

HERITAGE IMPACT ASSESSMENT

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

**FOR THE PROPOSED PROSPECTING APPLICATION ON PORTION 6 & 7 OF THE
FARM GAMS NO 367, UPINGTON, NORTHERN CAPE PROVINCE**

Type of development:

Prospecting Application

Client:

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Applicant:

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APPROVAL PAGE

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Report Title	Heritage Impact Assessment for the Prospecting Application On Portion 6 & 7 Of The Farm Gams No 367, Northern Cape Province.
Authority Reference Number	TBC
Report Status	Draft Report
Applicant Name	African Exploration Mining and Finance Corporation Soc Ltd

Responsibility	Name	Qualifications and Certifications	Date
Reporting	Jaco van der Walt - Archaeologist	MA Archaeology ASAPA #159 APHP #114	July 2023

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Date	Report Reference Number	Description of Amendment

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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 8 and 9
(g) Identification of any areas to be avoided, including buffers	Section 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 10.1 and 10.5
(l) Conditions for inclusion in the environmental authorisation	Section 10. 1 and 10.5
(m) Monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 10. 4.
(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 10.2
(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; and	Refer to the EA report
(q) Any other information requested by the competent authority	No other information requested at this time

Executive Summary

The proposed prospecting application is located on Portion 6 & 7 Of the Farm Gams No 367 in the Dawid Kruiper Local Municipality, Upington Area, 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 and by a non-intrusive pedestrian field survey. 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 15 065.81 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 drill sites or number of drillholes to be dug is not available at this point;
 - No intrusive activities will occur at this point of the application;
 - Limited site access;
- This desktop study is informed by available data for the area derived from several large-scale heritage surveys conducted for renewable energy and mining projects in the area, and the archaeological character of the region is now well described (e.g., Beaumont 2005 & 2008, Dreyer 2006, Van Ryneveld 2007a & 2007b, Van Schalkwyk 2011, Gaigher 2012, Morris 2012, Fourie 2014, van der Walt 2015, 2019 a and b); and
- According to the SAHRA Paleontological sensitivity map the study area is of moderate sensitivity and a desktop study is required for this aspect.

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

Recommendations:

- Once the drill 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;
- A paleontological desktop study should be conducted f 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.

Declaration of Independence

Specialist Name	Jaco van der Walt
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	10/07/2023

a) Expertise of the specialist

Jaco van der Walt has been practising as a Cultural Resource Management (CRM) archaeologist for 15 years. Jaco is an accredited member of the Association of South African Professional Archaeologists (ASAPA) (#159) and APHP #114 and have conducted more than 500 impact assessments in Limpopo, Mpumalanga, North West, Free State, Gauteng, Kwa Zulu Natal (KZN) as well as the Northern and Eastern Cape Provinces in South Africa.

Jaco has worked on various international projects in Zimbabwe, Botswana, Mozambique, Lesotho, Democratic Republic of the Congo (DRC) Zambia, Guinea, Afghanistan, Nigeria and Tanzania. Through this, he has a sound understanding of the International Finance Corporations (IFC) Performance Standard requirements, with specific reference to Performance Standard 8 – Cultural Heritage

TABLE OF CONTENTS

REPORT OUTLINE	4
EXECUTIVE SUMMARY	5
DECLARATION OF INDEPENDENCE	6
A) EXPERTISE OF THE SPECIALIST	6
ABBREVIATIONS	10
GLOSSARY	10
1 INTRODUCTION AND TERMS OF REFERENCE:	11
1.1 TERMS OF REFERENCE	15
1.2 PROJECT DESCRIPTION	16
1.3 ALTERNATIVES	17
2 LEGISLATIVE REQUIREMENTS	17
3 METHODOLOGY	18
3.1 LITERATURE REVIEW.....	18
3.2 GENEALOGICAL SOCIETY AND GOOGLE EARTH MONUMENTS.....	18
3.3 PUBLIC CONSULTATION AND STAKEHOLDER ENGAGEMENT:.....	18
3.4 SITE SIGNIFICANCE AND FIELD RATING.....	19
3.5 IMPACT ASSESSMENT METHODOLOGY.....	21
3.6 ASSUMPTIONS AND LIMITATIONS OF THE STUDY.....	22
4 DESCRIPTION OF SOCIO-ECONOMIC ENVIRONMENT	22
5 RESULTS OF PUBLIC CONSULTATION AND STAKEHOLDER ENGAGEMENT:	23
5.1.1 <i>Stakeholder Identification</i>	23
6 CONTEXTUALISING THE STUDY AREA:	23
6.1 LITERATURE REVIEW (SAHRIS)	23
6.2 GOOGLE EARTH AND THE GENEALOGICAL SOCIETY OF SOUTH AFRICA (GRAVES AND BURIAL SITES)	24
6.3 ARCHAEOLOGICAL BACKGROUND.....	25
6.3.1 <i>Stone Age</i>	25
6.3.2 <i>Stone Age History</i>	26
6.3.3 <i>Historical Context</i>	27
6.1.3. <i>Anglo-Boer War</i>	29
7 DESCRIPTION OF THE PHYSICAL ENVIRONMENT	30

8	CULTURAL HERITAGE BASELINE	31
8.1	HERITAGE RESOURCES.....	31
8.2	CULTURAL LANDSCAPE.....	31
8.3	PALEONTOLOGICAL HERITAGE	32
9	ASSESSMENT OF IMPACTS	32
9.1.1	<i>Nature of impacts</i>	32
9.1.2	<i>Cumulative impacts</i>	33
9.2	IMPACT ASSESSMENT TABLES.....	33
10	CONCLUSION AND RECOMMENDATIONS	34
10.1	RECOMMENDATIONS FOR CONDITION OF AUTHORISATION.....	34
10.2	REASONED OPINION	34
10.3	POTENTIAL RISK.....	34
10.4	MONITORING REQUIREMENTS	35
10.5	MANAGEMENT MEASURES FOR INCLUSION IN THE EMPR	36
11	REFERENCES	37

LIST OF FIGURES

FIGURE 1.1.	REGIONAL SETTING OF THE PROJECT.	12
FIGURE 1.2.	LOCAL SETTING OF THE PROJECT.	13
FIGURE 1.3.	AERIAL IMAGE SHOWING THE STUDY AREA AND SURROUNDS. (<i>GOOGLE EARTH 2023</i>)	14
FIGURE 6.1.	SUMMARY OF ARCHAEOLOGICAL AND HISTORICAL EVENTS IN SOUTH AFRICA.	25
FIGURE 7.1.	GENERAL SITE CONDITIONS IN THE STUDY AREA.	30
FIGURE 7.2.	GENERAL VIEW OF THE STUDY AREA.	30
FIGURE 7.3.	THE STUDY AREA IS CHARACTERISED BY SPARSE VEGETATION	30
FIGURE 7.4.	THE STUDY AREA IS CHARACTERISED BY SPARSE VEGETATION.	30
FIGURE 8.1.	PALAEONTOLOGICAL SENSITIVITY OF THE APPROXIMATE STUDY AREA (YELLOW POLYGON) AS INDICATED ON THE SAHRA PALAEONTOLOGICAL SENSITIVITY MAP.	32

LIST OF TABLES

TABLE 1. SPECIALIST REPORT REQUIREMENTS.....	4
TABLE 2: PROJECT DESCRIPTION	16
TABLE 3: INFRASTRUCTURE AND PROJECT ACTIVITIES	16
TABLE 4: HERITAGE SIGNIFICANCE AND FIELD RATINGS.....	20
TABLE 5. SELECTED STUDIES CONSULTED FOR THIS PROJECT.	23
TABLE 7. IMPACT ASSESSMENT FOR THE CONSTRUCTION PHASE OF THE PROJECT	33
TABLE 8. MONITORING REQUIREMENTS FOR THE PROJECT.....	35
TABLE 9. HERITAGE MANAGEMENT PLAN FOR EMPR IMPLEMENTATION	36

ABBREVIATIONS

ASAPA: Association of South African Professional Archaeologists
BGG Burial Ground and Graves
CFPs: Chance Find Procedures
CMP: Conservation Management Plan
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
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)

Early 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 and Terms of Reference:

Beyond Heritage was appointed to conduct a Heritage Impact Assessment (HIA) for the proposed prospecting application that is located on Portion 6 & 7 Of the Farm Gams No 367 in the Dawid Kruiper Local Municipality, Northern Cape (Figure 1.1 to 1.3). 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 impossible to define the exact locations of drill sites or number of drillholes to be dug and a heritage walkdown 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 EMP, once it's completed by the Environmental Assessment Practitioner (EAP).

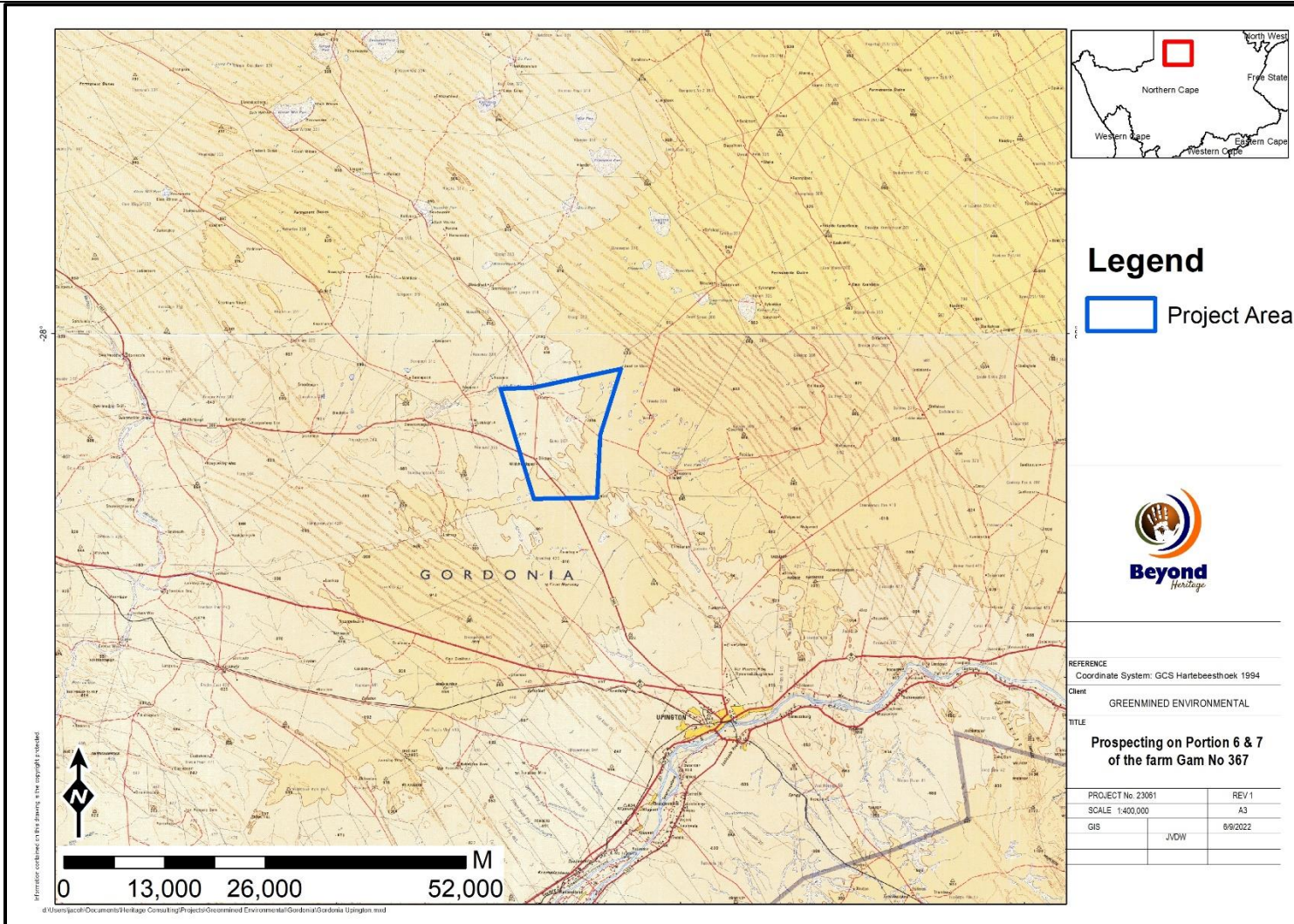


Figure 1.1. Regional setting of the Project.

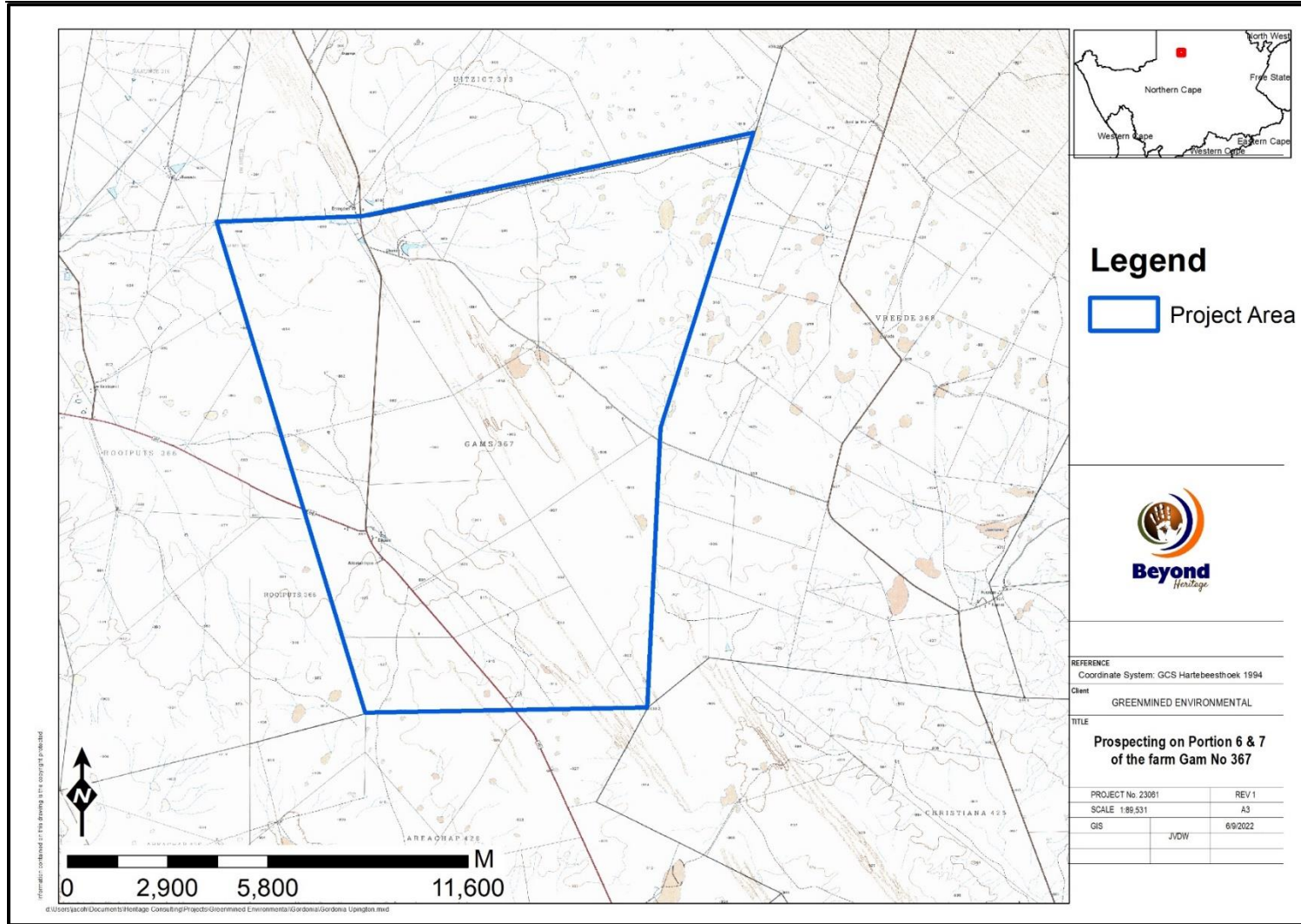


Figure 1.2. Local setting of the Project.

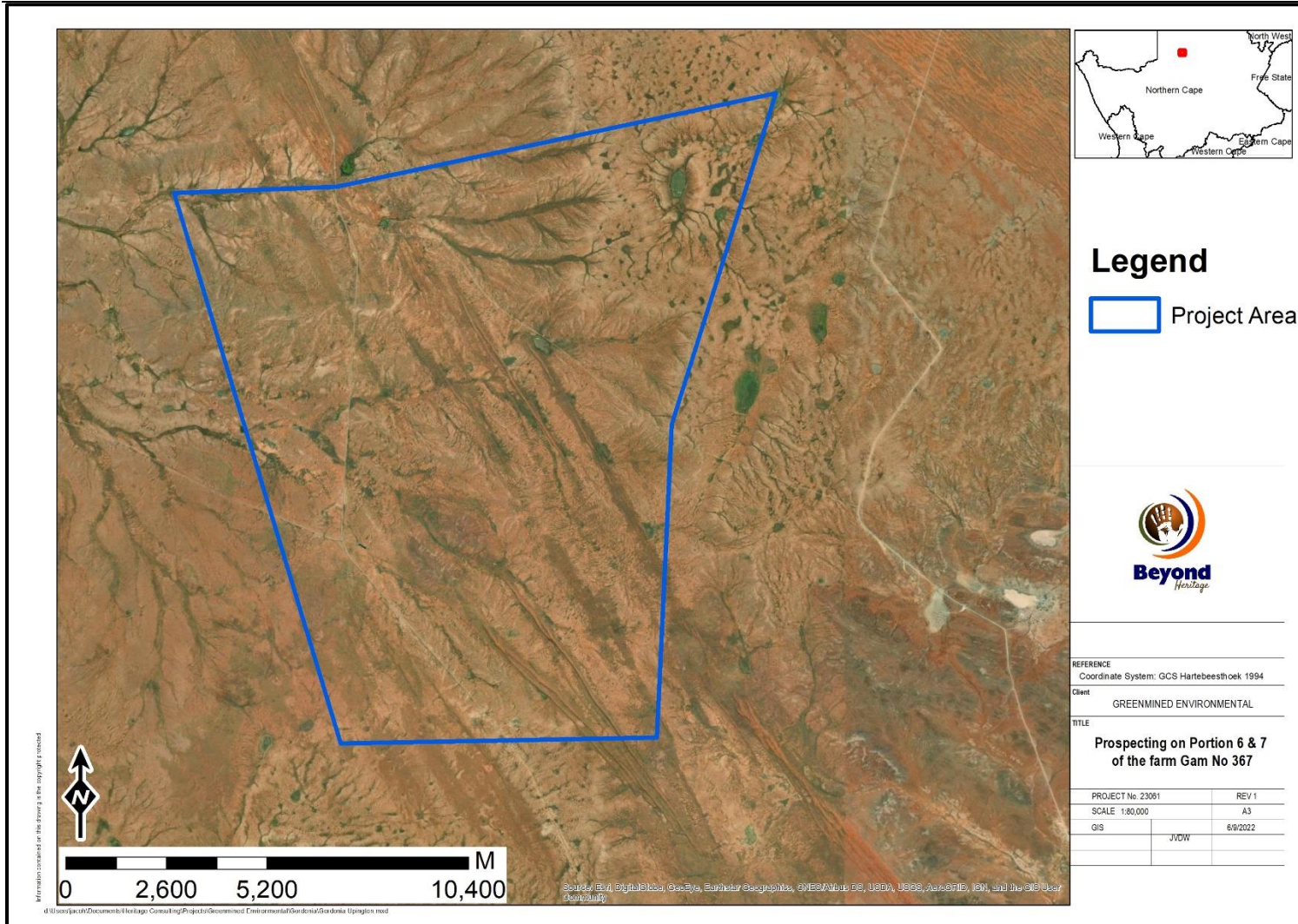


Figure 1.3. Aerial image showing the study area and surrounds. (Google Earth 2023)

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 is outlined under Table 2 and 3.

Table 2: Project Description

Magisterial District	Dawid Kruiper Local Municipality,
Central co-ordinate of the development	28° 6'51.38"S 21° 4'1.11"E
1:50 000 Topographic Map Number	2821AA

Table 3: Infrastructure and project activities

Type of development	Prospecting Application
<p>Prospecting Proposal: The step-wise work programme being considered for this prospecting include:</p> <ul style="list-style-type: none"> a) Desktop study b) Remote sensing c) Field mapping d) Geochemical survey e) Geophysical survey f) Trenching g) Drilling h) Geological modelling and resource estimation <p>Drilling/Trenching</p> <ul style="list-style-type: none"> • The implementation of trenching and/or drilling will be determined based on the results from initial exploratory work. Either technique will be implemented at spacing grid capable of providing an Inferred Mineral Resource. This Resource is defined at a low degree of confidence but is sufficient to be used to complete a Scoping Study and to evaluate the economic feasibility of the project to advise the decision to continue to feasibility study work. • Drilling will be to a maximum depth of 500 m. <p>Drilling/Trenching</p> <ul style="list-style-type: none"> • Drilling/Trenching will be carried out to provide sample material from intersections of the targeted strata or geological features. A small excavator or tractor-loader-backhoe will be used for trenching. On the other hand, the preferred method to employ for drilling is Reverse Circulation (RC) and/or diamond drill techniques. The objective of drilling/trenching programme is to assess the presence of potentially economic mineralisation. The number of drill holes to be dug and their depths to the top will depend on the results of Phase 1 and initial act2. Once favourable geological or geomorphological features such as channel lag gravel is encountered, then a detailed drilling grid will be prepared to focus on establishing the extent (and/or potential available volume) of the gravel deposit. 	

At this stage of the project, it is impossible to define the exact locations of drill sites or number of drillholes to be dug. However, the detailed drilling spacing will be planned to allow the defining of an Inferred Mineral Resources as per the SAMREC code.

1.3 Alternatives

No alternatives were provided for assessment.

2 Legislative Requirements

The HIA, as a specialist sub-section of 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;
- Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;
- 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 EMPr, to the Provincial Heritage Resource Agency (PHRA) or to 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.

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 HIA's 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. Relevant conservation or Phase 2 mitigation recommendations should be made. Recommendations are subject to evaluation by SAHRA.

Conservation or Phase 2 mitigation recommendations, as approved by SAHRA, are to be used as guidelines in the developer's decision-making process.

HIA – Gams Prospecting**July 2023**

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 requirement) 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 a 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 administrated by a local authority. Graves in this age category, located inside a formal cemetery administrated 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 reinternment 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**

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).

3.2 Genealogical Society and Google Earth Monuments

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where sites of heritage significance might be located; these locations were marked and visited during the fieldwork phase. The database of the Genealogical Society was consulted to collect data on any known graves in the area.

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.

3.4 Site Significance and Field Rating

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.

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 will be 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 (2007), 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 10 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. 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

The Reviewed Integrated Development Plan – 2017 - 2022 of the Dawid Kruiper Municipality highlighted the following: *“With regards to the socio-economic characteristics of the local population, the employment rate for the Municipality is relatively high, with as much as 75% of people of working age who are actively seeking employment being able to secure a job. However, the majority of the employed population is found in elementary occupations, which require little or no skills. This is also reflected in the low education levels of the local population, with as much as 12% of the population aged 20 years and older having no form of education whatsoever. This, to some extent, constrains the development potential of the Municipality in the development of more advanced industries. The level of employment and type of occupations taken up by the population of the Municipality also directly affects their income levels.*

The Municipality’s economy is rather centred on the trade and retail sector, due to its strong tourism sector, leaving the local economy fairly vulnerable for any significant changes in this industry. It is, therefore, important that the Municipality seeks to further diversify its economy into other sectors. Furthermore, the manufacturing sector of the municipality is one of the lowest performing sectors of the local economy. This sector has the potential to generate significant growth for the region, and Dawid Kruiper Municipality is experiencing a lack of manufacturing activities. As a result, much in the municipality has to be sourced from outside of the municipal boundaries, resulting in money flowing out of the local economy.”

5 Results of Public Consultation and Stakeholder Engagement:

5.1.1 Stakeholder Identification

Adjacent landowners and the public at large were informed of the proposed activity as part of the EIA process. Site notices and advertisements notifying interested and affected parties were placed at strategic points and in local newspapers.

6 Contextualising the study area:

6.1 Literature Review (SAHRIS)

Several previous heritage studies were conducted in the general study area (SAHRIS) (e.g., Beaumont 2005 & 2008, Dreyer 2006, Van Ryneveld 2007a & 2007b, Van Schalkwyk 2011, Gaigher 2012, Morris 2012, Fourie 2014, van der Walt 2015, 2019 a and b). These studies identified Early, Middle and Later Stone Age assemblages as well as historical structures and artefacts. None of these sites are located within the current areas being assessed. Studies consulted for this project are included in Table 5.

Table 5. Selected studies consulted for this project.

Author	Year	Project	Findings
Van der Walt, J.	2011	Archaeological Impact Assessment For the proposed S Kol Photovoltaic Plant. Keimoes, Northern Cape	MSA Scatters, an Old Wagon Road and I Mining Trenches
Gaigher, S.	2012	Proposed Establishment of Several Electricity Distribution Lines within the Northern Cape Province	Stone Age Artefacts
Gaigher, S.	2013	Heritage Impact Assessment (HIA) Report, EIA Phase for the Proposed Sirius Solar Project near Upington in the Northern Cape Province	Stone Age Artefacts
Morris, D.	2013	Proposed development of Phase 2 and Phase 3 of the Upington Solar Thermal Plant on Portion 3 of the farm McTaggart's Camp 453 near Upington. Scoping Phase Input.	No sites of significance
Morris, D.	2013	RE Capital 3 Solar Development on the property Dyasons Klip west of Upington, Northern Cape: Scoping phase Heritage Input	No sites of significance
Morris, D.	2013	RE Capital 3 Solar Development on the property Dyasons Klip west of Upington, Northern Cape: Archaeological Impact Assessment – proposed 'central' development footprint	Stone Age Scatter and ruins of historical dwellings.
Fourie, W.	2014	Proposed Rooipunt Solar Power Park near Upington, KAI !GARIB Municipality, Northern Cape Province. Heritage Impact Assessment	Stone age, Herder and historical mining sites.
Morris, D.	2014	Proposed development of Phase 2 and Phase 3 of the Upington Solar Thermal Plant on Portion 3 of the farm McTaggart's Camp 453 near Upington. HIA	Tungsten mining infrastructure and Stone Age scatters.
Van der Walt, J.	2015	Archaeological Impact Assessment For the proposed AEP Bloemsmond Solar 2 PV project, Keimoes, Northern Cape	MSA Scatters
Hollman, J.& Fourie, W.	2016	Powerlines for Proposed Rooipunt Solar Thermal Power Park Project Near Upington, ZF Mgcawu District Municipality, Northern Cape Province Heritage Impact Assessment	Abandoned Mine infrastructure
Van der Walt, J	2019 a	Heritage Impact Assessment Sirius Solar PV Project 4, Upington, Northern Cape Province	Stone Age Scatters, Historical Tungsten Mining as well as Labourer housing and a stone cairn.
Van der Walt, J	2019 b	Heritage Impact Assessment Sirius Solar PV Project 3, Upington, Northern Cape Province. Unpublished report.	Stone Age Scatter and Tungsten Mining Trenches
Van der Walt, J	2019 c	Heritage Impact Assessment Bloemsmond 3 PV Project, Upington, Northern Cape Province	Stone Age sites as well as a stone cairn
Van der Walt, J	2019 d	Heritage Impact Assessment Bloemsmond 4 PV Project, Upington, Northern Cape Province	Stone Age and Historical Find spots

Van der Walt, J	2019 e	Heritage Impact Assessment Bloemsmond 5 PV Project, Upington, Northern Cape Province	Stone Age Sites, Stone packed features and historical features.
Van der Walt, J	2019 f	Heritage Impact Assessment Bloemsmond Grid Connection Project, Upington, Northern Cape Province	Stone age and historical features as well as tungsten mining trenches.

6.2 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.

6.3 Archaeological Background

6.3.1 Stone Age

South Africa: A short chronology

Early Stone Age: 2 million - 250 000 BP. Hominins producing core and pebble tools, later stages includes handaxes and blades.

Middle Stone Age: 250 000 - 40 000 / 25 000 BP. *Homo Sapiens*. Prepared core techniques, formal tools, points, scrapers and backed artefacts. Occasionally includes bone points and ostrich eggshell fragments and grindstones.

Later Stone Age: 40 000 - 100 BP. Wide range of formal microlithic tools. Ostrich eggshell fragments, beads, rock art.

Ceramic Final Later Stone Age: 2000 BP. Wide range of formal microlithic tools, with thin-walled pottery, with some sites having faunal remains of ovicaprids.

Early Iron Age: 200 - 900 CE. Arrival of Bantu-speaking farmers who lived in sedentary settlements often located next to rivers. They kept livestock, cultivated sorghum, beans and cowpeas. Introduced metallurgy to the region and manufactured thick-walled pottery.

Middle Iron Age: 900 - 1300 CE. Confined to the modern-day Limpopo Province, and associated with early state formation, such as Mapungubwe and associated sites.

Late Iron Age: 1300 - 1840 CE. Marks the arrival of ancestral Eastern Bantu-speaking Nguni and Sotho-Tswana communities. Settlements are often located on or near hilltops for defensive purposes. The Iron Age as an archaeological period ends with the Mfecane, 1820s to 1840s CE. An event that caused major socio-political upheaval.

Historic events

1652: Dutch East India Company establishes refreshment station at modern-day Cape Town.

1658: First slave ships arrive at Table Bay.

1660 - 1793: Various armed conflicts between Khoisan and Europeans, several frontier wars between Europeans, Khoisan and Xhosa communities.

1795 - 1807: First British occupation of the Cape, the Dutch East India Company collapses, and slave trade is abolished.

1808 - 1820: Several frontier wars and first British Settlers arrive.

1820 - 1840: Onset of the Mfecane, abolishment of slavery and slaves are freed at the Cape. Dutch farmers started to migrate towards the interior of South Africa, what will become known as the 'Great Trek'.

1860 - 1880: Discovery of mineral wealth, diamonds and gold. Establishment of the Zuid-Afrikaansche Republiek (ZAR).

1899 - 1902: The South African War.

1910 - 1945: Unification of South Africa, formation of the ANC, World War I and World War II.

BP - Before Present
CE - Common Era

Figure 6.1. Summary of archaeological and historical events in South Africa.

6.3.2 Stone Age History

The region is well-known as one that produced the largest sample (n = 56) of prehistoric skeletons in South Africa (Morris 1995). Excavated in 1936, known as the 'Kakamas Skeletons', and currently housed in the National Museum in Bloemfontein, they are considered the 'type' specimens of Khoi morphology (1992). Grave locations can be expected along the Gariep (perhaps up to 35 km from its shore), and on the Gariep Islands between Upington and the Augrabies Falls. They are often marked with stone burial cairns, dug into the alluvial soil or into degraded bedrock above the alluvial margin. Graves can be isolated or grouped in small clusters, sometimes containing up to eight graves (Morris 1995).

Burial cairns can be elaborately formed, some with upright stones in their centres, but they are often disturbed. Cairns from near the Gariep Islands are often characterised by their high conical shapes, and the grave shafts filled with stones. Those closer to Augrabies Falls, however, graves are low and rounded with ashes in the grave shaft. The placing of specularite or red ochre over the body was common, but other grave goods are rare (Morris 1995).

Where dating was possible, most of the skeletons were dated to the last 200 years-or-so, but association with archaeological material from up to about 1200 years old is possible. The grave sites show parallels to those of recent Khoi populations (Morris 1995). Apart from the grave locations, archaeological sites of this period in the region have been further divided into the following industries.

Doornfontein sites are mostly confined to permanent water sources. The assemblages contain a consistently large complement of thin-walled, grit-tempered, well-fired ceramics with thickened bases, lugs, bosses, spouts, and decorated necks or rims. Lithics are often produced on quartz, and dominated by coarse irregular flakes with a small or absent retouched component (Beaumont et al. 1995; Lombard & Parsons 2008; Parsons 2008). Late occurrences contain coarser potsherds with some grass temper, a higher number of iron or copper objects, and large ostrich eggshell beads. These assemblages are mostly associated with the Khoi (Beaumont et al. 1995).

Swartkop sites can be almost contemporaneous with, or older than, the Doornfontein sites. They are usually characterised by many blades/bladelets and backed blades. Coarse undecorated potsherds, often with grass temper, and iron objects are rare. These sites are remarkably common throughout the region. They usually occur on pan or stream-bed margins, near springs, bedrock depressions containing seasonal water, hollows on dunes, and on the flanks or crests of koppies (Beaumont et al. 1995; Parsons 2008). Some of these sites are also associated with stone features, such as ovals or circles, that may represent the bases of huts, windbreaks or hunter's hides (Jacobson 2005; Lombard & Parsons 2008; Parsons 2004). These sites are linked to the historic /Xam communities of the area who usually followed a hunter-gatherer lifeway (Deacon 1986, 1988; Beaumont et al. 1995).

Wilton assemblages are distinguished by a significant incidence of cryptocrystalline silicates (mainly chalcedony) and contain many formal tools such as small scrapers, backed blades and bladelets. A regional variation of the Wilton in the area is often referred to as the Springbokoog Industry (Beaumont et al. 1995). A few heavily patinated Later Stone Age clusters, that include large scrapers, may represent Oakhurst-type aggregates (Beaumont et al. 1995).

The Middle Stone Age

Previous collections of stone tools in the region include artefacts with advanced prepared cores, blades and convergent flakes or points. Most of the scatters associated with the Middle Stone Age have a 'fresh' or un-abraded appearance. They appear to be mostly associated with the post-Howiesons Poort (MSA 3) or MSA 1 sub-phases (Beaumont et al. 1995).

Substantial Middle Stone Age sites seem uncommon. However, where archaeological sites were excavated, such as on the farm Zoovoorbij 458, a Middle Stone Age assemblage was excavated beneath

Later Stone Age deposits (Smith 1995). This shows that, although not always visible on the surface, the landscape was inhabited during this phase. The large flake component of the lower units of Zoovoorbij Cave has Levallois-type preparation on the striking platforms, reinforcing their Middle Stone Age context.

The Earlier Stone Age

Stone artefacts associated with this phase, based on their morphology, seem moderately to heavily weathered. Scatters may include long blades, cores (mainly on dolerite), and a low incidence of formal tools such as handaxes and cleavers. Clusters with distinct Acheulean characteristics have been recorded in the area (Beaumont et al. 1995).

6.3.3 Historical Context

Some of the earliest known people to have lived in the Kakamas region were the Nameiqua people who lived at !Nawabdanas (today known as Renosterkop) during the late eighteenth century. In 1778 Hendrik Jacob Wikar and in 1779 Colonel R.J. Gordon came in contact with these people. The following descriptions of the Nameiqua and other groups of people that lived in this area are based on the accounts of Wikar and Gordon.

Although reference is made to the fact that Europeans started to move into this territory from at least the 1760s onwards, the first literate person to visit and describe the people living along the Orange River was H.J. Wikar. Wikar deserted the service of the Dutch East India Company and fled to the interior in 1775. He presented a report on his findings of the people he encountered in the interior to the Governor of the Cape with the hope that he would be pardoned and that he could return to live in the colony. In his report, Wikar, referred to the Khoi of the Orange River as Eynikko / Eynicqua. He divided them into four separate groups: the Namnykoa / Namikoa, who lived on the islands above the Augrabies Falls, the Kaukoa and the Aukokoa higher up the river close to Kanoneiland and the Gyzikoas in the vicinity near the present day Upington. Although these groups were closely related, the Gyzikoas were intermixed genetically and culturally with Bantu-speaking peoples from the northeast. Wikar also recorded the presence of a group of people who he called the “Klaare Kraal” people. This group of people was apparently “a strong Bushman Kraal of about twenty huts but with no cattle” (Morris, 1992)

Another European traveller that visited the same region was Colonel R.J. Gordon, who met a group of people called the Anoe Eys, roughly translated as “bright kraal” people. Gordon recorded that this group of “Bushman catch fish and live by hunting, digging pits to trap rhinoceros at the side of the river.” Morris feels it reasonable that Wikar’s “Klaare Kraal” people and Gordon’s “bright kraal” people are the same group (Morris, 1992). Gordon went on to describe other people living along the river too and although the spelling of the names of the various group differ between these two early travellers it can be assumed that they are indeed speaking and describing the same groups of people.

In 1813 Reverend John Campbell travelled down the Orange River and met a group of people near the Augrabies Falls but was surprised by the few inhabitants that now lived in the area. This was mainly because of a period of severe drought and there was very little water in the area to support large human settlements. In 1824 another traveller, George Thompson rode through the central Bushmanland and reached the confluence of the Hartebeest and Orange Rivers very close to the modern Kakamas. According to his writings the whole area was deserted except for a small group of !Kora close to the Falls (Morris, 1992).

The Renosterkop settlement was on one of the large islands in the Orange River. Geographically the area that the Orange River flows through from Upington to the Augrabies Falls is characterized by the river splitting into various loops thus forming islands in the river (Moolman, 1946). The settlement consisted of ten mat huts that housed about five to six people each. The Nameiqua herded cattle, sheep and to a lesser extend goats. Cattle were their most prized possession, both economically and ritually. They were also

excellent hunters and would display the heads of rhino, hippo and buffalo in the centre of the settlement (Morris & Beaumont, 1991).

The Nameiqua people were not the only people that stayed in the area. Away from the river in areas less suitable for pastoralism lived groups such as the Noeies, Eieis and the /Xam. These groups lived mainly from hunting and gathering.

The relationships between the various groups of people that lived in this area were “peripheral” and involved “varying degrees of clientship during certain seasons, with limited exchange in items such as pots”. The Khoi peoples would sometimes also take San wives. Around the area of Upington lived the Geissiqua (Twin-folk) people. This was a mixed group of Korana-BaTlhaping (Tswana) group who were in regular contact with Tswana Iron Age communities to the northeast. This group of people would seemingly once a year trade with the tribes living along the river and who traded in items, such as, tobacco, ivory spoons, bracelets, knives, barbed assegais and smooth axes (Morris & Beaumont, 1991).

In the period leading up to the First Koranna War in 1869 the northwards trek of the Basters and the white farmers into the vicinity of the Orange River provided the Koranna (!Kora) people with opportunistic opportunities to steal cattle from these new settlers and flee to islands located in the river. It was inevitable that this would lead to armed conflict between these groups (De Beer, 1992). The First Koranna War was in 1869 and a second war took place from 1878 to 1879. After the second war many of the Basters went to settle north of the river. Reverend Scröder advocated for the Cape government to allow these Basters to go and settle in the area and from a buffer zone between the white settlers and the black tribes to the north of the Cape Colony (De Beer, 1992).

The irrigation of the Orange River has been central to the economic existence of the area in the vicinity of Upington since the 1880s. To the north of the river lies the Kalahari and to the south lies “Bushmanland”, these two areas being some of the driest land in South Africa (Legassick, 1996). Moolman attributes the beginning of irrigation in this area to the Basters who he calls: “primitive pastoral people”, who had “crude” ways to divert the river water to their “little gardens” (Moolman, 1946). According to Legassick the first person to irrigate the Orange River was one Abraham September, from whose lead the Dutch Reformed Church missionary Reverend C.H.W. Scröder and John H. Scott, the Special Magistrate for the Northern Border, stationed at Upington, would have gotten the idea to start irrigating the river on a much larger scale (Legassick, 1996).

The first 81 farms to be given out to the north of the Orange River from Kheis (opposite the present Groblershoop) to the Augrabies Falls were allocated almost exclusively to Basters in 1882. The term “Baster” refers to a group of people who have moved out of the Cape Colony to avoid social oppression and could refer to people of mixed parentage, particularly white and Khoikhoi or slave and Khoikhoi and also implies an economic category that implies the possession of property and who is culturally European (Morris, 1992). The farms bordering on the river measured in sizes ranging from 4000 to 10 000 morgen, these farms were “laid out on the basis of half an hour’s ride along the river and two and a half hours’ ride away from the river into the ‘back country’”. Once the irrigation canal was completed these farms were further divided into “water-erven” for irrigation and “dry-erven” for establishing buildings and the like (Legassick, 1996).

The district of Gordononia was established on 30 September 1885 and formed part of British Bechuanaland. It was only administrated as part of British Bechuanaland from April 1889. The Cape government instructed the Special Magistrate appointed for the area to settle the territory with “Baster farmers” living on the southern side of the Orange River. The area was soon settled with Basters, a few whites at first largely related to the Basters by marriage and some Kora, San and Xhosa people (Legassick, 1996). In 1891 the first census in the area recorded 735 whites, 1429 “aboriginal natives” and 3121 “other coloured persons” living in the area (Legassick, 1996).

Christiaan H. W. Scröder was a missionary from the Nederduits Gereformeerde Kerk in Upington, and knew all the islands and areas alongside the Orange River, stretching from his missionary station, far to the east and the west along the riverbank. He was an important figure with regards to the foundation of both the towns of Keimoes and Kakamas. Interestingly, the name Keimoes means “large eye”, and an eye appears on the coat of arms of the town, which was created in 1960 (De Beer, 1992). When Scröder first came to Upington in July 1883, there were already people in the area of Keimoes that used irrigation and planted fields. It is possible that the proficient Mr Scott, who was at that time the only person in “Basterland” who understood the art of channelling water to other areas, directed this irrigation project in 1882.

By 1883 it was necessary to build a second furrow for irrigation, and this was done under the vigilance of C. H. W. Scröder. These furrows contributed to the advancement of the town and in the following years many families started moving to the area (De Beer, 1992).

By 1886, the committee in charge of the settlement realized the necessity of building a school for the inhabitants of Gordonia. In 1887 a school was opened, with Pieter Rossouw as its first teacher. The school was closed again in 1899, due to the start of the Anglo-Boer War (De Beer, 1992). The construction on the church at Keimoes was started in 1888 and was completed in 1889. During the construction of the church, Scröder lived in Keimoes. The church can still be seen next to the main street running through Keimoes (De Beer, 1992).

Between 1889 and 1899, more and more white people started moving to the Gordonia area and by 1900 some 13 Afrikaner families had settled at Keimoes (De Beer, 1992). After the Anglo-Boer War, many farmers were forced to move to other areas, in search of greener pastures after their farms and livelihoods were destroyed during the war. Settling next to the Orange River was an obvious choice, due to the possibility of irrigating one's crops. Many of the farmers who came to the Gordonia area opted rather to settle in Keimoes than in Kakamas, since it was only possible to buy land in the former town. When farmers did not have the means to buy properties of their own, they often became *bywoners* to other landowners, paying a rent to live and work on the land.

6.1.3. Anglo-Boer War

The discovery of diamonds and gold in the Northern provinces had very important consequences for South Africa. After the discovery of these resources, the British, who at the time had colonized the Cape and Natal, had intentions of expanding their territory into the northern Boer republics. This eventually led to the Anglo-Boer War, which took place between 1899 and 1902 in South Africa, and which was one of the most turbulent times in South Africa's history. Even before the outbreak of war in October 1899 British politicians, including Sir Alfred Milner and Mr. Chamberlain, had declared that should Britain's differences with the Z.A.R. result in violence, it would mean the end of republican independence. This decision was not immediately publicized, and as consequence republican leaders based their assessment of British intentions on the more moderate public utterances of British leaders. Consequently, in March 1900, they asked Lord Salisbury to agree to peace on the basis of the status quo ante bellum. Salisbury's reply was a clear statement of British war aims. (Du Preez 1977).

In March 1900 Boer forces had taken Prieska, Kenhardt, Kakamas and Upington, attracting rebel support in the process. British columns were able to recapture the towns and the invasion had ended by June 1900. Local militias, including the Border Scouts (Upington), Bushmanland Borderers (Kenhardt) and Namaqualand Border Scouts (from the west) were established and patrolled the area.

7 Description of the Physical Environment

The topography of the area is undulating characterised by Aeolian sand on top of a calcrete sub strata with sparse grass cover and shrubs. The climate can be described as arid to semi-arid with rainfall occurring from November to April. The study area is currently used for grazing and falls within a Savannah Biome as described by Mucina et al (2006) with the vegetation described as Bushmanland Arid Grassland. The study area is surrounded by an area mostly characterised by agricultural and renewable energy developments. General site conditions are depicted in Figure 7.1 to 7.4.

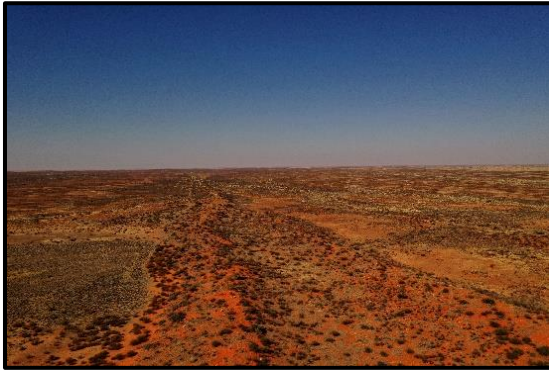


Figure 7.1. General site conditions in the study area.

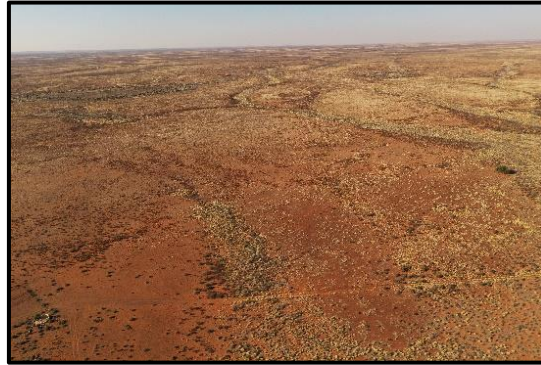


Figure 7.2. General view of the study area.



Figure 7.3. The study area is characterised by sparse vegetation transected by roads and fences.

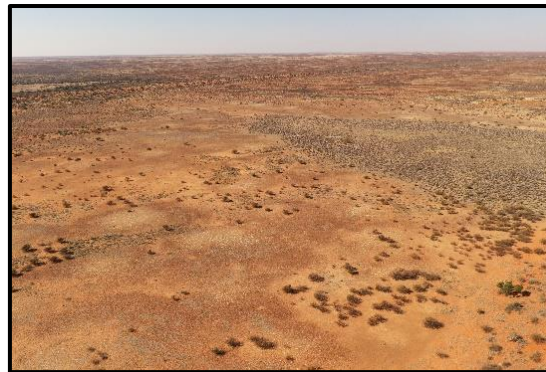


Figure 7.4. The study area is characterised by sparse vegetation.

8 Cultural Heritage Baseline

8.1 Heritage Resources

According to Beaumont *et al* (1995) “thousands of square kilometres of Bushmanland are covered by a low-density lithic scatter” and are referred to as background scatter (Orton 2016), generally of low heritage significance. Stone Age scatters and isolated finds of low heritage significance were recorded during HIA’s in the area (e.g., Gaigher 2013, Fourie 2014, van der Walt 2015 and 2018).

Based on previous studies conducted the 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. Similar sites are expected to occur in the project area.

8.2 Cultural Landscape

Historical land use and the cultural landscape are linked since the cultural landscape is shaped to some extent by the history of the area. Although the area seems to have been fallow in recent years, agricultural activity no doubt took place. This is largely related to small stock but has not left much trace. Another historic aspect that left the most visible remains on the landscape is previous mining activities. The Project area is part of a vast, scenic historic landscape ranging from the Stone Age to historic settlement.

The study area is characterised by Aeolian sand on top of a calcrete sub strata with sparse grass cover and shrubs. The larger area is utilised mostly for farming (grazing) with increasing numbers of solar projects also characterising the landscape. The area is vast and open with limited infrastructure with widespread occurrences of Stone Age material.

8.3 Paleontological Heritage

According to the SAHRA palaeontological sensitivity map the study area is indicated as of moderate significance and requires a desktop study prior to development (Figure 8.1).



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 8.1. Paleontological sensitivity of the approximate study area (yellow polygon) as indicated on the SAHRA Palaeontological sensitivity map.

9 Assessment of impacts

9.1.1 Nature of impacts

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.

Any additional effects to subsurface heritage resources can be successfully mitigated by implementing a chance find procedure. With the implementation of the recommended mitigation measures impacts of the project on heritage resources can be managed to an acceptable level.

9.1.2 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.

9.2 Impact Assessment Tables

Table 6. Impact assessment for the 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 drill 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; A paleontological desktop study should be conducted f 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.		

10 Conclusion and recommendations

The scope of work comprises a heritage desktop report for a large prospecting right area comprising approximately 15 065.81 ha. 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 renewable energy and mining projects in the area and the archaeological character of the area is now well described (e.g., Beaumont 2005 & 2008, Dreyer 2006, Van Ryneveld 2007a & 2007b, Van Schalkwyk 2011, Gaigher 2012, Morris 2012, Fourie 2014, van der Walt 2015, 2019 a and b). This provides the opportunity to establish potential heritage resources that could be affected in the area.

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 centered on rocky outcrops, pans and watercourses and similar sites are expected to occur in the project area. According to the SAHRA Paleontological sensitivity map the study area is of moderate sensitivity and a desktop study is required for this aspect.

No intrusive activities will occur at this point of the application and the potential impact on heritage resources is expected to be very low.

10.1 Recommendations for condition of authorisation

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

Recommendations:

- Once the drill 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;
- A paleontological desktop study 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.

10.2 Reasoned Opinion

The overall impact of the project with the recommended mitigation measures is considered to be low 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.

10.3 Potential risk

Potential risks to the proposed project are the occurrence of intangible features and unrecorded cultural resources (of which graves, Stone Age sites, historical features and subsurface cultural material are the highest risk). This can cause delays during exploration, as well as additional costs involved in mitigation and possible layout changes.

10.4 Monitoring Requirements

Day to day monitoring can be conducted by the Environmental Control Officers (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.
- *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	EO & ECO	Weekly (Construction phase)	Proactively	<ul style="list-style-type: none"> • The approved CFP must be implemented and awareness among contractors created (Refer to Appendix B).

10.5 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 drill 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; • A paleontological desktop study should be conducted f once the impact areas are confirmed; 	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	Monitoring report.
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	ECO Checklist/Report Number of chance finds reported and resolved.

11 References

- Beaumont, P.B., Smith, A.B. & Vogel, J.C. 1995. Before the Einiqua: the archaeology of the frontier zone. In: Smith, A.B. (ed.) *Einiqualand: studies of the Orange River frontier*: 236-264. Cape Town: University of Cape Town Press.
- Beaumont, P.B. & Morris, D. 1990. *Guide to archaeological sites in the Northern Cape*. Kimberley: McGregor Museum
- Beaumont, P.B. 2005. *Archaeological Impact Assessment at and in the Vicinity of a Quartzite Quarry on Portion 4 of the Farm Droogehout 442 near Upington*.
- Beaumont, P.B. 2008. *Phase 1 Heritage Impact Assessment Report on a Portion of the Farm Keboes 37, near Kanoneiland, Siyanda District Municipality, Northern Cape Province*.
- Breton, G., Schlebusch, C. M., Lombard, M., Sjödin, P., Soodyall, H. & Jakobsson, M. (2014). Lactase persistence alleles reveal partial East African ancestry^[1] of southern African Khoe pastoralists. *Current Biology*, 24(8), 852–858.
- Dreyer, C. 2006. *First Phase Archaeological and Cultural Heritage Assessment of the Proposed Concentrated Solar Thermal Plant (Csp) at the Farms Olyvenhouts Drift, Upington, Bokpoort 390 and Tampansrus 294/295, Groblershoop, Northern Cape*.
- Du Preez, S. J. 1977. *Peace attempts during the Anglo Boer War until March 1901*. Magister Artium thesis in History. Pretoria: University of Pretoria.
- Fourie 2014. *Heritage Impact Assessment for the proposed Solar Power Park for SolarReserve SA (Pty) Ltd, Farm Rooipunt 617, Gordonia RD, Siyanda District Municipal Region, Northern Cape*
- Gaigher, S. 2012. *Proposed Establishment of Several Electricity Distribution Lines within the Northern Cape Province*
- Gaigher, S. 2013. *Heritage Impact Assessment (HIA) Report, EIA Phase for the Proposed Sirius Solar Project near Upington in the Northern Cape Province*. Unpublished report for Savannah Environmental (Pty) Ltd.
- Hocking, A. 1983. *Kaias and cocopans: the story of mining in South Africa's Northern Cape*. Johannesburg: Hollards Publishers.
- Hollman, J. & Fourie, W. 2016 *Powerlines for Proposed Rooipunt Solar Thermal Power Park Project Near Upington, ZF Mgcawu District Municipality, Northern Cape Province Heritage Impact Assessment*
- Kaplan, J. 2017. *Archaeological Impact Assessment, Keren Energy Keimoes Solar Energy Farm on Erf 666 Keimoes, Northern Cape*
- Kaplan, J. 2013. *Heritage Impact Assessment Specialist Archaeological Study Proposed Low Cost Housing Project Erf 666 (Site B), Keimoes Northern Cape*
- Kaplan, J. 201. *Archaeological Impact Assessment proposed low cost housing project Erf 666 (Site A), Keimoes*.
- Le Baron, J.C., Kuman, K. and Grab, S.W., 2010. The landscape distribution of Stone Age artefacts on the Hackthorne plateau, Limpopo River valley, South Africa. *The South African Archaeological Bulletin*, pp.123-131.
- Lombard, M. 2011. *Background to the Stone Age of the Kakamas/Keimoes area for CRM purposes*. Unpublished report.
- Lombard, M., Wadley, L., Deacon, J., Wurz, S., Parsons, I., Mohapi, M., Swart, J. & Mitchell, P. (2012). South African and Lesotho Stone Age sequence updated (I). *South African Archaeological Bulletin*, 67(195), 123–144.
- Marais, J. J. 1977. *De Aar, Stad in wording 1902-1977*. De Aar: Feeskomitee.
- Morris, D. 1994. An ostrich eggshell cache from the Vaalbos National Park, Northern Cape, South Africa. *Southern African Field Archaeology* 3: 55-58.
- Morris, A.G. 1995. The Einiqua: an analysis of the Kakamas skeletons. In: Smith, A.B. (ed.) *Einiqualand: Studies of the Orange River Frontier*: 110-164. Cape Town: UCT Press.
- Morris, D. 2012. *Archaeological Impact Assessment for Blocuso*. Unpublished report.
- Morris, D. 2013. *Proposed development of Phase 2 and Phase 3 of the Upington Solar Thermal Plant on Portion 3 of the farm McTaggart's Camp 453 near Upington. Scoping Phase Input*.

- Morris, D. 2013. RE Capital 3 Solar Development on the property Dyasons Klip west of Upington, Northern Cape: Scoping phase Heritage Input
- Morris, D. 2013. RE Capital 3 Solar Development on the property Dyasons Klip west of Upington, Northern Cape: Archaeological Impact Assessment – proposed ‘central’ development footprint
- Morris, D. 2014. Proposed development of Phase 2 and Phase 3 of the Upington Solar Thermal Plant on Portion 3 of the farm McTaggart’s Camp 453 near Upington. HIA
- Mucina, L. & Rutherford, M.C. 2006. The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute. Pretoria.
- National Heritage Resources Act NHRA of 1999 (Act 25 of 1999)
- Orton, J. 2016. Prehistoric cultural landscapes in South Africa: a typology and discussion. *South African Archaeological Bulletin* 71: 119-129.
- Parsons, I. 2000. Later Stone Age open-air sites on Bloubos, Northern Cape. *Southern African Field Archaeology* 9: 55-67.
- Parsons, I. 2003. Lithic expressions of Later Stone Age lifeways in the Northern Cape. *South African Archaeological Bulletin* 58: 33-37.
- Parsons, I. 2004. Stone circles in the Bloubos landscape, Northern Cape. *Southern African Humanities* 16: 59-69.
- Parsons, I. 2007. Hunter-gatherers or herders? Reconsidering the Swartkop and Doornfontein Industries, Northern Cape Province, South Africa. *Before Farming* 2007/4: Article 3.
- Parson, I. 2008. Five Later Stone Age artefact assemblages from the interior Northern Cape Province. *South African Archaeological Bulletin* 63: 51-60.
- Ross, R. 2002. *A concise history of South Africa*. Cambridge: Cambridge University Press.
- SAHRA Report Mapping Project Version 1.0, 2009
- Smith, A.B. 1995. Archaeological observations along the Orange River and its hinterland. In: Smith, A.B. (ed.) *Einiqualand: studies of the Orange River frontier*: 236-264. Rondebosch: UCT Press.
- Van der Walt, J. 2011. Archaeological Impact Assessment For the proposed S Kol Photovoltaic Plant. Keimoes, Northern Cape
- Van der Walt, J. 2015. Archaeological Impact Assessment Report For the proposed AEP Bloemsmond Solar 1 PV project, Keimoes, Northern Cape. Unpublished report for Savannah Environmental (Pty) Ltd.
- Van Der Walt, J. 2014. AIA for Karoshoek Powerline. Unpublished report for Savannah Environmental (Pty) Ltd.
- Van der Walt, J. 2015. Archaeological Impact Assessment For the proposed AEP Bloemsmond Solar 2 PV project, Keimoes, Northern Cape
- Van der Walt, J 2019 a. Heritage Impact Assessment Sirius Solar PV Project 4, Upington, Northern Cape Province
- Van der Walt, J 2019 b. Heritage Impact Assessment Sirius Solar PV Project 3, Upington, Northern Cape Province. Unpublished report.
- Van der Walt, J 2019 c. Heritage Impact Assessment Bloemsmond 3 PV Project, Upington, Northern Cape Province
- Van der Walt, J 2019 d. Heritage Impact Assessment Bloemsmond 4 PV Project, Upington, Northern Cape Province
- Van der Walt, J 2019 e. Heritage Impact Assessment Bloemsmond 5 PV Project, Upington, Northern Cape Province
- Van der Walt, J 2019 f. Heritage Impact Assessment Bloemsmond Grid Connection Project, Upington, Northern Cape Province
- Van Ryneveld, K. 2007a. Phase 1 Archaeological Impact Assessment -Portion of the Farm Cnydas East 439, Upington District, Northern Cape, South Africa.
- Van Ryneveld, K. 2007b. Phase 1 Archaeological Impact Assessment -Portion of the Farm Bokspuits 118, Groblershoop District, Northern Cape, South Africa.
- Van Schalkwyk, J. 2011. AIA for Karoshoek Solar Park. Unpublished report.
- Wagenaar, E. J. C. 1984. A Forgotten frontier zone: settlements and reactions in the Stormberg area between 1820-60. Pretoria: Government Printer, 1984.