



NGT ESHS Solutions

PROJECT TITLE:

BASIC ASSESSMENT REPORT FOR THE AMENDMENT OF AN EXISTING
PROSPECTING RIGHT AND ENVIRONMENTAL AUTHORISATION FOR BOTHAVILLE
NE EXT A, SITUATED IN THE FREE STATE PROVINCE

PROJECT REFERENCE:

BOTHAVILLE NE EXT A

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SPECIALIST REPORT:

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.

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DECLARATION OF INDEPENDENCE

Miss. Cherene de Bruyn and Miss Kuni Mosweu for NGT ESHS Solutions have compiled this report (See Appendix 1 and 2). 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 Holdings (Pty) Ltd, was appointed by Shango to conduct an HIA (inclusive of Palaeontological Desktop Assessment) study for the amendment of an existing prospecting right and environmental authorisation for Bothaville NE Ext A, situated in the Free State Province. This HIA mainly focused on the eight proposed drillhole positions located on the farms Concord 392 (Portion RE), Eureka 761 (Portion 1) and Tarantaaldraai 156 (Portion 1). The receiving environment is located in the Moqhaka Local Municipality (MLM) of the Fezile Dabi District Municipality (FDDM), in the Free State Province of South Africa.

This HIA report forms part of the BAR 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 ESHS 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 areas surrounding the eight drillhole positions on the farms Concord 392 (Portion RE), Eureka 761 (Portion 1) and Tarantaaldraai 156 (Portion 1) was conducted on 7 February 2019. The survey was conducted by Miss Cherene de Bruyn (Archaeology and Heritage Consultant – NGT) and Miss Kuni Mosweu (Archaeological Assistant and Field Technician – NGT). 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 the areas surrounding the eight drillhole positions. In terms of the South African Heritage and Resources Agency (SAHRA)

Paleontological Sensitivity Layer, the area falls within a region 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 Bothaville, is located in a region rich in archaeology and heritage resources.
- However, no archaeological, historical resources or sources of living heritage were identified near the locations of the eight drillholes on the farms Concord 392 (Portion RE), Eureka 761 (Portion 1) and Tarantaaldraai 156 (Portion 1).
- No graves or burial grounds were identified in the project area (locations of the eight drillholes on the farms Concord 392 (Portion RE), Eureka 761 (Portion 1) and Tarantaaldraai 156 (Portion 1)). 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 an insignificant to very high sensitivity area:
 - 50% falls within a moderate sensitivity area (green), including the eight proposed drillholes.
 - 30% falls within a very high sensitivity area (red).
 - 15% falls within in insignificant sensitivity zone (grey).
 - 5% falls within a high sensitivity zone (orange).
- According to the PIA report, the proposed sites lie on Quaternary sands which overlie shales of the Vryheid Formation of the Ecca Group. Beneath these are the Central Rand Group, Witwatersrand Supergroup of the Free State Goldfield. Only the Vryheid Formation of the Karoo Supergroup is potentially fossiliferous. It is composed predominantly of mudstones, sandstones and shales and could have fossil plants typical of the Glossopteris flora. The Jurassic dolerite dykes and overlying Quaternary sands do not preserve fossils (See PIA report).

Recommendations:

Based on the Limitations and Conclusions it is recommended that:

- 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 prospecting 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 FS-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 an insignificant to very high sensitivity area. A Fossil Chance Find Protocol should be followed once drilling commences. If any fossils are discovered by the responsible person in charge, then they should be rescued and put aside for a professional Palaeontologist to assess (See PIA report and Appendix 3).
- The proposed prospecting activities on farms Concord 392 (Portion RE), Eureka 761 (Portion 1) and Tarantaaldraai 156 (Portion 1) will not have impact on the heritage and archaeological resources in the broader Bothaville area.

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LIST OF ABBREVIATIONS

ACRONYMS	DESCRIPTION
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AUTHORITIES	
ASAPA	Association of South African Professional Archaeologists
ESHS	Environmental, Socio-Economic and Heritage Sustainability
FDDM	Fezile Dabi District Municipality
FSPHRA	Free State Provincial Heritage Resources Authority
MLM	Moqhaka Local Municipality
NGT	Nurture, Grow, Treasure
SADC	Southern African Developing Community
SAHRA	South African Heritage Resources Agency
DISCIPLINE	
AIA	Archaeological Impact Assessment
BAR	Basic Assessment Report
CMP	Cultural Management Plan
CRM	Cultural Resources Management
ESA	Early Stone Age
EIAs	Environmental Impact Assessment
EMPr	Environmental Management Programme
EIA	Early Iron Age
ha	Hectares
HCMP	Heritage Cultural Management Plan Report
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:

The HIA developed by NGT ESHS Solutions for NGT Holdings on behalf of Shango Solutions (PTY) LTD

- 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.

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.

Cultural significance

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

Development

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in 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.

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 Holdings, was appointed by Shango to conduct an HIA (inclusive of Palaeontological Desktop Assessment) study for the amendment of an existing prospecting right and environmental authorisation for Bothaville NE Ext A, situated in the Free State Province. This HIA mainly focused on the eight proposed drillhole positions located on the farms Concord 392 (Portion RE), Eureka 761 (Portion 1) and Tarantaaldraai 156 (Portion 1). The receiving environment is located in MLM of the FDDM, in the Free State Province of South Africa.

The application area is distributed over 16 farms located south-east of Bothaville (*Figure 1-2 and Table 1*). The total size of the application area is 9 510,03 hectares (ha). The prospecting right FS 30/5/1/1/2/10273 PR was executed in September 2015. The work performed over the tenement has been in line with Years 1 and 2 of the Prospecting Work Programme. The prospecting right is currently half way through Year 3. Activities of Years 4 and 5 have been amended to include drilling activities, which will include the drilling of four drill holes to a depth of 700 metres (m) each respectively in Year 4 and Year 5.

The HIA investigated the potential impacts of the proposed project prospecting activities on any heritage resources identified within the receiving environment of the eight drillhole locations, 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.

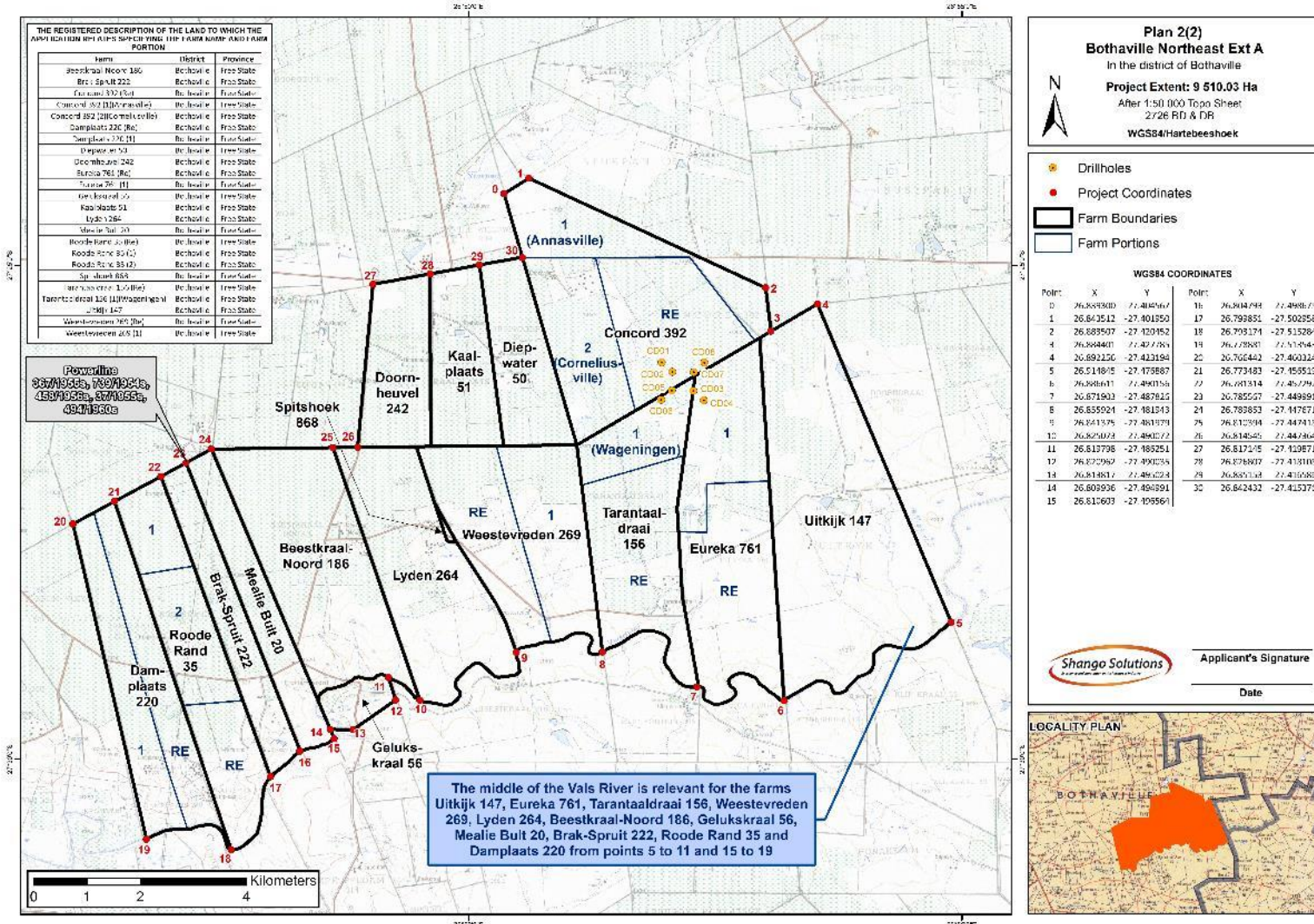


Figure 1: Map showing the location of the project area near Bothaville in the Free State Province (Source: Shango Solutions).



Figure 2: Google Earth map with the proposed drillhole locations

Table 1: GPS Co-ordinates of the proposed drill hole locations

DRILL HOLE	FARM	GPS CO-ORDINATES
CD01	Concord 392 (Portion RE)	<ul style="list-style-type: none"> • 27° 25' 58.90" S • 26° 51' 57.54" E
CD02	Concord 392 (Portion RE)	<ul style="list-style-type: none"> • 27° 26' 4.69" S • 26° 52' 3.94" E
CD03	Eureka 761 (Portion 1)	<ul style="list-style-type: none"> • 27° 26' 16.23" S • 26° 52' 16.68" E
CD04	Eureka 761 (Portion 1)	<ul style="list-style-type: none"> • 27° 26' 22.02" S • 26° 52' 23.08" E
CD05	Tarantaaldraai 156 (Portion 1)	<ul style="list-style-type: none"> • 27° 26' 16.02" S • 26° 52' 3.68" E
CD06	Tarantaaldraai 156 (Portion 1)	<ul style="list-style-type: none"> • 27° 26' 21.73" S • 26° 51' 57.13" E
CD07	Concord 392 (Portion RE)	<ul style="list-style-type: none"> • 27° 26' 4.82" S • 26° 52' 17.03" E
CD08	Concord 392 (Portion RE)	<ul style="list-style-type: none"> • 27° 25' 59.12" S • 26° 52' 23.47" E

1.2. Description of the Affected Environment

1.2.1. Land Use and History

The project area is located near Bothaville in the MLM of the FDDM, situated in the Free State Province of South Africa (*Table 2*). It is located in between the towns Bothaville, Viljoenskroon and Kroonstad. This area is characterised by natural grasslands. The farms Concord 392 (Portion RE), Eureka 761 (Portion 1) and Tarantaaldraai 156 (Portion 1) fall within a heavily disturbed area, as the area has been transformed by agricultural activities and the grazing of livestock.

1.2.2. Access

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

- N1
- R59
- R727

Table 2: Site Location and Property Information

Erf or farm number/s	Concord 392 (Portion RE) Eureka 761 (Portion 1) Tarantaaldraai 156 (Portion 1)
Size of development footprint	9 510,03 ha
Town	Bothaville
Responsible local authority	Moqhaka Local Municipality
Ward	18
Magisterial district	Fezile Dabi District Municipality
Region	Free State Province
Country	South Africa
Site centre GPS coordinates	<ul style="list-style-type: none"> • 27° 26' 12.59" S • 26° 52' 11.87" E

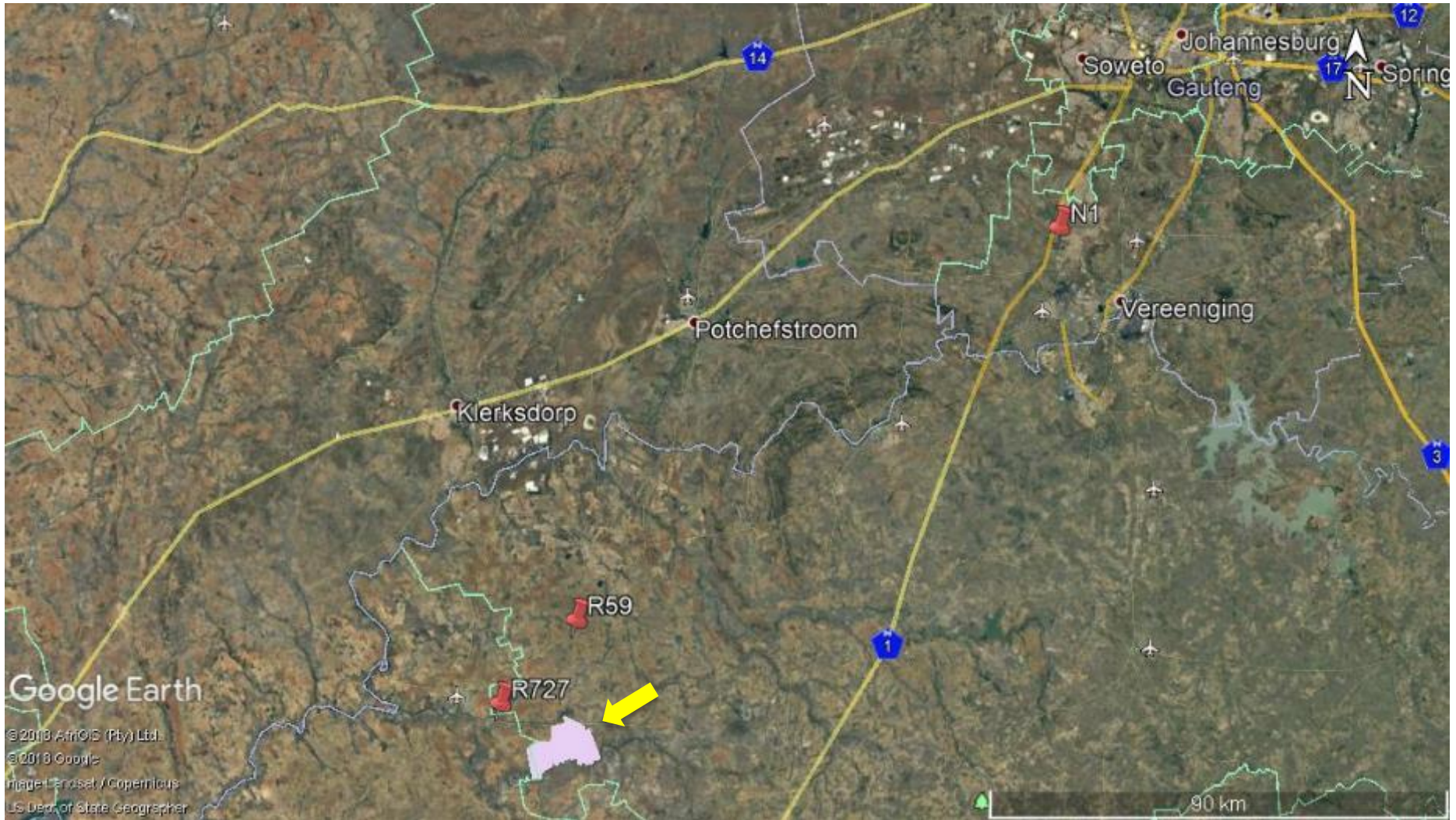


Figure 3: Google Earth image indicating access to the site (yellow arrow).

1.3. 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.”

Shango appointed NGT ESHS to conduct the HIA. Cherene de Bruyn, Archaeologist and Heritage Consultant for NGT ESHS, conducted the HIA for the proposed development. The appointment of NGT ESHS is in terms of the NHRA, No. 25 of 1999.

1.4. 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 3 below gives a summary of all the relevant legislations that informed the current study.

Table 3: 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.

1.5. 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 FS-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, Archaeologist and Heritage Consultant for NGT ESHS, 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 Frans Prins, the Director of **NGT ESHS Solutions**. 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 surrounding the eight drillhole locations on the farms Concord 392 (Portion RE), Eureka 761 (Portion 1) and Tarantaaldraai 156 (Portion 1) was conducted on 7 February 2019. The survey was conducted by Miss Cherene de Bruyn (Archaeology and Heritage Consultant – NGT ESHS) and Miss Kuni Mosweu (Archaeological Assistant and Field Technician – NGT ESHS). 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 development activities as well as within the 500 m radius:

- The survey of the proposed prospecting area, specifically the area proposed for the eight drillholes, 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 eight drill holes.
- 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 4*). 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 4: 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 5-8).

Table 5: 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 6: 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 7: 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 8: 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 Free State 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. 9, Figure. 4).

Table 9: 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	van Schalkwyk, J. (2003)	Orkney to Dealesville	300 km area from north east of Orkney to southwest of Dealesville	00840	28,2 km
2	Dreyer, C. (2007)	Bothaville	Farm Kransdrift 243	01809	41,2 km
3	Magoma, M. (2013)	Bothaville	NAMPO Agricultural	2348	33,9 km
4	Whitlow, L. (2015)	Bothaville	40 km north of Welkom, 51 km south of the town of Klerksdorp and approximately 2.5 km west of the town of Bothaville	7841	29,5 km

NO.	AUTHOR/YEAR	TOWN	SITE	SAHRIS ID	DISTANCE FROM PROJECT AREA
5	Daya, J. (2018)	Bothaville	Banks of the Vals and Vaal rivers	12230	30,4 km



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

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). ESA stones tools and faunal material have been found in the Vaal River, located approximately 26 km northwest from the development area (van Schalkwyk 2003).

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). The Vredefort Dome (*Table. 10, Figure. 5*), a UNESCO world heritage site located 75 km away from the development area, is an example of an MSA site in the Free State Province, as MSA stone tools have been found in the area (Mitchell 2002). Also, a skull of an archaic Homo Sapiens was found in the MSA layers at Florisbad, an open-air site located 155 km from the developmental area (Mitchell 2002). Furthermore, stone tool assemblages have been found at Rose Cottage cave, a site located a few kilometres from Ladybrand (Wadley 1995, 1997, 2000).

Table 10: Archaeological sites located in the Free State Province

SITE NO.	ARCHAEOLOGICAL SITE	TYPE OF SITE	SAHRIS ID	DISTANCE FROM PROJECT AREA
1	Schaapplaats	Later Stone Age	26571	198,7 km
2	Florisbad	Middle Stone Age	26509	165,29 km
3	Rose Cottage Cave	Middle Stone Age/ Later Stone Age	32417	209,10 km
4	Vredefort Dome	Middle Stone Age/ Late Iron Age	59044	78,9 km
5	Stowslands on Vaal	Later Stone Age	26522	170,5 km
6	Tandjiesberg Rock Shelter	Later Stone Age	26510	197,1 km
7	Modderpoortspruit Cave	Later Stone Age	26445	197,3 km

SITE NO.	ARCHAEOLOGICAL SITE	TYPE OF SITE	SAHRIS ID	DISTANCE FROM PROJECT AREA
8	Beehive Stone Huts, Sedan	Iron Age	26441	104,7 km
9	Willem Pretorius Game Reserve	Iron Age	26375	99,4 km
10	Lekgalong La Mantsopa	Later Stone Age/ Late Iron Age	89386	203,6 km
11	Ventershoek	Later Stone Age	26384	258,7 km

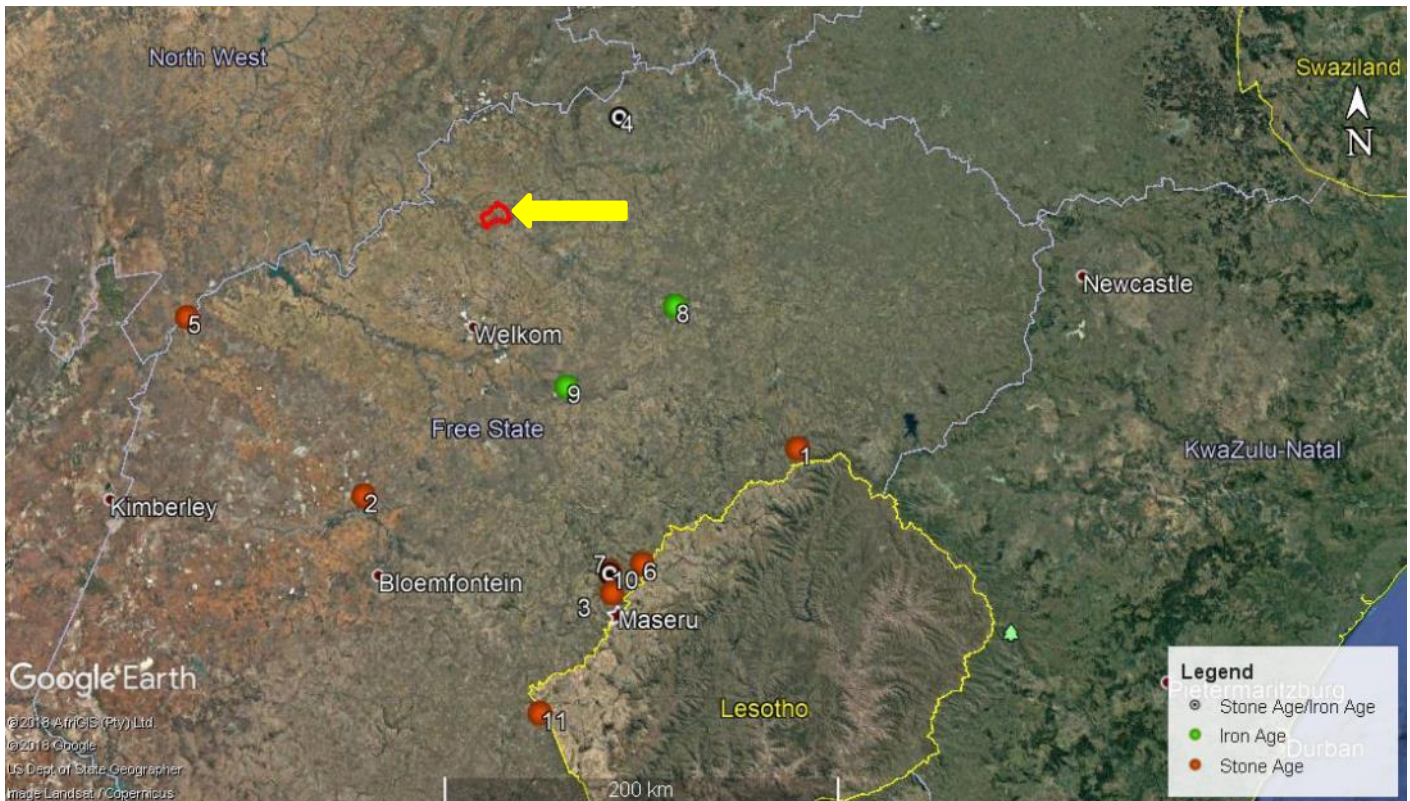


Figure 5: Google Earth map of the archaeological sites located in the Free State Province in relation to the proposed project area (the yellow arrow).

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

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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). LSA groups preferred to settle in rock shelters and caves close to rivers. Evidence of LSA inhabitants have been found in the case of rock engravings. For instance, LSA rock engravings have been found around the Vaal River (Bergh 1999). LSA rock art has also been found in Rose Cottage cave and at Tandjiesberg (Wadley 1995). Animal bones, stone tools such as small scrapers and grinding stones have also been found at Tandjiesberg (Wadley 1995).

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 (Freide 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.

The EIA is characterised by the first settlements of Bantu farming communities in southern Africa (Badenhorst 2010). These farmers mainly cultivated plants, herded domestic animals primarily sheep and goats and produced metal and ceramic vessels. Furthermore, these farmers lived in houses located on valley floors (Badenhorst 2010), to mainly cater subsistence for their crops and livestock. During the EIA, three streams of pottery are identified in Africa, which are the Kalundu Tradition which is referred as the western stream, the Kwale Branch which is the eastern stream and the Nkope Branch which is the central stream. Both the Nkope and Kwale streams form part of the Urewe Tradition (Mitchell 2002; Huffman 2002, 2007), which can be traced back to east Africa (Boeyens 2003). Several ceramics that are associated with the EIA have been found in areas surrounding the Orange River Scheme region (Samson 1972).

The MIA is a period that is mainly focussed in the Mapungubwe region, in southern Africa. The inhabitants that lived in the Mapungubwe region were mainly farmers and traders of gold. The MIA saw an increase in the population size of the southern African communities such as those who settled at Mapungubwe (Badenhorst 2010). This was brought on by the success of the established trading networks of ivory and gold for goods such as beads and cloth in the trans-Indian Ocean (Badenhorst 2010).

The LIA is mainly characterised by the domestication of cattle, hilltop settlements and the making of ceramics. Studies conducted on the LIA classification of stone wall settlement patterns have been done by Maggs (1976) and Mason (1986). Mason (1968) focused his research on stone wall sites located in the Magaliesberg, it is also in this area that the 19th century Tswana town, Marothodi is located (Anderson 2009). Mason (1986) published a review of his stone wall settlement types following more research that was conducted in the area. It is believed to be the period when Sotho-Tswana speaking groups migrated from east Africa to southern Africa due to climatic conditions in the region (Boeyens 2003). Ceramics of the Moloko Branch are associated with the Sotho-Tswana groups (Evers 1983; Huffman 2002; Mitchell & Whiteland 2005; Anderson 2009). The abundance of Moloko ceramic style of the Sotho-Tswana groups found in the Limpopo Province and Botswana regions indicates that this ceramic style replaced the earlier Eiland ceramics around (AD 1000-1300) (Mitchell 2002; Boeyens 2003; Huffman 2007). This is evidenced by tracing the Moloko ceramics back to the EIA of the Urewe Tradition (Boeyens 2003; Huffman 2007). In the Free State Province, Moloko style ceramics have been found around the Vaal River.

During the 16th to 18th Century AD, Sotho-Tswana speaking groups migrated from the central Highveld across the Vaal river into the southern Highveld in the Free State Province (Thorp 1996). Ceramics dating to the LIA have been found at Tandjiesberg Rock Shelter, in the Free State Province (Thorp 1996). Also, extensive stone wall sites have also been found in the Kroonstad region (Dreyer 2006). These sites are associated with Sotho-Tswana speakers who occupied the site from around 16th Century. Ceramics of the Ntsuanatsatsi facies and N- Type walling have also been found in the Free State Province, suggesting the presence of Nguni speakers in the Free State from AD 1450 to 1650. Ntsuanatsatsi facies are characterised by broad band stamping in the neck with stamped arcades on the shoulder (Huffman 2007). The Uitkomst facies (AD 1650 – 1820) of the same branch is seen as the successors to the Ntsuanatsatsi facies and contains elements of both Nguni (Ntsuanatsatsi facies) and Sotho-Tswana

speakers (Olifantspoort facies) pottery styles (Huffman, 2007). They are characterised by stamped arcades and blocks of parallel incisions and cord impressions, which represents contact between these two groups. Olifantspoort facies (AD 1500-1700) and Thabeng facies (AD 1700-1840) of the Moloko Branch have been found at Iron age sites in the Free state Province, around the Vaal River region (Mason 1986; Mitchell 2002; Huffman 2007). Olifantspoort pottery is characterised by “multiple bands of fine stamping and narrow incision separated by colour” (Huffman 2007). The presence of ceramics of the Olifantspoort facies (AD 1500-1700) and Thabeng facies (AD 1700-1840) around the Vaal River region provides evidence of the contact between Nguni and Sotho-Tswana speaking groups during the LIA.

Buispoort ceramics (AD 1700 – 1840), of the Moloko Branch, have been found to the north of Potchefstroom (Mason 1986; Boeyens 2003; Huffman 2007). Buispoort ceramics are characterised by “rim notching, broadly incised chevrons and white bands” (Huffman 2007). LIA stone wall settlement has been recorded in the Free State Province on the farm Middenspruit 151, located north-west of the town of Kroonstad. To the north of Kroonstad, in the Vredefort Dome, several LIA stone walled settlements, most likely related to Fokeng settlements, have been identified dating to AD 1450 – 1650 (Huffman 2007). A later occupation from AD 1700-1840 also occurred in this region (Huffman 2007).

3.3. Historical Period

The Historical Period dates from AD 1600 and is generally the period related to colonial settlement in South Africa. During the 1820’s and 1830’s, the *Mfecane* conflict and expansion of the Voortrekkers caused instability in South Africa (Huffmann 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 north-wards 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 1830s, 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.

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 (Thompson 2001; 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).

The discovery of gold in the Witwatersrand brought about conflict and led to the Anglo-Boer War in 1899-1902 as both the Afrikaner groups and the British wanted control of the gold production (Wessels 2010). On May 24th 1900, during the war, Lord Methuen, a British commander moved from Hoopstad past Wesselsbron in the direction of Bothaville (van Schalkwyk 2003). Then, on September 1900, General C R de Wet and Commandant Fourie camped in the vicinity of Bothaville (van Schalkwyk 2003). The British under Colonel Le Gallias later ambushed General C R de Wet's commando south of the Vals River on November 1900 (van Schalkwyk 2003). During this time, the British forces camped on the dorpsplein in Bothaville. On 6 November 1900, the battle of Doornkraal took place (van Schalkwyk 2003). Which resulted in 97 Boers caught and 17 killed, 38 British soldiers were killed (van Schalkwyk 2003).

Previous HIA and AIA's did not find any archaeology and heritage during their survey in the broader Bothaville region (van Schalkwyk 2003; Dreyer 2007; Magoma 2013; Whitlow 2015; Daya 2018). However, Bothaville is a town that is rich in history as it was officially established in 1893. It is characterised by Provincial Heritage Sites heritage sites such a Dutch Reformed church which was built in 1918 by Gerard Moerdijk (Muller 2017) and the Doornkraal Battlefield monument which was erected to commemorate the battle at Doornkraal and historical graves of the Boer are located in this area (Daya 2018).

3.4. Conclusion on Literature Review

The proposed development area is situated in a province that is rich in archaeology, history and heritage. The province is home to several archaeological sites that have yielded significant material culture related to the Stone and Iron Age. Archaeological stone tool artefacts, Iron-Age Sotho-Tswana stone walls and ceramics, graves, and colonial period buildings have been found throughout the province and areas close to the proposed development.

4. STUDY RESULTS

The background information yielded information about known archaeological and heritage resources located in the Free State Province, particularly the Bothaville region. The broader Free State Province has a long history with Sotho-Tswana speaking people migrating and settling in the area during the Iron Age.

The physical survey focused on the area proposed for prospecting, specifically the eight proposed drillhole locations located on the farms Concord 392 (Portion RE), Eureka 761 (Portion 1) and Tarantaaldraai 156 (Portion 1) (*Figure. 6*). The drillholes were labelled CD01 to CD08 respectively (*Figures. 7-14*). The proposed location for the drillholes are situated in a dry grassland area that is used for agricultural activities, including the growing of corn field and cattle grazing. Consequently, the areas are very disturbed by these activities. No archaeological resources or burial grounds or graves were identified at the proposed locations for the drillholes, or the 500 m zone of influence surrounding the drillhole locations

4.1. Archaeological sites

No archaeological resources or sites of living heritage were identified during the survey and site visit.

4.2. Built Environment Features

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

4.3. Burial Grounds and Graves

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

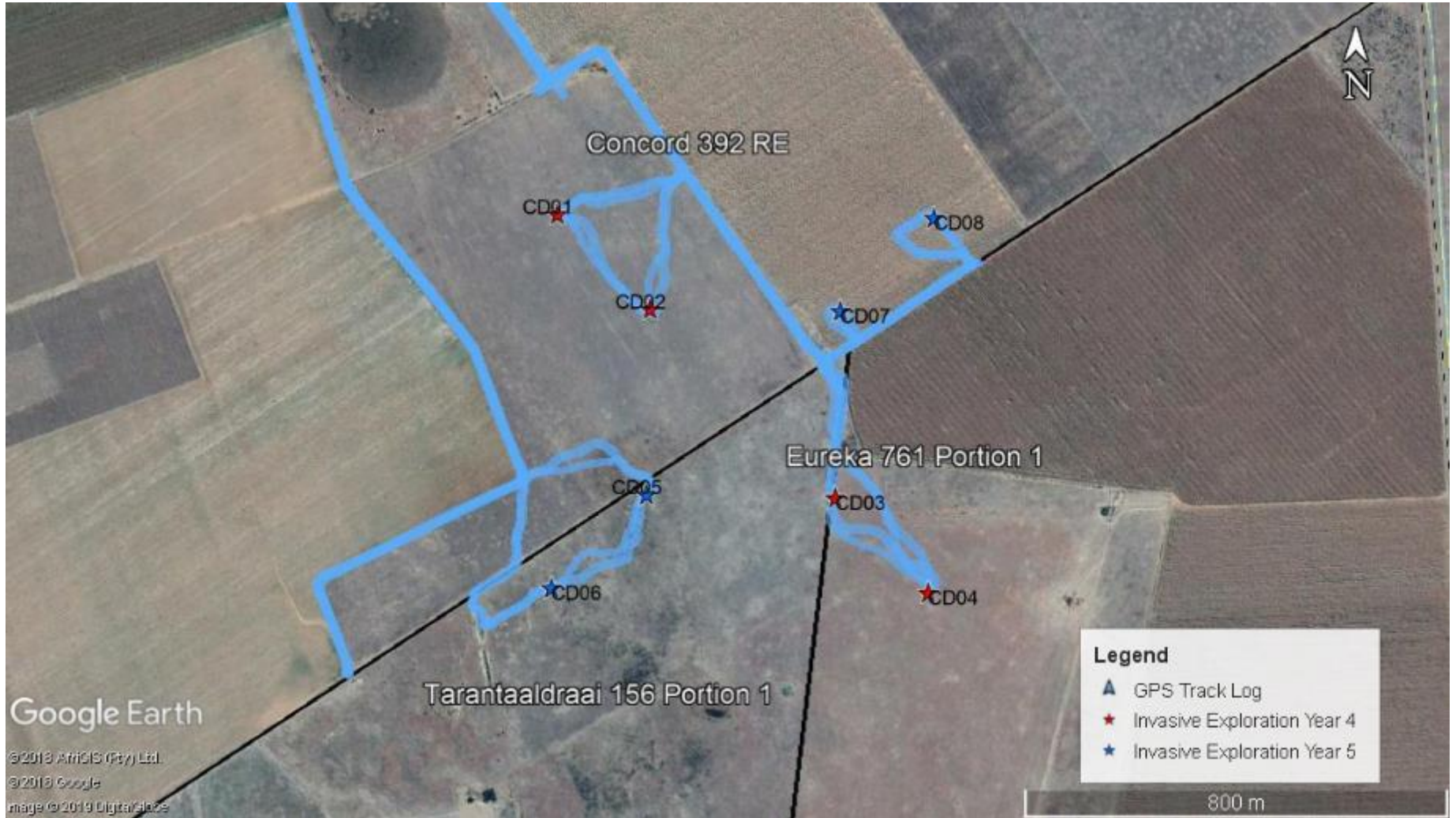


Figure 6: Google Earth image indicating the areas surveyed around the proposed drillhole locations.



Figure 7: General view of drillhole CD01 located on the farm Concord 392



Figure 8: General view of drillhole CD02 located on the farm Concord 392



Figure 9: General view of drillhole CD03 located on the farm Eureka 761



Figure 10: General view of drillhole CD04 located on the farm Eureka 761



Figure 11: General view of drillhole CD05 located on the farm Tarantaaldraai 156



Figure 12: General view of drillhole CD06 located on the farm Tarantaaldraai 156



Figure 13: General view of drillhole CD07 located on the farm Concord 392



Figure 14: General view of drillhole CD08 located on the farm Concord 392

4.4. Risk Assessment: Impacts on Heritage and Paleontological Resources

The potential impacts on heritage resources that could be located in the area was determined for the planning, construction, operational, decommissioning and rehabilitation phases (*Table. 11*). The risk assessment was then considered for any potential heritage resources (archaeological artefacts and features, built environment resources and burial grounds and graves) as well as paleontologically resources. The significance ratings (pre- and post-mitigation) have been determined for all the project phases in regard to the direct loss, destruction or damage of any heritage resources (*Table. 12- 31 and Figure. 15-34*).

Table 11: Potential impacts identified during the project phases on heritage resources

HERITAGE RESOURCES	PHASES:	POTENTIAL IMPACTS:	IMPACTS ASSOCIATED WITH THE CURRENT PROJECT
Archaeological and Living Heritage Resources	Planning and Design Construction Operation Decommissioning Rehabilitation and closure	<ul style="list-style-type: none"> Disturbance and destruction of archaeological resources and living heritage resources 	<ul style="list-style-type: none"> No
Burial Grounds and Graves	Planning and Design Construction Operation Decommissioning Rehabilitation and closure	<ul style="list-style-type: none"> Disturbance and destruction of the identified graves Potential of disturbance of unmarked, invisible and subterranean graves The commingling of skeletal remains through the unintentional unearthing of graves 	<ul style="list-style-type: none"> No
Built Environment Resources	Planning and Design Construction Operation Decommissioning Rehabilitation and closure	<ul style="list-style-type: none"> Disturbance of Old Farm houses and other historical infrastructure 	<ul style="list-style-type: none"> No
Paleontological Resources	Planning and Design Construction Operation Decommissioning Rehabilitation and closure	<ul style="list-style-type: none"> Disturbance of palaeontological resources 	<ul style="list-style-type: none"> Yes

4.4.1. Planning phase

Table 12: Impact and risk assessment rating for the pre-and post-mitigation for the Planning phase for Archaeological and Living Heritage Resources

Destruction/damage of archaeology and living heritage resources. - Proposal							
Heritage Impact Assessment	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	3	2	
	Extent of Impact	3	2	Reversibility of Impact	3	2	
	Duration of Impact	3	2	Probability	3	2	
	Environmental Risk (Pre-mitigation)					-9,00	
	Mitigation Measures						
	<i>See Table. 32</i>						
	Environmental Risk (Post-mitigation)					-4,00	
	Degree of confidence in impact prediction:					Medium	
	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		

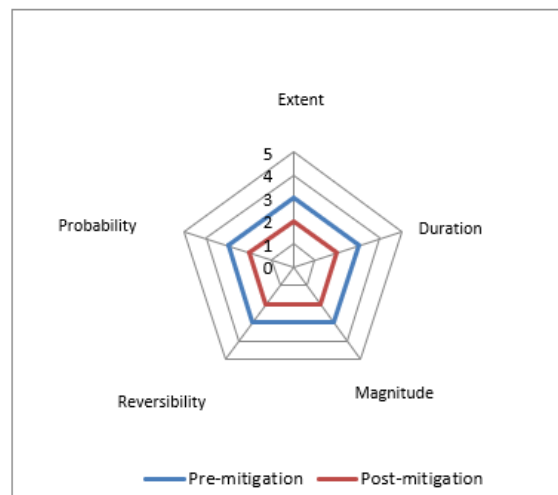


Figure 15: Radar chart indicating the pre-and post-mitigation for the Planning phase for Archaeological and Living Heritage Resources

Table 13: Impact and risk assessment rating for the pre-and post-mitigation for the Planning phase for Graves And Burial Grounds

Destruction/damage of graves and burial grounds - Proposal						
Heritage Impact Assessment	Impact Name	Destruction/damage of graves and burial grounds				
	Alternative	Proposal				
	Phase	Planning				
	Environmental Risk					
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
	Nature of Impact	-1	-1	Magnitude of Impact	3	2
	Extent of Impact	3	1	Reversibility of Impact	3	2
	Duration of Impact	3	2	Probability	3	2
	Environmental Risk (Pre-mitigation)					-9,00
	Mitigation Measures					
	<i>See Table. 32</i>					
	Environmental Risk (Post-mitigation)					-3,50
	Degree of confidence in impact prediction:					Medium
	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					-4,67	

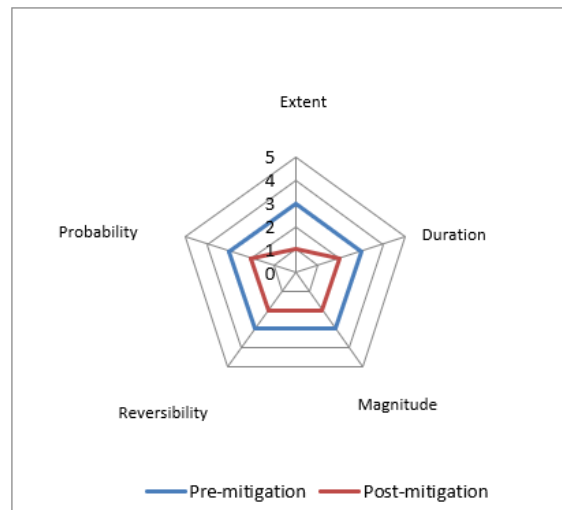


Figure 16: Radar chart indicating the pre-and post-mitigation for the Planning phase for Graves and Burial Grounds

Table 14: Impact and risk assessment rating for the pre-and post-mitigation for the Planning phase for Built Environment Resources

Destruction/damage of built environment resources - Proposal							
Heritage Impact Assessment	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	3	2	
	Extent of Impact	3	1	Reversibility of Impact	3	2	
	Duration of Impact	3	2	Probability	3	2	
	Environmental Risk (Pre-mitigation)					-9,00	
	Mitigation Measures						
	<i>See Table. 32</i>						
	Environmental Risk (Post-mitigation)					-3,50	
	Degree of confidence in impact prediction:					Medium	
	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					-4,67		

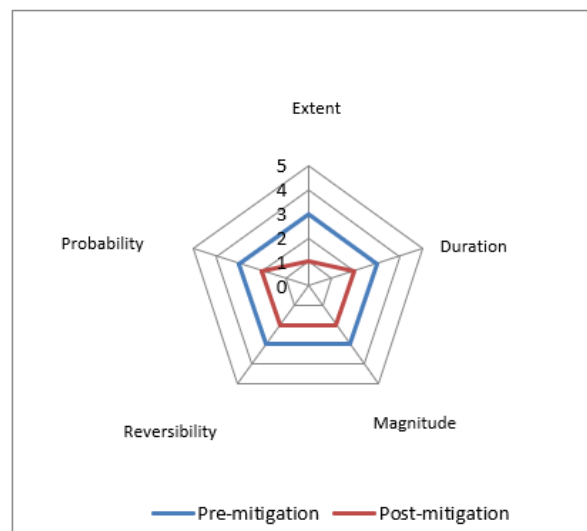


Figure 17: Radar chart indicating the pre-and post-mitigation for the Planning phase for Built Environment Resources

Table 15: Impact and risk assessment rating for the pre-and post-mitigation for the Planning phase for Paleontological Resources

A. Destruction/damage of palaeontological resources. - Proposal						
Paleontological Impact Assessment	Impact Name	Destruction/damage of palaeontological 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	2	2
	Extent of Impact	2	1	Reversibility of Impact	2	2
	Duration of Impact	2	2	Probability	2	2
	Environmental Risk (Pre-mitigation)					-4,00
	Mitigation Measures					
	<i>See Table. 32</i>					
	Environmental Risk (Post-mitigation)					-3,50
	Degree of confidence in impact prediction:					Medium
	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					-4,67	

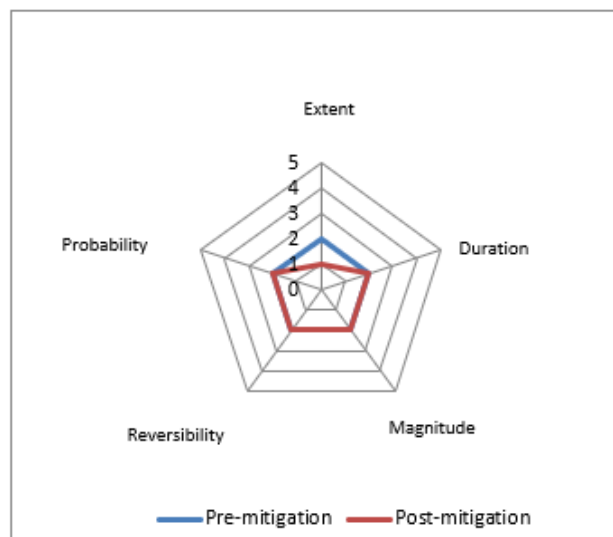


Figure 18: Radar chart indicating the pre-and post-mitigation for the Planning phase for Paleontological Resources

4.4.2. Construction phase

Table 16: Impact and risk assessment rating for the pre-and post-mitigation for the Construction phase for Archaeological And Living Heritage Resources

A. Destruction/damage of archaeology and living heritage resources. - Proposal						
Heritage Impact Assessment	Impact Name	Destruction/damage of archaeology and living heritage resources.				
	Alternative	Proposal				
	Phase	Construction				
	Environmental Risk					
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
	Nature of Impact	-1	-1	Magnitude of Impact	3	2
	Extent of Impact	3	2	Reversibility of Impact	3	2
	Duration of Impact	4	3	Probability	4	3
	Environmental Risk (Pre-mitigation)					-13,00
	Mitigation Measures					
	<i>See Table. 32</i>					
	Environmental Risk (Post-mitigation)					-6,75
	Degree of confidence in impact prediction:					Medium
	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					-9,00	

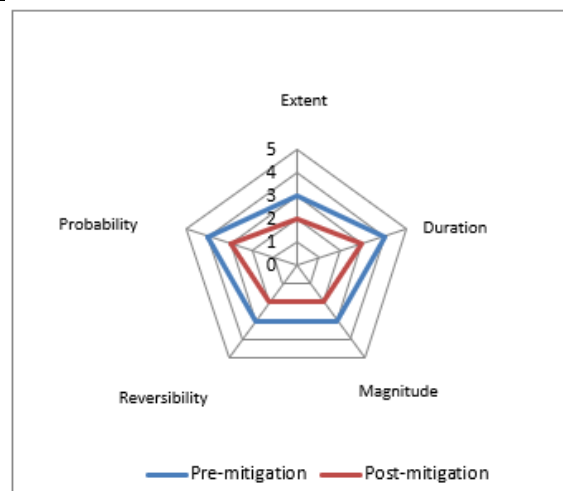


Figure 19: Radar chart indicating the pre-and post-mitigation for the Construction phase for Archaeological And Living Heritage Resources

Table 17: Impact and risk assessment rating for the pre-and post-mitigation for the Construction phase for Graves And Burial Grounds

A. Destruction/damage of graves and burial grounds - Proposal						
Heritage Impact Assessment	Impact Name	Destruction/damage of graves and burial grounds				
	Alternative	Proposal				
	Phase	Construction				
	Environmental Risk					
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
	Nature of Impact	-1	-1	Magnitude of Impact	3	2
	Extent of Impact	3	2	Reversibility of Impact	4	3
	Duration of Impact	4	3	Probability	4	3
	Environmental Risk (Pre-mitigation)					-14,00
	Mitigation Measures					
	<i>See Table. 32</i>					
	Environmental Risk (Post-mitigation)					-7,50
	Degree of confidence in impact prediction:					Medium
	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					-10,00	

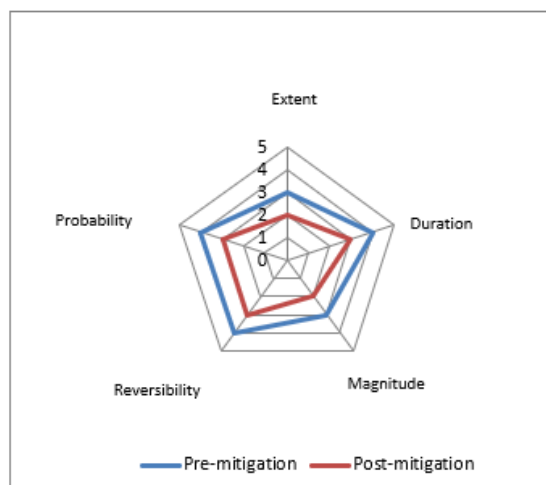


Figure 20: Radar chart indicating the pre-and post-mitigation for the Construction phase for Graves and Burial Grounds

Table 18: Impact and risk assessment rating for the pre-and post-mitigation for the Construction phase for Built Environment Resources

A. Destruction/damage of built environment resources - Proposal						
Heritage Impact Assessment	Impact Name	Destruction/damage of built environment resources				
	Alternative	Proposal				
	Phase	Construction				
	Environmental Risk					
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
	Nature of Impact	-1	-1	Magnitude of Impact	3	2
	Extent of Impact	3	2	Reversibility of Impact	4	3
	Duration of Impact	3	2	Probability	4	3
	Environmental Risk (Pre-mitigation)					-13,00
	Mitigation Measures					
	<i>See Table. 32</i>					
	Environmental Risk (Post-mitigation)					-6,75
	Degree of confidence in impact prediction:					Medium
	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					-9,00	

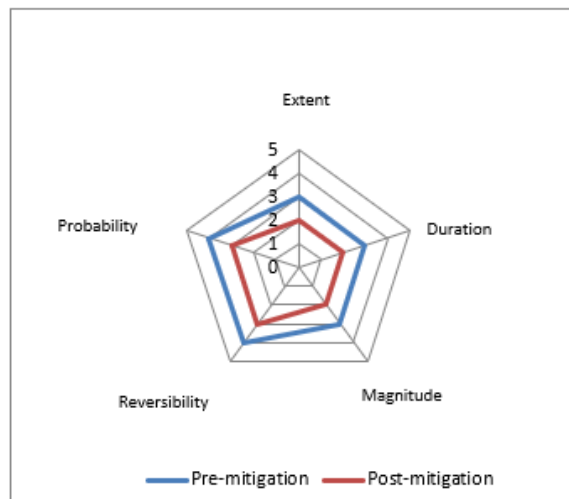


Figure 21: Radar chart indicating the pre-and post-mitigation for the Construction phase for Built Environment Resources

Table 19: Impact and risk assessment rating for the pre-and post-mitigation for the Construction phase for Palaeontological Resources

A. Destruction/damage of palaeontological resources. - Proposal						
Palaeontological Impact Assessment	Impact Name	Destruction/damage of palaeontological resources.				
	Alternative	Proposal				
	Phase	Construction				
	Environmental Risk					
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
	Nature of Impact	-1	-1	Magnitude of Impact	3	1
	Extent of Impact	2	1	Reversibility of Impact	5	5
	Duration of Impact	3	1	Probability	2	1
	Environmental Risk (Pre-mitigation)					-6,50
	Mitigation Measures					
	<i>See Table. 32</i>					
	Environmental Risk (Post-mitigation)					-2,00
	Degree of confidence in impact prediction:					Medium
	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					-2,67	

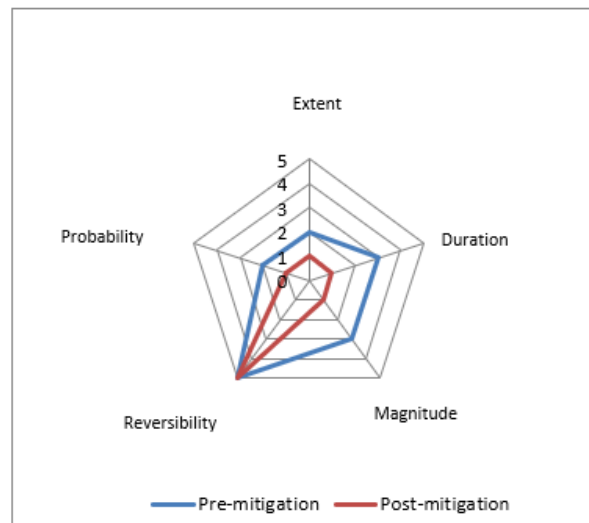


Figure 22: Radar chart indicating the pre-and post-mitigation for the Construction phase for Paleontological Resources

4.4.3. Operation phase

Table 20: Impact and risk assessment rating for the pre-and post-mitigation for the Operation phase for Archaeological And Living Heritage Resources

A. Destruction/damage of archaeology and living heritage resources. - Proposal						
Heritage Impact Assessment	Impact Name	Destruction/damage of archaeology and living heritage resources.				
	Alternative	Proposal				
	Phase	Operation				
	Environmental Risk					
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
	Nature of Impact	-1	-1	Magnitude of Impact	3	3
	Extent of Impact	3	2	Reversibility of Impact	4	2
	Duration of Impact	4	3	Probability	3	2
	Environmental Risk (Pre-mitigation)					-10,50
	Mitigation Measures					
	<i>See Table. 32</i>					
	Environmental Risk (Post-mitigation)					-5,00
	Degree of confidence in impact prediction:					Medium
	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					3	
<i>The impact may result in the irreplaceable loss of resources of high value (services and/or functions).</i>						
Prioritisation Factor					1,50	
Final Significance					-7,50	

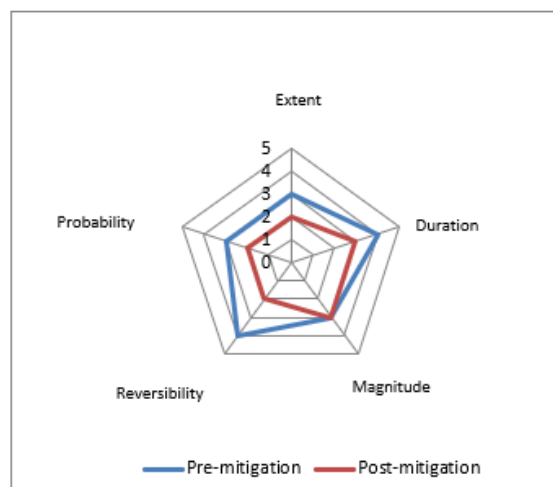


Figure 23: Radar chart indicating the pre-and post-mitigation for the Operation phase for Archaeological And Living Heritage Resources

Table 21: Impact and risk assessment rating for the pre-and post-mitigation for the Operation phase for Graves And Burial Grounds

A. Destruction/damage of graves and burial grounds - Proposal						
Heritage Impact Assessment	Impact Name	Destruction/damage of graves and burial grounds				
	Alternative	Proposal				
	Phase	Operation				
	Environmental Risk					
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
	Nature of Impact	-1	-1	Magnitude of Impact	3	3
	Extent of Impact	3	2	Reversibility of Impact	4	3
	Duration of Impact	4	3	Probability	3	2
	Environmental Risk (Pre-mitigation)					-10,50
	Mitigation Measures					
	<i>See Table. 32</i>					
	Environmental Risk (Post-mitigation)					-5,50
	Degree of confidence in impact prediction:					Medium
	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					3	
<i>The impact may result in the irreplaceable loss of resources of high value (services and/or functions).</i>						
Prioritisation Factor					1,50	
Final Significance					-8,25	

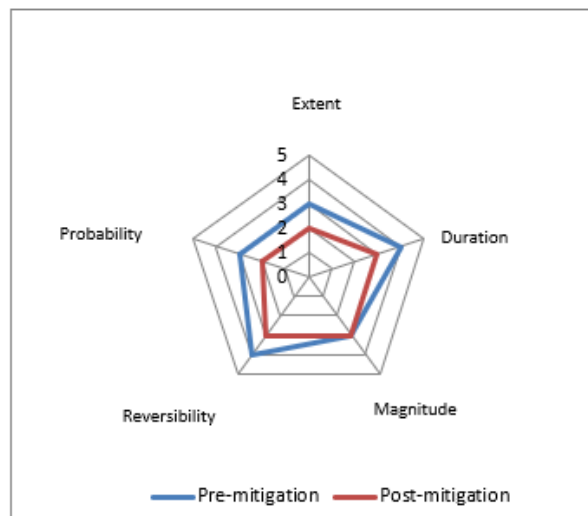


Figure 24: Radar chart indicating the pre-and post-mitigation for the Operation phase for Graves and Burial Grounds

Table 22: Impact and risk assessment rating for the pre-and post-mitigation for the Operation phase for Built Environment Resources

A. Destruction/damage of built environment resources - Proposal						
Heritage Impact Assessment	Impact Name	Destruction/damage of built environment resources				
	Alternative	Proposal				
	Phase	Operation				
	Environmental Risk					
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
	Nature of Impact	-1	-1	Magnitude of Impact	3	3
	Extent of Impact	3	2	Reversibility of Impact	4	2
	Duration of Impact	4	3	Probability	3	2
	Environmental Risk (Pre-mitigation)					-10,50
	Mitigation Measures					
	<i>See Table. 32</i>					
	Environmental Risk (Post-mitigation)					-5,00
	Degree of confidence in impact prediction:					Medium
	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					3	
<i>The impact may result in the irreplaceable loss of resources of high value (services and/or functions).</i>						
Prioritisation Factor					1,50	
Final Significance					-7,50	

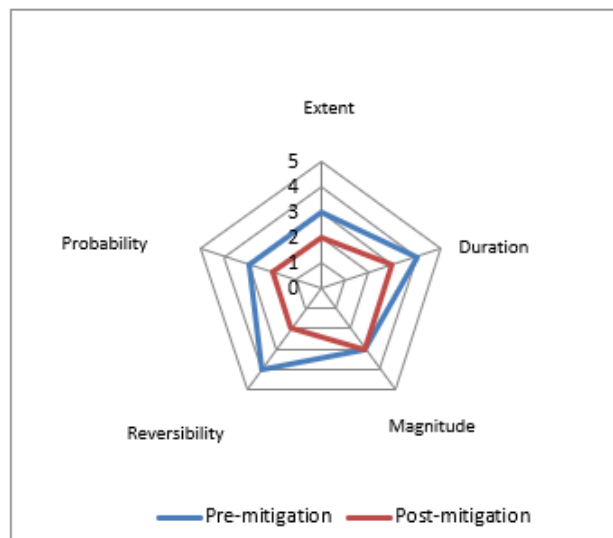


Figure 25: Radar chart indicating the pre-and post-mitigation for the Operation phase for Built Environment Resources

Table 23: Impact and risk assessment rating for the pre-and post-mitigation for the Operation phase for Paleontological Resources

A. Destruction/damage of palaeontological resources. - Proposal						
Paleontological Impact Assessment	Impact Name	Destruction/damage of palaeontological resources.				
	Alternative	Proposal				
	Phase	Operation				
	Environmental Risk					
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
	Nature of Impact	-1	-1	Magnitude of Impact	3	3
	Extent of Impact	3	1	Reversibility of Impact	4	2
	Duration of Impact	3	3	Probability	3	2
	Environmental Risk (Pre-mitigation)					-9,75
	Mitigation Measures					
	<i>See Table. 32</i>					
	Environmental Risk (Post-mitigation)					-4,50
	Degree of confidence in impact prediction:					Medium
	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					3	
<i>The impact may result in the irreplaceable loss of resources of high value (services and/or functions).</i>						
Prioritisation Factor					1,50	
Final Significance					-6,75	

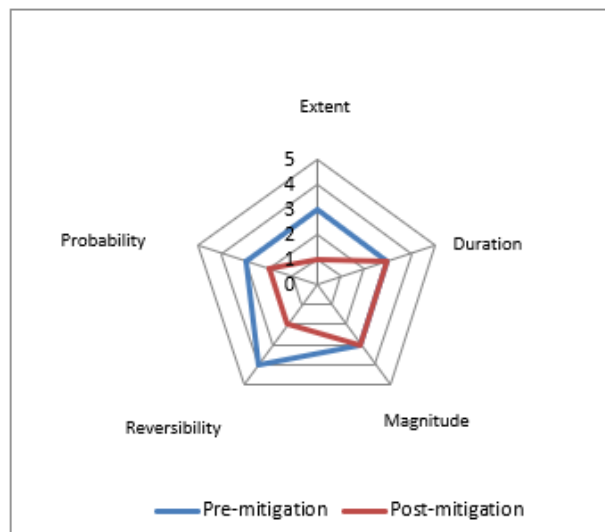


Figure 26: Radar chart indicating the pre-and post-mitigation for the Operation phase for Paleontological Resources

4.4.4. Decommissioning phase

Table 24: Impact and risk assessment rating for the pre-and post-mitigation for the Decommissioning phase for Archaeological And Living Heritage Resources

A. Destruction/damage of archaeology and living heritage resources. - Proposal						
Heritage Impact Assessment	Impact Name	Destruction/damage of archaeology and living heritage resources.				
	Alternative	Proposal				
	Phase	Decommissioning				
	Environmental Risk					
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
	Nature of Impact	-1	-1	Magnitude of Impact	3	3
	Extent of Impact	3	2	Reversibility of Impact	4	2
	Duration of Impact	3	3	Probability	3	2
	Environmental Risk (Pre-mitigation)					-9,75
	Mitigation Measures					
	<i>See Table. 32</i>					
	Environmental Risk (Post-mitigation)					-5,00
	Degree of confidence in impact prediction:					Medium
	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					3	
<i>The impact may result in the irreplaceable loss of resources of high value (services and/or functions).</i>						
Prioritisation Factor					1,50	
Final Significance					-7,50	

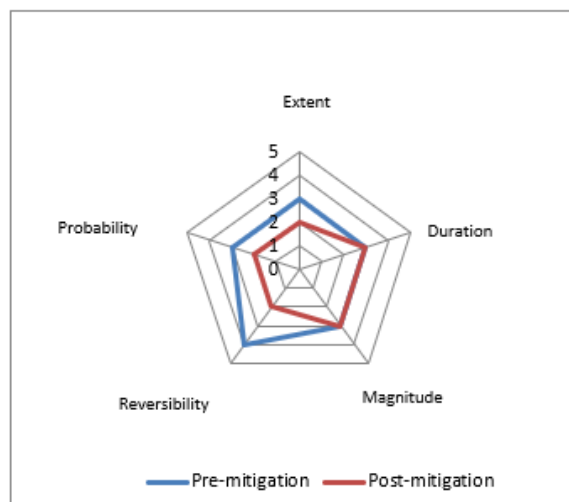


Figure 27: Radar chart indicating the pre-and post-mitigation for the Decommissioning phase for Archaeological And Living Heritage Resources

Table 25: Impact and risk assessment rating for the pre-and post-mitigation for the Decommissioning phase for Graves And Burial Grounds

A. Destruction/damage of graves and burial grounds - Proposal						
Heritage Impact Assessment	Impact Name	Destruction/damage of graves and burial grounds				
	Alternative	Proposal				
	Phase	Decommissioning				
	Environmental Risk					
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
	Nature of Impact	-1	-1	Magnitude of Impact	3	3
	Extent of Impact	3	2	Reversibility of Impact	4	2
	Duration of Impact	3	2	Probability	3	2
	Environmental Risk (Pre-mitigation)					-9,75
	Mitigation Measures					
	See Table. 32					
	Environmental Risk (Post-mitigation)					-4,50
	Degree of confidence in impact prediction:					Medium
	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					3	
<i>The impact may result in the irreplaceable loss of resources of high value (services and/or functions).</i>						
Prioritisation Factor					1,50	
Final Significance					-6,75	

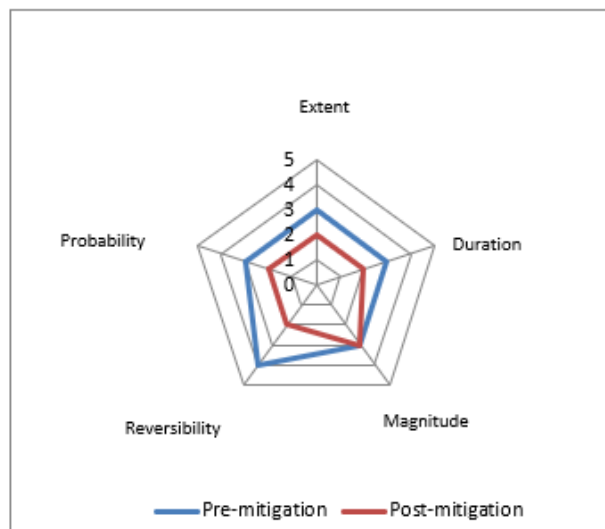


Figure 28: Radar chart indicating the pre-and post-mitigation for the Decommissioning phase for Graves and Burial Grounds

Table 26: Impact and risk assessment rating for the pre-and post-mitigation for the Decommissioning phase for Built Environment Resources

A. Destruction/damage of built environment resources - Proposal						
Heritage Impact Assessment	Impact Name	Destruction/damage of built environment resources				
	Alternative	Proposal				
	Phase	Decommissioning				
	Environmental Risk					
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
	Nature of Impact	-1	-1	Magnitude of Impact	3	3
	Extent of Impact	3	1	Reversibility of Impact	3	2
	Duration of Impact	3	2	Probability	3	2
	Environmental Risk (Pre-mitigation)					-9,00
	Mitigation Measures					
	<i>See Table. 32</i>					
	Environmental Risk (Post-mitigation)					-4,00
	Degree of confidence in impact prediction:					Medium
	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	

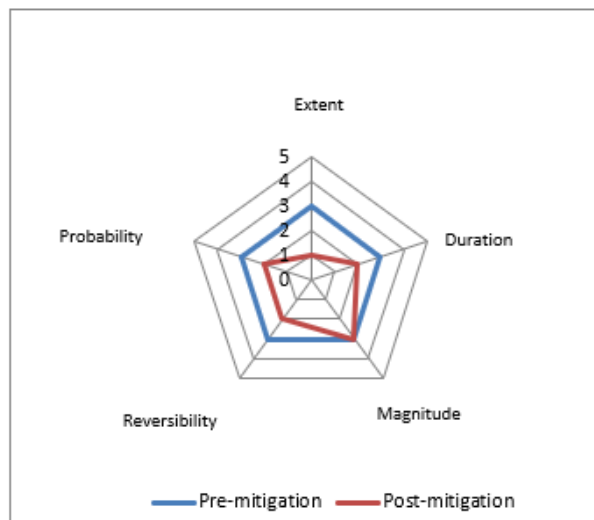


Figure 29: Radar chart indicating the pre-and post-mitigation for the Decommissioning phase for Built Environment Resources

Table 27: Impact and risk assessment rating for the pre-and post-mitigation for the Decommissioning phase for Paleontological Resources

A. Destruction/damage of palaeontological resources. - Proposal						
Palaeontological Impact Assessment	Impact Name	Destruction/damage of palaeontological resources.				
	Alternative	Proposal				
	Phase	Decommissioning				
	Environmental Risk					
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
	Nature of Impact	-1	-1	Magnitude of Impact	3	3
	Extent of Impact	2	1	Reversibility of Impact	3	2
	Duration of Impact	3	2	Probability	3	2
	Environmental Risk (Pre-mitigation)					-8,25
	Mitigation Measures					
	See Table. 32					
	Environmental Risk (Post-mitigation)					-4,00
	Degree of confidence in impact prediction:					Medium
	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	

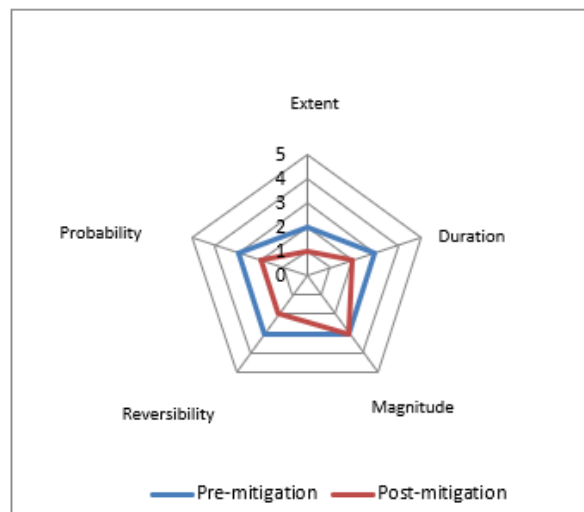


Figure 30: Radar chart indicating the pre-and post-mitigation for the Decommissioning phase for Paleontological Resources

4.4.5. Rehab and closure

Table 28: Impact and risk assessment rating for the pre-and post-mitigation for the Rehab and Closure phase for Archaeological And Living Heritage Resources

A. Destruction/damage of archaeology and living heritage resources. - Proposal						
Heritage Impact Assessment	Impact Name		Destruction/damage of archaeology and living heritage resources.			
	Alternative		Proposal			
	Phase		Rehab and closure			
	Environmental Risk					
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
	Nature of Impact	-1	-1	Magnitude of Impact	3	3
	Extent of Impact	3	2	Reversibility of Impact	4	2
	Duration of Impact	3	2	Probability	3	2
	Environmental Risk (Pre-mitigation)					-9,75
	Mitigation Measures					
	See Table. 32					
	Environmental Risk (Post-mitigation)					-4,50
	Degree of confidence in impact prediction:					Medium
	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					-6,00	

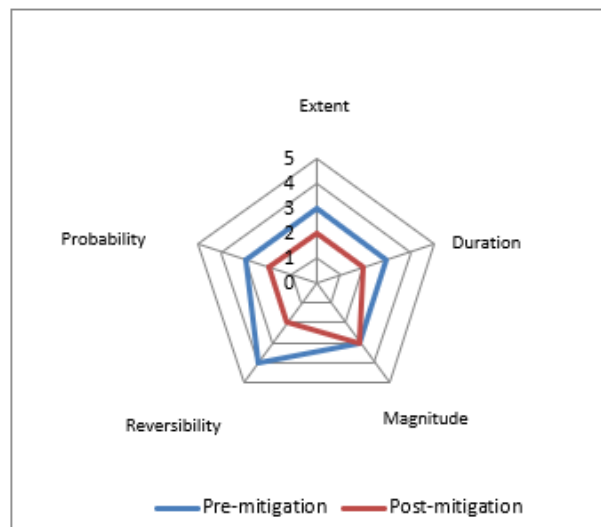


Figure 31: Radar chart indicating the pre-and post-mitigation for the Rehab and Closure phase for Archaeological And Living Heritage Resources

Table 29: Impact and risk assessment rating for the pre-and post-mitigation for the Rehab and Closure phase for Graves And Burial Grounds

A. Destruction/damage of graves and burial grounds - Proposal						
Heritage Impact Assessment	Impact Name	Destruction/damage of graves and burial grounds				
	Alternative	Proposal				
	Phase	Rehab and closure				
	Environmental Risk					
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
	Nature of Impact	-1	-1	Magnitude of Impact	3	3
	Extent of Impact	3	1	Reversibility of Impact	4	2
	Duration of Impact	3	2	Probability	3	2
	Environmental Risk (Pre-mitigation)					-9,75
	Mitigation Measures					
	<i>See Table. 32</i>					
	Environmental Risk (Post-mitigation)					-4,00
	Degree of confidence in impact prediction:					Medium
	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	

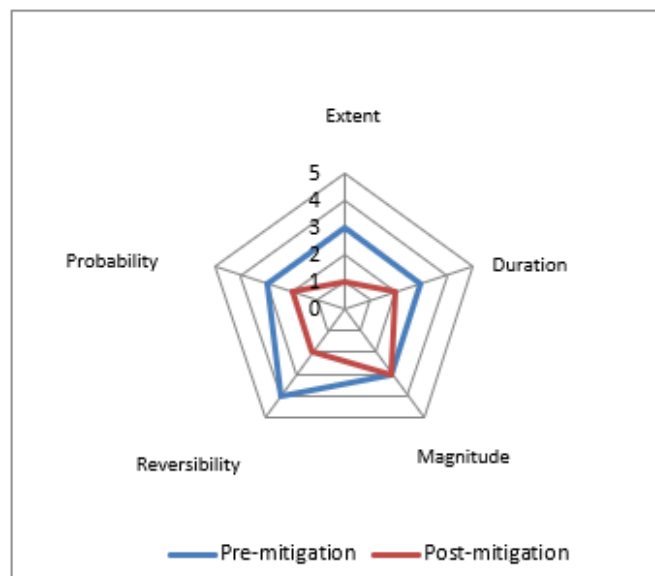


Figure 32: Radar chart indicating the pre-and post-mitigation for the Rehab and Closure phase for Graves and Burial Grounds

Table 30: Impact and risk assessment rating for the pre-and post-mitigation for the Rehab and Closure phase for Built Environment Resources

A. Destruction/damage of built environment resources - Proposal						
Heritage Impact Assessment	Impact Name	Destruction/damage of built environment resources				
	Alternative	Proposal				
	Phase	Rehab and closure				
	Environmental Risk					
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
	Nature of Impact	-1	-1	Magnitude of Impact	3	3
	Extent of Impact	3	2	Reversibility of Impact	4	2
	Duration of Impact	3	2	Probability	3	2
	Environmental Risk (Pre-mitigation)					-9,75
	Mitigation Measures					
	<i>See Table. 32</i>					
	Environmental Risk (Post-mitigation)					-4,50
	Degree of confidence in impact prediction:					Medium
	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					-6,00	

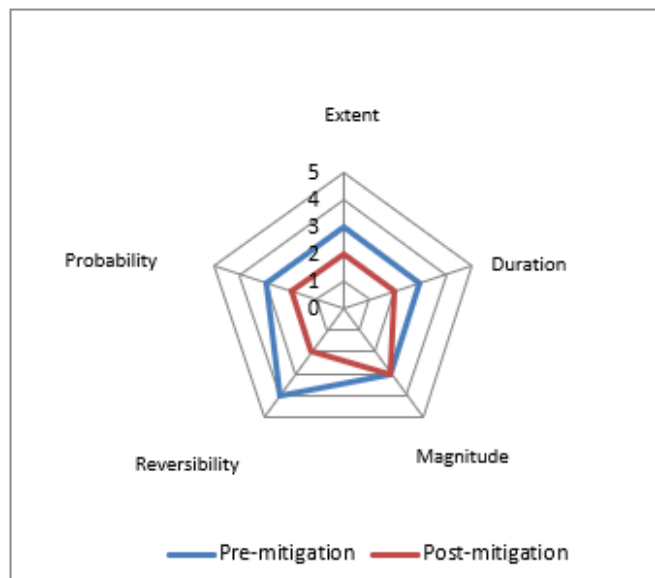


Figure 33: Radar chart indicating the pre-and post-mitigation for the Rehab and Closure phase for Built Environment Resources

Table 31: Impact and risk assessment rating for the pre-and post-mitigation for the Rehab and Closure phase for Paleontological Resources

A. Destruction/damage of palaeontological resources - Proposal						
Palaeontological Impact Assessment	Impact Name	Destruction/damage of palaeontological resources				
	Alternative	Proposal				
	Phase	Rehab and closure				
	Environmental Risk					
	Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
	Nature of Impact	-1	-1	Magnitude of Impact	3	2
	Extent of Impact	2	1	Reversibility of Impact	4	2
	Duration of Impact	3	2	Probability	3	2
	Environmental Risk (Pre-mitigation)					-9,00
	Mitigation Measures					
	<i>See Table. 32</i>					
	Environmental Risk (Post-mitigation)					-3,50
	Degree of confidence in impact prediction:					Medium
	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					-4,67	

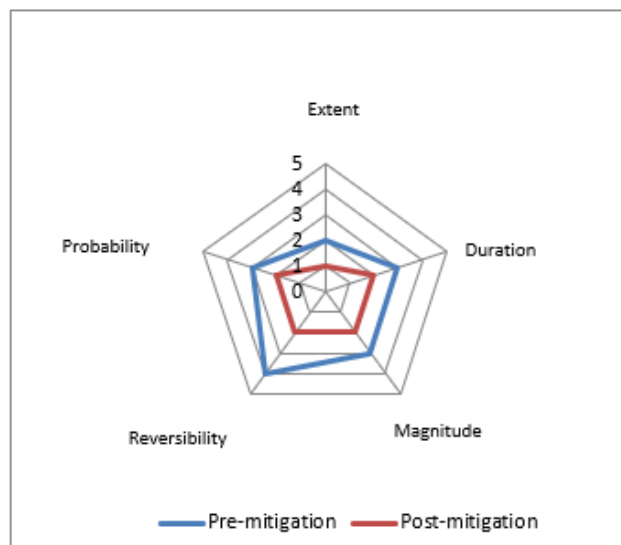


Figure 34: Radar chart indicating the pre-and post-mitigation for the Rehab and Closure phase for Paleontological Resources

4.5. Potential impacts and mitigation measures for heritage resources

Several mitigation measures were identified for heritage and paleontologically resources that could be identified in the project area (*Table. 32*). The mitigation measures are directly related to the significance of the potential impacts associated with the prospecting activities. A suggested Action plan for implementation of the recommended mitigation measures is presented in *Table. 33* and *Table. 34*.

Table 32: Table listing the various recommended mitigation measures for heritage resources.

HERITAGE RESOURCES	POTENTIAL IMPACTS	MITIGATION MEASURES
Archaeological and Living Heritage Resources	<ul style="list-style-type: none"> Disturbance and destruction of archaeological resources and living heritage resources 	<ul style="list-style-type: none"> If the prospecting activities bring archaeological materials to the surface, they should be treated as Chance Finds. The prospecting 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 FS-PHRA should also be informed immediately on such finds and mitigation/rescue permit to mitigate the finds be applied with them.
Burial Grounds and Graves	<ul style="list-style-type: none"> Disturbance and destruction of the identified graves Potential of disturbance of unmarked, invisible and subterranean graves The commingling of skeletal remains through the unintentional unearthing of graves 	<ul style="list-style-type: none"> It is recommended that no machinery or site camp associated with the proposed prospecting activities should be established near the graves. The graves should be treated as a No-Go-Area. The graves and burials should be demarcated and fenced off. If the impact cannot be mitigated a Grave Relocation Plan (GRAP) should be developed. The GRAP should include a detailed consultative process in efforts to located the next of kin and seek permission to relocate the graves. The relevant heritage permits

		<p>should be applied for from the SAHRA Burial Grounds and Graves unit. Permit with the Provincial Department of Health, with Cooperative Government and Tradition Affairs as well as with South Africa Police Services.</p>
Built Environment Resources	<ul style="list-style-type: none"> Disturbance of Old Farm houses and other historical infrastructure 	<ul style="list-style-type: none"> It is recommended that no machinery or site camp associated with the proposed prospecting activities should be established near the Built environment resources (i. e. Buildings older than 60 years). The Built environment should be treated as a No-Go-Area. The area should be demarcated and fenced off. If the impact cannot be mitigated a Phase 2 Study of the Built Environment should be conducted by a qualified archaeologist and conservationist architect to document the structure and develop detailed As-Builds as a record of the structure. After which a destruction permit can be applied for from SAHRA.
Paleontological Resources	<ul style="list-style-type: none"> Disturbance of palaeontological resources 	<ul style="list-style-type: none"> Develop Fossil Chance Find Protocol. If fossils are observed on site, the activities should immediately be stopped, and a palaeontologist called to assess and collect a representative sample. A rescue permit with need to be applied with SAHRA Archaeology, Palaeontology and Meteorite (APM) Unit

4.6. Mitigation measures including timeframes, roles and responsibilities

Table 33: Mitigation measures including requirements for timeframes, roles and responsibilities etc

No	Mitigation Measures	Phase	Timeframe	Responsible Party for Implementation	Monitoring Party (Frequency)	Target	Performance Indicators (Monitoring Tool)
1. Legal Compliance							
A	The Applicant together with the ECO shall identify and comply with all relevant national, provincial and local legislation, including associated regulations and bylaws and shall establish and maintain procedures to keep track of, document and ensure compliance with environmental legislative changes.	Planning Construction Operation Decommissioning Rehab and closure	Prior to construction and ongoing throughout lifespan of mine	Applicant ECO	ECO (Monthly)	Ensure compliance with relevant legislation	No legal directives Legal compliance audit scores (legal register) (ECO monthly checklist/report)
B	Should there be changes in legislation and/or regulations the Applicant shall take the necessary actions to incorporate such changes and to pass these requirements on to the Contractors.	Planning Construction Operation Decommissioning Rehab and closure	Prior to construction and ongoing throughout lifespan of mine	Applicant ECO	ECO (Monthly)	Ensure compliance with relevant legislation	Contractual agreements Contractors work packs (ECO monthly checklist/report)
2. Site Access, Security and Traffic Management							
A	Access to the site must be controlled. The entire site shall be fenced so as to restrict unauthorised personnel from entering the site. Only authorised	Construction Operation Decommissioning Rehab and closure	Ongoing	Applicant Contractor	Contractors EO (Daily) Mine EO (Weekly) ECO (Monthly)	Safety of people on site and surrounding landowners	No security or safety incidents as a result of unauthorised access to the site (site access

	personnel are allowed on site.						logbook) (safety reports) (incident registers)
B	All construction and mining vehicles using public roads shall be in a roadworthy condition and their loads secured. They must adhere to the speed limits and all local, provincial and national regulations with regards to road safety and transport.	Construction Operation Decommissioning Rehab and closure	Ongoing	Applicant Contractor	Safety Department (weekly) ECO (Monthly)	No road accidents	Vehicle roadworthiness and inspection spot checks Vehicles accident statistics (vehicle inspection records)
3. Impacts on Heritage and Paleontological resources							
A	If the prospecting activities bring archaeological materials to the surface, they should be treated as Chance Finds. The prospecting 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 FS-PHRA should also be informed immediately on such finds.	Construction Operation Decommissioning Rehab and closure	Ongoing	Applicant ECO and Heritage Specialist	ECO (Monthly)	Restricting damage or destruction of heritage resources	Follow-up visits by Heritage Specialists or SAHRA or FS - PHRA

B	It is recommended that no machinery or site camp associated with the proposed prospecting activities should be established near the graves; they should be treated as a No-Go-Area.	Construction Operation Decommissioning Rehab and closure	Ongoing	Applicant ECO and Heritage Specialist	ECO (Monthly)	Restricting damage or destruction of heritage resources	Follow-up visits by Heritage Specialists or SAHRA-BGG
C	It is recommended that Built Environment resources be fenced off and treated as No-Go- Areas.	Construction Operation Decommissioning Rehab and closure	Ongoing	Applicant ECO and Heritage Specialist	ECO (Monthly)	Restricting damage or destruction of heritage resources	Follow-up visits by Heritage Specialists or SAHRA or FS-PHRA
D	Develop Fossil Chance Find Protocol. If fossils are observed on site, the activities should immediately be stopped, and a palaeontologist called to assess and collect a representative sample.	Construction Operation Decommissioning Rehab and closure	Ongoing	Applicant ECO and Palaeontological Specialist	ECO (Monthly)	Restricting damage or destruction of heritage resources	Follow-up visits by Heritage Specialists or SAHRA APM Unit

4.7. Action plan for the Bothaville project

Table 34: Action plan for the Bothaville project

ACTION PLAN				
Phase	Management Action	Timeframe for Implementation	Responsible party for Implementation (frequency)	Responsible party for Monitoring/Audit/Review (frequency)
Planning phase	Develop Heritage Action Plan	1 month prior to onset of construction	Heritage specialist to be appointed	Environmental Manager (annual internal review) Heritage specialist (external review as required)
	Develop Fossil Finds Procedure	During the EIA phase and within 3 months of start of construction	Palaeontological specialist to be appointed	Environmental Manager (annual internal review) Heritage specialist (external review as required)
	Develop Grave Relocation Procedure	Within 3 months of start of construction	Heritage specialist to be appointed	Environmental Manager (annual internal review) Environmental Consultant (external review as required)
	Undertake Social engagement process	Upon start of grave relocation process	Heritage specialist to be appointed (as required)	Environmental Manager/ECO (audit and review as required)
	Construction	Monitoring of demarcated heritage sites (archaeological, graves and built environment resources)	Throughout construction	Environmental Officer (weekly)
	Specialist investigations upon discovery of previously unidentified heritage resources	As required	Heritage specialist to be appointed (as required)	Environmental Manager/ECO (audit and review as required)
Operation	Monitoring of demarcated heritage sites (archaeological, graves and built environment resources)	Throughout operation	Environmental Officer (weekly)	ECO (monthly audit)
Decommissioning	Monitoring of demarcated heritage sites (archaeological,	Throughout decommissioning	Environmental Officer (weekly)	ECO (monthly audit)

The HIA developed by NGT ESHS Solutions for NGT Holdings on behalf of Shango Solutions (PTY) LTD

	graves and built environment resources)			
Rehabilitation and Closure	Monitoring of demarcated heritage sites (archaeological, graves and built environment resources)	Throughout rehabilitation until closure	Environmental Officer (weekly)	ECO (monthly audit)

4.8. Paleontological Sensitivity

The SAHRA Palaeo-Sensitivity Layer (*Figure. 35*) shows that the project area is in an insignificant to very high sensitivity area. As such a field assessment and protocol for finds was required (See PIA and Appendix 3).

- 50% falls within a moderate sensitivity area (green), including the eight proposed drillholes.
- 30% falls within a very high sensitivity area (red).
- 15% falls within in insignificant sensitivity zone (grey).
- 5% falls within a high sensitivity zone (orange).

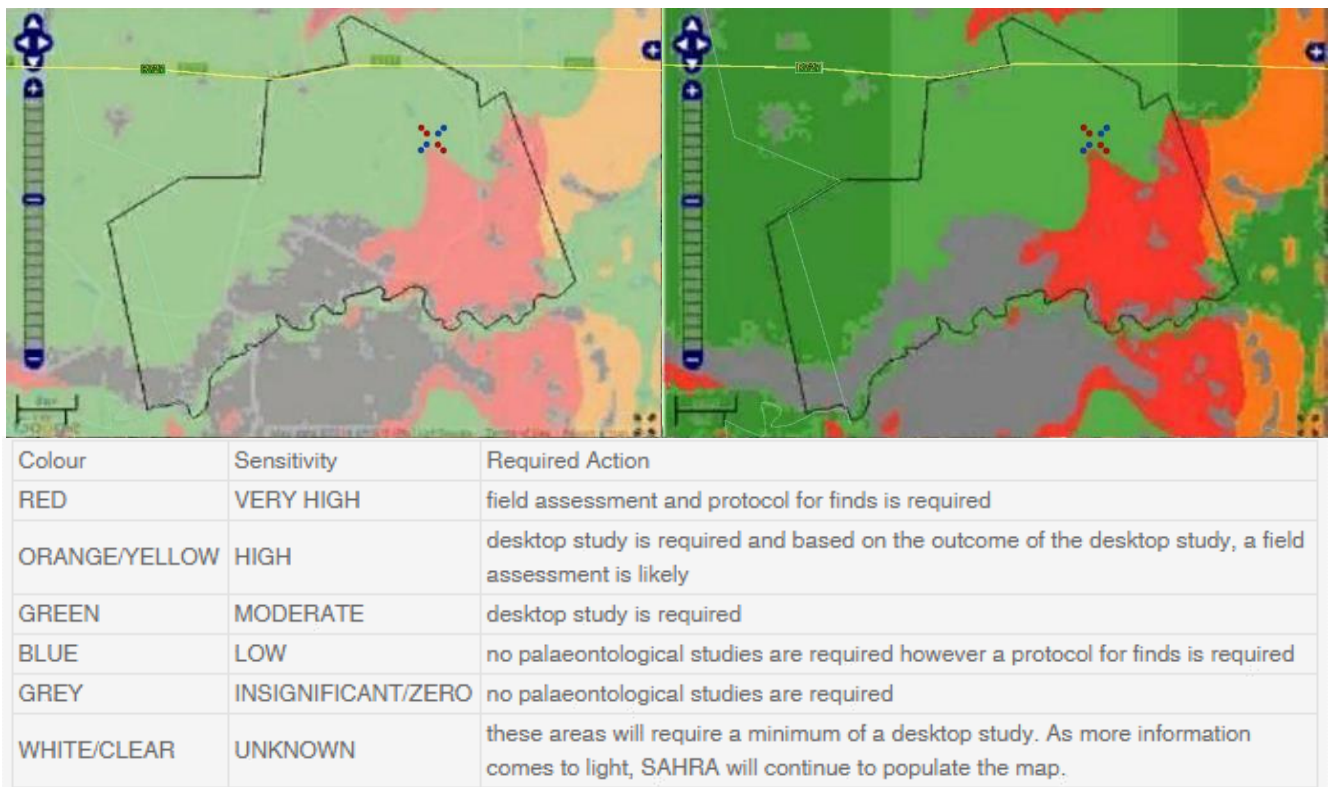


Figure 35: Palaeo-Sensitivity layer of Bothaville project area (with the drillhole locations) in the Free State Province.

4.9. Site Ratings

No site of heritage significance containing archaeological resources or burials and graves were identified.

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 Bothaville, is located in a region rich in archaeology and heritage resources.
- However, no archaeological, historical resources or sources of living heritage were identified near the locations of the eight drillholes on the farms Concord 392 (Portion RE), Eureka 761 (Portion 1) and Tarantaaldraai 156 (Portion 1).
- No graves or burial grounds were identified in the project area (locations of the eight drillholes on the farms Concord 392 (Portion RE), Eureka 761 (Portion 1) and Tarantaaldraai 156 (Portion 1)). 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 an insignificant to very high sensitivity area:
 - 50% falls within a moderate sensitivity area (green), including the eight proposed drillholes.
 - 30% falls within a very high sensitivity area (red).
 - 15% falls within in insignificant sensitivity zone (grey).
 - 5% falls within a high sensitivity zone (orange).
- According to the PIA report, the proposed sites lie on Quaternary sands which overlies shales of the Vryheid Formation of the Ecca Group. Beneath these are the Central Rand Group, Witwatersrand Supergroup of the Free State Goldfield. Only the Vryheid Formation of the Karoo Supergroup is potentially fossiliferous. It is composed predominantly of mudstones, sandstones and shales and could have fossil plants typical of the Glossopteris flora. The Jurassic dolerite dykes and overlying Quaternary sands do not preserve fossils (See PIA report).

6. RECOMMENDATIONS

Based on the Limitations and Conclusions it is recommended that:

- 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 prospecting 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 FS-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 an insignificant to very high sensitivity area. A Fossil Chance Find Protocol should be followed once drilling commences. If any fossils are discovered by the responsible person in charge, then they should be rescued and put aside for a professional Palaeontologist to assess (See PIA report and Appendix 3).
- The proposed prospecting activities on farms Concord 392 (Portion RE), Eureka 761 (Portion 1) and Tarantaaldraai 156 (Portion 1) will not have impact on the heritage and archaeological resources in the broader Bothaville area.

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8. APPENDIX 1: 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 : Archaeologist and Heritage Consultant
Years with firm : 8 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 : Archaeologist and Heritage Consultant

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 my 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	ASSIGNMENT	POSITION	LOCATION
2018- Current	<i>Employer - NGT Holdings (Pty) Ltd</i>	<i>Archaeologist and Heritage Consultant</i>	<i>RSA</i>
2018	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	
2018	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	
2018	Report on the exhumation and reburial report of 16 graves from Doornkop, to Voortrekker Cemetery in Middelburg, Mpumalanga Province, South Africa	Author	
2018	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	
2018	Heritage Impact Assessment for the proposed for the Construction of the Bulk Water Supply Pipeline and Feeder Pipes in Dunnottar, Gauteng Province	Author	
2018	Letter of Recommendation for Exemption from Conducting a full Heritage Impact Assessment Study for the Matlala Park, Ekurhuleni Metropolitan Municipality, Gauteng Province.	Author	

DATE	ASSIGNMENT	POSITION	LOCATION
2018	Heritage Impact Assessment for the Proposed KwaThema to Grundlingh WWTW Bulk Outfall Sewer: Capital Project Implementation near Nigel, Gauteng Province, South Africa.	Author	
2018	Heritage Impact Assessment the prospecting right and environmental authorisation application for Kroonstad South situated in the Free State Province.	Author	
2018	Heritage Impact Assessment the prospecting right and environmental authorisation application for Vredefort West situated in the Free State Province.	Author	
2018	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	
2018	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	
2018	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	
2018	Prospecting Right and Environmental Authorisation for the proposed WRE Nkuzana Prospecting Right Project.	Researcher	
2014-2015	<i>Forensic Anthropological Research Centre, University of Pretoria</i>	<i>DST-NRF Archaeological Intern</i>	<i>RSA</i>
2015	Report on rescue excavations and skeletal analyses of two archaeological graves inadvertently uncovered in Boitekong, North-West.	Field Assistant and Researcher	

DATE	ASSIGNMENT	POSITION	LOCATION
2015	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	
2014	Rescue excavation of an unmarked grave yard at Diamond Park, Greenpoint, Kimberley, Northern Cape Province	Field Assistant	
2014	Follow up site visit on human remains found at Bothlokwa (Ramatjowe & Mphakahne), Limpopo Province	Field Assistant	
2014	Follow up site visit on human remains found in Waterpoort, Soutpansberg, Limpopo Province	Field Assistant	
2014	Archaeological Assistant	Archaeon Ltd	RSA
2014	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	
2014	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	
2014	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	
2014	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	
2014	A report on a cultural heritage impact assessment for the proposed Thusanang housing development, close to Rustenburg, Northwest Province.	Field Assistant and Researcher	
2014	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	ASSIGNMENT	POSITION	LOCATION
2014	A report on the cultural heritage impact assessment for the proposed Isibonelo Colliery Block Z opencast mine, close to Kriel, Mpumalanga Province.	Field Assistant	
2014	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	
2014	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, SA
2018, 2016	Umbeli Belli Middle Stone Age Excavation	Field and Lab Assistant	Kwazulu-Natal, SA
2015-2016	Bio-Archaeological Analysis and Archaeological Geophysics Unit, University of Pretoria	Archaeological Contractor	Pretoria, SA
2016, 2015	Wenner-Gren Foundation Funded Grassridge Archaeological and Palaeoenvironmental Project	Field and Lab Assistant	Eastern Cape, SA
2015	Department of Anatomy, University of Pretoria	Student Teaching Assistant	Pretoria, SA

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

DATE	ORGANIZATION	POSITION
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.

A handwritten signature in black ink, appearing to read "Cherene de Bruyn".

Cherene de Bruyn

1 February 2019

9. APPENDIX 2: SPECIALIST CV – KUNI MOSWEU

Name : Kuni Mosweu
Profession : Archaeology
Date of Birth : 1994/06/05
Parent Firm : NGT Holdings (Pty) Ltd
Position in Firm : Assistant Archaeologist and Field Technician
Years with Firm : 3 Months
Nationality : South Africa
BI & Male/Female Status : Black South African Female
Languages :

Language	Speak	Read	Write
English	X	X	X
Tswana	X	X	X
Sotho	X	X	X

Country of Work Experience : South Africa
Proposed Position on Team : Assistant Archaeologist and Field Technician

KEY QUALIFICATIONS

I see myself as a dedicated, trusted and patient focused professional with wide range of skills in Archaeology Geography and Archaeology. Through my MSc degree in Archaeological landscape analysis using GIS I have honed my skills to evaluate, analyse and integrate various types of data. I am proficient in using ArcGIS, QGIS, Google Earth and total station. I was part of the team leading data collection, processing and excavating at the Klasies River excavations project for three years. I am interested in Landscape and Paleoenvironmental Archaeology and the importance of these aspects in human behaviour.

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

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

EDUCATION

NAME OF INSTITUTION	DEGREE OBTAINED	DATES ATTENDED
University of the Witwatersrand	MSc in Archaeology	2017 - 2019
University of the Witwatersrand	BSc Honours in Geography, Archaeology and Environment Studies	2016
University of Johannesburg	BA Geography	2013 - 2015

RELEVANT EXPERIENCE

DATE	ASSIGNMENT	POSITION	LOCATION
2018- Current	Employer - NGT Holdings (Pty) Ltd	Assistant Archaeologist and Field Technician	RSA
2018	Basic Assessment Report for the prospecting right and environmental authorization application for Ventersburg B situated in the Free State Province.	Field Assistant	
2018	Archival search and literature background study of the Lyttelton Primary School, Lyttelton Manor, Centurion, Gauteng Province.	Field Assistant and Researcher	
2018	Basic Assessment Report for the proposed construction of the bulk water supply pipeline and feeder pipes in Dunnottar, Gauteng Province.	Researcher	
2018	Phase 1 Heritage Impact Assessment study for development of Zandspruit Secondary School on portion 504 of the Farm Wilgespruit 190 IQ, Zonnehoeve, Gauteng province, south Africa.	Field Assistant and Researcher	
2018	Gap analysis for the Basic Assessment Report of the proposed mining project for prospecting right on the Farm Three sisters and an application for environmental authorization of Barberton, within the City of Mbombela local district, Mpumalanga, South Africa.	Author	

The HIA developed by NGT ESHS Solutions for NGT Holdings on behalf of Shango Solutions

2018 Proposed new Lambano Sub Acute Facility on stands 5454, 5455, 5456, 5456, 5457 and new Training Facility on stands 5458 and 5460 in Kensington within the City of Johannesburg Metropolitan Municipality, Gauteng Province, South Africa

Field Assistant and Researcher

SUMMARY OF OTHER EXPERIENCE

DATE	EMPLOYER	POSITION	LOCATION
2018, 2017	University of the Witwatersrand	Laboratory Assistant	Johannesburg, SA
2018, 2017	University of the Witwatersrand	Field Assistant and Data Manager	Johannesburg, SA
2017	University of the Witwatersrand	Tutor	Johannesburg, SA
2014, 2015	Star Schools	Invigilator	Johannesburg, SA

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.



Kuni Mosweu

1 February 2019

10. APPENDIX 3: 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:

- 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.