people at Tlokwe were forced to move northward toward Brits. The hills surrounding Fochville, just south of the study area, were inhabited by the Bakwena baMare-a-Phogole people, who were known to have settled in the area during the LIA (Vorster 1969). However, during the late 1820s, when the Difaqane started, Kokosi, the chief of the baMare-a-Phogole people, was forced to lead his people north due to Mzilikazi and his people driving many Iron Age communities at the time out of the area (Sadr 2020). There are also some Later Iron Age sites located on the farm Kraalkop 8.9km south-east of the study area, which belonged to the baMare-a-Phogole people. As such, it is likely that the baMare-a-Phogole people also inhabited the area surrounding the study area due to the closeness in proximity. However, these Later Iron Age sites located on the farm Kraalkop are believed to be Molokwane type stonewalling, which, according to Huffman (2007), extends from Gauteng westwards towards Zeerust. As such, further research into the identified sites is needed to identify the type of stonewalling they ascribe to.

4.2.2 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 assessed, by overlaying the study area on the images or map sheets, to observe the development of the area and to identify and locate historical structures, possible BGG and/or archaeological sites protected under section 34 and 36 of the NHRA, present in, or immediately adjacent to, the area.

Historical topographic maps (1:50 000) for various years (1958 and 1976) were available for utilisation in the background study. Through this analysis, it was identified that the area has been used mainly for industrial areas, which were associated with the surrounding limestone and gold mines. Most of these structures within the study area have, however, been demolished.

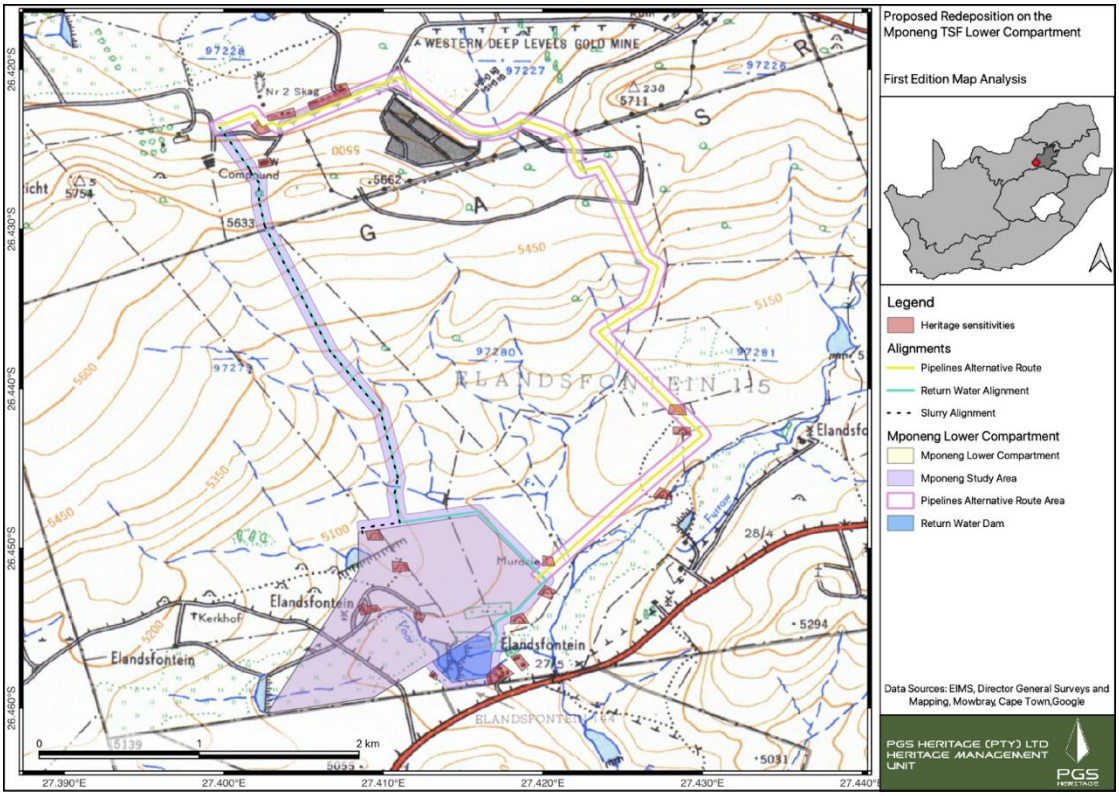


Figure 10 – A historical map of the study area and its surroundings from 1958 with heritage sensitivities.

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

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

- Coetzee, FP. 2008. Cultural Heritage Survey of the Proposed Development of Portion 53 of the Farm Kookfontein 545-IQ, Rothdene, Midvaal Local Municipality. For Triviron EAP. **No archaeological or historical resources were recorded during the survey**.

- Fourie, W. 2017. Archaeological Impact Assessment for Meyerton Mall and Residential Development on Portion 64 of Portion 81 of the Farm Rietfontein 364IQ, Meyerton,

Gauteng, Province. This report was a follow-up survey of the two areas identified in the previous study. **Thirteen specific sites/findspots were identified, containing mostly Middle Stone Age (MSA) stone tools, and a few Late Stone Age (LSA) stone tools. One of these sites was assessed to have medium significance.**

- Fourie, W. 2017. Finding on Possible Exemption from a Heritage Impact Study: Mixed Use Development on Portion 81 of the Farm Rietfontein 364IQ, Meyerton, Gauteng Province. **Although large sections of the property were heavily degraded and had in the past been used for dumping and backfilling of quarries, there were two areas identified with high-density scatters or remnants of Early (ESA) and Middle Stone Age (MSA)material**.

- Fourie, W. 2021. The Proposed Eskom Azaadville 4km 400KV Deviation Power Line, Eskom West rand Strengthening Phase I, Mogale City and Rand west City Local Municipality, Gauteng Province. **No heritage resources were identified during the heritage survey.**

- Hardwick, S. 2018. Environmental Impact Assessment for the Blyvoor Gold Mining Project near Carletonville, Gauteng Province. Notification of Intent to Develop. **No heritage resources were identified during the heritage survey.**

- Mann, N., Sachse, M. & Fourie, W. 2022. A Heritage Impact Assessment – Proposed Carpe Diem Solar Photovoltaic Plant and Associated Infrastructure on the Farms Varkenslaagte 119 IQ and Doornfontein 118 IQ, near Carletonville, Gauteng Province. **Two heritage resources were located, which consisted of one burial ground containing 10 informal graves and one locality, which included some stonewalling.**

- Pelser, A.J. & van Vollenhoven, A.C. 2009.A Report on a Heritage Impact Assessment Study for the Powerline from Glockner-Kookfontein Substations Vereeniging, Gauteng. For: Baagi Environmental Consultancy CC. **No objects, features or any sites of cultural (archaeological or historical) heritage significance were identified in the area of proposed development.**

- Pelser, A. J. 2018. Report on a Phase 1 Archaeological Impact Assessment for the Proposed Development of 2 New Kilns as Part of Corobrik Driefontein's Expansion on Portions 23 & 27 (Portions of Portion 22) of the Farm Driefontein 355 IQ, near Carletonville, Gauteng. **No heritage resources were identified during the heritage survey.**

- Pelser, A.J. 2011. A Report on a Heritage Walkdown Study for the Proposed New 275kvPowerline between the Glockner-Kookfontein Substations Vereeniging, Gauteng. For: Baagi Environmental Consultancy CC. **No cultural heritage (archaeological or historical) sites, features and objects of significance were identified during the Walk Down survey**.

- Pelser, A.J. 2013. Basic Assessment Report for a Waste Management License Application, DMS Powders, Meyerton Portions 4 & 63 of Kookfontein 545IQ, Gauteng. For: Shangoni Management Services (Pty) Ltd. **No sites, features or objects of any archaeological or historical (cultural heritage) significance were identified during the fieldwork.**

- Pistorius, J. C. C. 2019. A Phase I Heritage Impact Assessment Study for AngloGold Ashanti (Pty) Limited's Proposed Surface Pipeline and Associated Infrastructure near Carletonville in the Gauteng Province. **No heritage resources were identified during the heritage survey.**

- Pistorius, J.J. 2007. A Phase I Heritage Impact Assessment Study for Water and Sewage Pipeline Corridors near Vanderbijlpark in the Gauteng Province of South Africa. **This study identified the following types of heritage resources: two historical graveyards, a number of historical houses near Houtkop, historical stone structures, and historical houses located in one of the suburban areas of Vanderbijlpark.**

- Smeyatsky, I and Kitto, J. 2019. West Rand Strengthening Project, Spanning Randfontein, Krugersdorp & Westonaria, West Rand District Municipality, Gauteng Province. **The fieldwork resulted in the identification of twenty-three (23) archaeological and heritage sites. These identified sites comprise the following: the sites identified were 12 burial grounds and graves (of which four (4) are municipal cemeteries) and eleven (11) historical structures or dwellings.**

- van Schalkwyk, J. 2013. Heritage Impact Assessment for the Proposed Construction of Eskom Five (5) 88kv Powerlines Connecting Kookfontein and Jaguar Substations, Midvaal and Emfuleni Municipalities, Gauteng Province. **Eight heritage resources were identified, of which six are situated within or close to the current project area. The six sites include: the rock engraving site of Redan (Provincial Heritage Site), a Stone Age find spot, three cemetery or informal grave sites and a stone railway culvert.**

4.2.4 Heritage screening

A heritage screening was conducted by means of the South African DFFE National Web-based Environmental Screening Tool as required by GN 982**.** According to the heritage screening report, the project area has a **Low Heritage Sensitivity** (**Figure 11**). The fieldwork has shown that some archaeological and heritage resources were present in the area and thus have a higher rating than the original screening rating. This is in part due to the low resolution of the available data which the screening data is based.

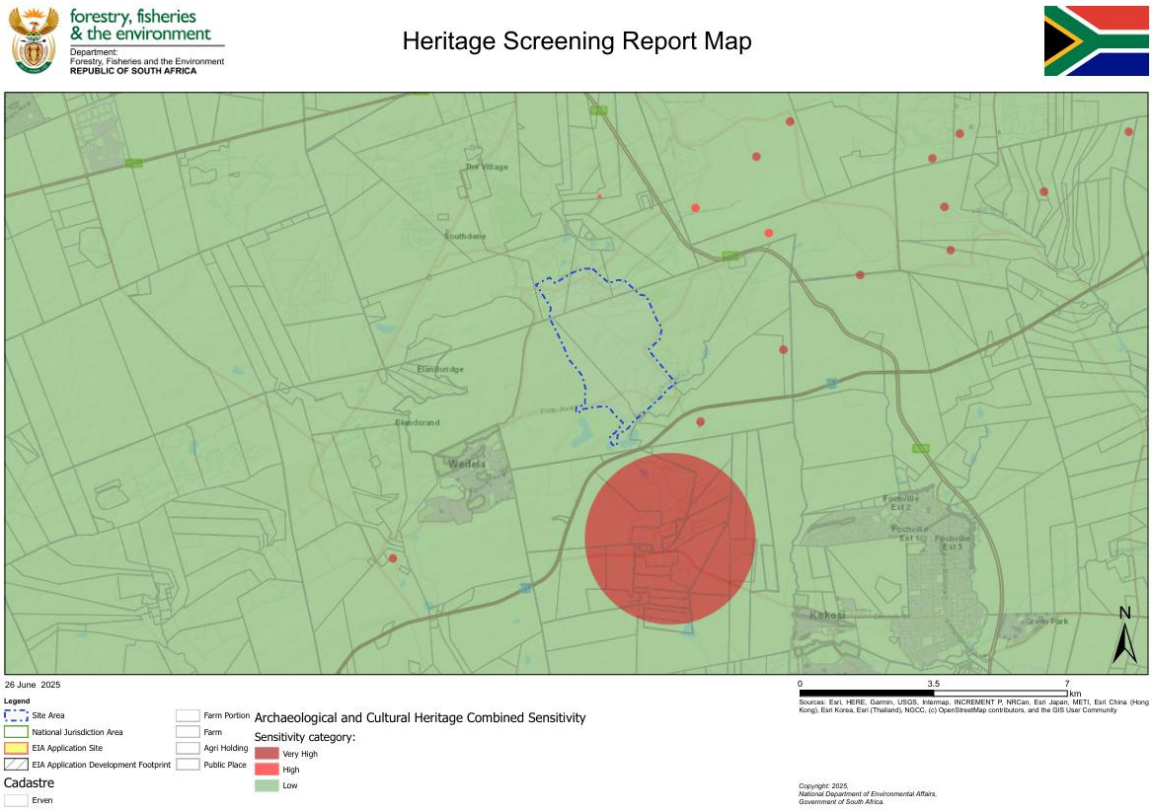


Figure 11 - Screening tool map indicating a low sensitivity rating for archaeology and heritage.

4.2.5 Heritage sensitivity

Analysis of topographical maps and satellite imagery enabled the identification of possible heritage-sensitive areas. By superimposing and analysing them, it was possible to rate these structures by age and thus their level of protection under the NHRA. **Table 5** lists the possible tangible heritage sites identified in the vicinity of the study area and the relevant legislative protection.

Table 5: Tangible heritage sites 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 identified the following areas as potentially sensitive from a heritage perspective. The analysis of studies conducted in the area assisted in developing the following landform type-to-heritage find matrix (**Table 6**).

Table 6: Landform type to heritage find matrix.

LANDFORM TYPE	HERITAGE TYPE
Crest and foothill	LSA and MSA scatters, Late Iron Age (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 findings[1]

The initial fieldwork was conducted on 30th June 2025 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 Error! Reference source not found..

During the fieldwork, a total of two heritage features, comprising one settlement unit, were identified within the study area (**Figure 13**). These consist of one stonewalling feature (**MPnr1**) and one stonewalling feature which contains four circular segments, some of which are likely stock enclosures (**MPnr2**). **MPnr1** is a more linear stonewalling of approximately 1m high and is constructed of medium – large compactly placed stones. **MPnr1** is located down the hill from **MPnr2**. It is rated as **high significance** and graded as **Grade IIIA**, as through further investigation of satellite imagery of the area, it was determined that **MPnr1** was a part of a concentration of stonewalling with inter-leading smaller stone circles indicative of a LIA stock enclosures. MPnr1 covers an area of 30x34m and abuts a steep rock face that acts as the northern wall of the larger stock enclosure. Indications are that the enclosures were utilised by recent herders into the later part of the 20th century.

MPnr2 consists of four large, connected circles, which form one stonewalling feature. The combined stock enclosures cover an area of approximately 30x 40m. These stonewalled circles are located on top of a hill, forming the upper northern section of the settlement unit incorporating

[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.*

MPnr1. The layout consists of two large enclosures with interleading smaller enclosure indicative of herding practices of keeping the younger animals away from adults during sheltering at night. On the periphery, two smaller enclosures utilised as shelter by herders are located, with an interleading footpath linking **MPnr1** and **MPnr2**.

Both units (**MPnr1** and **MPnr2**) contain dung deposits in the stock enclosures. Due to the vegetation cover no anthropogenic artefacts could be identified in association with the dung deposits.

The settlement unit is rated as having **high cultural significance** and is graded as **Grade IIIA** due to the traditional practice of many African cultures of burying their deceased within the stock enclosure space. Furthermore, both sites were identified to be a part of a larger stonewalling group in the area, which is at present under-research within the archaeological fraternity. As such, the area has a high potential to yield valuable information, supporting the high significance rating.

Additional fieldwork at the settlement unit was conducted and the extent of the stone walling was delineated with a differential GPS to enable accurate buffering of the site. See **Figure 13** and the individual site descriptions as contained in **Appendix B**. However, due to the dense vegetation in the field, not all features were identified during the fieldwork, but further sites were identified during further investigation utilising satellite imagery and background research of the area. As depicted in **Figure 14**, more stonewalled sites adjacent to the study area were located.

As discussed at the onset of the report, it is likely that the area was inhabited by the baMare-a-Phogole people during the LIA (from about the 1500s to the late 1820s). The baMare-a-Phogole had built similar stonewalling 8.9km south-east on a farm called Kraalkop, as well as 12km south near Fochville at a site referred to as “The Tlokwe Ruins”. It is noted that some of these sites have already been destroyed in the surrounding local area. Due to the destruction of other similar stonewalled settlements in the area, as well as the relevance of these sites on a bigger scale, they have both **a high significance and a higher cumulative impact** (rating of 2). Consequently, these sites hold the potential to yield information on a group of settlements for which little research has been completed and can offer deeper insight into the history of the local area.

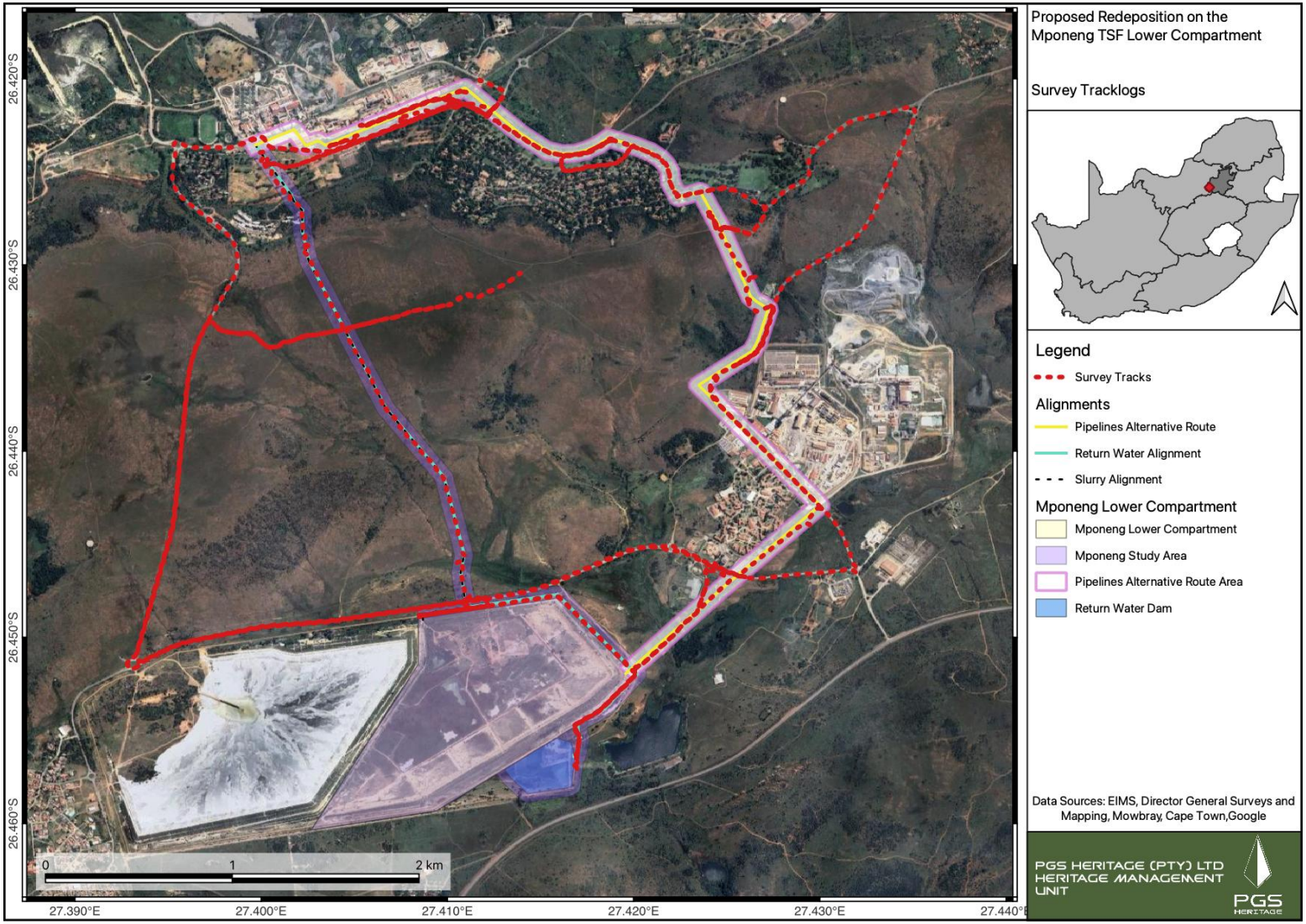


Figure 12 - Fieldwork tracklogs (track in orange, study area in blue).

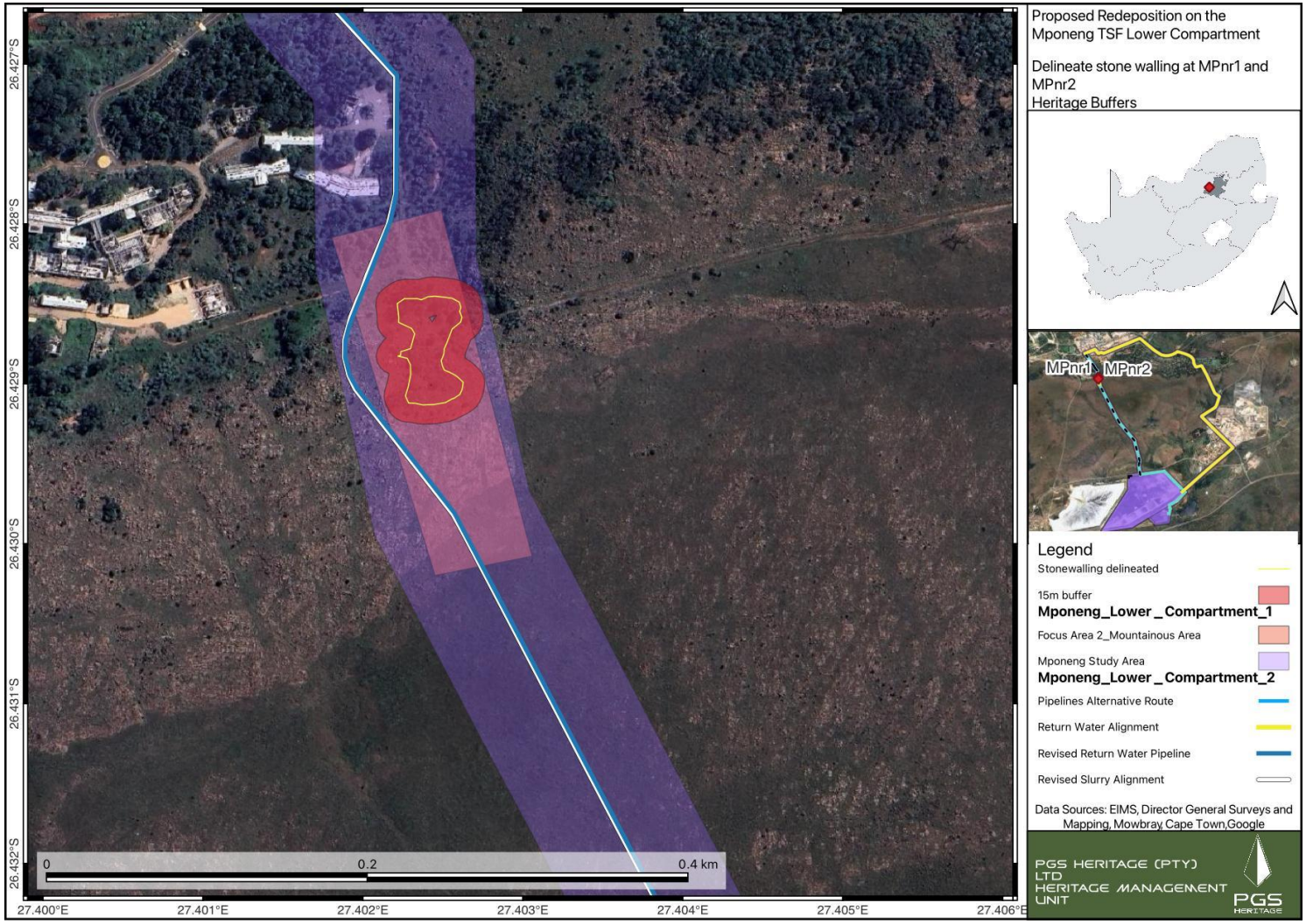


Figure 13 – Delineated stone walled site at MPnr1 and MPnr2 with adjusted alignment

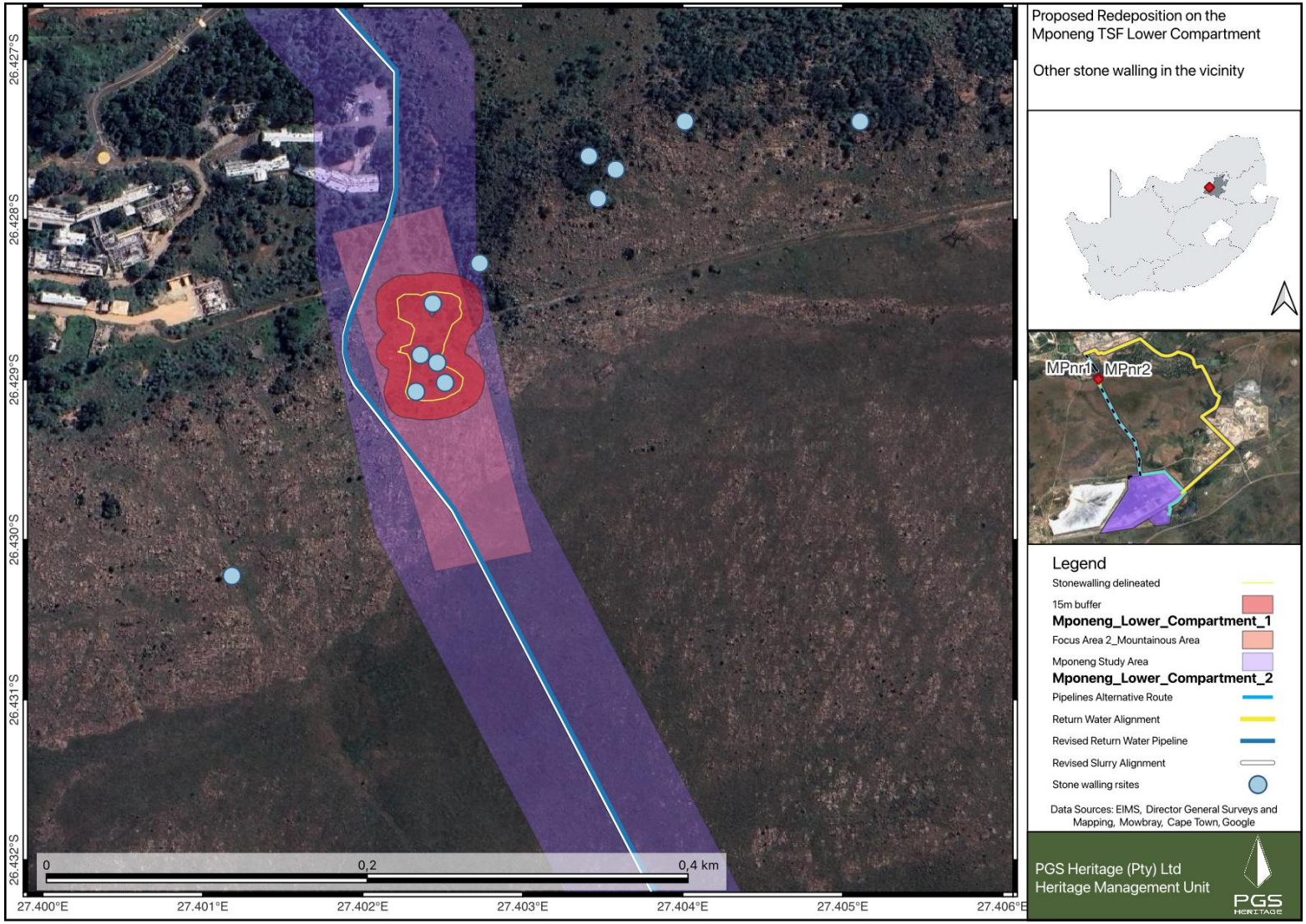


Figure 14 – Stone-walled sites both within the Mponeng TSF development area and adjacent to the study area with the final realignment.

5 IMPACT ASSESSMENT

The impact assessment rating is based on the rating scale as provided by EIMS.

The following section provides an analysis of the impact of the proposed project area on heritage resources identified within the recommencement of deposition of the Mponeng Lower Compartment TSF and the associated new pipelines study area:

5.1 Details of all alternatives considered

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

In order to redeposit on the Mponeng TSF, from the Savuka Plant, slurry pipelines will need to be constructed from the Savuka Plant to the TSF. The proposed slurry and return water pipes extend from the south of Savuka Plant at the starting point 26°25'24.95"S; 27°23'58.94"E, extending southwards, parallel to each other until reaching the northern extent of Mponeng TSF where they split. Thereafter, the slurry pipeline extends west before connecting to the Mponeng TSF while the return water pipeline extends east, then south around the TSF to the return water dam. There is an **alternative slurry and return water pipeline route** which extends to the east through Western Deep Levels, then south along Mponeng Gold Mine before heading to the west, where it connects to Mponeng TSF.

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.

Furthermore, due to the identified sites being located within the proposed route (**Figure 13**), the proposed route will have to deviate outside a 15m buffer around the extent of the sites, as discussed in **Table 11** and shown in **Figure 15**. This reduced buffer is suggested due to the natural constraints the rocky outcrop creates around the site.

Regarding the alternative route, no heritage resources were identified. As such, this route would not impact any heritage resources unless a chance find is identified, in which case the relevant chance finds procedure must then be put into place. The proposed route is also located within the vicinity of nearby stonewalling settlements adjacent to the development area, which the deviation must take into consideration (refer to **Figure 14**).

5.1.1 Archaeological resources

The two archaeological sites **MPnr1** and **MPnr2** have a **high heritage significance** and are both graded as **Grade IIIA** due to their significance as part of a larger stonewalling group, as well as due to the possibility of burials within the kraal space. The possibility of the archaeological resources

being impacted by the proposed realignment of the preferred recommencement of the deposition pipeline is **Low**, and the project can have a **Low** impact through implementing the relevant mitigation measures.

5.2 Impact assessment summary table

Implementing the impact assessment methodology as supplied by the EIMS**, Table 7** provides a quantitative assessment of the impacts on Archaeological features of the proposed Mponeng redeposition TSF Project. **Table 8** provides a quantitative assessment of the impacts on Unknown Archaeological resources of the proposed Mponeng redeposition TSF Project.

Table 7: Impact Table – Archaeological Features.

Identifier	Discipline	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	Consequence2	Post-Probability	Post-mitigation Significance Score	Post-Mitigation Significance	Confidence	Cumulative Impact	Irreplaceable loss	Priority Factor	Final score	Final Significance
MPnr1	Heritage	Archaeological Feature	1	Construction	Normal operations	-1	2	4	2	1	-2.25	3	-6.75	Medium to low -	-1	1	4	1	1	-1.75	2	-3.5	Low -	High	1	1	1.00	-3.50	Low -
MPnr2	Heritage	Archaeological Feature	1	Construction	Normal operations or	-1	2	4	2	1	-2.25	3	-6.75	Medium to low -	-1	1	4	1	1	-1.75	2	-3.5	Low -	High	1	1	1.00	-3.50	Low -

Table 8: Impact Table – Unknown Archaeological Resources (Chance Finds)

Identifier	Discipline	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	Consequence2	Post-Probability	Post-mitigation Significance Score	Post-Mitigation Significance	Confidence	Cumulative Impact	Irreplaceable loss	Priority Factor	Final score	Final Significance
Unknown Archaeological Resources (Chance Finds)	Heritage	Disturbance of Unknown	1	Construction	Normal operations or events	-1	1	5	3	5	-3,5	2	-7	Medium to low -	-1	1	5	2	5	-3,25	1	-3,25	Low -	Low	1	2	1,13	-3,66	Low -
Unknown Archaeological Resources (Chance Finds)	Heritage	Disturbance of Unknown	2	Construction	Normal operations or events	-1	1	5	3	5	-3,5	2	-7	Medium to low -	-1	1	5	2	5	-3,25	1	-3,25	Low -	Low	1	2	1,13	-3,66	Low -

6 MANAGEMENT RECOMMENDATIONS AND GUIDELINES

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

6.1 Construction and operational phases

The project will 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 that 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 recognise 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 Program (EMPr)**.
- An appropriately qualified heritage practitioner/archaeologist must be identified to be called upon if 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 by the designated environmental officer, and construction activities halted.
- In the case of the discovery of human remains,
    a. The South African Police Service (SAPS) needs to be notified. The SAPS will then confirm if the remains result from criminal activity, in which case they will be responsible for handling the process. In. the case where it is deemed to be archaeological, SAHRA must be informed who will then make recommendations on the process going forward.

- In the case of archaeological or historical finds:
    a. A 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. That will include notification of SAHRA, who will then confirm the mitigation process to be followed and if a permit will be required for the mitigation measures.
- The contractor, therefore, should have a contingency plan so that operations could move elsewhere temporarily while the materials and data are recovered.
- Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner/archaeologist.

6.3 Possible finds during construction

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

- Historical structures and foundations
- Unmarked BGG

6.4 Timeframes

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for the collection or excavation of heritage resources and lead times must be worked into the construction time frames. **Table 9** gives guidelines for lead times on permitting.

Table 9: Lead times for permitting and mobilisation.

Action	Responsibility	Timeframe
Preparation for field monitoring and finalisation of contracts	The contractor and service provider	1 month
Application for permits to do necessary mitigation work	Service provider – Archaeologist and SAHRA	3 months
Documentation, excavation and archaeological report on the relevant site	Service provider – Archaeologist	3 months
Handling of chance finds – BGG/Human Remains	Service provider – Archaeologist and SAHRA	2 weeks
Relocation of BGG affected by the development	Service provider – Archaeologist, SAHRA, Local and Provincial Government	6 months

6.5 Archaeological Watching Brief – relevant to work in or close to heritage resources

6.5.1 Objective

To ensure that any archaeological remains encountered during ground disturbance activities (e.g. construction, excavation, or site clearance) are properly identified, recorded, and preserved or documented in consultation with heritage authorities.

6.5.2 Scope

Applies to all project activities involving subsurface disturbance within areas of cultural sensitivity, as identified in the HIA.

6.5.3 Procedure Overview

1. Pre-Construction Planning: Review HIA findings and identify zones for monitoring.
2. Appointment of Heritage Monitors: Appoint a qualified archaeologist
3. Watching During Construction: Visual inspection of soil, stratigraphy, and possible artifacts during works.
4. Find Protocol: Stop work, notify archaeologist, secure site, and report to SAHRA if finds occur.
5. Post-Discovery Actions: Salvage excavation, documentation, and submission of a brief report if needed.
6. Reporting and Documentation: Record finds in cultural heritage register and report to the authority.

Table 10: Roles, Responsibilities and Implementation Actions

Role	Responsibility	Implementation Actions
Project Manager	Ensure compliance and funding for monitoring	Include watching brief in contractor ToRs; schedule archaeologist presence
Site Contractor	Cooperate with archaeologist; suspend work on discovery	Notify archaeologist and project manager on discovery; protect discovery site
Archaeologist	Monitor works; document finds; advise on mitigation	Field logs, GPS mapping, photography, emergency excavation
Heritage Authority	Approve methods; receive reports; direct post-discovery mitigation	Review submissions; issue excavation or relocation permits

6.6 Heritage Management Plan for Environmental Management Plan

Table 11: Heritage Management Plan for EMPr implementation.

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
General project area	Implement a chance to find procedures in case where possible heritage finds are uncovered.	Construction	During construction	Applicant ECO Heritage Specialist	ECO (monthly/as or when required)	Ensure compliance with relevant legislation and recommendations from SAHRA under section 34-36 and 38 of NHRA.	ECO Monthly Checklist/Report
Archaeological sites	All Archaeological sites will require Monitoring during site clearing in a 20m radius from the identified archaeological sites through the implementation of an archaeological watching brief (refer to **section 6.5**). Archaeological sites **MPnr1** and **MPnr2** are to be avoided by a 15m buffer as per s25 of the NHRA (**Figure 15**). **If the construction cannot deviate from the original layout, then further full mitigation and a destruction permit from SAHRA will be required.** Mitigation will require:	Construction	Construction	Applicant Archaeologist SAHRA Relevant PHRA	Monthly	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 of the NHRA.	Report after construction

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
	▪ Application for a s35 archaeological permit to document the site through test excavations and sampling of artefacts ▪ Documentation of the layout through plan layout sketches, test excavations to determine the temporal as well as tribal affinity of the settlement unit (**MPnr1 and MPnr2**) ▪ Upon completion of excavations and documentation a destruction permit under section 35 of the NHRA must be applied for before the site can be destroyed to enable the construction of the pipeline. ▪ Destruction activities must be monitored by an experienced archaeologist.						

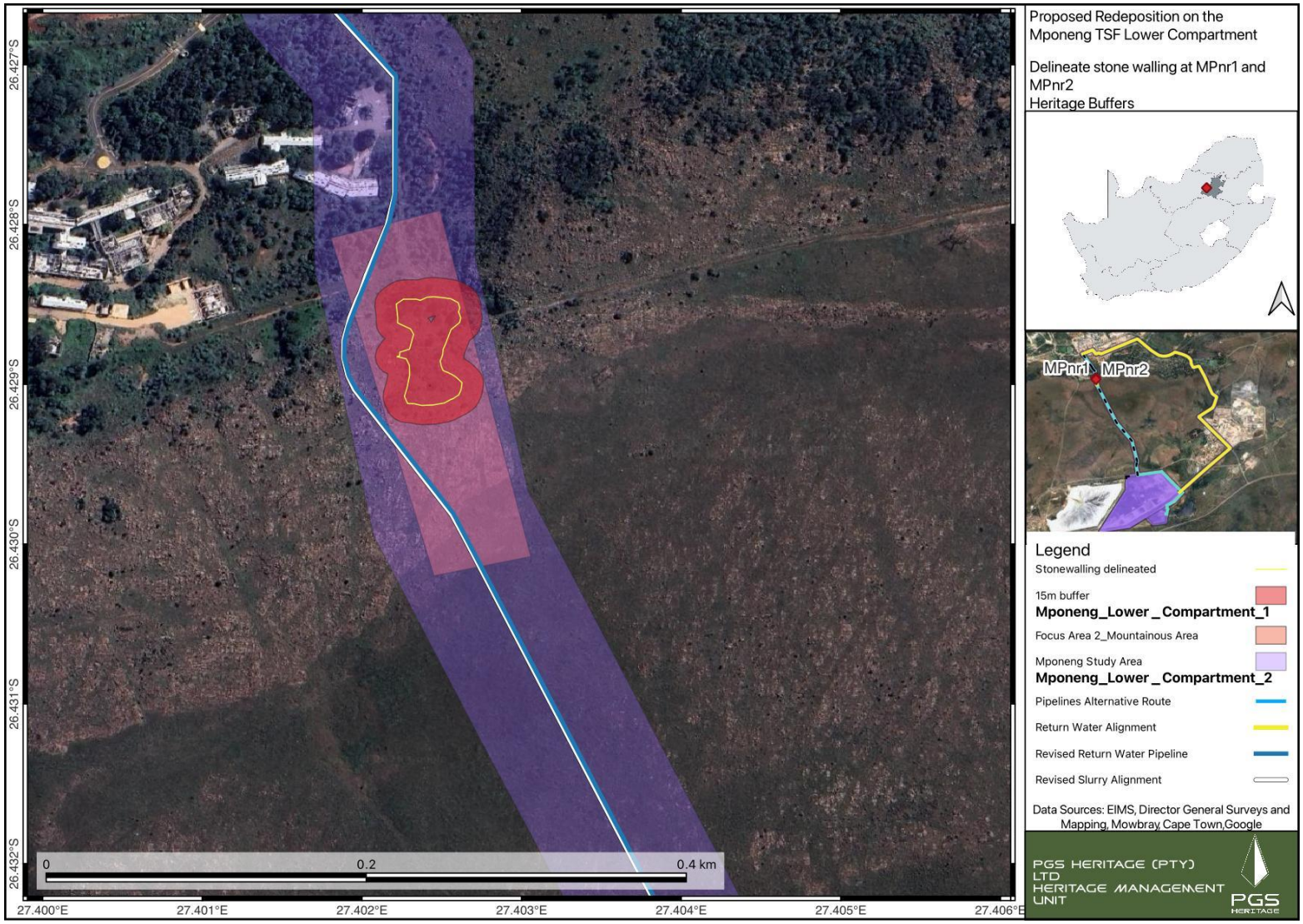


Figure 15 - Identified heritage resources with their applicable 15m buffers and realigned pipeline.

7 CONCLUSIONS AND RECOMMENDATIONS

The HIA identified two heritage resources within the study area (**MPnr1** and **MPnr2**), which consist of archaeological resources which are rated as having a **high heritage significance** and will require the proposed pipeline to deviate outside the applicable 15m buffers around the site's extent. If the pipeline cannot deviate, then further mitigation work will be required before the project can continue. Furthermore, it must be noted that there are various additional stonewalling sites adjacent to the study area, as depicted in **Figure 14**. However, the alternative route does not impact any known heritage resources and if a chance find is identified, then the relevant chance finds procedure must be implemented.

7.1 Archaeological Site

Two heritage features, comprising one settlement unit, stonewalling feature (**MPnr1**), which is rated as **high significance** and graded as **Grade IIIA**, and one larger stonewalling feature (**MPnr2**), which consists of four compartments and possible stock enclosure which have the chance of containing graves, which is also rated as high significance and graded as **Grade IIIA** due to the possibility of graves, were located within the study area. Both features form part of a larger group of stonewalling settlement units in the area, which has a lack of research, and holds the potential of yielding valuable information.

7.2 Mitigation measures

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

7.3 General

It is the combined considered opinion of the heritage specialists that the proposed pipeline route will have a **direct impact** (before mitigation) on several identified heritage resources rated being of **medium to high heritage significance.** The alternative route, on the other hand, will have **no impact** on known heritage resources. However, with the implementation of recommended mitigation measures in **Table 11**, the overall impact on heritage resources will be reduced to acceptable levels during the activities of the project.

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APPENDIX A

SITE DESCRIPTION FORMS

Site coordinates		
site_nr	**X**	**Y**
MPnr1	-26.4285	27.40239
MPnr2	-26.4288	27.40243

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
MPnr1	-26.4285	27.40239	**General Landscape Characteristics** Mountainous/Grassy vegetation **Site Conditions** Overgrown/limited visibility **Time Period** Iron Age **Site Type** Stonewalling **Site Extent** 10m x 10m **Notes** Large, compactly packed stones which form meter-high stonewalling. These stonewalls are located further down a hill from MPnr2. This feature, unlike the walling at MPnr2, is more linear and does not contain a circular shape. Upon further investigation, satellite imagery from Google Earth (year 1/2022) shows a connection of this linear stonewalling to an overall circular stone feature, which is roughly 16m in diameter. Based on this imagery, it seems to be a part of a larger stonewalling group in the area.	High	Grade 3 – A (IIIA)

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating

Figure 16 – A close-up of the linear stonewalling (left) and an area view of the linear stonewalling (right).

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
MPnr2	-26.4288	27.40243	**General Landscape Characteristics** Mountainous **Site Conditions** Overgrown/limited visibility **Time Period** Iron Age **Site Type** Stonewalling/Kraal **Site Extent** 20m x 20m **Notes** Four large circles of stone walling, some appear to be kraals which are large in size, they are each 4m, 6m, 7m and 12m in diameter respectively. These stonewalled circles on located on top of a hill and are situated in relative proximity to other stone walling further down the hill. Satellite imagery from Google Earth (year 1/2022) shows that these stonewall circles are a part of a larger stonewalling group in the area.	High	Grade 3 - A (IIIA)

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating

Figure 17 – A depiction of one of the compartments of the overall stonewalling feature (left) and an entrance to the stonewalling feature on the right.

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating

Figure 18 - A close-up depiction of the 1m high stonewalling (left) and a depiction of another one of the compartments of the overall stonewalling feature (right).

APPENDIX B

PGS TEAM CVs

DUNCAN MCLEAN

Professional Heritage Practitioner

PROFILE

I hold an advanced degree in Archaeology from the University of Pretoria, with a specialization in Iron Age studies of Southern Africa and a focus on faunal analysis. My academic background is complemented by practical experience in museum archaeology and heritage management.

Through my studies and laboratory work, I have developed expertise in historical artifact identification and research. My professional experience with PGS Heritage has further honed my skills in archaeological mitigations, site monitoring, and surveys across various scales.

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EDUCATION

University of Pretoria
2020-2022
BA Degree - Majors in Archaeology and Ancient Cultures

University of Pretoria
2023
BA Hons - Archaeology

WORK EXPERIENCE

PGS Heritage – Junior Archaeologist
2024- present
My experience encompasses leading small teams in various mitigation projects, ranging from small to large-scale, primarily in the Komatipoort region and near Brits. My responsibilities included utilising GPS systems, conducting site and artifact photography, and performing site monitoring. I have conducted archaeological monitoring near Steelpoort and Komatipoort. As a field archaeologist, I am currently engaged in conducting multiple Heritage Impact Assessments.

Internship at PGS Heritage
2023
Assisted with surveys and the processes behind surveying, as well as gained insight into a large-scale mitigation project in the Komatipoort region.

Tutoring
2022
Tutored primarily History at a high school level as opportunities arose.

PROFESSIONAL AFFILIATION

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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PGS HERITAGE

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