

HERITAGE IMPACT ASSESSMENT

(REQUIRED UNDER SECTION 38(8) OF THE NHRA (No. 25 OF 1999))

FOR THE PROPOSED PROSPECTING RIGHT WITH BULK SAMPLING OVER VARIOUS
FARMS IN THE HAY AND KURUMAN ADMINISTRATIVE DISTRICTS, NORTHERN
CAPE

Type of development:

Prospecting Application

Client:

Greenmined Environmental (Pty) Ltd

Applicant:

K2022641005 (SOUTH AFRICA) (Pty) Ltd

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APPROVAL PAGE

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Authority Reference Number	TBC
Report Status	Draft Report
Applicant Name	K2022641005 (SOUTH AFRICA) (Pty) Ltd

Responsibility	Name	Qualifications and Certifications	Date
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REPORT OUTLINE

Appendix 6 of the GNR 326 EIA Regulations published on 7 April 2017 provides the requirements for specialist reports undertaken as part of the Environmental Authorisation process. In line with this, Table 1 provides an overview of Appendix 6 together with information on how these requirements have been met.

Table 1. Specialist Report Requirements.

Requirement from Appendix 6 of GN 326 EIA Regulation 2017	Chapter
(a) Details of - (i) the specialist who prepared the report; and (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae.	Section a
(b) Declaration that the specialist is independent in a form as may be specified by the competent authority.	<i>Declaration of Independence</i>
(c) Indication of the scope of, and the purpose for which, the report was prepared.	Section 1
(cA) An indication of the quality and age of base data used for the specialist report.	Section 3.4.
(cB) A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change.	Section 9
(d) Duration, Date and season of the site investigation and the relevance of the season to the outcome of the assessment.	Section 3.4
(e) Description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used.	Section 3
(f) Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of site plan identifying site alternatives.	Section 7, 8 and 9
(g) Identification of any areas to be avoided, including buffers.	Section 7,8 and 9
(h) Map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers.	Section 8
(I) Description of any assumptions made and any uncertainties or gaps in knowledge.	Section 3.7
(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 or activities.	Section 1.3
(k) Mitigation measures for inclusion in the EMPr.	Section 9.1 and 9.5
(l) Conditions for inclusion in the environmental authorisation.	Section 9. 1 and 9.5
(m) Monitoring requirements for inclusion in the EMPr or environmental authorisation.	Section 9.6
(n) Reasoned opinion - (i) As to whether the proposed activity, activities or portions thereof should be authorised; (iA) Regarding the acceptability of the proposed activity or activities; and (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 9.3
(o) Description of any consultation process that was undertaken during the course of preparing the specialist report.	Section 5
(p) A summary and copies of any comments received during any consultation process and where applicable all responses thereto.	Refer to the EIA report
(q) Any other information requested by the competent authority.	No other information requested at this time

Executive Summary

K2022641005 (SOUTH AFRICA) (Pty) Ltd, applied for a prospecting right (PR) with bulk sampling, and environmental authorisation (EA) for kieselguhr over 15 602.0765 ha that extends over the properties within the Hay and Kuruman Administrative Districts of the Northern Cape. The Project areas are situated in the Taolo Gaetsewe District Municipality and the ZF Mgcawu District Municipality, Northern Cape. Greenmined Environmental has been appointed as the independent environmental assessment practitioner (EAP) to apply for the environmental authorisation for the Project. Beyond Heritage was appointed to conduct a Heritage Impact Assessment (HIA) for the project and the study area was assessed through a desktop assessment. Key findings of the assessment include:

- The scope of work is to conduct a heritage desktop report for a large prospecting right area comprising approximately 15 602.0765 ha;
- It was deemed not feasible to conduct fieldwork at this stage of the process due to the following reasons:
 - The extensive geographical size of the exploration application and the fact that the exact locations of bulk sampling trench/pit sites or number of drill holes to be dug is not available at this point;
 - No intrusive activities will occur at this point of the application;
- This desktop study is informed by available data for the area derived from several large-scale heritage surveys conducted for mining projects in the area as well as extensive archaeological studies at Kathu Complex and Kuruman, and the archaeological character of the region is now well described (e.g., Beaumont 1990; 2007; 2008, Morris 2005; 2008, Huffman 2001, Hutten and Hutten 2013, Fourie and van der Walt 2006, Webley and Halkett 2008);
- The prospecting areas are within an archaeologically rich landscape especially in relation to the Stone Age with significant sites such as the Kathu Complex and the National heritage sites of Wonderwerk Cave and Kathu Townlands found near the northern Project areas. The Karoo landscape is well known for its prevalence of Stone Age sites, and these can be expected across the landscape of both the northern and southern Project areas;
- Stone Age artefacts can be expected across the landscape ranging from low-density scatters to significant sites which are more focal to topographical features such as rocky outcrops, hills, drainage lines, pans, and confluences. These topographic features should be avoided as they are of higher heritage sensitivity for significant sites. Isolated finds of lower significance can also be expected within flat plains;
- MSA and LSA stone tools were previously recorded along the Ga-Mogara and Witleegte streams within the Farms Botha 313 and Devon 277 and more artefacts are likely to occur here (Hutten and Hutten 2013);
- Kieselguhr appears to be more prevalent along ancient water courses and paleo-marshes within the Griqualand West area where the southern Project areas are situated (Fouche 2024). These ancient watercourses may however be of high heritage sensitivity and Stone Age sites of significance may be present within these ancient watercourses and should be avoided as far as possible in terms of selecting areas for bulk sampling prospecting;
- According to the SAHRA Paleontological sensitivity map the study areas are of moderate and high sensitivity and an independent study was commissioned for this aspect (Bamford 2024).


The impact on heritage resources is expected to be low, and the Project can be authorised provided that the recommendations in this report are adhered to and based on the SAHRA's approval.

Recommendations:

The following recommendations for Environmental Authorisation apply and the Project may only proceed after receiving comment from SAHRA:

- Once the bulk sampling trenches/pit sites have been confirmed these areas have to be subjected to a heritage walk down, this should be conducted prior to the commencement of prospecting activities;
- Drill sites must be kept as close as possible to existing roads to minimise the impact on the landscape;
- Focal points on the landscape like rocky outcrops, hills, pans, and watercourses must be avoided as far as possible as these areas could be sensitive from a heritage point of view;
- Monitoring of the Project area by the ECO during the exploration phase for heritage and palaeontology chance finds, if chance finds are encountered to implement the Chance Find Procedure for the Project as outlined in Section 9.

Declaration of Independence

Specialist Name	Lara Lucija Kraljević
Declaration of Independence	<p>I declare, as a specialist appointed in terms of the National Environmental Management Act (Act No 107 of 1998) and the associated 2014 Environmental Impact Assessment (EIA) Regulations (as amended), that I:</p> <ul style="list-style-type: none"> • I act as an independent specialist 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 the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity; • I will comply with the Act, Regulations and all other applicable legislation; • I have no, and will not engage in, conflicting interests in the undertaking of the activity; • I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority; • All the particulars furnished by me in this form are true and correct; and • I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 49 A of the Act.
Signature	
Date	31/05/2024

a) Expertise of the specialist

Lara Kraljević completed her masters in archaeology at the University of Pretoria specialising in chemical and mineralogical studies of Iron Age ceramics. Lara is an accredited member of the Association of South African Professional Archaeologists (ASAPA) (#661). She has co-authored over 100 impact assessments in Gauteng, Limpopo, Mpumalanga, Northern Cape, Eastern Cape, and North West Provinces in South Africa.

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ABBREVIATIONS

ASAPA	Association of South African Professional Archaeologists
BGG	Burial Ground and Graves
CFPs	Chance Find Procedures
CMP	Conservation Management Plan
CoGHSTA	Co-operative Governance, Human Settlements and Traditional Affairs
CRR	Comments and Response Report
CRM	Cultural Resource Management
DFFE	Department of Fisheries, Forestry and Environment,
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment*
EIA	Early Iron Age*
EAP	Environmental Assessment Practitioner
EMPr	Environmental Management Programme
ESA	Early Stone Age
ESIA	Environmental and Social Impact Assessment
GIS	Geographical Information System
GPS	Global Positioning System
GRP	Grave Relocation Plan
HIA	Heritage Impact Assessment
LIA	Late Iron Age
LSA	Late Stone Age
MEC	Member of the Executive Council
MIA	Middle Iron Age
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MSA	Middle Stone Age
NCHM	National Cultural History Museum
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NID	Notification of Intent to Develop
NoK	Next-of-Kin
PRHA	Provincial Heritage Resource Agency
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency

**Although EIA refers to both Environmental Impact Assessment and the Early Iron Age both are internationally accepted abbreviations and must be read and interpreted in the context it is used.*

GLOSSARY

Archaeological site	Remains of human activity over 100 years old
Earlier Stone Age	~ 2.6 million to 250 000 years ago
Middle Stone Age	~ 250 000 to 40-25 000 years ago
Later Stone Age	~ 40-25 000, to the historic period
The Iron Age	~ AD 400 to 1840
Historic	~ AD 1840 to 1950
Historic building	Over 60 years old

1 Introduction

Beyond Heritage was appointed to conduct a Heritage Impact Assessment (HIA) for the proposed prospecting right (PR) with bulk sampling for diatomite/ diatomaceous earth/ kieselguhr over 15 602.0765 ha located on Portion 1 and the Remaining Extent of the Farm Botha 313, Portion 1 and the Remaining Extent of the Farm Devon 277, Portion 4 and 5 of the Farm Bermolli 583, Portion 1 and the Remaining Extent of the Farm Engelsdraai 221, Portion 1 and the Remaining Extent of the Farm Witdraai 204, Portion 1, 2, and the Remaining Extent of the Farm Vaalwater 84. The Project areas are situated within the John Taolo Gaetsewe District Municipality and the ZF Mgcawu District Municipality, Northern Cape (Figure 1.1 to 1.4). The report forms part of the Basic Assessment environmental authorisation process for the project.

The aim of the study is to assess the proposed development footprint on a desktop level to understand the cultural layering of the study area. It serves to assess the potential impact of the proposed project on non-renewable heritage resources, and to submit appropriate recommendations with regard to the responsible cultural resources management measures required. It is also conducted to protect such resources within the framework provided by the National Heritage Resources Act of 1999 (Act No 25 of 1999) (NHRA). The report outlines the approach and methodology utilized, which includes review of relevant literature; desktop assessment of the study area; reporting the outcome of the study.

At this stage of the project, it is not possible to define the exact locations of drill sites and bulk sampling trenches/pits or number of drill holes to be dug and a heritage walk down can be conducted once this is confirmed. Possible impacts were identified, and mitigation measures are proposed in this report. The South African Heritage Resources Agency (SAHRA) as a commenting authority under section 38(8) of NHRA requires all environmental documents, compiled in support of an Environmental Authorisation application as defined by National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations section 40 (1) and (2), to be submitted to SAHRA for commenting. Upon submission to SAHRA the project will be automatically given a case number as reference. As such the EIA report and its appendices must be submitted to the case as well as the EMPr, once it's completed by the Environmental Assessment Practitioner (EAP).

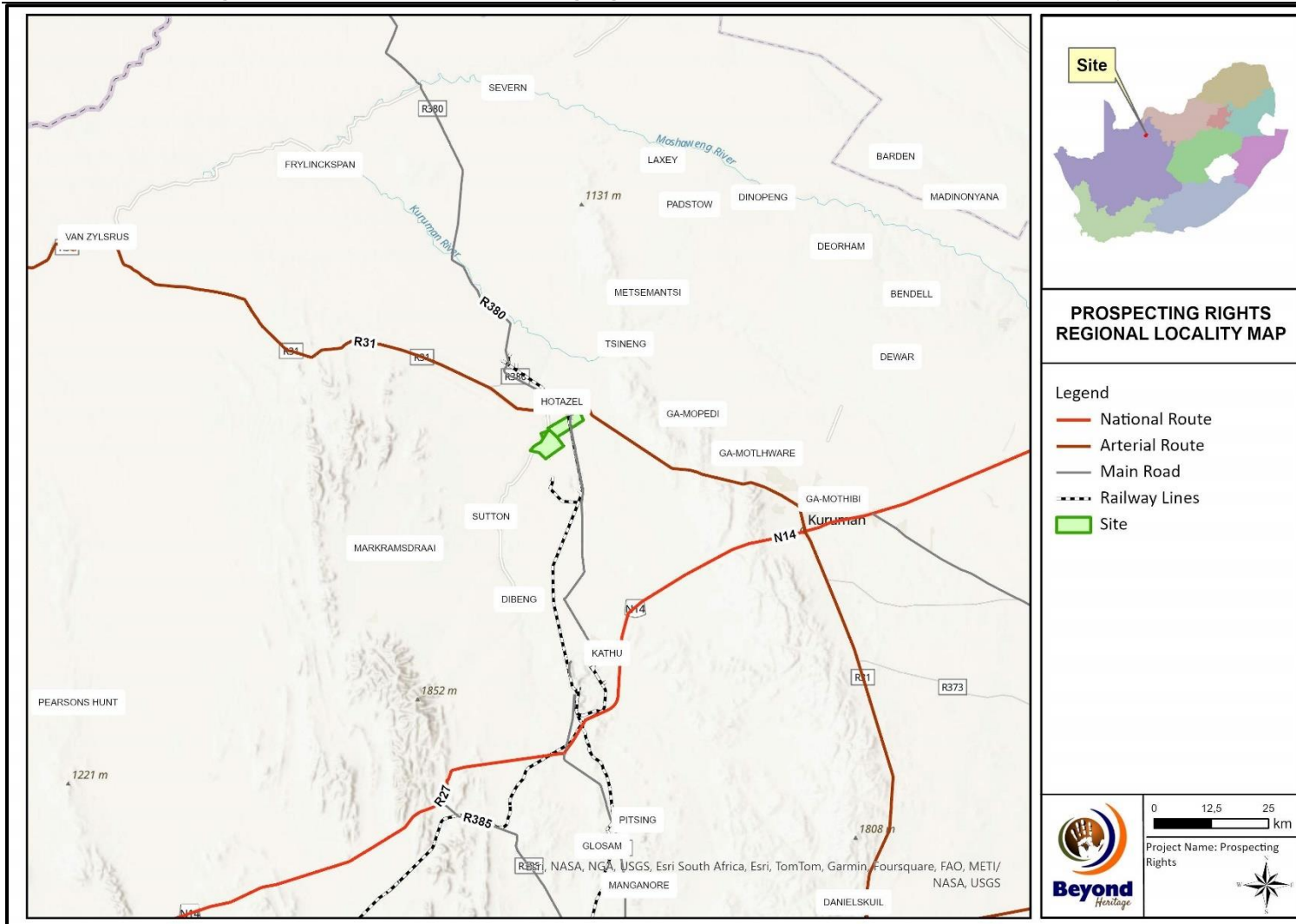


Figure 1.1. Regional setting of the northern Project areas (Extract of the 2722 1: 250 000 topographical map).

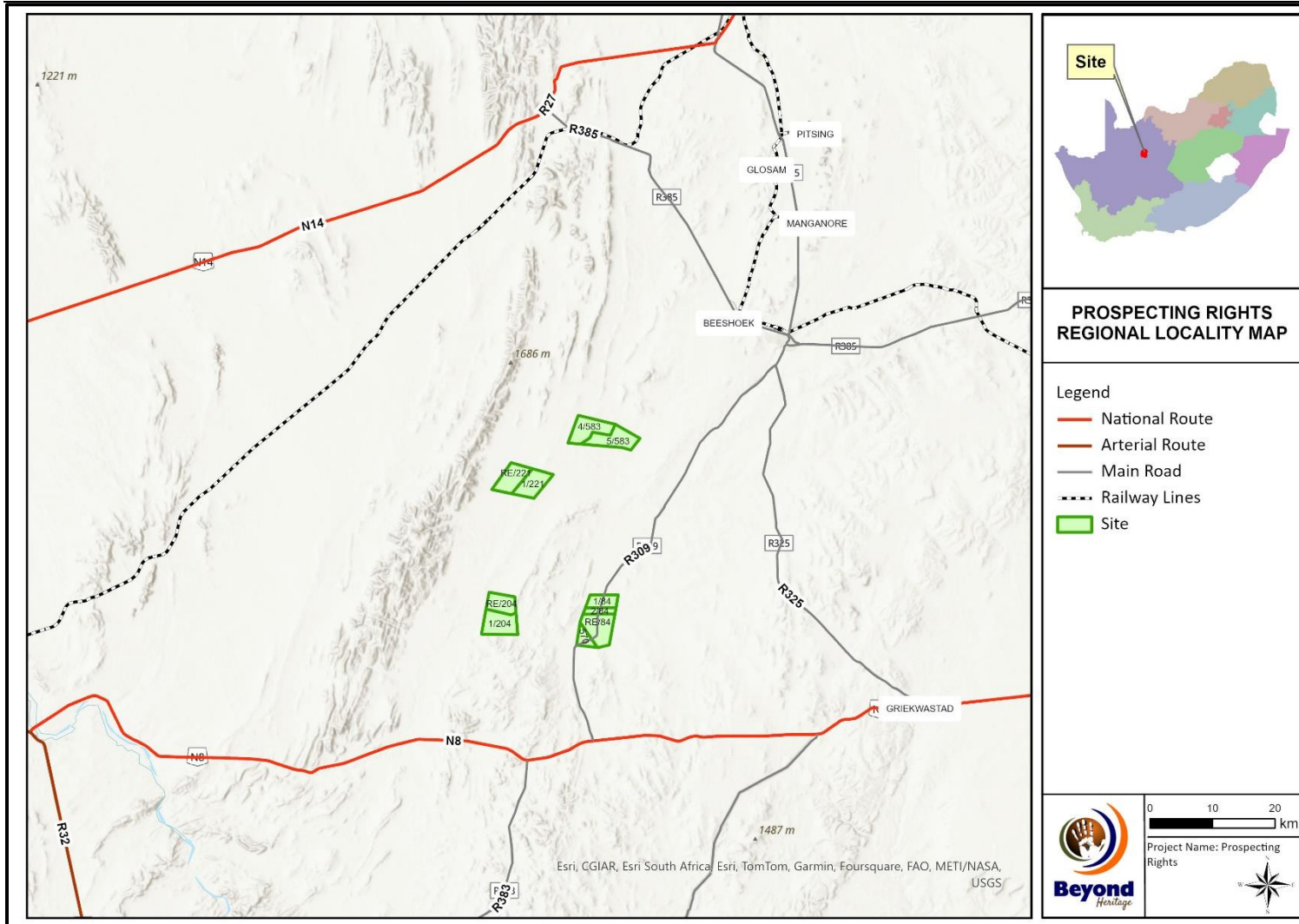


Figure 1.2. Regional setting of the southern Project areas (Extract of the 2822 1: 250 000 topographical map).

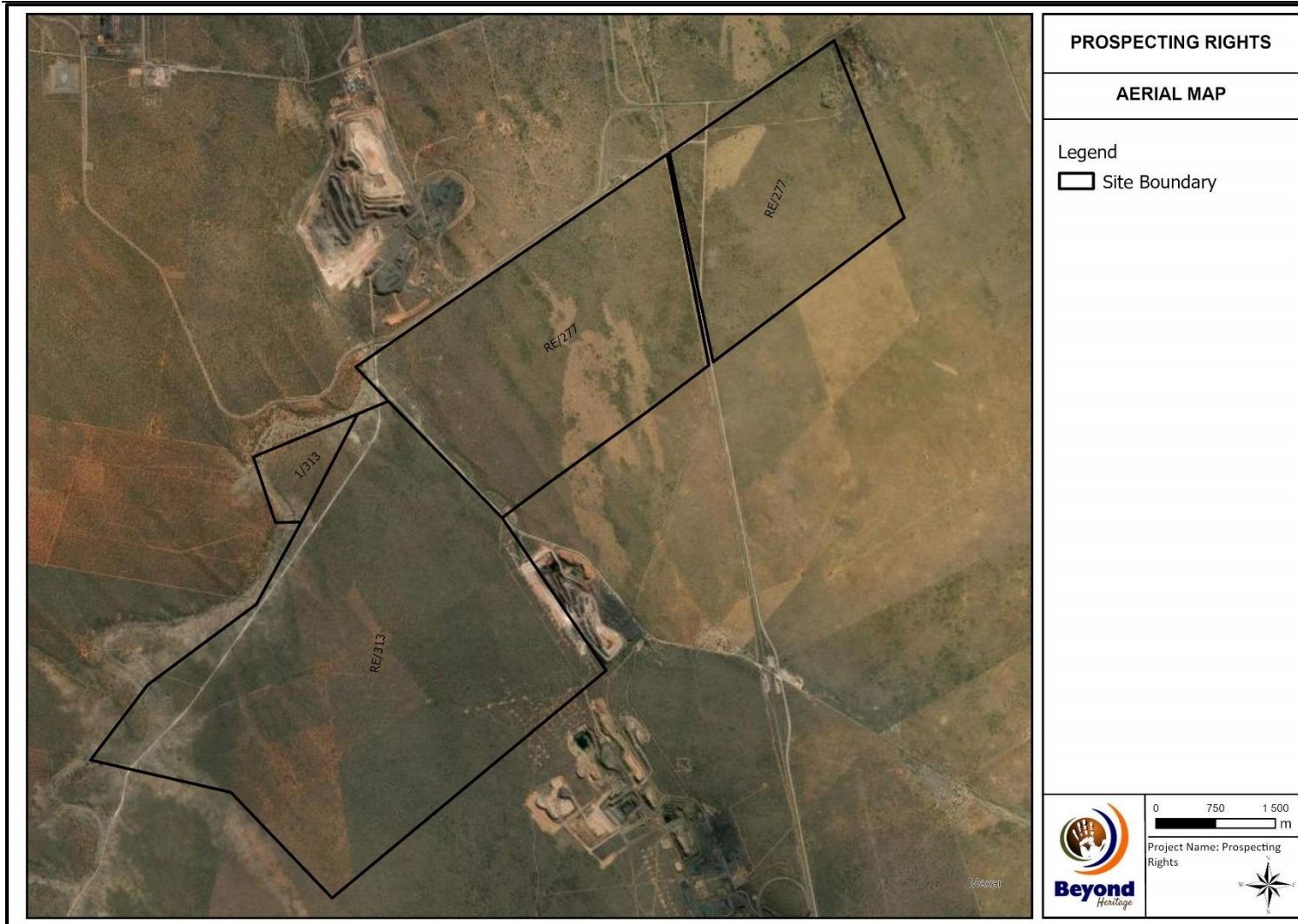


Figure 1.3. Aerial image of the northern Project areas and surrounds.

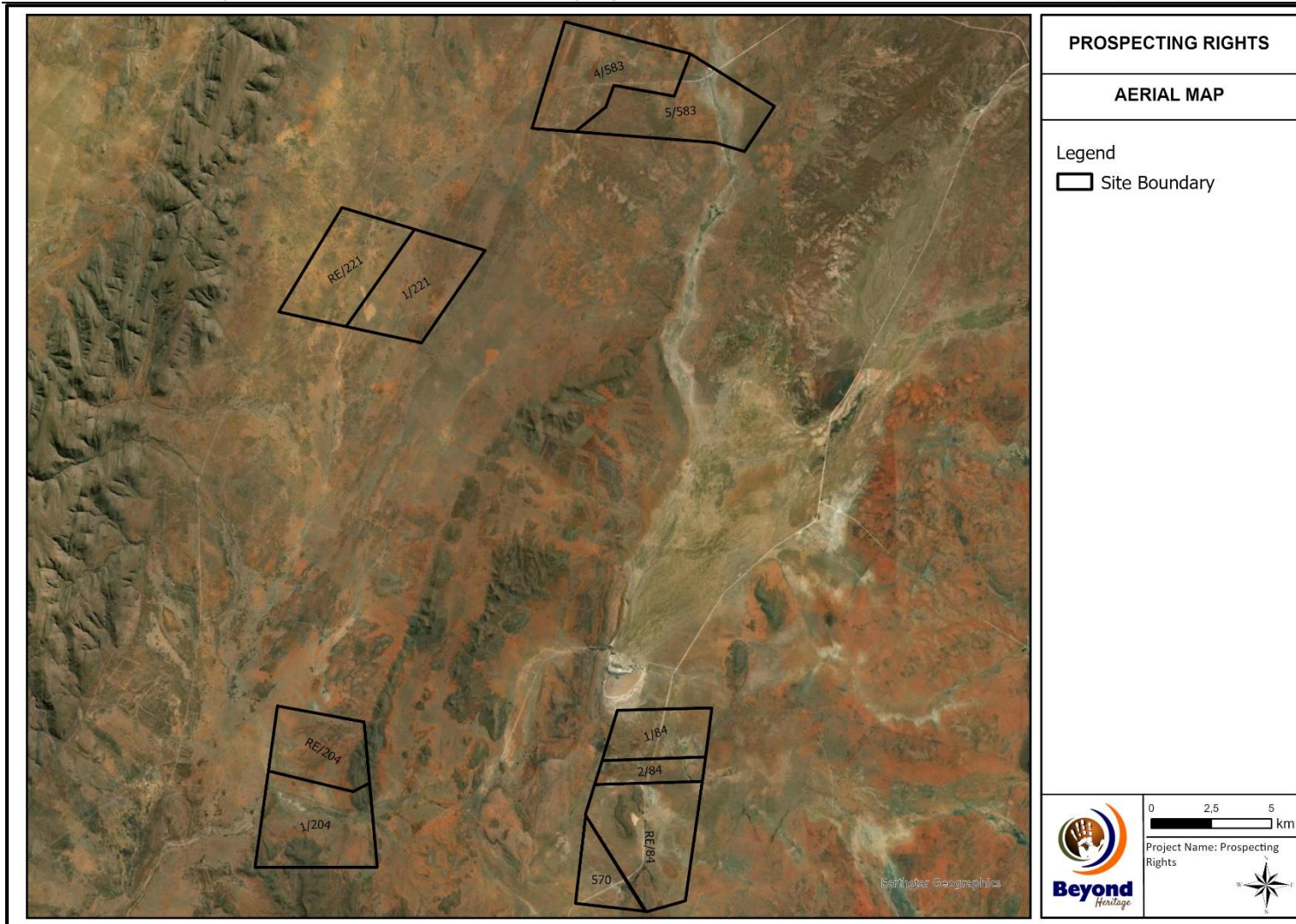


Figure 1.4. Aerial image of the southern Project area and surrounds.

1.1 Terms of Reference

The main aim of this desktop report is to determine if any known heritage resources occur within the project site. The objectives of the desktop report were to:

- » Conduct a desktop study:
 - * Review available literature, previous heritage studies and other relevant information sources to obtain a thorough understanding of the archaeological and cultural heritage conditions of the area;
 - * Identify known and recorded archaeological and cultural sites; and
 - * Determine whether the area is renowned for any cultural and heritage resources, such as Stone Age sites, informal graveyards or historical homesteads.
- » Compile a specialist Heritage Desktop Report in line with the requirements of the EIA Regulations, 2014, as amended on 07 April 2017.

The reporting is based on the results and findings of a desktop study, wherein potential issues associated with the proposed project will be identified. Reporting will aim to identify the anticipated impacts, as well as cumulative impacts, of the operational units of the proposed project activity on the identified heritage resources for all 3 development stages of the project, i.e. construction, operation and decommissioning. Reporting will also consider alternatives should any significant sites be impacted on by the proposed project. This is done to assist the developer in managing the discovered heritage resources in a responsible manner, in order to protect, preserve and develop them within the framework provided by Heritage Legislation.

When the localities of the invasive prospecting activities are fixed, the following terms will apply:

Field study (Walkdown)

Conduct a field study to: (a) locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; b) record GPS points of sites/areas identified as significant areas; c) determine the levels of significance of the various types of heritage resources affected by the proposed development.

Reporting

Report on the identification of anticipated and cumulative impacts the operational units of the proposed project activity may have on the identified heritage resources for all 3 phases of the project; i.e., construction, operation and decommissioning phases. Consider alternatives, should any significant sites be impacted adversely by the proposed project. Ensure that all studies and results comply with the relevant legislation, SAHRA minimum standards and the code of ethics and guidelines of ASAPA.

To assist the developer in managing the discovered heritage resources in a responsible manner, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act No 25 of 1999).

1.2 Project Description

Project components and the location of the Project are outlined in Tables 2 and 3.

Table 2: Project Description

Farm Name:	<ol style="list-style-type: none"> 1. Remaining Extent of the farm Botha No 313 2. Portion 1 of the farm Botha No 313 3. Remaining Extent of the farm Devon No 277 4. Portion 1 of the farm Devon No 277 5. Portion 4 of the farm Bermolli No 583 6. Portion 5 of the farm Bermolli No 583 7. Remaining Extent of the farm Engelsdraai No 221 8. Portion 1 of the farm Engelsdraai No 221 9. Remaining Extent of the farm Witdraai No 204 10. Portion 1 of the farm Witdraai No 204 11. Remaining Extent of the farm Vaalwater No 84 12. Portion 1 of the farm Vaalwater No 84 13. Portion 2 of the farm Vaalwater No 84 14. Remaining Extent of Farm No 570
Application area (Ha)	15 602.0765 ha
Magisterial district	<ul style="list-style-type: none"> ❖ Hay Administrative District, and ❖ Kuruman Administrative District
Distance and direction from nearest town	<p>Farms Botha No 313 and Devon No 277 are ±20 km east of Hotazel when travelling along the R380 in a south-eastern direction.</p> <p>Farms Bermolli No 583, Engelsdraai No 221, Witdraai No 204, and Vaalwater No 84 are between 30 km and 60 km south-west of Postmasburg when driving along the R383 in a southern direction.</p>
21 digit Surveyor General Code for each farm portion	<ol style="list-style-type: none"> 1. C0410000000031300000 2. C0410000000031300001 3. C0410000000027700000 4. C0410000000027700001 5. C0310000000058300004 6. C0310000000058300005 7. C0310000000022100000 8. C0310000000022100001 9. C0310000000020400000 10. C0310000000020400001 11. C0310000000008400000 12. C0310000000008400001 13. C0310000000008400002 14. C0310000000057000000

1:50 000 Topographic Map Number	2722BB, BD 2822BD, DA, DB, DD
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Table 3: Infrastructure and project activities

Type of development	Prospecting Application
Description of the overall activity.	<p>The Applicant, K2022641005 (SOUTH AFRICA) (Pty) Ltd, applied for a prospecting right (PR) with bulk sampling, and environmental authorisation (EA) for diatomite (SiO₂_nH₂O) /diatomaceous earth / kieselguhr (hereafter referred to as kieselguhr) over 15 602.0765 ha that extends over the properties within the Hay and Kuruman Administrative Districts of the Northern Cape.</p> <p>Should the relevant authorisations be granted, and the project commence the principal prospecting activities will entail the following:</p> <ul style="list-style-type: none"> ❖ Non-Invasive Prospecting: <ul style="list-style-type: none"> ◆ Desktop geological studies (Phase 1), ◆ Geological field mapping (Phase 2), ◆ Feasibility studies and target selection (Phase 4 & 6), ◆ Metallurgical Testing and Analysis (Phase 4), ❖ Invasive Prospecting (with bulk sampling): <ul style="list-style-type: none"> ◆ Drilling and excavation of trenches, exploration pits and collecting of bulk samples (Phase 3 & 5), ◆ Sloping, landscaping, and rehabilitation the affected areas (Phase 3 & 5). <p>The site layout plan can only be compiled once the bulk sampling target areas were identified following the non-invasive prospecting phases.</p>

1.3 Alternatives

Presently, the project proposal entails the prospecting of 15 602.0765 ha area over the above listed properties. The proposed footprint of the PR application was based on the available geological information which is of interest to kieselguhr.

2 Legislative Requirements

The HIA, as a specialist study to the EIA, is required under the following legislation:

- National Heritage Resources Act ((NHRA), Act No. 25 of 1999)
- National Environmental Management Act ((NEMA), Act No. 107 of 1998 - Section 23(2)(b))

A Phase 1 HIA is a pre-requisite for development in South Africa as prescribed by SAHRA and stipulated by legislation. The overall purpose of heritage specialist input is to:

- Identify any heritage resources, which may be affected;
- Assess the nature and degree of significance of such resources;
- Assess the negative and positive impact of the development on these resources; and
- Make recommendations for the appropriate heritage management (or avoidance) of these impacts.

The HIA should be submitted, as part of the impact assessment report or EMP, to the Provincial Heritage Resource Agency (PHRA) or to The South African Heritage Resources Agency (SAHRA). SAHRA will

ultimately be responsible for the evaluation of Phase 1 HIA reports upon which review comments will be issued. 'Best practice' requires Phase 1 HIA reports and additional development information, as per the impact assessment report and/or EMPr, to be submitted in duplicate to SAHRA after completion of the study. SAHRA accepts Phase 1 HIA reports authored by professional archaeologists, accredited with ASAPA or with a proven ability to do archaeological work.

SAHRA as a commenting authority under section 38(8) of the NHRA require all environmental documents, compiled in support of an EA application as defined by the National Environmental Management Act (NEMA) (Act No 107 of 1998) to be submitted to SAHRA for commenting. Environmental Impact Assessment (EIA) Regulations section 40 (1) and (2). The Environmental Impact Assessment (EIA) Regulations, Government Notice Regulation (GN) R.982 were published on 04 December 2014 and promulgated on 08 December 2014. Together with the EIA Regulations, the Minister also published GN R.983 (Listing Notice No. 1), GN R.984 (Listing Notice No. 2) and GN R.985 (Listing Notice No. 3) in terms of Sections 24(2) and 24D of the NEMA, as amended) Upon submission to SAHRA the project will be automatically given a case number as reference. As such the EIA report and its appendices must be submitted to the case as well as the EMPr, once it's completed by the Environmental Assessment Practitioner (EAP).

Minimum accreditation requirements include an Honours degree in archaeology or related discipline and 3 years post-university CRM experience (field supervisor level). Minimum standards for reports, site documentation and descriptions are set by ASAPA in collaboration with SAHRA. ASAPA is based in South Africa, representing professional archaeology in the SADC region. ASAPA is primarily involved in the overseeing of ethical practice and standards regarding the archaeological profession. Membership is based on proposal and secondment by other professional members.

Phase 1 HIAs are primarily concerned with the location and identification of heritage sites situated within a proposed development area. Identified sites should be assessed according to their significance (refer to Section 3.5). Relevant conservation or mitigation recommendations should be made. Recommendations are subject to evaluation by SAHRA.

Section 3 of the NHRA distinguishes nine criteria for places and objects to qualify as 'part of the national estate' if they have cultural significance or other special value. These criteria are:

- Its importance in/to the community, or pattern of South Africa's history;
- Its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- Its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- Its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- Its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- Its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- Its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa;
- Sites of significance relating to the history of slavery in South Africa

Conservation or mitigation recommendations, as approved by SAHRA, are to be used as guidelines in the developer's decision-making process.

Phase 2 archaeological projects are primarily based on salvage/mitigation excavations preceding development destruction or impact on a site. Phase 2 excavations can only be conducted with a permit, issued by SAHRA to the appointed archaeologist. Permit conditions are prescribed by SAHRA and includes

(as minimum requirements) reporting back strategies to SAHRA and deposition of excavated material at an accredited repository.

In the event of a site conservation option being preferred by the developer, a site management plan, prepared by a professional archaeologist and approved by SAHRA, will suffice as minimum requirement. After mitigation of a site, a destruction permit must be applied for with SAHRA by the applicant before development may proceed.

Human remains older than 60 years are protected by the National Heritage Resources Act, with reference to Section 36 and GNR 548 as well as the SAHRA BGG Policy 2020. Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 of the National Heritage Resources Act (NHRA), as well as the National Health Act of 2003 and are the jurisdiction of SAHRA. The procedure for Consultation Regarding Burial Grounds and Graves (Section 36[5]) of Act 25 of 1999 is applicable to graves older than 60 years that are situated outside a formal cemetery administered by a local authority. Graves in this age category, located inside a formal cemetery administered by a local authority, require the same authorisation as set out for graves younger than 60 years, in addition to SAHRA authorisation. If the grave is not situated inside a formal cemetery, but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws, set by the cemetery authority, must be adhered to.

Human remains that are less than 60 years old are protected under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance No. 7 of 1925) re-instituted by Proclamation 109 of 17 June 1994 and implemented by CoGHSTA as well as the National Health Act 2003 and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the office of the relevant Provincial Premier. Authorisation for exhumation and reinterment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. To handle and transport human remains, the institution conducting the relocation should be authorised under the National Health Act of 2003

3 METHODOLOGY

3.1 Literature Review and background study

A brief survey of available literature was conducted to extract data and information on the area in question to provide general heritage context into which the development would be set. This literature search included published material, unpublished commercial reports and online material, including reports sourced from the South African Heritage Resources Information System (SAHRIS). Findings are included in Section 6.1 and 6.2.

3.2 Genealogical Society and Google Earth Monuments

Google Earth and 1:50 000 topographic maps of the area were utilised to identify possible places of heritage sensitivity might be located; these locations were marked and visited during the fieldwork phase. The database of the Genealogical Society of South Africa (GSSA) was consulted to collect data on any known graves in the area. Results are included in Section 6.3.

3.3 Public Consultation and Stakeholder Engagement:

Stakeholder engagement is a key component of any EIA process, it involves stakeholders interested in, or affected by the proposed development. Stakeholders are provided with an opportunity to raise issues of concern (for the purposes of this report only heritage related issues will be included). The aim of the public consultation process undertaken by the EAP was to capture and address any issues raised by community members and other stakeholders. Results are included in Section 5 and the final EIA report.

3.4 Site Significance and Field Rating

The presence and distribution of heritage resources define a 'heritage landscape'. In this landscape, every site is relevant. In addition, because heritage resources are non-renewable, heritage surveys need to investigate an entire Project area, or a representative sample, depending on the nature of the project. In the case of the proposed Project the local extent of its impact necessitates a representative sample and only the footprint of the areas demarcated for development were surveyed. In all initial investigations, however, the specialists are responsible only for the identification of resources visible on the surface. This section describes the evaluation criteria used for determining the significance of archaeological and heritage sites. The following criteria were used to establish site significance with cognisance of Section 3 of the NHRA:

- The unique nature of a site;
- The integrity of the archaeological/cultural heritage deposits;
- The wider historic, archaeological and geographic context of the site;
- The location of the site in relation to other similar sites or features;
- The depth of the archaeological deposit (when it can be determined/is known);
- The preservation condition of the sites; and
- Potential to answer present research questions.

In addition to this criteria field ratings prescribed by SAHRA (2006), and acknowledged by ASAPA for the SADC region, were used for the purpose of this report. The recommendations for each site should be read in conjunction with section 9 of this report.

Table 4. Heritage significance and field ratings

<i>FIELD RATING</i>	<i>GRADE</i>	<i>SIGNIFICANCE</i>	<i>RECOMMENDED MITIGATION</i>
National Significance (NS)	Grade 1	-	Conservation; national site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; provincial site nomination
Local Significance (LS)	Grade 3A	High significance	Conservation; mitigation not advised
Local Significance (LS)	Grade 3B	High significance	Mitigation (part of site should be retained)
Generally Protected A (GP. A)	-	High/medium significance	Mitigation before destruction
Generally Protected B (GP. B)	-	Medium significance	Recording before destruction
Generally Protected C (GP.C)	-	Low significance	Destruction

3.5 Impact Assessment Methodology

The criteria below are used to establish the impact rating on sites:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- The **duration**, wherein it will be indicated whether:
 - * the lifetime of the impact will be of a very short duration (0-1 years), assigned a score of 1;
 - * the lifetime of the impact will be of a short duration (2-5 years), assigned a score of 2;
 - * medium-term (5-15 years), assigned a score of 3;
 - * long term (> 15 years), assigned a score of 4; or
 - * permanent, assigned a score of 5;
- The **magnitude**, quantified on a scale from 0-10 where; 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1-5 where; 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- The **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- the **status**, which will be described as either positive, negative or neutral.
- the degree to which the impact can be reversed.
- the degree to which the impact may cause irreplaceable loss of resources.
- the *degree* to which the impact can be mitigated.

The **significance** is calculated by combining the criteria in the following formula:

$$S = (E + D + M) P$$

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e., where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- 60 points: High (i.e., where the impact must have an influence on the decision process to develop in the area).

3.6 Assumptions and limitations of the study

The authors acknowledge that the brief literature review is not exhaustive on the literature of the area. Due to the vast project areas and the fact that the impact areas for invasive activities have not been finalised, the study area was not subjected to a field survey at this stage in the environmental process, it is recommended that this will be done when the actual exploration localities are fixed. It is assumed that information obtained for the wider area is applicable to the study area. It is possible that new information could come to light in future, which might change the results of this Impact Assessment.

4 Description of Socio-Economic Environment

(Information extracted from the Final IDP 2017 – 2022 John Taolo Gaetsewe District Municipality and the ZF Mgqawu District Municipality Draft Integrated Development Plan 2017- 2022 – Annual Review 2018/2019) (Fouche 2024).

The farms Devon No 277 and Botha No 313 are within Ward 04 of the Joe Morolong Local Municipality (JMLM) that forms part of the John Taolo Gaetsewe District Municipality (JTGDM). The JTGDM is the second smallest district in the Northern Cape, occupying only 6% of the province. JMLM covers the second largest area of the district municipality. There are 186 towns and settlements of which the majority are villages in the JMLM.

The population of the JTGDM has had an increase of about 17 465; from 2011 to 2016. There has been a major decline of about 6.3% in the population of JMLM that is mainly due to the out-migration from the municipality to the Ga-Segonyana and Gamagara Local Municipalities.

The farms Bermolli No 583, Engelsdraai No 221, Witdraai No 204 and Vaalwater No 84 are within wards 1 and 7 respectively of the Tsantsabane Local Municipality (TLM). The TLM is one of six local municipalities within the ZF Mgqawu District Municipality (ZFMDM) that is classified as a Category C municipality of the Northern Cape Province. The seat of the TLM is in Postmasburg with the municipal area including the towns/settlements of Boichoko, Postdene, New Town, Stasie, Groen Water, Skyfontein, Jean Heaven, Marenane, and Beeshoek. According to the revised population estimates based on the 2011 (Statistics South Africa, 2011), the TLM has a population of 35 093 (compared to the 2001 Census estimate of 27 082). This population accounts for 12% of the total population residing in the ZF Mgqawu District, making it the third most populated local municipality in the district following the //Khara Hais Local Municipality and the Kai Garib Local Municipality. The TLM has a population growth rate of 2.59%, compared to the 17.8% growth rate of the ZFMDM. South Africa is estimated to have an average annual growth rate of 1.4% which is less than that of TLM's growth rate.

5 Results of Public Consultation and Stakeholder Engagement:

In line with the NHRA, stakeholder engagement is a key component of any EA process, it involves stakeholders interested in, or affected by the proposed development. At the time of writing no heritage concerns have been raised. The relevant landowners, stakeholders and I&AP's were informed of the prospecting right application by means of an advertisement in the Noordkaap Bulletin, and on-site notices that were placed at conspicuous places. A notification letter inviting comments on the DSR over a 30-days commenting period (ending 25 March 2024) was sent to the landowners, lawful occupier, neighbouring landowners, stakeholders, and any other I&AP that may be interested in the project. Further to this an advertisement was placed in the Noordkaap Bulletin inviting the surrounding landowners whose contact details could thus far not be obtained to register on the project. All the notices and advertisements were available in both Afrikaans and English.

6 Contextualising the study area

6.1 Archaeological Background

6.1.1 Stone Age

South Africa has a long and complex Stone Age sequence of more than 2 million years. The broad sequence includes the Later Stone Age, the Middle Stone Age and the Earlier Stone Age. Each of these phases contains sub-phases or industrial complexes, and within these we can expect regional variation regarding characteristics and time ranges. For (CRM) purposes it is often only expected/ possible to identify the presence of the three main phases. Yet sometimes the recognition of cultural groups, affinities or trends in technology and/or subsistence practices, as represented by the sub-phases or industrial complexes, is achievable. The three main phases can be divided as follows;

- » Later Stone Age (LSA); associated with Khoi and San societies and their immediate predecessors. - Recently to ~30 thousand years ago.
- » Middle Stone Age (MSA); associated with Homo sapiens and archaic modern human - . 30-300 thousand years ago.
- » Earlier Stone Age (ESA); associated with early Homo groups such as Homo habilis and Homo erectus. - 400 000-> 2 million years ago.

The area in and surrounding Kathu is referred to as the Kathu Complex which is comprised of several Stone Age sites of varying heritage significance. A series of 11 localities which have been exposed due to sinkhole formations belong to the Kathu Complex (Beaumont 1990, Lukich et al 2019). The Kathu Pans form an important aspect of the study of human evolution due to the expansive occupation within the region. Evidence of the oldest lithic assemblage of the Fauresmith industry, dating back 500 thousand years can be found at the site of Kathu Pan 1 (Wilkins and Chazan 2012). Lithic assemblages found at Kathu Pan 1 show continued hominin occupation throughout the ESA, MA and LSA. Lithic technology at Kathu Pan 1 suggests one of the earliest pieces of evidence for the use of spears for hunting and blade production (Wilkins and Chazan 2012). On the farm Sims 462 Kathu Pan 6, 8,9,10, and 11 are found within a sinkhole that was caused by sediment collapse. Artefacts found on the farm Sims are associated with the Middle and Late Stone Age. Excavations on farm Sacha recovered Acheulean to Late Stone Age material from Kathu Pan 1. Stone tools recovered from the excavations are stored at the McGregor Museum (Beaumont 2000).

To the east of the town of Kathu, a site called the Townlands was discovered in 1980 by the landowner. Excavations and analysis of the site discovered the densest Stone Age scatter with over a million artefacts being recovered from the site (Chazan 2021). An in-situ quarry is speculated to have been made use of at Kathu Townlands, indicating the local procurement of materials as well as the local production of stone tools within the area (Walker et al 2014). The site itself spans roughly 12 hectares in size and is an important archaeological site pertaining to early human activity within the country. In 2013, the Kathu Townlands was declared a Grade 1 National Heritage site (Walker et al 2014).

Excavations at the Wonderwerk Cave situated in the Kuruman Hills yielded a deep deposit rich with Stone Age materials. The cave shows a long period of hominin occupation as the cave was used throughout the Stone Age. Rock engravings can also be found within the cave (Beaumont and Vogel 2006). Due to the importance of the finds, the cave has been registered as a National Heritage Site by SAHRA. Closer to Kuruman two shelters on the northern and southern faces of GaMohaana (in the Kuruman Hills northwest of the town) contain Later Stone Age remains and rock paintings. Archaeological surveys have shown rocky outcrops and hills, drainage lines, riverbanks, and confluences to be prime localities for archaeological finds and specifically Stone Age sites, as these areas were utilized for settlement of base camps close to water and hunting ranges.

Sotho-Tswana and Nguni societies, the descendants of the LIA mixed farming communities, found the region already sparsely inhabited by the Late Stone Age (LSA) Khoisan groups, the so-called 'first people'. Most of them were eventually assimilated by LIA communities and only a few managed to survive, such as the Korana and Griqua. This period of contact is referred to as the Ceramic Late Stone Age (De Jong 2010) and is represented by the Blinkklipkop specularite mine near Postmasburg and a cluster of important finds at Kathu Pan. Kathu Pan has been the subject of numerous heritage studies and is a notable heritage site (Beaumont 2004, Wilkins et al 2012). Additional specularite workings with associated Ceramic Later Stone Age material and older Fauresmith sites (early Middle Stone Age) are known from Lylyfeld, Demaneng, Mashwening, King, Rust & Vrede, Paling, Gloucester and Mount Huxley (Morris 2005).

Stone Age artefacts are often recorded at industrial sites similar to the mining activities at Makganyane and the effects of heavy-duty earth moving machinery on the formation of lithic debitage at open-air Stone Age/Palaeolithic sites was examined by Bradfield and Van der Walt (2018) at a site close to Kathu. The experiment with heavy-duty machinery produced only one pseudo-formal tool, most of the debitage produced mimics that occasioned by knapping, and this could attribute to some of the debitage/ artefacts identified on industrial sites.

6.1.2 Iron Age

Bantu-speaking people moved into Eastern and Southern Africa about 2,000 years ago (Mitchell 2002). These people cultivated sorghum and millets, herded cattle and small stock and manufactured iron tools and copper ornaments. Because metalworking represents a new technology, archaeologists call this period the Iron Age. Characteristic ceramic styles help archaeologists to separate the sites into different groups and time periods. The Iron Age as a whole represents the spread of Bantu speaking people and includes both the Pre-Historic and Historic periods. It can be divided into three distinct periods:

- » The Early Iron Age (EIA): Most of the first millennium AD.
- » The Middle Iron Age (MIA): 10th to 13th centuries AD.
- » The Late Iron Age (LSA): 14th century to colonial period.

Iron Age expansion southwards past Kuruman into the Ghaap Plateau and towards Postmasburg dates to the 1600's (Humphreys, 1976 and Thackeray, 1983). Definite dates for Tswana presence in the Postmasburg area are around 1805 when Lichtenstein visited the area and noted the mining activities of the Tswana (probably the Thlaping) tribes in the area. The Thlaro and Thlaping settled the area from Campbell in the east to Postmasburg and towards the Langeberg close to Olifantshoek in the north west before 1770 (Snyman, 1988). The Korana expansion after 1770 started to drive the Thlaro and Thlaping further north towards Kuruman (Shillington, 1985). Morris (2005) indicated that 3 Iron Age sites are on record within the area (Demaneng, Lylyveld and Kathu).

6.1.3 Historical Background

The 'Eye' and the water course springing from it have been a focus of utilization and settlement and it was in its immediate vicinity that Kuruman, as town, evolved from the late nineteenth century. Kuruman's name is thought to be derived from the name of an 18th century San leader Kudumane.

The earliest documented exploration of this region by European explorers occurred in 1801 when P.J. Truter and Dr. W. Somerville crossed the Orange River near Prieska and traversing through Blinkklip en route to what is now Kuruman (Bergh 1999). In the same period, William Anderson and Cornelius Kramer, representing the London Missionary Society, founded a mission station called Leeuwenkuil. Their primary focus was on a community referred to as 'the Bastards', a group characterized by a mix of cultural backgrounds stemming from various racial and cultural unions, including European and Khoi ancestry, as well as remnants of Khoi and San groups and liberated slaves. This diverse group eventually came to be

known as the Griqua (Erasmus, 2004). Due to the persistent threat posed by lions in the vicinity of Leeuwenkuil, the mission station was relocated in 1805 to Klaarwater. In 1813, the settlement that had developed there was officially renamed Griquatown. This change was proposed by Reverend John Campbell, Director of the London Missionary Society, during his visit to the area (Raper 2004).

On the 20th of December 1820, Andries Waterboer was elected to replace Berend Berends as leader of Griquatown. This would lead to tensions between Waterboer and the Griqua and during the 1820s, a group of Griqua left Griquatown and settled along the Modder River and became known as the Bergenaars. The Bergenaars would often attack the Thlaro, Thlaping, and Griqua. They also undertook various attacks on Griquatown and the mission station in Kuruman which Robert Moffat had established in 1824.

A treaty was signed on the 22nd of April 1842 between Griqua leader Andries Waterboer and Thlaping leader Mahura at Mahura's settlement near Taungs. This agreement was comprehensive, encompassing an allocation of the boundary between the two groups. However, it's essential to recognize that this boundary line was subject to change and negotiation. This demarcation closely resembled an earlier boundary, believed to have been established during the 1820s, marking the division between the Griqua and the Thlaping (Legassick, 2010).

Following the passing of Andries Waterboer, his son, Nicolaas Waterboer, assumed leadership in Griquatown. Nicolaas governed Griquatown until the British annexed the area in 1871 (Legassick 2010). It was under Nicolaas Waterboer's leadership that diamonds were uncovered in the region, sparking a contentious period of competing claims involving the Griqua, the Orange Free State, and the Zuid-Afrikaansche Republiek (ZAR). The area claimed as British territory became known as Griqualand West. Tensions rose in Griqualand West which sparked a rebellion amongst Tswana communities against the British and spread as far as the Langberg mountains.

The British territory grew as the whole area between Griqualand West and the Modder River was proclaimed the Crown Colony of British Bechuanaland. This included various areas which had been occupied by Tswana communities. This led to various 'native reserves' being established in Deben, Gathose, Langberg, and Kathu (Snyman 1986). In 1895, the Crown Colony of British Bechuanaland was annexed by the Cape Colony.

In the late 1890s, Rinderpest became widespread, and the residents were unable to stop the spread of the viral disease in cattle. The Rinderpest epidemic also sparked the Langberg Rebellion of 1897 whereby conflicts rose between authorities and Galeshiwe, a Thlaping leader from Taung. The conflict erupted when government representatives destroyed infected cattle belonging to Galishewe as a measure to halt the spread of disease. In retaliation, Galishewe killed an officer and fled to seek refuge with the Thlaro leader Toto of the Langberg. This incident triggered a widespread rebellion (Breutz 1963). The British authorities responded by assembling a military force, which included units from the Cape Mounted Rifles and Bechuanaland Field Force. By March 14, 1897, this force numbered approximately 1,000 men. In contrast, the Tswana rebels, facing serious shortages of provisions and ammunition from the outset of the rebellion, fielded an army of around 1,500 men (Snyman 1986). Despite their numerical advantage, the rebels faced a formidable and well-equipped British force supported by artillery. The rebellion was quelled and concluded when rebel leader Toto, along with his son Robanyane and their Thlaro followers, surrendered on the 2nd of August 1897 (Snyman 1986).

6.1.4 Historical Mining

The South African Railways Administration's intention to extend the railway line from Postmasburg to Kapstewel and Lohatla, transformed the entire manganese industry north of Postmasburg. This marked a significant milestone as Postmasburg became one of the select towns in the Northern Cape with a direct rail connection. While the railway extension to Beeshoek was constructed by the Manganese Corporation, subsequent extensions to Lohatla and Manganore, Sishen, and Hotazel were undertaken by the South African Railways (Snyman 1983). The prospect of railway extensions to this region also spurred other mining ventures, such as the establishment of Gloucester Manganese, a mining company formed to exploit manganese deposits on the farm Gloucester. Shortly thereafter, Gloucester Manganese merged with the Manganese Corporation to create the Associated Manganese Mines of South Africa Limited (Ammosal). Ammosal reconstructed the old ore handling plant from Beeshoek on the farm Gloucester, with operations here contributing significantly to the overall manganese production of 250,000 tons (S.A. Manganese, 1977).

In 1930, an Englishman named Pringle-Smith was appointed by S.A. Manganese to develop and implement a comprehensive prospecting program for the company's properties (S.A. Manganese 1977:46). This initiative aimed to resume prospecting work that had been initiated in 1927 but had been halted due to unfavourable financial conditions and the absence of a railway connection. Pringle-Smith swiftly commenced opening the mineral beds on the farms Kapstewel and Doornput. However, despite these efforts, S.A. Manganese lacked the market presence enjoyed by entities like the Manganese Corporation at that time. Consequently, the ore extracted was stockpiled at these two farms. Pringle-Smith departed from the Postmasburg area in 1932, driven by the intensified financial challenges of the Great Depression. His departure was prompted by S.A. Manganese's need to adjust his salary significantly downward (S.A. Manganese 1977). The economic repercussions of the Great Depression led to the closure of several smaller manganese mining companies. This period of economic hardship prompted a wave of merging and amalgamation within the industry. As a result, South African Manganese Limited and Associated Manganese Miners of South Africa Limited emerged as the dominant players in the manganese mining sector (Snyman 1983).

In the 1930s, the South African Geological Survey conducted a geological assessment of the minerals and ore deposits in the Postmasburg District. Among the team members was Dr. Leslie Gray Boardman, tasked with investigating manganese and hematite deposits in the district. In addition to identifying manganese deposits near Postmasburg, Dr. Boardman also discovered substantial iron ore deposits on farms situated along the northern extent of their study area, including Sishen, Bruce, and King (S.A. Manganese 1977).

From 1937, S.A. Manganese began acquisitions for various farms for mining. They would also establish a staff village to supplement for labour needed for the mining. In the 1940s, S.A. Manganese and the African Metals Corporation (Amcor), established a new company called Manganore Iron Mining Lt in order to mine iron ore. Dr Boardman had later convinced S.A. Manganese to acquire the farm Lilyveld as his geological survey had uncovered large amounts of haematite iron ore there.

In 1953, Iscor began with iron production at Sishen. The railway line from Postmasburg to Sishen had also been extended in this year in order to send ore to various Iscor plants in Pretoria, Vanderbijlpark, and Newcastle. By 1973, a second mine was established at Sishen and iron ore was exported to Saldanha Bay. This growth in the mining industry led to the establishment of the town of Kathu to house mine workers. By 1977, the Sishen-Saldanha railway line was completed.

6.2 Literature Review (SAHRIS)

Several Cultural Resource Management (CRM) surveys are on record for the general area and the relevant results of these studies are briefly discussed below and outlined in Table 5.

The Farm Botha 313 was previously surveyed for the proposed new United Manganese of Kalahari (UMK) Mine (Pistorius 2006). Stone tools dating to the Middle and Late Stone Age were found in isolated occurrences within the Farm. The stone tools were recorded along banks of the Witleegte River, in gravel deposits and in a gravel road. It was recommended that the artefacts be collected and stored in a museum and no other significant sites were recorded on the Farm Botha 313.

In 2013, Portion 1 of the Farm Botha was again surveyed and MSA/LSA lithics were recorded along the Ga-Mogara River (Hutten and Hutten 2013). The Farm Devon 277 was also surveyed, and a dilapidated farmhouse and various associated outbuildings of Historical age were recorded. MSA/LSA lithics were also identified along the Witleegte River.

Table 5. Studies consulted for the project.

Author	Year	Project	Findings
Morris, D.	2005a	Archaeological Impact assessment of mining areas on the farms Bruce, King, Mokaning and Parson between Postmasburg and Kathu in the Northern Cape.	Cemeteries, Stone Age sites.
Morris, D.	2005b	Report on a Phase 1 Archaeological Assessment of Proposed Mining Areas on the farms Ploegfontein, Klipbankfontein, Welgevonden, Leeuwfontein, Wolhaarkop and Kapstevél, west of Postmasburg, Northern Cape.	MSA scatters, an LSA shelter site
Morris, D.	2008	Archaeological and Heritage Phase 1 Impact Assessment for Proposed Upgrading of Sishen Mine Diesel Depot Storage Capacity at Kathu, Northern Cape.	MSA scatters.
Hutten, L., Hutten, W.	2013	Heritage Impact Assessment Report for the Farms Devon 277 Portion of Remaining extent and Botha 313 Portion 1.	MSA and LSA lithics, Historical structures.
Beaumont, P.	2005	Heritage Assessment for an EMPR amendment relating to a proposed crusher at Sishen Iron Ore Mine near Kathu in the Northern Cape province.	No sites were identified.
Beaumont, P.	2007	Supplementary Archaeological Impact Assessment Report on Sites near or on the Farm Hartnolls 458, Kgalagadi District Municipality, Northern Cape Province.	Widespread ESA scatters
Beaumont, P.	2008a	Phase 1 Heritage Impact Assessment Report on Portion 463/8 of the Farm Uitkoms 463, near Kathu, Kgalagadi Municipality, Northern Cape Province.	Stone Age scatters
Beaumont, P.	2008b	Phase 1 Archaeological Impact Assessment Report on Areas at Hotazhel Mine on the Farm Hotazhel 280, Kgalagadi District Municipality, Northern Cape Province.	No sites were identified.
Huffman, T.N.	2001	Draft Archaeological Survey of the Smartt/Rissik Mine, Northern Cape.	An isolated MSA lithic.

Fourie, W., van der Walt, J.	2006	Kalahari Manganese Mines: Heritage Assessment on Umtu 281, Olive Pan 282, Gama 283.	A cemetery, Stone Age scatter.
Van der Walt, J.	2012	Aia Report for the Proposed Extension of An Abandoned Gravel Pit on the Farm Harvard 171 in the Kudumane Magisterial District 13km East of Kuruman.	No sites were identified.
Van der Walt, J.	2013	Archaeological Impact Assessment for the Proposed Prospecting Right of a Quarry on the Farm Gamohaam 438 Portion 1 in the Kuruman Magisterial District.	No sites were identified.
Van der Walt, J.	2016	Archaeological Impact Assessment Report for the Proposed Metals Industrial Cluster near Kuruman, Northern Cape Province.	No sites were identified.
Van der Walt, J.	2017	Heritage Impact Assessment for the Proposed Khumani Iron Ore Mine Project, Sishen, Northern Cape.	No sites were identified.
Van der Walt, J.	2019	Heritage Impact Assessment for the Proposed Makganyane Prospecting Application, Postmasburg, Northern Cape Province.	MSA and LSA artefacts, 3 burial sites, 1 feature relating to exploration.
Pistorius, J.C.C.	2006	A Phase 1 Heritage Impact Assessment (HIA) Study for the Proposed New United Manganese of Kalahari (UMK) Mine on the Farms Botha 313, Smartt 314 and Rissik 330 near Hotazel in the Northern Cape Province of South Africa.	Remains of mining activities, Stone Age scatters.
Pistorius, J.C.C.	2008	A Phase I Heritage Impact Assessment (HIA) Study for a Proposed New Power Line for the United Manganese of Kalahari (UMK) Mine near Hotazel in the Northern Cape Province of South Africa.	No sites were identified.
Webley, L., Halkett, D.	2008	Phase 1 Heritage Impact Assessment: Proposed Prospecting on the Farms Adams 328 and Erin 316, Kuruman, Ga-Segonyana Municipality in the Northern Cape.	MSA/LSA scatters, graves, Historical structures and artefacts.
Kaplan, J.	2008	An Archaeological Assessment of Three Borrow Pits Alongside D300 Mothibistad, Northern Cape Province.	Stone Age scatter.
Dreyer, C.	2007	First Phase Archaeological and Cultural Heritage Assessment of the Proposed Garona-Mercury Transmission Power Line, Northern Cape, North-West Province & Free State.	ESA scatters, a cemetery, and traditional settlements.
Angel, J., Fourie, W.	2016	Upgrading of the 66kv Network to a 132kv Network in the Hotazel, Kuruman and Kathu Area, Northern Cape Province – Post Authorisation Walkdown from Mothibistad Substation to Sekgame Switching Station. Heritage Walk Down and Management Plan.	Cemeteries, historic structure, Stone Age site.
Birkholtz, P.	2019	Proposed Extension of Mining Activities and the Widening of a Haul Road on the Farm Lylyveld 545, near Kathu, Northern Cape Province	No sites were identified.

6.3 Google Earth and the Genealogical Society of South Africa (Graves and Burial Sites)

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where archaeological and historical sites might be located. The database of the Genealogical Society of South Africa indicated no known grave sites within the study area.

7 Heritage Baseline

7.1 Description of the Physical Environment

The Project area traverses various vegetation types including Kathu Bushveld, Postmasburg Thornveld, Olifantshoek Plains Thornveld of the Savanna Biome and the Northern Upper Karoo of the Nama-Karoo Biome.

The Kathu Bushveld is described as medium-tall tree layer with *Acacia erioloba* in places, but mostly open and including *Boscia albitrunca* as the prominent trees. Shrub layer generally most important with, for example, *A. mellifera*, *Diospyros lycioides* and *Lycium hirsutum*. Grass layer is variable in cover. The Postmasburg Thornveld is described as flats surrounded by mountains supporting open, shrubby thornveld characterised by a dense shrub layer and often lacking a tree layer; the grass layer is very sparse. Shrubs are generally low and with a karroid affinity. The Olifantshoek Plains Thornveld is described as a very wide and diverse unit on plains with usually open tree and shrub layers with, for example, *Acacia luederitzii*, *Boscia albitrunca* and *Rhus tenuinervis* and with a usually sparse grass layer. The Northern Upper Karoo is described as shrubland dominated by dwarf karoo shrubs, grasses, and *Acacia mellifera* subsp. *detinens* and some other low trees (especially on the sandy soils in the northern parts and vicinity of the Orange River). Flat to generally sloping, with isolated hills of Upper Karoo Hardeveld in the south and Vaalbos Rocky Shrubland in the northeast and with many interspersed pans (Mucina and Rutherford 2006).

The various farms which will undergo non-invasive prospecting covers an area of 15 602.0765 hectares with areas which will be prospected north of Kuruman at Hotazel and various farms west of Postmasburg.

The Kuruman and Asbestos Hills consist of banded iron formation, with jaspilite, chert and riebeckite-asbestos (Mucina and Rutherford 2006). Many stone tools found in the region of Kuruman have been seen to be made from jaspilite. Aeolian red sand can be found across much of the landscape in which the study areas lie.

7.2 Heritage Resources

The various farms earmarked for prospecting are situated within a larger sphere of significant archaeological sites. Stone Age sites and artefacts can be expected across the entirety of the landscape with more significant sites clustered expected on rocky outcrops, hills, and watercourses including pans. Low density scatters relating to the ESA, MSA, and MSA can also be expected in flat plains. The northern farms (Botha 313 and Devon 277) which will be prospected are situated closer to Kuruman which is home to more prominent Stone Age sites of significance.

The following features which have been highlighted within the scoping report on each farm may be focal points on the landscape for the presence of heritage resources:

- Botha 313 – the Ga-Mogara and Witleegte streams runs along the north-western boundary
- Devon 277- the Witleegte stream runs along the farm, a railway line passes through Portion 1 of the farm and will be avoided with a 110m buffer zone;
- Bermolli 583 – a drainage line passes through the farm, a farmyard is present on portion 4;
- Engelsdraai 221- a drainage line slopes towards the middle of the farm, two farmyards are situated on the farm and family graveyards have been noted on the farm;

- Witdraai 204- Hills are prevalent on the farm, two ridges enter the farm at the north-eastern and south-western corners of the farm, a drainage line runs through the farm, a farmyard is present on Portion 1, the Soutloop stream dissects the farm;
- Vaalwater 84- Hills are prevalent in the southern parts of the farm, a farmyard is present on Portion 1 and south of the remainder of the farm, family graveyards have also been noted on the farm, pans are also present on the farm;
- Farm No. 570- Hills present on the Farm Vaalwater 84 continue into the southeastern corner of the Farm No. 570. A drainage line also runs through the farm. Two farmsteads/homesteads are present south of the R383.

The Ga-Mogara and Witleegte streams have previously yielded MSA and LSA stone tools in a previous survey in which surface collection was recommended but as such heritage resources are confirmed within these water courses on farms Botha 313 and Devon 277 (Hutten and Hutten 2013).

These highlighted features, including further features which may be identified during prospecting including rocky outcrops, hills, and water courses should be avoided during non-invasive prospecting as these features are generally concurrent with significant heritage resources within the Karoo landscape. Informal graves may be also present across the landscape.

7.3 Cultural Landscape

The landscape has been mined since the contact period known as the Ceramic Later Stone Age whereby evidence of specularite mining and workings have been documented. The region is mineralogically rich, and mining is a large driving force in the economic sector. The project areas are situated within a landscape which is known for its extensive cultural layering spanning from the Early Stone Age to the Historic Period.

7.4 Paleontological Heritage

According to the SAHRA palaeontological sensitivity map, the various study areas are indicated as moderate and high palaeontological sensitivity (Figure 7.1-7.2), and an independent study was commissioned for this aspect (Bamford 2024).

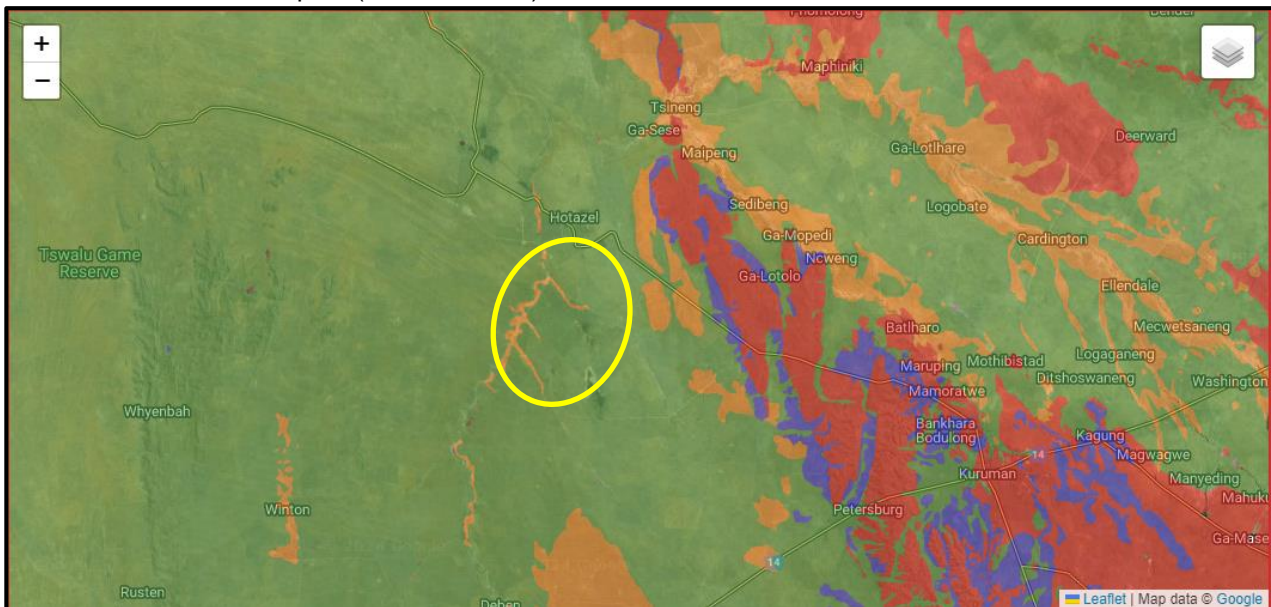
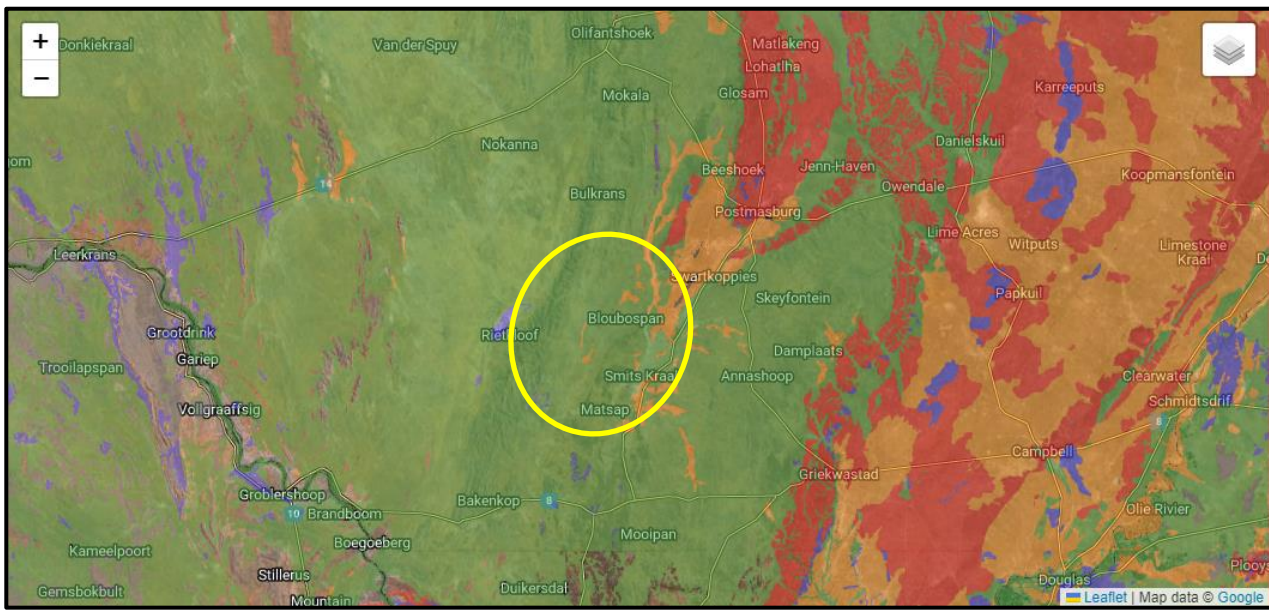


Figure 7.1. Paleontological sensitivity of the northern study areas (yellow polygon) as indicated on the SAHRA Palaeontological sensitivity map.



Colour	Sensitivity	Required Action
RED	VERY HIGH	Field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	Desktop study is required
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	No palaeontological studies are required
WHITE/CLEAR	UNKNOWN	These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map

Figure 7.2. Paleontological sensitivity of the southern study areas (yellow polygon) as indicated on the SAHRA Palaeontological sensitivity map.

8 Assessment of impacts

8.1 Impacts on tangible heritage resources.

It is assumed that the prospecting phase involves the removal of topsoil and vegetation drilling activities and creating new roads to get to the drill points. These activities can result in impacts that include destruction or partial destruction of previously unknown and non-renewable heritage resources.

No direct impacts to heritage resources are expected during non-invasive prospecting. Exact locations selected for bulk-sampling will be subject to a heritage walk-down to ensure heritage resources will not be impacted.

Any additional effects to subsurface heritage resources can be successfully mitigated by implementing a chance find procedure. Mitigation measures as recommended in this report should be implemented during all phases of the project. Impacts of the project on heritage resources is expected to be low during all phases of the development if mitigation measures are followed.

8.1.1 Cumulative impacts

Cumulative impacts considered as an effect caused by the proposed action that results from the incremental impact of an action when added to other past, present, or reasonably foreseeable future actions. (Cornell Law School Information Institute, 2020). Cumulative impacts occur from the combination of effects of various impacts on heritage resources. The importance of identifying and assessing cumulative impacts is that the whole is greater than the sum of its parts. In the case of this project, impacts can be mitigated to an acceptable level. However, when this project proceeds to actual mining this and other projects in the area can have a negative impact on heritage sites, the cultural landscape, and the sense of place.

8.2 Impact Assessment Tables

Table 6. Impact assessment for non-invasive activities of the project

Nature: During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological material or objects.		
	Without mitigation	With mitigation (Preservation/ excavation of site)
Extent	Site specific (1)	Site specific (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (3)	Low (3)
Probability	Probable (3)	Improbable (2)
Significance	27 (Low)	18 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation:		
<ul style="list-style-type: none"> Once the sites for bulk sampling have been confirmed these areas have to be subjected to a heritage walk down, this should be conducted prior to the commencement of prospecting activities; Drill sites must be kept as close as possible to existing roads in order to minimise the impact on the landscape; Focal points on the landscape like rocky outcrops or pans must be avoided as far as possible as these areas could be sensitive from a heritage point of view; Further palaeontological studies should be conducted once the impact areas are confirmed; Monitoring of the project area by the ECO during the exploration phase for heritage chance finds, and if chance finds are encountered to implement the Chance Find Procedure for the project. 		
Residual Impacts:		
If sites are destroyed this results in the depletion of archaeological record of the area and even though surface features can be avoided or mitigated, there is a chance that completely buried sites would still be impacted but this cannot be quantified.		

9 Conclusion and recommendations

The scope of work comprises a heritage desktop report for a large prospecting right area comprising approximately 15 602. 0765 ha across various farms. Due to the geographical size of the exploration application and the fact that no intrusive activities will occur at this point of the application, it was deemed not feasible to conduct fieldwork at this point. Several large-scale heritage surveys were conducted for mining projects in the area and the archaeological character of the area is now well described (e.g., Beaumont 2007; 2008, Morris 2005; 2008, Huffman 2001, Hutten and Hutten 2013, Fourie and van der Walt 2006, Webley and Halkett 2008). Extensive archaeological research has also been conducted at the Kathu Complex and Kuruman (Beaumont 2000). This provides the opportunity to establish potential heritage resources that could be affected in the area. The Farms Botha 313 and Devon 277 have previously undergone archaeological surveying whereby Middle and Later Stone Age artefacts were identified mainly along the Ga-Mogara and Witleegte streams (Hutten and Hutten 2013). It was recommended that the finds be collected and stored in a museum, but the presence of further heritage resources cannot be excluded here as the survey verified the heritage sensitivity of these watercourses.

National Heritage sites of Kathu Townlands and Wonderwerk Cave in the Kuruman Hills are situated near the northern farms which will undergo non-intrusive prospecting. It is clear from the studies conducted that the general area has a wealth of heritage sites and a cultural layering dating back to the Stone Age with scatters and sites dating to the ESA, MSA and LSA. Sites and artefacts dating to these periods are scattered over the landscape with MSA and LSA sites centred on rocky outcrops, pans and watercourses and similar sites are expected to occur in the project areas. Due to the great archaeological significance of the landscape, especially relating to the Stone Age, rocky outcrops, hills, and watercourses such as drainage lines and pans should be avoided as significant Middle and Late Stone Age sites are more likely to be found within these topographical features. Kieselguhr appears to be more prevalent along ancient water courses and paleo-marshes within the Griqualand West area where the southern Project areas are situated (Fouche 2024). These ancient watercourses may however be of high heritage sensitivity and Stone Age sites of significance may be present within these ancient watercourses and should be avoided as far as possible in terms of prospecting.

According to the South African Heritage Resource Authority (SAHRA) Paleontological sensitivity map the study areas are of moderate and high palaeontological sensitivity an independent study was commissioned for this aspect (Bamford 2024).

No intrusive activities will occur at this point of the application and the potential impact on heritage resources is expected to be very low. Final bulk sample trench/pit locations must be subject to a heritage walk-down prior to invasive prospecting.

The impact to heritage resources is expected to be low provided that the recommendations in this report are adhered to, based on the South African Heritage Resource Authority (SAHRA) 's approval.

9.1 Recommendations for condition of authorisation

The following recommendations for Environmental Authorisation apply and the Project may only proceed based on approval from SAHRA:

- Once the bulk sampling trenches/pit sites have been confirmed these areas have to be subjected to a heritage walk down, this should be conducted prior to the commencement of prospecting activities;
- Drill sites must be kept as close as possible to existing roads in order to minimise the impact on the landscape;
- Focal points on the landscape like rocky outcrops, hills, pans, and watercourses must be avoided as far as possible as these areas could be sensitive from a heritage point of view;
- Monitoring of the Project area by the ECO during the exploration phase for heritage and palaeontology chance finds, if chance finds are encountered to implement the Chance Find Procedure for the Project as outlined in Section 9.

9.2 Chance Find Procedure

9.2.1 Heritage Resources

The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped, and a qualified archaeologist must be contacted for an assessment of the find and therefore chance find procedures should be put in place as part of the EMP. A short summary of chance find procedures is discussed below and monitoring guidelines applicable to the Chance Find procedure is discussed below and monitoring guidelines for this procedure are provided in Section 9.5.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this Project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

9.2.2 Monitoring Programme for Palaeontology – to commence once the excavations / drilling activities begin.

1. The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence.
2. When excavations begin the rocks and discard must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (trace fossils, fossils of plants, insects, bone or coalified material) should be put aside in a suitably protected place. This way the Project activities will not be interrupted.
3. Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones. This information will be built into the EMP's training and awareness plan and procedures.
4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
5. If there is any possible fossil material found by the developer/environmental officer then the qualified palaeontologist sub-contracted for this Project, should visit the site to inspect the selected material and check the dumps where feasible.
6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
7. If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the Project has been completed and only if there are fossils.
8. If no fossils are found and the excavations have finished then no further monitoring is required.

9.3 Reasoned Opinion

The overall impact of the Project with the recommended mitigation measures is acceptable and residual impacts can be managed to an acceptable level through implementation of the recommendations made in this report. The socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures are implemented for the Project.

9.4 Potential risk

Potential risks to the proposed Project are the occurrence of intangible features and unrecorded cultural resources (of which graves, and subsurface cultural material are the highest risk). This can cause delays during construction, as well as additional costs involved in mitigation and possible layout changes. The stakeholder engagement process will assess intangible heritage resources further if this is listed as a concern.

9.5 Monitoring Requirements

Day to day monitoring can be conducted by the ECO. The ECO or other responsible persons should be trained along the following lines:

- *Induction training:*
 - Responsible staff identified by the developer should attend a short course on heritage management and identification of heritage resources.
 - Staff should also receive training on the CFP.
- *Site monitoring and watching brief:* As most heritage resources occur below surface, all earth-moving activities need to be routinely monitored in case of accidental discoveries. The greatest potential impacts are from pre-construction and construction activities. The ECO should monitor all such activities. If any heritage resources are found, the chance finds procedure must be followed as outlined above.

Table 7. Monitoring requirements for the Project

Heritage Monitoring					
Aspect	Area	Responsible for monitoring and measuring	Frequency	Proactive or reactive measurement	Method
Cultural Heritage Resource Chance Find	Entire Project area	ECO	Weekly (Pre construction and construction phase)	Proactively	<p>If risks are manifested (accidental discovery of heritage resources) the chance find procedure should be implemented:</p> <ol style="list-style-type: none"> 1. Cease all works immediately; 2. Report incident to the Sustainability Manager; 3. Contact an archaeologist to inspect the site; 4. Report incident to the competent authority; and 5. Employ reasonable mitigation measures in accordance with the requirements of the relevant authorities. <p>Only recommence operations once impacts have been mitigated.</p>

9.7 Management Measures for inclusion in the EMPr

Table 8. Heritage Management Plan for EMPr implementation

Area	Mitigation measures	Phase	Timeframe	Responsible party for implementation	Target	Performance indicators (Monitoring tool)
General project area	<ul style="list-style-type: none"> Once the bulk sampling sites have been confirmed these areas have to be subjected to a heritage walk down, this should be conducted prior to the commencement of prospecting activities; Drill sites must be kept as close as possible to existing roads in order to minimise the impact on the landscape; Focal points on the landscape like rocky outcrops or pans must be avoided as far as possible as these areas could be sensitive from a heritage point of view; 	Prior to exploration	Once off	Project Archaeologist Applicant EPC Contractor	Ensure compliance with relevant legislation and recommendations from SAHRA under Sections 35, 36 and 38 of NHRA	General project area
General project area	Monitoring of the project area by the ECO during pre-construction and construction phases for chance finds, if chance finds are encountered to implement the Chance Find Procedure for the project	During any invasive activities	Weekly	Applicant EPC Contractor	Ensure compliance with relevant legislation and recommendations from SAHRA under Sections 35, 36 and 38 of NHRA	General project area

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