



NGT ESH

Environment | Socio-Economics | Heritage

PROJECT TITLE:

PROPOSED MINING RIGHTS ON THE FARM WATERKLOOF 95 LOCATED BETWEEN GRIEKWASTAD AND GROBLERSHOOP IN THE PIXLEY KA SEME DISTRICT MUNICIPALITY WITHIN THE NORTHERN CAPE PROVINCE

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SPECIALIST REPORT:

Heritage Impact Assessment for the proposed mining rights on the farm Waterkloof 95 located between Griekwastad and Groblershoop in The Pixley Ka Seme District Municipality within the Northern Cape Province

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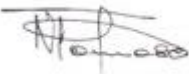
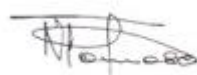
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DECLARATION OF INDEPENDENCE

Miss. Cherene de Bruyn for NGT ESH Solutions has compiled this report (*See Appendix 1*). The views expressed in this report are entirely those of the author and no other interest was displayed during the decision-making process for the project.

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EXECUTIVE SUMMARY

NGT ESHS, a subsidiary of NGT, was appointed by Kemu to conduct an HIA (inclusive of Palaeontological Desktop Assessment) study for the proposed mining rights on the farm Waterkloof 95 located between Griekwastad and Groblershoop. The receiving environment is located in SLM within PKSDM, Northern Cape Province, South Africa. The Phaphama Prospecting Right (Ref: NC 30/5/1/2/11434 PR), was acquired for Motjoli Iron Ore Company (Pty) Ltd (Motjoli) from Aquila Steel South Africa Pty (Ltd) (Aquila) in 2017. The principal Prospecting Right (Ref: NC 30/5/1/1/2/1023 PR) was renewed and ceded on granting to Motjoli. The Phaphama Prospecting Right is situated approximately 65km south of Kumba Iron Ore's Kolomela Iron Ore Mine. Motjoli intends to develop the Phaphama Iron Ore Mine on the Farm Waterkloof 95.

This HIA report forms part of the EIAs and it also informs the EMPR on the management and conservation of cultural heritage resources. This study is conducted independently in terms of Section 38 (3) of the National Heritage Resources Act (NHRA), No. 25 of 1999.

The standard NGT ESH HIA study process entailed conducting a detailed background information search of the receiving environment. The search assesses among other forms of data, previous studies conducted in and around the proposed study area or the development area. This also includes conducting an onsite investigation (survey) to identify and map out heritage resources on site and assess impacts of the proposed development on the identified heritage resources. Recommendations are then made with regards to how the identified heritage resources should be managed and/or mitigated to avoid being negatively impacted by development activities. Furthermore, recommendations are made on how the positive project benefits can be enhanced, to ensure a long-term strategy for the conservation and promotion of heritage resources, if any are found.

The survey of the Farm Waterkloof 95 was conducted on 10 April 2019. The survey was conducted by Miss Cherene de Bruyn (Manager: Archaeology & Heritage Unit/ Archaeologist and Heritage Consultant – NGT ESH) and Miss Kuni Mosweu (Candidate Environmental and Sustainability officer– NGT ESH). The survey was conducted on foot and a vehicle was also used to access the site.

During the survey, no archaeological resources or graves were identified. In terms of the South African Heritage and Resources Agency (SAHRA) Paleontological Sensitivity Layer, the area falls within a region

The HIA developed by NGT ESH Solutions for NGT Holdings on behalf of Kemu Holdings (Pty) Ltd and Motjoli Iron Ore Company (Pty) Ltd

defined as Moderate Sensitivity Area, therefore a desktop study and fossil finds protocol is required for these finds.

Conclusions:

Based on the results of literature review, field survey and the assessment of identified heritage resources, the following conclusions are made in terms of the National Heritage Act about the proposed development:

- It is concluded that the project area near Griekwastad, is located in a region rich in archaeology and heritage resources.
- During the survey the following heritage resources were found:
 - *Stone Tool-01:*
 - A single Stone Age tool was identified during the survey. The stone tool is most likely dates to the to the Late Stone Age (LSA) period. Although a stone tool has been found in the area, the area cannot be characterised as a site, since the artefact was found isolated and is of low density.
 - *Bullet Casing-01:*
 - A yellow shotgun cartridge was found on site.
 - From the markings it was determined the cartridge belongs to Express 34 cartridge range, which is designed for hunting by GB Cartridges. GB Cartridges was established in 1924 in Spain. However, the cartridge that was found most likely dates to the contemporary period and was mostly used by a farmer or hunter who was shooting some of the game found in the project area.
 - *Stonewall-01:*
 - A partial stone structure was identified, consisting of packed stones. The structure most likely formed part of previous farm buildings that have since collapsed and been destroyed.
 - *Building Ruins-01:*
 - The ruins of a contemporary brick old farm building were noticed. The roof, floor and most of the walls were destroyed, with only partial walls remaining.
- No sources of living heritage were identified on the farm Waterkloof 95.

- No graves or burial grounds were identified in the project area. However, graves are subterranean in nature and might not have been identified during the initial site visit and survey.
- In terms of SAHRA Paleontological Sensitivity Layer, the project area is located in a Moderate Sensitivity Area.
- According to the PIA report, the proposed iron ore mine lies on iron formation rocks of the Rooinekke Formation (of the Koegas Subgroup, Ghaap Group, Transvaal Supergroup) and these are not fossiliferous. In the vicinity are dolomites and limestones of other formations of the Ghaap Group that could potentially contain stromatolites, although none has been recorded (See PIA report: Annexure C).

Recommendations:

Based on the Conclusions it is recommended that subject to approval from NC-PHRA and SAHRA APM Unit that:

- *Stone Tool-01:*
 - The single stone tool found on site is of low heritage significance.
 - No mitigation is required.
- *Bullet Casing-01:*
 - The yellow shotgun cartridge is of low heritage significance.
 - No mitigation is required.
- *Stonewall-01:*
 - The stone structure is of low heritage significance.
 - No mitigation is required.
- *Building Ruins-01:*
 - The ruins of the buildings are contemporary and of low heritage significance.
 - No mitigation is required.
- It should be noted that some archaeological material, including artefacts and graves can be buried underground and as such, may not have been identified during the initial survey and site visits. In the case where the proposed development activities bring these materials to the surface, they should be treated as **Chance Finds**. Should such resources be unearthed, it is recommended that the mining activities be stopped immediately, and an archaeologist be

contacted to conduct a site visits and make recommendations on the mitigation of the finds. SAHRA and NC-PHRA should also be informed immediately on such finds.

- In terms of the SAHRA Paleontological Sensitivity Layer, the area falls within a region defined as Moderate Sensitivity area and a desktop study is required.
- According to the PIA report stromatolites are common trace fossils so it is recommended that if they will be disturbed by the mining operation then they should be put aside, and a palaeontologist asked to assess their scientific importance. If they are important then a SAHRA permit must be obtained by the palaeontologist for their removal from the site. This recommendation should be added to the EMP. As far as the palaeontology is concerned the project may proceed. *(See PIA report: Annexure C and Appendix B).*
- The proposed mining activities on the farm Waterkloof 95 will not have impact on the heritage and archaeological resources in the broader Griekwastad area.

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LIST OF ABBREVIATIONS

ACRONYMS	DESCRIPTION
AUTHORITIES	
ASAPA	Association of South African Professional Archaeologists
ESHS	Environmental, Socio-Economic and Heritage Sustainability
NC-PHRA	Northern Cape Provincial Heritage Resources Authority
NGT	Nurture, Grow, Treasure
PKSDM	Pixley Ka Seme District Municipality
SADC	Southern African Developing Community
SAHRA	South African Heritage Resources Agency
SAHRA APM	South African Heritage Resources Agency Archaeology, Palaeontology and Meteorites Unit
SLM	Siyancuma Local Municipality
DISCIPLINE	
AIA	Archaeological Impact Assessment
CRM	Cultural Resources Management
ESA	Early Stone Age
EIAs	Environmental Impact Assessment
EMPr	Environmental Management Programme
EIA	Early Iron Age
ha	Hectares
HIA	Heritage Impact Assessment
LIA	Late Iron Age
LSA	Late Stone Age
MIA	Middle Iron Age
MSA	Middle Stone Age
PIA	Palaeontological Impact Assessment
LEGAL	
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act

TERMS AND DEFINITIONS

Archaeological resources

These include:

- Material remains resulting from human activities which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures.
- Rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10 m of such representation.
- Wrecks, being any vessel or aircraft, or any part thereof which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation.
- Features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.
- This report focuses on the archaeological material (a stone tool and contemporary GB Express Cartridge) found on the Farm Waterkloof 95 in the Northern Cape Province.

Palaeontological

- This means any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial.
- The project area of this report is located in a moderate paleontological sensitive area (*See PIA report: Annexure 3*).

Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. Living heritage sites and burial grounds and grave form part of heritage resources of high cultural, social and spiritual (to some communities) significance in South Africa. However non were found on site.

Development

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

- Construction, alteration, demolition, removal or change in use of a place or a structure at a place.
- Carrying out any works on or over or under a place.
- Subdivision or consolidation of land comprising a place, including the structures or airspace of a place.
- Constructing or putting up for display signs or boards; any change to the natural or existing condition or topography of land.
- And any removal or destruction of trees, or removal of vegetation or topsoil.
- The current development is for the proposed mining rights on the farm Waterkloof 95, Northern Cape Province

Heritage resources

This means any place or object of cultural significance.

Living heritage

This means the intangible aspects of inherited culture, and may include cultural tradition; oral history; performance; ritual; popular memory; skills and techniques; indigenous knowledge systems; and the holistic approach to nature, society and social relationships

1. INTRODUCTION

1.1. Background Information of Project

NGT ESHS, a subsidiary of NGT, was appointed by Kemu to conduct an HIA (inclusive of Palaeontological Desktop Assessment) study for the proposed mining rights on the farm Waterkloof 95 located between Griekwastad and Groblershoop (*Figure 1-2*). The receiving environment is located in SLM within PKSDM, Northern Cape Province, South Africa.

The Phaphama Prospecting Right (Ref: NC 30/5/1/2/11434 PR), was acquired for Motjoli Iron Ore Company (Pty) Ltd (Motjoli) from Aquila Steel South Africa Pty (Ltd) (Aquila) in 2017. The principal Prospecting Right (Ref: NC 30/5/1/1/2/1023 PR) was renewed and ceded on granting to Motjoli. The Phaphama Prospecting Right is situated approximately 65km south of Kumba Iron Ore's Kolomela Iron Ore Mine. Motjoli intends to develop the Phaphama Iron Ore Mine on the Farm Waterkloof 95.

This HIA report forms part of the EIA and it also informs the EMPR on the management and conservation of cultural heritage resources. This study is conducted independently in terms of Section 38 (3) of the NHRA, No. 25 of 1999. The HIA investigated the potential impacts of the proposed project mining activities on any heritage resources identified within the receiving environment, such as archaeological artefacts, burial grounds and historical features of the built environment. The overall objective of the HIA is to give advice on the management of the heritage resources in and around the proposed project area in terms of known heritage resources management measures in line with the NHRA, No. 25 of 1999.

1.1. Description of the Affected Environment

1.1.1. Land Use and History

The project area is located near Griekwastad in SLM within PKSDM, situated in the Northern Cape Province, South Africa (*Table 1*). It is located in between the towns Griekwastad, Groblershoop and Postmasburg. This area is characterised by natural bushveld and grasslands. The Farm Waterkloof 95 has not been transformed by cultivation agricultural activities, it is however used for the grazing of livestock (cows and goats) as well as giraffes and several species of antelope and can be characterised as grazing fields.

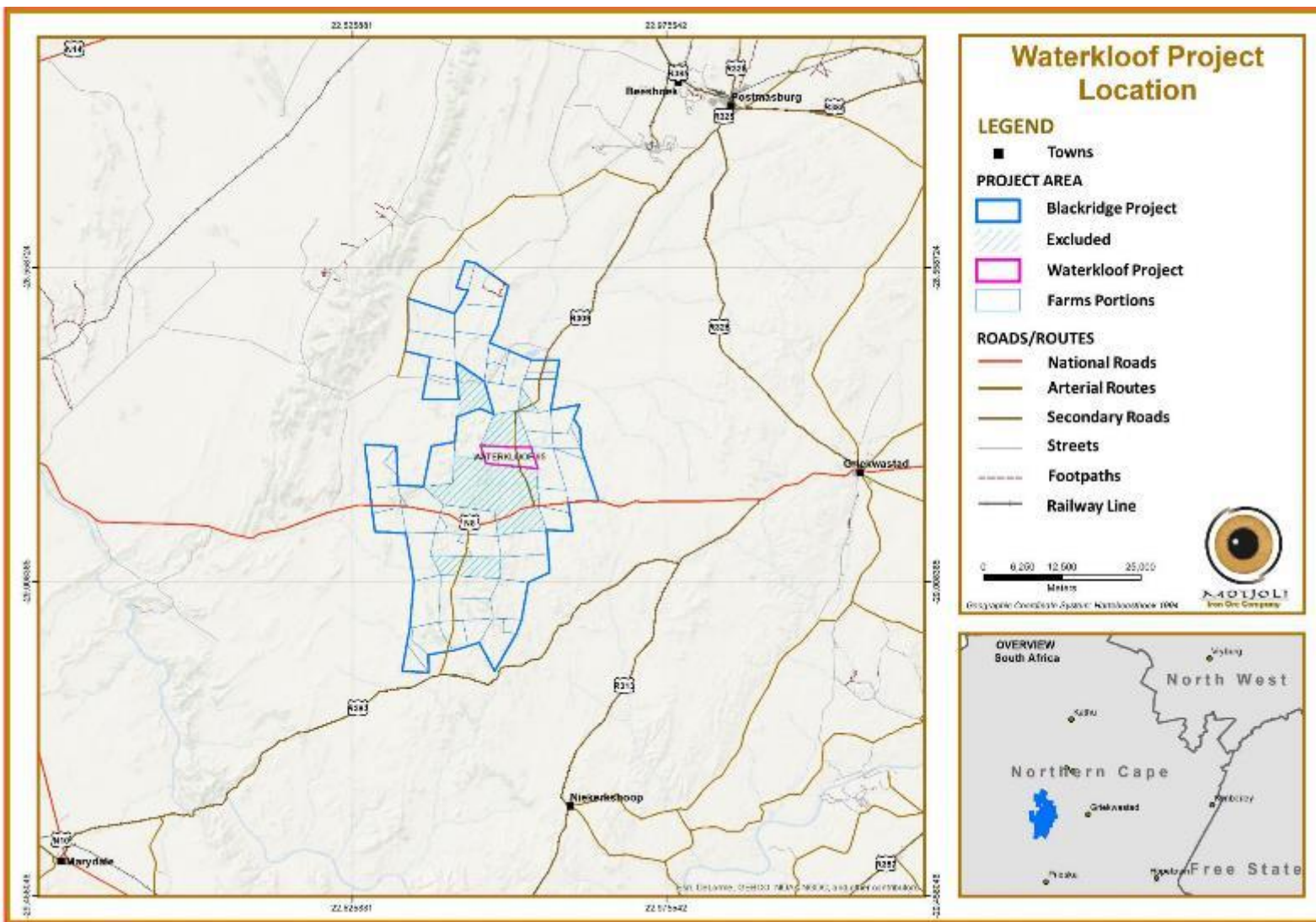


Figure 1: Map showing the location of the project area near Griekwastad in the Northern Cape Province (Source: Kemu Holdings).

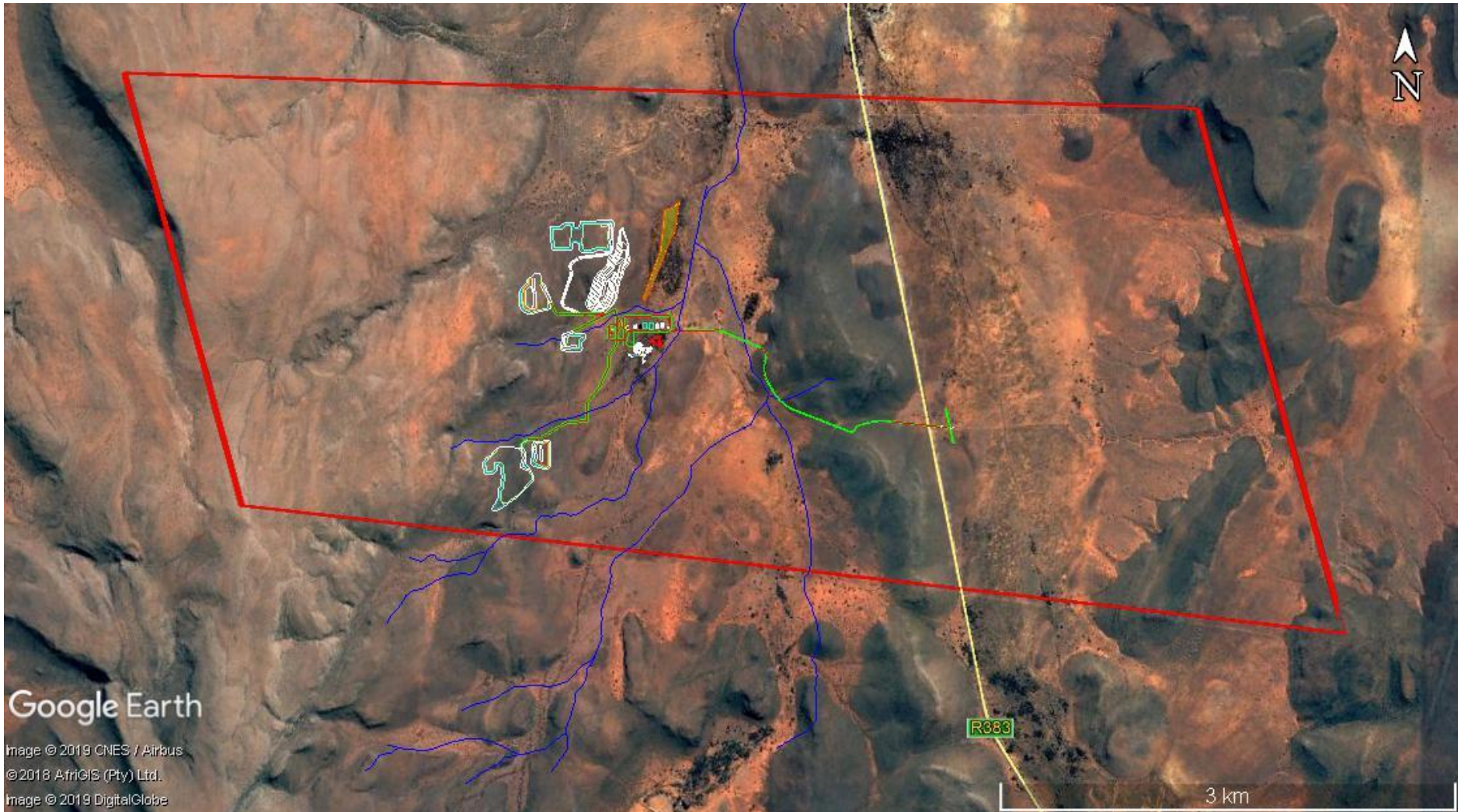


Figure 2: Google Earth map with the proposed mining infrastructure

1.1.2. Access

From Johannesburg, the project area can be accessed using the following roads (*Figure 3*):

- N12
- N8
- R383

Table 1: Site Location and Property Information

Erf or farm number/s	Waterkloof 95
Size of development footprint	2180,5506 ha
Town	Griekwastad
Responsible local authority	Siyancuma Local Municipality
Magisterial district	Pixley ka Seme District Municipality
Region	Northern Cape Province
Country	South Africa
Site centre GPS coordinates	<ul style="list-style-type: none"> • 28° 49' 46.70" S • 22° 45' 2.52" E

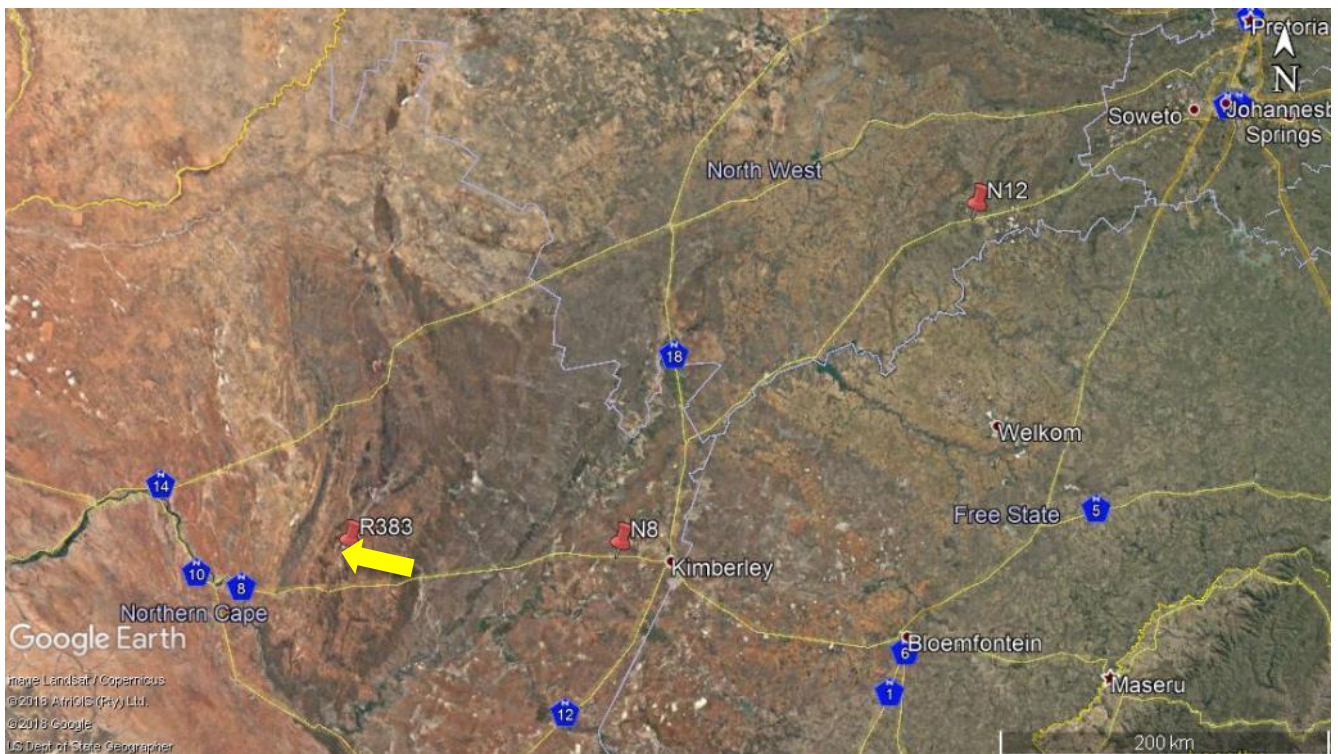


Figure 3: Google Earth image indicating access to the site (yellow arrow).

1.2. Terms of Reference for the Appointment of Archaeologist and Heritage Specialist

The HIA is conducted in terms of Sections 38 the NHRA, No. 25 of 1999. This prescript of the Act Section 38:

“the responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (3) (a): Provided that the following must be included:

- (a) The identification and mapping of all heritage resources in the area affected.
- (b) An assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7.
- (c) An assessment of the impact of the development on such heritage resources.
- (d) An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development.
- (e) The result of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources.
- (f) If heritage resources will be adversely affected by the proposed development, the consideration of alternatives.
- (g) Plans for mitigation of any adverse effects during and after the completion of the proposed development.”

Kemu appointed NGT ESH to conduct the HIA. Cherene de Bruyn, Manager: Archaeology & Heritage Unit for NGT ESH, conducted the HIA for the proposed development. The appointment of NGT ESH is in terms of the NHRA, No. 25 of 1999.

1.3. Legislative requirements for this study

The NHRA, No. 25 of 1999 sets norms and standards for the management of heritage resources in South Africa. Section 35 and 38 (3) of the NHRA, No. 25 of 1999 informs the current HIA. Table 2 below gives a summary of all the relevant legislations that informed the current study.

Table 2: Legislation and relevance to this HIA Study

Legislation (incl. Policies, Bills and Framework)	
<i>Heritage</i>	<ul style="list-style-type: none"> • Heritage resources in South Africa are managed through the NHRA, No. 25 of 1999. This Act sets guidelines and principles for the management of the <i>nation estate</i>. • Section 34 becomes relevant in terms of structures. • Section 35 becomes relevant in terms of archaeology and palaeontology. • Section 36 becomes relevant in terms of burial grounds and graves. • Section 38 of the Act becomes relevant in terms of nature of the proposed project in terms of developing the heritage impact assessment study.
<i>Environmental</i>	<ul style="list-style-type: none"> • The National Environmental Management Act (NEMA), No. 107 of 1998. • The cultural environment in South Africa is managed through Section 24 of the NEMA, No. 107 of 1998.

1.4. Limitations and Assumptions

Although a comprehensiveness physical survey was undertaken, it should be noted that some of the archaeological material, including artefacts and graves can be buried underground and as such, may not have been identified during the initial survey and site visit. In the case where the proposed development activities bring these materials to the surface, they should be treated as Chance Finds. Should such resources be unearthed, it is recommended that the development activities be stopped immediately, and an archaeologist be contacted to conduct a site visits and make recommendations on the mitigation of the finds. SAHRA and EC-PHRA should also be informed immediately on such finds. In this case, no archaeological material of graves should be moved from the site until the heritage specialist has been able to make an assessment regarding the significance of the site and archaeological material, which is also subject to SAHRA approval.

The following chapter outlines the methodology used to assess the current site impacts and cumulative impacts that will result from the proposed project on the identified historic or archaeological sites.

2. METHODOLOGY

2.1. Approach to the Study

Cherene de Bruyn (Manager: Archaeology & Heritage Unit/ Archaeology and Heritage Consultant – NGT ESH), is responsible for the compilation of the current HIA report. The Review and Quality Control (RQC) process involved reviewing the First Draft HIA (Revision 01) and revising the Second Draft (Revision 02); the RQC was completed by Mr Nkosinathi Tomose Executive Director and CEO NGT (also Principal Consultant for NGT subsidiaries **NGT ESH Solutions** and **NGT-Infraco** (an infrastructure development entity specialising **Construction, Conservation** (rehabilitation and refurbishment of historic sites, buildings and public artworks), and **Civils**). The RQC is a standard process at NGT; in the case that the Director and Principal Consultant is responsible for the report, another consultant has to undertake the RQC process.

2.2. Step I – Literature Review (Desktop Phase)

Background information search for the proposed development took place following the receipt of appointment letter from the client. Sources used included, but not limited to, published heritage studies, academic books and academic journal articles about the site and the broader area in which it is located. Interpretation of legislation (the NHRA, No. 25 of 1999) and local by-laws forms form the backbone for the study.

2.3. Step II – Physical Survey

The survey of the area focused on the proposed mining rights on the farm Waterkloof 95 located between Griekwastad and Groblershoop and was conducted on 10 April 2019. The survey was conducted by Miss Cherene de Bruyn (Manager: Archaeology & Heritage Unit/ Archaeologist and Heritage Consultant – NGT ESH) and Miss Kuni Mosweu (Candidate Environmental and Sustainability officer– NGT ESH). The survey was conducted on foot and a vehicle was also used to access the site. The aim of the survey was to identify archaeological and heritage sites and resources within the area proposed for the mining activities:

- The survey of the proposed mining area, specifically the area proposed for the mining infrastructure, was conducted on foot and the site was accessed using a bakkie.
- The aim of the surveys was to identify archaeological, burial grounds and graves and built environment heritage sites and resources in and around the area proposed for the mining.
- To record and document the sites using applicable tools and technology.

The following technological tools were used for documenting and recording identified resources on site:

- Garmin GPS (i.e. Garmin 62s) – to take Latitude and Longitude coordinates of the identified sites and to track the site.
- Canon SLR – to take photos of the affected environment and the identified sites.

2.4. Step III – Report Writing and Site Rating

The final step involves the compilation of the report using desktop research as well as the physical survey results. Archaeological resources, graves and sites found in the project area are rated according to the site significance classification standards as prescribed by SAHRA.

2.5. Assessment of Site Significance in Terms of Heritage Resources Management Methodologies

The following site significance classification minimum standards as prescribed by the SAHRA (2006) and approved by ASAPA for the Southern African Developing Community (SADC) region were used to grade the identified heritage resources or sites (*Table 3*). This Statement of Heritage Significance does not imply exemption from any national, provincial or local authority legal or other regulatory requirement, including any protection or management or general provision in terms of the NHRA, No. 25 of 1999.

Table 3: Site significance classification standards as prescribed by SAHRA

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	High Significance	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	High Significance	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. A)	-	Low Significance	Destruction

2.6. Impact Significance Rating in Accordance to Environmental Requirement:

Impact Significance Rating in will be completed and is guided by the requirements of the NEMA EIA Regulations (2014) (Tables 4-7).

Table 4: Table indicating the impact significance rating.

Alternative No	List Alternative Names	
Proposal	Development	
Alternative 1	Development Area 01	
Alternative 2	Development Area 02	
Nature	-1	Negative
	1	Positive
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site)
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years),
	3	Medium term (6-15 years),
	4	Long term (the impact will cease after the operational life span of the project),
	5	Permanent (no mitigation measure of natural process will reduce the impact after construction).
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected),
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected),
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way),
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease), or
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and

		cost.
	5	Irreversible Impact
Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur),
Public feedback	1	Low: Issue not raised in public responses
	2	Medium: Issue has received a meaningful and justifiable public response
	3	High: Issue has received an intense meaningful and justifiable public response
Cumulative Impact	1	Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	2	Medium: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	3	High: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable loss of resources	1	Low: Where the impact is unlikely to result in irreplaceable loss of resources.
	2	Medium: Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	3	High: Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).
Degree of Confidence	Low	<30% certain of impact prediction
	Medium	>30 and < 60% certain of impact prediction
	High	>60% certain of impact prediction
Priority	Ranking	Prioritisation Factor
3	Low	1,00
4	Medium	1,17
5	Medium	1,33
6	Medium	1,50
7	Medium	1,67



8	Medium	1,83
9	High	2,00
Phase		
Planning		
Construction		
Operation		
Decommissioning		
Rehab and closure		

Table 5: Impact Rating table with impact mitigation.

IMPACT DESCRIPTION		PRE – MITIGATION							POST – MITIGATION							IMPACT PRIORITISATION			
Impact	Phase	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Pre-mitigation ER	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Post-mitigation ER	Confidence	Public response	Cumulative Impact	Irreplaceable loss
1. Heritage Impact Ratings	Planning	-1	3	2	2	2	5	-11,25	-1	3	1	2	2	4	-8	High	1	2	1
								0	-1						0				
								0							0				

Table 6: Risk assessment.

	Impact Name						
	Alternative						
	Phase						
	Environmental Risk						
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation	
	Nature of Impact			Magnitude of Impact			
	Extent of Impact			Reversibility of Impact			
	Duration of Impact			Probability			
	Environmental Risk (Pre-mitigation)						
	Mitigation Measures						
	Heritage Risk (Post-mitigation)						
	Degree of confidence in impact prediction:						
	Impact Prioritisation						
	Public Response						
	Cumulative Impacts						
Degree of potential irreplaceable loss of resources							
Prioritisation Factor							
Final Significance							

Table 7: Final Significance Ratings

SIGNIFICANCE RATINGS	
Value	Description
< -10	Low Negative (i.e. where this impact would not have a direct influence on the decision to develop in the area)
≥ -10 and < -20	Medium Negative (i.e. where the impact could influence the decision to develop in the area)
≥ -20	High Negative (i.e. where the impact must have an influence on the decision process to develop in the area)
< 10	Low Positive (i.e. where this impact would not have a direct influence on the decision to develop in the area)
≥ 10 and < 20	Medium Positive (i.e. where the impact could influence the decision to develop in the area)
≥ 20	High Positive (i.e. where the impact must have an influence on the decision process to develop in the area)

3. BACKGROUND LITERATURE REVIEW: ARCHAEOLOGY

Southern Africa has one of the longest human species occupations record in the world. The occupation dates to approximately 2 million years ago (Mitchell 2002). Therefore, southern Africa is rich in archaeological material. The archaeology of South Africa is divided into three periods, which are mainly the Stone Age, Iron Age and the Historical Period. Each period is characterised by a unique cultural marker that distinguishes it from other archaeological periods. Both archaeological and historical sites have been identified all over South Africa, including the Northern Cape Province.

Several HIA and Archaeological Impact Assessments (AIA) have been conducted in and around the proposed development area. From an assessment of the South African Heritage Resources Information System (SAHRIS) database, previous Heritage and Archaeological Impact Reports in a 20 km radius of the proposed development area were reviewed. It was observed that archaeological and historical materials were found during past surveys within the 500 m radius of the study area (Table. 8, Figure. 4).

Table 8: Previous HIA and AIA reports conducted in and surrounding the proposed project area as recorded on the SAHRIS database

NO.	AUTHOR/YEAR	TOWN	SITE	SAHRIS ID	DISTANCE FROM PROJECT AREA
1.	Dreyer, C. (2006)	Grobliershoop	Olyvenhouts Drift, Upington, Bokpoort 390 And Tampansrus 294/295,	545	167,6 km
2.	Van Ryneveld, K. (2007)	Grobliershoop	Farm Bokspuits 118	MAPID_00 435	110 km
3.	Beaumont, P. (2008)	Grobliershoop	FARM 292	MAPID_02 068	61,4 km
4.	Dreyer, C. (2012a)	Grobliershoop	Farm 391 Sand Draai and Farm 390 Bokpoort	690	74,6 km
5.	Dreyer, C. (2012b)	Campbell	Campbell		145,8 km
6.	Morris, D. (2012)	Grobliershoop	Farms Sand Draai 391 and Bok Poort 390	690	83,1 km
7.	Van der Walt, J. (2012)	Grobliershoop	Farm Buchuberg 296	752	57,4 km
8.	Orton, J. & Webley, L. (2013)	Grobliershoop	Boegoeberg Hydropower Station	3106	58,3 km
9.	Webley, L. (2013)	Grobliershoop	Grobliershoop Substation and the Garona-Grobliershoop 132 Kv Powerline	-	75,9 km
10.	Dreyer, C. (2014)	Grobliershoop	Farm Sanddraai 391	-	82,1 km
11.	Dreyer, C. (2015)	Grobliershoop	Bokpoort 390	9659	73,5 km
12.	Van Schalkwyk, J. (2015)	Upington And	N10 National Road	7765	95,2 km

NO.	AUTHOR/YEAR	TOWN	SITE	SAHRIS ID	DISTANCE FROM PROJECT AREA
		Groblershoop			
13.	Engelbrecht, J. & Fivaz, H. (2018)	Groblershoop	Farm 387 Portion 18	12876	73, 2 km
14.	Rossouw, L. (2018)	Griekwastad	Farm Reliance No. 347	12340	44,4 km



Figure 4: Google Earth map indicating locations of previous heritage and archaeological impact assessments in relation to the proposed project area (red arrow).

3.1. Stone Age

The Stone Age is divided into the Early Stone Age (ESA) (± 2 Ma to ± 300 ka), the Middle Stone Age (MSA) (± 300 ka to ± 40 ka) and the Later Stone Age (LSA) (± 40 ka to ± 2 ka). It is important to note that these dates are not fixed due to variability and overlapping of site date across the country (Lombard *et al.*, 2012). The Stone Age refers to humans that mainly used stone as their technological marker. The ESA is characterised by two technological industries which are the Oldowan (± 2 Ma to ± 1.5 Ma) and Acheulean (± 1.5 Ma to 300 ka (Klein 2000; Lombard *et al.*, 2012). The Oldowan industry is characterised by flakes produced from pebbles, cobbles and percussive tools (Klein 2000; Roche *et al.* 2009). The Acheulean industry is characterised by large hand axes, cleavers and other bifacial tools (Klein 2000).

The Northern Cape is well known for not containing mainly Stone Age assemblages (Van Vollenhoven 2014). However, stone age artefacts have been found in the areas surrounding Kathu, at the Doornlaagte ESA site and at the Woderwerk Caves (Van Vollenhoven 2014; Dreyer 2015) (*Table 9 and Figure 5*). The stone age artefacts and sites found near Kathu pans represents one of the longest preserve stone age sequences in South Africa (Engelbrecht & Feivaz 2018). Several open-air stone age sites have been found near Upington (Melkboom, Biesje Poort and Bokvasmaak) and Carnarvon (Jagt Pan) (Parson 2008). On the Farm 292 located near Groblershoop, Beaumont (2008) found low densities of stone age artefacts. Archaeological deposits including stone tools and faunal and botanical remains found at Wonderwerk Cave, located near the towns of Kuruman and Danielskuil has indicated that the cave was occupied from the ESA to the LSA (Chazan & Horwitz 2015).

The MSA is widely debated to be the phase that marked a change in hominin species to anatomically modern humans (Wadley 2007). The use of ochre, ostrich eggshell water flasks which inform archaeologists about the emergence of symbolic behaviour and distinctive stone tools that are found in MSA sites of southern Africa have yielded evidence that this region is the origin of cognitive modern humans. The MSA is associated with small flakes, points and blades that are suggested to be made for hunting activities and cutting prey (Wurz 2013) and arrowheads or spears (Wadley 2007). In the Northern Cape, stone age artefacts are widely scattered throughout the landscape (Orton & Webley 2013). During her survey of the Farm Bokspuits 118, Van Ryneveld (2007) found low densities of MSA artefacts scatters at several Quartz outcrops. Similarly, Dreyer (2006) found three MSA sites on the farms Olyvenhouts Drift, Upington, and Bokpoort 390 and Tampansrus 294/295 in the district of Groblershoop. Scatters of MSA artefacts have been reported throughout the Northern Cape and around the project area in Groblershoop (Morris 2006; Van Ryneveld 2007; Van Vollenhoven 2014 and Webley 2013) Griekwastad, Hotazel and Kenhardt, Pofadder, Marydale, and in Upington (Dreyer 2006, 2012, 2014; Pelser & Lombard 2013; Webley 2013; Engelbrecht and Fivaz 2018). Several MSA and LSA artefacts were also found scattered around on the Farm 387 Groblershoop (Engelbrecht and Fivaz 2018). A specularite working site has been found to the east of Postmasburg, located in the area surrounding the proposed project area (Van Vollenhoven 2014).

Table 9: Archaeological sites located in the Northern Cape Province, surrounding the project area.

SITE NO.	ARCHAEOLOGICAL SITE	TYPE OF SITE	SAHRIS ID	DISTANCE FROM PROJECT AREA
1.	115 Main Road, Kimberley	Historical buildings	28449	198,7 km
2.	Alexander McGregor Memorial Museum, 10 Chapel Street, Kimberley	Historical buildings	28412	197,4 km
3.	Archaeological Site, Doornlaagte 97, Kimberley District	Stone Age	28360	153,2 km
4.	City Hall and Market Square, Kimberley	Historical building	28423	197,3 km
5.	Canteen Kopj	Stone Age	29476	176,5 km
6.	Cathedral of St Augustine, Le Roux Street, Upington	Historical building	28782	151,2 km
7.	De Beers Consolidated Mines Limited Head Office, 36 Stockdale Street, Kimberley	Historical building	28420	196,3 km
8.	Dutch Reformed Mother Church, Newton, Kimberley	Historical building	28416	195,9 km
9.	Dutch Reformed Church, Schroder Street, Upington	Historical building	28779	153,3 km
10.	Kathu Pan 1, Kathu, Northern Cape	Stone age	25782	129,5 km
11.	McGregor Museum, Atlas Street, Kimberley	Historical building	28409	198 km
12.	Moffat Press, Moffat Mission, Seodin Street, Kuruman	Historical building	28207	169,2 km
13.	Old Toll House	Historical building	29477	176,5 km
14.	Old Watermill, Upington	Historical building	28785	154,3 km
15.	Post Office and Magistrate's Court, Main Street, Griquatown	Historical building	28499	47,9 km
16.	Specularite Mine, Gatkoppies, Postmasburg	Late Iron Age/Historical Period	27857	67,8 km
17.	Wildebeestkuil Rock Art Site	Rock Art	31761	184 km



Figure 5: Google Earth map of the archaeological sites located in the Northern Cape Province in relation to the proposed project area (the yellow arrow).

The LSA is marked by microlithic stone tools, flakes and scrapers (Binneman 1995; Lombard *et al.*, 2012). This period is also associated with rock art. During this period, there was a development of an economic system, whereby hunter-gatherers inland hunted fauna and gathered plants which can be seen by seed remains in archaeological assemblages. Furthermore, evidence of symbolic behaviour has been found in southern African archaeological sites during this time. Symbolic behaviour of LSA period is shown by deliberate burial (Hall 1990), decorating using ostrich eggshell beads and the use of ochre (Hall & Binneman 1987). In the Northern Cape LSA artefacts are found near dune areas (Morris 2012). Several rock paintings and engravings have been found in the Karoo as well as in the broader Northern Cape (Morris 1988). Rock art paintings have been found in a small shelter and engravings have also been recorded on the farm Eindgoed (Fock & Fock 1989; Beaumont 2008). Rock art has also been found at Wonderwerk Cave in the Kuruman hills (Morris 1988).

3.2. Iron Age

The Iron Age is divided into the Early Iron Age (EIA) (AD 200 – 900), the Middle Iron Age (MIA) (AD 900 – 1300), and the Late Iron Age (LIA) (AD 1300 – 1840). The Iron Age is characterised by farming communities who domesticated animals, cultivated plants, produced various ceramic vessels (*Figure. 5*), smelted iron for weapons and manufactured tools. There is also evidence of small-scale mining of copper, iron and gold in the northern areas of Southern Africa (Friede 1980). The Iron Age groups migrated with their material culture and it can be observed in the archaeological record. The material culture expresses the identity of the groups as it forms part of the group's distinct patterns and cultural symbols (Huffman 2002). Ceramic style is used in Iron Age archaeology to distinguish the different Iron Age groups that lived in the southern African landscape.

Iron Age sites in the Northern Cape is scarce as many Iron Age groups chose to settle in the central and eastern parts of south Africa (Huffman 2007; Van Vollenhoven 2014). However, LIA Stone walled settlements of the Sotho-Tswana speaking groups have been found near Dithakong, a Bathlaping capital 40 km north of Kuruman Langeberge and what is known today as Witsand (Humphreys 1976; Van Vollenhoven 2014; Dreyer 2015; Rossouw 2018). When these Sotho-Tswana and Nguni group settled in the area, they found Khoi herder communities who had settled in the area from 400 -1100 AD (Van Vollenhoven 2014). These Khoi Herder communities later intermixed and intermarried with the Sotho-Tswana and Nguni speaking groups (Dreyer 2015). The Korana and Griqua groups did not intermarry into the Sotho-Tswana and Nguni communities (Van Vollenhoven 2014).

3.3. Historical Period

The Historical Period dates from AD 1600 and is generally the period related to colonial settlement in South Africa. The Korana were a nomadic Khoikhoi group who left the Cape region during 1661-1668 (Erasmus 2005). According to Ouzman (2005) a group called the 'Gorachoqua' (from which Griekwa derives) lived near Stellenbosch in the late 17th Century. Their leader was called 'Ora, from which !Kora derives (Ouzman 2005). As a result of Colonial settlers occupying the area, the Griekwa were forced to move into the interior of South Africa (Ouzman 2005). During the 18th century they settled in the Free State region (Van Vollenhoven 2016). Korana rock art is found scattered at sites in the eastern Free State Province (Ouzman 2005). The rock art is characterized by their painting techniques which include the use of fingers, macerated sticks or grass bundles (Ouzman 2005). In Korana rock art horses, guns, hunts, human figures, snakes, geometric shapes and smears and splatters are often depicted (Ouzman 2005).

PJ Truter's and William Somerville who were traders, reached the Dithakong near Kuruman in the Northern Cape in 1801 (Van Vollenhoven 2014). The London Mission Society station near Kuruman was established in 1817 (De Jong 2010; Van Vollenhoven 2014). Griekwastad was formerly known as the Klaarwater Station of the London Missionary society and was founded in 1802 (Roussouw 2018). The station was renamed Griekwatown in 1813 by Reverend J. Campbell from the London Missionary Society (Roussouw 2018).

During the 1820's and 1830's, the *Mfecane* conflict and expansion of the Voortrekkers caused instability in South Africa (Huffman 2004; Morton 2013). The conflict mainly came about due to environmental changes that caused drought in southern Africa, thus arable land was scarce, which in turn caused competition for land and invasions were on the rise (Eldredge 1987; Morton 2013). In the highveld region, the *Mfecane* conflict was escalated by Mzilikazi. It must be noted that before the Mzilikazi invasion, other groups such as the Pedi invaded the highveld area with no avail (Morton 2013). At about 1827, Mzilikazi migrated northwards from Natal settling in the interior of South Africa. Mzilikazi invaded parts of the interior of South Africa capturing, killing and driving away the Sotho-Tswana groups. Consequently, expanding his territory in the Highveld region (Okihiro 1973). At the same time, in the 1830's, the Voortrekkers were migrating northwards from the Cape Colony due to dissatisfaction with the British rule (Eldredge 1987). The migration of the Voortrekkers is known as the Great Trek. During the Great Trek the Voortrekkers can into conflict with the Tsana groups and Missionary groups who had settled near Bechuanaland and Griqualand West (Van Vollenhoven 2014). The migrations led to a series of battles and wars between the Zulu's, Voortrekkers and Sotho-Tswana communities in the Orange Free State and southern Transvaal (Gutteridge 2008). This resulted in the Sotho-Tswana people being dislocated from their historical settlements (Morton 2013). In October 1836, the Voortrekkers engaged in a battle with 3000 of Mzilikazi's warriors on Vegkop hill (Zvobgo 2009). The Voortrekkers who were assisted by the Sotho-Tswana and Griqua groups defeated Mzilikazi's Matabele, who fled to the Limpopo Province and settled in Zimbabwe (Zvobgo 2009). In 1848, the region between the Orange and Vaal Rivers was proclaimed as British Possession by Sir Harry Smith (Scott-Keltie & Epstein 1925). The Convention of Sandrivier was signed in 1852 between Great Britain and the Voortrekkers (Kruger 2018). In the Convention the Voortrekkers were given independence. The Voortrekkers then established the South African Republic (Transvaal) (Ashman 1996). In 1854, the Orange Free State was formed (Pistorius 2004). In the 1860's and 1870's the Korana and Griqua communities once again became involved in the conflicts between the Voortrekkers, the Tsana groups and the British Government (Van Vollenhoven 2014).

In around 1870 the first Colonial farmers arrived and settled around Groblershoop (Orton & Webley 2013). Groblershoop was developed on the farm Uitdraai (Engelbrecht & Fivas 2018). The town was originally called Sternham but changed to Groblershoop in 1935 (Engelbrecht & Fivas 2018). A historic water turbine

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located in the Orange river powered by oak gears was built in 1913 on the farm Winstead (Engelbrecht & Fivas 2018). Seven graves dating from the Rebellion of 1914 can be found on the road from Groblershoop to Griekwastad (Webley 2013; Engelbrecht & Fivas 2018). During their survey for the proposed Boegoeberg Hydropower station near Groblershoop Orton & Webley (2013) found several straight walls, semi-circles, L-shaped stone walls typical of pre-colonial walling from the Karoo.

3.4. Conclusion on Literature Review

The proposed development area is situated in a province that is rich in archaeology, history and heritage. The Northern Cape Province is home to several archaeological stone age sites, that have yielded some material culture. However material culture and stonewalls of Iron-Age Sotho-Tswana groups have been sparse, while colonial history of settlements and various conflicts are richer throughout the province.

4. STUDY RESULTS

The background information yielded information about known archaeological and heritage resources located in the Northern Cape Province, particularly the Griekwastad region. The broader Northern Cape Province has a history of occupation by Khoi herder, Sotho-Tswana speaking groups and Colonial farmers who migrated and settled in the area, establishing several towns and missionary stations.

The physical survey focused on the area proposed for mining dumps and infrastructure, on the farm Waterkloof 95 (Figure 6). The survey identified the ruins of a stone wall, one stone tool, a bullet casing and the ruins of a building (Figure 7). The area is characterised by several rock outcrops, small hills and dry river beds (Figure 8-23). The project area is situated in a dry bushveld-grassland area that is used for cow grazing and game (Figure 24-25). Several wind pumps, the ruins of farm buildings and old farm equipment has also been observed in the project area (Figure 26-27). The heritage resources identified in the project area including the recommended mitigation measures for each site are described below (Table 10-17). No burial grounds or graves were identified at the proposed project area.

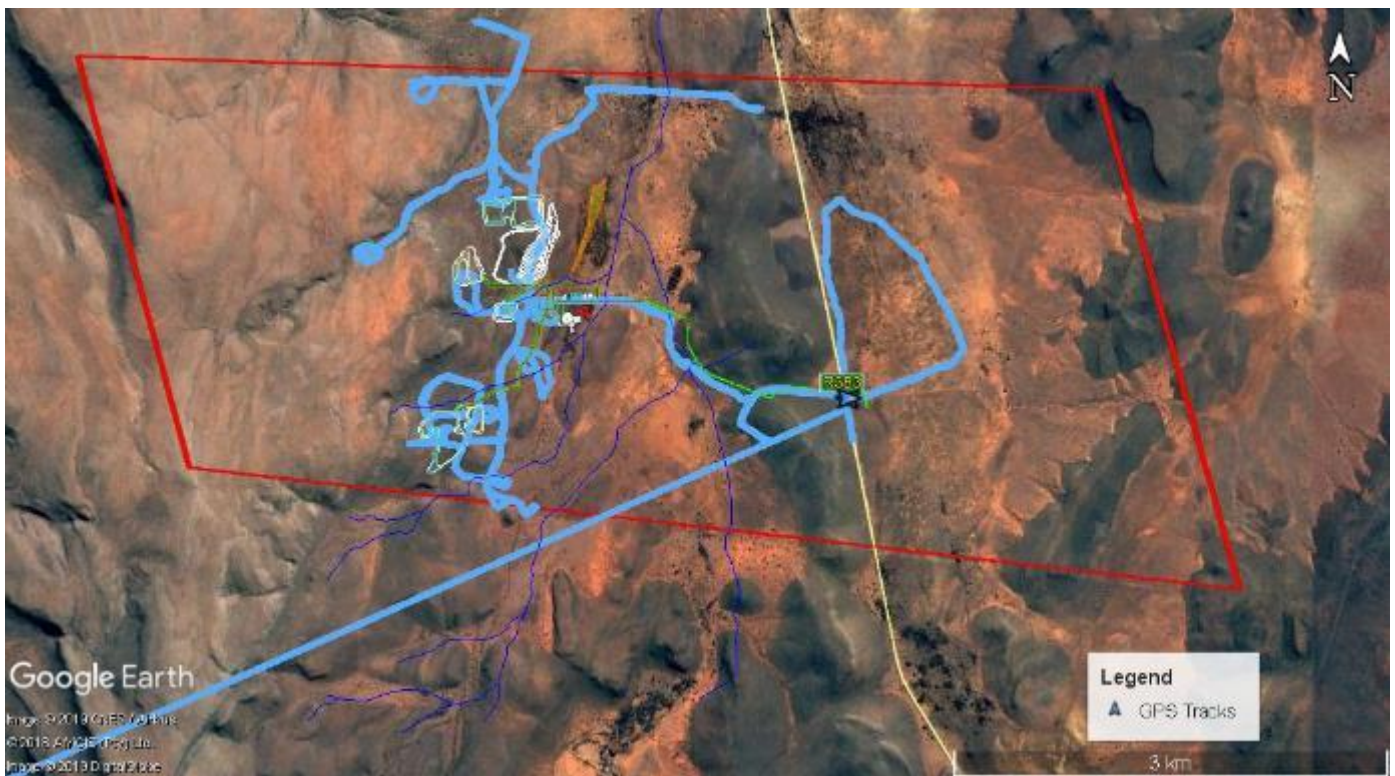


Figure 6: Google Earth image indicating the areas surveyed around the proposed mining development.

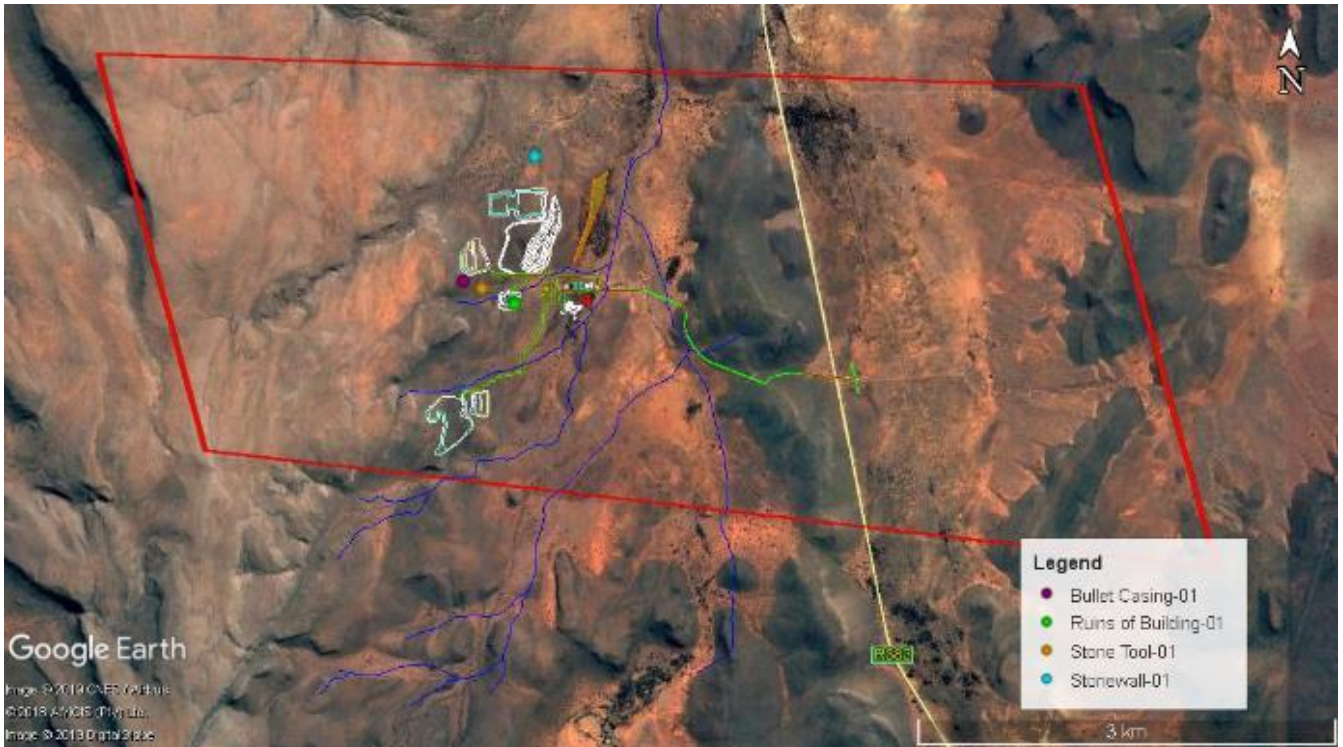


Figure 7: Heritage resources identified during the survey.

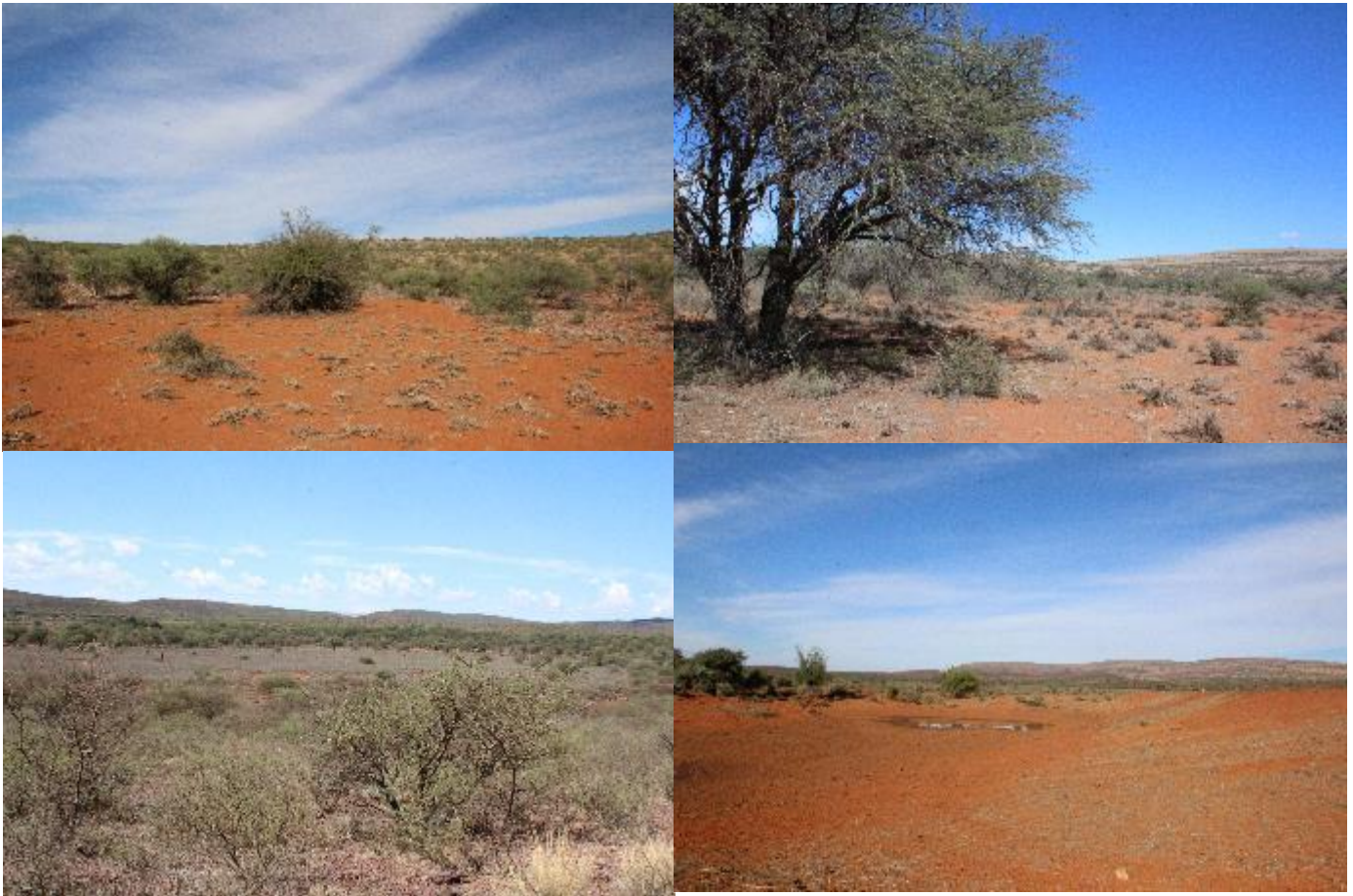


Figure 8: General view of the project area.



Figure 9: Small Koppie located on the Northern boundary of the project area.



Figure 10: Koppie located near the Southern boundary of the project area.



Figure 11: Rock outcrop in Western corner of project area.



Figure 12: General view of rock outcrops in the South-western corner of the project area.



Figure 13: General view of the north-eastern corner of the project area.



Figure 14: Several dry riverbeds and draining lines were observed throughout the project area.



Figure 15: General view of the area proposed for Fe Lode N 1, near the north-western corner of project



Figure 16: General view of the area proposed for Fe Lode NW 1



Figure 17: General view of Fe Lode Main 1



Figure 18: General view of Fe Lode Main 1 E



Figure 19: General view of south-western corner of the project area, near the proposed location of Fe Load Mid

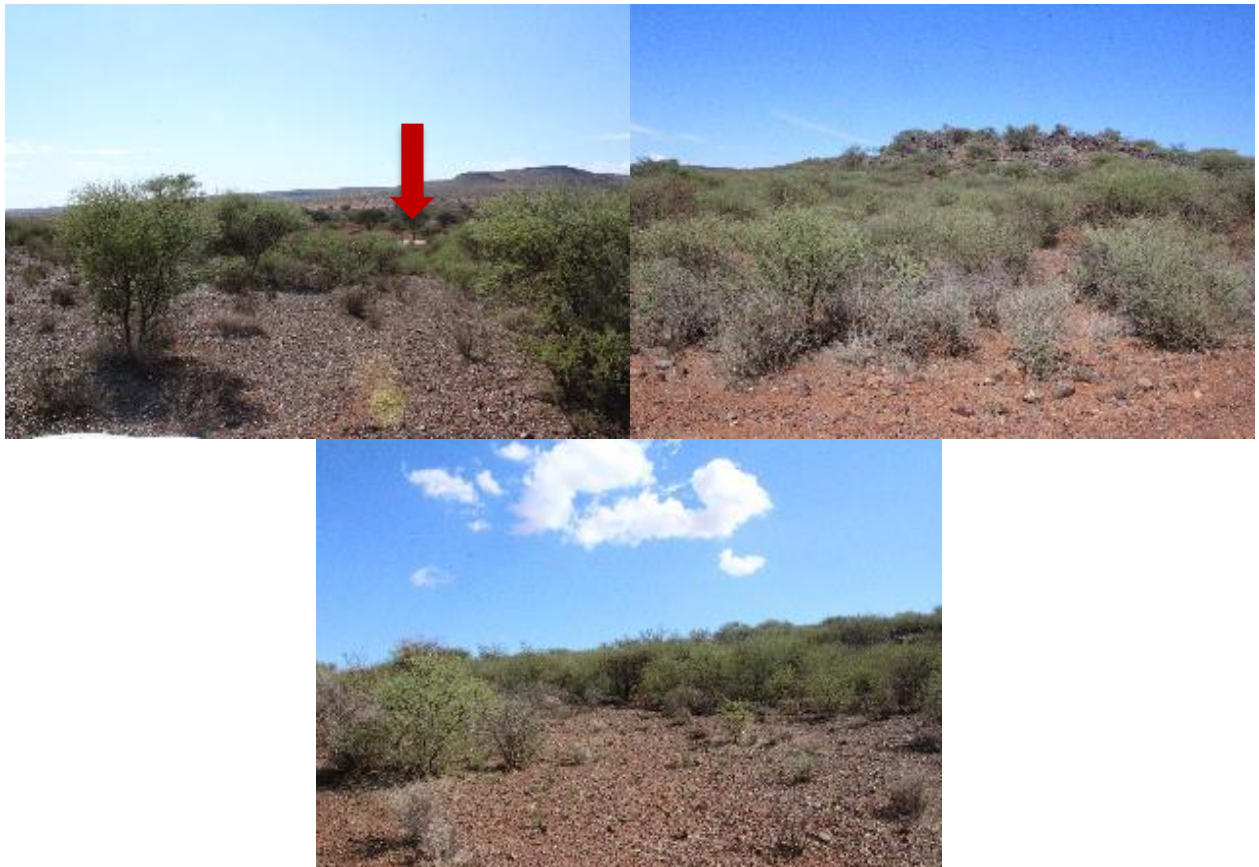


Figure 20: View of project area, near the R383 (red arrow), that is located in the middle of the project area.

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Figure 21: General view of the area proposed for the Waste Dump A.



Figure 22: General view of the area proposed for the Waste Dump B.



Figure 23: General view of the project area located to the east of the R383.



Figure 24: Cows grazing in the project area (Bones of cows were also found).



Figure 25: Some Giraffes (yellow circle) and Springbok (green circle) were also seen in the project area.



Figure 26: Wind pumps observed throughout the project area.



Figure 27: Old farm equipment observed in the project area.

4.1. Archaeological sites

Table 10: Stone Tool-01

Site Name:	Stone Tool-01
Type:	Archaeological
Density:	Low Density
Location/GPS Coordinates:	<ul style="list-style-type: none"> • 28° 49' 41.25" S • 22° 44' 16.04" E
Approximate Age:	Stone Age
Applicable Sections of the Relevant Acts:	<ul style="list-style-type: none"> • Section 35 of the NHRA, No. 25 of 1999
Description:	
<p>A single stone age tool was identified during the survey, west of the proposed location of Fe Lode Mid and south of Fe Lode NW 1 (Figure 28). From the background information several ESA, MSA and LSA artefact scatters of low significance have been observed throughout the region. The stone tools most likely dates to the most likely dates to the LSA. Although a stone tools has been found in the area, the area cannot be characterised as a site, since the artefact was found in isolated and in a low density.</p>	
Recommended Mitigation Measures:	
<ul style="list-style-type: none"> • The single stone tool found on site is of low heritage significance. • No mitigation is required. • Subject to approval from EC-PHRA 	



Figure 28: Stone artefact found on site

Table 11: Impact and risk assessment rating for the pre-and post-mitigation for the project phases for Archaeological and Living Heritage Resources

Destruction/damage of archaeology and living heritage resources					
Impact Name	Destruction/damage of archaeology and living heritage resources				
Alternative	Proposal				
Phase	Planning				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature of Impact	-1	-1	Magnitude of Impact	5	3
Extent of Impact	3	2	Reversibility of Impact	5	3
Duration of Impact	5	4	Probability	4	3
Environmental Risk (Pre-mitigation)					-18,00
Mitigation Measures					
<i>See Table 10</i>					
Environmental Risk (Post-mitigation)					-9,00
Degree of confidence in impact prediction:					High
Impact Prioritisation					
Public Response					1
<i>Low: Issue not raised in public responses</i>					
Cumulative Impacts					3
<i>Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change.</i>					
Degree of potential irreplaceable loss of resources					2
<i>The impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.</i>					
Prioritisation Factor					1,50
Final Significance					-13,50

Table 12: Bullet Casing-01

Site Name:	Bullet Casing-01
Type:	Archaeological
Density:	Low Density
Location/GPS Coordinates:	<ul style="list-style-type: none"> • 28° 49' 39.76" S • 22° 44' 11.22" E
Approximate Age:	Contemporary
Applicable Sections of the Relevant Acts:	<ul style="list-style-type: none"> • Section 35 of the NHRA, No. 25 of 1999
Description:	
<p>A yellow shotgun cartridge was found on site (<i>Figure 29</i>). From the markings it was determined the cartridge belongs to the Express 34 cartridge range, which is designed for hunting by GB Cartridges. GB Cartridges was established in 1924 in Spain (Cartuchos GB, S.A. 2019). However, the cartridge found most likely dates to the contemporary period and was mostly used by a farmer or hunter shooting some of the game found in the project area.</p>	
Recommended Mitigation Measures:	
<ul style="list-style-type: none"> • The yellow shotgun cartridge is of low heritage significance. • No mitigation is required. • Subject to approval from EC-PHRA 	



Figure 29: Yellow shotgun cartridge found on site.

Table 13: Impact and risk assessment rating for the pre-and post-mitigation for the project phases for Archaeological and Living Heritage Resources

A. Destruction/damage of archaeology and living heritage resources					
Impact Name	Destruction/damage of archaeology and living heritage resources				
Alternative	Proposal				
Phase	Planning				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature of Impact	-1	-1	Magnitude of Impact	5	2
Extent of Impact	3	2	Reversibility of Impact	5	1
Duration of Impact	5	2	Probability	4	1
Environmental Risk (Pre-mitigation)					-18,00
Mitigation Measures					
<i>See Table 12</i>					
Environmental Risk (Post-mitigation)					-1,75
Degree of confidence in impact prediction:					High
Impact Prioritisation					
Public Response					1
<i>Low: Issue not raised in public responses</i>					
Cumulative Impacts					3
<i>Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change.</i>					
Degree of potential irreplaceable loss of resources					2
<i>The impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.</i>					
Prioritisation Factor					1,50
Final Significance					-2,63

4.2. Built Environment Features

Table 14: Stonewall-01

Site Name:	Stonewall-01
Type:	Stone wall
Density:	Low Density
Location/GPS Coordinates:	<ul style="list-style-type: none"> • 28° 49' 10.76" S • 22° 44' 30.07" E
Approximate Age:	60 years and below
Applicable Sections of the Relevant Acts:	<ul style="list-style-type: none"> • Section 34 of the NHRA, No. 25 of 1999
Description:	
A partial stone structure was identified (<i>Figure 30</i>). It consists of packed stones located to the north of Fe Lode N1. The structure most likely formed part of previous farm buildings that have since been destroyed and collapsed.	
Recommended Mitigation Measures:	
<ul style="list-style-type: none"> • The stone structure is of low heritage significance. • No mitigation is required. • Subject to approval from EC-PHRA 	



Figure 30: Stone structure identified

Table 15: Impact and risk assessment rating for the pre-and post-mitigation for the project phases for Built Environment Resources

Destruction/damage of built environment resources					
Impact Name	Destruction/damage of built environment resources				
Alternative	Proposal				
Phase	Planning				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature of Impact	-1	-1	Magnitude of Impact	4	3
Extent of Impact	3	2	Reversibility of Impact	4	3
Duration of Impact	4	4	Probability	4	3
Environmental Risk (Pre-mitigation)					-15,00
Mitigation Measures					
See Table 14					
Environmental Risk (Post-mitigation)					-9,00
Degree of confidence in impact prediction:					High
Impact Prioritisation					
Public Response					1
<i>Low: Issue not raised in public responses</i>					
Cumulative Impacts					2
<i>Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.</i>					
Degree of potential irreplaceable loss of resources					2
<i>The impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.</i>					
Prioritisation Factor					1,33
Final Significance					-12,00

Table 16: Building Ruins-01

Site Name:	Building Ruins-01
Type:	Building
Density:	Low Density
Location/GPS Coordinates:	<ul style="list-style-type: none"> • 28° 49' 44.95" S • 22° 44' 24.80" E
Approximate Age:	Contemporary
Applicable Sections of the Relevant Acts:	<ul style="list-style-type: none"> • Section 34 of the NHRA, No. 25 of 1999
Description:	The ruins of a brick old farm building were noticed to the east of the proposed location of Fe Lode Mid and west of the proposed Process plant (Figure 31). The roof, floor and most of the walls were destroyed. The ruins are of no cultural significance.
Recommended Mitigation Measures:	<ul style="list-style-type: none"> • The ruins of the buildings are contemporary and of low heritage significance. • No mitigation is required. • Subject to approval from EC-PHRA



Figure 31: Ruins of old farm buildings

Table 17: Impact and risk assessment rating for the pre-and post-mitigation for the project phases for Built Environment Resources

Destruction/damage of built environment resources					
Impact Name	Destruction/damage of built environment resources				
Alternative	Proposal				
Phase	Planning				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature of Impact	-1	-1	Magnitude of Impact	4	2
Extent of Impact	3	2	Reversibility of Impact	3	2
Duration of Impact	3	2	Probability	4	2
Environmental Risk (Pre-mitigation)					-13,00
Mitigation Measures					
<i>See Table 16</i>					
Environmental Risk (Post-mitigation)					-4,00
Degree of confidence in impact prediction:					High
Impact Prioritisation					
Public Response					1
<i>Low: Issue not raised in public responses</i>					
Cumulative Impacts					2
<i>Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.</i>					
Degree of potential irreplaceable loss of resources					2
<i>The impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.</i>					
Prioritisation Factor					1,33
Final Significance					-5,33

4.3. Burial Grounds and Graves

No archaeological resources were identified during the survey and site visit.

4.4. Paleontological Sensitivity

The SAHRA Palaeo-Sensitivity Layer (*Figure. 32*) shows that the project area is in a moderate sensitivity area. As such a field assessment and protocol for finds was required (See PIA and Appendix 3).

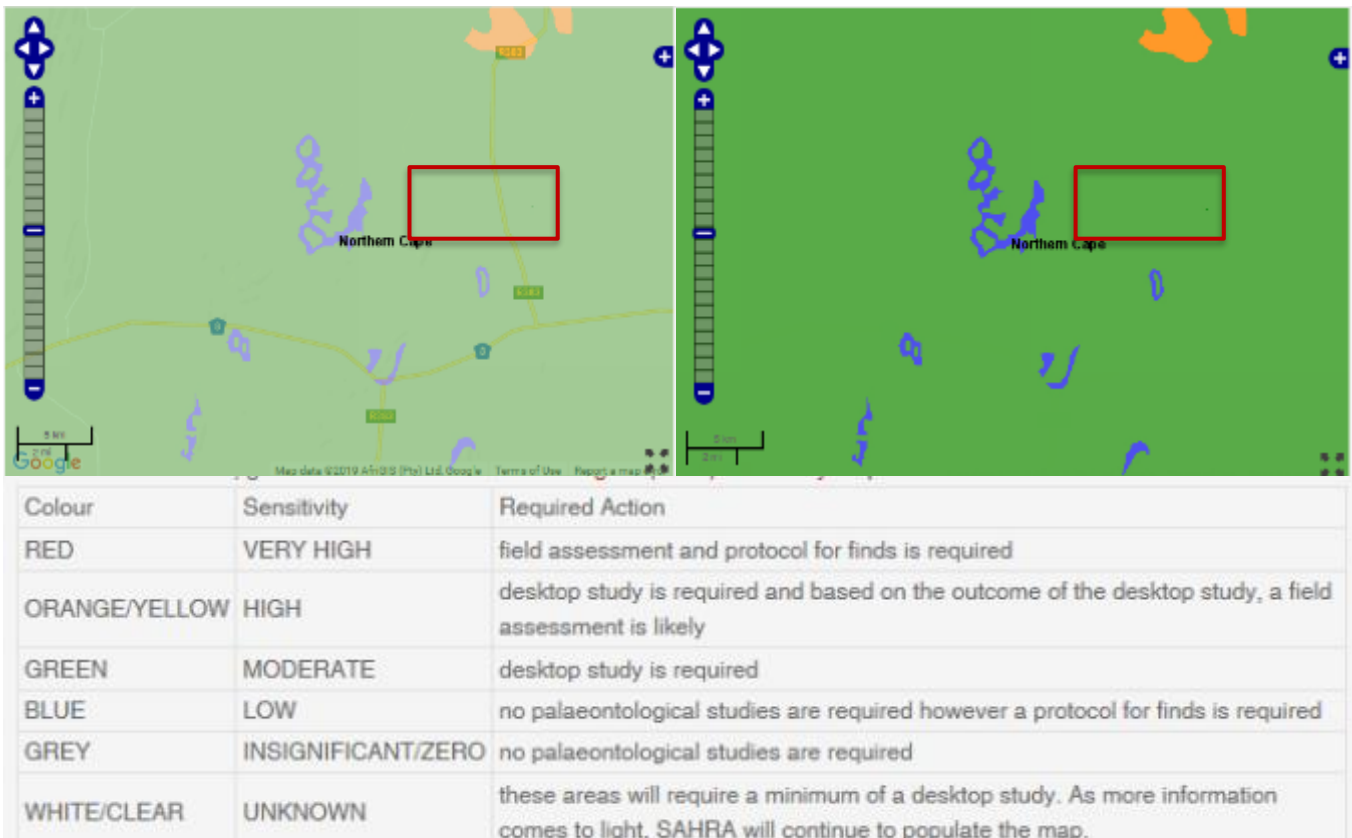


Figure 32: Palaeo-Sensitivity layer of Waterkloof 95 project area) in the Northern Cape Province.

4.5. Site Ratings

Table 18: Site significance classification and ratings for the buildings located in the project area

SITE	FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
Stone Tool-01	Generally Protected C (GP. A)	-	Low Significance	Destruction
Bullet Casing-01	Generally Protected C (GP. A)	-	Low Significance	Destruction
Stonewall-01	Generally Protected C (GP. A)	-	Low Significance	Destruction
Building Ruins-01	Generally Protected C (GP. A)	-	Low Significance	Destruction

5. CONCLUSIONS

Based on the results of literature review, field survey and the assessment of identified heritage resources, the following conclusions are made in terms of the National Heritage Act about the proposed development:

- It is concluded that the project area near Griekwastad, is located in a region rich in archaeology and heritage resources.
- During the survey the following heritage resources were found:
 - *Stone Tool-01:*
 - A single Stone Age tool was identified during the survey. The stone tool is most likely dates to the to the Late Stone Age (LSA) period. Although a stone tool has been found in the area, the area cannot be characterised as a site, since the artefact was found isolated and is of low density.
 - *Bullet Casing-01:*
 - A yellow shotgun cartridge was found on site.
 - From the markings it was determined the cartridge belongs to Express 34 cartridge range, which is designed for hunting by GB Cartridges. GB Cartridges was established in 1924 in Spain. However, the cartridge that was found most likely dates to the contemporary period and was mostly used by a farmer or hunter who was shooting some of the game found in the project area.
 - *Stonewall-01:*
 - A partial stone structure was identified, consisting of packed stones. The structure most likely formed part of previous farm buildings that have since collapsed and been destroyed.
 - *Building Ruins-01:*
 - The ruins of a contemporary brick old farm building were noticed. The roof, floor and most of the walls were destroyed, with only partial walls remaining.
- No sources of living heritage were identified on the farm Waterkloof 95.
- No graves or burial grounds were identified in the project area. However, graves are subterranean in nature and might not have been identified during the initial site visit and survey.
- In terms of SAHRA Paleontological Sensitivity Layer, the project area is located in a Moderate Sensitivity Area.
- According to the PIA report, the proposed iron ore mine lies on iron formation rocks of the Rooinekke Formation (of the Koegas Subgroup, Ghaap Group, Transvaal Supergroup) and these are not fossiliferous. In the vicinity are dolomites and limestones of other formations of the Ghaap

Group that could potentially contain stromatolites, although none has been recorded (See *PIA report: Annexure C*).

6. RECOMMENDATIONS

Based on the Conclusions it is recommended that subject to approval from NC-PHRA and SAHRA APM Unit that:

- *Stone Tool-01:*
 - The single stone tool found on site is of low heritage significance.
 - No mitigation is required.
- *Bullet Casing-01:*
 - The yellow shotgun cartridge is of low heritage significance.
 - No mitigation is required.
- *Stonewall-01:*
 - The stone structure is of low heritage significance.
 - No mitigation is required.
- *Building Ruins-01:*
 - The ruins of the buildings are contemporary and of low heritage significance.
 - No mitigation is required.
- It should be noted that some archaeological material, including artefacts and graves can be buried underground and as such, may not have been identified during the initial survey and site visits. In the case where the proposed development activities bring these materials to the surface, they should be treated as **Chance Finds**. Should such resources be unearthed, it is recommended that the mining activities be stopped immediately, and an archaeologist be contacted to conduct a site visits and make recommendations on the mitigation of the finds. SAHRA and NC-PHRA should also be informed immediately on such finds.
- In terms of the SAHRA Paleontological Sensitivity Layer, the area falls within a region defined as Moderate Sensitivity area and a desktop study is required.
- According to the PIA report stromatolites are common trace fossils so it is recommended that if they will be disturbed by the mining operation then they should be put aside, and a palaeontologist asked to assess their scientific importance. If they are important then a SAHRA permit must be obtained by the palaeontologist for their removal from the site. This recommendation should be added to the EMP. As far as the palaeontology is concerned the project may proceed. (*See PIA report: Annexure C and Appendix B*).
- The proposed mining activities on the farm Waterkloof 95 will not have impact on the heritage and archaeological resources in the broader Griekwastad area

7. REFERENCES

Ashman, P. 1996. Anglo- Boer war, 1880-1881 in Olson, J. S. & Shadle, R. *Historical Dictionary of the British Empire*. Westport: Greenwood Publishing, pp45-46

Beaumont, P. 2008. *Phase 1 Archaeological Impact Assessment Report On A Portion Of The Farm 292 Near Groblershoop, Karoo District Municipality, Northern Cape Province*. Heritage Impact Assessment Report

Binneman, J. F. 1995. *Symbolic construction of communities during the Holocene Later Stone Age in the South–Eastern Cape*. Unpublished PhD thesis. Johannesburg: University of the Witwatersrand.

Chazan, M., & Horwitz, L. K. 2015. An overview of recent research at Wonderwerk Cave, South Africa. In I. Thiaw & H. Bocoum (Eds.), *Preserving African cultural heritage. Proceedings of the 13th Congress of the Panafrican Archaeological Association for Prehistory and Related Studies – PAA*, and of the 20th Meeting of the Society of Africanist Archaeologists – SAfA, Dakar. Mémoires de l'IFAN - C. A. DIOP, n° 93, pp. 253–261

De Jong, R.C. 2010. *Heritage impact assessment report: proposed manganese and iron ore mining right application in respect of the remainder of the farm Paling 434, Hay registration division, Northern Cape*. Heritage Impact Assessment Report.

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*. Heritage Impact Assessment Report

Dreyer, C. 2012a. *First Phase Archaeological And Cultural Heritage Assessment Of The Proposed Water Pipeline From Sanddraai 391 To Bokpoort 390, Groblershoop, Northern Cape*. Heritage Impact Assessment Report

Dreyer, C. 2012b. *First Phase Archaeological And Heritage Assessment Of The Borrow Pit Developments Near Campbell, Northern Cape*. Heritage Impact Assessment Report.

Dreyer, C. 2014. *First Phase Archaeological & Heritage Investigation Of The Proposed Pv Energy Developments At The Farm Sanddraai 391 Near Groblershoop, Northern Cape Province*. Heritage Impact Assessment Report.

- Dreyer, C. 2015. *First Phase Archaeological & Heritage Assessment Of The Proposed Bokpoort li 300mw Combined 2 X 75 Pv & 150 Mw Csp Tower Solar Development On The Remainder Of The Farm Bokpoort 390, Groblershoop, Northern Cape Province*. Heritage Impact Assessment Report
- Eldredge, E.A. 1987. Drought, famine and disease in nineteenth-century Lesotho. *African Economic History*, (16): 61-93.
- Engelbrecht, J. & Fivaz, H. 2018. *Phase 1 Hia Report Farm 387 Portion 18 Groblershoop Northern Cape*.
- Erasmus, P. 2005. The 'Lost' South African tribe – Rebirth of the Koranna¹ in the Free State. *New Contree*, 50: 77-91
- Fock, G.J. & Fock, D.M.L. 1989. *Fe/sbilder in Sildafrika: Teil3. Vaa/-Oranje-Becken*. Koln: Bohlau Verlag.
- Friede, H. 1980. Iron Age mining in the Transvaal. *Journal of the Southern African Institute of Mining and Metallurgy*, 80(4): 156-165.
- Gutteridge, L. 2008. *The South African Bushveld: A Field Guide from the Waterberg*. Johannesburg: Southbound
- Hall, S. 1990. *Hunter-gatherer-fishers of the Fish River Basin: A Contribution to the Holocene Prehistory of the Eastern Cape*. Unpublished PhD thesis. Stellenbosch: University of Stellenbosch.
- Hall, S. and Binneman, J.F. 1987. Later Stone Age Burial Variability in the Cape: A Social Interpretation. *South African Archaeological Society*, 42(146): 140–152.
- Huffman, T. 2002. Regionality in the Iron Age: the case of the Sotho-Tswana. *Southern African Humanities*, 14: 1–22.
- Huffman, T. 2007. *Handbook to the Iron Age*. Pietermaritzburg: University of Kwazulu-Natal Press
- Humphreys, A.J.B. 1982. Cultural Material from Burials on the Farm St. Clair, Douglas Area, Northern Cape. *South African Archaeological Bulletin*, 37 (136): 68-70.

Klein, R. G. 2000. The Earlier Stone Age of Southern Africa. *The South African Archaeological Bulletin*, 27(172): 107-122.

Kruger, N. 2018. *Archaeological impact assessment of demarcated areas on a portion of portion 1 of the farm Middenspruit 151 for the proposed Middenspruit rock mine project in the Fezile Dabi District Municipality, Free State Province*. Heritage Impact Assessment 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: 120–144.

Mitchell, P. 2002. *The Archaeology of Southern Africa*. Cape Town: Cambridge University Press.

Morris, D. 1988. Engraved in Place and Time: A Review of Variability in the Rock Art of the Northern Cape and Karoo, *The South African Archaeological Bulletin*, 43(148): 109-120.

Morris, D. 2012. *Archaeological Impact Assessment Phase 1: 15 km Water Pipeline across farms Sand Draai 391 and Bok Poort 390 near Groblershoop, Northern Cape*. Heritage Impact Assessment Report.

Morton, F., 2013. Settlements, landscapes and identities among the Tswana of the western Transvaal and eastern Kalahari before 1820. *The South African Archaeological Bulletin*, 8 (197): 15-26.

Okihiro, G.Y. 1973. Resistance and Accommodation: baKwena—baGasechele 1842—52. *Botswana Notes and Records*, 104-116.

Orton, J. & Webley, L. 2013. *Heritage Impact Assessment for the Proposed Boegoeberg Hydropower Station Near Groblershoop, Northern Cape*. Heritage Impact Assessment Report.

Ouzman, S. 2005. The Magical Arts of a Raider Nation: Central South Africa's Korana Rock Art, *Further Approaches to Southern African Rock Art*, 9: 101-113.

Parsons, I. 2008. Five Later Stone Age Artefact Assemblages from the Interior Northern Cape Province. *The South African Archaeological Bulletin*, 63(187): 51-60.

Pelser, A.J. & Lombard, M. 2013. *A report on the archaeological investigation of Stone Age finds on the Paling 434, Hay Magisterial District, near Postmasburg in the Northern Cape Province*. Heritage Impact Assessment Report.

Pistorius, J. 2004. *A heritage impact assessment (HIA) study for an Emp for the Voorspoed Diamond Mine near Kroonstad in the Free State Province of South Africa*. Heritage Impact Assessment Report.

Roche, H. & Blumenschine, R. J. and Shea, J. J. 2009. Origins and adaptations of early Homo: what archaeology tells us, in Grine, F. E. & Fleagle, J. G. & Leakey, R. E. *The First Humans—Origin and Early Evolution of the Genus Homo*. Springer: Dordrecht, pp. 135-147

Rossouw, L. 2018. *Phase 1 Heritage Impact Assessment Of Proposed Installation Of A New 19 Ha Irrigation Pivot On The Farm Reliance No. 347 Near Griekwastad, Northern Cape Province*. Heritage Impact Assessment Report. Heritage Impact Assessment Report

Scott-Keltie, J. and Epstein, M. 1925. *The Statesman's Year-Book*. London: Macmillan and Co Ltd

Van Der Walt, J. 2012. *Archaeological Impact Assessment Report For The Proposed Re-Use Of A Hard Rock Quarry On The Farm Buchuberg 296 In The Hay Magisterial District 24km East Of Groblershoop*. Heritage Impact Assessment Report

Van Ryneveld, K. 2007. *Phase 1 Archaeological Impact Assessment – Portion Of The Farm Bokspuits 118, Groblershoop District, Northern Cape, South Africa*. Heritage Impact Assessment Report

Van Schalkwyk, J. 2015. *Documentation Of A Number Of Bridge And Culvert Structures On The N10 National Road Between Upington And Groblershoop, Northern Cape Province*. Heritage Impact Assessment Report

Van Vollenhoven, A.C. 2014. *A report on a basic heritage assessment for the proposed Eskom Fibre-Groblershoop 132 Kv power line, Northern Cape Province*. Heritage Impact Assessment Report.

Wadley, L., 2007. The Middle Stone Age and Later Stone Age. In Bonner, P. & Esterhuysen, A. & Jenkins, T. A. *Search for Origins: Science, History and South Africa's 'Cradle of Humankind'*. Johannesburg: Wits University Press. Pg 122 -135.

Webley, L. 2013. *Heritage Impact Assessment For Proposed Construction Of The Eskom Groblershoop Substation And The Garona-Groblershoop 132 Kv Powerline, Groblershoop, Northern Cape*. Heritage Impact Assessment Report

Wurz, S., 2013. Technological trends in the Middle Stone Age of South Africa between MIS 7 and MIS 3. *Current Anthropology*, 54(S8): S305-S319.

Zvobgo, C. J. M. 2009. *A History of Zimbabwe, 1890-2000 and Postscript, Zimbabwe, 2001-2008*. Tyne: Cambridge Scholars Publishing.

8. APPENDIX A: SPECIALIST CV – CHERENE DE BRUYN

Name : Cherene de Bruyn
Profession : Archaeology
Date of Birth : 1991/03/01
Parent Firm : NGT Holdings (Pty) Ltd
Position in Firm : Manager: Archaeology & Heritage Unit
Years with firm : 11 Months
Nationality : South Africa
BI & Male/Female Status : White South African Female
Languages :

Language	Speak	Read	Write
English	X	X	X
Afrikaans	X	X	X

Countries of Work Experience : South Africa
Proposed Position on Team : Manager: Archaeology & Heritage Unit

KEY QUALIFICATIONS

Cherene is a hardworking Archaeologist who has developed a mature and responsible approach to any task she undertakes. She received the British High Commissions Chevening Scholarship to complete her Master’s degree in Archaeology at UCL in 2016/2017. She is skilled in excavating and analysing archaeological artefacts such as pottery and skeletal human remains, and have an interest in Egyptian, African and burial archaeology. Cherene is a motivated individual who gained relevant professional experience in the heritage sector through Internships as well as through volunteering on archaeological projects.

●●●●● = Excellent ●●●● = Proficient ●●● = Intermediate ●● = Developing ● = Novice

Communication ●●●●●
 Team Work ●●●●●
 Time Management ●●●●●
 Adaptability ●●●●●
 Creativity ●●●●
 Leadership ●●●●
 Excavation ●●●●●
 Recording ●●●●●
 MS Office ●●●●
 Google Earth ●●●●
 QGIS ●●●
 Total Station ●●●

EDUCATION

NAME OF INSTITUTION	DEGREE OBTAINED	DATES ATTENDED
University College London	MA in Archaeology	2016-2017
University of Pretoria	BSC Honours in Physical Anthropology	2015
University of Pretoria	BA Honours in Archaeology	2013
University of Pretoria	BA in Archaeology	2010-2012

RELEVANT EXPERIENCE

DATE	PROJECTS	POSITION	LOCATION
2019-Present	NGT ESH (Pty) Ltd	Manager: Archaeology & Heritage Unit	RSA
	Exhumation and reburial report of 4 graves located at Tombo, Eastern Cape Province, South Africa.	Author	
	Heritage Impact Assessment for the mining right application for the Farm Woodlands 407, situated in the Free State Province.	Co-Author	
	Heritage Impact Assessment for the proposed for the Construction of the Bulk Water Supply Pipeline in Selcourt, in the Ekurhuleni Metropolitan Municipality, Gauteng Province	Co-Author	
	Heritage Impact Assessment for the refurbishments of Lyttelton Primary School, Lyttelton Manor, Centurion, Gauteng Province.	Author	
2018-2019	NGT Holdings (Pty) Ltd	Archaeologist and Heritage Consultant	RSA
	Heritage Impact Assessment for the refurbishments of the Caledonian Stadium in Pretoria, Gauteng Province.	Author	
	Gap Analysis Of All The Heritage And Cultural Reports Completed For The Madimatle Cave, Limpopo Province, South Africa	Author	
	Heritage Impact Assessment for the amendment of an existing prospecting right and environmental authorization for Bothaville NE Ext A, situated in the Free State Province.	Author	
	Heritage Impact Assessment for the Madimatle Cave located near Thabazimbi in the Limpopo Province, South Africa	Author	
	Letter of Recommendation for Exemption from conducting a heritage impact assessment for the proposed alterations of Erf 1/966 Rosettenville located at 94 Main Street Rosettenville within the City of Johannesburg Metropolitan Municipality, Gauteng Province.	Co-Author	
	Heritage Impact Assessment Study for the Proposed New Lambano Sub Acute Facility on Stand 5454, 5455, 5456,5457 and New Training Facility on Stands 5458 and 5460 in Kensington, Johannesburg, South Africa	Author	
	Heritage Impact Assessment for the Prospecting Right and Environmental Authorization Application for Ventersburg B situated in the Free State Province.	Author	

DATE	PROJECTS	POSITION	LOCATION
	Heritage Impact Assessment for the proposed prospecting rights application and environmental authorisation for the farm Three Sisters in Barberton, within the city of Mbombela Local District, Mpumalanga, South Africa	Author	
	Report on the exhumation and reburial report of 16 graves from Doornkop, to Voortrekker Cemetery in Middelburg, Mpumalanga Province, South Africa	Author	
	Heritage Impact Assessment Study For The Development Of The Zandspruit Secondary School On Portion 504 Of The Farm Wilgespruit 190 Iq, Zonnehoeve, Gauteng Province, South Africa	Author	
	Grave exhumation and relocation off 19 graves on erf 3 of Holding 87 North Riding Agricultural Holdings, City Of Johannesburg, Gauteng Province	Author	
	Heritage Impact Assessment and Integrated Cultural Resources Management Study For The Proposed Mfolozi-Mbewu 765kv Transmission Line, Zululand And King Cetshwayo District Municipality, Kwazulu-Natal.	Author	
	Archival Search And Literature Background Study Of The Lyttelton Primary School, Lyttelton Manor, Centurion, Gauteng Province	Author	
	Heritage Impact Assessment for the proposed for the Construction of the Bulk Water Supply Pipeline and Feeder Pipes in Dunnottar, Gauteng Province	Author	
	Heritage Impact Assessment for the Proposed Development of a Place of Worship for Hope Restoration Ministries Project on Portion 31 And 32 of the Farm Blue Hills 397 JR, Gauteng Province, South Africa – Version 2	Author	
	Letter of Recommendation for Exemption from Conducting a full Heritage Impact Assessment Study for the Matlala Park, Ekurhuleni Metropolitan Municipality, Gauteng Province.	Author	
	Heritage Impact Assessment for the Proposed KwaThema to Grundlingh WWTW Bulk Outfall Sewer: Capital Project Implementation near Nigel, Gauteng Province, South Africa.	Author	
	Heritage Impact Assessment the prospecting right and environmental authorisation application for Kroonstad South situated in the Free State Province.	Author	
	Heritage Impact Assessment the prospecting right and environmental authorisation application for Vredefort West situated in the Free State Province.	Author	
	Archaeological impact assessment for a mining permit application for portion 19 of the farm Syferfontein 303 IP within the city of Matlosana Local Municipality in the North West Province, South Africa.	Author	

DATE	PROJECTS	POSITION	LOCATION
	Background literature study on the archaeology and history of Madimatle Mountain and the Gatkop Caves situated within the Thabazimbi Local Municipal area of Waterberg District, Limpopo Province, south Africa.	Author	
	Heritage Impact Assessment report for the proposed development of a SMME Training Centre and Youth Enterprise Park on Erf 1977 Edendale-CC located in the Msunduzi Local Municipality, Pietermaritzburg, KwaZulu-Natal Province, South Africa.	Author	
	Prospecting Right and Environmental Authorisation for the proposed WRE Nkuzana Prospecting Right Project.	Researcher	
2014-2015	FARC, University of Pretoria	DST-NRF Archaeological Intern	RSA
	Report on rescue excavations and skeletal analyses of two archaeological graves inadvertently uncovered in Boitekong, North-West.	Field Assistant and Researcher	
	Report on Follow-up site visit excavation and physical anthropological analyses of archaeological human remains transferred from SAPA Victim Identification Center to Department of Anatomy. Mamelodi East Phase 2 House 566.	Field Assistant and Researcher	
	Rescue excavation of an unmarked grave yard at Diamond Park, Greenpoint, Kimberley, Northern Cape Province	Field Assistant	
	Follow up site visit on human remains found at Bothlokwa (Ramatjowe & Mphakahne), Limpopo Province	Field Assistant	
	Follow up site visit on human remains found in Waterpoort, Soutpansberg, Limpopo Province	Field Assistant	
2014	Archaetnos Ltd	Archaeological Assistant	RSA
	A report on a cultural heritage impact assessment for the proposed development on portion 91 of the farm Waterkloof 305 JQ, close to Rustenburg, Northwest Province.	Field Assistant	
	A report on the phase II heritage investigation of a farmstead on portion 470 of the farm Waterkloof 305 JQ near Rustenburg in the Northwest Province.	Field Assistant	
	A report on the heritage impact assessment for the proposed new bulk water and sewer pipeline from Cosmo City to Lanseria, Gauteng Province.	Field Assistant	
	A report on the updating of a previous cultural heritage impact assessment for the EMPR alignment and consolidation process at Anglo American Platinum: Rustenburg platinum mines – Rustenburg section, Northwest Province.	Field Assistant and Researcher	
	A report on a cultural heritage impact assessment for the proposed Thusanang housing development, close to Rustenburg, Northwest Province.	Field Assistant and Researcher	
	A report on the cultural heritage impact assessment for the Tshepong extension 1, 2 and 3 housing development, close to Vereeniging, Gauteng Province.	Field Assistant	

DATE	PROJECTS	POSITION	LOCATION
	A report on the cultural heritage impact assessment for the proposed Isibonelo Colliery Block Z opencast mine, close to Kriel, Mpumalanga Province.	Field Assistant	
	A report on a cultural heritage impact assessment for a proposed transport facility on portion 33 of the farm Vaalbank 289 JS, close to Middelburg, Mpumalanga Province.	Field Assistant	
	Report on a cultural heritage Impact assessment done for the Anglo-American Platinum and African Rainbow Minerals Modikwa Platinum Mine South Shaft 2 project, close to Burgersfort, Limpopo Province.	Field Assistant	

SUMMARY OF OTHER EXPERIENCE

DATE	EMPLOYER	POSITION	LOCATION
2018	Sci-bono Discovery Centre	Lascaux Exhibition Tour Guide	Newton, RSA
2017	Tower Bridge Exhibition	Casual Worker	London, UK
2018, 2016	Umbeli Belli Middle Stone Age Excavation	Field and Lab Assistant	Kwazulu-Natal, RSA
2015-2016	Bio-Archaeological Analysis and Archaeological Geophysics Unit, University of Pretoria	Archaeological Contractor	Pretoria, RSA
2016, 2015	Wenner-Gren Foundation Funded Grassridge Archaeological and Palaeoenvironmental Project	Field and Lab Assistant	Eastern Cape, RSA
2015	Department of Anatomy, University of Pretoria	Student Teaching Assistant	Pretoria, RSA

SUMMARY OF PUBLICATIONS

DATE	AUTHORS	TITLE AND JOURNAL
2018	De Bruyn, C. & Meyer, A.	A Bioarchaeological analysis of the historic human skeletal remains recovered from Lancaster Mine, Witwatersrand, South Africa. <i>The South African Archaeological Bulletin</i> , 73(207): 4-12
2017	De Bruyn, C. & Jordaan, J.	Regional feature: Perspectives from Southern African archaeology professionals. <i>International Journal of Student Research in Archaeology</i> 2(3): 2-18
2014	De Bruyn, C.	An archaeological investigation in the Masebe Nature Reserve, Limpopo Province, <i>The Digging Stick</i> 31(1):9-11

MEMBERSHIPS

DATE	ORGANIZATION	POSITION
2019- Present	Association of Southern African Professional Archaeologists	CRM Accredited
2018-Present	International Association of Impact Assessment South Africa	Member
2015 - Present	Association of Southern African Professional Archaeologists	Professional Member
2014 - Present	South African Archaeological Society	Member

DECLARATION

I confirm that the above information contained in the CV is an accurate description of my experience and qualifications and that, at the time of signature, I am available and willing to serve in the position indicated for me in the Proposal, for the durations and at the locations indicated therein.



Cherene de Bruyn

1 May 2019

9. APPENDIX B: CHANCE FINDS OF PALAEOLOGICAL MATERIAL

Introduction

This document is aimed to inform workmen and foremen working on a construction and/or mining site. It describes the procedure to follow in instances of accidental discovery of palaeontological material during construction/mining activities. This protocol does not apply to resources already identified under an assessment undertaken under section 38 of the NHRA no 25 of 1999.

Fossils are rare and irreplaceable. Fossils tell us about the environmental conditions that existed in a specific geographical area millions of years ago. As heritage resources that inform us of the history of a place, fossils are public property that the State is required to manage and conserve on behalf of all the citizens of South Africa. Fossils are therefore protected by the NHRA and are the property of the State. Ideally, a qualified person should be responsible for the recovery of fossils noticed during construction/mining to ensure that all relevant contextual information is recorded. Heritage Authorities often rely on workmen and foremen to report finds, and thereby contribute to our knowledge of South Africa's past and contribute to its conservation for future generations.

Training workmen and foremen need to be trained in the procedure to follow in instances of accidental discovery of fossil material, in a similar way to the Health and Safety protocol. A brief introduction to the process to follow in the event of possible accidental discovery of fossils should be conducted by the designated Environmental Control Officer (ECO) for the project, or the foreman or site agent in the absence of the ECO.

It is recommended that copies of the attached poster and procedure are printed out and displayed on-site so that workmen may familiarise themselves with them and are thereby prepared in the event that accidental discovery of fossil material takes place.

Actions to be taken: one person in the team must be identified and appointed as responsible for the implementation of the attached protocol in instances of accidental fossil discovery and must report to the ECO or site agent. If the ECO or site agent is not present on site, then the responsible person on-site should follow the protocol correctly in order to not jeopardise the conservation and well-being of the fossil material. Once a workman notices possible fossil material, he/she should report this to the ECO or site agent.

Procedure to follow if it is likely that the material identified is a fossil:

The HIA developed by NGT ESH Solutions for NGT Holdings on behalf of Kemu Holdings (Pty) Ltd and Motjoli Iron Ore Company (Pty)

- I. The ECO or site agent must ensure that all work ceases immediately in the vicinity of the area where the fossil or fossils have been found;
- II. The ECO or site agent must inform SAHRA of the find immediately. This information must include photographs of the findings and GPS co-ordinates;
- III. The ECO or site agent must compile a Preliminary Report and fill in the Fossil Discoveries: SAHRA Preliminary Record Form within 24 hours without removing the fossil from its original position. The Preliminary Report records basic information about the find including:
 - The date
 - A description of the discovery
 - A description of the fossil and its context (e.g. position and depth of find)
 - Where and how the find has been stored
 - Photographs to accompany the preliminary report (the more the better):
 - A scale must be used
 - Photos of location from several angles
 - Photos of vertical section should be provided
 - Digital images of hole showing vertical section (side);
 - Digital images of fossil or fossils.
- IV. Upon receipt of this Preliminary Report, SAHRA will inform the ECO or site agent whether or not a rescue excavation or rescue collection by a palaeontologist is necessary.
- V. Exposed finds must be stabilised where they are unstable, and the site capped, e.g. with a plastic sheet or sand bags. This protection should allow for the later excavation of the finds with due scientific care and diligence. SAHRA can advise on the most appropriate method for stabilisation.
- VI. If the find cannot be stabilised, the fossil may be collected with extreme care by the ECO or the site agent and put aside and protected until SAHRA advises on further action. Finds collected in this way must be safely and securely stored in tissue paper and an appropriate box. Care must be taken to remove all fossil material and any breakage of fossil material must be avoided at all costs.

No work may continue in the vicinity of the find until SAHRA has indicated, in writing, that it is appropriate to proceed.