THE PROPOSED ESKOM AZAADVILLE 4KM 400kV DEVIATION POWER LINE, ESKOM WESTRAND STRENGTHENING PHASE I, MOGALE CITY AND RANDWEST CITY LOCAL MUNICIPALITY, GAUTENG PROVINCE

Phase 1 – Heritage Impact Assessment

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Declaration of Independence

I, Wouter Fourie, declare that –

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

Disclosure of Vested Interest

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

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SIGNATURE: 

Report Title	THE PROPOSED ESKOM AZAADVILLE 4KM 400kv DEVIATION POWER LINE, ESKOM WESTRAND STRENGTHENING PHASE I, MOGALE CITY AND RANDWEST CITY LOCAL MUNICIPALITY, GAUTENG PROVINCE		
Control	**Name**	**Signature**	**Designation**
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EXECUTIVE SUMMARY

PGS Heritage (Pty) Ltd (PGS) was appointed by GA Environmental (Pty) Ltd to undertake a Heritage Impact Assessment (HIA) for the proposed Eskom Azaadville 4km 400kv Deviation Power Line, Eskom Westrand Strengthening Phase I, Mogale City and Randwest City Local Municipality, Gauteng Province

An archaeological and historical desktop study was undertaken to provide a historical framework for the project area and surrounding landscape (refer to Chapter 5). This was augmented by an assessment of previous archaeological and heritage studies completed for the surrounding landscape. Furthermore, an assessment was made of the early editions of the relevant topographic maps.

During the fieldwork the conducted by two archaeologist no heritage resources were identified within the assessment areas.

Palaeontology

The palaeontology of the site was found to be in most northern portion of the proposed Azaadville powerline deviation is underlain by the Klipriviersberg Group (Ventersdorp Supergroup) while the largest middle portion is underlain by the Turffontein Subgroup (Central Rand Group, Witwatersrand Supergroup) and the most southern tip is underlain by the Johannesburg Subgroup (Central Rand Group, Witwatersrand Supergroup). According to the South African Heritage Resources Information System, the Palaeontological Sensitivity of the Klipriviersberg Group, Turffontein Group and Johannesburg Group is Low

Recommendations

The following mitigation measures are listed in **Table 11** below.

Table 1 - Heritage management recommendations.

Area and site no.	Mitigation measures
General project area	• Implement a chance to find procedures in case possible heritage finds are uncovered.
Palaeontology	• No further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils

Conclusions

During the heritage walk through survey, no heritage resources were identified. The overall impact of the proposed project, on the heritage resources identified during this report, is seen as negligible after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised.

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TERMINOLOGY AND ABBREVIATIONS

Archaeological resources

This includes:

- material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency, and which is older than 100 years, including any area within 10m of such representation;
- wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Cultural significance

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

Cultural Landscapes Terminology

"perceptual qualities" Aspects of a landscape which are perceived through the senses, specifically views and aesthetics.

"cultural landscape" A representation of the combined worlds of nature and of man illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal (World Heritage Committee, 1992). Includes and extends beyond the study site boundaries.

"cultural landscape area" These are single unique areas which are the discrete geographical areas of a particular landscape type. Each will have its own individual character and identity, even though it shares the same generic characteristics with other areas of the same type.

"study site" The study site is assumed to include the area within the boundaries of the proposed development

"characteristics" elements, or combination of elements, which make a particular contribution to distinctive character.

"elements" individual components which make up the landscape, such as trees and fences.

"landscape character" A distinct, and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.

"landscape character assessment" This is the process of identifying and describing variation in the character of the landscape. It seeks to identify and explain the unique combination of elements and features (characteristics) that make landscapes distinctive. This process results in the production of a Landscape Character Assessment.
"sense of place" The unique quality or character of a place, whether natural, rural or urban. It relates to uniqueness, distinctiveness or strong identity.
"scenic route" A linear movement route, usually in the form of a scenic drive, but which could also be a railway, hiking trail, horse-riding trail or 4x4 trail.

Development
This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in a change to the nature, appearance or physical nature of a place or influences 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

Earlier Stone Age
The archaeology of the Stone Age between ~300 000 and 3 300 000 years ago.

Fossil
Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage
That which is inherited and forms part of the National Estate (historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

Heritage resources
This means any place or object of cultural significance and can include (but not limited to) as stated under Section 3 of the NHRA,

- places, buildings, structures and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features of cultural significance;

- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds, and
- sites of significance relating to the history of slavery in South Africa

Holocene

The most recent geological time period which commenced 10 000 years ago.

Later Stone Age

The archaeology of the last 40 000 years associated with fully modern people.

Late Iron Age (Early Farming Communities)

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

Middle Stone Age

The archaeology of the Stone Age between 40 000-300 000 years ago, associated with early modern humans.

Palaeontology

Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

Site

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

Table 2 – List of abbreviations used in this report

Abbreviations	Description
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
BA	Basic Environmental Assessment
BGG	Burial Grounds and Graves
CMP	Conservation Management Plan
CRM	Cultural Resource Management
EA	Environmental Authorisation
ECO	Environmental Control Officer
EFC	Early Farming Communities
EIA	Environmental Impact Assessment
EIA practitioner	Environmental Impact Assessment Practitioner
ESA	Earlier Stone Age
GN	Government Notice
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HMP	Heritage management plan
I&AP	Interested & Affected Party
LIA	Late Iron Age
LSA	Late Stone Age
MSA	Middle Stone Age
NCW	Not Conservation Worthy
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PGS	PGS Heritage (Pty) Ltd
PIA	Palaeontological Impact Assessment
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System

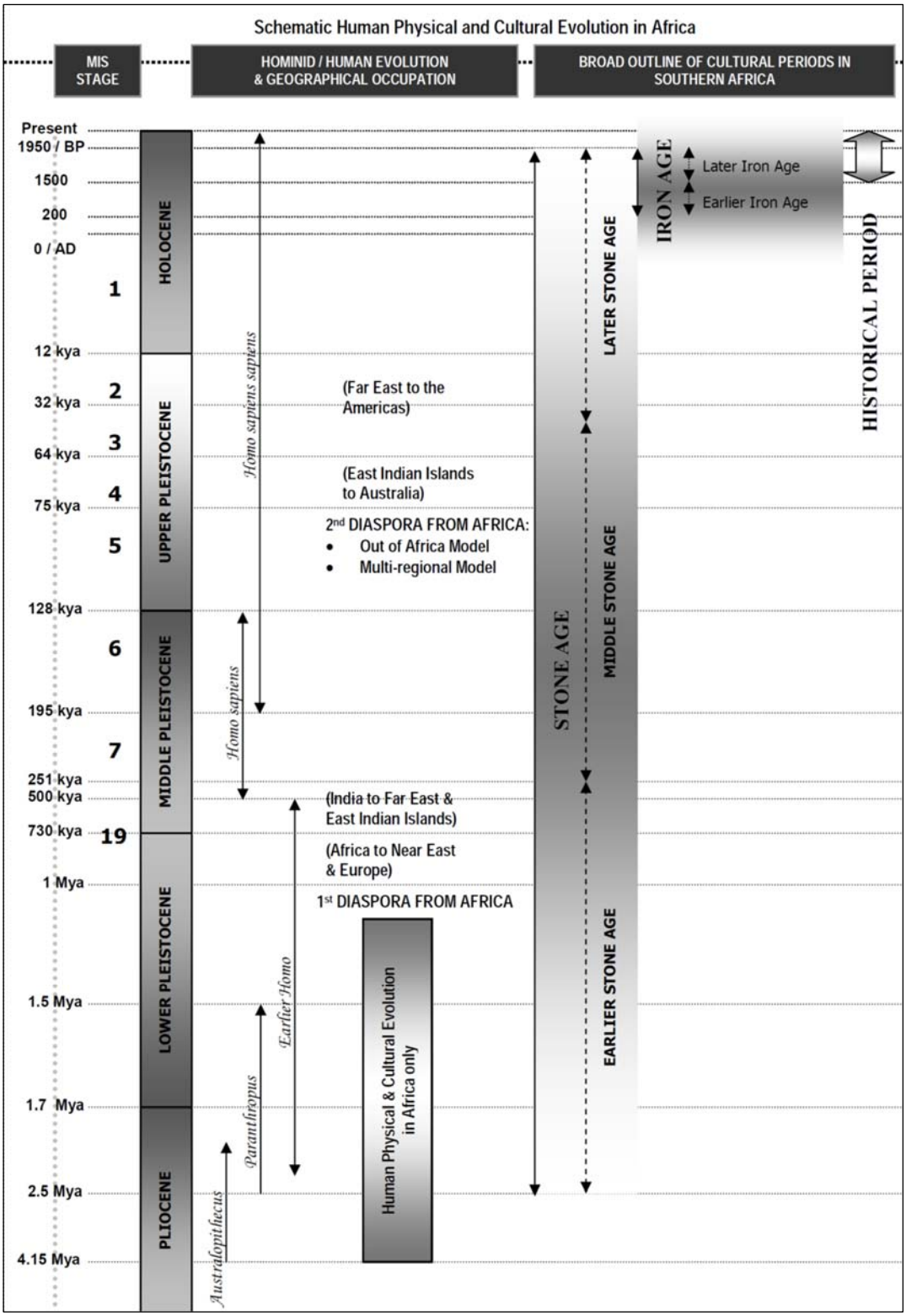

Figure 1 – Human and Cultural Timeline in Africa (Morris, 2008)

1 INTRODUCTION

PGS Heritage (Pty) Ltd (PGS) was appointed by GA Environmental (Pty) Ltd to undertake a Heritage Impact Assessment (HIA) for the proposed Eskom Azaadville 4km 400kv Deviation Power Line, Eskom Westrand Strengthening Phase I, Mogale City and Randwest City Local Municipality, Gauteng Province

1.1 Scope of the Study

The aim of this HIA is to identify possible heritage sites and finds that may occur in the proposed development area and to assess the impact of the proposed development on these identified heritage sites. The study also aims to inform the owners to manage the identified heritage resources responsibly, to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999) (NHRA).

1.2 Specialist Qualifications

This report was compiled by PGS. The staff at PGS has a combined experience of nearly 90 years in the heritage consulting industry and has extensive experience in managing HIA processes. PGS will only undertake heritage assessment work where the staff has the relevant expertise and experience to undertake that work competently.

The project team consisted of:

Wouter Fourie, senior archaeologist and Project Coordinator, is registered with ASAPA as a Professional Archaeologist and is accredited as a Principal Investigator; he is further an Accredited Professional Heritage Practitioner with the Association of Professional Heritage Practitioners (APHP).

Nicholas Fletcher, archaeologist, he holds a BA(Hon) Archaeology and has submitted his MA in archaeology.

Wynand van Zyl, archaeologist, is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist. He holds a BA(Hon) Archaeology.

1.3 Assumptions and Limitations

The following assumptions and limitations regarding this study and report exist:

Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites, as well as the density of vegetation cover found in some areas. As such, should any heritage features and/or objects not included in the present study be located or observed, a heritage specialist must immediately be contacted. Such observed or located heritage features and/or objects may not be disturbed or removed in any way, until such time that the heritage specialist has been able to assess as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. If any graves or burial places are identified or exposed during the development, the procedures and requirements pertaining to graves and burials will apply as set out below.

1.4 Legislative Context

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

1.4.1 *Statutory Framework: The National Heritage Resources (Act 25 of 1999)*

The NHRA has applicability, as the study forms part of an overall HIA in terms of the provisions of Section 34, 35, 36 and 38 of the NHRA and forms part of a heritage scoping study that serves to identify key heritage resources, informants, and issues relating to the palaeontological, archaeological, built environment and cultural landscape, as well as the need to address such issues during the impact assessment phase of the HIA process.

1.4.2 *Section 34 – Structures*

According to Section 34 of the NHRA, no person may alter, damage or destroy any structure that is older than 60 years, and which forms part of the site's built environment, without the necessary permits from the relevant provincial heritage authority.

1.4.3 *Section 35 – Archaeology, Palaeontology and Meteorites*

According to Section 35 (Archaeology, Palaeontology and Meteorites) and Section 38 (Heritage Resources Management) of the NHRA, Palaeontological Impact Assessments (PIA) and Archaeological Impact Assessments (AIA) are required by law in the case of developments in areas underlain by potentially fossiliferous (fossil-bearing) rocks, especially where substantial bedrock excavations are envisaged, and where human settlement is known to have occurred during prehistory and the historic period.

1.4.4 *Section 36 – Burial Grounds & Graves*

A section 36 permit application is made to the SAHRA or the competent provincial heritage authority which protects burial grounds and graves that are older than 60 years and must conserve and

generally care for burial grounds and graves protected in terms of this section, and it may make such arrangements for their conservation as it sees fit. SAHRA must also identify and record the graves of victims of conflict and any other graves which it deems to be of cultural significance and may erect memorials associated with these graves and must maintain such memorials. A permit is required under the following conditions:

Permit applications for burial grounds and graves older than 60 years should be submitted to the South African Heritage Resources Agency:

- destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of the conflict, or any burial ground or part thereof which contains such graves.
- destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
- bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.
- SAHRA or a provincial heritage resources authority may not issue a permit for the destruction or damage of any burial ground or grave referred to in subsection (3)(a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant.

1.4.5 *Section 38 - HIA as a Specialist Study within the EIA in Terms of Section 38(8)*

A NHRA Section 38 (Heritage Impact Assessments) application to MP-PHRA is required when the proposed development triggers one or more of the following activities:

- the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- the construction of a bridge or similar structure exceeding 50 m in length;
- any development or other activity which will change the character of a site,
- exceeding 5 000 m2 in extent; or
- involving three or more existing erven or subdivisions thereof; or
- involving three or more erven or divisions thereof which have been consolidated within the past five years; or
- the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- the re-zoning of a site exceeding 10 000 m2 in extent; or
- any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority

In this instance, no heritage impact assessment for the property has been undertaken in terms of the NEMA and EIA Regulations (2014, and as amended in 2017).

In this instance, the heritage assessment for the property is to be undertaken as a component of the EIA for the project. Provision is made for this in terms of Section 38(8) of the NHRA, which states that:

- An HIA report is required to identify, and assess archaeological resources as defined by the NHR Act, assess the impact of the proposal on the said archaeological resources, review alternatives and recommend mitigation (see methodology above).

Section 38 (3) Impact Assessments are required, in terms of the statutory framework, to conform to basic requirements as laid out in Section 38(3) of the NHRA. These are:

- The identification and mapping of heritage resources in the area affected;
- The assessment of the significance of such resources;
- The assessment of the impact of the development on the heritage resources;
- An evaluation of the impact on the heritage resources relative to sustainable socio/economic benefits;
- Consideration of alternatives if heritage resources are adversely impacted by the proposed development;
- Consideration of alternatives; and
- Plans for mitigation.

1.4.6 *Notice 648 of the Government Gazette 45421*

Although minimum standards for archaeological (2007) and palaeontological (2012) assessments were published by SAHRA (2016), Government Notice (GN) 648 requires sensitivity verification for a site selected on the national web-based environmental screening tool for which no specific assessment protocol related to any theme has been identified. The requirements for this GN are listed in **Table 3** and the applicable section in this report noted.

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Table 3 - Reporting requirements for GN648.

GN 648	Relevant section in report	Where not applicable in this report
2.2 (a) a desktop analysis, using satellite imagery	Section 4 and 5	-
2.2 (b) a preliminary on-site inspection to identify if there are any discrepancies with the current use of land and environmental status quo versus the environmental sensitivity as identified on the national web-based environmental screening tool, such as new developments, infrastructure, indigenous/pristine vegetation, etc.	Section 4 and 5	-
2.3(a) confirms or disputes the current use of the land and environmental sensitivity as identified by	Section 1 and 5	-

GN 648	Relevant section in report	Where not applicable in this report
the national web-based environmental screening tool		
2.3(b) contains a motivation and evidence (e.g., photographs) of either the verified or different use of the land and environmental sensitivity	Section 4 provides a description of the current use and confirms the status in the screening report	-

An assessment of the Environmental Screening tool provides the following sensitivity ratings for archaeological resources that fall within the proposed project area rated as Low (**Figure 2**), while palaeontological resources are rated as Very High to Moderate (**Figure 3).**

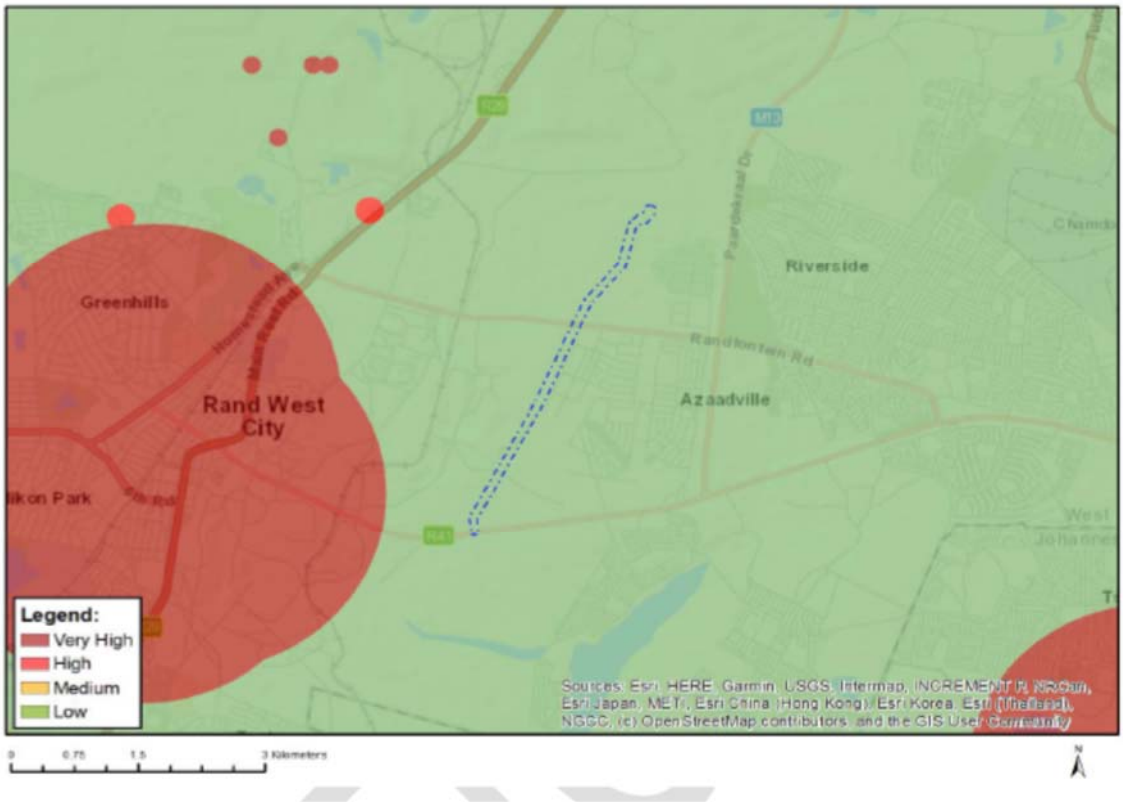

Figure 2 - Environmental screening tool's depiction of the archaeological and heritage sensitivity of the study area and surroundings.

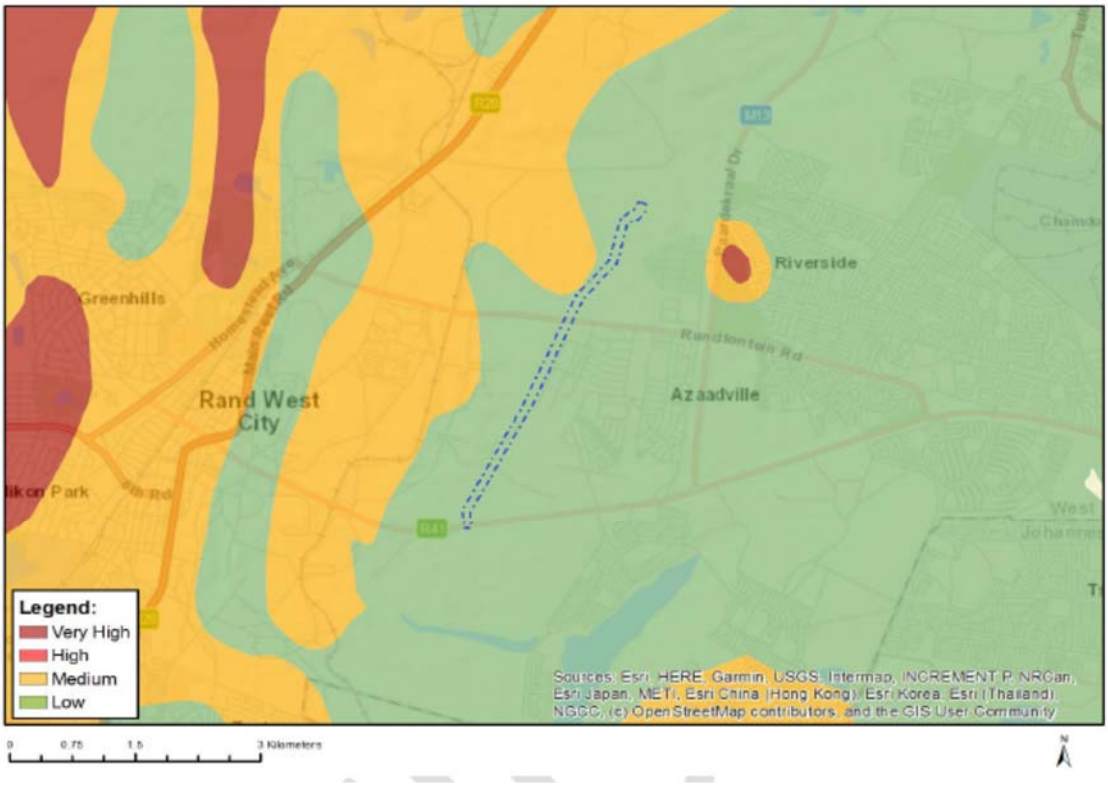

Figure 3 - Environmental screening tool's depiction of the paleontological sensitivity of the study area and surroundings.

1.4.7 *NEMA – Appendix 6 requirements*

The HIA report has been compiled considering the National Environmental Management Act (Act No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations (2014, and as amended in 2017). **Table 4** of this report sets out the relevant sections as listed in Appendix 6 of the EIA Regulations (2017), which describes the requirements for specialist reports. For ease of reference, **Table 4** provides cross-references to the report sections where these requirements have been addressed. It is important to note, that where something is not applicable to this HIA, this has been indicated in the table below.

Table 4 - Reporting requirements as per NEMA, as amended, Appendix 6 for specialist reports.

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report	Comment where not applicable.
1.(1) (a) (i) Details of the specialist who prepared the report	Page 2 of Report – Contact details and company	-
(ii) The expertise of that person to compile a specialist report including a curriculum vita	Section 1 – refer to **Appendix C**	-
(b) A declaration that the person is independent in a form as may be specified by the competent authority	Page ii of the report	-
(c) An indication of the scope of, and the purpose for which, the report was prepared	Section 1 and 2	-
(cA) An indication of the quality and age of base data used for the specialist report	Section 3, 4 and 5	-

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report	Comment where not applicable.
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 6 and 7	-
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3 and 4	-
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 3 and Appendix A and B	-
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 4 and 5	-
(g) An identification of any areas to be avoided, including buffers	Section 4, 7 and 8	-
(h) A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 2 and 4	
(i) A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1	-
(j) A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 7 and 8	
(k) Any mitigation measures for inclusion in the EMPr	Section 4, 6 and 7	
(l) Any conditions for inclusion in the environmental authorisation		Non required
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 4, 5 and 7	
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and	Section 8	
(n)(iA) A reasoned opinion regarding the acceptability of the proposed activity or activities; and		
(n)(ii) If the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Section 8	-
(o) A description of any consultation process that was undertaken during the course of carrying out the study		Not applicable. A public consultation process was handled as part of the BA process.
(p) A summary and copies if any comments that were received during any consultation process		Not applicable.
(q) Any other information requested by the competent authority.		Not applicable.
(2) Where a government notice by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	NEMA Appendix 6 and GN648 SAHRA guidelines on HIAs, PIAs and AIAs	

2 PROJECT DESCRIPTION

2.1 Site Location

The alignment traverses various farm portions and properties as indicated in **Table 5**.

Table 5 - Site Information

No	Farm Name	Parcel No	Portion	Latitude	Longitude	SG 21 Digit Code
1	Rietvalei 241 IQ	241		26°10'11.43S	27°44'21.99E	T0IQ000000000241 00000
2	Rietvalei 241 IQ	241	0	26°10'29.89S	27°43'49.95E	T0IQ000000000241 00000
3	Rietvalei 241 IQ	241	52	26°8'56.64S	27°44'52.28E	T0IQ000000000241 00052
4	Rietvalei 241 IQ	241	53	26°9'9.95S	27°45'11.39E	T0IQ000000000241 00053
5	Rietvalei 241 IQ	241	70	26°10'12.14S	27°44'44.57E	T0IQ000000000241 00070

2.2 Site Description

On the southern side of Randfontein road and above the R41, the proposed site is surrounded by mine dumps to the west and residential settlements to the east (Azaadville Gardens). There is evidence for sand mining on the southern section of the site and extensive dumping occurring in the central region of the site parallel to the residential settlement. To the north of Randfontein Road, the area is relatively open with only minor dumping occurring in small areas.

2.3 Project Description

Eskom Holdings SOC Ltd, (hereafter Eskom) intends to construct a 4km 400kV deviation route from the existing and authorised Hera - Westgate 400kV transmission powerline. The proposed deviation line is located across Ward 3 and 6 of Mogale City and Ward 8 of Rand West City Local Municipality. The proposed deviation line will affect the Remainder of Portions 0, 52 , 53, 70 of the Farm Rietvalei 241 IQ and Erf 210,213 and 214 Azaadville Gardens. Land negotiations and acquisition of affected property for this deviation are currently underway. The deviation line starts at the existing Westgate substation with approximate starting point coordinates of 26°08'58.43"S; 27°45'17.40"E and turns to the South Westerly direction for 4km to end coordinates of 26°11' 05.37"S; 27°44'08.58"E. The locality map showing the location of the section where the amendment is proposed is presented in **Figure 4**.

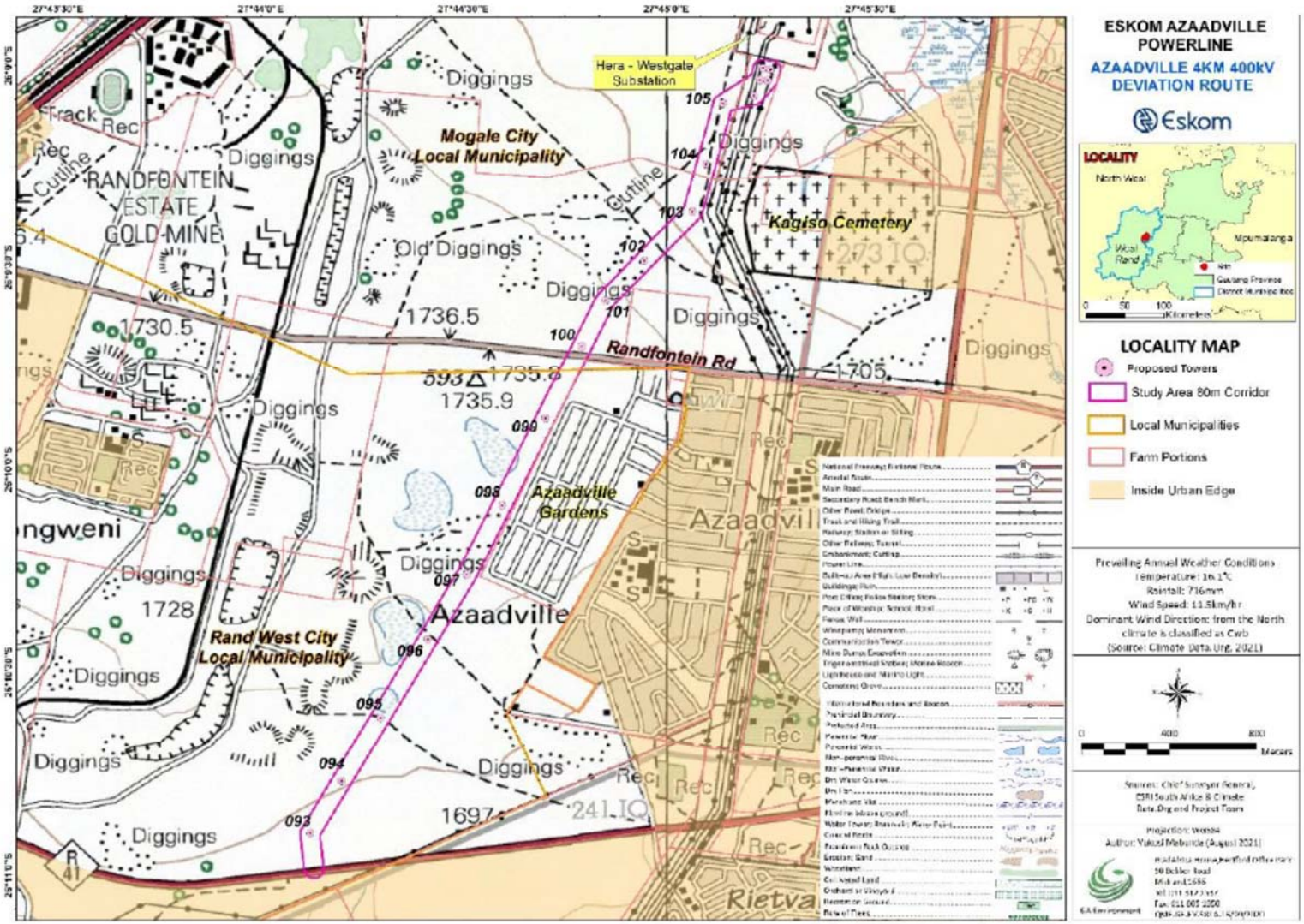

Figure 4 - Locality plan depicting the study area within its surroundings.

3 METHODOLOGY

3.1 Methodology for Assessing Heritage Site Significance

The HIA process consisted of three steps:

Step I – Desktop Study: An archaeological and historical background study was undertaken using available sources. Previous archaeological and heritage studies from the study area and surroundings were also accessed using the South African Heritage Resources Information System (SAHRIS) of SAHRA. Furthermore, an assessment was made of the early editions of the relevant topographic maps.

Step II – Physical Survey: The fieldwork undertaken for this study was undertaken by PGS. The current fieldwork comprised of an intensive field survey of the study area undertaken primarily by foot and vehicle over the course of two days by an experienced fieldwork team from PGS consisting of archaeologists (Nicholas Fletcher and Wynand van Zyl). The fieldwork was undertaken on 1 October 2021.

Step III – The final step involved the recording and documentation of relevant heritage resources, report writing as well as mapping and recommendations.

The significance of heritage sites was based on five main criteria (refer to **Appendix A**):

site integrity (i.e., primary vs. secondary context),
amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),

- Density of scatter (dispersed scatter)
- Low - <10/50m²
- Medium - 10-50/50m²
- High - >50/50m²
- uniqueness and
- the potential to answer present research questions.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows:

A - No further action necessary;
B - Mapping of the site and controlled sampling required;
C - No-go or relocate development position
D - Preserve site, or extensive data collection and mapping of the site; and
E - Preserve site

4 CURRENT STATUS QUO

The alignment footprint traverses a flat grass land that has been transformed by human activity. The surface bares the evidence of small-scale sand mining (**Figure 5** and **Figure 6**) and dumping of building rubble and household refuse (**Figure 9**). Towards to west of the footprint area overburden from open cats mining is evident (**Figure 5**).

Figure 5 - Soil stripping and dumping

Figure 6 - Remains of small-scale sand mining

Figure 7 - View towards Azaadville Gardens

Figure 8 - Survey beacon

Figure 9 - Rubble dumping

5 DESKTOP STUDY FINDINGS

5.1 Archaeological and Historical Overview of the Study Area and Surroundings

Date	Description
The Study Area and Surroundings during the Stone Age	
The South African Stone Age is the longest archaeologically-identified phase identified in human history and lasted for millions of years.	
2.5 million to 250 000 years ago	The Earlier Stone Age is the first and oldest phase identified in Southern Africa's archaeological history and comprises two technological phases. The earliest of these technological phases is known as Oldowan which is associated with crude flakes and hammer stones and dates to approximately 2 million years ago. The second technological phase in the Earlier Stone Age of Southern Africa is known as the Acheulian and comprises more refined and better made stone artefacts such as the cleaver and bifacial handaxe. The Acheulian phase dates back to approximately 1.5 million years ago. One such site is the Sterkfontein Caves which are located just 15km north of the study area. The Sterkfontein caves have also provides us with a wealth of knowledge on our previous Australopithecus and hominid ancestors through discoveries such as Mrs Ples and Little Foot (www.Maropeng.co.za)
250 000 to 40 000 years ago	The Middle Stone Age (MSA) dates to between 250 000 to 40 000 years BP. MSA dates of around 250 000 BP originate from sites such as Leopards Kopje in Zambia, while the late Pleistocene (125 000 BP) yields a number of important dated sites associated with modern humans (Deacon & Deacon, 1999). The MSA is characterised by flake and blade industries, the first use of grindstones, wood and bone artefacts, personal ornaments, use of red ochre, circular hearths and a hunting and gathering lifestyle.
40 000 years ago, to the historic past	The Later Stone Age is the third phase identified in South Africa's archaeological history. It is associated with an abundance of very small stone artefacts known as microliths. In Southern Africa, the Later Stone Age is characterised by the appearance of rock art in the form of paintings and engravings. The Magaliesberg Mountains located a 25km north of the study area is well known for its Stone Age history, and especially so the Later Stone Age (Carruthers, 2000). A number of researchers have undertaken excavations of these sites, including Professor Revil mason, Mr Robbie Steel and Dr Lyn Wadley. The Later Stone Age sites from this area include open sites such as Xanadu as well as rock shelter and cave sites such as Kruger Cave and Jubilee Shelter (Bergh, 1999). Additionally, Later Stone Age lithics were identified in the general surroundings of the study area during an archaeological survey undertaken by Van der Walt (2009).
The Study Area and Surroundings during the Iron Age – Early Farming Communities	
The arrival of early farming communities (EFC) during the first millennium, heralded in the start of the Iron Age for South Africa. The Iron Age is that period in South Africa's archaeological history associated with pre-colonial farming communities who practiced cultivation and pastoralist farming activities, metal working, cultural customs such as lobola and whose settlement layouts show the tangible representation of the significance of cattle (known as the Central Cattle Pattern) (Huffman, 2007).	

Date	Description
AD150-AD750	Early Iron Age ceramic facies can be identified within the vicinity of the study area. Firstly, the Bambata ceramic facies was identified at the site known as Jubilee shelter in the Magaliesberg which dates to between AD150 - AD750 and is associated with the Kalundu tradition though no settlements were ever found relating to this facies within the region (Wadley 1996). Secondly the Mzonjani ceramic facies associated with the Urewe tradition which can be found at the site known as Broederstroom which is a settlement located in the Magalies Valley which dates to between AD450 – AD750 and is situated approximately 40km north north east of the study area (Huffman 2007, Manson 1981, Wadley 1996).
AD1000-AD1300	The Middle Iron Age in the surrounding area is represented by the Eiland ceramic facies which dates to between AD 1000 – AD 1300 and is associated with the Kalundu tradition (Evers 1988, Huffman 2007). Eiland ceramics can also be found on the settlements of communities in the Limpopo valley that produce Mapungubwe facies ceramics. This hints to regional trade occurring across the Soutpansberg mountain range at sites like Mapungubwe and Mutamba (Antonites 2012, Calabrese 2007: 24). Hall (1981) has also identified the Eiland facies at Rooikrans in the Boschoffsberg valley and at Rhenosterkloof 3 in the Sand River Valley. While a variation of the Eiland facies can also be found in southeastern Botswana and is known as the Broadhurst facies (Denbow 1981, Biemond 2017)
AD1550-AD1580	The Ndebele an off shoot of the main Nguni-speaking peoples began their migrations to the Transvaal region. The main group of Transvaal Ndebele traces its ancestry to King Mhlanga who settled at Emhlangeni or Mohlakeng in Sotho which is now a suburb of Randfontein (van de Walt 2015). After the passing of Mhlanga, Musi Mhlanga's son assumed the position of king amongst the amaNdebele and soon after moved the amaNdebele north east to what is today know as Pretoria (www.Britanica.com).
AD 1600 AD 1750	The origins of the Bakwena ba Mogôpa can be traced back to a place named Rathatheng, near the junction of the Marico and Crocodile (Odi or Oori) Rivers, where the Bakwena ba Mogôpa were known to have settled as early as AD 1600. During the mid-seventeenth century, the Bakwena ba Mogôpa moved from Rathateng to Lokwadi (Zandrivierspoort) near the foot of the Phalane Mountains. During the first half of the eighteenth century, the Bakwena ba Mogôpa moved to the Mabjanamatswane Hills, north-east of modern-day Brits. the sphere of influence of the Bakwena ba Mogôpa during this time stretched from the Crocodile River in the west to the Apies River in the east, and from the Pienaars River in the north to the Hennops River in the south (Breutz, 1953) (Mogapi, 1996).
AD 1700	The Bapo ba Mogale, an early Nguni migrant group, resided along the banks of the Crocodile (Odi or Oori) river during this time (Breutz, 1953). Their settlements along the banks of this river would likely have been in the general surroundings of the present study area, albeit more likely along the western bank of the river than the eastern bank. Within a few years, the Bapo ba Mogale moved in a western direction to the area known as Makolokwe (either the present-day farm Wolwekraal or the present-day farm Kareepoort) (Breutz, 1953).

Date	Description
AD 1750 – Early 1800s	During the middle of the eighteenth century, the Bakwena ba Mogôpa moved from the Mabjanamatswane Hills in an eastern direction to settle at Mangwatladi (or Lengwatladi) east of the Apies River. They stayed here for a number of years moving back to the Mabjanamatswane Hills. Bakwena ba Mogôpa later settled in this same area at Mamogaleskraal (Gwate) at the foot of a hill named Thaba ya Morena (Breutz, 1953) (Mogapi, 1996).
AD 1817 - 1823	A Pedi force under Maleleku invaded the areas surrounding the Magaliesberg Mountains. After an unsuccessful attack against the Bakwena ba Mogôpa near the Apies River, the Pedi attacked the Bapo Mogale in the vicinity of Wolhuterskop. Although they were defeated as well, the Pedi managed to retire from the battle with a large number of captured cattle as well as women and children who were enslaved during the battle. The heir to the Bapo throne, Mohale Mohale, was a child at the time and although he was also almost captured in the battle, he was hidden in a kloof and managed to escape discovery. The name of the Magaliesberg Mountains is derived from Mohale Mohale's name (Breutz, 1953) (Carruthers, 2000).
AD 1827 - 1832	The Khumalo Ndebele (Matabele) of Mzilikazi moved north from their settlements along the Vaal River into the surroundings of the study area and started attacking the communities who were residing here (Bergh, 1999). They crossed over the Magaliesberg Mountain at present-day Commandonek, and according to Carruthers (2000) first attacked the Bakwena ba Mogôpa settlement located near present-day Zilkaatsnek. Although the Kwena defended themselves against the Matabele onslaught over the course of three separate battles, they were defeated in the end. Their surrender to Mzilikazi came at a very high cost, with their chief More and his son Segwati both executed and all the Kwena cattle confiscated. Additionally, the Kwena men were forced to join the ranks of the Matabele army, and those who refused were "…*impaled on stakes or had their ears and eyes removed*." (Carruthers, 2000:240). Mzilikazi then attacked the Bopo at Wolhuterskop, and dispersed them (Breutz, 1953). After the defeat of these and other groups living along the Magaliesberg Mountains, Mzilikazi and his Khumalo Ndebele settled themselves along the northern foot hills of the mountains between 1827 and 1832. He had three royal residences built along the mountain range, their localities providing an estimate of the area controlled and settled by the Matabele during these five years. The three Matabele royal residences were built at Kungwini (at the foot of the Wonderboom Mountain), Hlahlandlela (near present-day Rustenburg) and Dinaneni (near present-day Zilkaatsnek).
The Study Area and Surroundings during the Historical Period	
The Historical Period within the study area and surroundings commenced with the arrival of newcomers to this area. The first arrivals would almost certainly have been travellers, traders, missionaries, hunters and fortune seekers. However, with time, this initial trickle was replaced by a mass flood of white immigrants during the 1830s, when a mass migration of roughly 2 540 Afrikaner families (comprising approximately 12 000 individuals) from the frontier zone of the Cape Colony to the interior of Southern Africa took place. The people who took part in this Great Trek were later to be known as Voortrekkers (Visagie, 2011).	

Date	Description
As the Historical Period carried on, the general surroundings of the study area underwent significant changes and development during the twentieth century, including extensive development in the form of gold and uranium mining, railway and transportation development as well as the establishment of nearby towns such as Krugersdorp	
1836	The first Voortrekker parties started crossing over the Vaal River (Bergh, 1999).
AD1840s - 1850s	Increasing numbers of Voortrekkers started establishing themselves permanently in the general vicinity of the study area during this time (De Beer, 1975). During this period the first contacts between these new arrivals and the black people residing in this wider area took place. According to Bergh (2005), in particular with regards to the Rustenburg District located 70km north west of the study area, these early contacts resulted in the setting aside of land by the Voortrekker leadership for some of the black groups such as the Bafokeng. Mbenga (1997) also indicates that the relationship between the Voortrekkers and the Bakgatla were initially similarly amicable. However, within a short period the relationship between the Voortrekkers and the black groups living in these areas became increasingly strained. For example, Bergh (2005) states that the Bafokeng were eventually dispossessed of their farms. The system of unpaid labour enforced by the Voortrekkers on the local black groups would certainly have deteriorated the relationship further. See for example Morton (1992). The permanent settlement of white farmers in the area, resulted in the proclamation of individual farms and the establishment of permanent farmsteads.
AD 1886	The city of Johannesburg was formally established in 1886 with the discovery of gold and the Witwatersrand reef on the farm Langlaagte. The Randfontein Estates Gold Minning Company (Witwatersrand) Limited was established by J. B. Robinson shortly after the Witwatersrand gold rush which started in 1886. Robinson had acquired his wealth on the Kimberly diamond fields and was later appointed mayor of Kimberly. Robinson laid claim to two areas which later became known as Langlaagte and Crown mines. Laanglaagte had proven to be a success producing 10 ounces per ton and later 5 ounces per ton. The success at Langlaagte lead to Robison precuring more farms in the area around Randfontein. Other prospectors such as Rhodes and Hans Sauer had turned down the Randfontein area as there was an absence of 'red bar' which is found in the Witwatersrand sandstone formations and was thought to be indicative of the main reef. Though there are other reefs at greater depths such as the black reef and conglomerate reef which they were unaware of. (Randfontein Gold Mining Company Limited 1989) In November 1886 Robinson started buying property for future mining ventures and within a week he had purchased a quarter of the farm Uitvalfontein, a sixth of the farm Randfontein and sections of Middelvlei, Gemsbokfontein, Anvlakte, Droogeheuwel and Rietfontein. Later Robison acquired the remainder of farms Randfontein and Uitvalfontein before buying Waterval. The land acquired by Robinson amounted to 12000 ha and contained approximately 11km km of reef outcrop (Randfontein Gold Minning Company Limited 1989).
AD 1889-1898	The Randfontein Estates Gold Mining Company, Witwatersrand Limited was only officially registered on march 7th 1889, with Hermann Eckstein as the chairman and Maurice Marcus as Managing director. Later in 1889 James Brooks was appointed as managing director in place of Maurice Marcus. In 1891 James Brooks opened up Leader Reef. This reef was extremely rich and was later known as the Randfontein

Date	Description
	Leader. In 1898 a second reef was identified to the west of Randfontein. The reef was traced by all the existing subsidiaries into ground which had not yet been claimed. (Randfontein Gold Mining Company Limited 1989)
AD1899 - AD1902	On 11 October 1899 war broke out between Britain and the two Boer republics of the Orange Free State and Transvaal (Zuid-Afrikaansche Republiek). The Magaliesberg Mountains had strategic significance to both sides because of its closeness to Pretoria (and Krugersdorp) as well as the fact that the main access routes between Pretoria and the western part of the old Zuid-Afrikaansche Republiek (including the town of Rustenburg) passed through its valleys. As a result, a number of skirmishes and battles took place in the wider surroundings As part of the so-called 'scorched earth' policy initiated by Lord Kitchener, many Boer farmhouses were destroyed. This would certainly also have been true for the surroundings of the study area as well. Another aspect characteristic of the 'scorched earth' policy was the system of concentration camps (also referred to as refugee camps) in which Boer as well as Black women and children were held. The closest of any of these camps to the present study area, was the one at Krugersdorp and which was in existence from 1901 to March 1902. (www.angloboerwar.com). Many of the mines on the rand closed and their staff returned home. Then in November 1901 Pope Yeatman the general manager of the Randfontein Estates Gold Mining Company returned to South Africa to oversee the reopening of the mines and the installation of the new machinery which had come from Europe and the United States. (Randfontein Gold Mining Company Limited 1989) The Anglo-Boer War came to an end with the signing of the Peace Treaty of Vereeniging in May 1902. (www.angloboerwar.com)
AD 1903-1905	The Krugersdorp Municipality was established in 1903 of which Randfontein was included and remained so until 1929 when it became an independent Authority. In 1905 the first school was erected in Randfontein by the Transvaal administration as well as the first two churches one by the Anglican community the other by the Methodists. (Randfontein Gold Mining Company Limited 1989)
AD 1906 – 1910	The railway line between Pretoria North and Rustenburg was constructed during this time (Bergh, 1999).
AD 1914-1939	in 1914, the first world war broke out this led to the mobilization of south African forces to invade German West Africa. Hostilities ceased in 1918 with approximately 700 soldiers from Randfontein seeing active service. 25 years later in 1939 the second world war broke out. This led to the cutting of ties with Germany and mobilisation of a voluntary brigade by Jan Smuts from regiments such as the Transvaal Scottish of which many men resided in Randfontein. (Randfontein Gold Mining Company Limited 1989)
AD1950-1967	In 1950 Dr Nico Diederichs was elected as Randfontein's town representative in parliament. Later becoming state president. During this period tests were carried out in Randfontein showing that the bird reef contained uranium. This led to Randfontein estates Appling for a permit to become a uranium producer, which was Granted in 1952. Randfontein Estates' work force had diminished significantly from 27 000 men in the 1935 to 1600 men in 1967 with only one headgear in operation. Randfontein 247 IQ was subdivided and later included in the expansion of the West Porges Township in 1967. (Randfontein Gold Mining Company Limited 1989)

5.2 Archival and Historical Maps

An assessment of available archival and historical maps was undertaken as a way to establish a historic layering for the study area. These historic maps are also valuable resources in identifying possible heritage sites and features located within the study area. Topographic maps (1:50 000) for various years (1943 and 1980) were assessed to observe the development of the area, as well as the location of possible historical structures and burial grounds. The maps were also used to assess the possible age of structures located, to determine whether they could be considered as heritage sites. Map overlays were created showing the possible heritage sites identified within the areas of concern, as can be seen below.

The relevant topographical maps include:

- First Edition 2627BA Randfontein Topographic Sheet, surveyed and drawn by the Trigonometrical Survey Office in 1944.
- Second Edition2627BA Randfontein Topographic Sheet published by the Chief Director of Surveys and Mapping. Printed by the Government Printer in 1979.

5.2.1 *First Edition Topographical map 2627BA Randfontein*

The figures below depict a section of First Edition 2627BA Randfontein Topographic Sheet, surveyed and drawn by the Trigonometrical Survey Office in 1943 (**Figure 10**).

From the map, the project area and surrounding area was used as part of mining and agricultural activities. No heritage features are located within the project area.

5.2.2 *Second Edition Topographical map 2627BA Randfontein*

The figures below depict a section of the Second Edition 2627BA Randfontein Topographic Sheet published by the Chief Director of Surveys and Mapping. Printed by the Government Printer in 1957 (**Figure 11**).

From the map, the project area and surrounding area was used as part of mining and agricultural activities. It is evident that the study area had no know structures up to 1954.

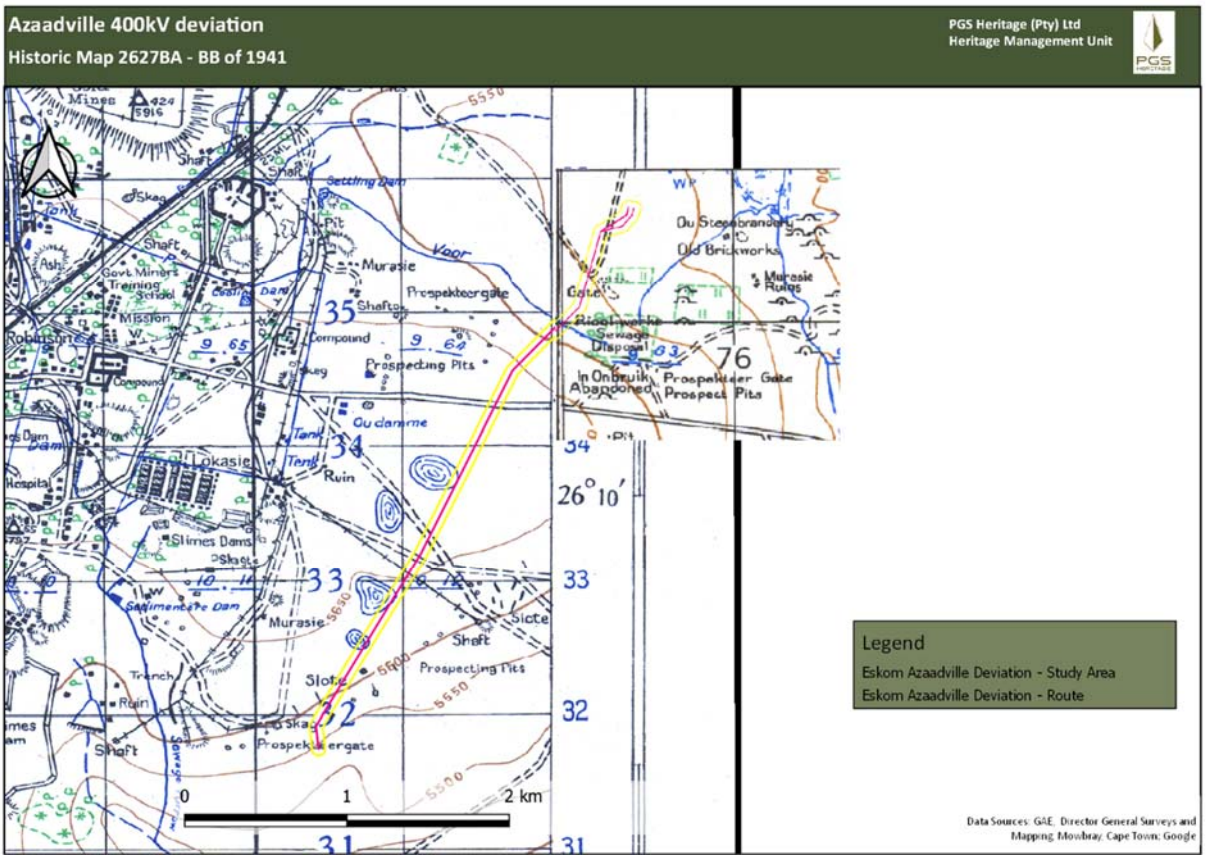

Figure 10 - Section of the First Edition 2627BA depicting the alignment on the map (yellow polygon).

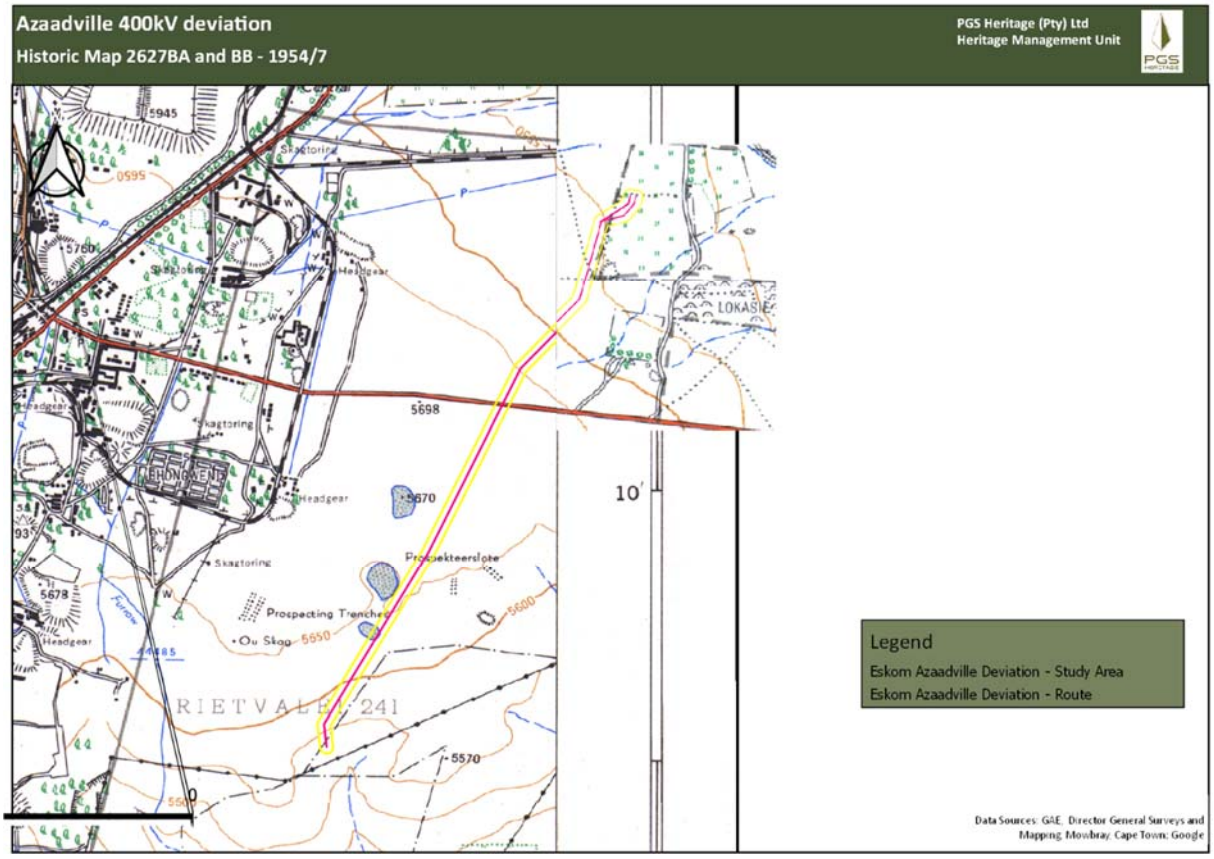

Figure 11 - Section of the Second Edition 2627BA depicting the alignment on the map (yellow polygon).

6 FIELDWORK FINDINGS

6.1 Introduction

The fieldwork undertaken for this study was undertaken by PGS. The current fieldwork comprised of an intensive field survey of the study area undertaken primarily by foot and vehicle over the course of one day by an experienced fieldwork team from PGS. The fieldwork was undertaken 1 October 2021

During the fieldwork, hand-held GPS devices were used to record tracklogs (**Figure 12**). These recorded track logs show the routes followed by the fieldwork team on site. The recorded tracklogs are also shown on maps depicted on the subsequent pages.

No heritage resources were identified during the fieldwork.

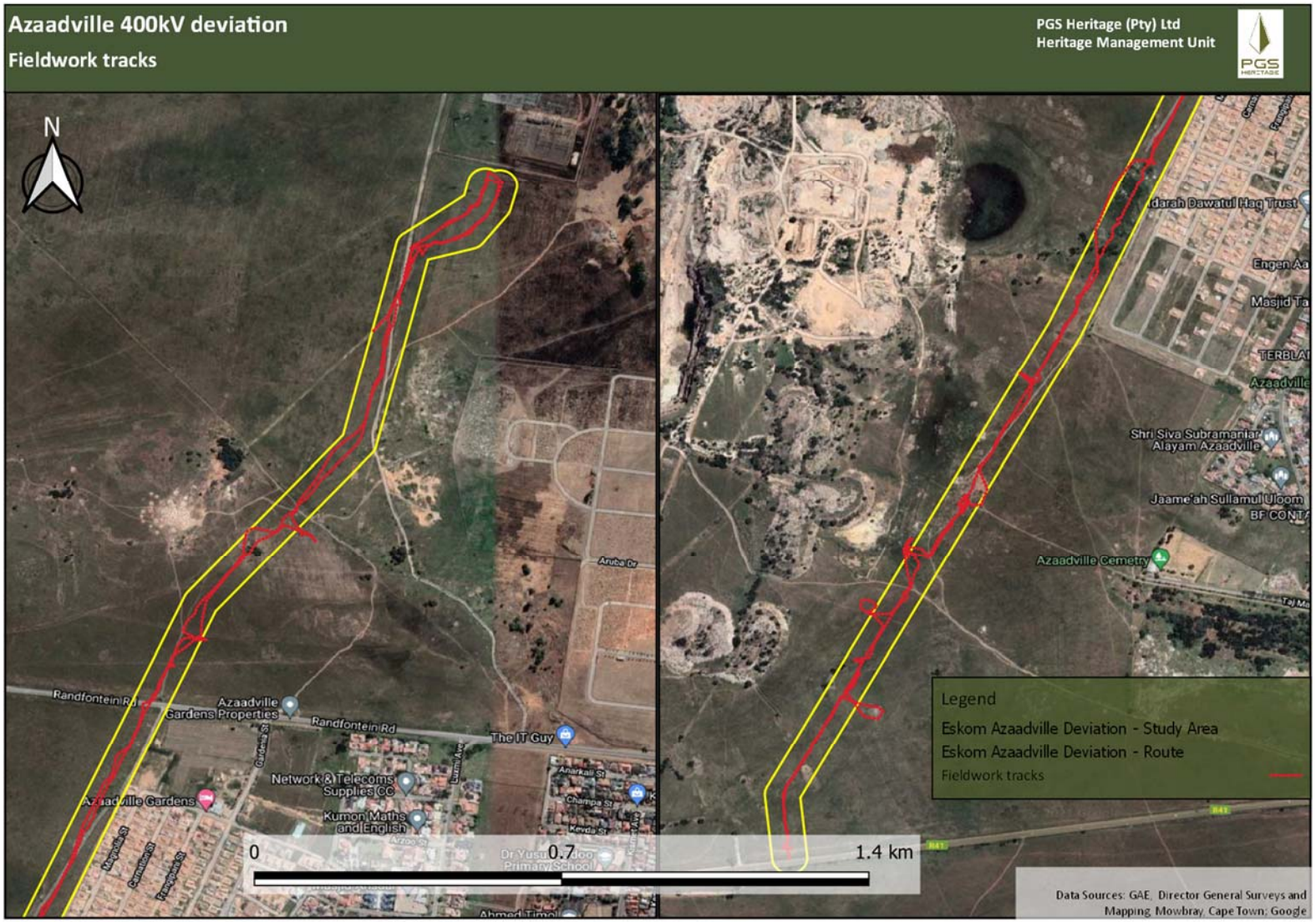

Figure 12 - Google Earth image depicting the study area in red with the recorded tracklogs in red

6.2 Palaeontology

Butler (2021) notes that the most northern portion of the proposed Azaadville powerline deviation is underlain by the Klipriviersberg Group (Ventersdorp Supergroup) while the largest middle portion is underlain by the Turffontein Subgroup (Central Rand Group, Witwatersrand Supergroup) and the most southern tip is underlain by the Johannesburg Subgroup (Central Rand Group, Witwatersrand Supergroup). According to the South African Heritage Resources Information System, the Palaeontological Sensitivity of the Klipriviersberg Group, Turffontein Group and Johannesburg Group is Low.

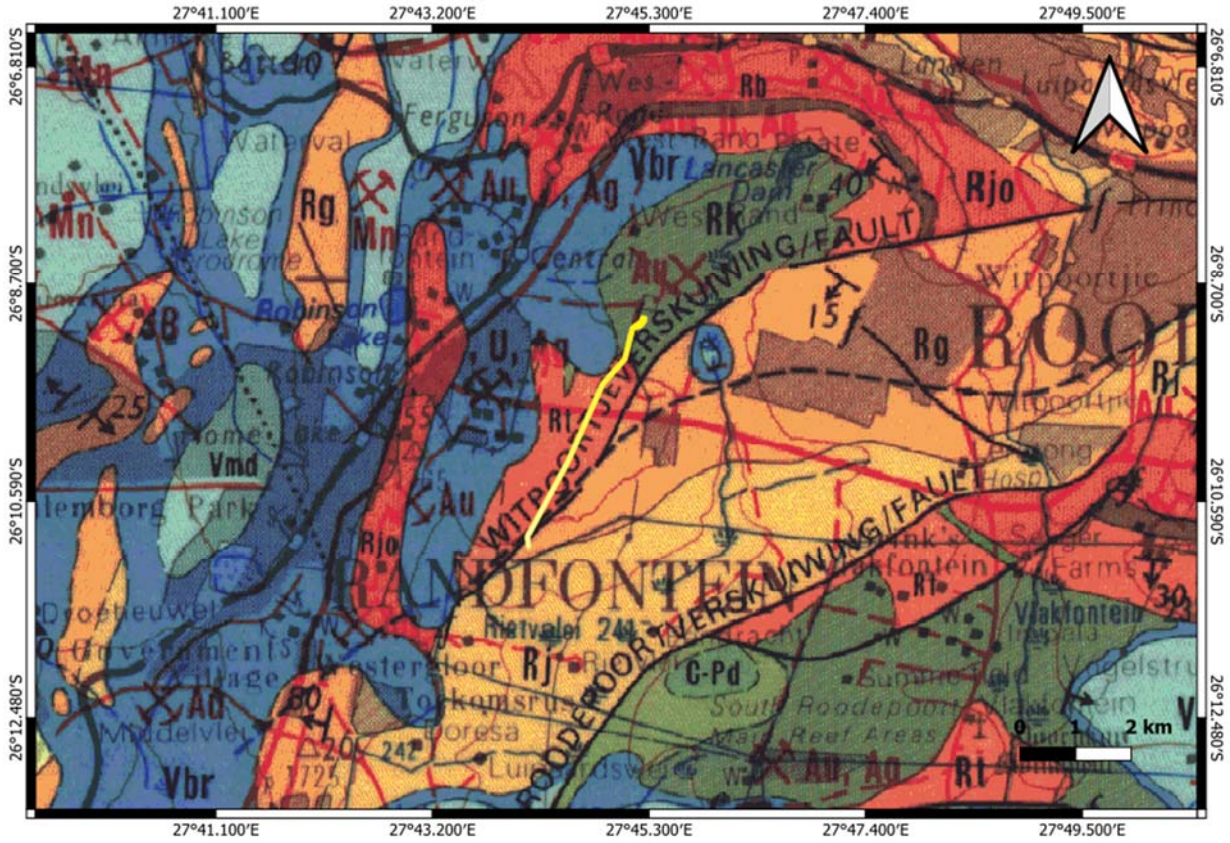

Figure 13: Extract of the 1:250 000 2626 Wes-Rand Geological Map (1986) (Council of Geoscience, Pretoria) indicating the surface geology of the proposed development.
Rk (Klipriviersberg Group, Ventersdorp Supergroup; Rt,(Turffontein Subgroup, Central Rand Group, Witwatersrand Supergroup) Rg, Government Subgroup, Wesrand Group, Witwatersramd Supergroup) Vmd, (Malmani Subgroup, Chuniespoort Group, Transvaal Supergroup) Vbr, Black Reef Formation Transvaal Supergroup) C-Pd, (Dwyka Group, Karoo Supergroup), Rjo Johannesburg Group Central Rand Group, Witwatersrand Supergroup

It is therefore considered that the proposed development is deemed appropriate and will not lead to detrimental impacts on the palaeontological resources of the area. The construction and operation of the powerline may be authorised as the whole extent as the development footprint is not considered sensitive in terms of palaeontological resources.

It is thus recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils.

7 IMPACT ASSESSMENT

7.1 Methodology for Impact Assessment

The main objective of this section is to provide independent and scientifically sound information on the impacts identified during the EIA phase. Based on the requirements of the impact assessment, impacts identified, and issues and concerns raised are assessed with regard to their significance. The impact assessment is aimed at determining the impacts associated with the proposed development and the prescription of mitigation measures. Other impacts associated with the proposed development are discussed in detail in this section. The significance of the potential impacts is described in terms of their *nature, extent, duration, intensity* and *probability*.

In this report, impacts with a low significance are considered to have no influence on the decision to proceed with the proposed development. Impacts with a moderate significance will influence the decision, unless they can be effectively mitigated to a low significance, whereas impacts with a high significance - despite mitigation - would influence the decision to proceed with the proposed development.

7.1.1 *Impact Mitigation Hierarchy*

The Impact Mitigation Hierarchy provides steps that must be used in mitigating adverse impacts of a project and in turn ensuring environmental protection. There are various levels of preference for mitigation options with the most preferred method and the first step as avoidance and the least and final method as offset. Refer to **31** for an illustration of the Mitigation Hierarchy.

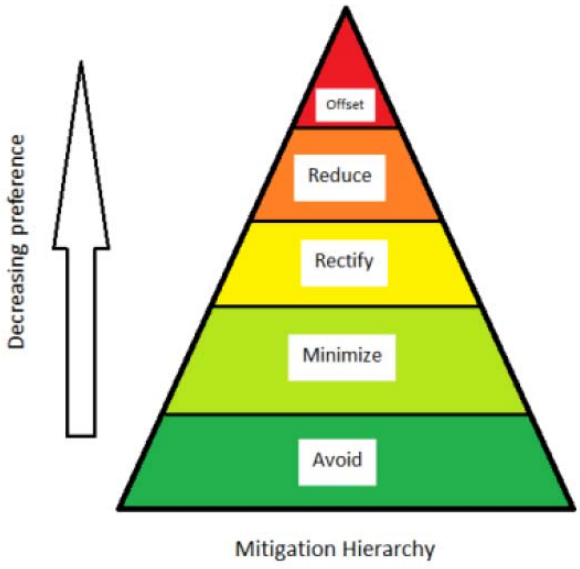

Figure 14: Mitigation hierarchy showing levels of preference (Eco Intelligent, 2016)

Each of the mitigation types will be discussed and contextualised to the proposed development.

Step 1: Avoidance- Although this is the most preferred form of mitigation on projects to avoid adverse environmental impacts as it will not result in the development.

Step 2: Minimisation- This entails the reduction of adverse environmental impacts through various means as it based on the recognition that environmental impacts cannot be fully avoided in the proposed activity. The Mitigation measures proposed are discussed in **Chapter 8** of this report as well as in the Environmental Management Programme attached as **Appendix H.**

Step 3: Rectification- Where an impact has already taken place, rectification entails the implementation of corrective measures to avoid further adverse environmental impacts. Rectification will apply in cases where Contractors or maintenance employees may have erroneously undertaken construction activities outside the development.

Step 4: Reduction- This is applicable where the above-mentioned rectification is not possible. Rectification requires new management practices and/or changes in methodology to ensure environmental protection.

Step 5: Environmental Offset- although this does not occur on the proposed development, it is meant to cater for the effects of the development through compensation of biodiversity losses by measures such as the establishment of new plants on another area outside the study area where it is not possible to avoid the clearance of vegetation or rehabilitate the disturbed areas.

7.2 Impact Assessment Methodology

In accordance with the NEMA EIA regulations (Government Notice R.982, promulgated in terms of Section 24 of the National Environmental Management Act, 1998 (Act 107 of 1998), as amended the Environmental Assessment Practitioner (EAP) is required to assess the significance of potential impacts in terms of the following criteria as outlined in Appendix 1:

- cumulative impacts;
- nature, significance and consequences of the impact and risk;
- extent and duration of the impact and risk;
- probability of the impact and risk occurring;
- the degree to which the impact and risk can be reversed;
- the degree to which the impact and risk may cause irreplaceable loss of resources; and
- the degree to which the impact and risk can be avoided, managed or mitigated.

Activities within the framework of the proposed development and their respective construction and operational phases, give rise to certain impacts. For the purpose of assessing these impacts, the project has been divided into three phases from which impacting activities can be identified, namely:

Construction phase:

This phase refers to all the pre-construction and construction related activities on site, until the Contractor leaves the site.

Operational phase:

This includes all post construction activities, including the operation and maintenance of the proposed development.

The assessment of the impacts will be conducted according to a synthesis of criteria required by the integrated environmental management procedure. The methodology that will be used comprises of the following four steps:

- Step 1: Identification of positive and negative impacts of the project;
- Step 2: Identification of the significance rating of the impact before mitigation;
- Step 3: Identification of the mitigation measure and the mitigation efficiency; and
- Step 4; Identification of the significance rating of the impact after mitigation;

Activities that will be undertaken to give effect to the proposed development gives rise to certain impacts. For the purpose of assessing these impacts, the project has been divided into the following phases discussed in **Table 24**.

Table 6 - Project phases in a development

PHASES OF A PROJECT IN WHICH IMPACTS WILL OCCUR
Status Quo
The study area as it currently exists.
Pre-construction phase
All activities on site up to the start of construction, not including the transport of materials, but including the initial site preparations. This also includes the impacts that would be associated with planning.
Construction phase
All the construction and construction-related activities on site, until the contractor leaves the site.
Operational phase
All activities after construction, including the operation and maintenance of the proposed development.
The activities arising from each of the relevant phases have been included in the impact assessment tables. The assessment endeavours to identify activities that would require environmental management actions to mitigate the impacts arising from them. The criteria against which the activities were assessed are given in the next section.

7.3 Assessment Criteria

The assessment of the impacts has been conducted according to a synthesis of criteria required by the guideline documents to the EIA regulations (2006) and integrated environmental management series published by the Department of Environmental Affairs and Tourism (DEAT) currently Department of Environment, Forestry and Fisheries (DEFF). In addition to this, it is a requirement of the National Environmental Management Act (NEMA) 2014 Regulations as amended, Appendices 1 and 2 that an Impact and Risk Assessment process be undertaken for the Basic Assessments and Environmental Impact Reporting. Acronyms have been used in some of the tables to abbreviate some aspects of the assessment criteria. The Assessment Criteria is based on the following:

- Nature of impact;
- Extent **(E);**
- Duration **(D)**;
- Intensity **(I);**
- Consequence **(C);** *this will be a combination of Extent **(E)**+Duration **(D)** + Intensity **(I)***

- Probability **(P)**;
- Determination of significance (with or without mitigation); *and is a combination of consequence **(C)**x Probability **(P);***
- Reversibility of impact; and
- Irreplaceable loss of resources will be *defined as loss of resource for the purposes of the Impact Assessment Tables*

Each of these are explained in **Table 25** below.

Table 7 - Assessment Criteria

ASSESSMENT CRITERIA	SCORING
Nature of Impact	
This is an appraisal of the type of effect the proposed activity would have on the affected environmental component. The description should include what is being affected, how and whether the impact is positive or negative	*Scoring does not apply, impact will either be positive or negative*
b) Extent (E)	
The physical and spatial size of the impact. This is classified as: *i) Site* *The impact could affect the whole, or a measurable portion of the site.* *ii) Local* *The impacted area extends only as far as the activity, e.g. a footprint of the specific activity* *iii) Regional* *The impact could affect areas such as neighbouring farms, transport corridors and the adjoining towns.* *iv) National* *The impact could have an effect on South Africa.*	*1* *2* *3* *4*
c) Duration (D)	
The lifetime of the impact; this is measured in the context of the lifetime of the proposed project. *i) Short term* *The impact will either disappear with mitigation or will be mitigated through natural processes (less than 1 year).* *ii) Medium term* *The impact will last up to the end of the phases, thereafter it will be entirely negated (1 to 10 years).* *iii) Long term* *The impact will continue or last for the entire operational life of the development but will be mitigated by direct human action or by natural processes thereafter.* *iv) Permanent*	*1* *2* *3* *4*

ASSESSMENT CRITERIA	SCORING
Nature of Impact	
Mitigation either by man or natural processes will not occur in such a way or in such a time span that the impact can be considered transient, thus beyond decommissioning.	
d) Intensity (I)	
Is the impact destructive or benign? Does it destroy the impacted environment, alter its functioning, or slightly alter it? These are rated as: *i) Low* *The impact alters the affected environment in such a way that the natural processes or functions are not affected.* *ii) Medium (Moderate)* *The affected environment is altered, but function and process continue, albeit in a modified way.* *iii) High* *Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases. This will be a relative evaluation within the context of all the activities and the other impacts within the framework of the project.*	*1* *2* *3*
Consequence of Impact (C)	
The anticipated consequence of the impact is determined using the following formula: *Consequence = Duration + Extent + Intensity* *Consequence is rated as:* *Negligible* *An acceptable impact on natural systems, patterns or processes.* *Low* *A small impact on natural systems, patterns or processes, where the environment continues to function but in a modified manner and for which mitigation is desirable but not essential* *Moderate* *A substantial alteration of natural systems, patterns or processes, where environmental functions and processes are altered such that they temporarily or permanently cease. Mitigation will be required.* *High* *A serious alteration of natural systems, patterns or processes. Impacts may result in the irreversible damage to irreplaceable aspects if mitigation measures are not implemented.* *Very High* *Very high impact on natural systems, patterns or processes, where environmental functions and processes are altered such that could permanently cease, even with mitigation.*	*3* *4-5* *6-8* *9-10* *11-12*

ASSESSMENT CRITERIA	SCORING
Nature of Impact	
Probability (P)	
This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time. The classes are rated as follows: *i) Improbable* *The possibility of the impact occurring is very low, due either to the circumstances, design or experience.* *ii) Probable* *There is a possibility that the impact will occur to the extent that provisions must be made.* *iii) Highly probable* *It is most likely that the impacts will occur at some or other stage of the development. Plans must be drawn up before the undertaking of the activity.* *iv) Definite* *The impact will take place regardless of any prevention plans, and mitigation actions or contingency plans are relied on to contain the effect.*	*1* *2* *3* *4*
h) Significance of impact with or without mitigation	

Score		*Significance = Consequence x Probability*					
Probability	*4*	*Definite*	*4*	*8*	*12*	*16*	*20*
	3	*Highly probable*	*3*	*6*	*9*	*12*	*15*
	2	*Probable*	*2*	*4*	*6*	*8*	*10*
	1	*Improbable*	*1*	*2*	*3*	*4*	*5*
			Negligible	*Low*	*Moderate*	*High*	*Very High*
			1	*2*	*3*	*4*	*5*
		Consequence					

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. To determine significance of the potential impact/risk, the consequence is multiplied by probability. *The classes are rated as follows:*	
i) No significance *The impact is not substantial and does not require any mitigation.* *Score 1-3*	*1-3*
ii) Low	*4-6*

ASSESSMENT CRITERIA	SCORING
Nature of Impact	
The impact is of little importance but may require limited mitigation. Score 4-6 *iii) Medium (Moderate)* *The impact is of importance and therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels. Score 8-10* *iv) High* *The impact is of great importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Score 12-16* *v) Fatal Flaw* *The impact presents a fatal flaw and the entire development option or entire project proposal is unacceptable. Score 20*	*8-10* *12-16* *20*
Reversibility of impact (R)	
The extent to which the impacts are reversible *(i) Yes* *The impact is reversible within two years after construction.* *(ii) No* *The impact is reversible within 2 to 10 years after construction.*	
g) The degree to which the impact can cause irreplaceable loss of resources	
(i) Low *The impact results in the loss of resources but the natural, cultural and social processes/functions are not affected.* *(ii) Medium* *The loss of resources occurs but natural cultural and social processes continue, albeit in a modified manner.* *(iii) High* *The impact results in irreplaceable loss of resource.*	

7.4 Statement of Heritage significance

No heritage resources were identified during the field work or as part of the palaeontological desktop assessment. Subsurface remains can however be uncovered during construction.

7.5 Heritage Impacts

The assessed impact as indicated in **Table 8** is seen as negligible.

Table 8 – Impact assessment table – Impact on heritage resources

Impact	Extent	Duration	Intensity	Consequence	Probability	Significance
Impact on heritage resources	Site	Short-term	Low		Improbable	Negligible
	1	1	1	3	1	3.00

7.6 Management recommendations and guidelines

7.7 Construction phase[1]

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

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

7.8 Chance finds procedure

- An appropriately qualified heritage practitioner/archaeologist must be identified to be called upon in the event that any possible heritage resources or artefacts are identified.
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities halted.
- The qualified heritage practitioner/archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and the impact on the heritage resource.
- The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the materials and data are recovered.
- Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner/archaeologist.

[1] *Construction in this case refers to bush clearing, trenching, and planting of orchards*

7.9 Possible finds during construction and operation (mining activities)

The study area occurs within a greater archaeological site as identified during the desktop and fieldwork phase. Bush clearance and trenching could uncover the following:

- High density concentrations of Iron Age artefact such as pottery
- Human remains
- Stone walling

7.10 Timeframes

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for collection or excavation of heritage resources and lead times must be worked into the construction time frames. **Table 9** gives guidelines for lead times on permitting.

Table 9 - Lead times for permitting and mobilisation

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

7.11 Heritage Management Plan for EMPr implementation

Table 10 - Heritage Management Plan for EMPr implementation

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target
General project area	• Implement a chance to find procedures in case possible heritage finds are uncovered.	Construction and operation	During construction and operation	Applicant Heritage Specialist	During bush clearing	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34-36 and 38 of NHRA

8 CONCLUSIONS AND RECOMMENDATIONS

PGS was appointed by GA Environmental (Pty) Ltd to undertake a HIA for the proposed Eskom Azaadville 4km 400kv Deviation Power Line, Eskom Westrand Strengthening Phase I, Mogale City and Randwest City Local Municipality, Gauteng Province

An archaeological and historical desktop study was undertaken to provide a historical framework for the project area and surrounding landscape (refer to Chapter 5). This was augmented by an assessment of previous archaeological and heritage studies completed for the surrounding landscape. Furthermore, an assessment was made of the early editions of the relevant topographic maps.

During the fieldwork the conducted by two archaeologist no heritage resources were identified within the assessment ares.

8.1 Palaeontology

The palaeontology of the site was found to be in most northern portion of the proposed Azaadville powerline deviation is underlain by the Klipriviersberg Group (Ventersdorp Supergroup) while the largest middle portion is underlain by the Turffontein Subgroup (Central Rand Group, Witwatersrand Supergroup) and the most southern tip is underlain by the Johannesburg Subgroup (Central Rand Group, Witwatersrand Supergroup). According to the South African Heritage Resources Information System, the Palaeontological Sensitivity of the Klipriviersberg Group, Turffontein Group and Johannesburg Group is Low

8.2 Recommendations

The following mitigation measures are listed in **Table 11** below.

Table 11 - Heritage management recommendations.

Area and site no.	Mitigation measures
General project area	• Implement a chance to find procedures in case possible heritage finds are uncovered.
Palaeontology	• No further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils

8.3 Conclusions

During the heritage walk through survey, no heritage resources were identifeid. The overall impact of the proposed project, on the heritage resources identified during this report, is seen as negligible after

the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised.

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Historical Topographic Maps

All the historic topographical maps used in this report were obtained from the Directorate: National Geo-spatial Information of the Department of Rural Development and Land Reform in Cape Town.

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https://www.maropeng.co.za/news/entry/fossil sites in the cradle of humankind Sterkfontein caves

Google Earth

At least some of the aerial depictions of the study area were obtained using Google Earth.

Appendix A

Heritage Assessment Methodology

The applicable maps, tables and figures, are included as stipulated in the NHRA (no 25 of 1999), the NEMA (no 107 of 1998). The HIA process consisted of three steps:

Step I – Literature Review: The background information to the field survey relies greatly on the Heritage Background Research.

Step II – Physical Survey: A physical survey was conducted by vehicle through the proposed project area by a qualified heritage specialist. The survey was conducted over one day (21 August 2019), aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.

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

The significance of heritage sites was based on four main criteria:

- Site integrity (i.e., primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter)
    - Low - <10/50m2
    - Medium - 10-50/50m2
    - High - >50/50m2
- Uniqueness; and
- Potential to answer present research questions.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows:

A - No further action necessary;
B - Mapping of the site and controlled sampling required;
C - No-go or relocate development activity position;
D - Preserve site, or extensive data collection and mapping of the site; and
E - Preserve site.

Impacts on these sites by the development will be evaluated as follows:

Site Significance

Site significance classification standards use is based on the heritage classification of s3 in the NHRA and developed for implementation keeping in mind the grading system approved by SAHRA for

archaeological impact assessments. The update classification and rating system as developed by Heritage Western Cape (2016) is implemented in this report

Site significance classification standards prescribed by the Heritage Western Cape Guideline (2016), were used for the purpose of this report (Error! Reference source not found. and Error! Reference source not found.**)**.

Table A 1: Rating system for archaeological resources

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Langebaanweg (West Coast Fossil Park), Cradle of Humankind	May be declared as a National Heritage Site managed by SAHRA. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Highest Significance
II	Heritage resources with special qualities which make them significant, but do not fulfil the criteria for Grade I status. Current examples: Blombos, Paternoster Midden.	May be declared as a Provincial Heritage Site managed by PHRA-NW. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Exceptionally High Significance
III	Heritage resources that contribute to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. Current examples: Varschedrift; Peers Cave; Brobartia Road Midden at Bettys Bay	Resource must be retained. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree.	Resource must be retained where possible where not possible it must be fully investigated and/or mitigated.	Medium Significance
IIIC	Such a resource is of contributing significance.	Resource must be satisfactorily studied before impact. If the recording already done (such as in an HIA or permit application) is not sufficient, further recording or even mitigation may be required.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant or the consultant and approved by the authority.	No research potential or other cultural significance

Table A 2: Rating system for built environment resources

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Robben Island	May be declared as a National Heritage Site managed by SAHRA.	Highest Significance
II	Heritage resources with special qualities which make them significant in the context of a province or region, but do not fulfil the criteria for Grade I status. Current examples: St George's Cathedral, Community House	May be declared as a Provincial Heritage Site managed by PHRA-NW	Exceptionally High Significance
II	Such a resource contributes to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. These are heritage resources which are significant in the context of an area.	This grading is applied to buildings and sites that have sufficient intrinsic significance to be regarded as local heritage resources; and are significant enough to warrant that any alteration, both internal and external, is regulated. Such buildings and sites may be representative, being excellent examples of their kind, or may be rare. In either case, they should receive maximum protection at local level.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree. These are heritage resources which are significant in the context of a townscape, neighbourhood, settlement or community.	Like Grade IIIA buildings and sites, such buildings and sites may be representative, being excellent examples of their kind, or may be rare, but less so than Grade IIIA examples. They would receive less stringent protection than Grade IIIA buildings and sites at local level.	Medium Significance
IIIC	Such a resource is of contributing significance to the environs. These are heritage resources which are significant in the context of a streetscape or direct neighbourhood.	This grading is applied to buildings and/or sites whose significance is contextual, i.e., in large part due to its contribution to the character or significance of the environs. These buildings and sites should, as a consequence, only be regulated if the significance of the environs is sufficient to warrant protective measures, regardless of whether the site falls within a Conservation or Heritage Area. Internal alterations should not necessarily be regulated.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant and approved by the authority. Section 34 can even be lifted by PHRA-NW for structures in this category if they are older than 60 years.	No research potential or other cultural significance

WOUTER FOURIE

Professional Heritage Specialist and Professional Archaeologist and Director PGS Heritage

Summary of Experience

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

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

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

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

Key Qualifications

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

BA - Archaeology, Geography and Anthropology - 1996

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

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

CRM Accreditation (ASAPA) -

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

Key Work Experience

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

2007 – 2008 - Project Manager – Matakoma-ARM, Heritage Contracts Unit, University of the Witwatersrand

2005-2007 - Director – Matakoma Heritage Consultants (Pty) Ltd

2000-2004 - CEO– Matakoma Consultants

1998-2000 - Environmental Coordinator – Randfontein Estates Limited. Randfontein, Gauteng
1997-1998 - Environmental Officer – Department of Minerals and Energy. Johannesburg, Gauteng

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