



PGS
HERITAGE

THE PROPOSED DEVELOPMENT OF AN AIRPORT FOR KOLOMELA MINE IN POSTMASBURG, NORTHERN CAPE

Heritage Impact Assessment

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+ 27 (0) 12 332 5305



+27 (0) 86 675 8077



contact@pgsheritage.co.za



PO Box 32542, Totiusdal, 0134

Offices in South Africa, Kingdom of Lesotho and Mozambique

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

Directors: HS Steyn, PD Birkholtz, W Fourie

Declaration of Independence

I, Cherene de Bruyn, declare that –

General declaration:

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

Disclosure of Vested Interest

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

HERITAGE CONSULTANT:

PGS Heritage (Pty) Ltd

CONTACT PERSON:

Cherene de Bruyn – Archaeologist

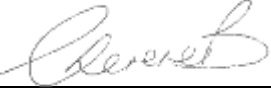

Tel: +27 (0) 12 332 5305

Email: cherene@pgsheritage.co.za

SIGNATURE:



ACKNOWLEDGEMENT OF RECEIPT

Report Title	THE PROPOSED DEVELOPMENT OF AN AIRPORT FOR KOLOMELA MINE IN POSTMASBURG, NORTHERN CAPE.		
Control	Name	Signature	Designation
Author	Cherene de Bruyn		Archaeologist/ PGS Heritage
Internal review	Wouter Fourie		Principal Heritage Specialist
Reviewed			

CLIENT: EXM Advisory Services (Pty) Ltd

CONTACT PERSON: Kerry Fairly
Tel: +27 (0)10 007 3617
E-mail: kerry@exm.co.za

SIGNATURE: _____

EXECUTIVE SUMMARY

PGS Heritage (Pty) Ltd (PGS) was appointed by EXM Advisory Services (Pty) Ltd (EXM) to undertake a Heritage Impact Assessment (HIA) and Palaeontological Impact Assessment (PIA) which will serve to inform the Environmental Impact Report (EIR) and Environmental Management Programme (EMPr) for the proposed development of an airport for Kolomela mine in 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.

During the survey, 11 heritage sites were identified. Of these 11 sites, 10 sites (PMB-01 to PMB-10) consist of archaeological resources around pan areas characterised by high density surface stone tool scatter, while one site (PMB-11) contains features that could be possible graves. Ten pan sites contain stone tools (PMB-01 to PMB-10) and have a medium heritage significance and heritage rating of IIIB. One possible gravesite (PMB-11) has a high heritage significance and heritage rating of IIIA. This site has a high heritage sensitivity.

Burial Grounds and graves

PMB-11 has a high heritage rating and a heritage grading of IIIA. It is recommended that if any construction activity is done within 50 meters from the grave it is demarcated with a 30meter buffer during such activities.

The impact significance before mitigation on the graves will be LOW negative before mitigation. *Only the study site will be affected by the proposed development.* The possibility of the impact occurring **is unlikely**. 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.

Archaeological sites

The identified archaeological site has a medium heritage significance and with the current proposed layout the impact significance before mitigation on the identified archaeological sites will be MODERATE negative before mitigation. The possibility of the impact occurring **is unlikely** except for site **PMB-06** that is close to the footprint area of the airport. 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.

In the event that any of the identified archaeological site are to be disturbed a Phase 2 archaeological mitigation process must be implemented. This will include, surface collections, test excavations and analysis of recovered material. A permit issued under s35 of the NHRA will be required to conduct such work.

Palaeontological Impacts

The PIA indicated that the site is underlain by the Quaternary aged sediments of the Kalahari Group as well underlying Griqualand West Basin rocks, Transvaal Supergroup. According to the PalaeoMap of South African Heritage Resources Information System the Palaeontological Sensitivity of the Kalahari Group is high and the Griqualand West rocks of the Transvaal Supergroup is moderate

Very High palaeontological sensitivity has been allocated to the Ghaap Group while the Kalahari Group has a high Palaeontological Sensitivity. The expected duration of the impact is assessed as potentially permanent to long term to permanent. In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be **permanent**. Impacts on palaeontological heritage during the construction phase could potentially occur but are regarded as having a moderate possibility.

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. These discoveries ought to be protected (if possible, in situ) and the ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that suitable mitigation (e.g. recording and collection) can be carry out by a palaeontologist.

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

General

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 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 period which commenced 10 000 years ago.

Late Stone Age

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

Late Iron Age (Early Farming Communities)

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

Middle 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

Abbreviations	Description
AIA	Archaeological Impact Assessment
APHP	Association of Professional Heritage Practitioners
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EIAs practitioner	Environmental Impact Assessment Practitioner
ESA	Earlier Stone Age
EXM	EXM Advisory Services (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
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
SIOC	Sishen Iron Ore Company (Pty) Ltd

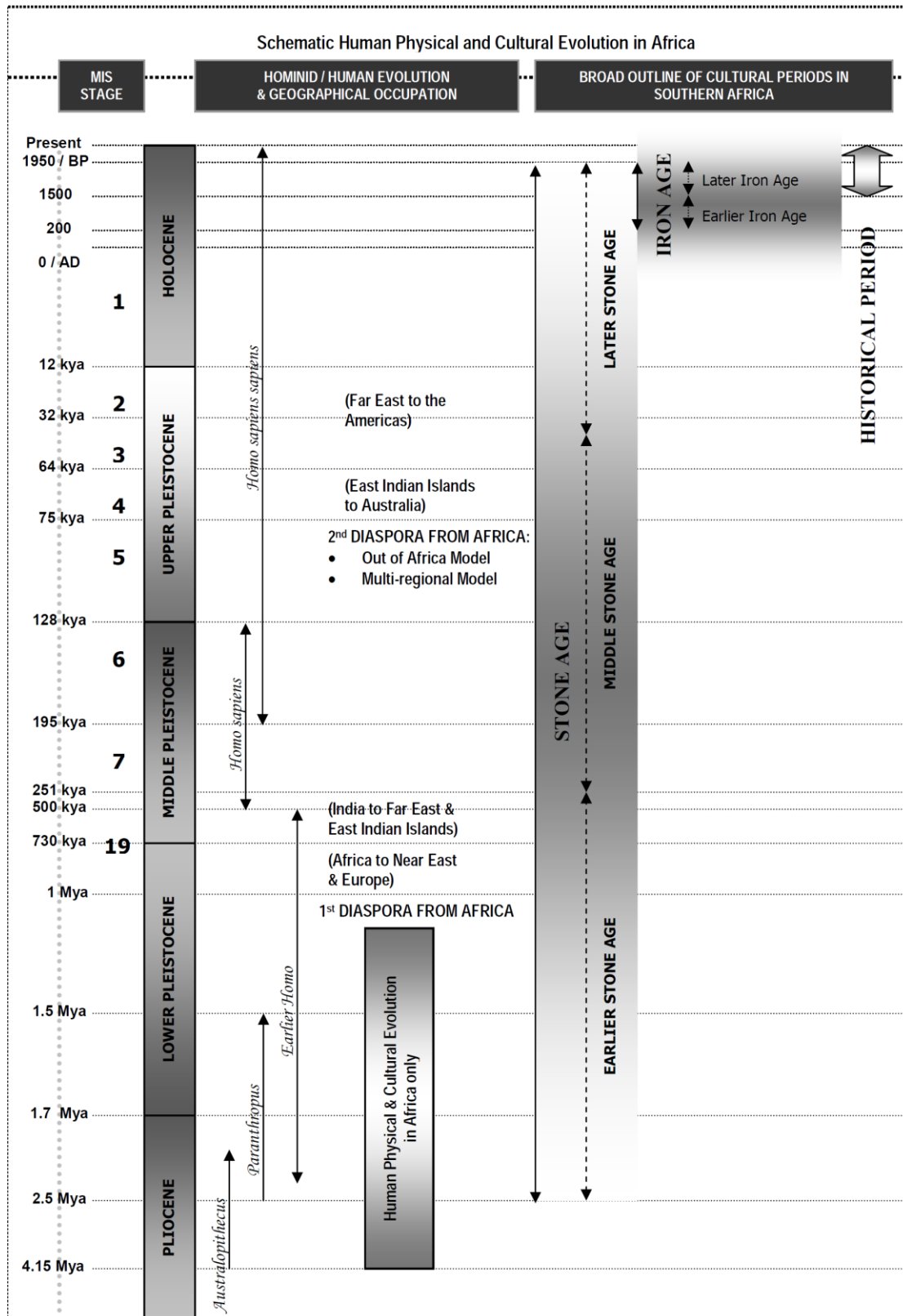


Figure 1 – Human and Cultural Timeline in Africa (Morris, 2008)

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 Environmental Impact Assessment (EIA) and Environmental Management Programme (EMPr) for the proposed development of an airport for Kolomela mine in 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 development area. The HIA aims to inform the EIA in the development of a comprehensive EMPr to assist the project applicant in responsibly managing the identified heritage resources in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act (Act 25 of 1999) (NHRA).

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.

Cherene de Bruyn author of this report is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist and is accredited as a Principal Investigator and Field Director, she is further also a member of the International Association for Impact Assessment South Africa (IAIASA). She holds a MA in Archaeology, BSc (Hons) in Physical Anthropology and a BA (Hons) in Archaeology.

Wouter Fourie, the Project Coordinator, 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

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 Context

The identification, evaluation and assessment of any cultural heritage site, artefact or find in the South African context is required and governed by the following legislation:

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

1.4.1 Notice 648 of the Government Gazette 45421

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

Table 2 - Reporting requirements for GN648

GN 648	Relevant section in report	Where not applicable in this report
2.2 (a) a desktop analysis, using satellite imagery;	section 4.5	
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.	4.1	-
2.3(a) confirms or disputes the current use of the land and environmental sensitivity as identified by the national web-based environmental screening tool;	section 4.1	-
2.3(b) contains motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity;	section 4.1	-

1.4.2 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 3 - 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 Appendix 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 2.1	-
(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 6	-
(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 and Appendix A	-
(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 5	
(g) An identification of any areas to be avoided, including buffers	Section 4.6	
(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 8	
(k) Any mitigation measures for inclusion in the EMPr	Section 7.11	
(l) Any conditions for inclusion in the environmental authorisation		None required
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 7.11	
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and	Section 8	
(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 8	-
(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

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

1.4.3 The National Heritage Resources Act

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

The NHRA is utilized as the basis for the identification, evaluation and management of heritage resources and in the case of Cultural Resource Management (CRM) those resources specifically impacted on by development as stipulated in Section 38 of NHRA. This study falls under s38(8) and requires comment from the relevant heritage resources authority.

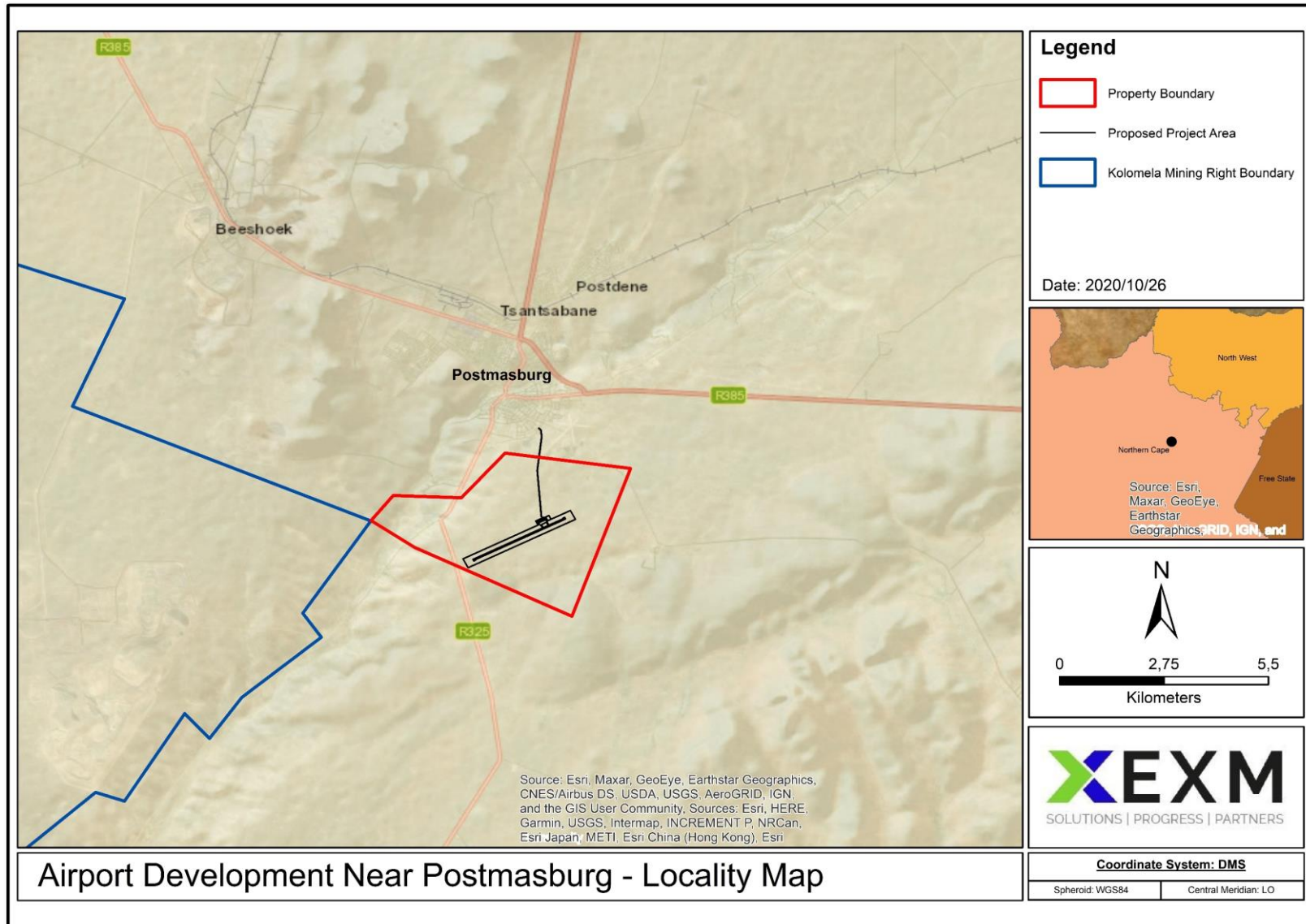
2 SITE LOCATION AND DESCRIPTION

2.1 Locality and Site Description (provided by EXM)

The proposed development of an airport for Kolomela mine in Postmasburg, Northern Cape Province. The project area is located on the Remaining Extent of Farm Kalkfontein 474 within the Tsantsabane Local Municipality of the Hay Magisterial District, Northern Cape Province. The Property size is 1 371 hectares, while the development footprint size is approximately 80 hectares. The site is located 3 km south-west of the Postmasburg CBD, 80 km south of Kathu and 60 km north-west of Griekwastad (**Figure 2**).

The following infrastructure is encountered in the area:

- Provincial roads (R253 and R309);
- Agricultural properties;
- Power lines



Airport Development Near Postmasburg - Locality Map

Figure 2 – Locality map of the proposed development of an airport for Kolomela mine in Postmasburg (Provided by EXM)

2.2 Project description (provided by EXM)

Sishen Iron Ore Company (Pty) Ltd (SIOC) – Kolomela mine, part of Kumba Iron Ore (Kumba) is proposing the development of a new airport on the Farm Kalkfontein 474 R/E, south of Postmasburg in the Tsantsabane Local Municipal area. The purpose of the airport will be to accommodate air traffic related to passengers travelling to and from Kolomela mine.

Currently, flights carrying passengers for Kolomela are serviced by Assmang's Tommy's Airfield. SIOC makes use of SA Airlink for air travel to Postmasburg. This involves 7 flights in 29-seater J41 turbo-prop aeroplanes per week. However, there is a shortage of capacity on the Kolomela flights and many passengers are forced to fly to Sishen and are subjected to a long (over 100 km) and potentially dangerous road transfer from Kathu to Postmasburg. The existing runway at Tommy's Field is too short to accommodate larger planes. The short runway also does not allow for safe departures of fully-loaded aircraft under 'hot and high' conditions and various safety incidents have been reported. Furthermore, it is probable that SA Airlink will retire the fleet of J41 aircraft currently servicing Kolomela in the future. There is thus a need for a longer, safer runway to accommodate air traffic to Kolomela mine.

2.2.1 Infrastructure

The proposed new airport and associated infrastructure will cover approximately 80 hectares. A conceptual layout of the airport is given in **Figure 4**.



Figure 3 - Airport Conceptual Layout

2.2.2 Runway and helipad(s)

The runway will be approximately 2.2 km in length and 30 meters wide, assuming a level runway. The dimensions of the runway have been calculated in terms of the type of aircraft that will be accommodated by the airport. Factors such as take-off and landing velocity of the aircrafts were considered. A helipad(s) will also be developed to accommodate helicopters at the facility.

2.2.3 Access road

A paved access road will be developed which will connect the proposed airport with the R325 regional road. The road will be approximately 900 m in length and 7 meters wide.

2.2.4 Fuel storage and supply

A fuel farm will be developed to accommodate fuel storage tanks that will be used for the refuelling of aircraft. The J41 turbo-prop aeroplanes that will be the dominant aircraft in the fleet has a fuel capacity of 6 000 liters and fuel will be delivered on 2-week intervals. The storage capacity of the fuel farm will be sized accordingly. Currently it is estimated that a total volume of +/- 40 000 liters will be stored on site. A re-fuelling depot with pumps and delivery systems will also be developed.

2.2.5 Parking area

A parking area will be developed for airport staff and travellers. The parking area will also accommodate car hire vehicles.

2.2.6 Fire station

A fire station building will be developed which will include an elevated fire lookout. Dedicated water tanks will be established for firefighting purposes.

2.2.7 Electricity supply lines

A new electricity supply line of 11kV will be developed to connect the proposed facility with a substation nearby the existing Postmasburg airport or alternative substation.

2.2.8 Terminal and supporting facilities.

The terminal will entail a departures lounge with 60 seat capacity plus standing room for 20 pax at 1,2 m². The terminal will also include a baggage reclamation area, offices, a kitchen and ablution facilities. For reliable security and passenger processing, 2x X ray machines will be installed to improve throughput, provide redundancy and reduce boarding times. An initial conceptual layout of the terminal is given in **Figure 4**.

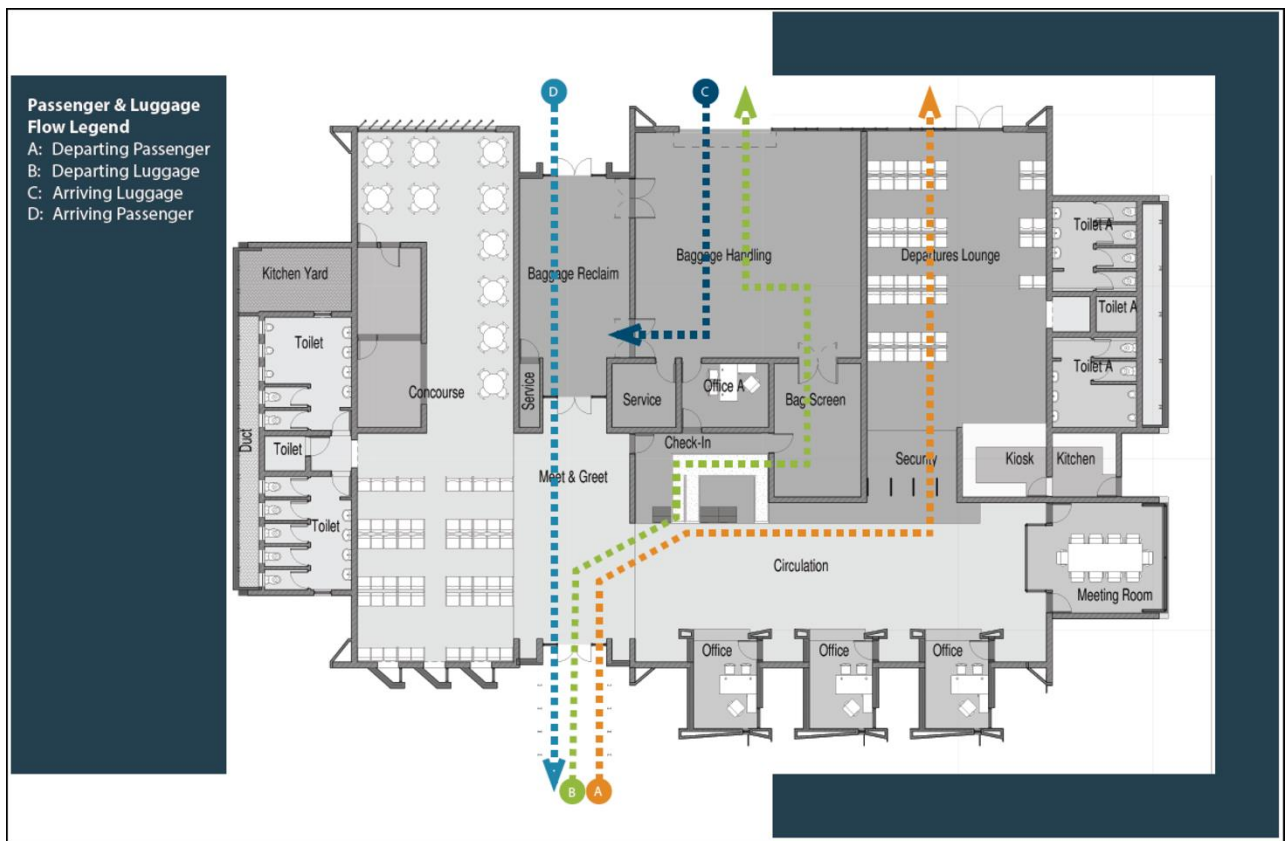


Figure 4 - Conceptual Terminal Layout

3 METHODOLOGY

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 analysis¹: 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: A physical survey was conducted by vehicle through the proposed project area by a qualified heritage specialist. The survey was conducted between 10-14 August 2020, aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.

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

¹ According to Notice 648 of the Government Gazette 45421

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**).

Table 4 - Rating system for archaeological resources

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Langebaanweg (West Coast Fossil Park), Cradle of Humankind	May be declared as a National Heritage Site managed by SAHRA. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Highest Significance
II	Heritage resources with special qualities which make them significant, but do not fulfil the criteria for Grade I status. Current examples: Blombos, Paternoster Midden.	May be declared as a Provincial Heritage Site managed by HWC. 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

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

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
	Current examples: Robben Island		
II	Heritage resources with special qualities which make them significant in the context of a province or region, but do not fulfil the criteria for Grade I status. Current examples: St George's Cathedral, Community House	May be declared as a Provincial Heritage Site managed by HWC.	Exceptionally High Significance
II	Such a resource contributes to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. These are heritage resources which are significant in the context of an area.	This grading is applied to buildings and sites that have sufficient intrinsic significance to be regarded as local heritage resources; and are significant enough to warrant that any alteration, both internal and external, is regulated. Such buildings and sites may be representative, being excellent examples of their kind, or may be rare. In either case, they should receive maximum protection at local level.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree. These are heritage resources which are significant in the context of a townscape, neighbourhood, settlement or community.	Like Grade IIIA buildings and sites, such buildings and sites may be representative, being excellent examples of their kind, or may be rare, but less so than Grade IIIA examples. They would receive less stringent protection than Grade IIIA buildings and sites at local level.	Medium Significance
IIIC	Such a resource is of contributing significance to the environs. These are heritage resources which are significant in the context of a streetscape or direct neighbourhood.	This grading is applied to buildings and/or sites whose significance is contextual, i.e. in large part due to its contribution to the character or significance of the environs. These buildings and sites should, as a consequence, only be regulated if the significance of the environs is sufficient to warrant protective measures, regardless of whether the site falls within a Conservation or Heritage Area. Internal alterations should not necessarily be regulated.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough 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

4.1 Site Description

The project area falls within the existing agricultural area just outside of Postmasburg.

Existing surrounding land uses associated with the project area include a combination of:

- agricultural areas,
- pans; and
- dirt roads.

As a result, the vast majority of the site footprint overlays fairly undisturbed terrain. Overall, the accessibility of the project footprint area was fairly good. Visibility was good.



Figure 5 - The site was accessed via the R325



Figure 6 - Several farm roads thought the property



Figure 7 – View of the south-eastern section of the project area



Figure 8 – View of the north-eastern section of the project area



Figure 9 – View of the north-western section of the project area



Figure 10 – View of the south-western section of the project area




Figure 11 - Several Pans were observed throughout the project area

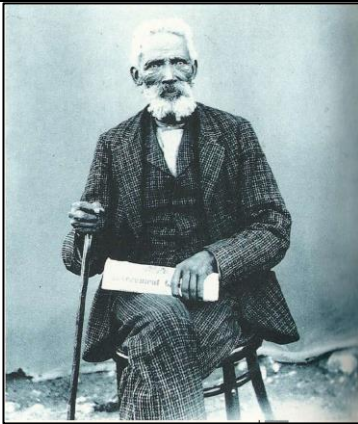
4.2 Overview of Study Area and Surrounding Landscape

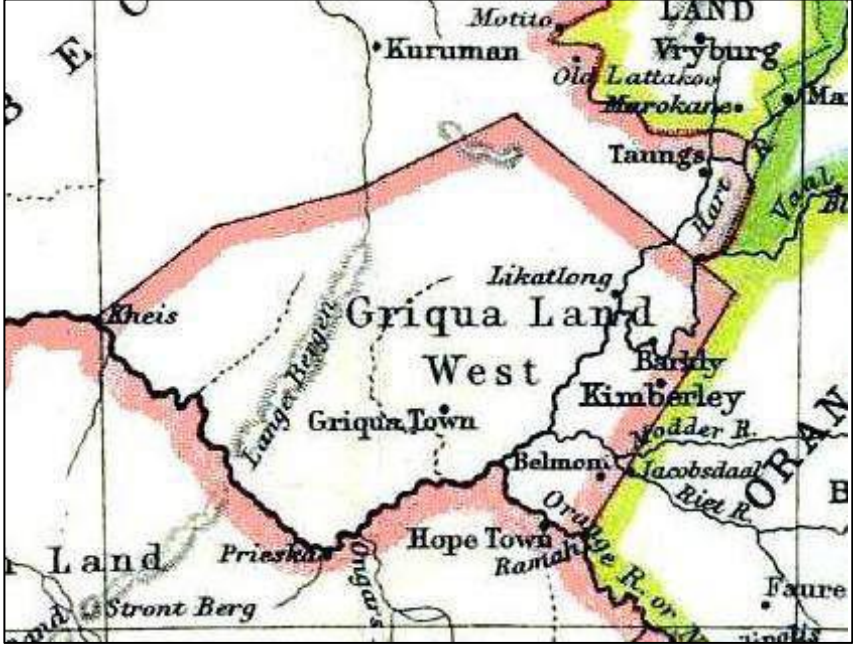
DATE	DESCRIPTION
2.5 million to 250 000 years ago	<p>The Earlier Stone Age (ESA) is the first and oldest phase identified in South Africa's archaeological history and comprises two technological phases. The earliest of these is known as Oldowan and is associated with more robust flaked tools. It dates to approximately <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 78.8 km to the north by 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</p>

DATE	DESCRIPTION
	2013). MSA sites and occurrences have been identified in the direct vicinity of the study area, with the very significant Kathu Pan localities (Wilkins & Chazan, 2012) located 78.8 km to the north by north-east. See also, for example, Beaumont (2009) and Kruger (2014).
40 000 years ago, to the historic past	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. A number of LSA sites are known from the direct vicinity of the study area. Significant examples include the specularite mines at Blinkklipkop (24.6 km to the north-east) and Doornfontein (17.2 km to the north-east), as well as the rock engraving sites at Beeshoek (12 km to the north-east) and Palingpan (23.1 km to the north-east).
800 AD – 820 AD	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. During this initial period the mining activities would have been undertaken by San hunter-gatherers and Kora pastoralists. Only after the seventeenth century were such activities likely also undertaken by Iron Age Tswana groups.
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 (65.8 km north-east of the study area), Majeng (Langberg), Khoiise (Khuis on the Molopo River) and Tlhaka-la-Tlou (present day Daniëlskuil situated roughly 68.7 km north-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




DATE	DESCRIPTION
	over the Orange River in the vicinity of Prieska and passed Blinkklip on their way to present-day Kuruman (Bergh, 1999).
1802 - 1813	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 and 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 “... <i>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’...</i> ” (Legassick, 2010).
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 of this particular rich source (Thackeray., et al, 1983). From here they travelled further north and reached the Kuruman River where they met Tswanaspeaking 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 “... <i>about thirty flat spherical huts.</i> ” Although the people who stayed here were herdsman 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). Although Lichtenstein was certainly not the first European explorer to travel through this area (the Truter & 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.
1811 – 1813	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).

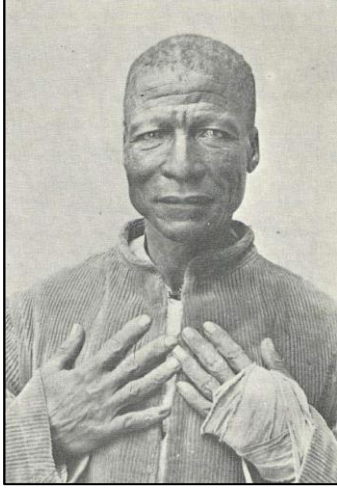
DATE	DESCRIPTION
	 <p data-bbox="571 958 1278 987"><i>Figure 12 - Reverend John Campbell (Campbell, 1815). He</i></p>
1813	<p data-bbox="459 1003 1390 1122">During 1813 John Campbell of the London Missionary Society also visited the general vicinity of the study area. He arrived at Klaarwater on 9 June 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>
1820s	<p data-bbox="459 1131 1390 1272">Barend Barends and his followers moved from their settlement at Daniëlskuil 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 data-bbox="459 1283 1390 1489">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 (68.7 km northeast of the study area), whereas Adam Kok II established himself in the vicinity of Campbell (94 km south-east of the study area) (Legassick, 2010).</p>
1821 – August 1828	<p data-bbox="459 1500 1390 1765">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 occasions (late 1824, July 1827 and December 1827) they attacked Griquatown itself (Cope, 1977).</p>
Early 1830s	<p data-bbox="459 1776 1390 1977">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).</p>


DATE	DESCRIPTION
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 29.5 km and 44.8 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 Gatlhose, roughly 65.8 km north-east of the study area (Breutz, 1963). Likely between 1850 and 1860 the area known as Maremane (located directly south of Gatlhose) was an outpost grazing area of the BaThlaro chief Makgolokwe and his son Toto. The first designated leader of this area was Isaak 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 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 35.8 km north-east of the study area.
13 December 1852	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 data-bbox="475 1686 1374 1765"><i>Figure 13 - Nicolaas Waterboer, who succeeded as leader of Griquatown in 1852 after the death of his</i></p>
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,


DATE	DESCRIPTION
	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	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 (www. wikipedia.org). The study area fell within Griqualand West at the time.
	 <p data-bbox="459 1218 1390 1341"><i>Figure 14 - Section of a map titled "Sketch Map of South Africa showing British Possessions". The map is dated to July 1885. (www.wikipedia.com).The boundaries and position of Griqualand West is depicted on this figure.</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, 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. 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. 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). 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. 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 in proximity to 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 (Snyman, 1983).</p> <p>On 30 November 1889 the congregation finally decided to establish the new town and church at Blinkklip. They submitted an application to the authorities, but it was turned down. 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. 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'"</i> (Snyman, 1983:10). The town's stands were eventually only sold on 12 August 1892 (Snyman, 1983).</p>


DATE	DESCRIPTION
	<div style="display: flex; justify-content: space-around;">   </div> <p><i>Figure 15 - Historic portraits of the two members of the Postma family associated with the 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	<p>Sir Charles Warren proclaims British Bechuanaland. This area comprised the land between Griqualand West and the Molopo River (Snyman, 1986). As mentioned elsewhere, the boundary between British Bechuanaland and Griqualand West was established a short distance north of the study area.</p>
1886	<p>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).</p>
c. 1890	<p>The Griqua mined iron at Gatkoppies near Postmasburg (Breutz, 1963).</p>
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 16 - An everyday scene in Griqualand West during the Rinderpest Epidemic: large numbers of destroyed cattle (Snyman, 1983:20).</i></p>

DATE	DESCRIPTION
	 <p data-bbox="459 712 1390 745"><i>Figure 17 - Toto, leader of the Thlaro along the Langberg (Snyman, 1983:17).</i></p>
1897	<p data-bbox="459 763 1390 1211">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 curb the spread of the disease. After killing an officer, Galishewe fled to the Thlaro leader Toto of the Langberg. A full-scale rebellion broke out that was eventually suppressed (Breutz, 1963). 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 Vlaktefontein (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 Vlaktefontein was reinforced (Snyman, 1983).</p>
1899 - 1902	<p data-bbox="459 1225 1390 1615">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. 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. They were under the direct command of Kommandant Jan Vorster and Veldkornet Piet Venter (Snyman, 1983).</p> <p data-bbox="459 1648 1390 1973">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). 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</p>

DATE	DESCRIPTION
	<p>forces under the command of Kommandant E. Conroy. 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. 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). 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). 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>
	 <p data-bbox="459 1279 1342 1308"><i>Figure 18 - A group of Boer rebels from Postmasburg (Snyman, 1983:16).</i></p>

DATE	DESCRIPTION
	 <p data-bbox="459 972 1390 1093"><i>Figure 19 - 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	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. 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). The West End Diamond Mine was located 13.9 km north-east of the present study area.
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	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

DATE	DESCRIPTION
	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). The farm Doornfontein 446 is located 13.3 km to the north of the present study area.
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). 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 28.1 km north-east of the study area), Thaakwanene (located 34.7 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 "... <i>thorough prospecting programme of S.A. Manganese's properties...</i> " (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 spate 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. Bernhardi, 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).

DATE	DESCRIPTION
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).
	 <p data-bbox="464 1377 1394 1458"><i>Figure 20 - 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 (17 km north-east of study area),

DATE	DESCRIPTION
	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 16.6 km northeast 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 20.3 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).
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 Bophutatswana. 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 (www.lrc.org.za/Docs/Judgments/khosis.doc).

4.3 Archaeological Background to the Study Area and Surroundings

4.3.1 A Review of the Archaeological Context of the Northern Cape

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

4.3.2 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 years. 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).

4.3.3 *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).

4.3.4 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 Holocene occupations a occur along the (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).

A recent 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.

4.3.5 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).

4.3.6 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.

4.3.7 *The Mining of Pigments from the Surroundings*

The geology of the Postmasburg area is entirely composed of rocks ascribed to the Transvaal System, which include large areas of "...dolomite and dolomite limestone, with banded ironstones, jasper and cherts, overlaid by shales, conglomerates, quartzites and 'blinkklip' breccias, belonging to the Timeball Hill Stage of the Pretoria series..." (Beaumont & Boshier 1974). These 'blinkklip' breccias are exceptionally rich in specularite in places, which was formed by the widespread slumping of the Timeball Hill/Gamagara beds into hollows, sinks and fissures, in the dolomite, which resulted in acute contortion and brecciation cavities and rubble subsequently filled and cemented to variable extents, with haematite and specularite, by the iron rich ground waters (Beaumont & Boshier 1974).

All these deposits were mined in pre-colonial times, with underground workings and pits located at Blinkklipkop and Paling and only pits at Gloucester and Mount Huxley (Beaumont & Boshier 1974). Extensive archaeological excavations were undertaken at two of these localities, namely Blinkklipkop and Doornfontein.

4.3.8 *Blinkklipkop*

This site is arguably the most significant archaeological and historical site in the vicinity of Postmasburg. It is a pre-colonial specularite mine located in a hill known as Blinkklipkop (or Gatkoppies) roughly 5km north-east of the town of Postmasburg. Specularite is a "...*crystalline form of hematite that is steel grey/iron-black in colour with a silvery sparkle...*" (Thackeray et.al., 1983:17) and which was much prized as a cosmetic by the different pre-colonial cultures of the area. The mine consisted of an open cutting into the hillside, which at the time of the archaeological excavations undertaken in 1980 was partially filled with rubble and covered with grass and trees. This cutting was an anthropogenic cave created by pre-colonial mining activity, and at the time of the excavations contained rubble and occupation debris as well as an underground tunnel. Although this tunnel was found to be less than 50 m long, historical accounts exist of larger underground workings extending to a depth of nearly 200 feet (Thackeray et.al., 1983).

The presence of the site had been known since the early historical times, and European explorers and travellers such as Lichtenstein and Burchell visited the site in 1805 and 1812 respectively. At the time the specularite mine was interpreted by these and other visitors as associated with Kora and Tswana groups. However, the archaeological research undertaken by A.I. Thackeray, J.F. Thackeray and P.B. Beaumont between 8 and 25 April 1980 provided much older origins for the site (Thackeray et.al., 1983).

The archaeological excavations revealed a total of 3,580 lithics, which included retouched scrapers and miscellaneous pieces (constituting 1% of the lithics from the site), flakes (accounting for 90% of the lithics from the site), blades (quite rare at the site) and only one bladelet core. The battered appearance of the lithics indicates that they were used for mining. While no metal mining tools were found, there is evidence that these were used in more recent times as shown by the neat cut marks visible on some areas of the site's walls. Other stone artefacts from the site include lower and upper grindstones containing haematite stains, suggesting that at times the ore was ground on site (Thackeray et.al., 1983).

The non-lithic artefacts recovered from Blinkklipkop include ostrich eggshell fragments and beads; pottery; glass beads as well as faunal remains (Thackeray et.al., 1983). The archaeological research at Blinkklipkop has revealed that mining activities at the site likely commenced before roughly 800 AD, and that before the seventeenth century these mining activities were undertaken by Khoi herders and possibly San hunter gathers with Late Iron Age Tswana pastoralists also in all likelihood involved thereafter (Thackeray et.al., 1983).

4.3.9 Doornfontein

During 1973 archaeological research was undertaken by P.B. Beaumont and A.K. Boshier on a pre-colonial specularite mine located in a slight rise in an area known as Jonas Vlakte on the farm Doornfontein 446. The farm is located 6.8km north-west of Postmasburg (Beaumont & Boshier, 1974).

The Doornfontein site comprised four chambers. Chambers 1 and 2 had caved in, whereas Chamber 3 was found to be 50m long and up to 10m wide and 5,5m high. A narrow opening on the northern end of Chamber 3 led to Chamber 4, which was partially flooded at the time of the archaeological excavations in 1973. Assuming the mineral had originally filled the site, it is estimated that approximately 45 000 metric tons of specularite would have been removed from the site.

Two trenches were laid out in Chamber 3 and excavated. The archaeological collection excavated from the site included a large number of lithics of which typical mining tools such as hammer stones were particularly evident; ostrich eggshell fragments and beads; decorated and undecorated pottery, metal artefacts which included an iron spear head and a copper strip bead; bone artefacts such as a possible pendant as well faunal remains. Other interesting artefacts recovered during the excavations include a high number of bone arrow parts of which four are pointed, two are linkshafts, one is incomplete and 11 are badly broken. Interestingly, human remains were also excavated from the site. A number of historic and modern artefacts were also recovered, including one green and two colourless glass bottle fragments, a plastic button and a .22 cartridge case (Beaumont & Boshier, 1974).

Radiocarbon dates obtained from the excavations indicated that mining activities at this site commenced in approximately 830 AD (Beaumont & Boshier, 1974) which is roughly contemporary with the dates obtained from Blinkklipkop.

4.3.10 Conclusions

Archival and historical research has revealed that Postmasburg and surrounds has a deep history of occupation. The possibility of archaeological finds during the field work is rated as very high.

4.4 Archival/historical maps

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

The SG Diagram Farm Kalkfontein 474 from the Chief Surveyor-General database (<http://csg.dla.gov.za/>) indicates that the farm was surveyed in 1881 and proclaimed 1883. The diagram shows that a farmstead with structures already existed in the western corner of the original farm but outside the study area (**Figure 21**).

Topographic maps (1:50 000) for various years (1946,1976 and 1989) 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, as can be seen below (**Figure 22-Figure 23**).

The relevant topographical maps include:

- First Edition of 2823AC Postmasburg Topographic Map 1:50000, surveyed in 1970 and drawn in 1971 by the Trigonometrical Survey Office and published by the Government Printer in 1971.
- Second Edition of 2823AC Postmasburg Topographic Map 1:50000, published by the Chief Directorate, Surveys and Mapping in 1990.

It can be seen that all the map sheets consulted depict the entire project area surrounded by several huts, as well as old agricultural fields. Historical roads are also depicted.

Furthermore, no SG Diagrams are available for the of Farm Kalkfontein 474 from the Chief Surveyor-General database (<http://csg.dla.gov.za/>).

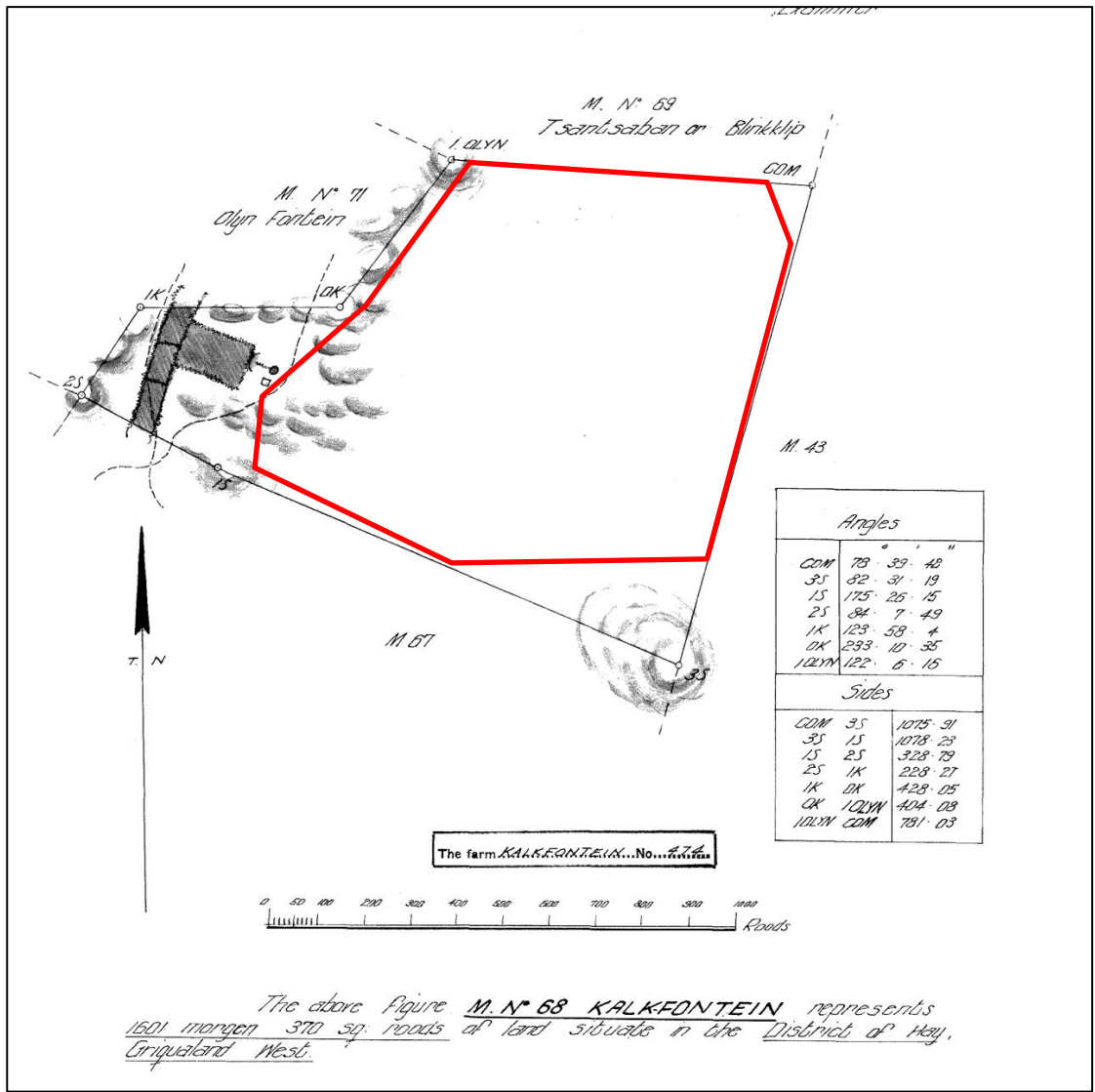


Figure 21 - SG Survey diagram as produced in 1883 (surveyed 1881) (study area in the red polygon)

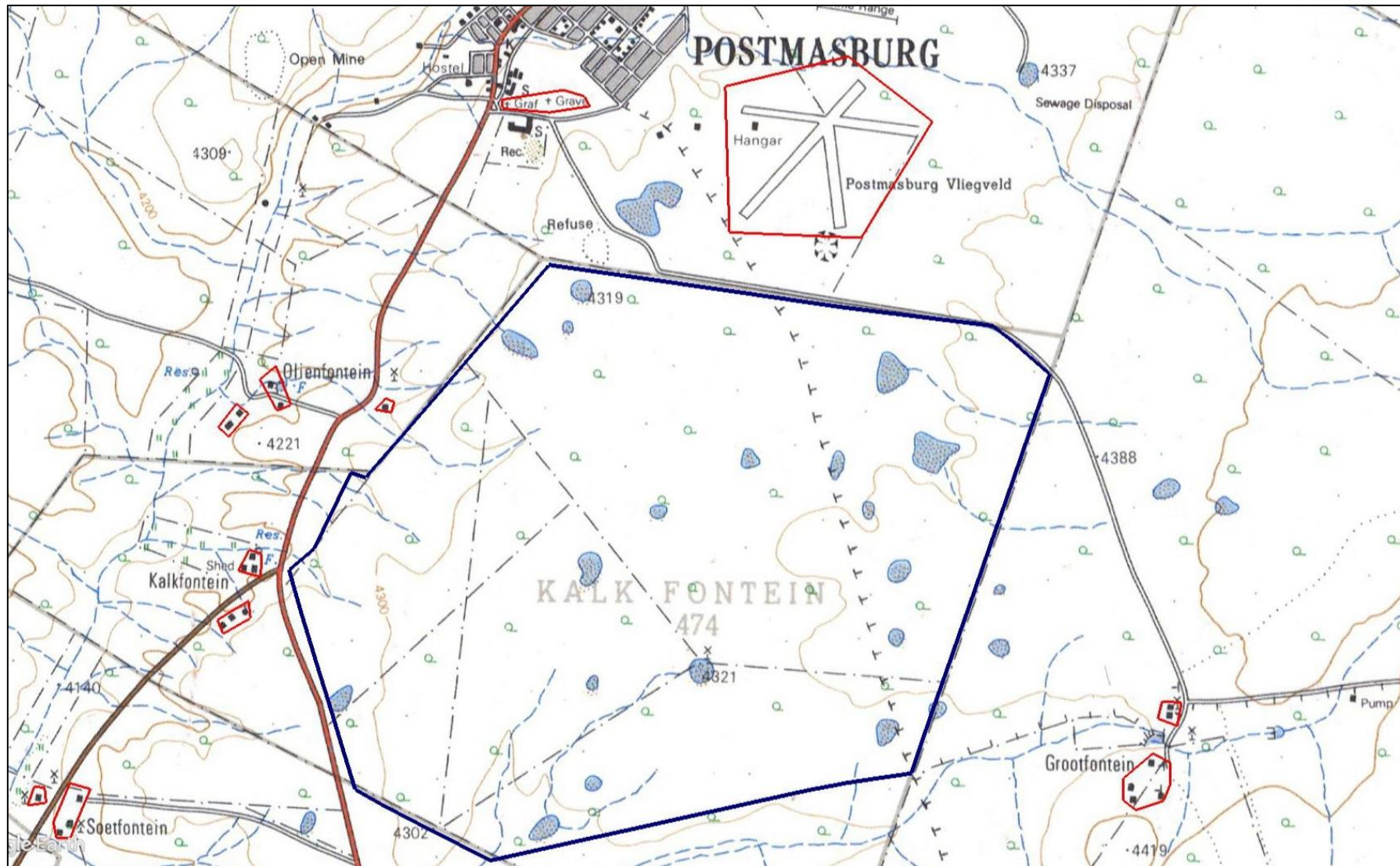


Figure 22 – First Edition of 2823AC Postmasburg Topographic Map 1:50000 dating to 1970, showing the proposed airport for the Kolomela mine, with several possible heritage features (red polygons) located in close proximity to the project area.

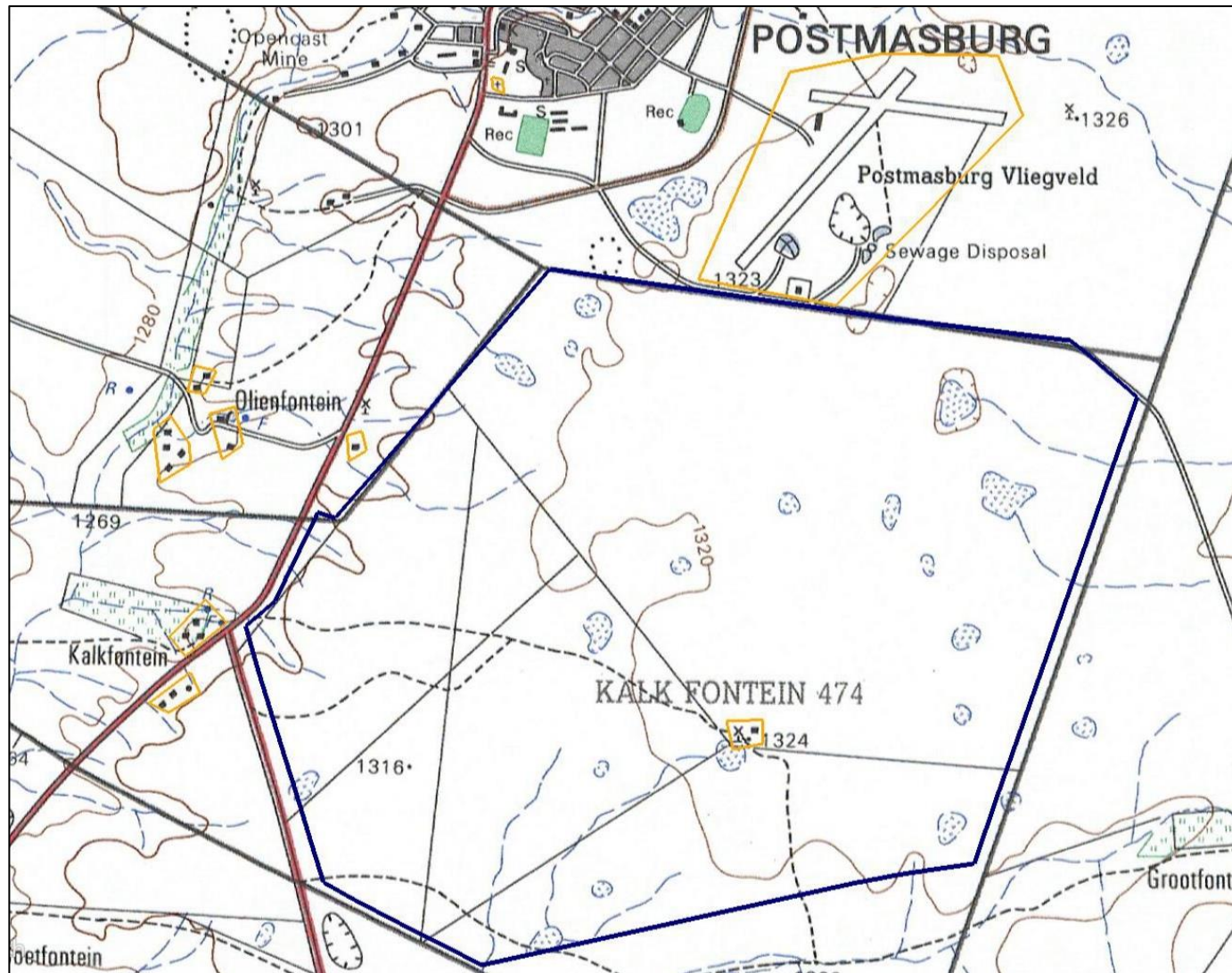


Figure 23 – Second Edition of 2823AC Postmasburg Topographic Map 1:50000, showing the proposed airport for the Kolomela mine, with several possible heritage features (orange polygons) located in close proximity to the project area

4.5 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 25**).

4.5.1 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 (**Figure 24**). According to the Heritage screening report, the project area has a Medium heritage sensitivity.

4.5.2 Heritage Sensitivity

The sensitivity maps were produced by overlying:

- Satellite Imagery;
- Current Topographical Maps; and
- First to third edition Topographical Maps dating from the 1940's to 1970s.

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

- Dwellings;
- Clusters of dwellings (homesteads, huts and farmsteads);
- Archaeological Sensitive areas; and
- Structures/Buildings.

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

Name	Description	Legislative protection
Archaeology - Iron Age Sites	Older than 100 years	NHRA Sect 3 and 35
Architectural Structures	Possibly older than 60 years	NHRA Sect 3 and 34
Graves and Burial Grounds	60 years or older	NHRA Sect 3 and 36

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

Table 7 - Landform type to heritage find matrix

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

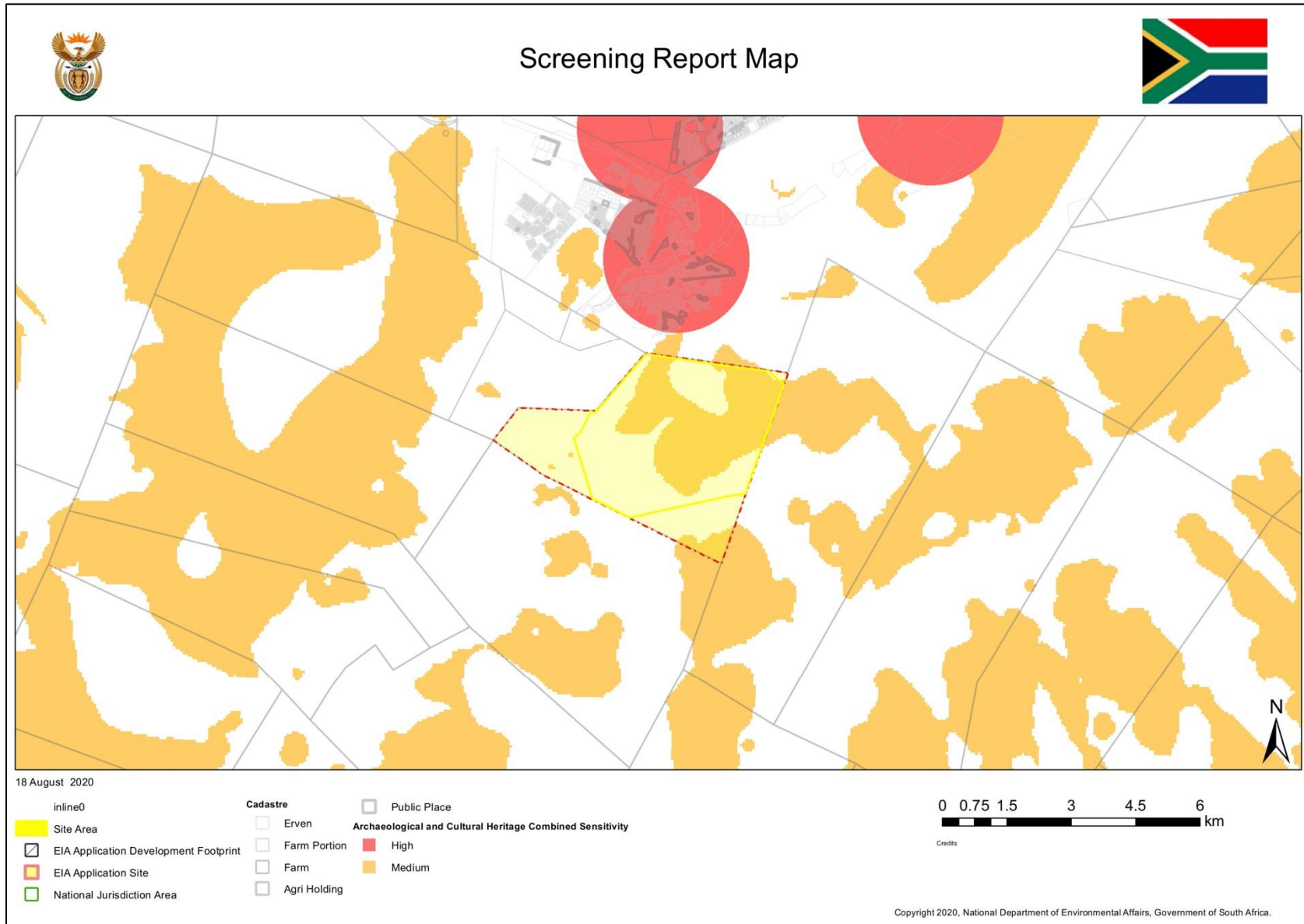


Figure 24 - Heritage Screening map. Source: Department of Environmental Affairs



Heritage Sensitivity

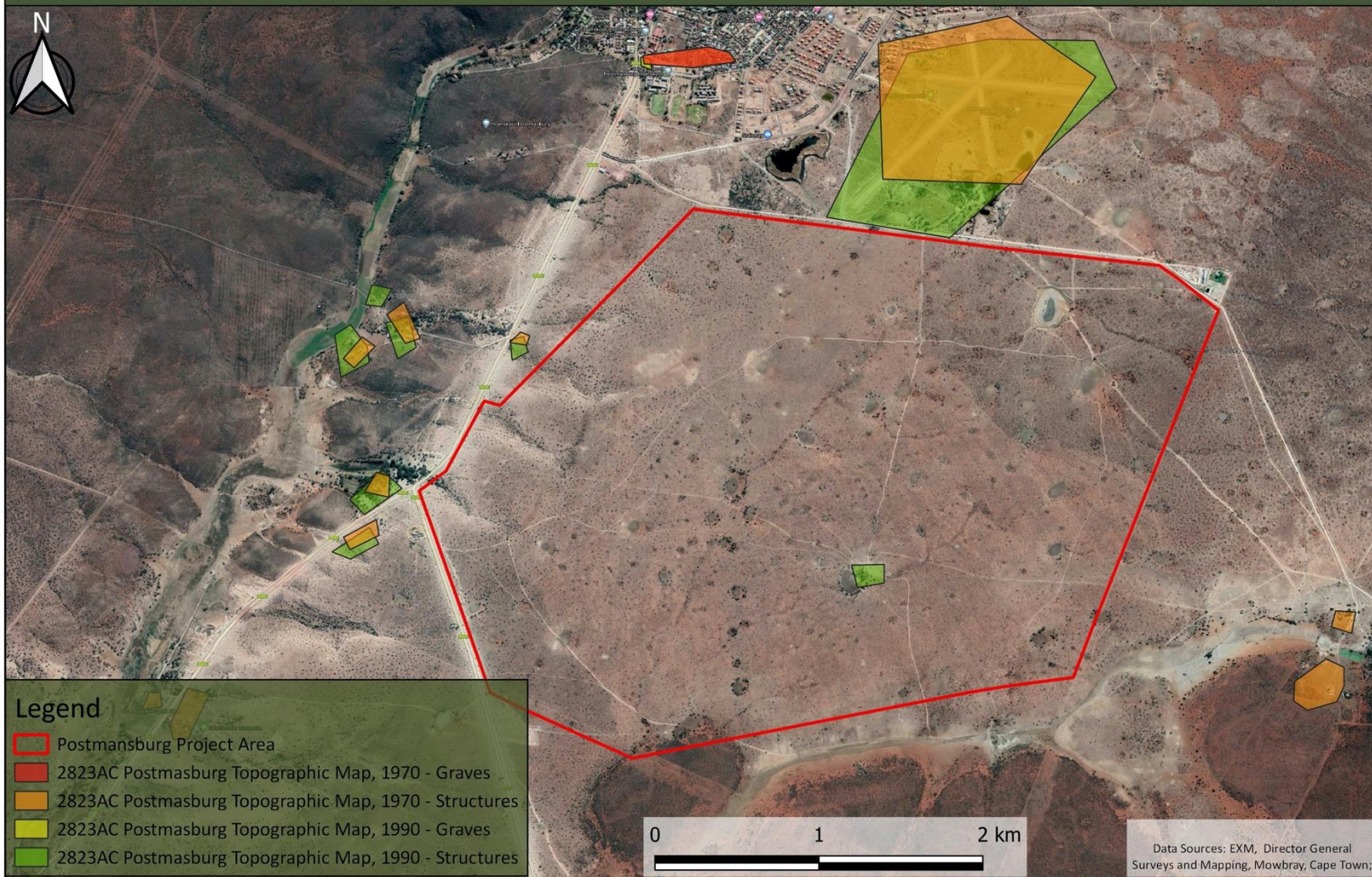


Figure 25 – Heritage sensitivity map indicating possible sensitive areas around and within the proposed Airport for Kolomela Mine in Postmasburg – Overview map.

5 FIELDWORK AND FINDINGS

A controlled surface survey was conducted on foot and by a vehicle over a period of four days by two archaeologist and heritage specialists from PGS. The fieldwork was conducted 10 – 13 August 2020. The tracklogs (in yellow) for the survey are indicated in **Figure 26**.

During the survey, 11 heritage sites² were identified. Of these 11 sites, 10 sites (PMB-01 to PMB-10) consist of archaeological sites around pan areas characterised by surface stone tool scatter, while one site (PMB-11) contains features that could be possible graves. A background scatter of MSA and LSA stone tools was observed throughout the area. The areas with a high-density scatter, especially around pans were marked as sites.

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

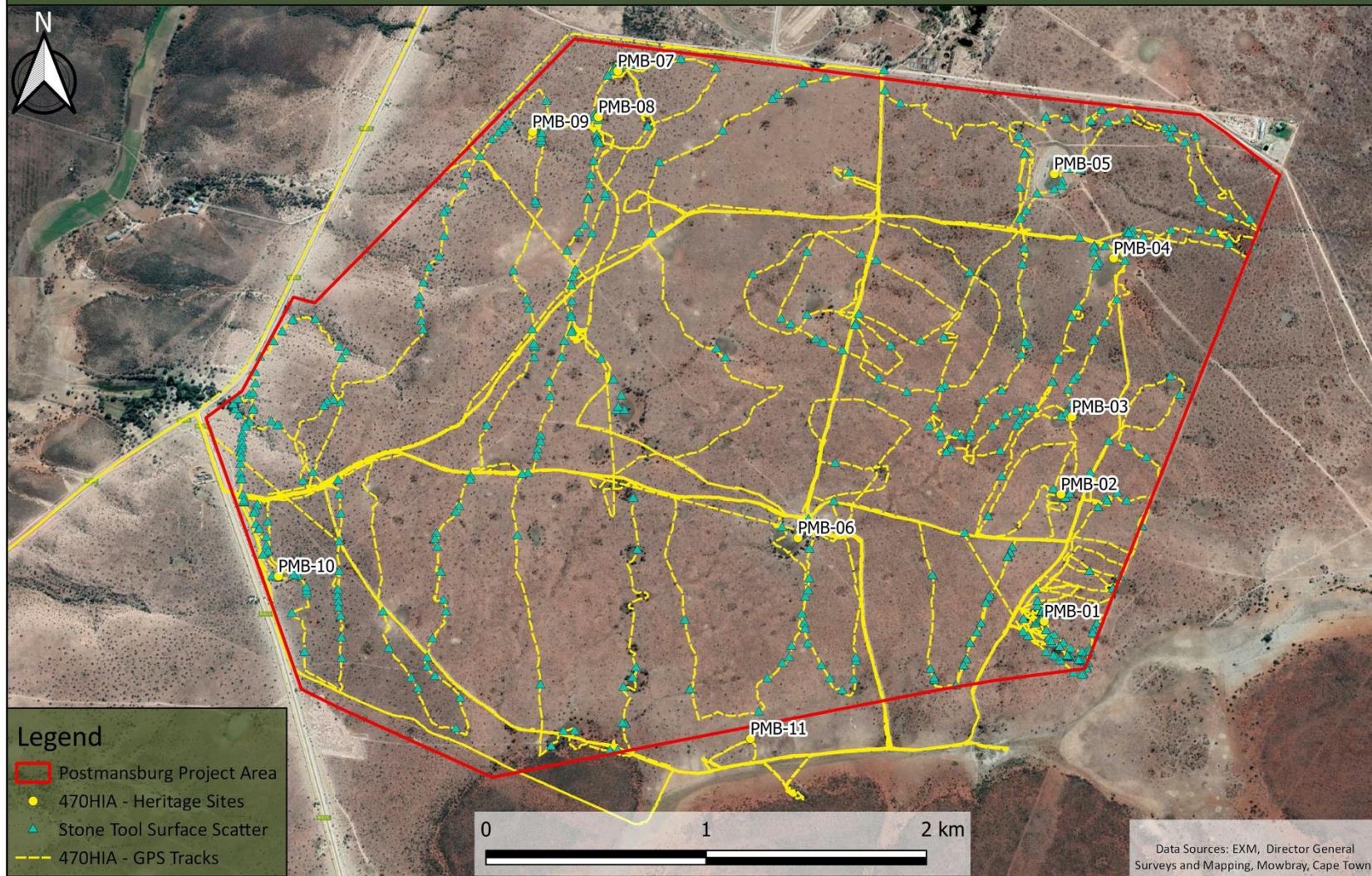



Figure 26 – Locality of the heritage resource– Identified heritage sites and a surface scatter of stone tools throughout the project area

Table 8 - Sites identified during the heritage survey

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
PMB-01	28°22'8.84"S	23° 5'0.09"E	<p>A high-density scatters of stone tools, dating to the LSA and MSA, including cores, flakes and blades were observed at PMB-01. The tools are scattered around and in a pan. The site is approximately 192m in width and 217m in length. The tools were made from cryptocrystalline silicas (CCS); Jaspers (yellow and red) and banded ironstone.</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> • A Phase 2 survey be conducted, that will include a representative sampling of the assemblages. 	Medium Significance	IIB
					
			<p>Figure 27 - View of the pan</p>		

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
<p>Figure 28 – Some of the stone tools found at PMB-01</p>					

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
PMB-02	28°21'50.18"S	23° 5'2.54"E	<p>A medium-density surface scatter of stone tools, dating to the LSA and MSA, including cores, flakes and blades were observed at PMB-02. The tools are scattered around and in a pan. The site is approximately 80m in width and m 105m in length. The tools were made from CCS; Jaspers (yellow and red) and banded ironstone.</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> • A Phase 2 survey be conducted, that will include a representative sampling of the assemblages. 	Medium Significance	IIB



Figure 29 - View of the general site


Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
					

Figure 30 - Stone tools sampled

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
PMB-03	28°21'38.80"S	23° 5'4.16"E	<p>A high-density scatters of stone tools, dating to the LSA and MSA, including cores, flakes and blades were observed at PMB-03. The tools are scattered around and in a pan. The site is approximately 106m in width and 117m in length. The tools were made from cryptocrystalline silicas (CCS); Jaspers (yellow and red) and banded ironstone.</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> • A Phase 2 survey be conducted, that will include a representative sampling of the assemblages. 	Medium Significance	IIB




Figure 31 - View of pan

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
<p data-bbox="777 1251 1487 1278">Figure 32 – A sample of some of the tools found at PMB-03</p>					

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
PMB-04	28°21'15.52"S	23° 5'10.29"E	<p>A high-density scatters of stone tools, dating to the LSA and MSA, including cores, flakes and blades were observed at PMB-01. The tools are scattered around and in a pan. The site is approximately 157m in width and 265m in length. The tools were made from CCS; quartz; jaspers (yellow and red) and banded ironstone.</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> • A Phase 2 survey be conducted, that will include a representative sampling of the assemblages. 	Medium Significance	IIB



Figure 33 - View of pan

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
 <p>The figure consists of six photographs of stone tools. The top row shows three different views of tools, each with a black and white scale bar. The bottom row shows three more tools, also with scale bars. The tools vary in size and shape, some appearing as flaked stones and others as more rounded, possibly ground stones. The background is reddish-brown soil with some dry vegetation.</p>					
<p>Figure 34 – A sample of stone tools found at PMB-04</p>					



Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
PMB-05	28°21'3.12"S	23° 5'1.55"E	<p>A high-density scatters of stone tools, dating to the LSA and MSA, including cores, flakes and blades were observed at PMB-05. The tools are scattered around and in a pan. The site is approximately 154m in width and 248m in length. The tools were made from CCS; jaspers (yellow and red) and banded ironstone.</p> <p>A picnic area with small benches was located to the east of the pan.</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> • A Phase 2 survey be conducted, that will include a representative sampling of the assemblages. 	Medium Significance	IIB



Figure 35 - View of pan



Figure 36 - Picnic area by pan

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
					
					
<p>Figure 37 – A sample of tools found scattered at the pan</p>					

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
PMB-06	28°21'56.58"S	23° 4'23.91"E	<p>A medium-density scatters of stone tools, dating to the LSA and MSA, including cores, flakes and blades were observed at PMB-06. The tools are scattered around and in a pan. The site is approximately 146m in width and 170m in length. The tools were made from cryptocrystalline silicas (CCS); Jaspers (yellow and red) and banded ironstone.</p> <p>A small homestead, with a windpump and kraal if located to the north of the pan.</p> <p>NOTE: Only the archaeological context is graded. <i>The homestead has no heritage significance</i></p> <p>It is recommended that:</p> <ul style="list-style-type: none"> • A Phase 2 survey be conducted, that will include a representative sampling of the assemblages. 	Medium Significance	IIB



Figure 38 - View of homestead and windpump



Figure 39 - View of pan

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
<p>The image displays eight photographs of archaeological stone artifacts. The top row shows four small, dark, irregularly shaped stones on a reddish-brown surface with a scale bar below them. The middle row contains three photographs: a large, translucent, yellowish-brown stone core on the left; a group of several smaller, yellowish-brown stones in the center; and a group of six yellowish-brown stones of various sizes on the right. The bottom row features two photographs: one showing four yellowish-brown stones on the left, and another showing two large, yellowish-brown stones on the right. Each photograph includes a black and white scale bar for size reference.</p>					

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
PMB-07	28°20'48.05"S	23° 3'57.46"E	<p>A high-density scatters of stone tools, dating to the LSA and MSA, including cores, flakes and blades were observed at PMB-07. The tools are scattered around and in a pan. The site is approximately 51m in width and 72m in length. The tools were made from CCS; Jaspers (yellow and red) and banded ironstone.</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> • A Phase 2 survey be conducted, that will include a representative sampling of the assemblages. 	Medium Significance	IIB



Figure 40 - View of pan

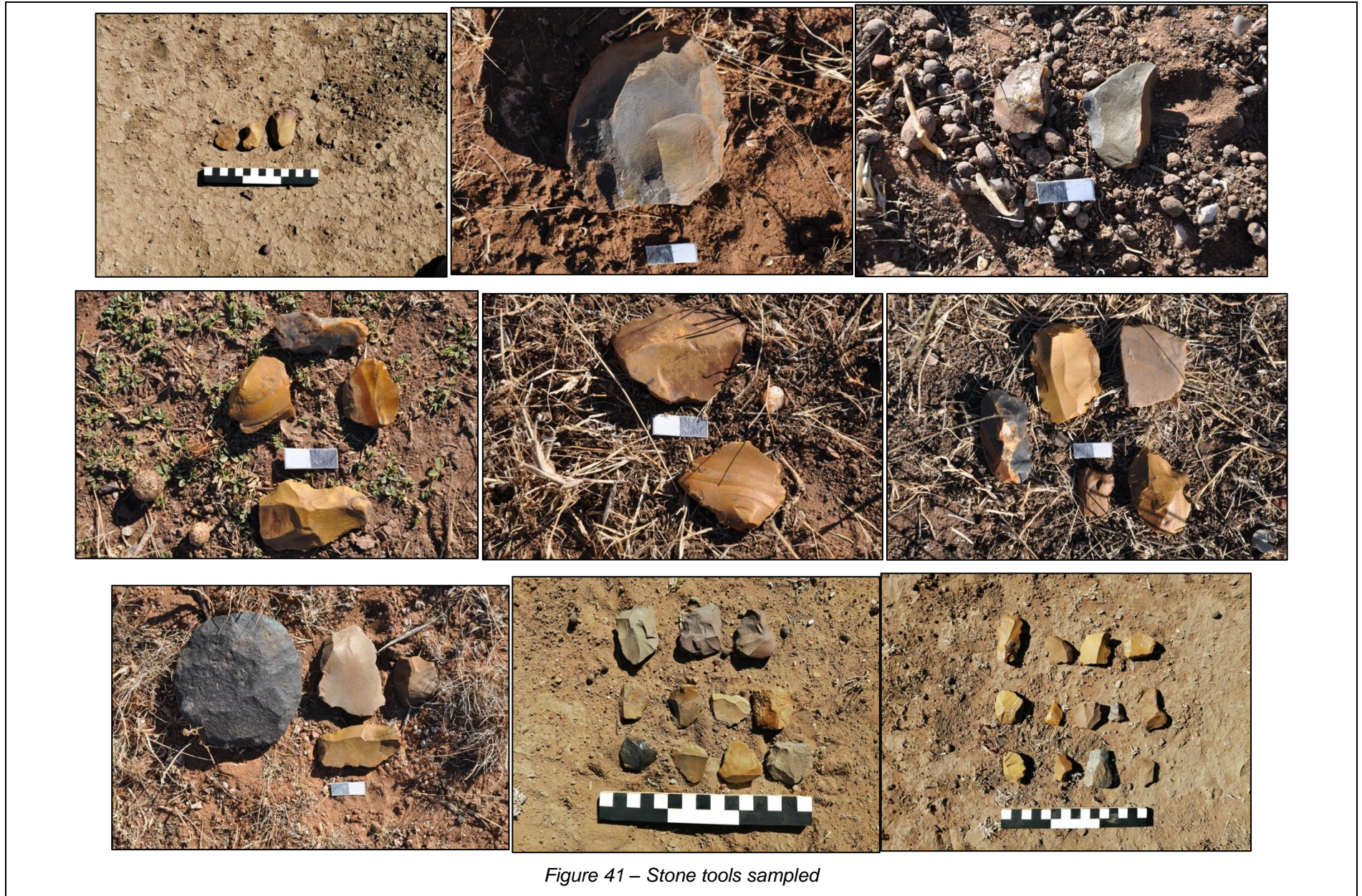


Figure 41 – Stone tools sampled

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
PMB-08	28°20'54.78"S	23° 3'54.61"E	<p>A medium density scatters of stone tools, dating to the LSA and MSA, including cores, flakes and blades were observed at PMB-08. The tools are scattered around and in a pan. The site is approximately 33m in width and 37m in length. The tools were made from CCS; Jaspers (yellow and red) and banded ironstone.</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> • A Phase 2 survey be conducted, that will include a representative sampling of the assemblages. 	Medium Significance	IIB





Figure 42 - View of pan

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
<p data-bbox="936 1155 1323 1187" style="text-align: center;"><i>Figure 43 - Stone tools sampled</i></p>					

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
PMB-09	28°20'56.97"S	23° 3'44.93"E	<p>A high-density scatters of stone tools, dating to the LSA and MSA, including cores, flakes and blades were observed at PMB-09. The tools are scattered around and in a pan. The site is approximately 82m in width and 53m in length. The tools were made from CCS; jaspers (yellow and red) and banded ironstone.</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> • A Phase 2 survey be conducted, that will include a representative sampling of the assemblages. 	Medium Significance	IIB



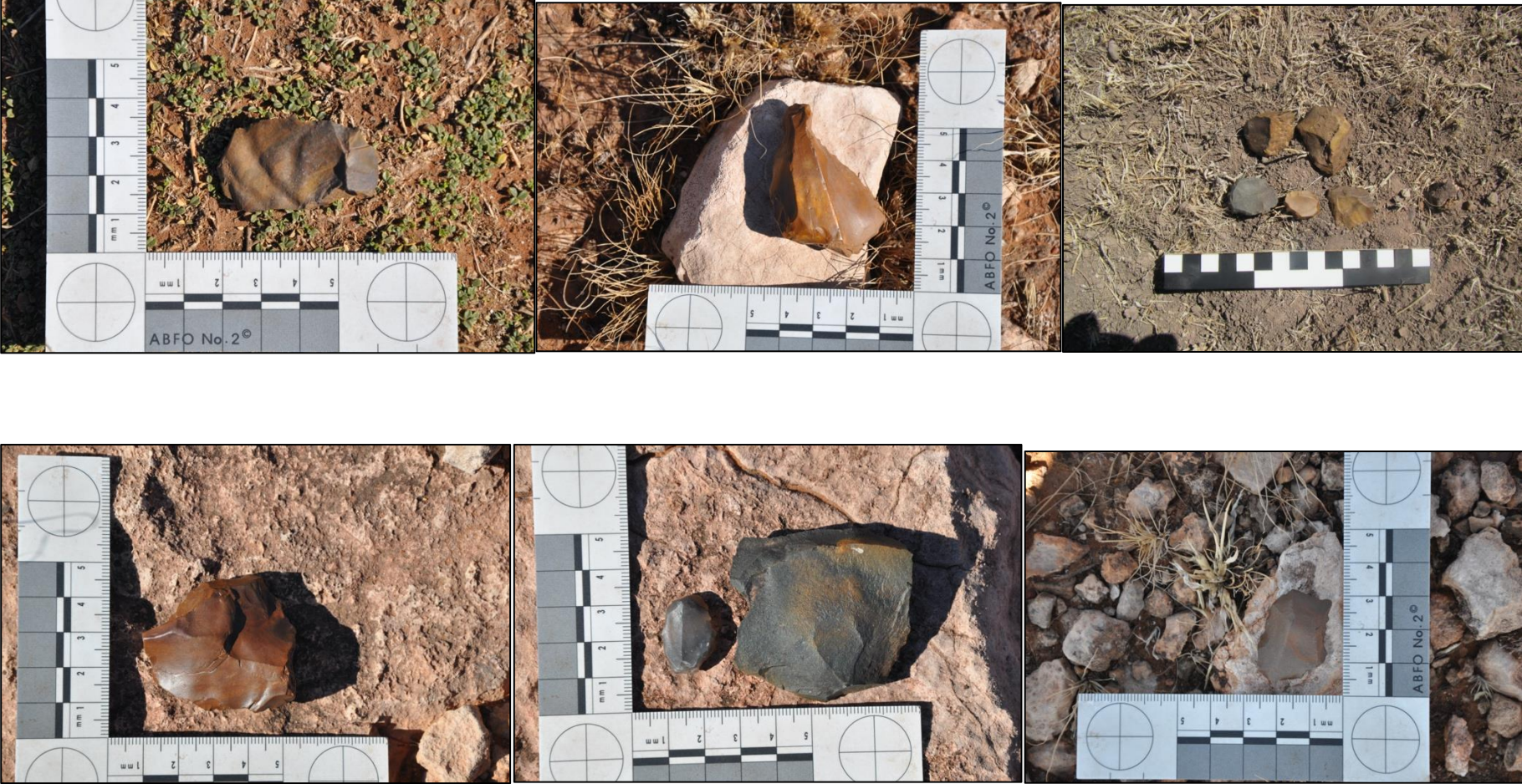
Figure 44 - View of pan

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
					
					
<p>Figure 45 – A sample of stone tools from the site</p>					

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
PMB-10	28°22'2.21"S	23° 3'7.60"E	<p>A medium density scatters of stone tools, dating to the LSA and MSA, including cores, flakes and blades were observed at PMB-10. The tools are scattered around and in a pan. The site is approximately 48m in width and 52m in length. The tools were made from CCS; jaspers (yellow and red) and banded ironstone.</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> • A Phase 2 survey be conducted, that will include a representative sampling of the assemblages. 	Medium Significance	IIB



Figure 46 - View of pan

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
 <p>The figure consists of six photographs arranged in two rows of three. Each photograph shows a different stone tool or fragment. The top row shows: 1) a dark, rounded stone tool next to a ruler; 2) a large, light-colored stone tool with a dark, translucent, flake-like feature; 3) several small, dark stone tools scattered on the ground with a ruler. The bottom row shows: 1) a dark, flake-like stone tool; 2) a large, dark, rectangular stone tool; 3) a dark, rectangular stone tool surrounded by other rocks and debris. Each photograph includes a ruler for scale, with markings in millimeters and centimeters. Some rulers also feature a circular target and the text 'ABFO No. 2'.</p>					
<p><i>Figure 47 - A sample of stone tools from the site</i></p>					

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
PMB-11	28°22'26.07"S	23° 4'16.94"E	<p>A possible prospectors grave was identified near the southern boundary of the project area. The grave was pointed out by the landowner. The grave is overgrown and consists of an upright stone surrounded by packed stones. This site is however located outside of the proposed project 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"> • The site should be demarcated with a 30-meter buffer and that the graves should be avoided and left in situ. • A Grave Management Plan should be developed for the graves which also need to be approved by WHC, if graves are to be relocated. • If the site is going to impact and the graves need to be removed a grave relocation process for site PMB-11 is recommended as a mitigation and management measure. 	High	IIIA



Figure 48 - View of possible grave

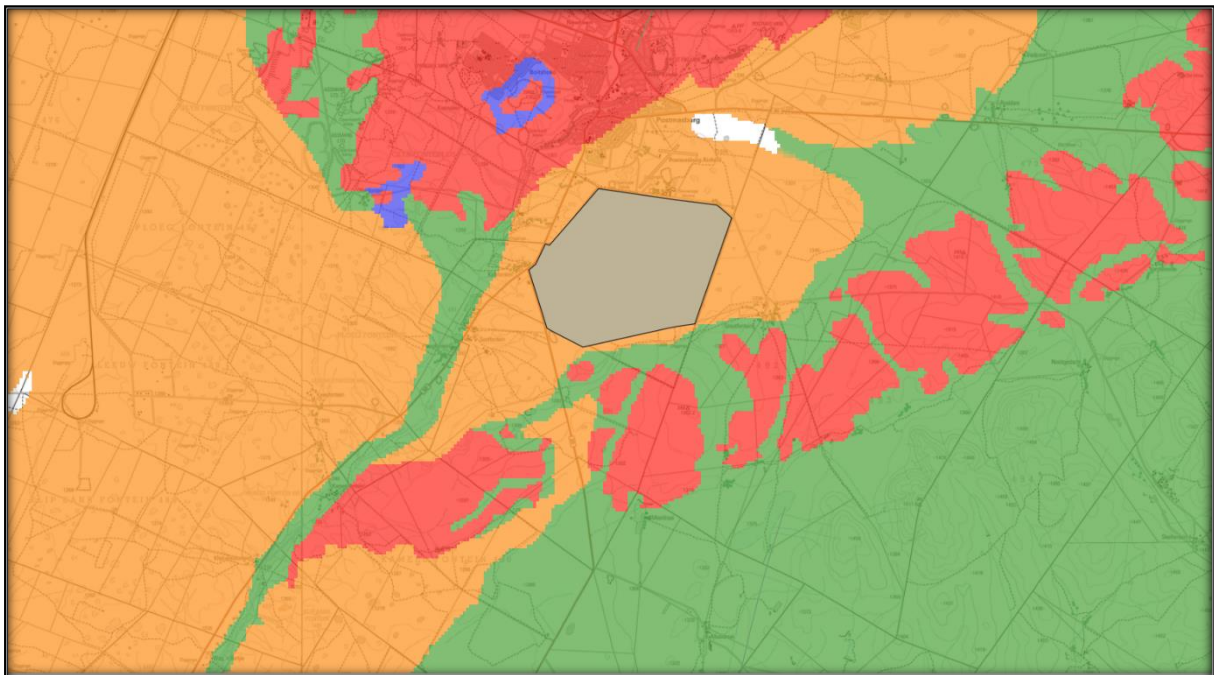
5.1 Sensitivity assessment outcome

From the desktop assessment high to low heritage sensitive areas were identified. Many of the heritage sensitive areas identified during the desktop search consisted of old structures and buildings that fall outside the study area.

During the survey, 11 heritage sites were identified. Of these 11 sites, 10 sites (PMB-01 to PMB-10) consist of archaeological sites around pan areas characterised by surface stone tool scatter, while one site (PMB-11) contains features that could be possible graves. Ten pan sites contain stone tools (PMB-01 to PMB-10) and have a medium heritage significance and heritage rating of IIIB. One possible gravesite (PMB-11) has a high heritage significance and heritage rating of IIIA. This site has a high heritage sensitivity.

6 PALAEOLOGY

According to the PalaeoMap of SAHRIS the Palaeontological Sensitivity of the proposed area of the project footprint occurs (Figure 49) there is a high chance of finding fossils in this area.



*Figure 49 - Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences).
Approximate location of the proposed development is indicated in grey.*

The palaeontological impact assessment (PIA) conducted by Banzai Environmental (Butler, 2020) determined that the site is underlain by the Quaternary aged sediments of the Kalahari Group as well underlying Griqualand West Basin rocks, Transvaal Supergroup. According to the PalaeoMap of South

African Heritage Resources Information System the Palaeontological Sensitivity of the Kalahari Group is high and the Griqualand West rocks of the Transvaal Supergroup is moderate (**Figure 50**).

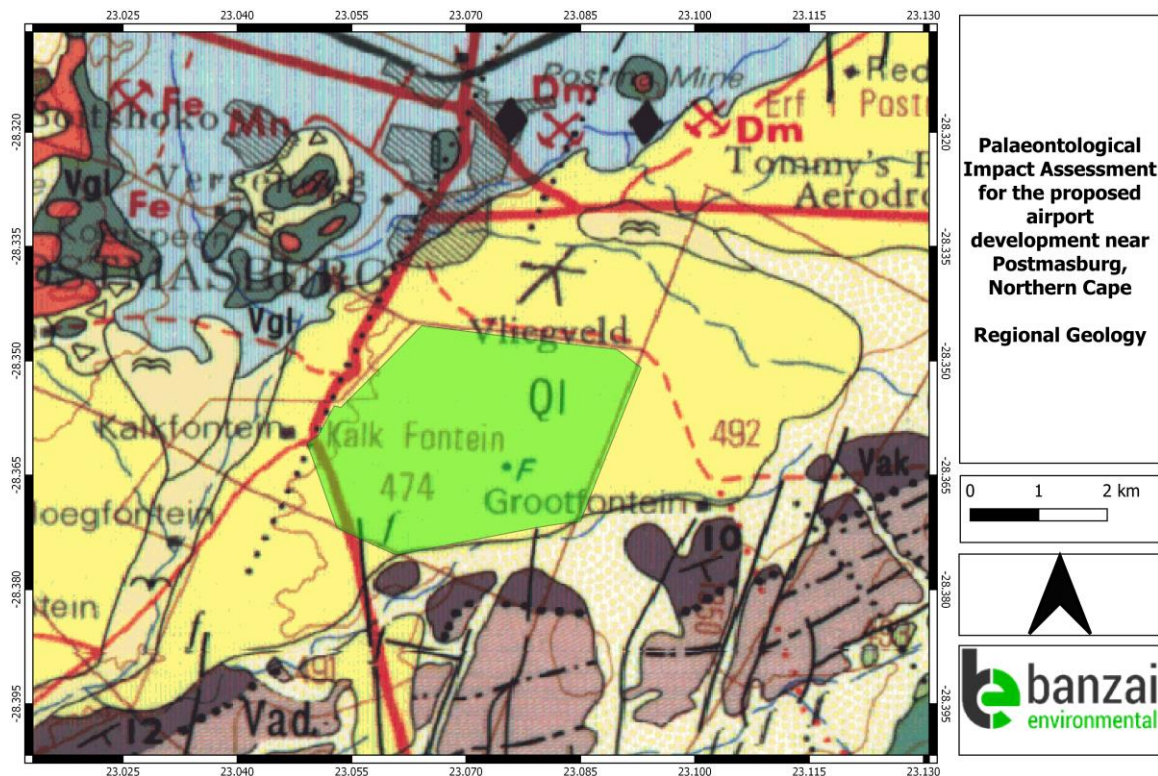


Figure 50 - Extract of the 2822 Postmasburg Map (Council of Geoscience) indicating the surface geology of the proposed airport development near Postmasburg. The proposed development is underlain by surface limestone and alluvium of the Kalahari Group. Q1-Surface limestone, Vad - Daniëlskuil Member and Vak-Kuruman Member (Asbesberg Formation, Griekwastad Group).

A 1-day site specific field survey of the development footprint were conducted on foot and by motor vehicle on 15 August 2020. No visible evidence of fossiliferous outcrops was found.

7 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 9**.

Table 9 - Quantitative rating and equivalent descriptors for the impact assessment criteria

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

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

7.1 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 km²) but the significance of this effect is dependent on the concentration or level of pollution. If the concentration is great, the significance of the impact would be HIGH or VERY HIGH, but if it is diluted it would be VERY LOW or LOW. Similarly, if 60 ha of a grassland type are destroyed the impact would be VERY HIGH if only 100 ha of that grassland type

were known. The impact would be VERY LOW if the grassland type was common. A more detailed description of the impact significance rating scale is given in **Table 10** below.

Table 10 - 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.

7.2 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 11**.

Table 11 - Description of the significance rating scale

RATING		DESCRIPTION
5	Global/National	The maximum extent of any impact.
4	Regional/Provincial	The spatial scale is moderate within the bounds of impacts possible and will be felt at a regional scale (District Municipality to Provincial 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 Eskom property.
1	Proposed site	The impact will affect an area no bigger than the ash disposal site.

7.3 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 12.

Table 12 - Description of the temporal rating scale

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

7.4 Degree of Probability

Probability or likelihood of an impact occurring will be described as shown in

Table 13 below.

Table 13 - 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

7.5 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 14**. 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 14 - 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.

7.6 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:

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

An example of how this rating scale is applied is shown in **Table 15**.

Table 15 - Example of Rating Scale

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

Note: The significance, spatial and temporal scales are added to give a total of 8, that is divided by 3 to give a criteria rating of 2,67. The probability (3) is divided by 5 to give a probability rating of 0,6. The criteria rating of 2,67 is then multiplied by the probability rating (0,6) to give the final rating of 1,6.

The impact risk is classified according to five classes as described in the **Table 16** below.

Table 16 - Impact Risk Classes

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

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

7.7 Heritage Impacts

During the survey, 11 heritage sites were identified. Of these 11 sites, 10 sites (**PMB-01 to PMB-10**) consist of archaeological sites around pan areas characterised by surface stone tool scatter, while one site (**PMB-11**) contains features that could be possible graves. Ten pan sites contain stone tools (**PMB-01 to PMB-10**) and have a **medium heritage significance** and heritage rating of IIIB. One possible gravesite (PMB-11) has a high heritage significance and heritage rating of IIIA. This site has a **high heritage significance**.

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

7.7.1 Burial Grounds and graves

PMB-11 has a high heritage rating and a heritage grading of IIIA.

The impact significance before mitigation on the graves will be LOW negative before mitigation. *Only the study site will be affected by the proposed development.* The possibility of the impact occurring **is unlikely**. 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.

7.7.2 Archaeological sites

The impact significance before mitigation on the identified archaeological sites will be MODERATE negative before mitigation. *Only the study site will be affected by the proposed development.* The possibility of the impact occurring **is unlikely** except for site **PMB-06** that is close to the footprint area of the airport. 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.

7.7.3 Palaeontological Impacts

Very High palaeontological sensitivity has been allocated to the Ghaap Group while the Kalahari Group has a high Palaeontological Sensitivity. The expected duration of the impact is assessed as potentially permanent to long term to permanent. In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be **permanent**. Impacts on palaeontological heritage during the construction phase could potentially occur but are regarded as having a moderate possibility.

Proposed Development of an Airport for Kolomela Mine in Postmasburg,
Heritage Survey

PGS Heritage (Pty) Ltd
Heritage Management
Unit

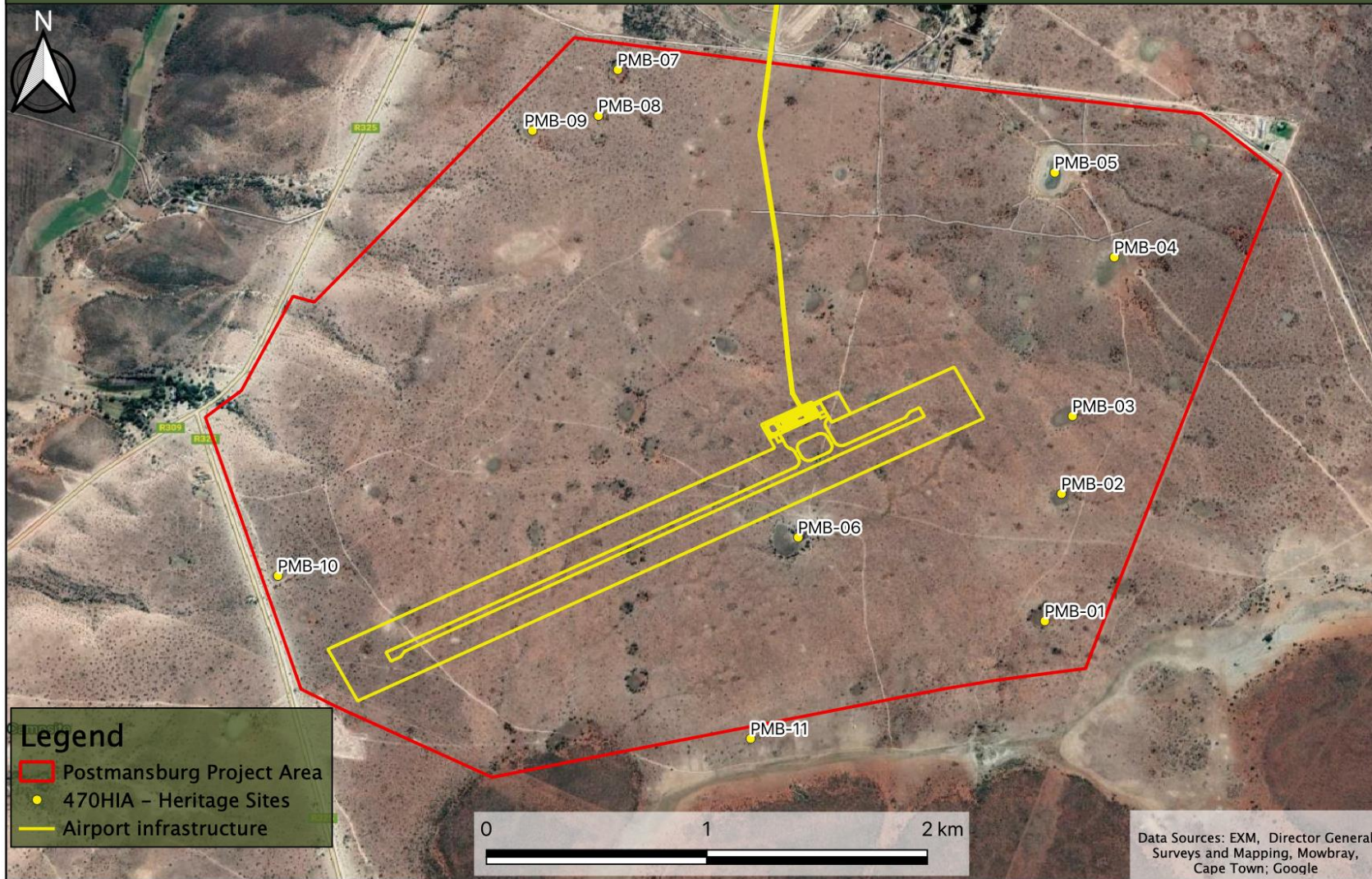


Figure 51 – Locality of the heritage resource in relation to the proposed airport footprint area

7.8 Impact Assessment Table

Table 17 - Impact Assessment Table (pre-mitigation)

IMPACT	IMPACT DIRECTION	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
Impact on burial ground and graves	Negative	LOW	Isolated Sites / proposed site	Permanent	Unlikely	
		2	1	5	2	1,07
Impact on archaeological sites	Negative	VERY HIGH	Isolated Sites / proposed site	Permanent	Could happen	
		5	1	5	3	2,20
Palaeontological resources	Negative	VERY HIGH	Study Area	Permanent	Could happen	
		5	2	5	3	2,40

Table 18 - Impact Assessment Table (post-mitigation)

IMPACT	IMPACT DIRECTION	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
Impact on burial ground and graves	Negative	LOW	Isolated Sites / proposed site	Permanent	Practically impossible	
		2	1	5	1	0,53
Impact on archaeological sites	Negative	VERY HIGH	Isolated Sites / proposed site	Permanent	Unlikely	
		5	1	5	2	1,47
Palaeontological resources	Negative	VERY HIGH	Isolated Sites / proposed site	Permanent	Unlikely	
		5	1	5	2	1,47

7.9 Management recommendations and guidelines

7.9.1 Construction phase

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

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

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

7.9.2 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 in the event that any possible heritage resources or artefacts are identified.
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities halted.
- The qualified heritage practitioner / archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and the impact on the heritage resource.
- The contractor therefore should have 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.

7.9.3 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 reclamation activities, could uncover the following:

- High density concentrations of stone artefact
- unmarked graves

7.10 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 19** gives guidelines for lead times on permitting.

Table 19 - Lead times for permitting and mobilisation

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

7.11 Heritage Management Plan for EMPr implementation

Table 20 - Heritage Management Plan for EMPr implementation

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
General project area	Implement a chance to find procedures in case where possible heritage finds are uncovered.	Construction 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
Possible graves	The site should be demarcated with a 30-meter buffer and the grave should be avoided if any construction is to happen close to it.	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
Identified archaeological sites	In the event that any of the identified archaeological site are to be impacts a Phase 2 archaeological mitigation process must be implemented. This will include, surface collections, test excavations and analysis of recovered material. A permit issued under s35 of the NHRA will be required to conduct such work.	Pre-construction	Pre-construction	Applicant Archaeologist	None	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
Palaeontological finds	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

8 CONCLUSIONS

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.

8.1 Heritage Sites

During the survey, 11 heritage sites were identified. Of these 11 sites, 10 sites (PMB-01 to PMB-10) consist of archaeological resources around pan areas characterised by high density surface stone tool scatter, while one site (PMB-11) contains features that could be possible graves. Ten pan sites contain stone tools (PMB-01 to PMB-10) and have a medium heritage significance and heritage rating of IIIB. One possible gravesite (PMB-11) has a high heritage significance and heritage rating of IIIA. This site has a high heritage sensitivity.

8.1.1 Burial Grounds and graves

PMB-11 has a high heritage rating and a heritage grading of IIIA. It is recommended that if any construction activity is done within 50 meters from the grave it is demarcated with a 30-meter buffer during such activities.

The impact significance before mitigation on the graves will be LOW negative before mitigation. The possibility of the impact occurring **is unlikely**. 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.

8.1.2 Archaeological sites

The identified archaeological site has a medium heritage significance and with the current proposed layout the impact significance before mitigation on the identified archaeological sites will be MODERATE negative before mitigation. The possibility of the impact occurring **is unlikely** except for site **PMB-06** that is close to the footprint area of the airport. 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.

In the event that any of the identified archaeological site are to be disturbed a Phase 2 archaeological mitigation process must be implemented. This will include, surface collections, test excavations and analysis of recovered material. A permit issued under s35 of the NHRA will be required to conduct such work.

8.1.3 Palaeontological Impacts

The PIA indicated that the site is underlain by the Quaternary aged sediments of the Kalahari Group as well underlying Griqualand West Basin rocks, Transvaal Supergroup. According to the PalaeoMap of South African Heritage Resources Information System the Palaeontological Sensitivity of the Kalahari Group is high and the Griqualand West rocks of the Transvaal Supergroup is moderate

Very High palaeontological sensitivity has been allocated to the Ghaap Group while the Kalahari Group has a high Palaeontological Sensitivity. The expected duration of the impact is assessed as potentially permanent to long term to permanent. In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be **permanent**. Impacts on palaeontological heritage during the construction phase could potentially occur but are regarded as having a moderate possibility.

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. These discoveries ought to be protected (if possible, in situ) and the ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that suitable mitigation (e.g. recording and collection) can be carry out by a palaeontologist.

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

8.2 General

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 of this report have been developed to minimise the project impact on heritage resources.

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9.5 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.

9.6 Contemporary Cartographic Data

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

PROFESSIONAL CURRICULUM FOR CHERENE DE BRUYN

Name: Cherene de Bruyn
Profession: Archaeologist
Date of Birth: 1991-03-01
Parent Firm: PGS Heritage (Pty) Ltd
Position in Firm: Archaeologist
Years with Firm: 6 Months
Years' experience: 2
Nationality: South African
HDI Status: White Female

EDUCATION:

Name of University or Institution : University of Pretoria
Degree obtained: : BA
Major subjects : Archaeology and Anthropology
Year : 2010-2012

Name of University or Institution : University of Pretoria
Degree obtained : BA (Hons)
Major subjects : Archaeology
Year : 2013

Name of University or Institution : University of Pretoria
Degree obtained : BSc (Hons)
Major subjects : Physical Anthropology
Year : 2015

Name of University or Institution : University College London
Degree obtained : MA
Major subjects : Archaeology
Year : 2016/2017

Professional Qualifications:

Association of Southern African Professional Archaeologists - Professional Member (#432)

International Association for Impact Assessment South Africa - Member (#6082)

Association of Southern African Professional Archaeologists - CRM Accreditation

- Principal Investigator: Grave relocation
- Field Director: Colonial period archaeology, Iron Age archaeology
- Field Supervisor: Rock art, Stone Age archaeology
- Laboratory Specialist: Human Skeletal Remains

Languages:

Afrikaans & English

KEY QUALIFICATIONS

Heritage Impact Assessment Management, Historical and Archival Research, Archaeology, Physical Anthropology, Grave Relocations, Fieldwork and Project Management including *inter alia*

Summary of Experience

Involvement in various grave relocation projects and grave “rescue” excavations in the various provinces of South Africa

Involvement with various Heritage Impact Assessments, within South Africa

- Heritage Impact Assessments for various projects

HERITAGE ASSESSMENT PROJECTS

Below a selected list of Heritage Impact Assessments (HIA) Projects involvement:

- Heritage Impact Assessment for the upgrade of road d4407 between Hluvukani and Timbavati, road d4409 at Welverdiend and road d4416/2 between Welverdiend and road P194/1 in the Bohlabela region of the Mpumalanga Province.
- Heritage Impact Assessment for the proposed Piggery on Portion 46 of the farm Brakkefontien 416, within the Nelson Mandela Bay Municipality, Eastern Cape.
- Heritage Impact Assessment for proposed development On Erf 30, Letamo Town, Farm Honingklip 178 Iq, Mogale Local Municipality, Gauteng Province.
- Heritage Impact Assessment for the proposed Prospecting Right Application on the Farm Reserve No 4 15823 And 7638/1, near St Lucia, within the jurisdiction of the Mfolozi Local Municipality in the King Cetshwayo District Municipality, KwaZulu-Natal Province.
- Heritage Impact Assessment for the proposed mining rights on the Farm Waterkloof 95 located between Griekwastad and Groblershoop in the Pixley Ka Seme District Municipality within the Northern Cape Province.
- Heritage Impact Assessment for the proposed East Coast Gas 400 Kv Power Lines, located in Richards Bay, within the Umhlathuze Local Municipality in the King Cetshwayo District Municipality in the Kwazulu-Natal Province.
- Heritage Impact Assessment for the mining right application for the Farm Woodlands 407, situated in the Free State Province.
- Heritage Impact Assessment for the refurbishments of Lyttelton Primary School, Lyttelton Manor, Centurion, Gauteng Province.
- Heritage Impact Assessment for the amendment of an existing prospecting right and environmental authorization for Bothaville NE Ext A, situated in the Free State Province.
- Heritage Impact Assessment and Integrated Cultural Resources Management Study for The Proposed Mfolozi-Mbewu 765kv Transmission Line, Zululand And King Cetshwayo District Municipality, KwaZulu-Natal.
- Heritage Impact Assessment for the proposed for the Construction of the Bulk Water Supply Pipeline and Feeder Pipes in Dunnottar, Gauteng Province.
- Heritage Impact Assessment the prospecting right and environmental authorisation application for Kroonstad South situated in the Free State Province.

- Archaeological impact assessment for a mining permit application for portion 19 of the farm Syferfontein 303 IP within the city of Matlosana Local Municipality in the North West Province.

GRAVE RELOCATION PROJECTS

Below, a selection of grave relocation projects involvement:

- Report on the relocation of graves. Relocation of four stillborn graves from the Farm Wonderfontein 428 Js, Belfast, Mpumalanga Province.
- Report on the relocation of graves. Relocation of approximately 6 graves from Kwaqubuka Tribal Area, Mtubatuba Local Municipality, Kwa-Zulu Natal Province. Grave exhumation and relocation of 19 graves on erf 3 of Holding 87 North Riding Agricultural Holdings, City of Johannesburg, Gauteng Province.
- Report on the exhumation and reburial report of 16 graves from Doornkop, to Voortrekker Cemetery in Middelburg, Mpumalanga Province
- Report on rescue excavations and skeletal analyses of two archaeological graves inadvertently uncovered in Boitekong, North-West Province.
- Rescue excavation of an unmarked graveyard at Diamond Park, Greenpoint, Kimberley, Northern Cape Province.
- Report on Follow-up site visit excavation and physical anthropological analyses of archaeological human remains transferred from SAPA Victim Identification Centre to Department of Anatomy. Mamelodi East Phase 2 House 566.
- Excavation of human remains from Marulaneng village, Bakenberg Limpopo Province.
- Follow up site visit on human remains found at Bothlokwa (Ramatjowe & Mphakahne), Limpopo Province.
- Follow up site visit on human remains found in Waterpoort, Soutpansberg, Limpopo Province.

EMPLOYMENT SUMMARY:

Positions Held

- 2020 – to date: Archaeologist - PGS Heritage (Pty) Ltd
- 2019: Manager of the NGT ESHS Heritage Department – NGT Holdings (Pty) Ltd
- 2018 – 2019: Archaeologist and Heritage Consultant – NGT Holdings (Pty) Ltd
- 2015-2016: Archaeological Contractor - BA3G, University of Pretoria
- 2014 – 2015: DST-NRF Archaeological Intern, Forensic Anthropological Research Centre

WOUTER FOURIE

Professional Heritage Specialist and Professional Archaeologist and Director PGS Heritage

Summary of Experience

Specialised expertise in Archaeological Mitigation and excavations, Cultural Resource Management and Heritage Impact Assessment Management, Archaeology, Anthropology, Applicable survey methods, Fieldwork and project management, Geographic Information Systems, including *inter alia*

-

Involvement in various grave relocation projects (some of which relocated up to 1000 graves) and grave “rescue” excavations in the various provinces of South Africa

Involvement with various Heritage Impact Assessments, within South Africa, including -

- Archaeological Walkdowns for various projects
- Phase 2 Heritage Impact Assessments and EMPs for various projects
- Heritage Impact Assessments for various projects
 - Iron Age Mitigation Work for various projects, including archaeological excavations and monitoring
 - Involvement with various Heritage Impact Assessments, outside South Africa, including -
- Archaeological Studies in Democratic Republic of Congo
- Heritage Impact Assessments in Mozambique, Botswana and DRC
- Grave Relocation project in DRC

Key Qualifications

BA [Hons] (Cum laude) - Archaeology and Geography - 1997

BA - Archaeology, Geography and Anthropology - 1996

Professional Archaeologist - Association of Southern African Professional Archaeologists (ASAPA) - Professional Member

Accredited Professional Heritage Specialist – Association of Professional Heritage Practitioners (APHP)

CRM Accreditation (ASAPA) -

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

Key Work Experience

2003- current - Director – Professional Grave Solutions (Pty) Ltd

2007 – 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

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

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

Worked on various heritage projects in the SADC region including, Botswana, Mozambique, Malawi, Mauritius, Zimbabwe and the Democratic Republic of the Congo