



**PGS**  
**HERITAGE**

## **KOLOMELA MINE EXPANSION**

**Amendment of Existing Mining Activities for Kolomela Mine  
located South-west of Postmasburg, Northern Cape.**

### **Heritage Impact Assessment**

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## Declaration of Independence

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

## Disclosure of Vested Interest

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

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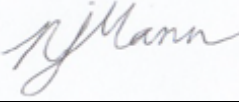


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## EXECUTIVE SUMMARY

PGS Heritage (Pty) Ltd (PGS) was appointed by EXM Environmental Advisory (Pty) Ltd (EXM) to undertake a Heritage Impact Assessment (HIA) which will serve to inform the updating of the Environmental Management Programme (EMPr) for the proposed expansion project for the Kolomela Mine located south-west of Postmasburg, Northern Cape.

Heritage resources are unique and non-renewable and as such, any impact on such resources must be seen as significant. The HIA has shown that the study area and surrounding area has some heritage resources situated within the proposed development boundaries. Through data analysis and a site investigation, the following issues were identified from a heritage perspective.

The scope of work was to provide a HIA report for the proposed Kolomela Mine expansion project. The study commenced with a brief archival and historical desktop study which was used to compile a historical layering of the study area within its regional context. This component indicated that both the immediate study area and the surrounding farms have a rich historical and archaeological history. The archival and historical study was followed by a detailed investigation of all previous heritage and archaeological reports identified on SAHRIS.

The fieldwork that was conducted on the mine consisted of a visit by two archaeologists from PGS Heritage to survey the proposed development footprint areas as well as to revisit some of the sites that had previously been identified within the present study area. The aim of revisiting the sites was to ascertain whether mitigation measures needed to be updated.

A field survey was undertaken on the new proposed development footprint areas. However, limited fieldwork was undertaken in areas that were already disturbed. To some degree, the archaeological visibility of the area was not ideal for surveying due to the dense thorn scrub and grass cover in the region. Furthermore, movement and survey of some areas on the property were inhibited on the account of active blasting and access restricted areas.

In previous heritage and archaeological impact assessment reports, eight heritage sites were identified within footprint areas of the mine property (Morris, 2005; African Heritage Consultants, 2011; Miller, 2011; van der Ryst, 2011; PGS, 2015).

These eight previously identified heritage sites along with the four sites (and five findspots) recently identified within the proposed development area will be discussed in more detail below.

## Heritage Sites Identified<sup>1</sup>

The fieldwork completed in 2015 (PGS, 2015), confirmed the presence of 6 Stone Age sites (**KOL 1, KOL 2, KOL 5, KOL 6, KOL 7 and KOL 8**), 1 historical mine (**KOL 3**) and 1 historical farmstead complex (**KOL 4**). Two burial grounds were identified as part of the farmstead (**KOL4.2 and KOL4.4**)

The fieldwork completed for the current HIA has confirmed the presence of 1 burial ground site (**KME-01**), 1 archaeological site (**KME-04**) and 2 modern/recent structures (**KME-02, KME-03**) that may be affected by the proposed development.

### *Burial Grounds and Graves*

**KOL4.2, KOL4.4 and KME-01** are identified as heritage resources of **high local heritage significance** (heritage grading: IIIA).

### *Historical Sites*

The historical mine (**KOL 3**) and historical farmstead complex (**KOL 4**) are identified as heritage resources of **high local heritage significance** (heritage grading: IIIA).

### *Archaeology*

Mostly MSA and LSA artefacts were observed within the study area and raw materials utilised included jasper, cryptocrystalline silica (ccs) and quartz. Single isolated artefacts were also observed across portions of the study area. Five findspots (**KME-05 – KME-09**) were documented during the survey. These sparse surface scatters were however not classified as sites and have been determined to have no research potential or other cultural significance (heritage grading: not conservation worthy (NCW)).

One Stone Age sites (**KME-04**) were identified within a proposed a waste rock dump area. After appropriate investigation, the site has been determined to have no research potential or other cultural significance (heritage grading: IIIC).

The previously identified low-density scatter of stone tools (KOL 2) was identified as a heritage resource of **low local heritage significance** (heritage grading: IIIC) and the previously identified archaeological pan sites (**KOL 1, KOL 5, KOL 6, KOL 7, KOL 8**) are of **low to medium local heritage significance** (heritage grading: IIIB/IIIC).

*An evaluation of the current status of the site KOL5, 6 and during the current fieldwork of this HIA it is evident that only one pan remains at each of the sites of **KOL 5, 6 and 7** with a total of 3 pans remaining of the original 69 identified for the 3 sites in the original HIAs. It is unclear if*

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<sup>1</sup> Site in this context refers to a place where a heritage resource is located and not a proclaimed heritage site as contemplated under s27 of the NHRA.

any permitting or mitigation was done for the destruction of these pans as recommended in the original HIAs. These pan sites are all allocated a significance of low-medium.

#### *Modern/Recent Structures*

After appropriate investigation, **KME-02** and **KME-03** have been determined to have no research potential or other cultural significance (heritage grading: not conservation worthy (NCW)).

#### **The significance grading of the identified archaeological and historical heritage resources ranged from NCW to IIIA.**

#### **Impact Statement**

An analysis of the various components of the HIA indicates a mitigated medium to low negative impact on heritage resources and are expanded on below.

#### *Burial Grounds and Graves*

An assessment of the possible impacts of the proposed project on graves and burial grounds has shown that unmitigated impacts consist of a moderate negative impact. **By implementing the mitigation measures as listed in this report these impacts can be managed to low negative.**

#### *Historical Sites*

An assessment of the possible impacts of the proposed project on historical heritage resources has shown that unmitigated impacts consist of a moderate negative impact. **By implementing the mitigation measures as listed in this report these impacts can be managed to low negative.**

#### *Archaeology*

As KME-04, KOL 2 and the findspots (**KME-05 – KME-09**) were assessed to have low to no heritage significance, they are not included in the impact risk assessment calculations. The reason for this is that sites of low to no heritage significance will **not require mitigation**. Although in the case of KOL 2, it was recommended that “should future mining activities expose archaeological material at this site, an archaeologist must be contracted to comment on the significance of the finds” (African Heritage Consultants 2011:20).

An assessment of the possible impacts of the proposed project on the previously identified archaeological pan sites (**KOL 1, KOL 5, KOL 6, KOL 7, KOL 8**) has shown that unmitigated impacts consist of a moderate negative impact. **By implementing the mitigation measures as listed in this report these impacts can be managed to low negative.**

### Modern/Recent Structures

As these sites were assessed to have no heritage significance, they are not included in the impact risk assessment calculations. The reason for this is that sites of low to no heritage significance will **not require mitigation**.

### Recommendations

The following mitigation measures are listed in the table below.

Area and site no.	Mitigation Measures
<b>General project area</b>	<ul style="list-style-type: none"><li>Implement a chance find procedures in case where possible heritage finds are uncovered.</li></ul>
Burial Grounds and Graves ( <b>KOL 4.2, KOL 4.4 and KME-01</b> ) that were rated as high local heritage significance and had a heritage grading of IIIA.	<ul style="list-style-type: none"><li>KOL 4.2 and KOL 4.4 (the graves that form part of the historic farmyard complex (KOL 4)): A minimum buffer of 250 meters from any mining activities (e.g. blasting) must be maintained.</li><li>KME-01: The graves should be demarcated with a 100-meter buffer and should be avoided and left in situ.</li><li>A Grave Management Plan should be developed for the graves which also need to be approved by SAHRA BGG.</li><li>If the site is going to be impacted and the graves need to be removed a grave relocation process as per the Kolomela Heritage Management Plan for the site is recommended as a mitigation and management measure.</li></ul>
Historical sites ( <b>KOL 3 and KOL 4</b> ) that were rated as high local heritage significance and had a heritage grading of IIIA.	<ul style="list-style-type: none"><li>KOL 3 - A 400 meter buffer must be maintained between the site and any proposed development.</li><li>KOL 4 - A minimum buffer of 250 meters from any mining activities must be maintained.</li></ul>
Archaeological sites ( <b>KME-04 and KOL 2</b> ) that were rated as low local heritage significance and had a heritage grading of IIIC.	<ul style="list-style-type: none"><li>KME-04 - The documentation of the site in this HIA report is sufficient and the site can be destroyed without a permit but with the approval of this report.</li><li>KOL 2 - It had been recommended that "Should future mining activities expose archaeological material at this site, an archaeologist must be contracted to comment on the significance of the finds" (African Heritage Consultants 2011:20).</li></ul>

Area and site no.	Mitigation Measures
Archaeological pan sites ( <b>KOL 1, KOL 5, KOL 6, KOL 7, KOL 8</b> ) were rated as low to medium local heritage significance and had a heritage grading of IIIB/IIIC.	<ul style="list-style-type: none"> <li>▪ A general buffer of 30 meters for the remaining pan sites are recommended.</li> <li>▪ Phase 2 mitigation (representative sampling) on certain pans will be required before they are destroyed by mining activities. This will require a permit issued by the South African Heritage Resources Agency (SAHRA).</li> </ul>
Modern/recent Structures ( <b>KME-02</b> and <b>KME-03</b> ) were rated to have no research potential or other cultural significance and had a heritage grading of not conservation worthy (NCW).	<ul style="list-style-type: none"> <li>▪ No mitigation is required.</li> </ul>
Findspots ( <b>KME-05 – KM—09</b> ) were rated to have no research potential or other cultural significance and had a heritage grading of not conservation worthy (NCW).	<ul style="list-style-type: none"> <li>▪ No mitigation is required.</li> </ul>

### General

In general terms, only the footprint areas of the proposed mining activities as depicted on the mine expansion footprint layout plan from within this report, were assessed during this HIA. Should the development footprints of the proposed development change in any way, these additional areas will have to be assessed in the field and included as part of a revised HIA study.

It is the author's considered opinion that overall impact on heritage resources is Low. Provided that the recommended mitigation measures are implemented, the impact would be acceptably Low or could be totally mitigated to the degree that the project could be approved from a heritage perspective. The management and mitigation measures as described in Section 6 and 8 of this report have been developed to minimise the project impact on heritage resources.



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## TERMINOLOGY AND ABBREVIATIONS

### Archaeological resources

This includes:

- material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency, and which is older than 100 years, including any area within 10m of such representation;
- wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation; and
- features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

### Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

### Development

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

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

### Early Stone Age

The archaeology of the Stone Age between 700 000 and 3 300 000 years ago.

### Fossil

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

### Heritage

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

### Heritage resources

This means any place or object of cultural significance and can include (but not limited to) as stated under Section 3 of the NHRA,

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

### **Holocene**

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

### **Late Stone Age**

The archaeology of the last 30 000 years associated with fully modern people.

### **Late Iron Age (Early Farming Communities)**

The archaeology of the last 1000 years up to the 1800's, associated with iron-working and farming activities such as herding and agriculture.

### **Middle Iron Age**

The archaeology of the period between 900-1300AD, associated with the development of the Zimbabwe culture, defined by class distinction and sacred leadership.

### **Middle Stone Age**

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

### **Palaeontology**

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



*Table 1: List of abbreviations used in this report.*

<b>Abbreviations</b>	<b>Description</b>
AIA	Archaeological Impact Assessment
APHP	Association of Professional Heritage Practitioners
ASAPA	Association of South African Professional Archaeologists
BMM	Black Mountain. Mine
CCS	Cryptocrystalline Silicate
CRM	Cultural Resource Management
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EIAs practitioner	Environmental Impact Assessment Practitioner
ESA	Earlier Stone Age
EXM	EXM Environmental Advisory (Pty) Ltd
GN	Government Notice
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
IAIASA	International Association for Impact Assessment South Africa
LCTs	Large Cutting Tools
LIA	Late Iron Age
LSA	Late Stone Age
MIA	Middle Iron Age
MPRDA	Mineral and Petroleum Resources Development Act 28 of 2002
MSA	Middle Stone Age
NEMA	National Environmental Management Act, 1998 (Act No 107 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No 25 of 1999)
NCW	Not Conservation Worthy
PGS	PGS Heritage (Pty) Ltd
PHRA	Provincial Heritage Resources Authority
PIA	Palaeontological Impact Assessment
PSSA	Palaeontological Society of South Africa
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System

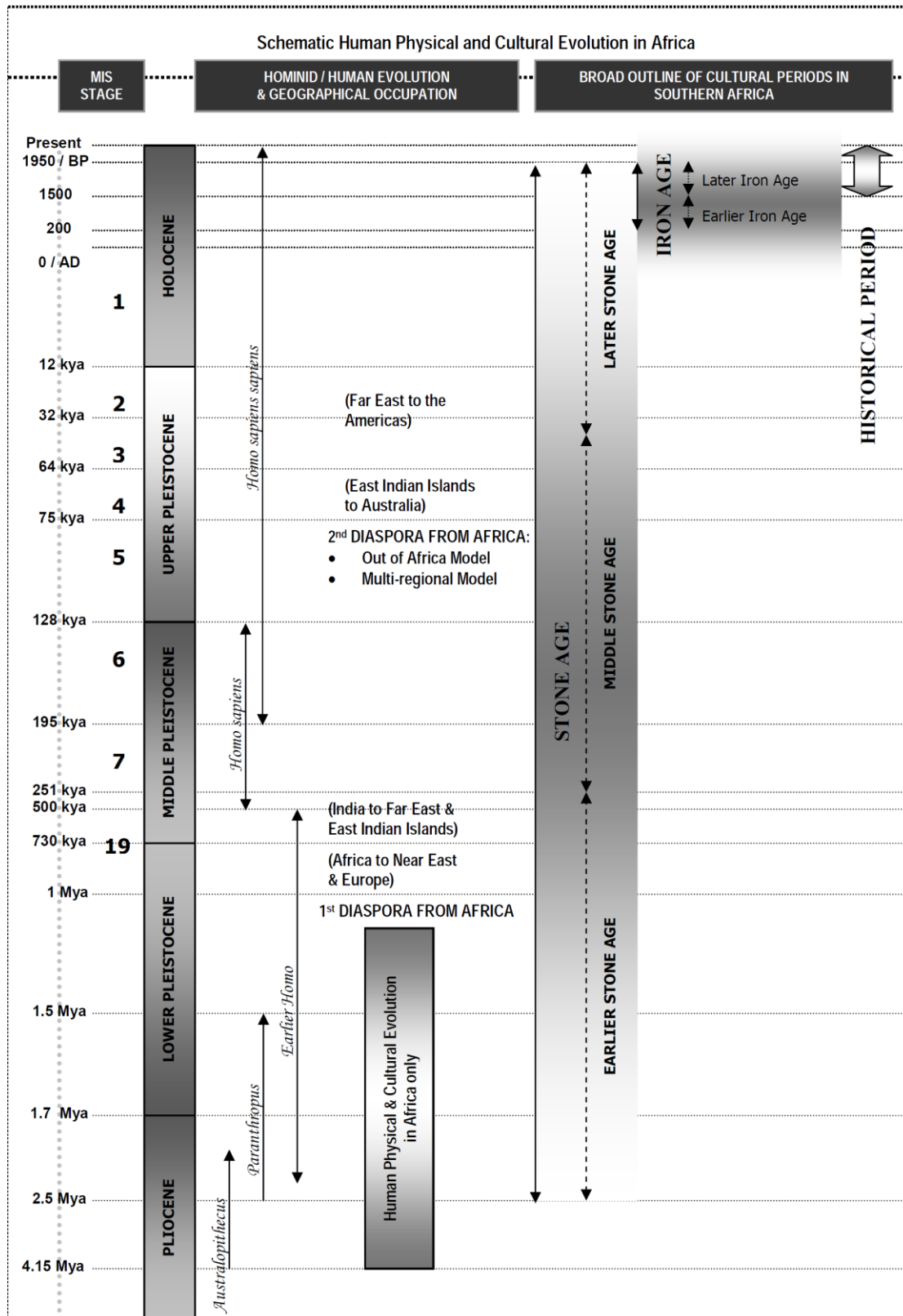


Figure 1: Human and Cultural Timeline in Africa (Morris, 2008)

# 1 INTRODUCTION

PGS Heritage (Pty) Ltd (PGS) was appointed by EXM Environmental Advisory (Pty) Ltd (EXM) to undertake a Heritage Impact Assessment (HIA) which will serve to inform the updating of the Environmental Management Programme (EMPr) for the proposed expansion project for the Kolomela Mine located south-west of Postmasburg, Northern Cape.

## 1.1 Scope of the Study

The aim of the study is to identify possible heritage sites and finds that may occur in the proposed mining amendment footprint area. The HIA aims to inform the Environmental Impact Assessment (EIA) in the development of a comprehensive EMPr to assist the project applicant in responsibly managing the identified heritage resources to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act (Act 25 of 1999) (NHRA).

The aims of the study are as follows:

- To provide a HIA report in terms of the proposed mining amendment.

## 1.2 Specialist Qualifications

This HIA was compiled by PGS.

The staff at PGS have 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.

Ms. Nikki Mann graduated with her Master's degree (MSc) in Archaeology and is registered as a Professional Archaeologist with the Association of Southern African Professional Archaeologists (ASAPA).

Wynand van Zyl, field archaeologist holds a BA (Hons) in Archaeology.

Wouter Fourie, the Project Coordinator and co-author, is registered with the ASAPA as a Professional Archaeologist and is accredited as a Principal Investigator; he is further an Accredited Professional Heritage Practitioner with the Association of Professional Heritage Practitioners (APHP).

### 1.3 Assumptions and Limitations

A detailed field survey was undertaken on the new proposed development footprint areas. However, limited fieldwork was undertaken in areas that were already disturbed. To some degree, the archaeological visibility of the area was not ideal for surveying due to the dense thorn scrub and grass cover in the region. Furthermore, movement and survey of some areas on the property were inhibited on the account of active blasting and access restricted areas.

Not detracting in any way from the comprehensiveness of the research undertaken, it is necessary to realise that the heritage resources located during the desktop research and fieldwork do not necessarily represent all the possible heritage resources present within the area. Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well.

### 1.4 Legislative and Policy Framework

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:

- National Environmental Management Act (NEMA), Act 107 of 1998 – Appendix 6
- National Heritage Resources Act (NHRA), Act 25 of 1999
- Mineral and Petroleum Resources Development Act (MPRDA), Act 28 of 2002

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

- i. GNR 982 of 2014, as amended 2017 (Government Gazette 38282) promulgated under the NEMA:
  - a. Basic Assessment Report (BAR) – Regulations 19 and 23
  - b. Environmental Scoping Report (ESR) – Regulation 21
  - c. Environmental Impact Report (EIR) – Regulation 23
  - d. Environmental Management Plan (EMP) – Regulations 19 and 23
- ii. Notice 648 of the Government Gazette 45421
- iii. NHRA Act 25 of 1999
  - a. Protection of Heritage Resources – Sections 34 to 36; and
  - b. Heritage Resources Management – Section 38
- iv. MPRDA Regulations of 2014:
  - a. Environmental reports to be compiled for application of mining right – Regulation 48.
  - b. Contents of scoping report – Regulation 49
  - c. Contents of environmental impact assessment report – Regulation 50

- d. Environmental management programme – Regulation 51
- e. Environmental management plan – Regulation 52

#### *1.4.1 NEMA – Appendix 6 requirements*

The HIA report has been compiled considering the NEMA Appendix 6 requirements for specialist reports as indicated in the table below. For ease of reference, the table below provides cross-references to the report sections where these requirements have been addressed. It is important to note, that where something is not applicable to this HIA, this has been indicated in the table below.

Table 2: Reporting requirements as per NEMA Appendix 6 for specialist reports

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report	Comment where not applicable.
1.1(a) (i) Details of the specialist who prepared the report	Page 2 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 <b>Appendix A</b>	-
(b) A declaration that the person is independent in a form as may be specified by the competent authority	Page ii of the report	-
(c) An indication of the scope of, and the purpose for which, the report was prepared	Section 1.1	-
(cA) An indication of the quality and age of base data used for the specialist report	Section 3	-
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 8	-
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3	-
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 3	-
(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 8	
(g) An identification of any areas to be avoided, including buffers	Section 6, 9	
(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;		
(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 6, 8	
(k) Any mitigation measures for inclusion in the EMPr	Section 6, 9	
(l) Any conditions for inclusion in the environmental authorisation		None required
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 9	
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and	Section 10	
(n)(iA) A reasoned opinion regarding the acceptability of the proposed activity or activities; and		
(n)(ii) If the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Section 10	-
(o) A description of any consultation process that was undertaken during the course of carrying out the study		Not applicable. A public consultation process was handled as part of the EIA and EMP process.
(p) A summary and copies if any comments that were received during any consultation process		Not applicable. To date no comments

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report	Comment where not applicable.
		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.	NEMA Appendix 6 and GN648	

#### 1.4.2 Notice 648 of the Government Gazette 45421

Although minimum standards for archaeological (2007) and palaeontological (2012) assessments<sup>2</sup> were published by the South African Heritage Resources Agency (SAHRA) (2016), Government Notice (GN) 648 requires sensitivity verification for a site selected on the national web-based environmental screening tool for which no specific assessment protocol related to any theme has been identified. The requirements for this GN are listed in **Table 3** and the applicable section in this report noted.

*Table 3: Reporting requirements for GN648*

GN 648	Relevant section in report	Where not applicable in this report
2.2 (a) a desktop analysis, using satellite imagery;	Section 5	
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	-
2.3(a) confirms or disputes the current use of the land and environmental sensitivity as identified by the national web- based environmental screening tool;	Section 4	-
2.3(b) contains motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity;	Section 4 provides a description of the current use and confirms/doesn't confirm the status in the screening report.	-

An assessment of the Environmental Screening tool provides the following sensitivity rating for archaeological and heritage resources as low (**Figure 2**), while palaeontological resources are rated as medium and high (**Figure 3**). A site visit conducted as part of a Palaeontological Impact Assessment (PIA) (Butler, 2019) revealed no visible evidence of fossiliferous outcrops and an overall low palaeontological sensitivity was allocated to Kolomela.

<sup>2</sup> South African Heritage Resources Agency. 2007. *Minimum Standards: Archaeological and Paleontological Components of Impact Assessment Reports*. May 2007.

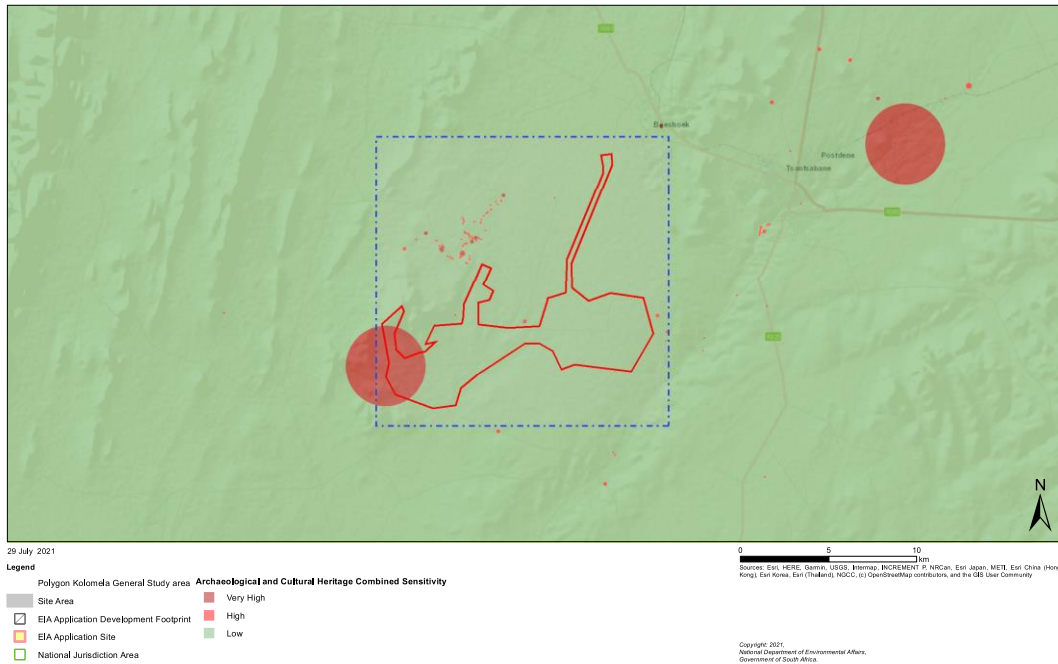


Figure 2: Heritage Screening map. Source: Department of Environmental Affairs.

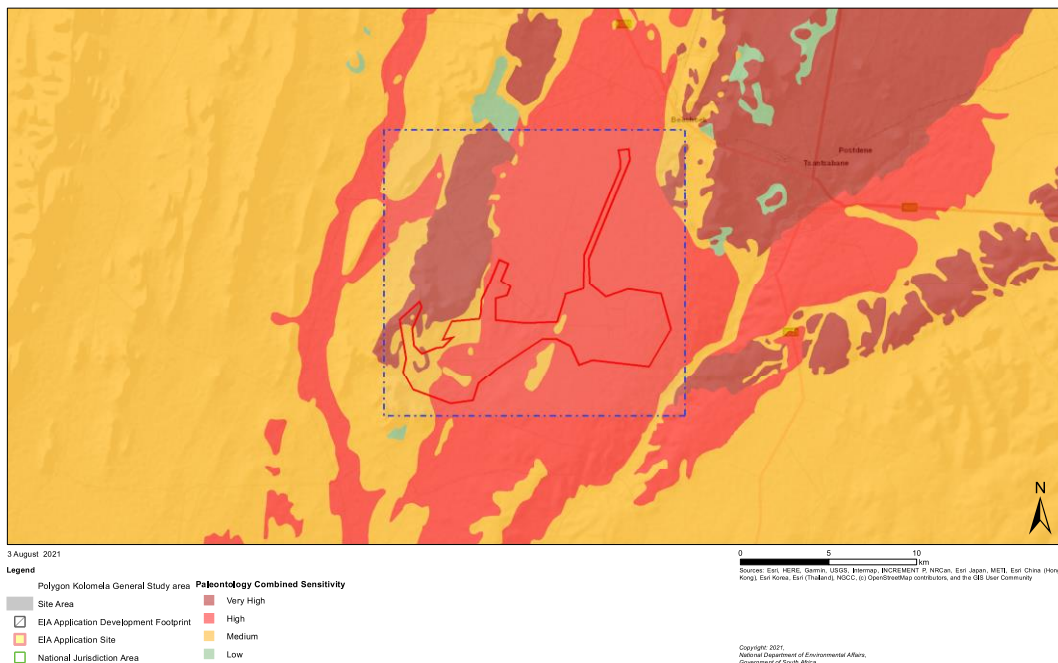


Figure 3: Palaeontology Screening map. Source: Department of Environmental Affairs

### 1.4.3 The National Heritage Resources Act (NHRA; Act 25 of 1999)

The NHRA has applicability, as the study forms part of an overall HIA in terms of the provisions of Section 34, 35, 36 and 38 of the NHRA and forms part of a heritage scoping study that serves to identify



key heritage resources, informants, and issues relating to the palaeontological, archaeological, built environment and cultural landscape, as well as the need to address such issues during the impact assessment phase of the HIA process.

### **Section 35 – Archaeology, Palaeontology and Meteorites**

According to Section 35 (Archaeology, Palaeontology and Meteorites) and Section 38 (Heritage Resources Management) of the NHRA, PIAs and Archaeological Impact Assessments (AIA) are required by law in the case of developments in areas underlain by potentially fossiliferous (fossil-bearing) rocks, especially where substantial bedrock excavations are envisaged, and where human settlement is known to have occurred during prehistory and the historic period.

### **Section 36 – Burial Grounds & Graves**

A section 36 permit application is made to the SAHRA or the competent provincial heritage authority which protects burial grounds and graves that are older than 60 years and must conserve and generally care for burial grounds and graves protected in terms of this section, and it may make such arrangements for their conservation as it sees fit. The SAHRA must also identify and record the graves of victims of conflict and any other graves which it deems to be of cultural significance and may erect memorials associated with these graves and must maintain such memorials. A permit is required under the following conditions:

Permitting requirements for burial grounds and graves older than 60 years (prehistoric) and historic burials to the SAHRA:

- a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves.
- b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
- c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.
- d) SAHRA or a provincial heritage resources authority may not issue a permit for the destruction or damage of any burial ground or grave referred to in subsection (3)(a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant.

### **Section 38 HIA as a Specialist Study within the EIA in Terms of Section 38(8)**

A NHRA Section 38 (Heritage Impact Assessments) application to the SAHRA is required when the proposed development triggers one or more of the following activities:

Permitting requirements for demolition of built environment features:

- a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- b) the construction of a bridge or similar structure exceeding 50 m in length;
- c) any development or other activity which will change the character of a site,
  - i. exceeding 5 000 m<sup>2</sup> in extent; or
  - ii. involving three or more existing erven or subdivisions thereof; or
  - iii. involving three or more erven or divisions thereof which have been consolidated within the past five years; or
  - iv. the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- d) the re-zoning of a site exceeding 10 000 m<sup>2</sup> in extent; or
- e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority

In this instance, the heritage assessment for the property is to be undertaken to inform the updating of the EMP. Provision is made for this in terms of Section 38(8) of the NHRA, which states that:

This is an HIA submitted to the relevant authority in terms of Section 38(8) of the National Heritage Resources Act. The commenting authority is the SAHRA.

An HIA report is required to identify, and assess archaeological resources as defined by the Act, assess the impact of the proposal on the said archaeological resources, review alternatives and recommend mitigation.

Section 38 (3) Impact Assessments are required, in terms of the statutory framework to conform to basic requirements as laid out in Section 38(3) of the NHRA. These are:

- The identification and mapping of heritage resources in the area affected
- The assessment of the significance of such resources
- The assessment of the impact of the development on the heritage resources
- An evaluation of the impact on the heritage resources relative to sustainable socio/economic benefits

- Consideration of alternatives if heritage resources are adversely impacted by the proposed development
- Consideration of alternatives
- Plans for mitigation in the future

## 2 TECHNICAL DETAILS OF THE PROJECT (PROVIDED BY CLIENT)

### 2.1 Site Location and Description

#### 2.1.1 Description of the property

<b>Farm Name:</b>	Farm Leeuwfontein No. 488 Remaining Extent Farm Strydfontein No. 614 Plaas No. 476 Farm Ploegfontein No. 487 Remaining Extent Farm Klipbankfontein No. 489 Remaining Extent Farm Kapsteveld No. 541 Portion 1 Remaining Extent Farm Kapsteveld No. 541 Portion 3 Farm Kapsteveld No. 541 Portion 2 Farm Kapsteveld No. 541 Remaining Extent Plaas No. 485 Plaas No. 486 Farm Kappies Kareeboom 540
<b>Application area (Ha)</b>	The mining right area covers 18 466 ha, of which 4340 ha is already disturbed or will be disturbed by mining infrastructure footprints.
<b>Magisterial district:</b>	The Hay Magisterial District (Tsantsabane Local Municipality) ZF Mgcawu District Municipality
<b>Distance and direction from nearest town</b>	8km southwest of Postmasburg
<b>Land description</b>	The current land use within the Kolomela Mine property (Kapsteveld and Wolhaarkop farms) is primarily mining. Some evidence for game farming can also be seen, which may be remnants of previous agricultural activities on newly acquired properties. The dominant land use in the area surrounding Kolomela Mine (Floradale) is livestock and game farming. There are also a number of human settlements and other land uses adjacent to the mine site.

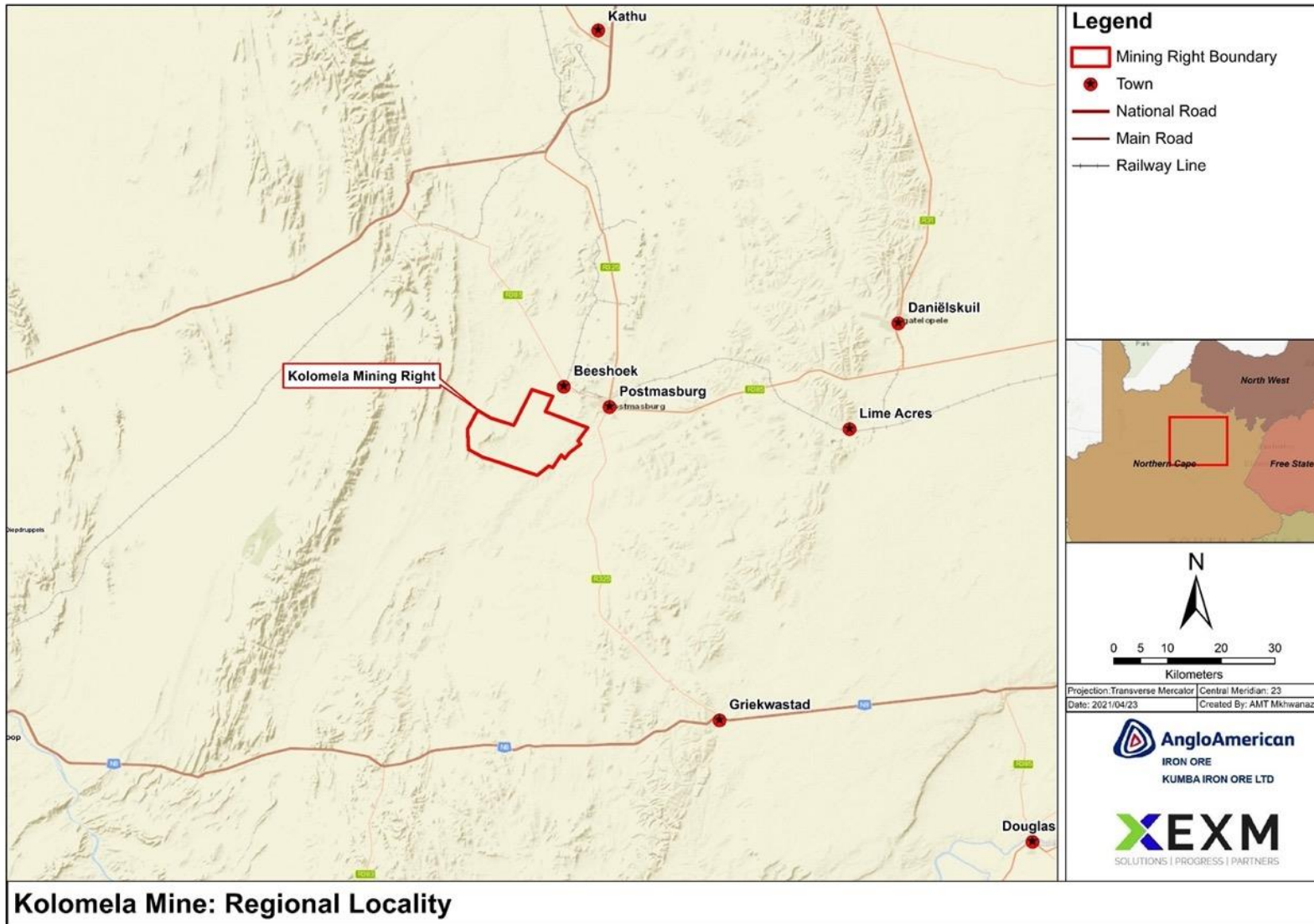


Figure 4: Regional locality of the Kolomela Mine (provided by client).

## 2.2 Technical Project Description

### 2.2.1 Description of the Proposed Activity

The Sishen Iron Ore Company (Pty) Ltd (SIOC), which forms part of Kumba Iron Ore Limited (Kumba), is the applicant for the proposed Kolomela Mine development.

The proposed development entails the expansion of existing mining activities as part of an overall amendment of mining activities at Kolomela Mine. The proposed mining development is located approximately 8km south-west of Postmasburg in the Tsantsabane Local Municipality, Northern Cape Province. The Minister of Mineral Resources granted a mining right for the mining of iron ore at Kolomela Mine on 5 May 2008, {Ref: (NC) 069 MR} and is valid until 17 September 2038, unless cancelled or suspended.

Kolomela mine operates as a conventional open cast mine where ore is extracted by means of drilling, blasting, loading and hauling. Iron ore is currently extracted from three opencast pits, namely Klipbankfontein, Leeuwfontein and Kapstevél North. Kolomela is in the process of developing the Kapstevél South Pit. Kolomela proposes to expand and amend some of the existing activities and also develop new infrastructure to support continued and future production at the mine. This includes:

- Conveyor – DSO to DMS
- Conveyor – DMS to DSO
- DMS Tailings Storage Facility (TSF)
- KS At Pit Facility Access Road
- KSS Park Up Area
- DMS Railway Line
- Water Diversion Berm
- Pit Areas of Relaxation
- 50m Rehab Zone
- KS Atpit Facility Footprint Expansion
- Conveyor to Kasptevél Atpit
- Tyre Management Area
- Amended Haul Roads
- Evaporation Dam
- Low Grade Stockpile
- Low Grade Stockpile
- Ore Stockpile Area
- Solar Facility/ PV Plant Power
- Exploration Core Yard Expansion

- Aucampsrus Access Area
- KS Pit Total Footprint
- Proposed KS Waste Rock Dumps (WRDs)
- Soil Stockpile and Park Up Areas
- Approved WRDs
- Backfill Area
- KS Potential Ore Bodies

The existing and planned infrastructure at Kolomela mine is illustrated below in **Figure 5**. The proposed development areas and survey assessment areas that will be addressed in this HIA is illustrated in **Figure 6** and **Figure 7**.

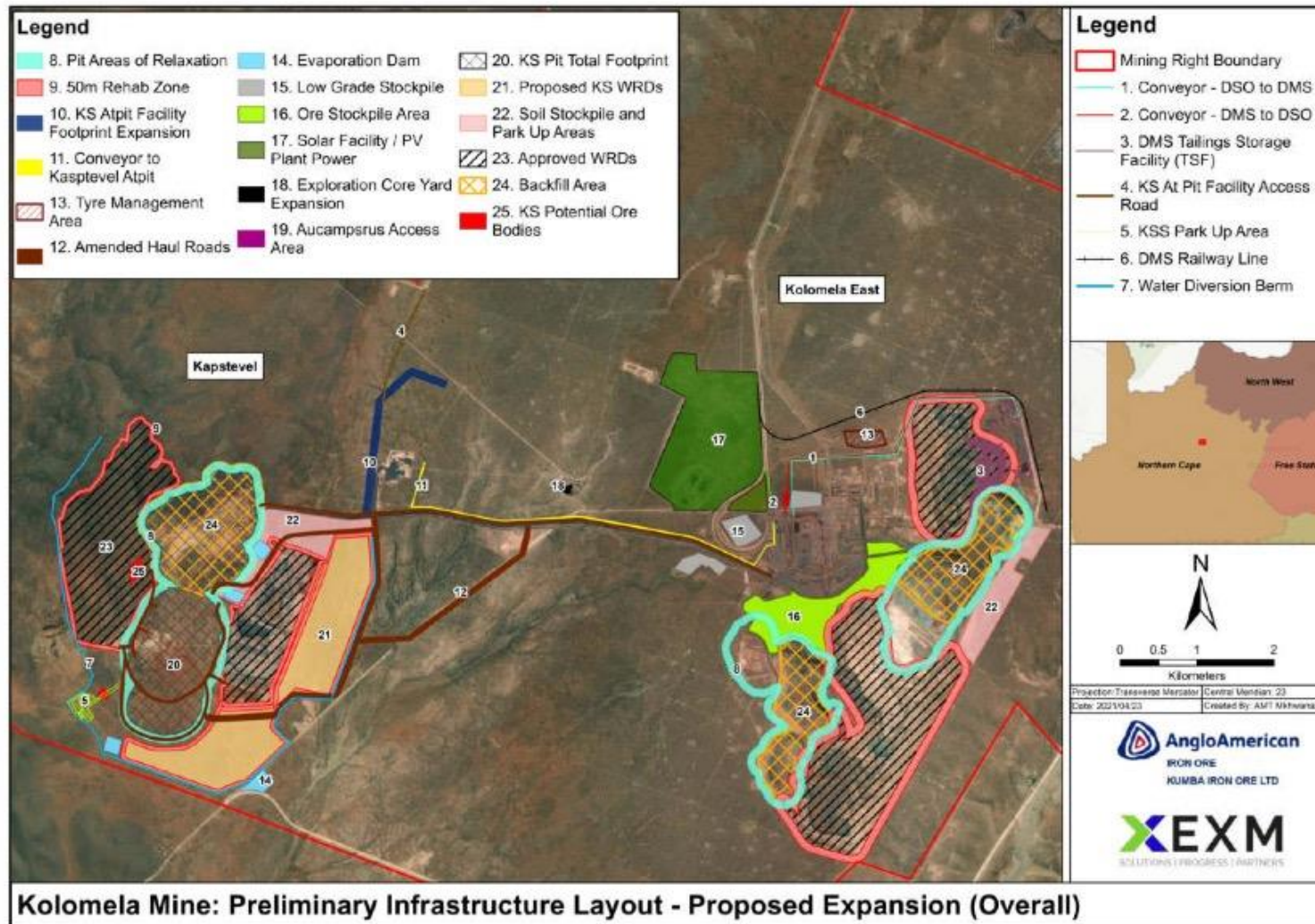
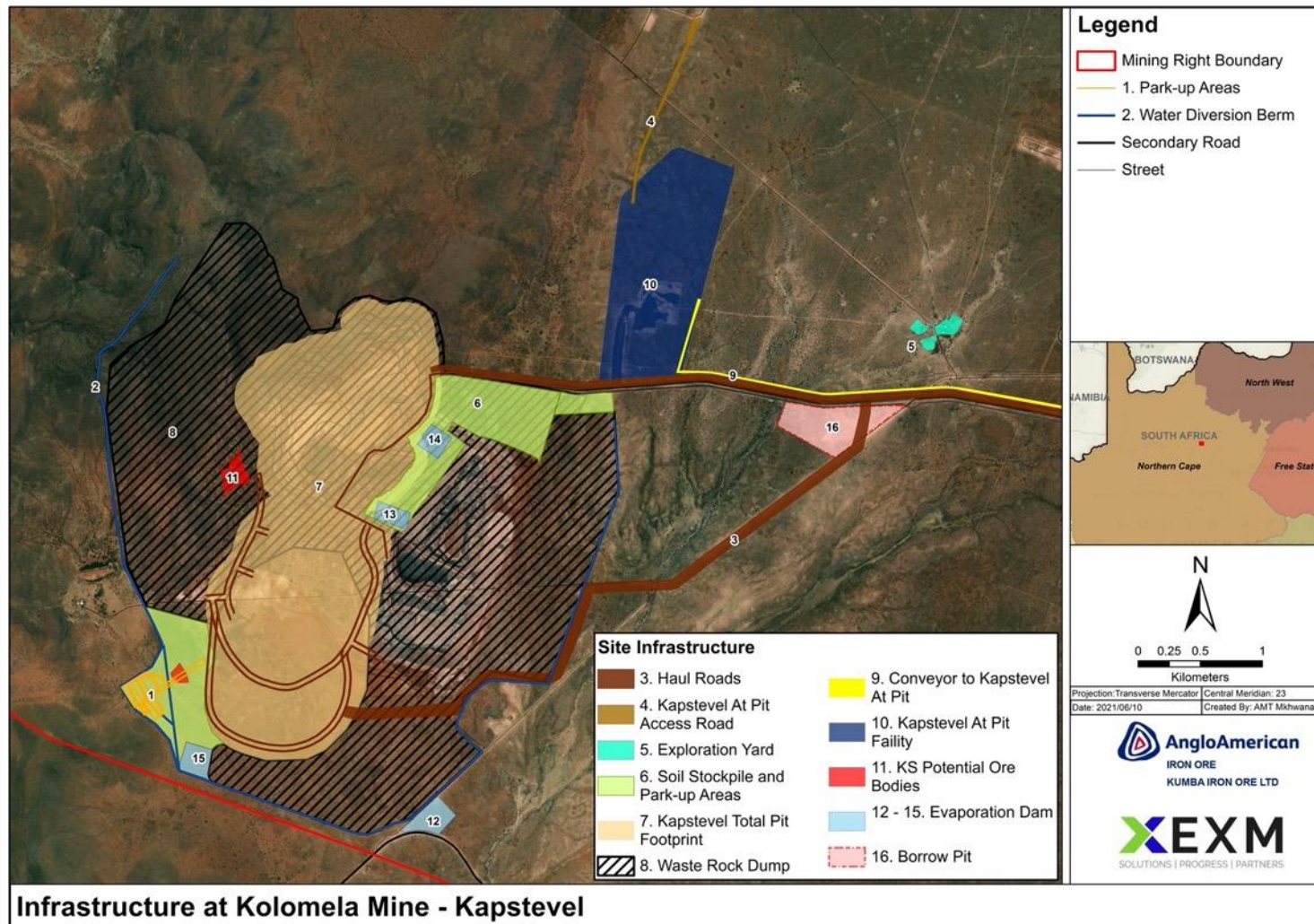
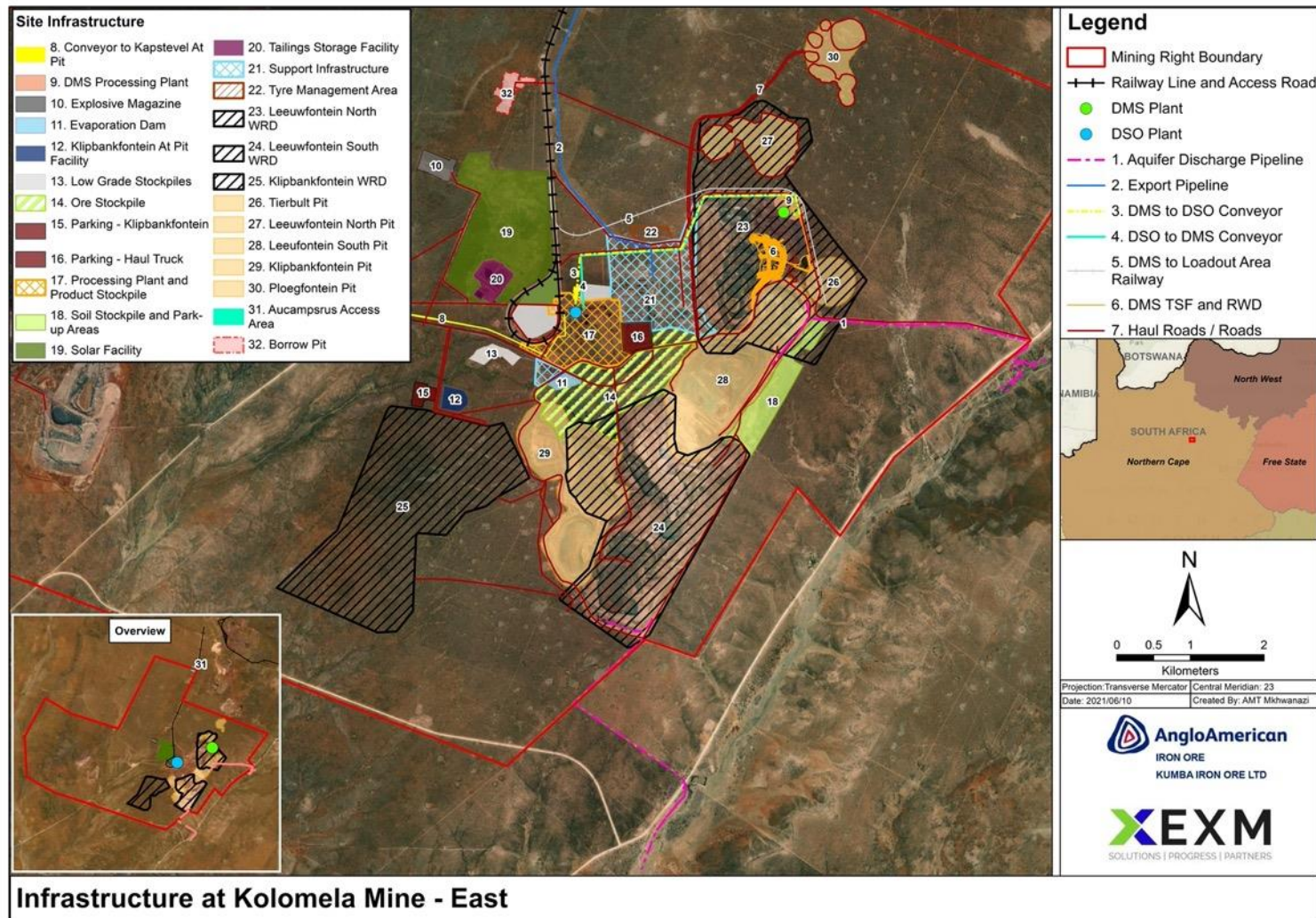


Figure 5: Preliminary Infrastructure Layout – Proposed Overall Expansion (provided by EXM).







**Infrastructure at Kolomela Mine - East**

Figure 7: Infrastructure at Kolomela Mine – Eastern section of the study area (provided by EXM).

### 3 METHODOLOGY

This report was compiled by PGS for the proposed Kolomela Mine expansion project, which represents the expansion of existing mining activities of the Kolomela Mine. The applicable maps, tables and figures, are included as stipulated in the NHRA (no 25 of 1999), the NEMA (no 107 of 1998). The HIA process consisted of three steps:

Step I – Literature Review and sensitivity analysis<sup>3</sup>: The background information to the field survey relies greatly on previous studies completed for the project to determine known sensitivities, as well as the heritage background research completed for this report.

Step II – Physical Survey: The fieldwork that was conducted on the mine property consisted of a brief visit by two archaeologists from PGS Heritage to survey new proposed development footprint areas as well as to revisit some of the sites that had previously been identified within the present study area. The survey was conducted between 19-21 July 2021 and aimed at locating and documenting sites falling within and adjacent to the proposed development footprint. The aim of revisiting previously identified sites was to ascertain whether mitigation measures needed to be updated. Limited fieldwork was undertaken in areas that were already disturbed. Furthermore, movement and survey of some areas on the property were inhibited on the account of active blasting and access restricted areas.

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

#### 3.1 Site Significance

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

Site significance classification standards prescribed by the Heritage Western Cape Guideline (2016), were used for the purpose of this report (**Table 4** and **Table 5**).

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<sup>3</sup> According to Notice 648 of the Government Gazette 45421

*Table 4: Rating system for archaeological resources*

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

*Table 5: Rating system for built environment resources*

<b>Grading</b>	<b>Description of Resource</b>	<b>Examples of Possible Management Strategies</b>	<b>Heritage Significance</b>
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: 8 Ventershoek Street, Colesberg	May be declared as a Provincial Heritage Site managed by Ngwao-Boswa.	Exceptionally High Significance
II	Such a resource contributes to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		

<b>Grading</b>	<b>Description of Resource</b>	<b>Examples of Possible Management Strategies</b>	<b>Heritage Significance</b>
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. These are heritage resources which are significant in the context of an area.	This grading is applied to buildings and sites that have sufficient intrinsic significance to be regarded as local heritage resources; and are significant enough to warrant that any alteration, both internal and external, is regulated. Such buildings and sites may be representative, being excellent examples of their kind, or may be rare. In either case, they should receive maximum protection at local level.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree. These are heritage resources which are significant in the context of a townscape, neighbourhood, settlement or community.	Like Grade IIIA buildings and sites, such buildings and sites may be representative, being excellent examples of their kind, or may be rare, but less so than Grade IIIA examples. They would receive less stringent protection than Grade IIIA buildings and sites at local level.	Medium Significance
IIIC	Such a resource is of contributing significance to the environs. These are heritage resources which are significant in the context of a streetscape or direct neighbourhood.	This grading is applied to buildings and/or sites whose significance is contextual, i.e., in large part due to its contribution to the character or significance of the environs. These buildings and sites should, as a consequence, only be regulated if the significance of the environs is sufficient to warrant protective measures, regardless of whether the site falls within a Conservation or Heritage Area. Internal alterations should not necessarily be regulated.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough 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 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

#### **4 CURRENT STATUS QUO**

A site visit was conducted by two archaeologists from PGS from the 19th-21st July 2021. A mine representative accompanied the project team during the survey. The general vicinity of the proposed development area was assessed. A field survey was undertaken on the new proposed development footprint areas.

The study area is situated south-west of Postmasburg, Northern Cape Province. The proposed activity comprises the extension of existing mining activities within the Kolomela Mine. Man-made topographical features, including open pits, waste rock dumps and mining infrastructure dominate the topography of the mining rights area at Kolomela Mine. The natural surface topography of the undisturbed study areas is relatively flat (**Figure 8**). An ephemeral stream, the Groenwaterspruit, lies along the eastern border of the Kolomela mining right area.

The climate of the area is hot and semi-arid, and rainfall is irregular and erratic (250-450mm/year).

Kolomela is located in the Koranna-Langeberg Mountain Bushveld, Kuruman Mountain Bushveld, Kuruman Thornveld, Northern Upper Karoo, Olifantshoek Plains Thornveld and Postmasburg Thornveld (Mucina & Rutherford, 2006). To some degree, the archaeological visibility of the area was not ideal for surveying due to the dense scrub and grass cover in the region (**Figure 9**). Within the assessment area there are natural open clearings of stunted grass growth (**Figure 10**).

The dominant land use in the area surrounding Kolomela Mine is livestock farming. There are also residential areas (incl. Postmasburg, Beeshoek Mine Residential Village, farmhouse and farm labourer homes), educational facilities, The Beeshoek Mine and sheep, cattle and goat farming areas adjacent to the mine area.

Most of the study area slopes gently to the south-west from the Ploegfontein area in the east to Welgevonden, with several drainage courses converging to the south. A prominent hill, Wolhaarkop, is situated on the south-western portion of the study area (**Figure 11**). The south-eastern part of the study area consists of mainly calcrete-capped plains on red soils. Several small shallow pans occur within this area (**Figure 12**). The underlying geology of the Northern Upper Karoo is formed by shales of the Volkrust and Prince Albert Formations as well as Dwyka Group diamictites. Rock types encountered include jasper and cryptocrystalline silica (ccs). Surficial deposits, such as calcretes of the Kalahari Group, cover large areas of the mine property. The variably deep to shallow red soils are often eroded by water runoff/throughflow (**Figure 13, Figure 14**), wind deflation (**Figure 15**) and bioturbation by animals (**Figure 16**).

It is important to note that sections of the proposed mining development areas are disturbed by vegetation clearing (**Figure 21**) and previous mining infrastructure and activities (**Figure 26**). This includes sections of the Kapstevl Pit expansion area (**Figure 17**), haul road widening areas (**Figure 18**), conveyor – DMS to DSO (**Figure 19**), railway line (**Figure 20**), exploration core yard expansion area, soil stockpile and parkup areas (eastern side: **Figure 22, Figure 23, Figure 24**; western side: **Figure 25**), low-grade stockpile areas (southern portion, **Figure 27**) and the proposed pit areas of relaxation. Limited fieldwork was undertaken in these areas that were clearly disturbed. Furthermore, movement and survey of some areas on the property were inhibited on the account of active blasting and access restricted areas.



*Figure 8: General view of an undisturbed section from within the study area. The southern waste dump can be seen in the background (facing north).*



*Figure 9: General view of tall grass and scrub in the assessment area (facing south-east).*



*Figure 10: General view of stunted grass growth in the assessment area.*



*Figure 11: View of the mine from the summit of the Wolhaarkop hill (facing east)*



*Figure 12: General view of a pan.*



*Figure 13: View of mudcracks in the assessment area.*



*Figure 14: General view of natural gullies in the western assessment area.*



*Figure 15: Deflated soils in the western assessment area.*



*Figure 16: Animal burrows in red soils.*



*Figure 17: View of surface disturbance within the proposed Kapsteveld Pit expansion area.*



*Figure 18: View of Haul Road widening area where disturbance by mine related activity was evident (facing south)*



*Figure 19: General view of a disturbed area adjacent to a partially rehabilitated slope (facing south).*





*Figure 20: Sunken pipeline in the area adjacent to the proposed railway line.*



*Figure 21: Vegetation clearing within proposed expansion area for the exploration core yard.*



*Figure 22: Soil and rock dumping within the eastern proposed soil stockpile and parkup area (facing west).*



*Figure 23: Mine related activity in the eastern proposed soil stockpile and parkup area (facing north).*



*Figure 24: Cleared area within the eastern proposed soil stockpile location.*



*Figure 25: View of surface disturbance within the western proposed soil stockpile and parkup area.*



Figure 26: General view of the north-western assessment area adjacent to a road expansion area (facing north).



Figure 27: Southern low-grade stockpile area is already disturbed.

## 5 OVERVIEW OF STUDY AREA AND SURROUNDING LANDSCAPE


### 5.1 Historic Overview of the Study Area and Surrounding Landscape

DATE	DESCRIPTION
2.5 million to 250 000 years ago	<p>The Earlier Stone Age (ESA) is the first and oldest phase identified in South Africa's archaeological history and comprises two technological phases. The earliest of these is known as Oldowan and is associated with more robust flaked tools. It dates to approximately &lt;2 million years ago. The second technological phase is the Acheulian and comprises more refined stone artefacts such as the cleaver and bifacial hand axe. The Acheulian dates back to approximately 1.5 million years ago.</p> <p>A number of ESA sites and occurrences are known from the general vicinity, though the most significant sites from this area are the Kathu Pan and Kathu Townlands localities and also the Bestwood sites (Chazan et al, 2012) all located in proximity to the town of Kathu 75 km to the north-east. Research at Kathu Townlands was first undertaken by P.B. Beaumont (1990, 2004). The locality has a remarkable high lithic density containing millions of ESA artefacts (Mitchell, 2002; Walker et al, 2013; Walker et al, 2014). Moreover, the interface between the ESA and MSA is also represented at Kathu Pan by the transitional lithic industry of the Fauresmith (Porat et al, 2010).</p>
<250 000 to 40 000 years ago	<p>The Middle Stone Age (MSA) is associated with flakes, points and blades manufactured by means of the prepared core technique. This phase is furthermore associated with modern humans and complex cognition (Wadley 2013).</p> <p>MSA sites and occurrences had been identified in the direct vicinity of the study area, with the very significant Kathu Pan localities (Wilkins &amp; Chazan, 2012) located 75 km to the north-east. See also, for example, Beaumont (2009) and Kruger (2014).</p>
40 000 years ago to the historic past	<p>The Later Stone Age (LSA) is the third archaeological phase identified and is associated with an abundance of very small stone tools known as microliths.</p> <p>A number of LSA sites are known from the direct vicinity of the study area. Significant examples include the specularite mines at Blinkklipkop (18.2 km to the north-east) and Doornfontein (14.9 km to the north), as well as the rock engraving sites at Beeshoek (9.9 km to the north-east) and Palingpan (23.9 km to the north-east).</p>
800 AD – 820 AD	<p>The archaeological excavations undertaken by Beaumont and Boshier (1974) and Thackeray et al (1983) have revealed that the mining of specularite at Doornfontein and Tsantsabane/Blinkklipkop commenced during this time. Blinkklipkop for example is located 10.5 km north-east of the study area.</p> <p>During this initial period the mining activities would have been undertaken by San hunter-gatherers and Kora pastoralists. Only after the 17<sup>th</sup> century were such activities likely also undertaken by the Iron Age Tswana groups.</p>


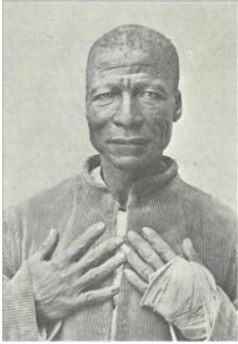
DATE	DESCRIPTION
Early 1600s	The Tswana groups known as the Thlaping and Thlaro moved southward into the area presently known as the Northern Cape. A century later they were settled in areas as far south as Majeng (Langeberg), Tsantsabane (Postmasburg) and Tlhaka le Tlou (Daniëlskuil) (Snyman, 1986). In terms of the Thlaro specifically, Breutz (1963) states that after they broke away from the Hurutshe during the period between 1580 and 1610, they travelled along the Molopo River and the Southern Kalahari before arriving at the confluence of the Kudumane, Mosaweng and Molopo. From here they established themselves at Tsowe (west of Morokweng), Gatlhose (10.9km south-east of the study area), Majeng (Langeberg), Khoise (Khuis on the Molopo River) and Tlhaka-la-Tlou (present day Daniëlskuil situated roughly 72km south-east of the study area). It is evident that the study area and surrounding landscape would be central within the overall settlement area of the two Tswana groups at the time.
c. 1770	During this time the Kora moved into the area. Due to their superior firearms, they applied increasing pressure on the Thlaping and Thlaro groups. In the end the Thlaping moved into a north-eastern direction to settle in the general vicinity of Dithakong, north-east of present-day Kuruman. The Thlaro settled in areas to the west and north-west of the Thlaping (Snyman, 1986).
c. 1786 – c. 1795	A German deserter by the name of Jan Bloem established himself at Tsantsabane (Blinkklip) (Legassick, 2010). This place is located 5km north- east of the present-day town of Postmasburg. The settlement of Jan Bloem at the specularite mine may have been a way in which to control the valuable site and any trading activities associated with it.
c. 1795	Legassick (2010) confirms the presence of the Thlaping, Thlaro and Kora in the general vicinity of the study area during this time. The study area and surrounding landscape would have represented a southern peripheral area of the overall landscape occupied by especially the Thlaping and Thlaro groups at the time. From a map depicted in Legassick (2010:338) it is evident that at the time the Kora started moving in north-eastern direction from the areas along the central Orange river to the banks of the Harts River.
Early 1800s	After the threat of the Kora became less intensive, the Thlaping moved to the vicinity of present-day Kuruman. The Thlaro returned to the Langeberg, establishing them on a permanent basis there during the 1820s (Snyman, 1986). The settlement of the Thlaping in the vicinity of Kuruman occurred during the reign of Molehabangwe. This period in the history of the Thlaping was seen as a period of wealth and power, and at the time they even had control of the <i>sibello</i> quarry near Blinkklip (Legassick, 2010).
1801	The first known visit to this area by European explorers (i.e., excluding European renegades and fugitives such as Jan Bloem) took place in 1801. The journey was undertaken by P.J. Truter and Dr W. Somerville. They crossed over the Orange River in the vicinity of Prieska and passed Blinkklip on their way to present-day Kuruman (Bergh, 1999).
1802 - 1813	During this year William Anderson and Cornelius Kramer, both of the London Missionary Society, established a mission station at a place called Leeuwenkuil. The focus of their work was a group known as the Bastards (Erasmus, 2004). This group could be described as a cultural conglomeration descending not only from relationships between different cultures and races (i.e., European and Khoi), but also comprised remnants of Khoi and San groups as well as freed slaves. The particular group later became known as the Griqua. Due to the problems caused by the presence of lions at Leeuwenkuil, the mission station was moved in 1805 to a place higher up called Klaarwater. On 7 August 1813, the settlement which had sprung up at Klaarwater was renamed Griquatown. This came about as a result of a number of proposals made by the Reverend John Campbell, the Director of the London Missionary Society who was visiting the mission stations from this area at the time. He suggested that "...the Bastards change their name to 'Griqua' and that Klaarwater became Griquatown. This was because 'on consulting among themselves they found a majority were descended from a person of the name Griqua'..." (Legassick, 2010). Griquatown is located 54 km south-east of the present study area.
1805	During this year the German explorer Martin Hinrich Carl Lichtenstein travelled through the general vicinity of the study area. After crossing the Orange River in the vicinity of present-day Prieska, Lichtenstein's party visited present-day Daniëlskuil, and by June 1805 they were at Blinkklip (Postmasburg), a well-known source for obtaining specular haematite. Archaeological investigations at Blinkklipkop (also known as Nauga) established a date of AD 800 for the utilization

DATE	DESCRIPTION
	<p>of this particular rich source (Thackeray., et al, 1983). From here they travelled further north and reached the Kuruman River where they met Tswana-speaking people. They followed the river downstream for three days, after which they followed a tributary to reach Lattakoe. From here they turned south and reached the Orange River on 11 July 1805. While on their way to the Kuruman River (and to the south thereof), Lichtenstein and his fellow travellers visited a small settlement consisting of "...about thirty flat spherical huts." Although the people who stayed here were herdsmen who looked after the cattle of richer people living on the Kuruman River, they indicated that San (Bushmen) were also present in the area (Lichtenstein, 1930).</p> <p>Although Lichtenstein was certainly not the first European explorer to travel through this area (the Truter &amp; Somerville expedition had for example passed through this area in 1801), or for that matter the last (Burchell travelled through the area in 1811 followed by John Campbell in 1813) (Bergh, 1999), Lichtenstein did leave behind a written record of this journey providing a valuable glimpse into the early history of the general surroundings of the study area.</p>
1811 – 1813	<p>During this period the famous English explorer and artist William Burchell visited the general vicinity of the study area. Accompanied by missionary Anderson, Burchell crossed over the Orange River at Little Bend from where they travelled to Klaarwater. Using the settlement as a temporary base, Burchell undertook numerous journeys which included one which passed through Blinkklip (Bergh, 1999).</p>
1813	<p>During 1813 John Campbell of the London Missionary Society also visited the general vicinity of the study area. He arrived at Klaarwater on 9 June 1813, where he rested for a few days before continuing in a northern direction to present-day Kuruman, passing through Blinkklip on the way (Bergh, 1999).</p> <div data-bbox="746 958 1066 1435" data-label="Image"> </div> <p><i>Figure 28: Reverend John Campbell (Campbell, 1815). He paid a visit to Blinkklip during the second half of 1813.</i></p>
1820s	<p>Barend Barends and his followers moved from their settlement at Danielskuil to Boetsap (roughly 154km north-east of the study area). At the same time Thlaping ruler Mothibi, the brother of Mahura, settled in the vicinity of Boetsap before moving to Griquatown (Legassick, 2010). The first settlement of Blinkklip by the Griqua also took place during this time (Legassick, 2010).</p>
20 December 1820	<p>On this day Andries Waterboer was elected as leader of Griquatown in the place of Berend Berends (Legassick, 2010). This period saw fission within the Griqua community, and it is not surprising that two long-term leaders moved away from Griquatown to establish autonomous settlements away from their former town. Berend Berends for example moved to Daniëlskuil (54 km south-east of the study area), whereas Adam Kok II established himself in the vicinity of Campbell (85 km south-east of the study area) (Legassick, 2010).</p>
1821 – August 1828	<p>During this period another group of Griqua became dissatisfied with Waterboer and moved away from Griquatown to first settle along the Modder River. This group was known as the Bergenaars and they were supported by Kora and San elements (Cope, 1977). A section of the Bergenaars known as the Klein Bergenaars (Little Bergenaars) settled along the Langberg. At its closest point this mountain range is located 6.5 km west of the present study area. The Bergenaars constantly attacked the Thlaro, Thlaping as well as the Griqua. On three separate</p>

DATE	DESCRIPTION
	occasions (late 1824, July 1827 and December 1827) they attacked Griquatown itself (Cope, 1977).
Early 1830s	During this time Andries Waterboer stationed a number of Griqua families at a fountain north of Tsantsabane (Blinkklip) as well as at Daniëlskuil. Shortly thereafter, a missionary of the London Missionary Society by the name of John Baillie was transferred from the mission station at Kuruman to Tsantsabane. He was to work among the Sotho-Tswana living in and around Tsantsabane at the time. Baillie subsequently left the mission station and resigned from the London Missionary Society in 1836 (Legassick, 2010).
2 April 1842	A treaty was signed between Griqua leader Andries Waterboer and Thlaping leader Mahura at Mahura's settlement near Taungs. The agreement included a definition of the boundary between the two groups. The section of the agreed upon boundary closest to the study area ran from "...the northerly point of the Langeberg and extending a little south of Nokaneng, and further half-way between Maremane and Klipfontein..." (Legassick, 2010:291). While the exact location of Nokaneng is not currently known, the farms Klipfontein 437 and Maremane 678 are situated 24.7 km and 40.9 km to the north-east. This suggests that the present study area was located south of the boundary line between the Griqua and the Thlaping as defined in the treaty. As such, the study area was defined within this treaty as forming part of the land of the Griqua (Legassick, 2010).
1850	A Thlaro leader by the name of Molete and his baThlaro бага Keakopa followers moved away from the Korannaberg and established themselves at Gathlose, roughly 48 km north-east of the study area (Breutz, 1963). Likely between 1850 and 1860 the area known as Maremane (located directly north of Gathlose) was an outpost grazing area of the BaThlaro chief Makgolokwe and his son Toto. The first designated leader of this area was Isaak Thupane Thupane, followed by Toto's son Robanyane who fled to present-day Namibia after the Langberg Rebellion of 1897 (Breutz, 1963).
1850 – 1855	During this period a Thlaro chief by the name of Isaak Thupane Thupane established himself at Logageng (Gatkoppies) near Postmasburg. He subsequently moved with his followers to Groenwater 453. However, during the time that Thupane was living at Logageng, Kgangeng discovered the fountain at Metsematale. Subsequently, the land was ceded by Waterboer to the Thlaro and Kgangeng and his followers settled at Groenwater as well (Breutz, 1963). The farm Groenwater 453 is located 25 km north-east of the study area.
13 December 1852	<p>After the death of Andries Waterboer, his son Nicolaas Waterboer became the leader of Griquatown. He ruled Griquatown until the annexation of the area by the British in 1871 (see below) (Legassick, 2010). It was during the rule of Nicolaas Waterboer that diamonds were discovered in the area which led to a period of claims and counter-claims between the Griqua, the Orange Free State as well as the Zuid-Afrikaansche Republiek and which eventually led to the annexation of the area.</p> <div data-bbox="724 1429 1090 1854" data-label="Image"> </div> <p data-bbox="480 1854 1337 1933"><i>Figure 29: Nicolaas Waterboer, who succeeded as leader of Griquatown in 1852 after the death of his father Andries Waterboer (Reader's Digest, 1994:168).</i></p>


DATE	DESCRIPTION
Before 1856	During the period before 1856 the Thlaro leader Masibi occupied the area known as Skeyfontein (also Skeynfontein or Dikeing). The farm Skeyfontein 536 is located 19.4 km east of the present study area.
1867	Diamonds were discovered for the first time in South Africa near Hopetown. Alluvial diamonds were also discovered along both banks of the Orange River in the vicinity of the confluence of the Vaal and Harts Rivers (Van Staden, 1983). This resulted in large numbers of fortune seekers streaming into the wider vicinity of the study area from overseas. This factor would have had a profound impact on the social-dynamics of the landscape.
27 October 1871	<p>The area located in general terms between the Orange and Vaal Rivers and south of Kuruman was proclaimed as British Territory and named Griqualand West. This proclamation came as a result of ownership disputes between the Griqua, the Boer Republic of the Orange Free State and the Boer Republic of the Zuid-Afrikaansche Republiek in terms of the newly discovered diamond diggings (<a href="http://www.wikipedia.org">www.wikipedia.org</a>). The study area fell within Griqualand West at the time.</p>  <p><i>Figure 30: Section of a map titled “Sketch Map of South Africa showing British Possessions”. The map is dated to July 1885. (<a href="http://www.wikipedia.com">www.wikipedia.com</a>). The boundaries and position of Griqualand West is depicted on this figure. The approximate position of the present study area is shown.</i></p>
1873 - 1876	After the province of Griqualand West came into existence in 1873, the study area now fell within the Griquatown (later Hay) District of Griqualand West. Subsequently, three government surveyors namely M.P. Auret, F.H.S. Orpen and J. Mintern were sent out to survey the whole district into individual farms (Snyman, 1983).
1876 - 1878	During this period the first farms in the vicinity of Blinkklip were bought by white farmers. These included the farms Pensfontein (bought by C. And G. Harrison), Kappies (bought by John Ryland), Soetfontein (bought by Henry Immuell) as well as the farms Vlakplaats, Abelsvlakte, Blouboskuil, Bloubosputs and Geelputs (all bought by R. Attwell). At the time farms such as Matsap, Klipfontein, Olynfontein, Kalkfontein, Gazip, Ploegfontein, Goedgedacht, Lukasdam, Vaalpan, Rooipoort and Klipbanksfontein had Griqua owners (Snyman, 1983). Interestingly, of all the farms mentioned in this paragraph, Klipbanksfontein are located within the present study area whereas farms such as Pensfontein and Olynfontein are located directly adjacent to the present study area.
1878	A rebellion broke out amongst some of the Tswana communities living in Griqualand West. This rebellion, which was a response to British expansion and colonialism, spread to the Langberg. A force under Colonel Charles Warren left Griqualand West during October 1878 and defeated the “rebels” at the Langberg (Snyman, 1986).

DATE	DESCRIPTION
1880 - 1892	<p>During this period a number of events took place which led to the establishment of the town of Postmasburg.</p> <p>One of these events occurred during February 1880 when a troop of the Griqualand West Border Police was stationed at Blinkklip. The reason for this decision was that Blinkklip was situated strategically close to the Bechuanaland border (Snyman, 1983).</p> <p>Another event was the inclusion of Griqualand West in the Cape Colony during 1880, which resulted in higher numbers of permanent white settlement in the area (Snyman, 1983).</p> <p>That the Blinkklip area was seen from government side as favourable for the establishment of a town, can be deduced from the fact that during 1881 a government surveyor by the name of J. Mintern had surveyed the whole Blinkklip valley between Olynfontein and Vinci into agricultural stands. During the same year as many as 38 whites were staying on farms at Blinkklip (Snyman, 1983).</p> <p>During 1882 a number of Reformed Church congregates arrived in the area between Griquatown and Blinkklip. In May 1884 the congregation agreed to establish a church place on the farm Ploegfontein (located directly north- east of the study area) for a period of five years. When the period of five years ended, the church council undertook an investigation to find a suitable place for a new church as well as a new town.</p> <p>On 30 November 1889 the congregation finally decided to establish the new town and church at Blinkklip. They applied to the authorities, but it was turned down.</p> <p>On 2 March 1891 their religious leader Dominie Martinus Postma submitted a petition which had been signed by 51 people in favour of the establishment of a town at Blinkklip, to the authorities. This application was approved and during April 1891 a government surveyor by the name of J.A. Thwaites surveyed 82 stands around the police camp. As it took more than a year for the stands to be allocated, a second petition was organised during September 1891. The petition asked for the rapid allocation of stands, as well as for the renaming of the settlement from Blinkklip to Postmasburg in honour of Professor Dirk Postma, the founder of the Reformed Church of South Africa. Although the authorities were in favour of the establishment of a town, they did not agree with the proposed name change.</p> <p>In January 1892 Dominie Martinus Postma again asked for the name change and indicated that all the white residents of area were in favour of this. On 14 April 1892 the Assistant-Commissioner of Crown Lands reported as follows: <i>"...in view of the unanimous request of the inhabitants, instructions have been issued for the necessary arrangements to be made for the change of the name of the township from 'Blink Klip' to 'Postmasburg' (Snyman, 1983:10).</i></p> <p>The town's stands were eventually only sold on 12 August 1892 (Snyman, 1983).</p> <div data-bbox="624 1290 1190 1767" data-label="Image"> </div> <p><i>Figure 31: Historic portraits of the two members of the Postma family associated with early development of Postmasburg. On the left is Professor Dirk Postma in whose honour the town of Postmasburg was named, with Dominie Martinus Postma on the right. He was the person driving the establishment and naming of the town (Snyman, 1983:9).</i></p>
30 September 1885	Sir Charles Warren proclaims British Bechuanaland. This area comprised the land between Griqualand West and the Molopo River (Snyman, 1986). As mentioned


DATE	DESCRIPTION
	elsewhere, the boundary between British Bechuanaland and Griqualand West was established a short distance north of the study area.
1886	As a result of the work of a commission appointed by the British rulers of British Bechuanaland, a number of so-called "native reserves" were established in this area. These included the Gatlhose Reserve and the Maremane Reserve (Snyman, 1986).
c. 1890	The Griqua mined iron at Gatkoppies near Postmasburg (Breutz, 1963).
September 1896	<p>A viral disease affecting cattle (and some other species of even-toed ungulates) known as Rinderpest swept through Southern Africa during this time (www.wikipedia.org). Although attempts were made to halt the spread of the disease from the north by erecting a fence between the boundaries of Griqualand West and Bechuanaland, this proved unsuccessful. Incidentally, only three gates were placed in this fence, namely at Gatlhose, Nelsonsfontein and Blikfontein (Snyman, 1988).</p>  <p><i>Figure 32: An everyday scene in Griqualand West during the Rinderpest Epidemic: large numbers of destroyed cattle (Snyman, 1983:20).</i></p>
1897	<p>The Rinderpest epidemic did not only have a massive socio-economic impact, it also resulted in the Langberg Rebellion of 1897. Conflict broke out between the authorities and a Thlaping leader from Taung, Galeshiwe. The conflict arose after some of his cattle that were infected by Rinderpest were destroyed by the government to kurb the spread of the disease. After killing an officer, Galeshiwe fled to the Thlaro leader Toto of the Langberg. A full-scale rebellion broke out that was eventually suppressed (Breutz, 1963).</p> <p>Although most of the activities associated with the rebellion took place some distance to the north-west of the study area, the impact of the rebellion was felt throughout the surrounding landscape. For example, farms located not too far from study area such as Lukasdam (7.4 km north of the study area), Mount Temple (21.8 km north-west of the study area) and Vlakfontein (13.3 km north-east of the study area) came under attack from stock thieves during this time. After the farms Mount Temple and Groenkloof were physically attacked, a police post which had been established on the farm Vlakfontein was reinforced (Snyman, 1983).</p>  <p><i>Figure 33: Toto, leader of the Thlaro along the Langeberg (Snyman, 1986:17).</i></p>
1899 - 1902	The South African War (also known as the Anglo Boer War) was fought between Great Britain and the Boer republics of the Zuid-Afrikaansche Republiek and Orange Free State.



DATE	DESCRIPTION
	<p>After the outbreak of hostilities on 11 October 1899, the military commander of Griqualand West and British Bechuanaland Lieutenant- Colonel R.P. Kekewich issued a proclamation whereby all residents of these areas were considered British subjects and as such had to refrain from assisting the Boer forces. However, when a Free State Commando under Kommandant Jan Jordaan and Judge J.B.M. Hertzog occupied Postmasburg on 18 November 1899, a large number of Postmasburg residents took up arms and joined the commando. These rebels formed part of the force under the command of P.J. de Villiers which by March 1900 was in command of the entire Griqualand West. The rebels were under the direct command of Kommandant Jan Vorster and Veldkornet Piet Venter (Snyman, 1983).</p> <p>In April 1900 Sir Charles Warren received the order to retake Griqualand West and British Bechuanaland. Apart from a short delay caused by a skirmish at Fabersput (near Campbell), Warren occupied the towns from within the area (including Postmasburg) within a short period of time. This had a devastating effect on the morale of the rebel forces, who for the most part surrendered. However, fifty rebels under the command of General De Villiers joined the Transvaal forces under the command of General J.H. de la Rey in the western part of the Zuid-Afrikaansche Republiek (Snyman, 1983).</p> <p>In June 1901 General De Villiers attacked the region again to act as a link between General J.H. de la Rey in the Western Transvaal and General J.C. Smuts in the North-Western Cape. On 10 August 1901 the town of Postmasburg was occupied by Boer forces under the command of Kommandant E. Conroy.</p> <p>A number of victories for the Boer forces in this area followed, including the attack on 10 August 1901 of Veldkornet Van Aswegen at Kareepan which resulted in the taking of 110 horses. The farm Kareepan 450 is located 9.4 km north-east of the study area. Other successes took place at Griquatown and Rooikoppies.</p> <p>These Boer victories resulted in almost the entire white population of Postmasburg taking up arms on the Boer side during August and September 1901. After a battle at Kalkfontein (south of Postmasburg) on 15 September 1901, the town was retaken by the British. However, during January and February 1902 General De Villiers was again in control of Postmasburg and used it as his headquarters during this period (Snyman, 1983).</p> <p>During the last few months of the war, the Boer forces focussed their attention on attacking the convoys operating between Griquatown and Daniëlskuil. This resulted in skirmishes and battles at places such as Dirkspan and Doornfontein, both located north-east of the study area (Snyman, 1983).</p> <p>The war ended on 31 May 1902 with the British as victors. The effects of the war were felt for years after the hostilities had actually ended.</p> <div data-bbox="572 1476 1241 1939" data-label="Image"> </div> <p><i>Figure 34: A group of Boer rebels from Postmasburg (Snyman, 1983:16).</i></p>

DATE	DESCRIPTION
	 <p data-bbox="491 618 1331 734"><i>Figure 35: Captain T.L.H. Shone, who not only discovered a Kimberlite pipe near Postmasburg, but who is also regarded as the first person to mine manganese in the vicinity of the study area (S.A. Manganese, 1977:24)</i></p>
1913	In this year the so-called “Native Locations” of Skeyfontein and Groenwater were established by Proclamation 131 of 1913 (Breutz, 1963).
1918	During this period the Influenza Pandemic arrived in South Africa. Although the Postmasburg area was seemingly not seriously affected by the disease (Snyman, 1983), the situation on the diamond diggings toward Lichtenburg and Bloemhof were much worse and hundreds of people died there during this period (Van Onselen, 1996).
1918 – 1920	<p data-bbox="480 936 1343 1043">During 1918 a prospector by the name of Casper Venter and his assistant Plaatjie discovered a Kimberlite pipe on the townlands of Postmasburg. The following year T.L.H. Shone discovered a second Kimberlite pipe which became the Postma’s Diamond Mine.</p> <p data-bbox="480 1048 1343 1240">Venter sold his discovery rights to Oliver Daniel, and during May 1920 the West End Diamond Mine was established. In the same year Daniel and his partners sold the mine to Sir Abe Bailey for an amount of £80,000.00 (Snyman, 1983). Although the discovery of the Kimberlite pipe brought large numbers of fortune seekers to Postmasburg in the hope that the town would become the new Kimberley, it was only the West End Mine as well as the Postma’s Mine which proceeded with the mining of diamonds (S.A. Manganese, 1977).</p> <p data-bbox="480 1245 1343 1285">The West End Diamond Mine was located 13.9 km north-east of the present study area.</p>
1919 - 1930	Mine activities at the West End Diamond Mine continued during this period, until work was ceased due to the financial crisis associated with the Great Depression. During this time the mine retrieved 182, 955 carats of diamonds (Snyman, 1983).
1920 - 1921	The Kimberlite pipe which had been discovered by Shone was mined during this time by Postma’s Diamond Prospect Limited (Snyman, 1983).
1922	<p data-bbox="480 1435 1343 1628">In this year T.L.H. Shone (who had discovered the Kimberlite pipe at Postma’s Mine three years earlier) discovered manganese on the farm Doornfontein. Although the presence of manganese in the surrounding landscape had been known before this discovery Shone was the first person to actually mine manganese in this area and was also responsible for focussing the attention of those interested in manganese on the surroundings of Postmasburg (Snyman, 1983).</p> <p data-bbox="480 1632 1343 1673">The farm Doornfontein 446 is located 13.3 km to the north of the present study area.</p>
1922 – 1923	After the cessation of activities by the Postma’s Diamond Prospect Limited, mining activities were undertaken during this time by the Diamond Fields of Africa Exploration Company Limited (Snyman, 1983).
1925	With partners Reg Saner and John Dale-Lace, T.L.H. Shone established the first manganese mining company in South Africa, namely Union Manganese Mines and Minerals Limited. The company obtained options on a number of farms in the Postmasburg district (Snyman, 1983).
1924 – 1927	Mining activities were taken over by the Postma’s Diamond Syndicate in 1934 after the cessation of activities by Diamond Field (Snyman, 1983).
22 December 1926 – May 1927	On 22 December 1926 a second manganese mining company was established by Niels Langkilde and A.J. Bester. The company was named South African Manganese Limited (Snyman, 1983).

DATE	DESCRIPTION
	During 1927 the company appointed two experienced prospectors to investigate the properties of the company. These two prospectors were S. Griffiths and W.J. Marais. Their work focussed on the four most important farms owned by the company, namely Kapstewel (located 20.1 km north of the study area), Thaakwanene (located 30.7 km north-east of the study area), Knoffelfontein (unknown location) and Doornput (seemingly located north of Postmasburg). Although the results of the prospecting activities were deemed to be very positive, the lack of a railway link between the market and these properties was a serious hurdle (S.A. Manganese, 1977).
1929	A company by the name of the Postma's Diamond Mine undertook mining activities at the Postma's Mine (Snyman, 1983).
4 November 1930	On this day the extension of the railway line from Koopmansfontein to Postmasburg was officially opened by the Minister of Railways, C.W. Malan. This meant that Postmasburg was now one of the few towns in the Northern Cape which boasted a direct rail link. The extension of the railway line to Beeshoek was built by the Manganese Corporation, whereas the further extensions of the line to Lohatla and Manganore (1936), Sishen (1953) and Hotazel (1961) were undertaken by the South African Railways (Snyman, 1983).
1930 - 1932	During 1930 an Englishman by the name of Pringle-Smith was appointed by S.A. Manganese to devise and execute a "...thorough prospecting programme of S.A. Manganese's properties..." (S.A. Manganese, 1977:46). This meant that the prospecting work undertaken in 1927 and which had been halted due to the poor financial climate and the lack of a railway link could now be proceeded with. Within a relatively short space of time Pringle-Smith started opening up the beds on the farms Kapstewel and Doornput. However, the company did not have the market which for example the Manganese Corporation possessed at the time, and as a result the ore was stockpiled at these two farms. Pringle-Smith left the Postmasburg area in 1932 after the financial implications of the Great Depression worsened the situation for S.A. Manganese to such an extent that he was asked to agree to a much lower salary (S.A. Manganese, 1977).
1930 – 1931	The activities at the Postma's Mine were continued during this time by the company Postma's Mine (Snyman, 1983).
1931 - 1939	During this time the dumps at the West End Diamond Mine were mined by F. Bernhardt, R.A. Dunsford and T. Begbie. However, this proved unsustainable, and this work was ceased in 1939 (Snyman, 1983).
Early 1930s	Due to the financial impacts of the Great Depression, a number of smaller manganese mining companies were closed down. A period of amalgamation followed which resulted in the South African Manganese Limited as well as the Associated Manganese Miners of South Africa Limited becoming the leaders in the manganese mining industry (Snyman, 1983).
1935	The Postmasburg Diamond Mine was the last company to undertake mining activities at the Postma's Mine. All activities at the mine were halted when the mine became flooded during this year. The different mining companies operating at the Postma's Mine during the period from 1919 to 1935 retrieved a total of 5,155 carats of diamonds (Snyman, 1983). The Mancorp Mine village was established during this year (Snyman, 1983).
c. 1936	After the willingness of the South African Railways Administration to extend the railway line from Postmasburg to Kapstewel and Lohatla became known, the entire manganese industry north of Postmasburg changed for the better. An example of this was that S.A. Manganese stepped up operations on the farm Kapstewel. The work here was overseen by none other than Captain T.L.H. Shone (S.A. Manganese, 1977). The promise of railway extensions to this area also resulted in other mining activities such as the establishment of a mining company by the name of Gloucester Manganese. This company was established to mine the manganese deposits on the farm Gloucester. Shortly thereafter an amalgamation took place between Gloucester Manganese and the Manganese Corporation which resulted in the formation of the Associated Manganese Mines of South Africa Limited (Ammosal). Ammosal re-erected the old ore handling plant from Beeshoek on the farm Gloucester and the operations here represented a large portion of the total manganese production of 250,000 tons (S.A. Manganese, 1977).

DATE	DESCRIPTION
	 <p data-bbox="507 629 1315 689"><i>Figure 36: Prospecting activities on the farm Kapstewel during 1937 (S.A. Manganese, 1977:59).</i></p>
1937	The farm to the east of Gloucester, named Lohatla, was now being viewed more favourably by S.A. Manganese. During this year they reached an agreement with the owner, which eventually resulted in the acquisition of the farm (S.A. Manganese, 1977). During the same year the company bought the freehold of the farm Klipfontein and also bought 600 morgen of the farm Kapstewel in order to build a staff village. This village was named Manganore (S.A. Manganese, 1977). The Lohatla mine village was also established during this time (Snyman, 1983).
1948	The production of iron ore came to the foreground during this time with the mining of iron ore by S.A. Manganese at Manganore and by the Associated Manganese Miners of South Africa at Beeshoek (Snyman, 1983).
1953	In this year Iscor commenced iron production at Sishen (Snyman, 1983).
1958 - 1978	Iron ore (and manganese) mining activities were undertaken by Consolidated African Mines on the farms Pensfontein (11.6 km north-east of study area), Kapstewel and Rooinekke. These activities were halted when the market for iron disappeared in 1978 (Snyman, 1983).
1959 - 1966	Iron ore mining activities were started at the so-called Springbok Mine during 1959. These activities took place around a low hill situated south-west of Postmasburg. The work on the town end of the property was undertaken by the Springbok Industrial and Mineral Ventures Limited and the work undertaken on the other end (toward the farm Koeispeen 475) were undertaken by Griqualand Iron Ore (Pty) Ltd. The mining activities of the companies at Springbok Mine ceased in 1966 (Snyman, 1983). The Springbok Mine is situated 7.7 km north-east of the study area.
Early 1960s	The residents of Skeyfontein and Groenwater were forcibly removed from their land as part of the system of Apartheid (BAO, 2390, D188/1235/1).
1963	F.M. Mangan discovered iron ore deposits on the farm Kareepan (Snyman, 1983). This farm is situated 9.4 km north-east of the present study area.
1963 - 1977	During this time mining activities were renewed on the original prospecting land of West End Diamond Mine. Mining activities included the sinking of two shafts as well as the working of the old mine dumps. Due to financial losses, all activities here were ceased in 1977 (Snyman, 1983).
c. 1966 - 1978	During this time Springbok Industrial started mining the iron ore deposits which had been discovered on Kareepan in 1963. By 1978 all activities were halted as there was no more market for iron ore (Snyman, 1973).
1976 - 1977	During this time the Gathlose and Maremane Communities were removed from their land and taken to the Shipton Farms in the then homeland of Bophutswana. After their removal, the South African Government decided to establish a Battle School here. As the Xhosis Community was still staying on the land, they were moved to a section of the original land roughly 14 000 hectares in extent. The Lohatla Battle School was subsequently established ( <a href="http://www.lrc.org.za/Docs/Judgments/khosis.doc">www.lrc.org.za/Docs/Judgments/khosis.doc</a> ).

## 5.2 Archaeological Background to the Study Area and Surroundings

### 5.2.1 *A review of the Archaeological Context of the Northern Cape*

This section was taken from the HIA compiled for the Kolomela Amendment Project (PGS, 2015), and leans greatly on text provided by the Stone Age specialist for the report, Dr Maria van der Ryst.

### 5.2.2 *Introduction*

The Northern Cape is an arid region with limited surface water so that archaeological remains are often found in the vicinity of water (Mitchell, 2002) and also sources of lithics that have been used to produce stone tools. Palaeo- and current river systems, springs and pans and dominant geographical landscape features such as hills or shelters are important locales within any landscape. The region has very numerous small shallow pans. Areas around and in pans tend to display higher densities of lithics (van der Ryst, 2011; Habitat, 2013).

The region abounds with the remains of prehistoric hunting and gathering groups. Numerous archaeological sites have been recorded, researched and published through archaeological impact and heritage assessments. In addition to the well-known Taung localities some important fossiliferous and lithic-bearing breccias have recently been found on the Ghaap Plateau (Curnoe, 2005; Herries et al, 2007; Johnson et al, 1997). Stone tools mostly mark areas of prehistoric occupations, and these suggest a widespread presence for tool-producing Plio-Pleistocene hominins in southern Africa (Barham and Mitchell 2008). This important part of the prehistory of southern Africa, known as the Stone Age, is chronologically divided into the Earlier, Middle and Later Stone Ages (ESA, MSA and LSA).

The ESA is characterized by the use of large stone cutting tools (LCT's) (McNabb et al, 2004), in particular handaxes, but also cleavers and tool types such as scrapers. Following on the ESA the MSA typologies represent greater specialization in the production of stone tools, in particular flake, blade and scraper tools and also in a more extended range of specialized, formal tools. Regional lithic style, evidence for symbolic signalling, polished bone tools, portable art and decorative items are apparent during the MSA. ESA and MSA lithics occur widespread around water sources and previously favourable land settings that are now buried. During the LSA small (microlithic) tools, bone tools and weapon armatures and a range of decorative items as well as rock art were produced. Ceramics were used and/or manufactured by hunters and Khoekhoe herders towards the terminal phases of the LSA over a period of around 2000 year. The more recent occupations of LSA groups are abundant as surface finds and in sealed deposits in shelters (Beaumont et al, 1995).

Differences in stone artefact assemblages have been used in attempts to discern between late-Holocene hunter-gatherer and herder sites (Parsons, 2003, 2004, 2007, 2008; Lombard and Parsons, 2008) but this distinction is not generally accepted. Hunter-gatherer assemblages termed Swartkop may contain grass-tempered ceramics (Beaumont and Vogel, 1989). Sites with engravings, for example Jagt Pan, are often situated close to water sources. The Doornfontein herder sites contain ceramics that occasionally have lugs and/or spouts. Differences in the geographical spread indicate a preference for pastoral Doornfontein sites along rivers while Swartkop sites are usually found further from the river (Fauvelle-Aymar, 2004). Substantial herder encampments were located along the Orange River floodplain. Hendrik Jacob Wikar during his travels in 1778 recorded the names of the various herder groups who had settlements on both sides of the river (Mossop, 1935). Stone circles have also been documented in the Northern Cape. These features may represent residential structures being the bases of huts or windbreaks, storage structures, stock enclosures or hunting blinds (Kinahan, 1996; Parsons, 2004; Jacobson, 2005).

### 5.2.3 *Pan Sites*

A pan site investigated near Kathu on the farm Nooitgedacht 469 (Woon 469) demonstrated a similar pattern to the pan sites at Kolomela. The Phase 2 investigations confirmed an ephemeral utilization during the ESA, low incidences of MSA tool types and a later LSA occupation (Habitat, 2013).

### 5.2.4 *Shelter Sites*

Cave sites, apart from the well-known Wonderwerk, are uncommon. The lithic succession at Wonderwerk serves as a benchmark for the Stone Age sequence of the Northern Cape (Chazan et al. 2008). Rock shelters along the escarpment contain deposits of LSA and herder occupations (Humphreys and Thackeray, 1983; Herries et al, 2007). The Ghaap Escarpment contains small rock shelters with occupations dating to the Holocene (Humphreys and Thackeray, 1983; Herries et al, 2007). Excavations at Burchell's Shelter (Humphreys, 1975) and Dikbosch I and II and at two shelters at Limerock (Humphreys and Thackeray, 1983) confirm occupations up to the historical period. Travellers such as Burchell (1967) described some of the Bushmen present within this region. He noted that they wore sandals and that their skin karosses were reddened with ochre (Humphreys, 1975:10, 16).

An HIA undertaken at Heuningkrans 364 in the Postmasburg District (African Heritage Consultants, 2013) not only recorded extensive MSA deposits with lithics made on Banded Ironstone Formations (BIFs) but also several LSA shelter sites. Lithics, ostrich eggshell fragments and rubbing stones and also undiagnostic ceramics have been noted in a line of shelters situated mid-slope on a range of low cliffs within a small valley. This is a contained

cultural landscape that exhibits all the elements and subsistence resources required by a hunter-gatherer lifestyle. The valley is accordingly a significant heritage feature.

#### 5.2.5 *Rock Art*

The rock art of the Northern Cape comprises paintings and, importantly, diverse categories of engravings (Morris, 2012). There are several engraving sites close to the study area near Daniëlskuil: Daniëlskuil Townlands, Lime Acres at Beestehoek, Ouplaas, Boplaas, Klipvlei and Carter Block (Wilman, 1933; Collins, 1973; Morris, 1988, 2001, 2002, 2007, 2008, 2009, 2012; Morris and Beaumont, 1994; Beaumont, 1998; Webley, 2010). Some depict historical subject matter from the 19th of farmers (or perhaps Griqua) wearing broad-brimmed hats (Morris and Beaumont, 1994). Similar imagery has been recorded north of Daniëlskuil (Morris, 2009).

#### 5.2.6 *The Use and Mining of Pigments*

Earth pigments, and in particular ochre and specular haematite, is universally used for secular and religious purposes (Watts, 2002). Pigments and the unique engraved and incised ochre tablets from MSA contexts at sites such as Wonderwerk demonstrate the time-depth of such practices (Mitchell, 2002). Manuports of soft red haematite were found in association with an ESA Acheulean assemblage at Kathu Pan I in deposits dated to ~540 ka ago (Porat et al, 2010). At Wonderwerk, Kathu Pan and Canteen Koppie similar unmodified specularite and ochre lumps have been found in association with transitional ESA/MSA Fauresmith lithics (Beaumont and Bednarik, 2013). The specularite mines in the Northern Cape, including Tsantsabane/Blinkklipkop and Doornfontein 1 near Postmasburg, were rich and well-known ore sources that were quarried extensively over a long period of time (Arbousset and Daumas, 1968; Beaumont and Boshier, 1974; Beaumont and Morris, 1990; Thackeray et al, 1983). A pigment quarry represents a compressed record of long-term extraction and field processing where ongoing quarrying of ore bodies often destroys earlier evidence.

### 5.3 **Previous Archaeological and Heritage Studies from the General Region around the Study Area**

A search of the SAHRIS database for previous reports submitted to SAHRA produced eight archaeological or heritage impact assessment reports. See the summarised details of these reports below.

- ***Report On A Phase 1 Archaeological Impact Assessment of Proposed Mining Areas on the Farms Bruce, King, Mokaning and Parson; Between Postmasburg and Kathu, Northern Cape. David Morris. February 2005. Ivuzi Water, Environmental and Earth Science Consultants.***

This report identified four grave/cemetery sites: three on the farm Parson and one on the farm King. Several Stone Age sites were also identified, mainly in the form of sparse scatters of artefacts situated on the plains area and parts of some hills, as well as along the banks of the Gamokara River. These sites were all Middle Stone Age.

- ***Phase 1 Heritage Impact Assessment Report on the farm portions potentially affected by a proposed direct rail link between the Sishen South Mine near Postmasburg and the Sishen - Saldanha Line, Siyanda District Municipality, Northern Cape Province. Peter Beaumont. September 2007. Synergistics Environmental Services.***

The survey identified two Later Stone Age occurrences, of which one may postdate AD 1900, three burial sites, and a historic house with a nearby rubbish dump that probably dates to between 1900 and 1950.

- ***Heritage Impact Assessment Scoping Report: Proposed Skeifontein Photovoltaic Power Plant and Power Lines, Near Postmasburg, Northern Cape. Elize Becker. November 2011. CCA Environmental.***

Roughly 28 heritage sites were identified in this report. Approximately 12 were historical structures or the remains of such structures (i.e. stone walls, collapsed ruins, etc.). A number of settlements, with at least one grave/cemetery site, were also identified. Scattered stone tools were also identified at a few localities.

- ***Heritage Impact Assessment on Portion 2 and the Remainder of the farm Gloucester 674, near Postmasburg (Tsantsabane Local Municipality) in the Northern Cape Province. For: Kai Batla Holdings (Pty) Ltd. By A.J. Pelser and A.C. van Vollenhoven. Archaetnos. May 2011***

Only three sites were identified by this survey: two of the sites comprised ruins of historical structures, while the third site contained the remains of a number of more recent prefabricated structures dating to the period c. 1970s.

- ***Phase 1 Heritage Impact Assessment Report on Five Borrow Pits adjacent to the R383 and R386 Roads south of Postmasburg, Siyanda District Municipality, Northern Cape Province. Peter Beaumont. September 2007. Synergistics Environmental Services.***

The only heritage sites identified in this report, were modest lithic samples in the vicinity of the existing borrow pits. Two borrow pits are located on the farm Klip Bankfontein 489, which is one of the farms affected by the expansion of mining activities in the current study area. One borrow pit is located on the farm Ploeg Fontein 487.



- ***Cultural Heritage Site Inspection Report for the purpose of a prospecting right EMP – (Portion Of) Skeyfontein 536, Postmasburg District, Northern Cape, South Africa. Karin van Ryneveld. Diamond Core Resources. 29 June 2005***

No culturally significant heritage sites were identified, except for a few random Middle Stone Age lithics.

- ***A Second Report on a Heritage Impact Assessment for the Upgrade of Transnet’s Glosam Siding for PMG’s Bishop Mine (Loading Bay) on Portion 2 and the Remainder of Gloucester 674 near Postmasburg, Tsantsabane Local Municipality, Northern Cape. For: Kai Batla Holdings (Pty) Ltd. A.J. Pelser. Archaetnos. June 2012***

A number of heritage sites were identified in this report and in previous one (2011) by Archaetnos. Most of the identified sites were either historical structures/ruins or scatters of Stone Age artefacts.

- ***A Report on a Heritage Impact Assessment Study for proposed mining development on the remaining extent and Portions 2, 3, 4 And 5 Of Kapstewel 436, Kuruman Registration District, Siyanda District Municipality, Northern Cape Province. For Autumn Skies Trading 128 Cc. A.J. Pelser & Dr A.C. Van Vollenhoven. Archaetnos. July 2009.***

Stone tools were found scattered over the area during the survey. One possible, small, Iron Age site was found in the area during the survey. Seven sites were identified overall. Three of these were recent structures associated with the existing mine. One is an archaeological site with stone-wall structures that may date to either the Late Stone Age or the Iron Age. There is also a possible grave.

#### **5.4 Previous Archaeological and Heritage Studies from within the Kolomela Mine Property**

A number of previous archaeological and heritage surveys were undertaken within the property of the Kolomela Mine. Various sites were identified by these archaeological and heritage impact assessment studies (Morris, 2005; van der Ryst, 2011; Miller, 2011; Küsel, 2011; PGS, 2015). These reports identified 17 heritage sites in total, 15 of which fall within the actual mine boundary.

Of the 15 heritage sites within the mine boundary, six sites are archaeological (five Stone Age and one Iron Age/historic). Three of the identified Stone Age sites were highlighted as having significance but these will not be affected by the current proposed expansion of mining activities. One of these sites is a haematite outcrop with LSA and MSA artefacts, as well as some examples of animal “rubbing stones”. This site is located on the farm Wolhaarkop and

was identified in the reports by Morris (2005) and van der Ryst (2011). One is a surface scatter of Middle Stone Age (MSA) stone artefacts located on the farm Leeuwfontein, at the site where the footprint of the mining plant is marked to be extended in the future for a beneficiation process (van der Ryst, 2011). The third is a large pan, one of several located on the farm Leeuwfontein, which was highlighted as significant as the surface collection was dominated by Earlier Stone Age (ESA) tool types (van der Ryst, 2011). The remaining three archaeological sites were assessed to be of low significance.

Eleven historical structures and farmstead complexes located within the mine boundary were identified in a report undertaken by Miller in 2011. All of these identified historical sites were also documented photographically and by drawings (Miller, 2011). Nine of these structures and farmstead complexes are located within the boundary of the mining area and two are located on farms situated outside the mining area boundary.

Of the nine sites located within the mining boundary, five are historical farmstead complexes, some of which contain historic cemeteries, relatively well-preserved buildings and structures and others of which comprise only the remains of structures. These farmstead complexes were assessed to be of varying significance, from low to high, depending on the preservation (Miller, 2011). More recently, a farm worker cemetery was also identified (PGS, 2015).

The other two sites included a herder's dwelling, located on the farm Kapstevlei; and a farming outpost site, containing various secondary structures (windmill, reservoir, several wire-fenced animal enclosures, remains of a labourer's house, vegetable garden, prefabricated steel-framed shed dwelling). These sites were assessed to be of no to low significance by Miller (2011).

The two historical sites located outside the mine boundary include a site on the farm Gruispan where various pieces of historical mining equipment were identified and a historical farmstead located on the farm Kappies Karreeboom, which is situated south of the mine boundary.

## **5.5 Archival and Historic Maps of the Study Area and Surrounding Landscape**

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

The relevant archival/historical maps include:

- Griqualand West and Adjacent Territories Map (undated, possibly c.1875) -**Figure 38, Figure 39**

- Griquatown Sheet of the Cape of Good Hope Reconnaissance Series, 1914 - **Figure 40**

#### 5.5.1 1:50 000 Topographical Map 2822BD – First Edition 1970

Topographic maps (1:50 000) for various years were assessed to observe the development of the area, as well as the location of possible historical structures and burial grounds. The maps were also used to assess the possible age of structures located, to determine whether they could be considered as heritage sites. Map overlays were created showing the possible heritage sites identified within the areas of concern.

The relevant topographical maps include:

- First Edition of 2822BD Topographic Map 1:50000 based on air photography undertaken in 1967, surveyed in 1970 and drawn in 1971 by the Trigonometrical Survey Office.
- Second Edition of 2822BD Topographic Map 1:50000, published by the Chief Director of Surveys and Mapping in 1990.

A section of the First Edition of the 2822BD Topographical Sheet is depicted in **Figure 37**.

The map sheets consulted shows several structures in the study area that all likely to be at least 51 years old.

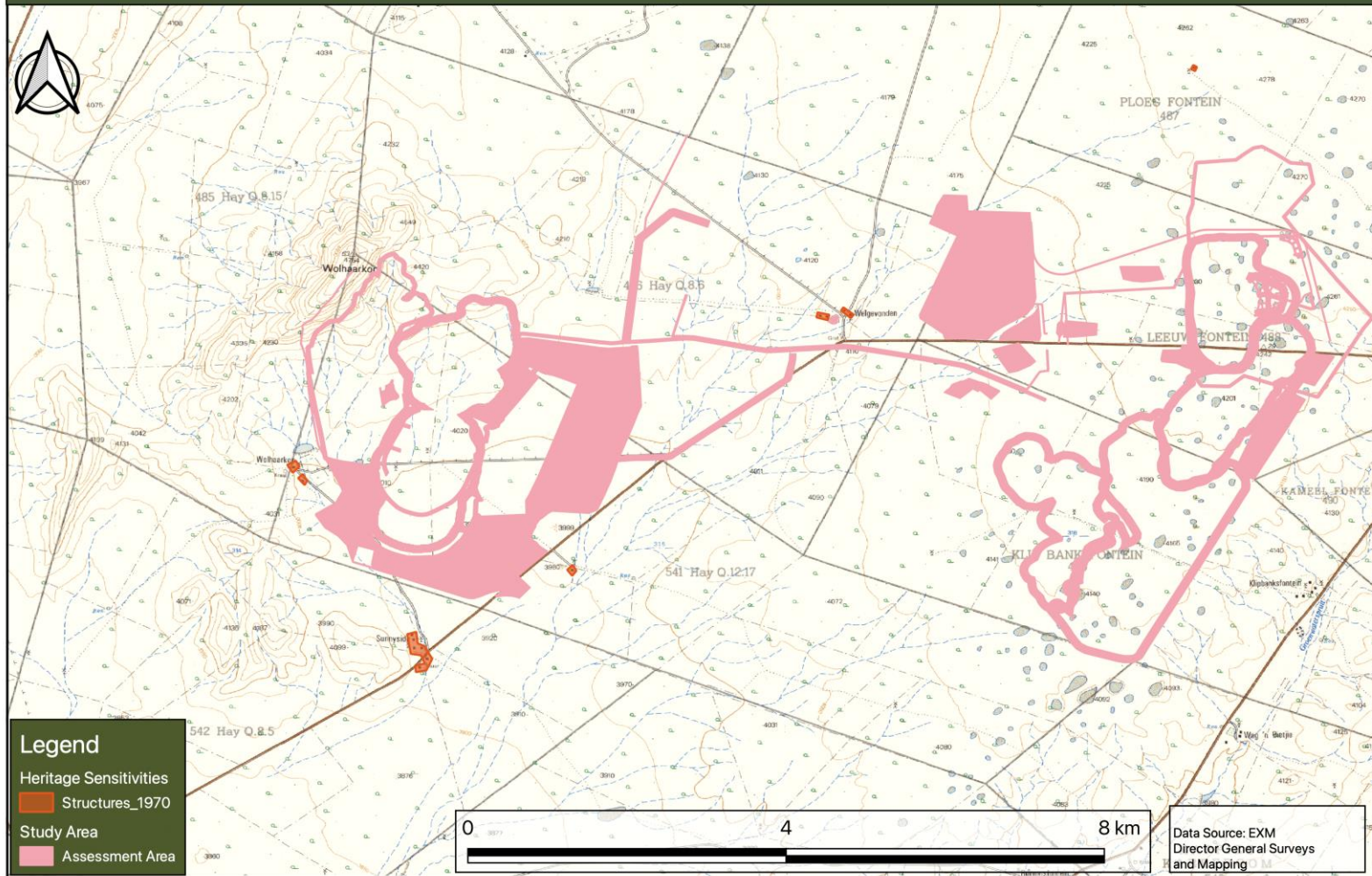


Figure 37: First Edition of 2822BD Topographic Map 1:50000, showing the proposed expansion areas for the Kolomela mine, with possible heritage features (orange polygons) located within the vicinity of the study area.

### 5.5.2 *Griqualand West and Adjacent Territories Map (undated, possibly c.1875)*

The figure below depicts a section of the map titled, “Map No 1 Shewing the Relative Positions of Griqualand West and Adjacent Territories” (National Archives, Maps, 3/1784). Since other information on the map refers to the boundaries of Griqualand West at various dates from 1830 to 1871, this map can probably be dated to between c. 1872 and c. 1875. The following observations can be made:

- The geographically recognisable names of Blinkklip and Kappies are shown (circled in yellow). Blinkklip is the site of the prehistoric and historic settlement which later became the European town of Postmasburg. Kappies is possibly the original name of the farm currently known as “Kappies Kareeboom”, which is located directly south-east of the present study area. As a result, it is clear that the present study is located directly north-west of the depicted place name of Kappies on this map.
- While the two places of Blinkklip and Kappies are both located within a triangular shaped area on the map, the present study area would be either just within or just outside of the western side of the triangular shape. This line represents a boundary line between the then Orange Free State and the Griqua under Waterboer that was claimed by President Jacobus Johannes Venter of the Republic of the Orange Free State in 1862. From this it is evident that the study area was located at the time on this boundary line claimed by the Free State in 1862, and quite possible was situated just within the land claimed by the Free State. Of course, these boundary lines and claims to land became extremely significant after the discovery of diamonds.
- The post-1871 position of Griqualand West is depicted on the map as a shaded area and indicates that the present study area was located within Griqualand West at the time. The area falling outside and to the north of this shaded section was in 1885 proclaimed as the Crown Colony of British Bechuanaland.



- A farmstead with the name “Wolhaarkop” is depicted on the map (marked in red). It comprises two buildings, a wind-pump, as well as a temporary dam. It is believed that this farmstead was identified during previous heritage surveys on the western boundary of the farm Kapsteviel. This site is included in this report as site KOL 4.
- The “Klipbanksfontein” farmstead is shown on the map (see purple marker) as one building.
- A farmstead with the name “Kameelfontein” is depicted on the map (marked in yellow). It comprises one building as well as a temporary dam.
- Two temporary dams (see green markers) are located within the study area.
- Two small temporary pans (see blue markers) are located within the study area.

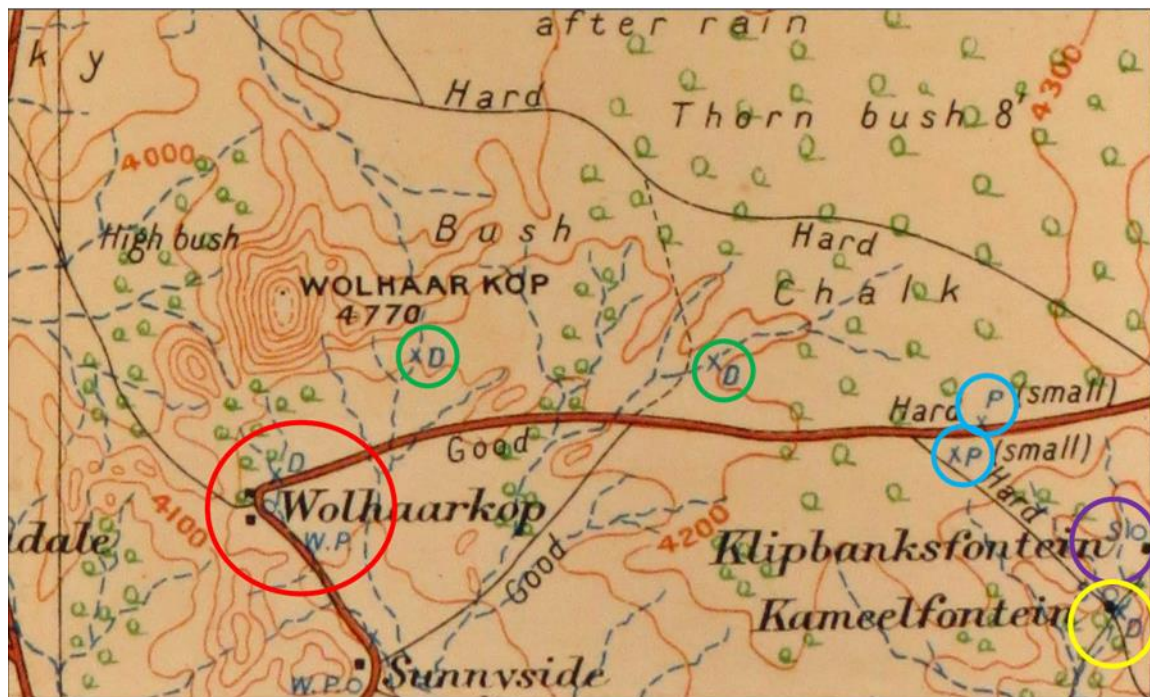


Figure 40: Section of the Griquatown Sheet of the Cape of Good Hope Reconnaissance Series, dated to 1911 (National Archives, Maps, 3/652). Almost the entire area as depicted in this image is located within the mine.

## 5.6 Findings of the historical desktop study

The findings can be compiled as follows and have been combined to produce a heritage sensitivity map for the project based on the desktop assessment (**Figure 41**, **Figure 42**).

### 5.6.1 Heritage Screening

A Heritage Screening Report was compiled by the Department of Environmental Affairs National Web-based Environmental Screening Tool as required by Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended. According to the Heritage screening report, the project area has a Low heritage sensitivity (**Figure 2**).

## 5.6.2 Heritage Sensitivity

The sensitivity maps were produced by overlying:

- Satellite Imagery;
- Current Topographical Maps; and
- First to third edition Topographical Maps dating from the 1970's to 1990s.

This enabled the identification of possible heritage sensitive areas that included:

- Archaeological Sensitive areas
- Structures/Buildings
- Graves/burial ground

By superimposition and analysis, it was possible to rate these structure/areas according to age and thus their level of protection under the NHRA. Note that these structures refer to possible tangible heritage sites as listed in **Table 6**.

*Table 6: Tangible heritage sites in the study area*

<b>Name</b>	<b>Description</b>	<b>Legislative protection</b>
Archaeology	Older than 100 years	NHRA Sect 3 and 35
Architectural Structures	Possibly older than 60 years	NHRA Sect 3 and 34
Burial grounds	Graves	NHRA Sect 3 and 36 and MP Graves Act

Additionally, evaluation of satellite imagery has indicated the following areas that may be sensitive from a heritage perspective. The analysis of the studies conducted in the area assisted in the development of the following landform type to heritage find matrix (**Table 7**).

*Table 7: Landform type to heritage find matrix*

<b>Landform Type</b>	<b>Heritage Type</b>
Crest and foot hill	LSA and MSA scatters, LIA settlements
Crest of small hills	Small LSA sites – scatters of stone artefacts, ostrich eggshell, pottery and beads
Watering holes/pans/rivers	ESA, MSA and LSA sites, LIA settlements
Farmsteads	Historical archaeological material
Ridges and drainage lines	LSA sites, LIA settlements
Dune areas	LSA and MSA scatters

The heritage sensitivity maps (**Figure 41, Figure 42**) were used during the field work to assist in identifying and assessing heritage resources in the landscape.



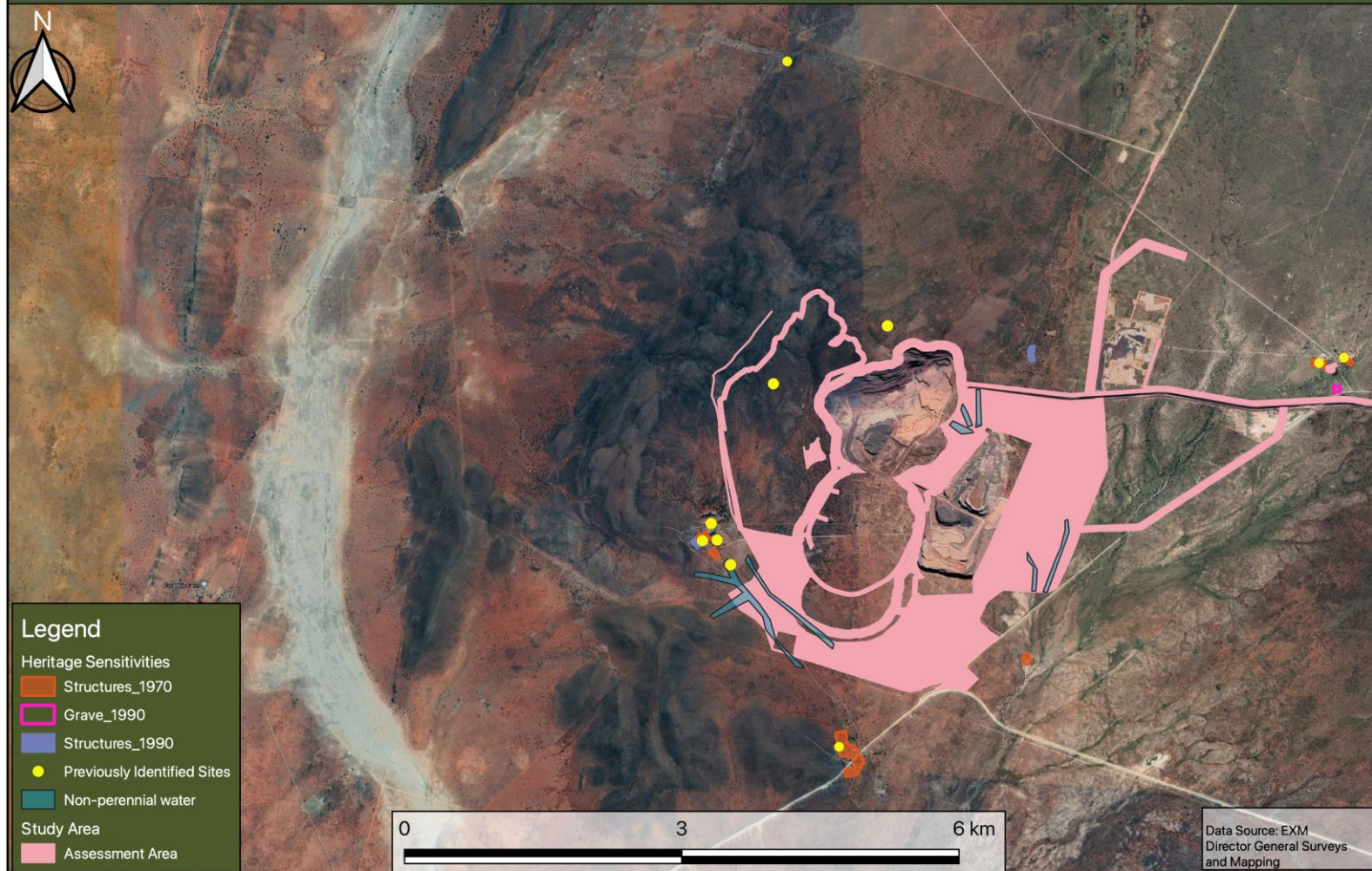


Figure 41: Heritage sensitivity map indicating possible sensitive areas around and within the western part of the proposed Kolomela Mine development area.

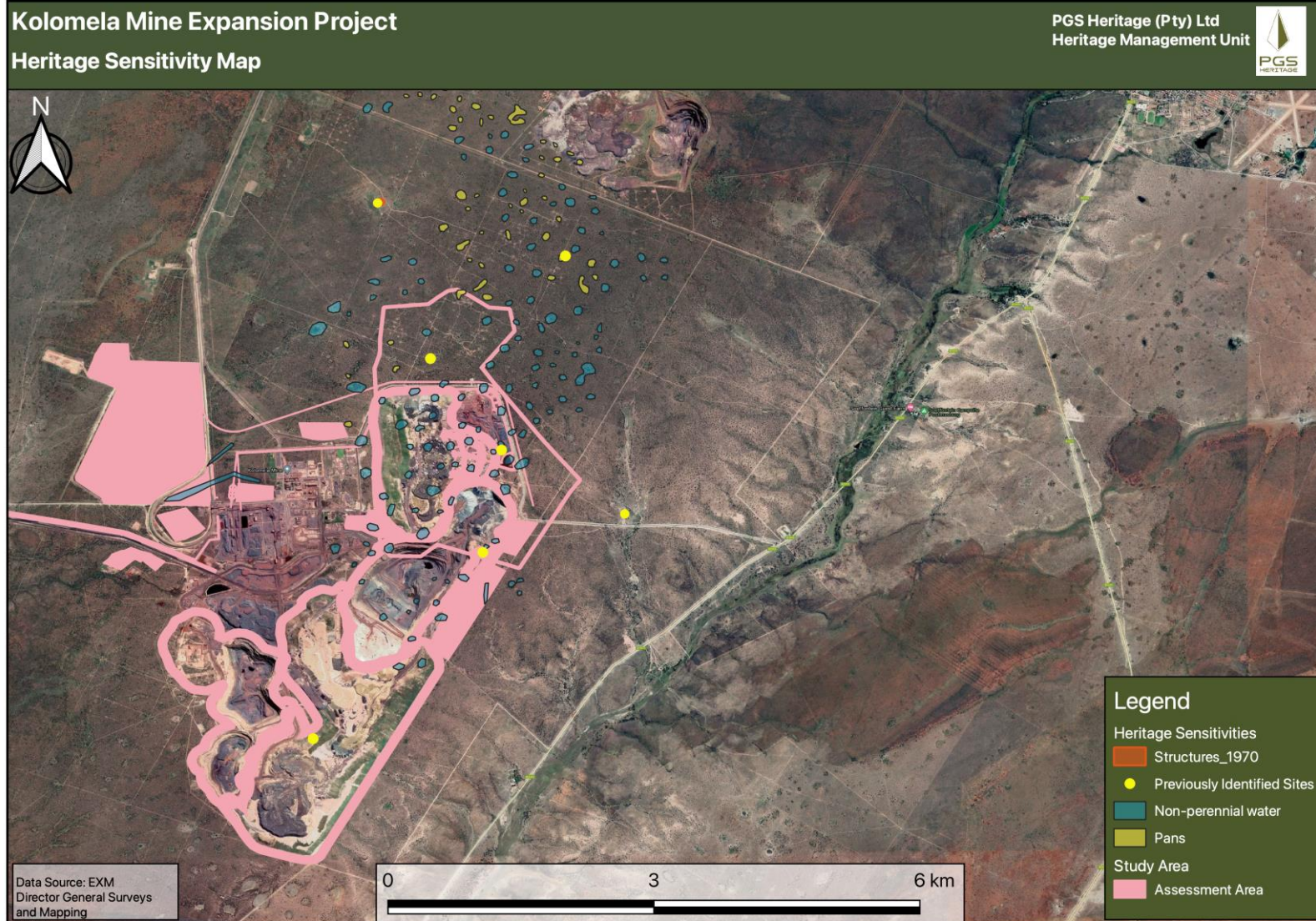


Figure 42: Heritage sensitivity map indicating possible sensitive areas around and within the eastern part of the proposed Kolomela Mine development area.

## 6 FIELDWORK AND FINDINGS

### 6.1 Heritage sites previously identified within the mine property

In previous heritage and archaeological impact assessment reports, eight heritage sites were identified within footprint areas of the Kolomela Amendment Project inside the mine property (Morris, 2005; African Heritage Consultants, 2011; Miller, 2011; van der Ryst, 2011; PGS, 2015). The fieldwork identified heritage finds that were then classified as either archaeological sites, structures or graves. The fieldwork completed in 2015 (PGS, 2015), confirmed the presence of 6 Stone Age sites (**KOL 1**, **KOL 2**, **KOL 5**, **KOL 6**, **KOL 7** and **KOL 8**), 1 historical mine (**KOL 3**) and 1 historical farmstead complex (**KOL 4**).

It is important to note that four of the sites from this section comprise clusters of small pans which are believed to contain Stone Age material. These four pan clusters form part of the belt of at least 165 small pans located along the eastern end of the mine property. Due to the high number of small pans from within the study area, it was impractical for each individual pan to be visited in the field and assessed for its exact archaeological characteristics. These four pan clusters were provided with the same archaeological status, significance and mitigation based on the archaeological characteristics of at least three pans investigated nearby (with site **KOL 1** representing one of these).

Each cluster was given a separate site identification number (**KOL 5**, **KOL 6**, **KOL 7** and **KOL 8**) and each of these sites contained different pan numbers. As such, **KOL 5** contained 19 small pans (of which seven had been destroyed by mining activities undertaken between 7 October 2013 and 2 December 2014), **KOL 6** contained six small pans (of which five had been destroyed by mining activities undertaken between 7 October 2013 and 2 December 2014), **KOL 7** contained 44 small pans (of which 17 had been destroyed by previous mining activities conducted between 7 October 2013 and 2 December 2014) and **KOL 8** contained four small pans. As of 2015, **KOL 5** contained 12 small pans, **KOL 6** a single small pan, **KOL 7** contained 27 small pans and **KOL 8** four small pans.

The figures below illustrate the heritage sites that were previously identified within the study area (**Figure 43**, **Figure 44**). In **Table 8**, the eight heritage sites will be discussed individually.

Kolomela Mine Expansion Project  
Previously Identified Heritage Resources

PGS Heritage (Pty) Ltd  
Heritage Management Unit

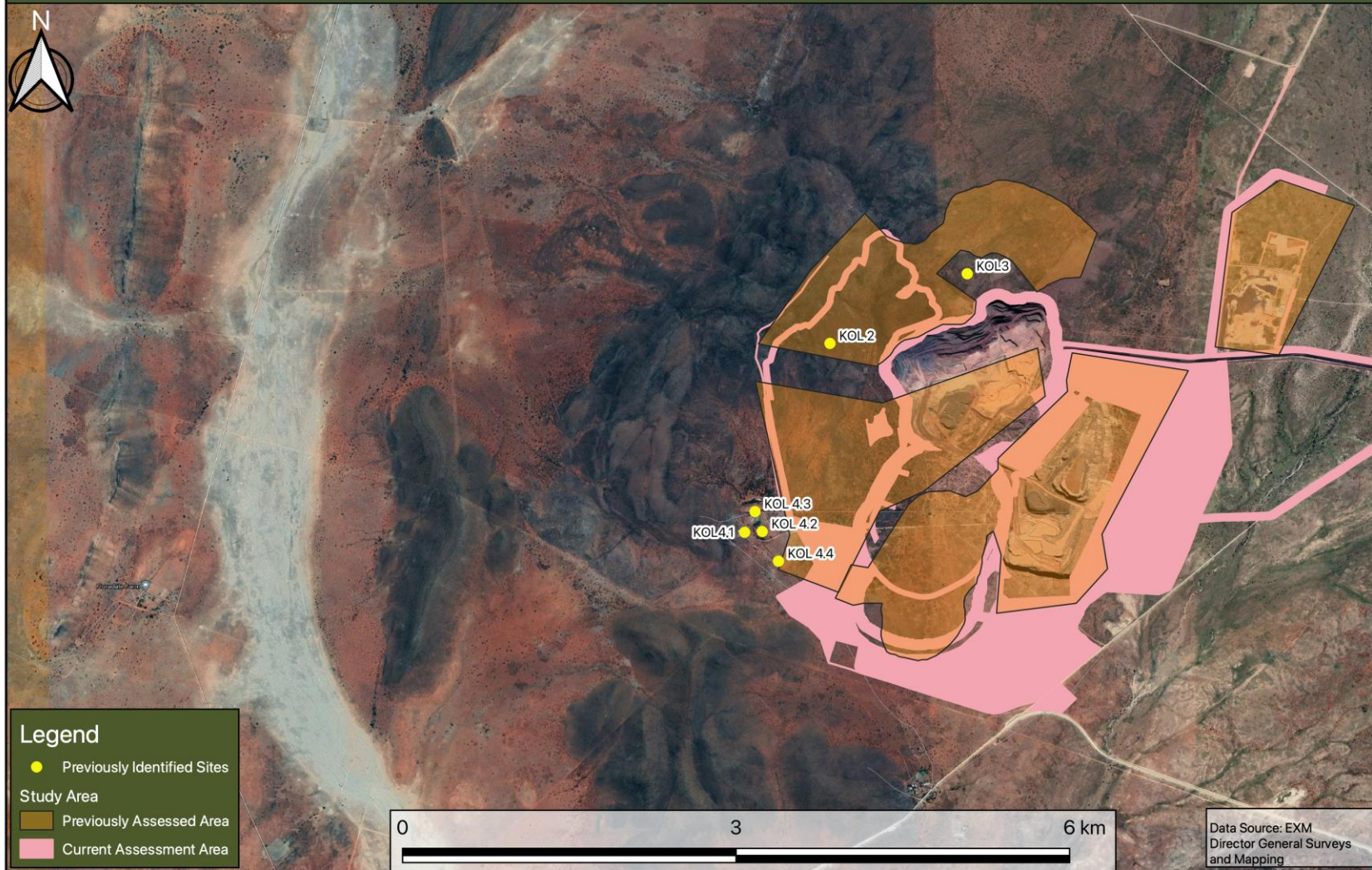


Figure 43: Locality of the heritage resources previously identified in the western part (Kapsteviel) of the study area.

Kolomela Mine Expansion Project  
Previously Identified Heritage Resources

PGS Heritage (Pty) Ltd  
Heritage Management Unit

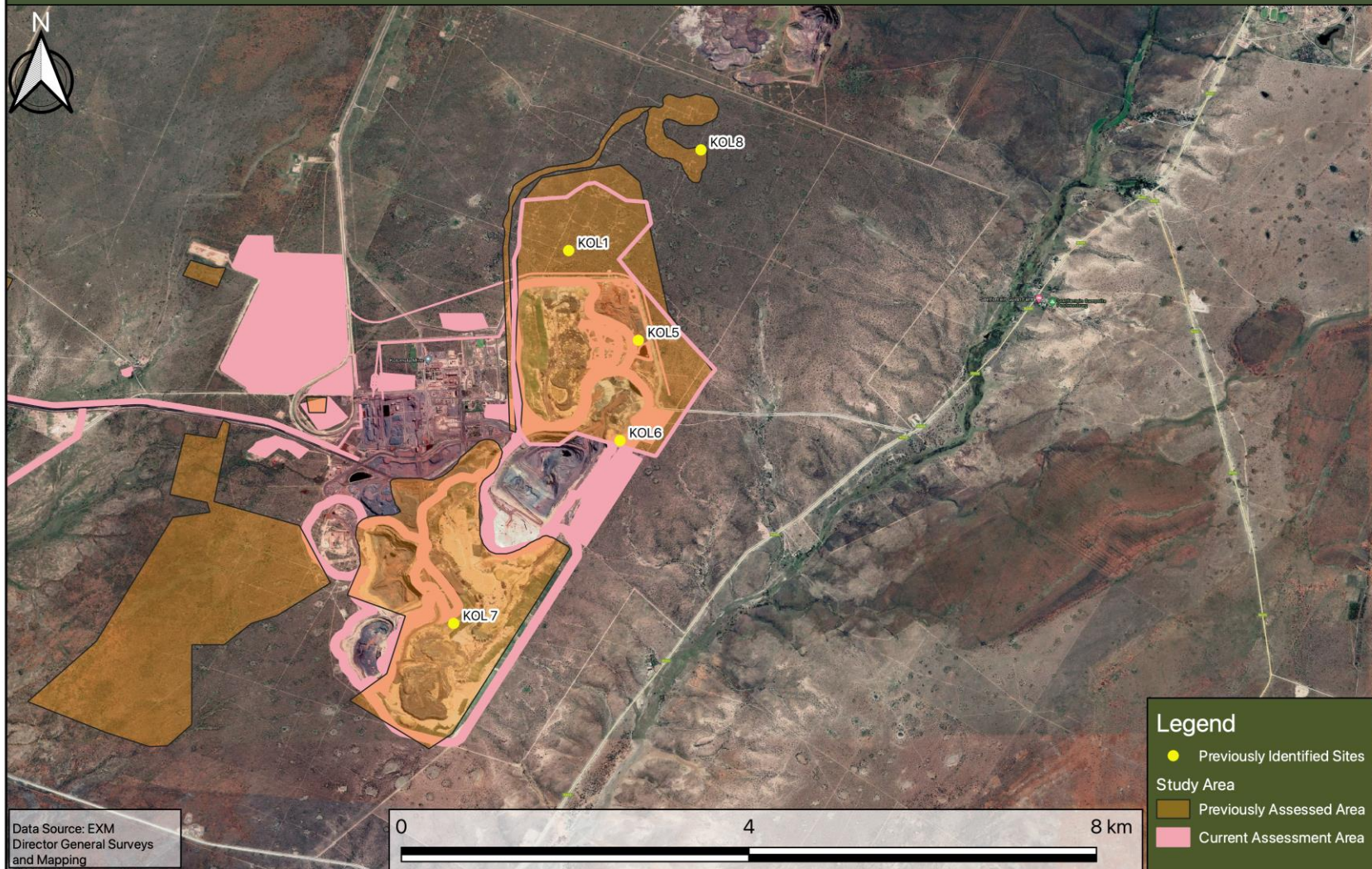





Figure 44: Heritage resources previously identified in the eastern part of the study area.



Table 8: Sites previously identified in the study area


Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
KOL 1	-28.367472°S	22.980361°E	<p>The site comprised one shallow pan located on the farm Ploegfontein (<b>Figure 45</b>). The site was first documented in Morris' impact assessment report of 2005 and was later confirmed by van der Ryst's report of 2011. During previous field surveys a surface density of stone artefacts of up to 15 artefacts/m<sup>2</sup> could be identified. The stone artefacts are mainly of Middle Stone Age typology (<b>Figure 61</b>).</p> <p>During the HIA undertaken by Van der Ryst in 2011, this pan yielded a representative collection of MSA and LSA stone tool types, and also a few ceramic sherds. The recent site visit by PGS Heritage on 4 February 2015 confirmed the previous findings of MSA and LSA lithics as well as some ceramics at the site.</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> <li>As KOL 1 is located within the area that is designated for the expansion of the Leeuwfontein North Waste Rock Dump (WRD), Phase 2 mitigation (representative sampling) will be required before the site is destroyed by mining activities. This will require a permit issued by the South African Heritage Resources Agency (SAHRA).</li> <li>A general 30 meter buffer is recommended until a destruction permit is issued.</li> </ul>	Low-Medium Significance	IIIB/IIIC

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			 <p data-bbox="389 772 943 799"><i>Figure 45: Small pan site identified by Morris (2005)</i></p>	 <p data-bbox="1285 772 1921 799"><i>Figure 46: Cores identified at KOL 1 by Van der Ryst (2011)</i></p>	
KOL 2	-28.383458°S	22.866872°E	<p data-bbox="786 834 1617 970">The site comprised a Stone Age site that was identified by Morris (2005) on the Remainder of the farm Kapstevel. It comprised a scatter of possibly Late Stone Age artefacts observed on a colluvial fan in one of the valleys (<b>Figure 47</b>). The surface density of the site was assessed to be perhaps 3 or 4 artefacts per m<sup>2</sup>.</p> <p data-bbox="786 999 1043 1026">It is recommended that:</p> <p data-bbox="786 1062 1617 1139">Should future mining activities expose archaeological material at this site, an archaeologist must be contracted to comment on the significance of the finds (African Heritage Consultants 2011:20).</p>	Low Significance	IIIC

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
 <p data-bbox="613 1018 1653 1050"><i>Figure 47: MSA tools observed at an archaeological occurrence on the plains (van der Ryst 2011)</i></p>					
KOL 3	-28.377064°S	22.879478°E	<p>The site comprises a historic mine (<b>Figure 48, Figure 49</b>). This site was initially identified by Van der Ryst (2011). It is located on the farm Welgevonden 486. An archaeological recording of the site (Phase 2 assessment) was conducted in 2019 by PGS.</p> <p>The site is situated within the prospecting area of an open-cast pit. The area surrounding the workings has been heavily prospected during the current mining activities. The open-mine workings of haematite consist of a narrow trench with two stopes on the highest section. It is similar to ancient open mining technologies that resulted in a narrow deep trench (Küsel, 1979) and was suited to rocks that dip steeply or are vertical (Hammer et al, 2000:51).</p>	High Significance	IIIA



Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			<p>The mine workings drain towards the east. It has been estimated that 3000 to 4000 tons of haematite ore could have been removed. The backfilling of the excavation obscure details such as possible tunnels (van der Ryst, 2011).</p> <p>Information provided by the last owner indicated that two small outcrops of specularite have been worked by some groups during the twentieth century (Van der Ryst, 2011).</p> <p>Recommendation:</p> <ul style="list-style-type: none"> <li>• As KOL 3 does not fall within the current proposed development area, no impact is expected.</li> <li>• A buffer area of 400m must be maintained between the site and any proposed development.</li> </ul>		
 <p data-bbox="271 1145 1055 1177"><i>Figure 48: View along the open excavation representing the historic mine.</i></p>			 <p data-bbox="1335 1118 1872 1174"><i>Figure 49: Detail of excavation in the historic mine. (Photograph by S Küsel, in Miller 2011)</i></p>		

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
KOL 4			A historical farmstead complex is situated on the farm Kapsteviel. It comprises a farmyard containing several structures; together with associated landscape features; and two cemeteries ( <b>Figure 50</b> ). The site was divided into four sub-categories to facilitate significance and mitigation requirements.		
 <p>Figure 50: Google Earth image depicting the farmstead at KOL 4 and all its components.</p>					
KOL 4.1	-28.400792°S	22.859033°E	<p>The site comprises a farmyard. There is a main dwelling, a wagon shed, kitchen with bakery extension, a school, a power generation shed, a cold room and various early 20th century farming tools.</p> <p>The original dwelling, barn and outer kitchen were built at the beginning of the 20th century (<b>Figure 51, Figure 52</b>). During the 1920s the main house was extended, and the school was added at this time. It is likely that the final alterations were made during the 1960s. Finally, the whole site was refurbished</p>		II

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			<p>for the occupation of the farm manager of the Kolomela mining operations, possibly during the late 1990s or early twenty-first century.</p> <p>As the site comprises structures older than 60 years, the farmyard enjoys general protection under the provision of Section 34 (1) of the National Heritage Resources Act, Act 25 of 1999. Furthermore, sections of the farmyard are also believed to be older than 100 years and as a result these buildings are defined as archaeological sites and as such are protected by Section 35 (4) of the same Act.</p> <p>Besides, the site is not only older than 60 years but represents a complete time capsule of a century of farming lifestyle in the Northern Cape. All elements of the site are well preserved, and collectively it qualifies to be declared as a provincial heritage site (African Heritage Consultants, 2011).</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> <li>• As KOL 4.1 does not fall within the current proposed development area, no impact is expected.</li> <li>• A minimum buffer of 250 meters from any mining activities (e.g. blasting) must be maintained.</li> </ul>		

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating	
KOL 4.2	-28.400725°S	22.860647°E	<p>The site comprises a cemetery of the Bredenkamp family is located roughly 160 m east of the farmyard (<b>Figure 53</b>). The graves are divided into parallel rows and are all covered by formal dressings and all have inscribed headstones. The cemetery comprises the graves of 12 members of the Bredenkamp family. The Bredenkamp family had lived on the Kapsteviel farm for over 100 years and four generations (Miller, 2011). One of the oldest graves in the cemetery dates to 1893 and contains the following inscription:</p> <p style="text-align: center;"><i>IN LOVING MEMORY OF ALETTA ELIZABETH BREDENKAMP BORN 11 DECEMBER 1889 DIED 13 JULY 1893 PARENTS JM &amp; AE BREDENKAMP</i></p>	High Significance	IIIA	





Figure 51: View of the historic farmhouse at KOL 4.1 (Miller, 2011)




Figure 52: View of the old barn at KOL 4.1 (Miller, 2011)


Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			<p style="text-align: center;"><i>MAT 19 VERS 14</i></p> <p>The most recent grave appears to date from 1997 and contains the following inscription:</p> <p style="text-align: center;"><i>PETRUS JOHANNES BREDENKAMP 28-10-1940 ☆ † 30-05-1997</i></p> <p>Burial grounds and graves are protected under Section 36 of the NHRA 25 of 1999. Thus, the site is rated as having a high heritage significance with a heritage rating of IIIA. All graves have high levels of emotional, religious and in some cases historical significance. It is also important to understand that the identified graves could have significant heritage value to the relevant families.</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> <li>● As KOL 4.2 does not fall within the current proposed development area, no impact is expected.</li> <li>● A minimum buffer of 250 meters from any mining activities (e.g. blasting) must be maintained.</li> </ul>		


Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
					
	<p><i>Figure 53: General view of the cemetery of the Bredenkamp family at KOL 4.2.</i></p>				
KOL 4.3	-28.398892°S	22.859992°E	<p>The site comprises two generations of valley dams that are typical of water storage in this region, together with associated irrigation fields. The main landscape features associated with the farmyard are situated to the north-east of the dwelling (<b>Figure 54</b>). The farm road that used to be the communication link from Postmasburg over Leeuwfontein and Welgevonden also runs through the farmyard.</p> <p>The significance of these features is related to the fact that they form part of a larger overall farmstead complex, the individual components of which have been retained from the nineteenth century to the present day. The significance is assessed as being medium-high.</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> <li>• As KOL 4.3 does not fall within the current proposed development area, no impact is expected.</li> <li>• A minimum buffer of 250 meters from any mining activities (e.g. blasting) must be maintained.</li> </ul>	Medium-High Significance	IIIA/IIIB


Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			 <p style="text-align: right; font-size: small;">Image © 2021 CNES / Airbus</p>		
<p>Figure 54: Google Earth image depicting the context between the Kapsteveld farmstead as well as the dams and irrigation systems.</p>					
KOL 4.4	-28.403444°S	22.862139°E	<p>The site comprises a cemetery which can be associated with nearby farm worker accommodation was identified south-east of the farmyard (<b>Figure 55</b>). The farm worker cemetery was investigated during the 2015 site visit (PGS, 2015). It is not fenced and consists of approximately 30 graves. The graves are placed in three unequal rows and all the graves are orientated from west to east. Most of the graves have elongated mounds of soil and packed rocks as grave dressings, with some of the graves only containing a single rock at the western end to indicate the grave position. The cemetery covers an area of approximately 10m x 25m in extent.</p> <p>Burial grounds and graves are protected under Section 36 of the NHRA 25 of 1999. Thus, the site is provisionally rated as having a high heritage significance with a heritage rating of IIIA. All graves have high levels of emotional, religious and in some cases historical significance. It is also important to understand that the identified graves could have significant heritage value to the relevant families.</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> <li>• As KOL 4.4 does not fall within the current proposed development area, no impact is expected.</li> <li>• A minimum buffer of 250 meters from any mining activities (e.g. blasting) must be maintained.</li> </ul>	High Significance	IIIA


Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
					
<p><i>Figure 55: General view of the cemetery at KOL 4.4.</i></p>					
KOL 5	-28.378006°S	22.988556°E	<p>The site comprised of 12 pans in 2015 and the current status are that only one pan still remains.</p> <p>The pans are assumed to have similar significance to that noted by both Morris (2005) and van der Ryst (2011) for the pans that were investigated during the fieldwork for their respective reports. All the pan localities are assigned a low to medium significance.</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> <li>• As KOL 5 is located within the area that is designated for the expansion of the Leeuwfontein North Waste Rock Dump (WRD), Phase 2 mitigation (representative sampling) will be required before the site is destroyed by mining activities. This will require a permit issued by the South African Heritage Resources Agency (SAHRA).</li> <li>• A general 30-meter buffer is recommended until a destruction permit is issued.</li> </ul>	Low-Medium Significance	IIIB/IIIC



Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
					
<p>Figure 56: Google Earth image taken from the 2015 HIA report. The pans that comprised KOL 5 are highlighted in red. The pan positions were obtained from the Heritage Management Plan for the Kolomela Mine (African Heritage Consultants, 2011).</p>					
KOL 6	-28.389789°S	22.986400°E	<p>The site comprises a single pan.</p> <p>A comparison of the Google Earth images for the period between 2011 and the present day has indicated that there had been six small pans, but five of them had been destroyed by mining activities undertaken between 7 October 2013 and 2 December 2014.</p> <p>The pan can be assumed to have similar significance to that noted by Morris (2005) and van der Ryst (2011) who investigated the locality during the fieldwork for their respective reports. The pan is believed to be of low to medium significance.</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> <li>As KOL 6 is located within the area that is designated for the expansion of the Leeuwfontein North Waste Rock Dump (WRD), Phase 2 mitigation (representative sampling) will be required before the site is destroyed by mining activities. This will require a permit issued by the South African Heritage Resources Agency (SAHRA).</li> <li>A 30 meter buffer around the remaining features must be kept until such time as a destruction permit is granted.</li> </ul>	Low-Medium Significance	IIIB/IIIC

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
					
<p><i>Figure 57: Google Earth image taken from the 2015 HIA report. The pans that comprised KOL 6 are highlighted in red. The pan positions were obtained from the Heritage Management Plan for the Kolomela Mine (African Heritage Consultants, 2011).</i></p>					
KOL 7	-28.411264°S	22.966856°E	<p>The site comprises of one pan.</p> <p>A comparison of the Google Earth images for the period between 2011 and the present day has indicated that there had been 44 small pans but that 17 of these had been destroyed by mining activities undertaken between 7 October 2013 and 2 December 2014 and by 2019 only one pan remains.</p> <p>The pans can be assumed to have similar significance to that noted by Morris (2005) and van der Ryst (2011) who investigated the locality during the fieldwork for their respective reports. The pan is believed to be of low to medium significance.</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> <li>• A general 30-meter buffer is recommended for the remaining pan sites.</li> <li>• Phase 2 mitigation (representative sampling) on certain pans will be required before they are destroyed by mining activities. This will require a permit issued by the South African Heritage Resources Agency (SAHRA).</li> </ul>	Low-Medium Significance	IIIB/IIIC

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			 <p style="text-align: center;"><i>Figure 58: Google Earth image taken from the 2015 HIA report. The pans that comprised KOL 7 are highlighted in red. The pan positions were obtained from the Heritage Management Plan for the Kolomela Mine (African Heritage Consultants, 2011).</i></p>		
KOL 8	-28.355650°S	22.995911°E	<p>The site comprises 4 pans.</p> <p>The pans can be assumed to have similar significance to that noted by Morris (2005) and van der Ryst (2011) who investigated the locality during the fieldwork for their respective reports. The pan is believed to be of low to medium significance. This said, it should be noted that the imagery of the 2011 Heritage Management Plan allocates a Medium to High Significance to all 165 pans located on the eastern end of the mine property.</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> <li>• As KOL 8 does not fall within the current proposed development area, no impact is expected.</li> <li>• A general buffer of 30 meters around the features must be maintained.</li> </ul>	Low-Medium Significance	IIIB/IIIC

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
					
<p><i>Figure 59: Google Earth image taken from the 2015 HIA report. The pans comprising KOL 8 are highlighted in red. The pan positions were obtained from the Heritage Management Plan for the Kolomela Mine (African Heritage Consultants, 2011).</i></p>					

## 6.2 Heritage sites identified during the current field assessment

A controlled surface survey was conducted on foot on **19-21 July 2021** by two archaeologists from PGS. A mine representative accompanied the project team during the survey. The tracklogs (in yellow) for the survey and previously assessed areas are depicted in **Figure 60**. **Figure 61**, **Figure 62** and **Figure 63** illustrate the heritage resources identified in the study area during the current field survey.

The fieldwork identified heritage finds that were then classified as either find spots, Stone Age sites, structures, or graves. The fieldwork completed for the HIA component has confirmed the presence of 1 burial ground site (**KME-01**), 1 Stone Age site (**KME-04**), 2 modern/recent structures (**KME-02**, **KME-03**) and 5 findspots (**KME-05 – KME-09**) that may be affected by the proposed development. Although frequent MSA and LSA artefacts were observed within the study area, in general these scatters of artefacts were not dense enough to be classified as archaeological sites (**exception of KME-04**).

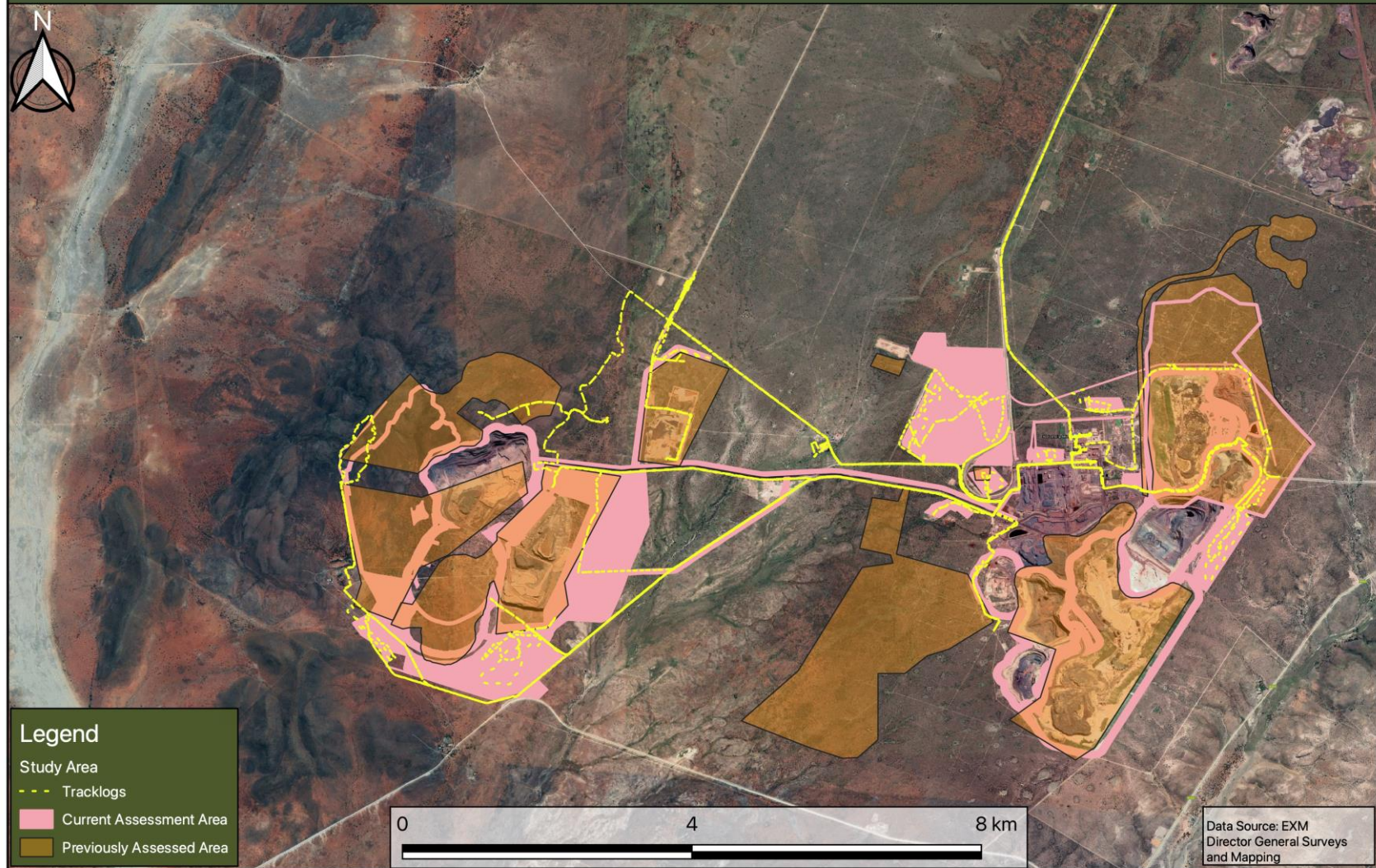


Figure 60: Tracklogs of fieldwork.



Figure 61: Locality of the heritage resources identified in the western part (Kapstevel) of the study area.



Figure 62: Heritage resources identified in the eastern part of the study area.



Figure 63: Closer view of heritage resources located within the vicinity of the exploration yard.



### 6.3 Find Spots

The find spots (**KME-05 – KME-09; Table 9**) were only documented where more than 5 identifiable modified lithics were observed within a 5-metre radius. Most of the find spots were found to coincide with open areas which were characterised by sparse scatters of lithics consisting mainly of flakes, debitage and cores. This observation also correlates with the findings of the previous heritage studies undertaken in the region. Mostly MSA and LSA artefacts were observed within the study area and raw materials utilised included jasper, cryptocrystalline silicates (ccs) and quartz (**Figure 64**). Single isolated artefacts were also observed across portions of the study area.

*Table 9: Find spots identified during the heritage survey*

Site Number	Lat	Lon	Description	Sensitivity	Heritage Rating
KME-05	-28.405886°S	22.863817°E	Low density MSA/LSA scatter	No research potential or other cultural significance	NCW
KME-06	-28.379490°S	22.990983°E	Low density MSA/LSA scatter	No research potential or other cultural significance	NCW
KME-07	-28.382257°S	22.960686°E	Low density MSA/LSA scatter	No research potential or other cultural significance	NCW
KME-08	-28.386090°S	22.952970°E	Low density MSA/LSA scatter	No research potential or other cultural significance	NCW
KME-09	-28.381718°S	22.940508°E	Low density MSA/LSA scatter	No research potential or other cultural significance	NCW





*Figure 64: Some of the artefacts identified as find spots.*


## 6.4 Sites


Table 10: Sites identified during the heritage survey



Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
KME-01	-28.383211°S	22.927127°E	<p>The site comprises a burial ground of approximately 9 graves (<b>Figure 65</b>). The graves are fenced off and overgrown (<b>Figure 66</b>). One of the graves has a stone headstone but the rest of the graves consist of piles of rocks or mounds of sediment. The site is however located 140m south-west of the proposed exploration core expansion area.</p> <p>Burial grounds and graves are protected under Section 36 of the NHRA 25 of 1999. Thus, the site is provisionally rated as having a high heritage significance with a heritage rating of IIIA. All graves have high levels of emotional, religious and in some cases historical significance. It is also important to understand that the identified graves could have significant heritage value to the relevant families.</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> <li>• The graves should be demarcated with a <b>100-meter buffer</b> and that the graves should be avoided and left in situ.</li> <li>• A Grave Management Plan should be developed for the graves which also need to be approved by SAHRA BGG</li> <li>• If the site is going to be impacted and the graves need to be removed a grave relocation process for site KME-01 is recommended as a mitigation and management measure.</li> </ul>	High Significance	IIIA

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
 <p data-bbox="936 646 1332 678"><i>Figure 65: View of graves at KME-01.</i></p>					

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			 <p style="text-align: center;"><i>Figure 66: View of KME-01.</i></p>		
KME-02	-28.381230°S	22.926790°E	<p>The site comprised an abandoned single roomed structure (<b>Figure 67</b>). This structure was situated approximately 100m north-west of the current exploration core yard area. The construction materials and technique are consistent with modern building methods. It was constructed from red clay bricks and has a cement foundation. It has metal door and window frames. The site is however located outside of the proposed project area. As no additional information was available, the site is provisionally rated as NCW as it has no research potential or is of other cultural significance.</p> <p><b>Extent:</b> approx. 7mx9m (incl. cement foundation at front of structure)</p> <p><b>Recommendation:</b></p> <ul style="list-style-type: none"> <li>As KME-02 will not be impacted by the proposed development, no mitigation is required.</li> </ul>	No research potential or other cultural significance	NCW

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
					
			<p><i>Figure 67: View of KME-02.</i></p>		
KME-03	-28.381182°S	22.927132°E	<p>The site comprised an abandoned single roomed structure.</p> <p>The structure was situated approximately 60m north-west of the current exploration core yard area (<b>Figure 68</b>). The construction materials and technique are consistent with modern building methods. It was constructed from red clay bricks and has a cement foundation. It has metal door and window frames. As no additional information about the structure was available, the structure is provisionally rated as NCW as it has no research potential or is of other cultural significance. As the structure does not fall within the proposed development area, no mitigation is required.</p> <p><b>Extent:</b> approx. 7mx9m (incl. cement foundation at front of structure)</p> <p><b>Recommendation:</b></p> <ul style="list-style-type: none"> <li>As KME-03 will not be impacted by the proposed development, no mitigation is required.</li> </ul>	No research potential or other cultural significance	NCW

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			 <p style="text-align: center;"><i>Figure 68: View of the structure at KME-03.</i></p>		
KME-04	-28.385547°S	22.862765°E	<p>The site comprises a low-medium density surface scatter of stone tools (+-5-10 artefacts in 10mx10m). The site is situated on a scree slope near the base of the Wolhaarkop hill, within the proposed Waste Rock Dump area. The tools were located on a surface that gently sloped towards the east (<i>Figure 70</i>). Mostly MSA and LSA artefacts were observed at KME-04. Cores, flakes, scrapers and debitage were observed and were mostly manufactured from jasper, ccs and quartz (<i>Figure 69</i>). It is unlikely that these artefacts were observed in their primary context due to the nature of the environment. The artefacts are exposed to erosion due to the proximity of an ephemeral stream on the slope (<i>Figure 71</i>).</p> <p><b>Extent:</b> Approximately 20mx30m</p> <p><b>Recommendation:</b></p> <ul style="list-style-type: none"> <li>No mitigation is required. The documentation of the site in this HIA report is sufficient and the site can be destroyed without a permit but with the approval of this report.</li> </ul>	Low Significance	IIIC

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating	
			 <p data-bbox="360 863 965 890"><i>Figure 69: Some of the stone tools identified at KME-04.</i></p>	 <p data-bbox="1413 876 1794 903"><i>Figure 70: General view of KME-04.</i></p>		

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
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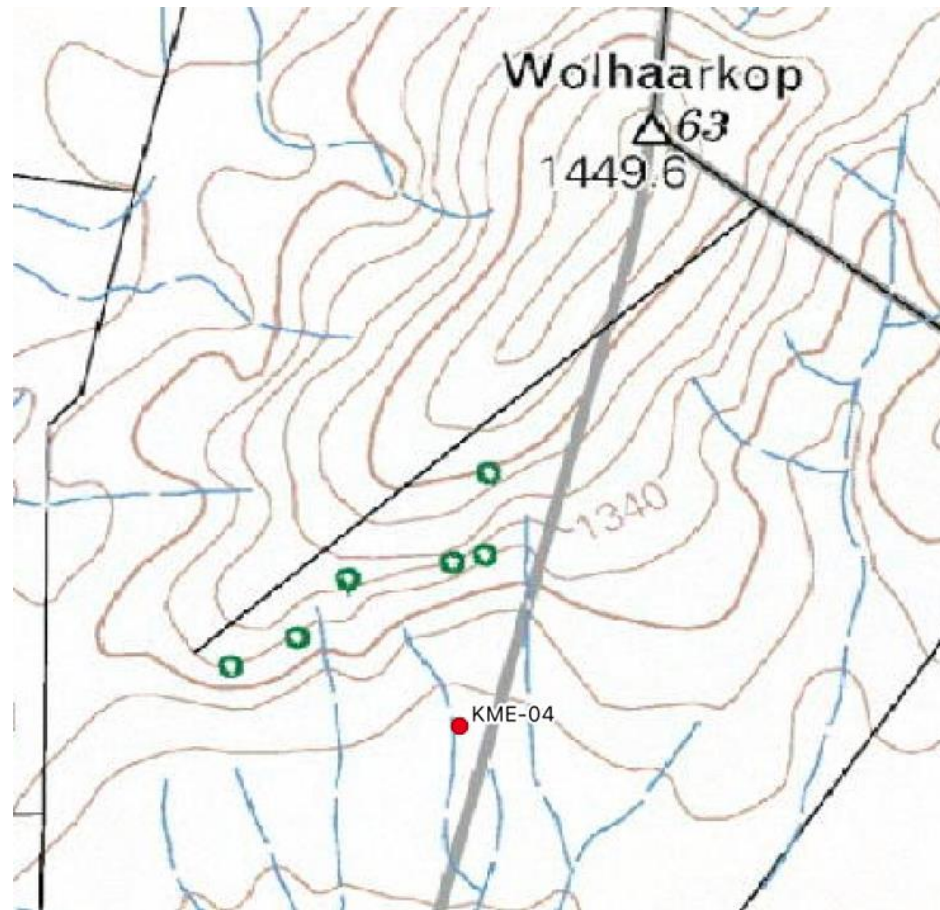


Figure 71: Section of the topographic map illustrating the geomorphic context of KME-04.



## 7 STAKEHOLDER ENGAGEMENT AND INTANGIBLE HERITAGE

### 7.1 Introduction

The current fieldwork by the heritage team excluded any direct stakeholder engagement regarding tangible and intangible heritage. The Public Participation process as part of the updating of the EMPr did however raise one comment on heritage related issues:

A Mr. Frederick Pier from the *Khoisan Revolusie*, contacted EXM via email raising the issue of the destruction of Griqua graves:

*“Kindly note that this area was an area where our people of Griqua descent were staying. We are also aware of remains from gravesites during previous excavations at Kolomela mine.*

*We would like to draw the attention of your office to the above mentioned issue.*

*Please make sure that no Gravesites is in the areas where you are going to do your excavations if any remains are located in this areas, Please feel free to contact us on this address (sic).”*

PGS followed up with Mr Pier and had a discussion around the email submitted. Mr Pier confirmed that he is representing the *Huis van die Griekwas van Griekwaland Wes* and no longer the *Khoisan Revolusie*. He indicated that he was previously in contact with representatives of Kolomela when graves were damaged in an area close to Kolomela and Beeshoek mines. However, he did not recall that further engagement occurred with their community from Kolomela’s side. Mr Pier undertook to supply further information at a later stage.

Mr Pier, finally, indicated that the need for regular interaction with local communities and stakeholders, representative of communities historically associated with the area must receive attention.

Such an initiative will assist with sharing knowledge on tangible and intangible heritage of the area. Kolomela mine needed to develop a formalised plan to manage the engagement and possible impacts on indigenous people in the mine’s area of influence.

### 7.2 Kolomela mine’s Indigenous People Plan

In the following section, we refer to the Kolomela mine’s Indigenous People Plan (IPP), which was interpreted and used with the data reported in the Indigenous People Scoping Report and the community baseline study report.

There are two main groups of Indigenous People present in Kolomela mine's area of influence - the Groenwater community and the Griqua people.

*The Groenwater community* is settled approximately 30km from Postmasburg. The Groenwater community forms part of the Batlharo Batswana Clan and is governed by one of eight officially recognised traditional councils in the Northern Cape.

*The Griqua people* are mostly concentrated in Griekwastad and Campbell, approximately 80km from Postmasburg. The Grikwas (originally the Khoi Khoi) are descendants of the Khoi San (term used to refer to groups like the Xun, Khwe and Khomani, Nama, and Korana). The Khoi Khoi were the first native people to come into contact with the Dutch settlers in South Africa in the mid 17th century.

In Kolomela mine's IPP, the following points were highlighted to assist with the engagement between the mine and the Groenwater, Griekwastad and Campbell communities:

- Follow the correct protocols for engagement of the Groenwater leadership (i.e. Chief Kweetsane) and maintain regular engagement to identify any new issues, impacts or risks.
- Maintain regular engagement with Griqua Kings to identify any new issues, impacts or risks.
- The two Griqua groups should be treated the same by Kolomela mine. To date, all engagement occurred with King Johannes Waterboer and none with King Adam Kok V of Campbell. This imbalance will be addressed with the implementation of the IPP, when feedback is provided to the Griqua Kings.
- Monitor the work of the Commission of Khoisan Matters to ensure the engagement with legitimate leadership and prevent community conflict.

## **8 IMPACT ASSESSMENT**

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

The impacts will be ranked according to the methodology described below. Where possible, mitigation measures will be provided to manage impacts. In order to ensure uniformity, a standard impact assessment methodology will be utilised so that a wide range of impacts can be compared with each other. The impact assessment methodology makes provision for the assessment of impacts against the following criteria:

- Significance;
- Spatial scale;
- Temporal scale;
- Probability; and
- Degree of certainty.

A combined quantitative and qualitative methodology was used to describe impacts for each of the aforementioned assessment criteria. A summary of each of the qualitative descriptors along with the equivalent quantitative rating scale for each of the aforementioned criteria is given in **Table 11**.

*Table 11: Quantitative rating and equivalent descriptors for the impact assessment criteria*

RATING	SIGNIFICANCE	EXTENT SCALE	TEMPORAL SCALE
1	VERY LOW	Proposed site	Incidental
2	LOW	Study area	Short-term
3	MODERATE	Local	Medium/High-term
4	HIGH	Regional / Provisional	Long-term
5	VERY HIGH	Global / National	Permanent

A more detailed description of each of the assessment criteria is given in the following sections.

### 8.1 Significance Assessment

Significance rating (importance) of the associated impacts embraces the notion of extent and magnitude but does not always clearly define these since their importance in the rating scale is very relative. For example, the magnitude (i.e. the size) of area affected by atmospheric pollution may be extremely large (1 000 km<sup>2</sup>) but the significance of this effect is dependent on the concentration or level of pollution. If the concentration is great, the significance of the impact would be HIGH or VERY HIGH, but if it is diluted it would be VERY LOW or LOW. Similarly, if 60 ha of a grassland type are destroyed the impact would be VERY HIGH if only 100 ha of that grassland type were known. The impact would be VERY LOW if the grassland type was common. A more detailed description of the impact significance rating scale is given in **Table 12** below.

*Table 12: Description of the significance rating scale*

RATING	DESCRIPTION
5 Very high	Of the highest order possible within the bounds of impacts which could occur. In the case of adverse impacts: there is no possible mitigation and/or remedial activity which could offset the impact. In the case of beneficial impacts, there is no real alternative to achieving this benefit.
4 High	Impact is of substantial order within the bounds of impacts, which could occur. In the case of adverse impacts: mitigation and/or remedial activity is feasible but difficult, expensive, time-consuming or some combination of these. In the case of beneficial impacts, other means of achieving this benefit are feasible but they are more difficult, expensive, time-consuming or some combination of these.
3 Moderate	Impact is real but not substantial in relation to other impacts, which might take effect within the bounds of those which could occur. In the case of adverse impacts: mitigation and/or

		remedial activity are both feasible and fairly easily possible. In the case of beneficial impacts: other means of achieving this benefit are about equal in time, cost, effort, etc.
2	Low	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts: mitigation and/or remedial activity is either easily achieved or little will be required, or both. In the case of beneficial impacts, alternative means for achieving this benefit are likely to be easier, cheaper, more effective, less time consuming, or some combination of these.
1	Very low	Impact is negligible within the bounds of impacts which could occur. In the case of adverse impacts, almost no mitigation and/or remedial activity are needed, and any minor steps which might be needed are easy, cheap, and simple. In the case of beneficial impacts, alternative means are almost all likely to be better, in one or a number of ways, than this means of achieving the benefit. Three additional categories must also be used where relevant. They are in addition to the category represented on the scale, and if used, will replace the scale.
0	No impact	There is no impact at all - not even a very low impact on a party or system.

## 8.2 Spatial Scale

The spatial scale refers to the extent of the impact i.e. will the impact be felt at the local, regional, or global scale. The spatial assessment scale is described in more detail in **Table 13**.

*Table 13: Description of the spatial rating scale*

RATING		DESCRIPTION
5	Global/National	The maximum extent of any impact.
4	Regional/Provincial	The spatial scale is moderate within the bounds of possible impacts and will be felt at a regional scale (District Municipality to Provincial Level).
3	Local	The impact will affect an area up to 10 km from the proposed site.
2	Study Site	The impact will affect an area not exceeding the boundary of the study area.
1	Proposed site	The impact will affect an area no bigger than the site.

## 8.3 Temporal/Duration Scale

In order to accurately describe the impact, it is necessary to understand the duration and persistence of an impact in the environment. The temporal scale is rated according to criteria set out in **Table 14**.

*Table 14: Description of the temporal rating scale*

RATING		DESCRIPTION
1	Incidental	The impact will be limited to isolated incidences that are expected to occur very sporadically.
2	Short-term	The environmental impact identified will operate for the duration of the construction phase or a period of less than 5 years, whichever is the greater.
3	Medium-term	The environmental impact identified will operate for the duration of life of the project.
4	Long-term	The environmental impact identified will operate beyond the life of the operation of the project.
5	Permanent	The environmental impact will be permanent.

#### 8.4 Degree of Probability

Probability or likelihood of an impact occurring will be described as shown in **Table 15** below.

*Table 15: Description of the degree of probability of an impact occurring*

RATING	DESCRIPTION
1	Practically impossible
2	Unlikely
3	Could happen
4	Very likely
5	It's going to happen / has occurred

#### 8.5 Degree of Certainty

As with all studies it is not possible to be 100% certain of all facts, and for this reason a standard “degree of certainty” scale is used as discussed in **Table 16**. The level of detail for specialist studies is determined according to the degree of certainty required for decision-making. The impacts are discussed in terms of affected parties or environmental components.

*Table 16: Description of the degree of certainty rating scale*

RATING	DESCRIPTION
Definite	More than 90% sure of a particular fact.
Probable	Between 70 and 90% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	Between 40% and 70% sure of a particular fact, or of the likelihood of an impact occurring.
Unsure	Less than 40% sure of a particular fact or the likelihood of an impact occurring.
Can't know	The consultant believes an assessment is not possible even with additional research.
Don't know	The consultant cannot, or is unwilling, to make an assessment given available information.

#### 8.6 Quantitative Description of Impacts

To allow for impacts to be described in a quantitative manner, in addition to the qualitative description given above, a rating scale of between 1 and 5 was used for each of the assessment criteria. Thus the total value of the impact is described as the function of significance, spatial and temporal scale, as described below:

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

An example of how this rating scale is applied is shown in **Table 17**.

*Table 17: Example of Rating Scale*

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Low	Local	Medium Term	Could Happen	Low
Impact on heritage structures	2	3	3	3	1.6

**Note:** The significance, spatial and temporal scales are added to give a total of 8, which is divided by 3 to give a criterion rating of 2.67. The probability (3) is divided by 5 to give a probability rating of 0.6. The criteria rating of 2.67 is then multiplied by the probability rating (0,6) to give the final rating of 1,6.

The impact risk is classified according to five classes as described in the **Table 18** below.

*Table 18: Impact Risk Classes*

RATING	IMPACT CLASS	DESCRIPTION
0.1 – 1.0	1	Very Low
1.1 – 2.0	2	Low
2.1 – 3.0	3	Moderate
3.1 – 4.0	4	High
4.1 – 5.0	5	Very High

Therefore, with reference to the example used for heritage structures above, an impact rating of 1.6 will fall in the Impact Class 2, which will be considered to be a low impact.

## 8.7 Heritage Impacts

### 8.7.1 Impact on heritage sites previously identified within the mine property

In previous heritage and archaeological impact assessment reports, eight heritage sites were identified within footprint areas of the Kolomela Amendment Project inside the mine property (Morris, 2005; African Heritage Consultants, 2011; Miller, 2011; van der Ryst, 2011; PGS, 2015). The fieldwork identified heritage finds that were then classified as either archaeological (Stone Age) sites, structures or graves. The fieldwork completed in 2015 (PGS, 2015), confirmed the presence of 6 Stone Age sites (**KOL 1, KOL 2, KOL 5, KOL 6, KOL 7** and **KOL 8**), 1 historical mine (**KOL 3**) and 1 historical farmstead complex (**KOL 4**).

The following section evaluates and rates the impact of the proposed development on the identified heritage resources on the proposed layout as provided by the client.

#### **Burial ground and grave sites**

The impact significance before mitigation on the graves (**KOL 4.2** and **KOL 4.4**) will be MODERATE negative before mitigation. The impact of the proposed development will be local in extent. **The impact could possibly happen.** The expected duration of the impact is assessed as potentially permanent. Implementation of the recommended mitigation measures will modify this impact rating to an acceptable LOW negative impact.

#### **Archaeological sites**

The Stone Age site (**KOL 2**) has a **low local heritage significance** and heritage rating of IIIC. Therefore KOL 2 is not included in the impact risk assessment calculations.

The pans (**KOL 1, KOL 5, KOL 6, KOL 7** and **KOL 8**) can be assumed to have similar significance to that noted by both Morris (2005) and van der Ryst (2011) for the pans that were investigated during the fieldwork for their respective reports. All the pan localities are assigned a **low to medium local heritage significance** (heritage grading of IIIB/IIIC).

The impact significance before mitigation on the pan sites will be MODERATE negative before mitigation. The impact of the proposed development will be local in extent. **The impact could possibly happen.** The expected duration of the impact is assessed as potentially permanent. Implementation of the recommended mitigation measures will modify this impact rating to an acceptable LOW negative impact.

### ***Historical sites***

The historical mine site (**KOL 3**) and the historical farmstead complex (**KOL 4**) have a **high local heritage significance** and heritage rating of IIIA.

The impact significance before mitigation on the historical sites will be HIGH negative before mitigation. The impact of the proposed development will be regional in extent. **The impact could possibly happen.** The expected duration of the impact is assessed as potentially permanent. Implementation of the recommended mitigation measures will modify this impact rating to an acceptable LOW negative impact.

#### *8.7.1 Impact on heritage sites identified during the current field assessment*

During the current fieldwork, nine heritage resources were identified. Of these nine, one (**KME-01**) consisted of a burial ground, one (**KME-04**) consisted of an archaeological site, two (**KME-02, KME-03**) consisted of modern/recent structures and five (**KME-05 – KME-09**) consisted of findspots.

The following section evaluates and rates the impact of the proposed development on the identified heritage resources on the proposed layout as provided by the client.

### ***Burial Grounds and graves***

The burial ground (**KME-01**) has a **high heritage significance** and heritage rating of IIIA. The impact significance before mitigation on the graves will be MODERATE negative before mitigation. The impact of the proposed development will be local in extent. **The impact could**

**possibly happen.** The expected duration of the impact is assessed as potentially permanent. Implementation of the recommended mitigation measures will modify this impact rating to an acceptable LOW negative impact.

### ***Archaeological sites***

The Stone Age site (**KME-04**) has a **low heritage significance** and heritage rating of IIIC. Although, **KME-04** falls within a proposed waste rock dump area, it is not included in the impact risk assessment calculations. The reason for this is that the site is of low heritage significance and will not require further mitigation beyond the documentation of the site in this HIA report.

The findspots (**KME-05 – KME-09**) were assessed to have no heritage significance, they are not included in the impact risk assessment calculations. The reason for this is that sites of no heritage significance will **not require mitigation**.

### ***Modern/recent structures***

The modern/recent structures at **KME-02** and **KME-03** are provisionally rated as NCW as they have **no research potential** or are of other cultural significance. As these sites were assessed to have no heritage significance, they are not included in the impact risk assessment calculations. The reason for this is that sites of low to no heritage significance will **not require mitigation**.



## 8.8 Impact Assessment Tables

Implementing the abovementioned impact assessment methodology, the following tables provide a quantitative assessment of the impacts of the proposed development on the burial ground and grave sites, archaeological sites, historical sites and modern/recent structures.

Table 19: *Impact Assessment Table (pre-mitigation)*

Impact	Impact Direction	Significance	Spatial Scale	Temporal Scale	Probability	Rating
Burial ground and grave sites (KOL 4.2 , KOL 4.4, KME-01)	Negative	MODERATE (3)	Local (3)	Permanent (5)	Could happen (3)	2,2
Archaeological pan sites (KOL 1, KOL 5 – KOL 8 )	Negative	MODERATE (3)	Local (3)	Permanent (5)	Very Likely (4)	2,9
Historical sites (KOL 3 and KOL 4)	Negative	HIGH (4)	Regional (4)	Permanent (5)	Could happen (3)	2,6

Table 20: *Impact Assessment Table (post-mitigation)*

Impact	Impact Direction	Significance	Spatial Scale	Temporal Scale	Probability	Rating
Burial ground and grave sites (KOL 4.2 , KOL 4.4, KME-01)	Negative	MODERATE (3)	Local (3)	Permanent (5)	Unlikely (2)	1,5
Archaeological pan sites (KOL 1, KOL 5 – KOL 8 )	Negative	MODERATE (3)	Local (3)	Permanent (5)	Unlikely (2)	1,5
Historical sites (KOL 3 and KOL 4)	Negative	HIGH (4)	Regional (4)	Permanent (5)	Unlikely (2)	1,7

## 9 MITIGATION MEASURES AND GENERAL RECOMMENDATIONS

### 9.1 Mitigation Measures for Previously Identified Heritage Resources

Please note that the mitigation guidelines that were provided for identified heritage resources in the previous heritage and archaeological impact assessment reports (Morris, 2005; African Heritage Consultants, 2011; Miller, 2011; van der Ryst, 2011; PGS, 2015) are still valid as mentioned below. Additional mitigation measures are based on the buffer distances as implemented by SAHRA in their guidelines as accepted in 2020.

#### 9.1.1 Mitigation Measures Required for Sites KOL 1, KOL 5 – KOL 8

These sites have been assessed as having a Moderate Impact Risk.

- A general buffer of 30 meters for the remaining pan sites are recommended.
- Phase 2 mitigation (representative sampling) on certain pans will be required before they are destroyed by mining activities. This will require a permit issued by the South African Heritage Resources Agency (SAHRA).

#### 9.1.2 Mitigation Measures Required for Site KOL 2

- It had been recommended that “should future mining activities expose archaeological material at this site, an archaeologist must be contracted to comment on the significance of the finds” (African Heritage Consultants 2011:20).

#### 9.1.3 Mitigation Measures Required for Site KOL 3

- A 400 meter buffer must be maintained between the site and any proposed development.

#### 9.1.4 Mitigation Measures Required for Site KOL 4

- A minimum buffer of 250 meters from any mining activities must be maintained.
- A Grave Management Plan should be developed for the graves (KOL 4.2 and KOL 4.4) which also need to be approved by SAHRA BGG.
- If a grave site is going to be impacted upon and the graves need to be removed, a grave relocation process is recommended as a mitigation and management measure.

## **9.2 Mitigation Measures for Recently Identified Heritage Resources**

### *9.2.1 Mitigation Measures Required for Site KME-01*

- The graves should be demarcated with a 100-meter buffer and should be avoided and left in situ.
- A Grave Management Plan should be developed for the graves which also need to be approved by SAHRA BGG.
- If the site is going to be impacted and the graves need to be removed a grave relocation process for site KME-01 is recommended as a mitigation and management measure.

### *9.2.2 Mitigation Measures Required for Sites KME-02 and KME-03*

- As KME-02 and KME-03 are rated to have no research potential or other cultural significance and had a heritage grading of not conservation worthy (NCW), no mitigation is required.

### *9.2.3 Mitigation Measures Required for Site KME-04*

- As KME-04 was rated as low local heritage significance and had a heritage grading of IIC, no mitigation is required. The documentation of the site in this HIA report is sufficient and the site can be destroyed without a permit but with the approval of this report.

## **9.3 General Recommendations and Mitigation Measures**

### *9.3.1 Construction phase*

The project will encompass a range of activities during the construction phase, including vegetation clearance, excavations and infrastructure development associated with the project.

It is possible that cultural material will be exposed during construction and may be recoverable, keeping in mind delays can be costly during construction and as such must be minimised. Development surrounding infrastructure and construction of facilities results in significant disturbance, however foundation holes do offer a window into the past, and it thus may be possible to rescue some of the data and materials. It is also possible that substantial alterations will be implemented during this phase of the project, and these must be catered for. Temporary infrastructure developments are often changed or added to the project as required. In general, these are low impact developments as they are superficial, resulting in little alteration of the land surface, but still need to be catered for.

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

### 9.3.2 Chance Find Procedure

- A heritage practitioner / archaeologist should be appointed to develop a heritage induction program and conduct training for the ECO as well as team leaders in the identification of heritage resources and artefacts.
- 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, and construction activities halted.
- The qualified heritage practitioner / archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and the impact on the heritage resource.
- The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the materials and data are recovered.
- Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner / archaeologist.

### 9.3.3 Possible finds during construction and operation (mining activities)

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

- High density concentrations of stone artefact
- Unmarked graves

### 9.3.4 Timeframes

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for collection or excavation of heritage resources and lead times must be worked into the construction time frames. **Table 21** gives guidelines for lead times on permitting.

*Table 21: 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

Action	Responsibility	Timeframe
Handling of chance finds – Graves/Human Remains	Service provider – Archaeologist and SAHRA	2 weeks
Relocation of burial grounds or graves in the way of construction	Service provider – Archaeologist, SAHRA, local government and provincial government	6 months

## 9.4 Heritage Management Plan for EMPr implementation

Table 22: 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)
<b>General project area</b>	Implement chance find procedures in case where possible heritage finds are uncovered.	Construction and operation	During construction and operation	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
<b>Burial grounds and possible graves</b>	<p><b>KME-01:</b> The site should be demarcated with a 100-meter buffer and the grave should be avoided if any activities are to happen close to it.</p> <p><b>KOL4.2, KOL4.4:</b> The grave sites that form part of the historic farmyard complex (KOL 4), should be demarcated with a 250-meter buffer and the grave should be avoided if any activities are to happen close to it.</p>	Construction through to Operational	During Construction and Operation	Applicant Environmental Control Officer (ECO) Heritage specialist	Monthly	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report
<b>Identified archaeological sites</b>	<p>Implement mitigation recommendations previously provided for identified archaeological sites (<b>KOL 1, KOL 2, KOL 5 - KOL 8</b>).</p> <p><b>KOL 1, KOL 5 - KOL 8:</b>                      - A general buffer of 30 meters for the remaining pan sites are recommended.                      -Phase 2 mitigation (representative sampling) on certain pans will be required before they are destroyed by mining activities. This will require a permit issued by SAHRA.</p> <p><b>KOL 2:</b>                      "Should future mining activities expose archaeological material at site KOL 2, an archaeologist must be contracted to comment on the significance of the finds" (African Heritage Consultants 2011:20).</p>	Construction through to Operational	During Construction and Operation	Applicant Environmental Control Officer (ECO) Heritage specialist	Monthly	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 and 38 of NHRA	ECO Monthly Checklist/Report

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
<b>Historical sites</b>	<p>Implement mitigation recommendations previously provided for identified archaeological pan sites (<b>KOL 3</b> and <b>KOL 4</b>).</p> <p><b>KOL 3:</b> A 400 meter buffer must be maintained between the site and any proposed development.</p> <p><b>KOL 4:</b> A minimum buffer of 250 meters must from any mining activities must be maintained.</p>	Construction through to Operational	During Construction and Operation	Applicant Environmental Control Officer (ECO) Heritage specialist	Monthly	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34, 35 and 38 of NHRA	ECO Monthly Checklist/Report
<b>Palaeontological finds</b>	However, if fossil remains are discovered during any phase of construction, either on the surface or exposed by fresh excavations the Chance Find Protocol must be implemented by the ECO in charge of these developments.	Construction	Construction	Applicant ECO Palaeontologist	Monthly	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 of NHRA	Final report to be used by the develop to apply for a destruction permit under s35 of the NHRA
<b>Stakeholder engagement with local communities</b>	Include regular interaction with local communities focussed on discussions around tangible and intangible heritage as part of the updating of the CHMP and the Social Management Plan	Construction through to Operational	During Construction and Operation	Applicant Environmental Control Officer (ECO)	Quarterly	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34, 35 and 38 of NHRA	Yearly Checklist/Report

## 10 CONCLUSIONS

PGS was appointed by EXM to undertake a HIA which will serve to inform the updating of the EMP for the proposed expansion project for the Kolomela Mine located south-west of Postmasburg, Northern Cape.

Heritage resources are unique and non-renewable and as such, any impact on such resources must be seen as significant. The HIA has shown that the study area and surrounding area has some heritage resources situated within the proposed development boundaries. Through data analysis and a site investigation, the following issues were identified from a heritage perspective.

The scope of work was to provide a HIA report for the proposed Kolomela Mine expansion project. The study commenced with a brief archival and historical desktop study which was used to compile a historical layering of the study area within its regional context. This component indicated that both the immediate study area and the surrounding farms have a rich historical and archaeological history. The archival and historical study was followed by a detailed investigation of all previous heritage and archaeological reports identified on SAHRIS.

The fieldwork that was conducted on the mine property consisted of a visit by two archaeologists from PGS Heritage to survey new proposed development footprint areas as well as to revisit some of the sites that had previously been identified within the present study area. The aim of revisiting the sites was to ascertain whether mitigation measures needed to be updated.

A detailed field survey was undertaken on the new proposed development footprint areas. However, limited fieldwork was undertaken in areas that were already disturbed. To some degree, the archaeological visibility of the area was not ideal for surveying due to the dense thorn scrub and grass cover in the region. Furthermore, movement and survey of some areas on the property were inhibited on the account of active blasting and access restricted areas.

In previous heritage and archaeological impact assessment reports, eight heritage sites were identified within footprint areas of the mine property (Morris, 2005; African Heritage Consultants, 2011; Miller, 2011; van der Ryst, 2011; PGS, 2015).

These eight previously identified heritage sites along with the four sites (and five findspots) recently identified within the proposed development area will be discussed in more detail below.

### 10.1 Heritage Sites Identified

The fieldwork completed in 2015 (PGS, 2015), confirmed the presence of 6 Stone Age sites (**KOL 1**, **KOL 2**, **KOL 5**, **KOL 6**, **KOL 7** and **KOL 8**), 1 historical mine (**KOL 3**) and 1 historical farmstead complex (**KOL 4**). Two burial grounds were identified as part of the farmstead (**KOL4.2** and **KOL4.4**)



The fieldwork completed for the current HIA has confirmed the presence of 1 burial ground site (**KME-01**), 1 archaeological site (**KME-04**) and 2 modern/recent structures (**KME-02, KME-03**) that may be affected by the proposed development.

#### *10.1.1 Burial Grounds and Graves*

**KOL4.2, KOL4.4** and **KME-01** are identified as heritage resources of **high local heritage significance** (heritage grading: IIIA).

#### *10.1.2 Historical Sites*

The historical mine (**KOL 3**) and historical farmstead complex (**KOL 4**) are identified as heritage resources of **high local heritage significance** (heritage grading: IIIA).

#### *10.1.3 Archaeology*

Mostly MSA and LSA artefacts were observed within the study area and raw materials utilised included jasper, ccs and quartz. Single isolated artefacts were also observed across portions of the study area. Five findspots (**KME-05 – KME-09**) were documented during the survey. These sparse surface scatters were however not classified as sites and have been determined to have no research potential or other cultural significance (heritage grading: not conservation worthy (NCW)).

One Stone Age sites (**KME-04**) were identified within a proposed a waste rock dump area. After appropriate investigation, the site has been determined to have no research potential or other cultural significance (heritage grading: IIIC).

The previously identified low-density scatter of stone tools (KOL 2) was identified as a heritage resource of **low local heritage significance** (heritage grading: IIIC) and the previously identified archaeological pan sites (**KOL 1, KOL 5, KOL 6, KOL 7, KOL 8**) are of **low to medium local heritage significance** (heritage grading: IIIB/IIIC).

*An evaluation of the current status of the site KOL5, 6 and during the current fieldwork of this HIA it is evident that only one pan remains at each of the sites of **KOL 5, 6 and 7** with a total of 3 pans remaining of the original 69 identified for the 3 sites in the original HIAs. It is unclear if any permitting or mitigation was done for the destruction of these pans as recommended in the original HIAs. These pan sites are all allocated a significance of low-medium.*

#### 10.1.4 Modern/Recent Structures

After appropriate investigation, **KME-02** and **KME-03** have been determined to have no research potential or other cultural significance (heritage grading: not conservation worthy (NCW)).

**The significance grading of the identified archaeological and historical heritage resources ranged from NCW to IIIA.**

## 10.2 Impact Statement

An analysis of the various components of the HIA indicates a mitigated medium to low negative impact on heritage resources and are expanded on below.

#### 10.2.1 Burial Grounds and Graves

An assessment of the possible impacts of the proposed project on graves and burial grounds has shown that unmitigated impacts consist of a moderate negative impact. **By implementing the mitigation measures as listed in this report these impacts can be managed to low negative.**

#### 10.2.2 Historical Sites

An assessment of the possible impacts of the proposed project on historical heritage resources has shown that unmitigated impacts consist of a moderate negative impact. **By implementing the mitigation measures as listed in this report these impacts can be managed to low negative.**

#### 10.2.3 Archaeology

As KME-04, KOL 2 and the findspots (KME-05 – KME-09) were assessed to have low to no heritage significance, they are not included in the impact risk assessment calculations. The reason for this is that sites of low to no heritage significance will **not require mitigation**. Although in the case of KOL 2, it was recommended that “should future mining activities expose archaeological material at this site, an archaeologist must be contracted to comment on the significance of the finds” (African Heritage Consultants 2011:20).

An assessment of the possible impacts of the proposed project on the previously identified archaeological pan sites (**KOL 1, KOL 5, KOL 6, KOL 7, KOL 8**) has shown that unmitigated impacts consist of a moderate negative impact. **By implementing the mitigation measures as listed in this report these impacts can be managed to low negative.**

### Modern/Recent Structures

As these sites were assessed to have no heritage significance, they are not included in the impact risk assessment calculations. The reason for this is that sites of low to no heritage significance will **not require mitigation**.

### 10.3 Recommendations

The following mitigation measures are listed in the table below.

Area and site no.	Mitigation Measures
<b>General project area</b>	<ul style="list-style-type: none"><li>▪ Implement a chance find procedures in case where possible heritage finds are uncovered.</li></ul>
Burial Grounds and Graves ( <b>KOL 4.2, KOL 4.4</b> and <b>KME-01</b> ) that were rated as high local heritage significance and had a heritage grading of IIIA.	<ul style="list-style-type: none"><li>▪ KOL 4.2 and KOL 4.4 (the graves that form part of the historic farmyard complex (KOL 4)): A minimum buffer of 250 meters from any mining activities (e.g. blasting) must be maintained.</li><li>▪ KME-01: The graves should be demarcated with a 100-meter buffer and should be avoided and left in situ.</li><li>▪ A Grave Management Plan should be developed for the graves which also need to be approved by SAHRA BGG.</li><li>▪ If the site is going to be impacted and the graves need to be removed a grave relocation process as per the Kolomela Heritage Management Plan for the site is recommended as a mitigation and management measure.</li></ul>
Historical sites ( <b>KOL 3</b> and <b>KOL 4</b> ) that were rated as high local heritage significance and had a heritage grading of IIIA.	<ul style="list-style-type: none"><li>▪ KOL 3 - A 400 meter buffer must be maintained between the site and any proposed development.</li><li>▪ KOL 4 - A minimum buffer of 250 meters from any mining activities must be maintained.</li></ul>

Area and site no.	Mitigation Measures
Archaeological sites ( <b>KME-04</b> and <b>KOL 2</b> ) that were rated as low local heritage significance and had a heritage grading of IIIC.	<ul style="list-style-type: none"> <li>▪ KME-04 - The documentation of the site in this HIA report is sufficient and the site can be destroyed without a permit but with the approval of this report.</li> <li>▪ KOL 2 - It had been recommended that “Should future mining activities expose archaeological material at this site, an archaeologist must be contracted to comment on the significance of the finds” (African Heritage Consultants 2011:20).</li> </ul>
Archaeological pan sites ( <b>KOL 1, KOL 5, KOL 6, KOL 7, KOL 8</b> ) were rated as low to medium local heritage significance and had a heritage grading of IIIB/IIIC.	<ul style="list-style-type: none"> <li>▪ A general buffer of 30 meters for the remaining pan sites are recommended.</li> <li>▪ Phase 2 mitigation (representative sampling) on certain pans will be required before they are destroyed by mining activities. This will require a permit issued by the South African Heritage Resources Agency (SAHRA).</li> </ul>
Modern/recent Structures ( <b>KME-02</b> and <b>KME-03</b> ) were rated to have no research potential or other cultural significance and had a heritage grading of not conservation worthy (NCW).	<ul style="list-style-type: none"> <li>▪ No mitigation is required.</li> </ul>
Findspots ( <b>KME-05 – KM—09</b> ) were rated to have no research potential or other cultural significance and had a heritage grading of not conservation worthy (NCW).	<ul style="list-style-type: none"> <li>▪ No mitigation is required.</li> </ul>

#### 10.4 General

In general terms, only the footprint areas of the proposed mining activities as depicted on the mine expansion footprint layout plan from within this report, were assessed during this HIA. Should the development footprints of the proposed development change in any way, these additional areas will have to be assessed in the field and included as part of a revised HIA study.

It is the author’s considered opinion that overall impact on heritage resources is Low. Provided that the recommended mitigation measures are implemented, the impact would be acceptably Low or could be totally mitigated to the degree that the project could be approved from a heritage

perspective. The management and mitigation measures as described in Section 6 and 8 of this report have been developed to minimise the project impact on heritage resources.

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### 11.2 Unpublished References

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- Pelser, A.J. & A.C. Van Vollenhoven. 2009. Heritage Impact Study for Proposed Mining Development on the Remaining Extent of the farm Lohatla 673, Kuruman Registration District, Siyanda District Municipality, Northern Cape Province. An unpublished report by Archaeos.
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- Pelser A.J. June 2012. A 2nd Report on a Heritage Impact Assessment for the Upgrade of Transnet's Glosam Siding for PMG's Bishop Mine (Loading Bay) On Portion 2 and the Remainder of Gloucester 674 near Postmasburg, Tsantsabane Local Municipality, Northern Cape. An unpublished report by Archaetnos for Kai Batla Holdings (Pty) Ltd.
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### **11.3 Archival References**

BAO, 2390, D188/1235/1 National Archives, Maps, 3/1784

### **11.4 Internet References**

[www.lrc.org.za/Docs/Judgments/khosis.doc](http://www.lrc.org.za/Docs/Judgments/khosis.doc) [www.wikipedia.org](http://www.wikipedia.org)

### **11.5 Historic Topographic Maps**

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



## 11.6 Contemporary Cartographic Data

MapSource and Google Earth were used to depict contemporary cartographic data.

### Appendix A - Project team CV's

#### PROFESSIONAL CURRICULUM FOR NIKKI MANN

**Name:** Nikki Mann  
**Profession:** Archaeologist  
**Date of birth:** 1992-10-13  
**Parent Firm:** PGS Heritage (Pty) Ltd  
**Position at Firm:** Archaeologist  
**Years with firm:** 2  
**Years of experience:** 7  
**Nationality:** South African  
**HDI Status:** White

#### EDUCATION:

**Name of University or Institution** : University of Cape Town  
**Degree obtained** : BSc  
**Major subjects** : Archaeology, Environmental and Geographical Sciences  
**Year** : 2013

**Name of University or Institution** : University of Cape Town  
**Degree obtained** : BSc [Hons]  
**Major subjects** : Archaeology  
**Year** : 2014

**Name of University or Institution** : University of Cape Town  
**Certificate obtained** : MSc – Archaeology (phytolith analysis)  
**Year** : 2017

#### Professional Qualifications:

Professional Archaeologist - Association of Southern African Professional Archaeologists - Professional Member – No 472

#### Languages:

English  
French

#### KEY QUALIFICATIONS

- 3 years of work in the heritage consulting field;
- 7 years working experience in archaeological excavations;
- Proven experience in report writing and report deliverables;

#### HERITAGE IMPACT ASSESSMENTS

##### *South African*

10MW Chelsea Solar PV. Gqeberha, Eastern Cape. SLR. **Position:** Heritage Specialist.  
Koup 1 and Koup 2 WEF. Beaufort West, Western Cape. SiVEST. **Position:** Heritage Specialist.  
Victoria West Pipelines. Victoria West, Northern Cape. iXEng. – **Position:** Heritage Specialist.  
East Orchards Poultry Farm Project. Delmas, Mpumalanga. EcoSphere. – **Position:** Heritage Specialist.

Gunstfontein WEF and OHL. Sutherland, Northern Cape. Savannah– **Position:** Heritage Specialist.  
Overhead power line for Oya PV Facility. Sutherland, Northern Cape. SiVEST– **Position:** Heritage Specialist.  
Infrastructure for Kudusberg WEF. Sutherland, Northern Cape. SiVEST– **Position:** Heritage Specialist.  
Proposed SKA fibre optic cable, between Beaufort West and Carnarvon, Northern and Western Cape. **Position:** Heritage Specialist.  
Proposed SANSA Space Operations. Matjiesfontein, Western Cape. **Position:** Heritage Specialist  
Pienaarspoort WEF 1 and 2. North-west of Matjiesfontein, Western Cape. Savannah- **Position:** Heritage Specialist.  
Swellendam WEF. Swellendam, Western Cape. – **Position:** Heritage Specialist.  
Matjiesfontein Road Extension Project. Matjiesfontein, Western Cape. **Position:** Heritage Specialist.

#### **MITIGATION WORK**

2020 – Coega Zone 10, Coega IDZ, Eastern Cape Province. Colonial Period Phase 2 Mitigation Archaeological Excavation. **Archaeologist.**

2019 – 2020 - **Lesotho Highland Development Authority – Polihali Dam Project - Heritage Management Plan development and Implementation.** Mokhotlong, Kingdom of Lesotho. **Archaeologist.**

2018- *Proposed development of boreholes and associated pipelines for the Langebaan Aquifer within the Hopefield Private Nature Reserve, Hopefield, Western Cape.* **Archaeologist.**

#### **POSITIONS HELD**

**2021 – current:** Archaeologist - PGS (Pty) Ltd

**2019 – 2020:** Archaeologist - PGS (Pty) Ltd Lesotho

**2018 – 2020:** Contract Archaeologist – CTS Heritage

#### **REFERENCES**

Wouter Fourie  
PGS Heritage  
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CTS Heritage  
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Email:  
nic.wiltshire@ctsheritage.com

## PROFESSIONAL CURRICULUM FOR WOUTER FOURIE

**Name:** Wouter Fourie  
**Profession:** Archaeologist  
**Date of birth:** 1974-04-30  
**Parent Firm:** PGS Heritage (Pty) Ltd  
**Position at Firm:** Director  
**Years with firm:** 17  
**Years of experience:** 24  
**Nationality:** South African  
**HDI Status:** White

### EDUCATION:

**Name of University or Institution** : University of Pretoria  
**Degree obtained** : BA  
**Major subjects** : Archaeology, Geography and Anthropology  
**Year** : 1996

**Name of University or Institution** : University of Pretoria  
**Degree obtained** : BA [Hons] (Cum laude)  
**Major subjects** : Archaeology and Geography  
**Year** : 1997

**Name of University or Institution** : National Nuclear Regulator  
**Certificate obtained** : Radiation Protection Officer Certificate  
**Year** : 1999

**Name of University or Institution** : University of Cape Town  
**Certificate obtained** : Project Management Foundations short  
course  
**Year** : 2015

**Name of University or Institution** : University of Cape Town  
**Certificate obtained** : MPhil – Conservation of Built Environment  
**Year** : 2016-Current

### Professional Qualifications:

Professional Heritage Practitioner – Association of Professional Heritage Practitioners (APHP)  
Professional Archaeologist - Association of Southern African Professional Archaeologists -  
Professional Member – No 041

### CRM Accreditation

Principal Investigator - Grave Relocations  
Field Director – Iron Age  
Field Supervisor – Colonial Period and Stone Age  
Accredited with Amafa KZN

### Languages:

Afrikaans  
English – Speaking (Good) Reading (Good), Writing (Good)

### KEY QUALIFICATIONS

- More than 21 consecutive years of work in the heritage consulting field;
- In depth knowledge of heritage management principles;
- 19 years working experience in the protection of cultural heritage sites and archaeological excavations;

- Proven experience in report writing and report deliverables;
- 19 years experience in management of the cultural heritage consultancy teams;
- 10 years of experience in institutional, multinational company interaction and project implementation;
- Proven experience in project scheduling and programming;
- Experience in development and implementation of quality, environmental and environmental health management systems for projects and companies;
- Experience in the development of policies and guidelines related to heritage management.
- Experience in planning and implementation of workshops and conferences.

## INTERNATIONAL PROJECTS

**2017 – current: Position: Heritage Specialist and Project Director – Lesotho Highland Development Authority – Polihali Dam Project - Heritage Management Plan development and Implementation. Mokhotlong, Kingdom of Lesotho – Project Value: €1,800,000.00**

2016 – current – **Position:** Heritage Specialist and Project Director - Total – Grave Relocation Action Plan and implementation for the Mozambique Liquid Natural Gas Project, **Palma, Northern Mozambique – Project Value: €2,800,000.00**

2018 – **Position:** Heritage Specialist and Project Manager – Sovereign Metals – Malingunde Graphite Project, **Malawi – Heritage Impact Assessment – Project Value: €25 000.00**

2017 - **Position:** Heritage Specialist and Project Manager – Aurcon Singapore for the Government for Mauritius – Heritage Assessment for the proposed Rapid Rail Link, **Port Louis, Mauritius – Project Value: €6,200.00**

2013 – 2016 - **Position:** Heritage Specialist and Project Manager - SLR Consulting - Heritage Impact Assessment, Manica Gold Project, **Manica Province, Mozambique - Project Value: €5,000.00**

2012 - **Position:** Heritage Specialist and Project Manager - SLR Consulting - Heritage Impact Assessment, Namoya SALR – Gold Mine, Maniema Province in the eastern **Democratic Republic of Congo (DRC) - Project Value: €5,500.00**

2012 - **Position:** Heritage Specialist and Project Manager - Consolidated Contractors Group S.A.L. -Mitigation and Grave Relocation at Site 37-A3-16 on the Mahalpye to Kudumatse Road Construction Project. **Central District, Botswana - Project Value: €7,500.00**

2010 - **Position:** Heritage Specialist and Project Manager - Digby Wells & Associates - Grave Relocation Procedures and Consultation – RAP Process, Kibali Gold Mine, Watsa, Oriental Province, **Democratic Republic of the Congo - Project Value: €5,500.00**

2010 - **Position:** Heritage Specialist and Project Manager - Digby Wells & Associates - Archaeological Study, Kibali Gold Mine, Watsa, Oriental Province, Democratic Republic of the Congo - **Project Value: €5,500.00**

2008 - **Position:** Heritage Specialist and Project Manager - Digby Wells & Associates - Mmamabula Mining Project CIC, **Botswana - Project Value: €5,000.00**

## HERITAGE IMPACT ASSESSMENTS

### **South African**

Below a selected list of over 400 heritage studies completed

**Clanwilliam Dam Heritage Project (2014-2017). Clanwilliam, Western Cape. Department of Water and Sanitation – Position: Heritage Specialist. Project Value: R 7,5 mil**

Leeuwberg Wind Energy Project. Loeriesfontein, Northern Cape. SiVEST. – **Position:** Heritage Specialist. **Project Value:** R 120 000.

Leeudoringstad Solar Energy Project. North West Province. SiVEST. – **Position:** Heritage Specialist. **Project Value:** R 50 000.

Lephalale Combined Power Project, Limpopo Province. Kongiwe Environmental. – **Position:** Heritage Specialist. **Project Value:** R 100 000.

Lebone Emergency College Upgrade, Pretoria. Department of Infrastructure Development. **Position:** Heritage Specialist. **Project Value:** R 100 000.

Gautrain Management Agency (SiVEST Environmental) – Gautrain Rapid Rail Link – Feasibility Study – **Position:** Heritage Specialist

Pilgrim’s Rest Housing Development – Heritage Impact Assessment, Mpumalanga. Aurecon. – **Position:** Heritage Specialist. **Project Value:** R 60 000.

Era Brickworks, Delmas, Mpumalanga. Heritage Impact Assessment. Jones and Wagerner. – **Position:** Heritage Specialist. **Project Value:** R 40 000.

Daggaskaal Road Upgrade, Mpumalanga. Heritage Impact Assessment. NCC Environmental. – **Position:** Heritage Specialist. **Project Value:** R40 000.

Eureka and Aletta Wind Energy Projects. Copperton, Northern Cape. – **Position:** Heritage Specialist. **Project Value:** R 95 000.

Sendawo Solar Project, Vryburg, Northern Cape. Heritage Impact Assessment. SiVEST – **Position:** Heritage Specialist. **Project Value:** R 90 000.

Tlitseng Solar Project, Lichtenburg, North West Province. Heritage Impact Assessment. – **Position:** Heritage Specialist. **Project Value:** R 80 000.

Kuruman 66kV Project. Kuruman, Northern Cape. Zitholele. – **Position:** Heritage Specialist. **Project Value:** R 85 000.

Goodwood Housing Scheme, WC – Heritage Scoping – **Position:** Heritage Specialist

Vereeniging Gymnasium, Heritage assessment and Guidelines, Meyerton, Gauteng. – **Position:** Heritage Specialist

Victoria West, Wind Energy Project. CSIR. – **Position:** Heritage Specialist. **Project Value:** R 120 000.

Kloof and Driefontein Sibanye Gold. Heritage Management Plan. Carletonville, Gauteng. – **Position:** Heritage Specialist and Project Manager. **Project Value:** R 430 000.

AEL Detonator Campus, Heritage Impact Assessment. Modderfontein, Gauteng. – **Position:** Heritage Specialist and Project Manager. **Project Value:** R 240 000.

Solar Reserve (Worley Parson RSA), Heritage Impact Assessment, Humansrus Solar Park, Daniëlskuil, Northern Cape – **Position:** Heritage Specialist

Kappa-Sterrekus 765kV Project. ACER Africa. Heritage Walkdown. Western Cape. – **Position:** Heritage Specialist. **Project Value:** R 140 000.

Solar Reserve (Worley Parson RSA), Heritage Impact Assessment, Rooipunt Solar Park, Upington, Northern Cape – **Position:** Heritage Specialist

Solar Reserve (Worley Parson RSA), Heritage Impact Assessment, Arriesfontein Solar Park, Daniëlskuil, Northern Cape – **Position:** Heritage Specialist

Solar Reserve (Worley Parson RSA), Heritage Impact Assessment, Slypklip Solar Park, Kimberley, Northern Cape – **Position:** Heritage Specialist

Mainstream Renewable Power South Africa (SiVest), Heritage Impact Assessment, Loeriesfontein Solar Park, Northern Cape – **Position:** Heritage Specialist

Mainstream Renewable Power South Africa (SiVest), Heritage Impact Assessment, De Aar Solar Park, Northern Cape – **Position:** Heritage Specialist

Mainstream Renewable Power South Africa (SiVest), Heritage Impact Assessment, Droogfontein GRAP103 – Heritage Register for the Ekurhuleni Metropolitan Municipality, Aurecon – **Position:** Heritage Specialist

## **MITIGATION WORK**

2021 – Coega Zone 10, Coega IDZ, Eastern Cape Province. Colonial Period Phase 2 Mitigation Archaeological Excavation. **Principle Investigator**

2020 – Mokala Road Diversion, Hotazel, Northern Cape Province. Stone Age Phase 2 Mitigation Archaeological Excavation. **Principle Investigator**

2020 – Transnet Tank Farm, Coega IDZ, Eastern Cape Province. Stone Age Phase 2 Mitigation Archaeological Excavation. **Principle Investigator with Prof John Parkinson**

**2017 – Current - Lesotho Highland Development Authority – Polihali Dam Project - Heritage Management Plan development and Implementation. Mokhotlong, Kingdom of Lesotho**  
**Project Manager**

2014-2017 - Raising of the Clanwilliam Dam – Heritage Mitigation, Clanwilliam, Western Cape.  
**Project Manager**

2013 - Kappa Gamma, MSA Mitigation, Touws Rivier, Western Cape. **Field Director, Dr M.M. van der Ryst, PI**

2012 - Misgund N1 Interchange upgrade, Iron Age Phase 2 excavation, Johannesburg, Gauteng Province. **Field Director, under Prof. JCA Boeyens, PI**

2011 – Eskom 400kV – Dinaledi Spitskop – Phase 2 Historical Site, Mitigation - **Field Director, J.P Behrens, PI**

2011 – Eskom 400 kV – Dinaledi Marang – Phase 2 Middel Stone Age Site, Mitigation **Field Director, Dr M.M. van der Ryst, PI**

2011 – Eskom 400 kV – Dinaledi Marang – Phase 2 Late Iron Age, Mitigation - **Field Director, under Prof. JCA Boeyens, PI**

2011 – Eskom 400 kV – Dinaledi Marang – Phase 2 Early Stone Age Site, Mitigation - **Field Director, under Dr K. Kumann, PI**

2011 - Eskom 400kV – Dinaledi-Spitskop – Phase 2 Middel Stone Age Site, Mitigation - **Field Director, under Dr M.M van der Ryst, PI**

2009 - Nkomati Mine, Onverwacht Phase 2 excavations, Badplaas, Mpumalanga. **Field Director, under Prof. TN Huffman, PI**

2008 - TWP, Wesizwe Platinum Phase 2 excavations, Pilanesberg, North West Province. **Field Director, under Prof. TN Huffman, PI**

2008 - The Heads Trust, Heritage Assessment and phase 2 documentation, and monitoring for Lydenburg Ext 38 housing development, Lydenburg, Mpumalanga. **Field Director, under Prof. JCA Boeyens, PI**

## POSITIONS HELD

**2018 – current:** Director - PGS Heritage Mozambique Lda

**2017 – current:** Director - PGS Heritage (Pty) Ltd Lesotho

**2003 – current:** Director - PGS Heritage (Pty) Ltd

**2006 – 2008:** Project Manager – Matakoma-ARM, Heritage Contracts Unit, University of the Witwatersrand

**2005-2007:** Director – Matakoma Heritage Consultants (Pty) Ltd

**2000-2004:** CEO– Matakoma Consultants

**1998-2000:** Environmental Coordinator – Randfontein Estates Limited. Randfontein, Gauteng

**1997-1998:** Environmental Officer – Department of Minerals and Energy. Johannesburg, Gauteng

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