HERITAGE IMPACT ASSESSMENT FOR A 40MW PHOTOVOLTAIC PLANT ACROSS SITES 2B, 3B, 3C, 4B AND 5B ASSOCIATED WITH THE TUBATSE FERROCHROME PLANT, STEELPOORT, FETAKGOMO TUBATSE LOCAL MUNICIPALITY, LIMPOPO.

Heritage Impact Assessment

Template Number	Document Number	Revision	Date
PGS PJ REP 007 01	708HIA-001	2.0	29 February 2024

[redacted]

Offices in South Africa, Kingdom of Lesotho and Mozambique

Directors: HS Steyn, PD Birkholtz, W Fourie

REVISION HISTORY

Version	Issue Date	Description of Changes
00	16 October 2023	First draft
01	29 February 2024	Updated layouts of project

Declaration of Independence

- I, Daniel Tasker, declare that –
- General declaration:
- 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.

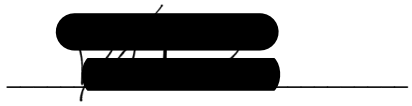
Disclosure of Vested Interest

- 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;

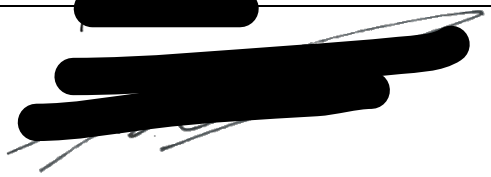
HERITAGE CONSULTANT: PGS Heritage (Pty) Ltd

CONTACT PERSON: Daniel Tasker – Junior Archaeologist

Tel: [redacted]

SIGNATURE: 

ACKNOWLEDGEMENT OF RECEIPT

Report Title	**SPECIALIST STUDY IN SUPPORT OF AN ENVIRONMENTAL IMPACT ASSESSMENT (EIA) FOR AN EXTENSION OF THE PHOTOVOLTAIC (PV) DEVELOPMENT AT SITE 2 ADJACENT TO THE SAMANCOR FERROCHROME SMELTER IN TUBATSE, LIMPOPO.**		
Control	**Name**	**Signature**	**Designation**
Author	D Tasker		PGS Heritage -Junior Archaeologist
Reviewer	W Fourie		PGS Heritage -Project Manager/Archaeologist
Reviewed	P Reddy		Client

CLIENT: **Royal HaskoningDHV (Pty) Ltd**

CONTACT PERSON: **Prashika Reddy**
Tel: [redacted]

SIGNATURE: _____

The Heritage Impact Assessment Report has been compiled considering the National Environmental Management Act (Act No. 107 of 1998) (NEMA): Appendix 6 of the Environmental Impact Assessment (EIA) Regulations of 2014 (as amended, 2017) requirements for specialist reports as indicated in the table below.

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	**Relevant section in report**
1.(1) (a) (i) Details of the specialist who prepared the report	Page ii of Report – Contact details and company
(ii) The expertise of that person to compile a specialist report including a curriculum vita	Section 1.2 – 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 1.1
(cA) An indication of the quality and age of base data used for the specialist report	N/A
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 5
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 4.4
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	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
(g) An identification of any areas to be avoided, including buffers	Section 4
(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 4.3
(i) A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.3
(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 4
(k) Any mitigation measures for inclusion in the EMPr	Section 6
(l) Any conditions for inclusion in the environmental authorization	Section 6
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorization	Section 6
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and	Section 6 and 7
(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 6
(o) A description of any consultation process that was undertaken during the course of carrying out the study	Informal consultation in fieldwork.
(p) A summary and copies if any comments that were received during any consultation process	Not applicable. To date no comments regarding heritage resources that require input from a specialist have been raised.
(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.	No protocols or minimum standards for HIAs or PIAs

EXECUTIVE SUMMARY

PGS Heritage (Pty) Ltd was appointed by Royal HaskoningDHV (Pty) Ltd to undertake a Heritage Impact Assessment (HIA) that forms part of the Environmental Impact Assessment (EIA) for 40MW photovoltaic plant across sites 2B, 3B, 3C, 4B and 5B associated with the Tubatse Ferrochrome plant, Steelpoort, Fetakgomo Tubatse Local Municipality, Limpopo.

The project's footprint is underlain by the Quaternary Alluvium and Magaliesberg Formations of the Pretoria Group (Transvaal Supergroup). Despite the vast majority of the study area being of low palaeontological sensitivity, a highly sensitive portion was identified (**Figure 26**) that, given SAHRIS' recommendations, required a Palaeontological Desktop Assessment (PDA). A subsequent PDA was then undertaken, in which a Moderate Palaeontological Significance was allocated for the construction phase of the development and a very low significance was given post-mitigation (see Butler 2023).

During the fieldwork a total of twelve heritage features and resources where identified (**Figure 25**). These consist of three potential burial grounds with approximately 5 graves (**TFC001**) 2 graves (**TFC004**) and 3 graves (**TFC005**), one locality with recent historic structures (**TFC002-1 – TFC002-8**) and one low significance archaeological site (**TFC003**).
Three additional sites previously identified in the 2021 survey (Fourie 2021) also fall within the current study area. **Site 2-1** is a gravesite with **Site2-2**, being a potential gravesite and **Site2-4** is another low significance archaeological site. See **Figure 24** and the individual site descriptions as contained in **Appendix B**. The field description forms were collected with ArcGIS Survey123 in field software.

Historical Structures
Eight poorly preserved historical structures of the same locality were observed within the study area. Six (**TFC002-1 – TFC002-4, TCF002-6** and **TFC002-8**) of the homesteads all followed the same construction process where mud and stones built the walls and foundations while, thin concrete covered the floors, walls and pillars. The final two (**TFC002-5 and TFC002-7**) homesteads, while part of the greater locality appear to be built in a different style. All homesteads have a high significance rating given their potential to contain infant burials.

Archaeological Site
The stone packed archaeological site of **TFC003** is rated as 3C (IIIC) given its degradation, while the previously identified **Site 2-4** was given the same rating and is detailed in the 2021 report (Fourie 2021).

Burial grounds and graves
Burial grounds have a high heritage rating and a heritage grading of IIIA. According to the SAHRA graves management policy a buffer of at least 30-meters must be kept around burial grounds and graves. The potential grave sites of **TFC001**, **TFC004** and **TFC005** still require further investigation but should be avoided

during construction. Recommendations for **Site 2-1** and **Site 2-2** were detailed in the previous 2021 report (Fourie 2021).

Palaeontology

According to the Palaeosensitivity Map available on the South African Heritage Resources Information System database (SAHRIS), the Palaeontological Sensitivity of the proposed development area is rated as Low (blue) (**Figure 26**). As such the required chance finds procedures are included in this report (Almond and Pether 2008, SAHRIS website). However, the miniscule portion of Site 2B's southern section is within the high palaeontological sensitivity (orange), as such, a subsequent PDA was completed (Butler 2023).

Mitigation measures

Mitigation measures are described in **Table 9** of this report.

Conclusion

It is the combined considered opinion of the heritage specialists that the proposed project will have a direct impact on several identified heritage resources rated being of low to high heritage significance.

With the implementation of recommended mitigation measures the overall impact on heritage resources will be reduced to acceptable levels during the activities of the project.

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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.

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 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

Early Stone Age

The archaeology of the Stone Age between 700 000 and 2 500 000 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.

Late Stone Age

The archaeology of the last 30 000 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 30 000-300 000 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.

Abbreviations	Description
AIA	Archaeological Impact Assessment
APHP	Association of Professional Heritage Practitioners
ASAPA	Association of South African Professional Archaeologists
BA	Basic Environmental Assessment
CRM	Cultural Resource Management
ECO	Environmental Control Officer
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GN	Government Notice
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
NCW	Not conservation worthy
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PHRA-G	Gauteng Provincial Heritage Resources Authority
PGS	PGS Heritage (Pty) Ltd
PHS	Provincial Heritage Site
PSSA	Palaeontological Society of South Africa
PV	Photovoltaic
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
TFC	Tubatse FerroChrome

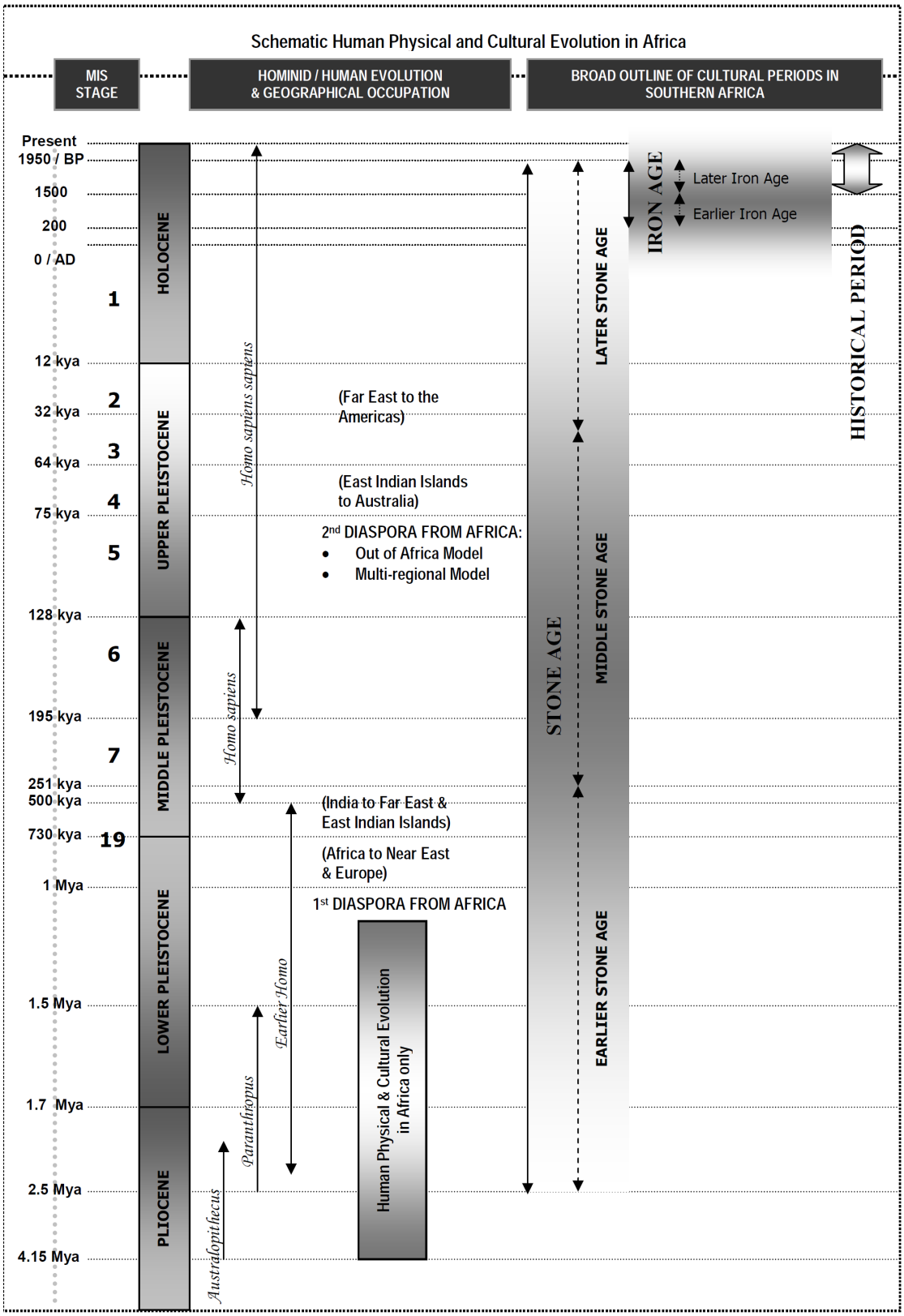

Figure 1 – Human and Cultural Timeline in Africa

1 INTRODUCTION

Royal HaskoningDHV (Pty) Ltd appointed PGS Heritage (Pty) Ltd (PGS) to undertake a Heritage Impact Assessment (HIA) that forms part of the Environmental Impact Assessment (EIA) for 40MW photovoltaic plant across sites 2B, 3B, 3C, 4B and 5B associated with the Tubatse FerroChrome (TFC) plant, Steelpoort, Fetakgomo Tubatse Local Municipality, Limpopo.

1.1 Scope of the Study

The aim of the study is to identify heritage sites and finds that may occur in the proposed project area. The HIA aims to inform the EIA to assist the developer in managing the discovered heritage resources in a responsible manner, 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 HIA Report was compiled by PGS.

The staff at PGS has a combined experience of nearly 70 years in the heritage consulting industry. PGS and its staff have extensive experience in managing HIA processes. PGS will only undertake heritage assessment work where they have the relevant expertise and experience to undertake that work competently.

Daniel Tasker, author of this report is an MSc (Archaeology) graduate from the University of the Witwatersrand, South Africa, specialising in the Stone Age. He is a registered professional archaeologist with the Association of Southern African Professional Archaeologists (ASAPA).

Wouter Fourie, the Project Coordinator and Archaeologist, is registered with the Association of Southern African Professional Archaeologists (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).

1.3 Assumptions and Limitations

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 and existing vegetation cover. It should be noted most of the study area was accessible for the fieldwork survey, despite large gullies intersecting the study area.

Fieldwork was also focussed on area that was not previously ploughed or disturbed by farming activity, thus focussing on areas with the highest potential to yield heritage resources.

Therefore, should any heritage features and/or objects be located or observed outside the identified heritage sensitive areas during the construction activities, a heritage specialist must be contacted immediately. 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 make an assessment 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 located 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:

- Notice 648 of the Government Gazette 45421- general requirements for undertaking an initial site sensitivity verification where no specific assessment protocol has been identified.
- National Environmental Management Act (NEMA), Act 107 of 1998 – Appendix 6
- National Heritage Resources Act (NHRA), Act 25 of 1999

1.4.1 Notice 648 of the Government Gazette 45421

Although minimum standards for archaeological (2007) and palaeontological (2012) assessments were published by SAHRA, 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 1** and the applicable section in this report noted.

Table 1: 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 4.3	
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.	4.1	-
2.3(a) confirms or disputes the current use of the land and environmental sensitivity as identified by the national web-based environmental screening tool;	section 4.1	-
2.3(b) contains motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity;	section 4.1	-

1.4.2 NEMA – Appendix 6 requirements

The HIA report has been compiled considering the NEMA Appendix 6 requirements for specialist reports as indicated in the table below. For ease of reference, the table below provides cross-references to the report sections where these requirements have been addressed.

1.4.3 The National Heritage Resources Act

- National Heritage Resources Act (NHRA) Act 25 of 1999
  - Protection of Heritage Resources – Sections 34 to 36; and
  - Heritage Resources Management – Section 38

The NHRA is utilised as the basis for the identification, evaluation, and management of heritage resources and in the case of Cultural Resource Management (CRM) those resources specifically impacted on by development as stipulated in Section 38 of NHRA. This study falls under s38(8) and requires comment from the relevant heritage resources authority that includes the South African Heritage Resources Authority (SAHRA).

Section 24(2) of the NEMA requires environmental authorisation from the environmental authority for certain activities that have been identified and must undergo an EIA or Basic Assessment (BA) process. Similarly, Section 38 NHRA lists specific development activities that require notice to the heritage resources authority to determine if an HIA process is necessary. Approval from the heritage authority is mandatory before proceeding with the development activities.

To avoid redundancy and facilitate coordination between NEMA and NHRA requirements, Section 38(8) of the NHRA states that if the development activities listed in Section 38(1) require an EIA under NEMA, a separate HIA and approval from the heritage resources authority are unnecessary. However, the environmental authority must ensure that the heritage resources authority's requirements for HIA are fulfilled and that its comments and recommendations are considered before granting environmental authorisation.

Therefore, if a NEMA EIA is required for the development activities listed under Section 38 of the NHRA, separate HIA and EIA processes may not be followed, and different decisions may not be issued under NHRA and NEMA. The EIA process will be followed, and if the heritage resources authority requires HIA, it must be conducted as one of the EIA specialist studies.

The environmental authority must ensure that the heritage resources authority's requirements for the assessment are met. A separate heritage approval may not be issued, but the environmental authority must consider the heritage resources authority's comments and recommendations before granting or refusing environmental authorisation.

It must however be noted that if no environmental process is required, but the proposed development still triggers the requirements for and HIA under section 38(1) of the NHRA, SAHRA or the relevant provincial heritage authority will be the authorising authority. This entity could then require a full HIA completed considering the requirements for public participation and stakeholder engagement as contemplate in the regulations under the NHRA.

2 TECHNICAL DETAILS OF THE PROJECT

2.1 Locality

The project area is within the Fetakgomo Local Municipality of the Sekhukhune District Municipality, Limpopo Province. The sites are in and around the town of Steelpoort (**Figure 2**).

2.1.1 Site Description

The application area is situated on the remainder of portions of the farm Goudmyn 337KT with a footprint area of approximately 59ha (**Figure 2**).

Figure 2 - Regional Locality of study area (red polygon)

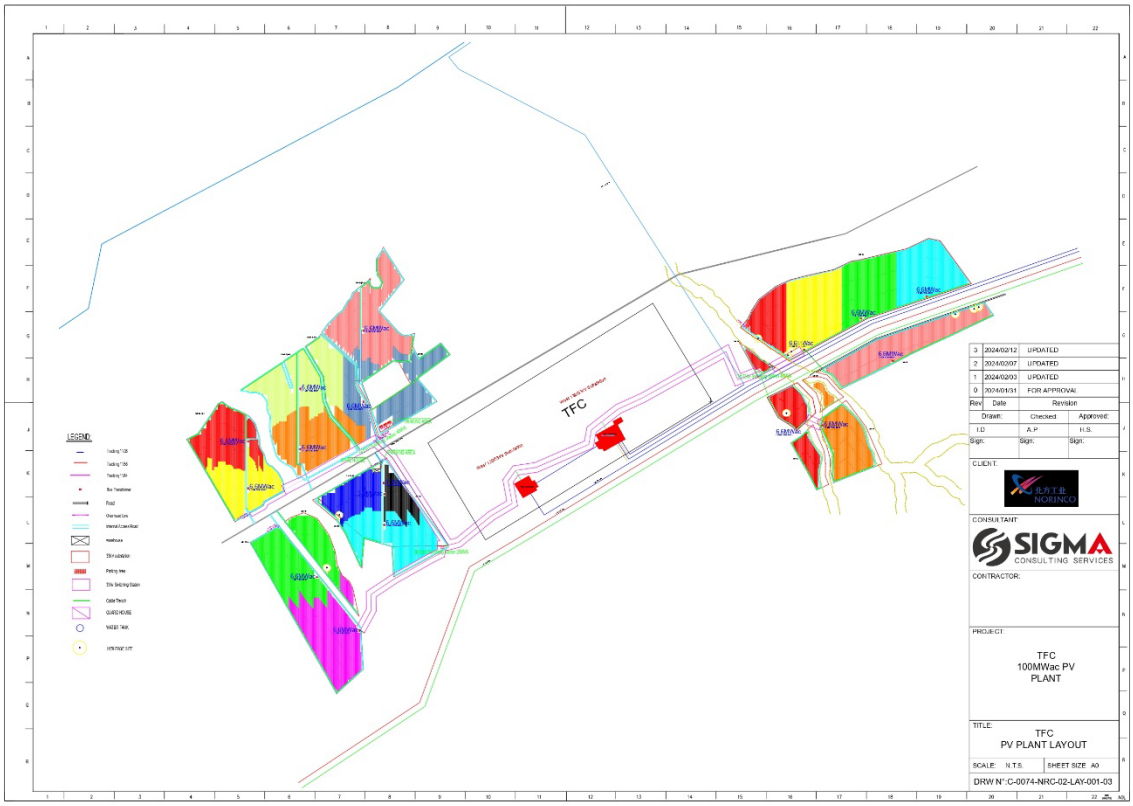

Figure 3 - Proposed layout of the infrastructure related to the 40MW plant (provided by client).

2.2 Technical Project Description

2.2.1 Project description

Sites 2B, 3B, 3C, 4B and 5B will be assessed for the placement of PV infrastructure. The details of the sites are provided below:

Site Number	Size (ha)	Farm Details
2B	47,49	Goudmyn 337 KT Ptn 00001 & Ptn 00010
3B	2,37	Goudmyn 337KT Ptn 0000
3C	1,71	Goudmyn 337 KT Ptn 00000
4B	5,52	Goudmyn 337 KT Ptn 00000
5B	2,14	Goudmyn 337 KT Ptn 00000 & Ptn 00006

The PV plant will consist of the following infrastructure presented below (see Table 2 also). Note that there will be sharing of infrastructure with the first phase i.e. previously authorised Sites 2, 3,4 and 5.

- Solar PV panels that will be able to deliver the required 40MW output to the Samancor grid;
- Inverters that convert direct current (DC) generated by the PV modules into alternating current (AC) to be exported to the Samancor electrical grid;
- Transformer/ s that raises the system AC low voltage to medium voltage. The transformer converts the voltage of the electricity generated by the PV panels to the correct voltage for delivery to the TFC Plant;
- Transformer substation; and
- Instrumentation and Control consisting of hardware and software for remote plant monitoring and operation of the facility.

Associated infrastructure includes:

- Mounting structures for the solar panels in a fixed tilt of rotating tracking configuration;
- Cabling between the structures, to be lain underground where practical;
- New 33kV overhead powerlines between the various sites and the Tubatse East and -West substation buildings;
- Local substation and transformer yard at each PV site;
- Containerized switchgear substation at Tubatse East and -West MV substations for connecting to the Tubatse substation busbars;
- Water provision infrastructure (i.e. pipeline/ s, storage tank/ s, etc.) for PV panel cleaning;
- Battery Energy Storage System (BESS); and
- Internal access roads (typically 6m) roads will be constructed, but existing roads will be used as far as possible), fencing (approximately 3m in height), gates and access control.

The proposed facility components descriptions for Phase 2 are listed below:

Table 2 - Facility component descriptions

Facility Component	Description
Height of PV panels	Approximately 5m
Total Site Extent	59,23 ha
Length of internal roads	Varies
Width of internal roads	Approximately 6m
Number of inverters/transformers	3
Area occupied by inverter/ transformers (inverters are combined with the transformers on each site)	200m2
Height of and type of fencing	Security fencing approximately 3m high
Overhead powerline length	Varies
Overhead powerline capacity	33kV (40MVA Site 2 to East Substation)
Overhead powerline servitude	50m corridor to be assessed in the EIA Study Overhead line or underground cable technology can be used for the power evacuation in these corridors
Overhead powerline tower height	• Power lines comprising of a wood pole tower construction is proposed for the 33 kV power lines. In cases where there is a double Power Corridor, either two wood pole lines will be used or a single steel monopole with a double circuit configuration. • The height of the single circuit wood pole construction is 11m-13m and the steel monopoles are typically 20m tall
Underground cables	Varies in length according to site location and connection point
Switching Station	One switching stations is proposed: 33kV switching station 40MVA - 100m2
Chemical Toilets	Chemical toilets will be provided per 15 people which will be serviced at a minimum of once every week.
On-site substations	▪ Existing capacity - Tubatse East = 62.5MW, Tubatse West = 37.5MW ▪ 33kV indoor switchgear blocks will be added to the Tubatse East- and West Substations with a footprint of approximately 300m2 respectively
Laydown areas	Phase 1 to be used
Construction camp	Phase 1 to be used
Access roads	Only internal roads
BESS	No BESS for Phase 2
Water	The water used in this project is mainly for cleaning photovoltaic modules, which are transported by tankers, and the water supply source is TFC Water Plant, we will follow the advice of Samancor and RHDHV. The total water consumption for a single cleaning is about 1200m3. The

Facility Component	Description
	main pollutant for the panel is dust, and the wastewater from washing panels will be discharged to the ground naturally.
Water provision	▪ Water will be required during the construction activities as well as during the operational phase for panel cleaning. During construction, it is estimated that 2 x 15000ℓ water tankers will be used for dust suppression and other construction activities. During operations, it is estimated that the proposed PV plant will require approximately 1200m3 per cleaning cycle (based on best practice). The cleaning cycle depends on the type of technology, the pollution at the location as well as the seasonality. ▪ Water will be obtained from the TFC process and no raw water sources will be required. ▪ Water availability - The proposed PV plant will require approximately 20kℓ x 60 = 1.2Mℓ per cleaning cycle (based on best-practice and to be confirmed with the concept (envelope) design). The cleaning cycle depends on the type of technology, the pollution at the location as well as the seasonality. Lastly, it also depends on the maintenance regime of the operator. One can assume to allow for two (2) cleaning cycles per month as this is a typical global approach. The water can be provided by the TFC Smelter based on the amount of industrial water available and the quality of water required as well as the conditions of the current WUL. The industrial water may need to be demineralized before it can be used on the panels.
Water balance	▪ During both the construction and operation phases no permanent water supply by borehole or river abstraction will take place nor will wastewater removal be installed on the site. ▪ During construction, water will be brought in by tanker. ▪ During operation, panels will be cleaned by water brought in by tanker. The water will be supplied from the TFC process. The runoff water from washing the panels will discharge to the ground and will either infiltrate, evaporate or runoff into the environment. This is acceptable as it is considered clean water. ▪ In terms of domestic use, portable toilets with a conservancy tank will be placed on site and will periodically be removed and emptied. There will be no sewage network installed on site.

3 ASSESSMENT METHODOLOGY

The section below outlines the assessment methodologies utilised in the study.

3.1 Methodology for Assessing Heritage Site significance

This HIA report was compiled by PGS for the proposed 40MW extension to the approved solar plant. The applicable maps, tables and figures are included, as stipulated in the NHRA (no 25 of 1999) and the National Environmental Management Act (NEMA) (No. 107 of 1998). The HIA process consists of three steps:

Step I – Literature Review and initial site analysis: The background information to the field survey relies greatly on the Heritage Background Research which was undertaken through archival research and evaluation of satellite imagery and topographical maps of the study area.

Step II – Physical Survey: A physical survey was conducted by a combination of vehicle and pedestrian access through the proposed project area by one qualified heritage specialist and one field assistant (between 19 and 21 April 2022), 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 heritage resources identified in the physical survey, the assessment of these resources in terms of the HIA criteria and report writing, as well as mapping and constructive recommendations.

The significance of heritage sites is 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.

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

3.1.1 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 (**Table 3** and **Table 4**).

Table 3: 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 Provincial Heritage Authority. 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	No further actions under the NHRA are required. This must be motivated by the applicant or	No research potential or other cultural significance

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
	retained as part of the National Estate.	the consultant and approved by the authority.	

Table 4: 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 Provincial Heritage Authority.	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.	Low Significance

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
		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.	
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 HWC for structures in this category if they are older than 60 years.	No research potential or other cultural significance

3.2 Methodology used in determining the significance of environmental impacts

The methodology used to determine the environmental impact significance was provided by Royal HaskoningDHV and is explained in **Appendix A**.

4 CURRENT STATUS QUO

4.1 Site Description

All sites surveyed were characterised by dense, overgrown vegetation with many *Acacias* dominating the treeline.

Site 2B was dissected by two deep gullies running South-North towards the Steelpoort river and further dissected by a large servitude of electrical infrastructure running West-East. To the far South of Site 2B, hills and mountains dominate the landscape. The adjacent silica mine has impacted the study area, as large mine roads run through Site 2B, and this has resulted in some illegal dumping on site (**Figure 4-7** and **11**).

Site 3B is currently a mine quarry dump, so any potential heritage is not visible due to the dumping (**Figure 9 and 12**). **Sites 3C and 4B** share the same description as both have a gentle slope towards the north, both are separated by a drainage gully, and both remain undisturbed bushveld and grassland (**Figure 10 and 13**). **Site 5B** is a flat piece of land with thorny grassland, it is adjacent a mining storage facility and is lightly disturbed by the activity in the area (Figure **11**).

Sites 2B, 3B, 3C, 4B and 5B are all characterised by Sekhukhune Plains Bushveld, it is described in Mucina and Rutherford (2006:480) as:

> *"**Distribution:** Limpopo and Mpumalanga Provinces: Lowland area from Burgersfort and the lower basin of the Steelpoort River in the south, northwards through the plains of the Motse River basin to Jobskop and Legwareng (south of the Strydpoort. Mountains). Continues up the basin of the Olifants River to around Tswaing and the valleys of the Lepellane and Mohlaletsi Rivers. Altitude mostly about 700–1 100 m.*
>
> ***Vegetation & Landscape Features:** Mainly semi-arid plains and open valleys between chains of hills and small mountains running parallel to the escarpment. Predominantly short, open to closed thornveld with an abundance of Aloe species and other succulents. Heavily degraded in places and overexploited by man for cultivation, mining and urbanisation. Both man-made and natural erosion dongas occur in areas containing clays rich in heavy metals. Encroachment by indigenous microphyllous trees and invasion by alien species is common throughout the area.*
>
> ***Geology & Soils:** Complex geology, with rocks mainly mafic and ultramafic intrusive rocks of the main to lower zones of the Rustenberg Layered Suite on the. eastern lobe of the Bushveld Igneous Complex (Vaalian). The zones (subsuites) are dominated by concentric belts of norite, gabbro, anorthosite and pyroxenite, with localised protrusions of magnetite, chromatite, serpentinised harzburgite, olivine diorite, shale, dolomite and quartzite. Most of the area consists of red apedal soils. Deep, loamy Valsrivier soils are characteristic of the plains and shallow Glenrosa soils are found on the lowlying, rocky hills. Patches of erodable black, melanic structured horizons are common around small mountains. Some Steendal soils are underlain by gypsum. Land types mainly Ae, Ib, Ea and Ia."*

Site 2B is also characterized by the Sekhukhune Mountain Bushveld, it is described in Mucina and Rutherford (2006:481) as:

> **"Distribution:** Limpopo and Mpumalanga Provinces: Mountains and undulating hills above the lowlands of the SVcb 27 Sekhukhune Plains Bushveld, including the steep slopes of the Leolo Mountains (except areas of Gm 20 Leolo Summit Sourveld), Dwars River Mountains (except areas of Gm 19 Sekhukhune Montane Grassland) and Thaba Sekhukhune, and a number of isolated smaller mountains (e.g. Phepane and Morone). Also the undulating small hills in the valley of the Steelpoort River up to and along the Klip River flowing past Roossenekal. Altitude about 900–1 600 m.
>
> **Vegetation & Landscape Features:** Dry, open to closed microphyllous and broad-leaved savanna on hills and mountain slopes that form concentric belts parallel to the northeastern escarpment. Open bushveld often associated with ultramafic soils on southern aspects. Bushveld on ultramafic soils contain a high diversity of edaphic specialists. Bushveld of mountain slopes generally taller than in the valleys, with a well-developed herb layer.

Bushveld of valleys and dry northern aspects usually dense, like thicket, with a herb layer comprising many shortlived perennials. Dry habitats contain a number of species with xerophytic adaptations, such as succulence and underground storage organs. Both man-made and natural erosion dongas occur on footslopes of clays rich in heavy metals.

Geology & Soils: Rocks mainly ultramafic intrusives of the lower, critical and main zones of the eastern Rustenberg Layered Suite of the Bushveld Igneous Complex (Vaalian). Three subsuites (zones), namely Croydon, Dwars River and Dsjate consist mainly of norite, pyroxenite, anorthosite and gabbro, and are characterised by localised intrusions of magnetite, diorite, dunite, bronzitite and harzburgite. Soils are predominantly shallow, rocky and clayey. Glenrosa and Mispah soil forms are common, with lime present in low-lying areas. Rocky areas without soil are common on steep slopes. The Dwars River Valley is characterised by prismacutanic horizons with melanic structured diagnostic horizons. Around Steelpoort red apedal, freely drained soils occur and these deeper soils include Hutton, Bonheim and Steendal soil forms. Land types mainly Ib, Ae, Ic and Fb."

Figure 4 – View from the centre of Site 2B towards the South

Figure 5 – View from the North of Site 2B towards the West

Figure 6 – Deep gully intersecting Site 2B

Figure 7 – View of central section of Site 2B towards the North

Figure 8 – View of the very large servitude running East-West along Site 2B

Figure 12 – A view on the northern boundary of Site 2B. Disturbances and dumping in the area are most likely from the nearby mine.

Figure 9 – A general view looking East at Site 3B. The whole site in now a mine dump.

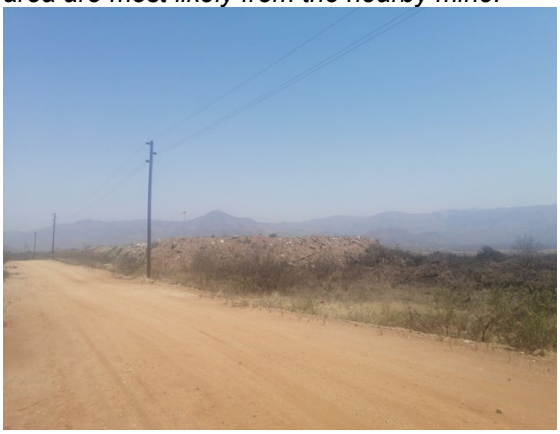

Figure 13 – A view looking West at Site 3B, the mine dump can be seen behind the road.

Figure 10 – A general view of site 3C. Dense shrubbery can be observed.

Figure 14 – A view looking West at Site 4B, a small servitude runs along its western border.

Figure 11 – A general view looking West at Site 5B, the area to the North is already in use by the mine.

4.2 Historical Background

DATE	DESCRIPTION
The Study Area and Surroundings during the Stone Age	
The South African Stone Age is the longest archaeologically identified phase in human history and lasted for millions of years.	
2.5 million - 250 000 years ago	The Early Stone Age is the first and oldest phase identified in South 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 hammerstones and dates to some 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 hand axe. The Acheulian dates to approximately 1.5 million years ago. Stone artefacts dating to the Early Stone Age have been identified by previous archaeological surveys on some of the farms included in the study area and immediate surrounds, including Onverwacht 292KT, Hendrikplaats 281KT and Winterveld 293KT (Pistorius 2005; 2006). The site of Maleoskop lies 90km South-West of the study area and is unique in the sense of producing both Oldawan and Acheulean eroded Early Stone Age deposits (Esterhuysen & Smith 2007).
250 000 to 30 000 years ago	The Middle Stone Age is the second oldest phase identified in South Africa's archaeological history. This phase is associated with flakes, points and blades manufactured by means of the so-called 'prepared core' technique. During previous archaeological surveys, scatters of Middle Stone Age lithics have been identified on some of the farms included in the study area and immediate surrounds, including Onverwacht 292KT, Hendrikplaats 281KT and Winterveld 293KT (Pistorius 2005; 2006). The famous site of Bushman Rock Shelter lies just 40km to the East of the study area, here *in-situ* deposits dating back to 30,000 years consist of stone tools, animal bones and ash from the ephemeral use of the shelter (Esterhuysen & Smith 2007).
30 000 years ago to the historic past	The Later Stone Age is the third archaeological phase identified and is associated with an abundance of very small artefacts known as microliths. A well-known feature of the Later Stone Age is rock art in the form of rock paintings and engravings. Stone artefacts dating to the Early Stone Age have been identified by previous archaeological surveys on some of the farms included in the study area and immediate surrounds, including Onverwacht 292KT, Hendrikplaats 281KT and Winterveld 293KT (Pistorius 2005; 2006). The aforementioned site of Bushman Rock Shelter (40km East) also boasts a large spanning deposit linked to the Late Stone Age beginning at 12000 years ago. This period is particularly interesting as it is linked to the transition into the Holocene and warmer temperatures (Esterhuysen & Smith 2007).

The Study Area and Surroundings during the Iron Age	
The arrival of early farming communities 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).	
AD 450 – AD 750	The Mzonjani facies of the Kwale Branch of the Urewe Ceramic Tradition is the earliest Iron Age presence for which archaeological evidence had been found in the surroundings of the study area. The key features on the decoration of the ceramics from this facies comprise punctuates on the rim and spaced motifs on the shoulder of the vessel (Huffman, 2007). No sites associated with the Mzonjani facies are known to be located within the study area or its immediate surroundings.
AD 750 – AD 1000	The Doornkop facies of the Happy Rest Sub-branch of the Kalundu Ceramic Tradition is the second Iron Age presence in the study area and surroundings. The key features on the decoration of the ceramics from this facies comprise multiple herringbone bands in neck (Huffman, 2007). No significant sites associated with the Doornkop facies are known to be located within the study area. This said, one site with Doornkop pottery and burnt floors was identified by a previous survey on the farm Maandagshoek 254 KT, which is located immediately north of the study area (Roodt 2006).
AD 1000 – AD 1300	The Eiland facies of the Happy Rest Sub-branch of the Kalundu Ceramic Tradition is the third Iron Age presence for which archaeological evidence had been found in the surroundings of the study area. The key features on the decoration of the ceramics from this facies comprise fine herringbone with ladder stamping (Huffman, 2007). No significant sites associated with the Eiland facies are known to be located within the study area. This said, one site with Eiland pottery was identified by a previous survey on the farm Maandagshoek, which is located immediately north of the study area.
AD 1300 – AD 1500	The Kgopolwe facies of the Happy Rest sub-branch of the Kalundu Ceramic tradition is the fifth Iron Age presence for which archaeological evidence had been found in the surroundings of the study area. The key features on the decoration of the ceramics from this facies comprise multiple incised bands separated by colour and lip decoration on bowls (Huffman, 2007). Sites with Kgopolwe facies ceramics have been identified in the surroundings of the study area. In fact, one of the sites identified during the present fieldwork contains Kgopolwe pottery (see site MDK 7).
AD 1650 - AD 1840	The Marateng facies of the Moloko Branch of the Urewe Ceramic Tradition is the sixth Iron Age facies to be identified within the surroundings of the study area. The key features of the decoration used on the ceramics from this facies include incised arcades on upper shoulder separating black and red (Huffman, 2007). The Marateng facies can be associated with modern Pedi. One of the sites identified during the present fieldwork contains Marateng pottery (see site MDK 3).

4.2.1 Late Iron Age and Historic Black Settlement

4.2.2 The situation during the early nineteenth century

According to Bergh (1999), the Pedi, Roka, Koni and Tau were settled in the wider region during the start of the nineteenth century. As confirmation of this, Schoeman (1997) indicates that when the Bapedi settled in the Sekhukhune land region during the second half of the seventeenth century (Schoeman, 1997), several groups such as the Kwena, Roka, Koni and Tau had preceded them there.

The Kwena of Mongatane was the first of these groups to settle in this wider area. Upon reaching the Olifants River, they split up into two groups. The first of these was under the leadership of Masabela, who established the first permanent Sotho settlement in Sekhukhuneland. The second group under Kope, decided to proceed upstream along the Olifants River and subsequently established themselves near present-day Groblersdal. It was this second group under Kope that later became known as the BaKopa.

With time the Phasa, related to the group of Masabela, also moved into the Sekhukhuneland region. Although both these groups referred to themselves as the Roka, other groups of a similar name were also found here. After the settlement of the Roka, and by approximately 1700, various Koni and Tau groups also moved into the area.

4.2.3 Khumalo Ndebele

The Khumalo Ndebele of Mzilikazi was a Northern-Nguni group that moved out of KwaZulu-Natal during 1821. They first settled at the confluence of the Vaal and Olifants Rivers from where they moved further north and fought with the Ndzundza-Ndebele of Magodongo who resided near present-day Stoffberg. The Ndzundza-Ndebele were defeated, and Mzilikazi and his followers settled temporarily in these parts (Bergh, 1999).

During their short residence in the area, the Khumalo-Ndebele attacked the Koni of Makopole in the vicinity of present-day Lydenburg, before attacking the Bapedi of Maroteng in 1822.

Mzilikazi then turned his attention to the area between the Olifants and Steelpoort Rivers, which was the heartland of the Bapedi. In the ensuing military activities, the Pedi paramount leader Phetedi, as well as most of his brothers, were killed. However, one of the brothers managed to escape northwards and survived. He was Sekwati.

Sekwati returned to the area in 1828 and settled at Phiring, from where he started to rebuild the Maroteng kingdom.

According to Smith (1967), the Khumalo-Ndebele stayed in the wider surroundings of the present study area for approximately a year, and during this time raided or destroyed much of the grain and livestock of the surrounding communities.

4.2.4 Bapedi

As mentioned, the Bapedi settled in the Sekhukhuneland region during the second half of the seventeenth century (Schoeman, 1997).

During the later stages of the 1700s and early period of the 1800s, the Morateng group of the Bapedi became the most dominant force in the area, subjecting many of the other communities and groups. They reached their zenith during the rule of Thulare (ca. 1790 – ca. 1820).

Although the heartland of the BaPedi kingdom was the area between the Olifants and Steelpoort Rivers, their influence stretched much further than that. For example, the winter pasture of Sekwati was in the areas directly to the east of the Steelpoort River.

4.2.5 Voortrekkers and the establishment of Ohrigstad and Lydenburg

To get further away from British influence, and at the same time closer to the market at Delagoa Bay, the Voortrekker leader Andries Hendrik Potgieter together with a large following, moved from areas only recently established after the Great Trek such as Potchefstroom, Pretoria and the Magaliesberg to the vicinity of Ohrigstad. It is estimated that by August 1845, there were already a thousand Voortrekkers resident in the surroundings of Ohrigstad (Botha, 1958).

Figure 15 - Andries Hendrik Potgieter (Pienaar, 1990:136).

Attention now focused on establishing a town, and as early as 30 July 1845, a meeting was held at the new town named Ohrigstad. The meeting was aimed at reorganising the Voortrekker government and establishing a new Volksraad (Botha, 1958).

The wider areas surrounding the town also became increasingly settled by the new arrivals. During the period between August 1845 and December 1847, a total of 406 individual farms were proclaimed.

Due to several reasons, including the prevalence of malaria, the settlement of Ohrigstad began to decline. As a result, the Volksraad came together on 19 September 1849 in the higher-lying town of Krugerspos and decided that a new town was to be established in a healthier area. On 20 September 1849, the decision was made to name the new town “Leidenburg”, and on 23 January 1850, the Volksraad in Potchefstroom decided that the new town was to be established on the farm Rietspruit (Botha, 1958:91).

The Lydenburg district was proclaimed as an independent state, namely the Republic of Lydenburg, on 17 December 1856 (Duvenage, 1966).

4.2.5.1 Relations between the Voortrekkers and Bapedi during Sekwati's reign

In July 1845 the Voortrekker leader A.H. Potgieter negotiated a settlement with Sekwati. This settlement was aimed at allowing Potgieter's followers to settle and establish farms in present-day Mpumalanga. However, relations turned sour when the Volksraad negotiated and made a separate agreement with the Swazi kingdom to allow white farmers to settle in the areas falling under Sekwati's rule. Sekwati was very unhappy about this agreement in that he felt that as the Swazi never managed to subject him, he still had the only say in terms of the land in question.

Nonetheless, farmers started establishing farms over large parts near Ohrigstad and Lydenburg, as well as quite close to Sekwati's residence and capital.

Although the initial stages (1845 to 1846) of contact between the Bapedi of Sekwati and the Boers was characterised by peace, this issue regarding the land negotiations started to hurt the relationship.

By August 1852, relations had so deteriorated that Potgieter led a commando against Sekwati. The commando, assisted by black forces, was not able to defeat the Pedi at their Phiring stronghold and lay a siege around the town to subjugate them. The siege also proved unsuccessful and the commando left. Although the military activities did not curtail the power and influence of Sekwati, he decided to relocate his capital to the more defensive Thaba Mosego in the Leolo Mountains.

Due to the failure of the military actions taken against Sekwati, as well as the secession of the Lydenburg Republic in 1856, the Boers from these parts started making a strong motion in favour of a peaceful settlement with Sekwati. In October 1857, a commission was appointed to investigate the possible resolution of peace with the Pedi leader. Issues regarding land and boundaries were also to be discussed. On 17 November 1857, the Boers and Sekwati concluded a peace agreement. According to the terms of the agreement, the Steelpoort River was established as the boundary between the Bapedi and the Boer Republic. However, the agreement did not solve all the problems as it did not stipulate or rule on the issue of Boer farms already existing to the west of the Steelpoort River, nor did it indicate how far south the boundary of the Pedi land reached.

After the signing of the agreement, during the late 1850s, relative peace settled over the area. However, the 1860s and 1870s were characterised by friction between the Bapedi and the white farmers. These unfriendly relations worsened and culminated in open warfare during the latter part of the 1870s.

4.2.6 Relations between the Whites and Bapedi during Sekhukhune's reign

When Sekhukhune succeeded Sekwati as ruler of the Bapedi in 1861, his priority was to strengthen his power base by eliminating or fighting any threats to his throne. Apart from the direct threats to his throne, Sekhukhune also felt threatened by several groups that used to be under Pedi influence. For example, the Ndzundza-Ndebele and Bakopa started functioning independently from the Pedi during this time.

As a means of strengthening his position, Sekhukhune remained at peace with the Boers and subsequently made an agreement with the Lydenburg Republic, which in effect, upheld the same provisions contained in the 1857 agreement, with the exception that no ruling was made in terms of the Steelpoort River as the boundary.

In October 1863, Sekhukhune sent Pedi forces to assist a Boer attack on the Ndzundza. However, the attack was a failure (Bergh, 1999).

Nevertheless, many factors again soured the relationship between the Bapedi and the whites (Bergh, 1999). During this time Sekhukhune sent some of his people to settle on the farms south and east of the Steelpoort River. In terms of the present study area, it is interesting to note that groups under Vroetepe and Marobele were sent to the banks of the Dwars Rivers to settle there to grow crops on the rivers' banks (Van Rooyen, 1950).

When a farmer named Jancowitz, who had bought a farm in the vicinity of Mafolofolo, was prohibited from marking the beacons on his property (or from collecting wood there) by followers of Sekhukhune's younger brother Johannes Dinkwanyane, Sekhukhune decided to send his warriors to assist his brother.

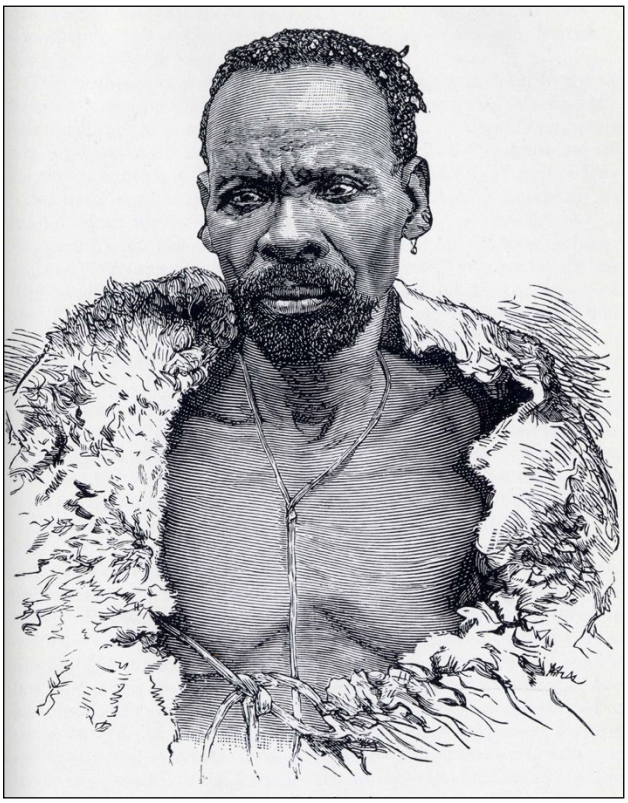

Figure 16 - Sekhukhune, ruler of the Bapedi (Grosskopf, 1957).

The Boers from the surrounding areas identified the incident as a threat and grouped themselves into lagers. They subsequently asked the government for assistance. On 16 May 1876, the Volksraad declared war on the Bapedi. After a few successes, the forces of the Zuid-Afrikaansche Republiek attacked Tshate, the new capital of Sekhukhune. As the first attacks proved unsuccessful, the decision was made to place the town under siege. Although a peace agreement was signed on 16 February 1877, Sekhukhune was not in agreement with all of the provisions. The subsequent British annexation of Transvaal allowed Sekhukhune a measure of strategic space. Although negotiations were undertaken with the new British authorities, the relations between the British and the Bapedi eventually resulted in the outbreak of war. The war ended in the attack on Sekhukhune's capital Tshate on 28 November 1879. Although Sekhukhune managed to escape, he was captured on 2 December 1879, and imprisoned at Pretoria (Bergh, 1999).

Most of the significant battles of the wars between the Bapedi of Sekhukhune and the Z.A.R. as well as the British authorities, such as the decisive Tshate battle of 28 November 1879, took place far away from the study area. For example, Tshate, the scene of this battle and also capital of Skhukhune, was located 18.3 km north-west of the present study area.

4.3 Overview of the study area and surrounding landscape

4.3.1 Archival and historical maps

The examination of historical data and cartographic resources represents a critical tool for locating and identifying heritage resources and in determining the historical and cultural context of the study area. Relevant topographic maps and satellite imagery were studied to identify structures, possible burial grounds or archaeological sites present in the footprint area.

Historical topographic maps (1:50 000) for various years (1963, 1975 and 1997) were available in the background study. These maps were assessed to observe the development of the area, as well as the location of possible historical structures and burial grounds. The study area was overlain on the map sheets to identify structures or graves situated within or immediately adjacent to the study area that could possibly be older than 60 years and thus protected under Section 34 and 36 of the NHRA.

Figure 17 depicts the historic land use of the area in 1963, here, small patches of cultivated land intersect the bushveld landscape of the study area. A notable historic settlement was identified and is indicated as a Bantu hut in Site 2B. Historic aerial photography from 1954 (**Figure 18**) and 1970 (**Figure 19**) shows the extent of the various homesteads pre-dating 1954 in the area of Site 2B.

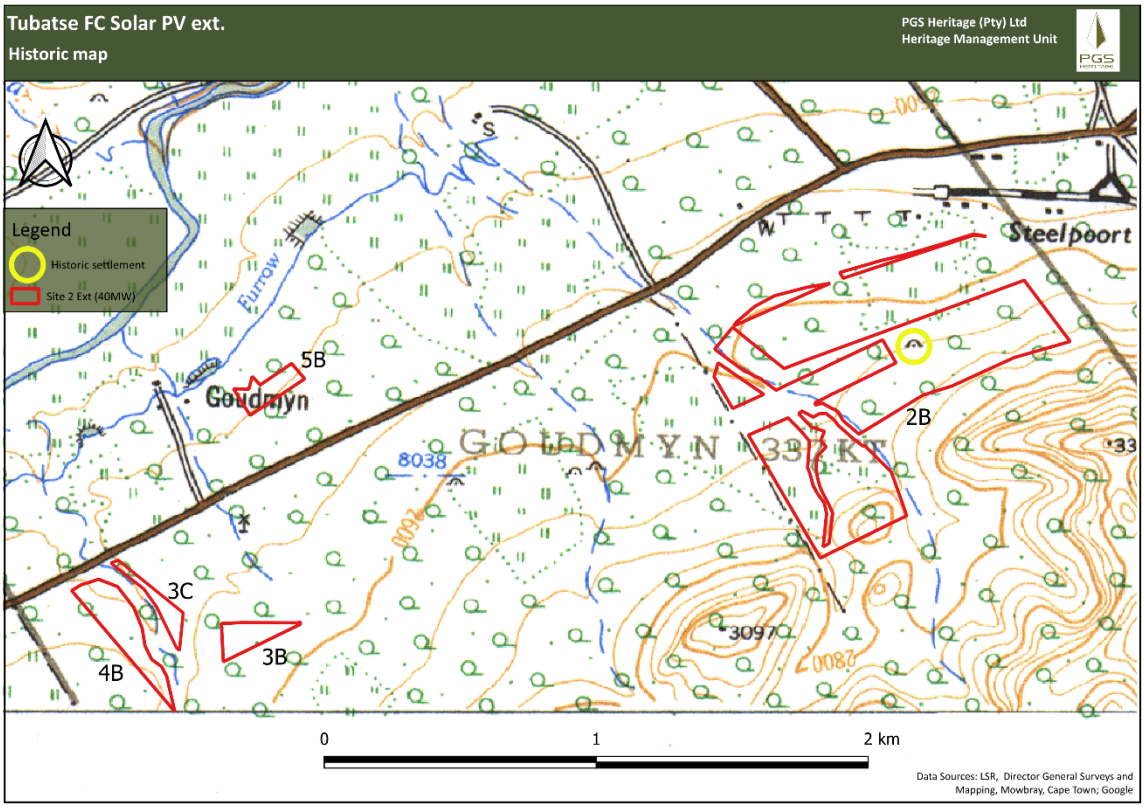

Figure 17 - First Edition of 2430CA Steelpoort Topographic Map 1:50000 dating to 1963, with possible heritage features (yellow polygon) located in the project area.

Figure 18 - Aerial photograph from 1954 indicating structures present in Site 2B

Figure 19 - Aerial photograph from 1970 indicating structures present in Site 2B

4.3.2 Previous heritage impact assessment reports from the study area and surroundings

A search of the South African Heritage Resources Information System (SAHRIS) database revealed that several previous archaeological and heritage impact assessments had been undertaken within the surroundings of the study area. In each case, the results of each study are shown in bold. These previous studies are listed below in ascending chronological order:

- van Schalkwyk J., 2003. *Eskom Transmission Line Duvha (Witbank) to Janus (Mecklenburg) : Cultural Heritage Scoping Report.*
  The author noted the presence of the tribal capital of the Pedi on the farm Hackney 116KT along the development route of the transmission line as well as stone walled sites and several farmsteads, bridges, and other structures older than 60 years.
- Huffman T., & Schoeman MH., A., 2004. *Archaeological Reconnaissance for Project Lion - A phase-1 report prepared for Metago Environmental Engineers.*
  On the farm Kennedys Vale, a survey yielded few *ex-situ* handaxes from the Early Stone Age, large amounts of Middle stone age material like triangular points, flakes

scrapers and cores. Five Early Iron Age sites from the Doornkop period represented by daga and pottery shards were also documented. Of the Late iron age represented on the farm, four sites represented by pottery as well as a fifth represented by a smelting area were all identified. Finally, four recent Pedi homesteads were also documented.

- Pistorius J., CC., 2005. *An Assessment of the Heritage Potential for a Proposed New Route for a 132 kV Power Line Between the Merensky Substation and the Proposed New Burgersfort Substation in the Mpumalanga and Limpopo Provinces of South Africa*
  Along the large infrastructure route of the powerline numerous informal graves along the Morore mountain range, Middle Stone Age scatters along dongas and rudimentary stone walls with potential unmarked graves were all identified.
- Pistorius, JCC. 2005. *Results of a Phase II Heritage Impact Assessment Study: An Investigation of Late Iron Age (including initiation cairns) and Mining Heritage Remains on the farm Onverwacht 292KT in the Limpopo and Mpumalanga Provinces of South Africa.*
  An informal grave site with three graves, early mine adits and a Late Iron Age site complete with a furnace and stone cairns used in initiations were documented. Early, Middle and Late Stone Age sites were also noted in the network of dongas of the Steelpoort valley.
- Pistorius J., CC., 2006. *A Phase 1 Heritage Impact Assessment (HIA) Study for Modikwa Platinum's South Shaft 3 Project Area in the Steelpoort in the Limpopo and Mpumalanga Province of South Africa*
  Here on Winterveld 293KT, recent homesteads and small villages were found as well as, a number of single graves and small graveyards. Early, Middle and Late Stone Age scatters were observed throughout dongas of the Steelpoort valley.
- Roodt, F., 2006. *Heritage Resources Assessment Report: Residential Development on the Farm Goudmyn 337 KT Steelpoort, Mpumalanga*
  The author found recent historical ruins with the possibility of infant burials and stone packed cairns for initiation purposes.
- Pistorius J., CC., 2007. *A Phase 1 Heritage Impact Assessment (HIA) Study for the Proposed New Spitzkop Platinum Mine in the Steelpoort in the Mpumalanga Province*
  On the farms Spitzkop 333 Kennedys Vale 361 and De Goede Verwachting 322 numerous sites of heritage significance were found. These included: Middle Stone Age tools from dongas (scrapers cores and points), three graveyards (1, 3 and 9 graves respectively), an initiation cairn, and four sites with remains of a network of mud dwellings.
- Roodt, F., 2007. *Heritage Impact Assessment Report Olifantspoortjie 319 KT, Goudmyn 337 KT Residential Development Steelpoort,*

Middle stone age material was observed throughout the farm and found concentrated in two deflations. A graveyard with four graves as well as, four recent historical structures were also documented. A large occupation of Iron Age sites were also found, 5 different stone wall complexes and sites were identified.

- van Schalkwyk J., 2007. *Heritage Impact Scoping Report for the Planned Steelpoort Integration Project, Limpopo Province*
  Here over 89 sites of heritage significance are noted over the large powerline infrastructure but specifically: a general abundance of Middle Stone Age scatters, Early Iron Age complexes, informal graves and historic structures are documented in the area.
- Celliers JP., 2008. *Phase 1 Archaeological Impact Assessment for MTC Minerals Concerning Mining Activities on the Farm Goudmyn 337 KT*
  A graveyard containing 15 graves, another containing 30 graves and a graveyard containing 22 graves were documented. A secondary context scatter of potshards, dam and pumphouse ruins and a missionary station were all also identified.
- Pelser A., & van Vollenhoven A., 2008. *A Report on a Cultural Heritage Impact Assessment on Portion 14 of the Farm Sterkfontein 318 KT, Burgersfort/Steelpoort Area, Limpopo*
  Here only 2 sections of low stone walling were identified from the Late Iron Age.
- *Fourie, W., 2021. Proposed 100MW PV Plant at the Samancor Chrome Operations, Steelpoort, Limpopo.*
  During the field work several heritage features and resources were identified and logged. A total of 57 points of interest were logged that resulted in the delineation and identification of 24 separate heritage sites. These consist of **five burial grounds**, **nine historic recent structures**, 9 archaeological sites including high density Middle Stone Age scatters. This study is the precursor to the current study and has resulted in extensive archaeological mitigation on the currently approved PV sites of 3, 4 and 5.

4.3.3 Heritage screening

A heritage screening report was compiled by the Department of Environmental Affairs National Web-based Environmental Screening Tool as required by Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended. According to the heritage screening report, the project area has a Low Heritage Sensitivity, except for where it intersects with Site 3C (**Figure 20 and Figure 21**). The fieldwork has shown that some archaeological and heritage resources were present in the area and thus have a higher rating than the original screening rating. This is in part due to the low resolution of the available data that the screening data is based on.

It must however be noted that the screening tool corresponds with the findings during the fieldwork for sites 3B, 3C and 4B.

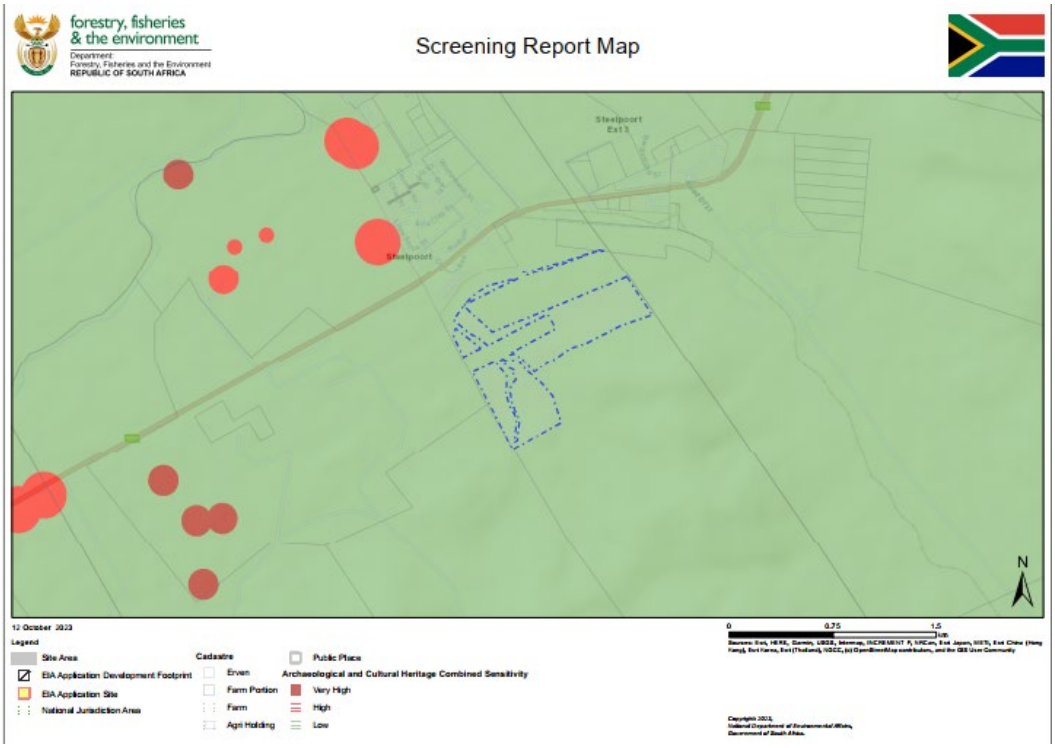

Figure 20 - Screening tool map indicating a low sensitivity rating for archaeology and heritage at Site 2B. Source: Department of Environmental Affairs

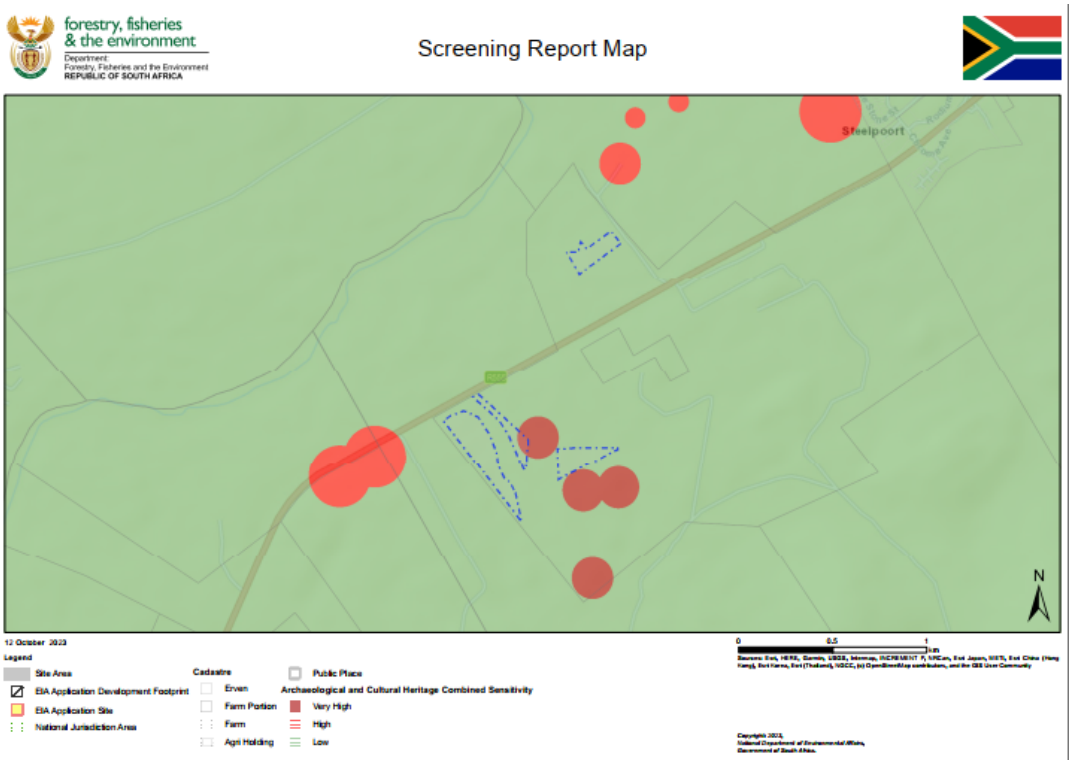

Figure 21 - Screening tool map indicating a low sensitivity rating for archaeology and heritage at Sites 3B, 4B, 5B, while 3C intersects with an area of very high sensitivity. Source: Department of Environmental Affairs

The screening tool has also shown that the palaeontological sensitivity for the proposed development areas are rated as medium and high sensitivities. This rating is higher than the palaeontological sensitivity rating as shown in the SAHRIS palaeontological sensitivity rating as LOW and HIGH. This definitive rating system of SAHRA indicates the geology as having a low and high palaeontological sensitivity as such a PDA was completed (Butler 2023) but a chance finds procedure is still included in the EMPr plan.

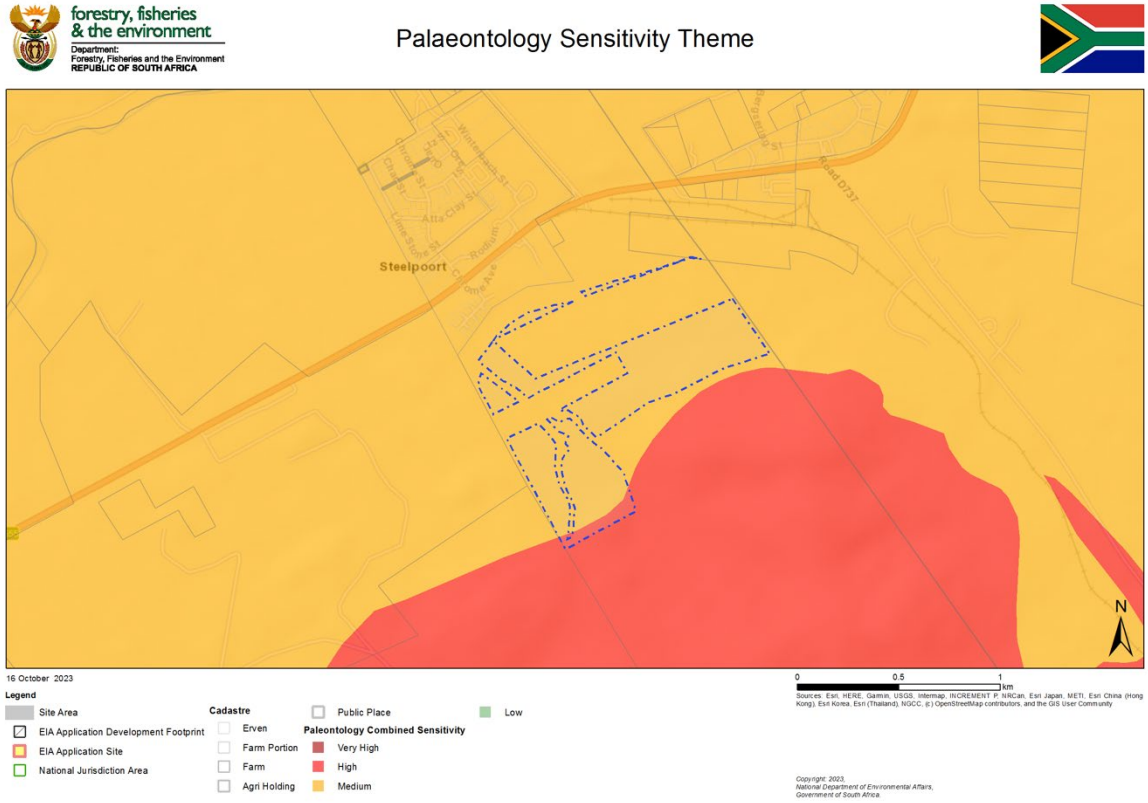

Figure 22: Palaeontological sensitivity from the DFFE screening tool - Site 2B

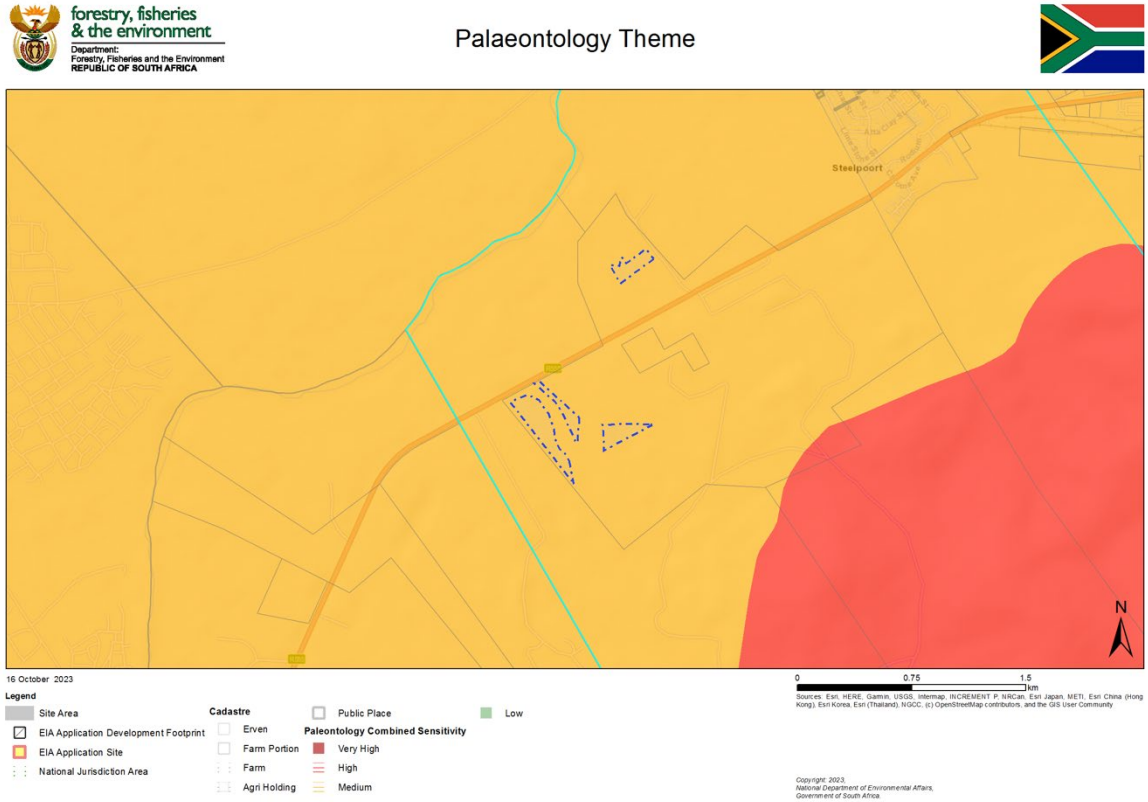

Figure 23: Palaeontological sensitivity from the DFFE screening tool - Site 3B-5B

4.3.4 Heritage sensitivity

Analysis of maps and satellite imagery enabled the identification of possible heritage sensitive areas. By superimposition and analysis, it was possible to rate these structures according to age and thus their level of protection under NHRA. **Table 5** lists the possible tangible heritage sites identified in the vicinity of the study area and the relevant legislative protection.

Table 5: Tangible heritage site in the study area.

Name	Description	Legislative protection
Archaeology	Older than 100 years	NHRA Sections 3 and 35
Structures	Possibly older than 60 years	NHRA Sections 3 and 34
Burial grounds	Graves	NHRA Sections 3 and 36 and MP Graves Act

Additionally, evaluation of satellite imagery has indicated the following areas that may be sensitive from a heritage perspective. The analysis of the studies conducted in the area assisted in the development of the following landform type to heritage find matrix (**Table 6**).

Table 6: Landform type to heritage find matrix

LANDFORM TYPE	HERITAGE TYPE
Crest and foot hill	LSA and MSA scatters, LIA settlements
Crest of small hills	Small LSA sites – scatters of stone artefacts, ostrich eggshell, pottery, and beads
Watering holes/pans/rivers	ESA, MSA and LSA sites, LIA settlements
Farmsteads	Historical archaeological material
Ridges and drainage lines	LSA sites, LIA settlements
Forested areas	LIA sites

4.4 Fieldwork findings[1]

The fieldwork was conducted on 3rd and 4th of October 2023 by a field team of PGS heritage. One archaeologist (Daniel Tasker) as well as an experienced field technician (Xander Fourie). Their movement on site was tracked by GPS and a tracklog map can be seen in **Figure 24**.

During the fieldwork a total of twelve heritage features and resources where identified (**Figure 25**). These consist of three potential burial grounds (BGG) with approximately 5 graves (**TFC001**), 2 graves (**TFC004**) and 3 graves (**TFC005**), one locality with recent and historic structures (**TFC002-1 – TFC002-8**) and one medium significance archaeological site (**TFC003**).

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

Three additional sites previously identified in the 2021 survey (Fourie 2021) also fall within the current study area. **Site 2-1** is a BGG with18 graves, **Site 2-2**, being a potential gravesite and **Site 2-4** is another low significance archaeological site. See **Figure 24** and the individual site descriptions as contained in **Appendix B**. The field description forms were collected with ArcGIS Survey123 in field software.

The recent historic structures are all older than 60 years given that they appear on the 1954 aerial photography and the 1963 map and are all poorly preserved homesteads intercepted and disturbed by the large servitude (**TFC002-1 - TFC002-8**). It is possible for still born burials to have been buried in association with the homestead locality at site **TCF002,** it is therefore given the high grading of 3A(IIIA). According to well-known ethnologist H.O. Mönnig, graves were buried in different localities across a Pedi settlement or *kgoro.* Mönnig (1967:139) states that "*Chiefs and heads of lineages and their wives, and the heads of households are buried in the cattle kraal. Young men and women of lesser importance are buried in the private courtyard (mafuri) behind the hut. Babies are buried inside the hut, and young children are buried under the eaves of the hut*."

Furthermore, Mönnig (1967: 140) provides the following description in terms of the marking of such graves: "*The grave is then filled up by the close male relatives, and a small stone placed in the center of the grave to indicate its position for future sacrifices*." It is therefore clear that any graves associated with a particular *kgoro* may not be well marked and visible on the surface. However, Mönnig (1967:40) adds that "…*as soon as the grave is filled, the female relative who officiated previously approaches with a clay pot filled with water and purifying medicines. In the case of a polygamist, all his wives have to come, each with a pot. All the persons who took part in the burial, and who were thus contaminated with ditshila, then cleanse themselves by washing their hands in the water. Each woman then drops her pot on the grave, where it is shattered*." As this site was abandoned some time ago, no direct information with regards to the presence (or not) of graves is currently available.

The stone packed archaeological site of **TFC003** is rated as 3C (IIIC) given its degradation and could potentially be a grain bin stand or initiation cairn. The other features surrounding the potential grain bin stand / initiation cairn were too degraded which made identification difficult. The previously identified stone packed **Site 2-4** was given the same rating and is detailed thoroughly in the 2021 report (Fourie 2021).

The potential grave sites of **TFC001**, **TFC004** and **TFC005** still require further investigation, but burial grounds have a high heritage rating and a heritage grading of IIIA. **TCF001** contains potentially more than the 5 graves observed due to limited visibility. **TFC004** and **TFC005** contained

2 and 3 graves, respectively. Recommendations for **Site 2-1** and **Site 2-2** were detailed in the previous 2021 report (Fourie 2021).

Figure 24 - Fieldwork tracklogs (track in red, study area in green)

Figure 25 - Identified heritage resources within the development area

4.5 Palaeontology

According to the Palaeosensitivity Map available on the South African Heritage Resources Information System database (SAHRIS), the Palaeontological Sensitivity of the proposed development area is rated as low (blue) and high (orange) (**Figure 26**). A PDA was therefore completed (Butler 2023) and an additional chance finds procedure is included in the EMPr plan (Almond and Pether 2008, SAHRIS website).

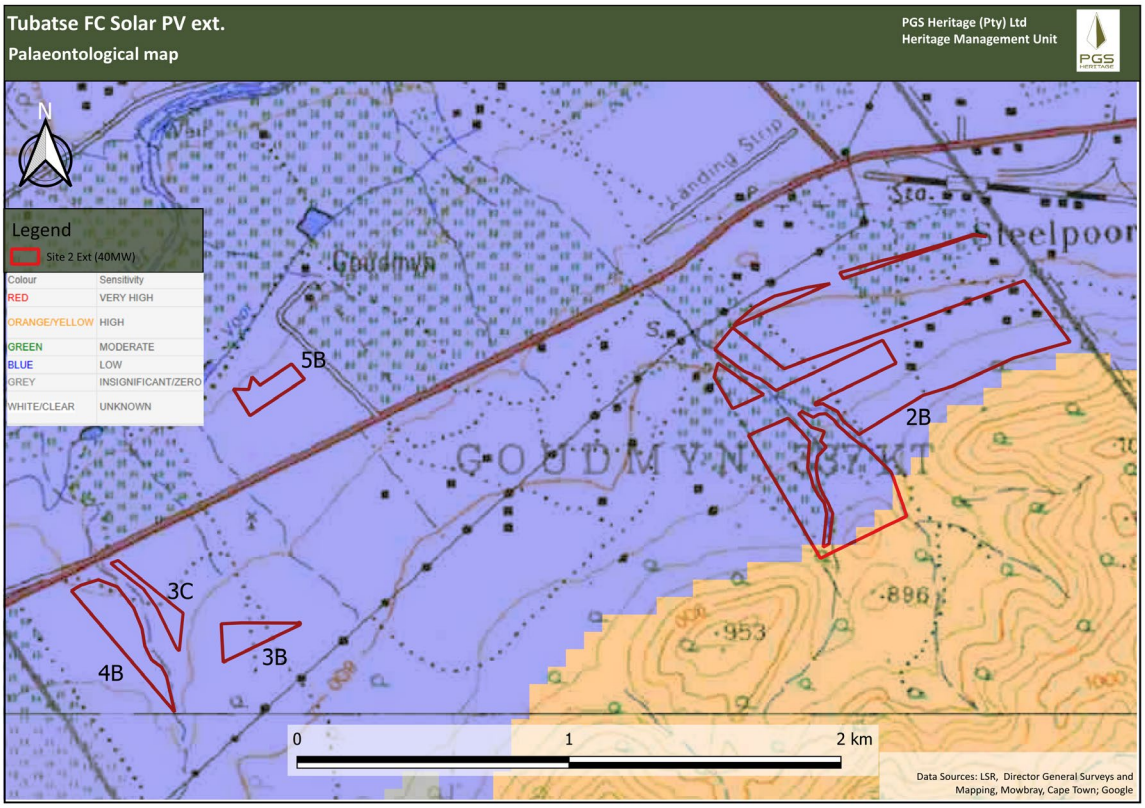

Figure 26 - The proposed 40MW extension area superimposed upon the palaeontological sensitivity of the area (40MW Site 2 ext. lies within the blue low sensitivity and orange high fossil sensitivity zones) - from the SAHRIS PalaeoMap map (Council of Geosciences).

5 IMPACT ASSESSMENT

The impact assessment rating is based on the rating scale as contained in **Appendix A**.

The following section provides an analysis of the impact of the proposed project area on heritage resources identified within the study area.

5.1 Details of all alternatives considered

This section describes alternative means of carrying out the operation and the consequences of not proceeding with the proposed project.

The “no-go” alternative refers to the option of not going ahead with the proposed project. This will entail maintaining the current status quo with no impact from the project.

5.1.1 Burial grounds and graves

The burial ground at sites TFC001, TFC004, TFC005, Site 2-1 and Site 2-2 have a high local heritage significance with 3A heritage grading. The possibility of the burial ground impacted by the proposed SF cannot be excluded and the project can potentially have a MODERATE impact without mitigation. Implementation of the recommended management and mitigation measures can reduce the impact rating.

5.1.2 Historical Structures

The impact on the recent historic structures (TFC002-1 – TFC002-8) and their potential unmarked graves identified during the fieldwork is calculated as having a MODERATE significance before and after the implementation of the proposed mitigation measures.

5.1.3 Archaeological resources

The two archaeological sites at TFC003 and Site 2-4 have a low local heritage significance with a low heritage grading (IIIC). The possibility of the archaeological resources impacted by the proposed 40MW solar ext. cannot be excluded and the project can potentially have a MODERATE impact without and with mitigation.

5.1.4 Palaeontology

The SAHRIS website notes that the paleontological significance and potential of the geology of the area is rated as low and high. The impact significance can be rated as MODERATE before and LOW after mitigation.

5.2 Impact assessment summary table

Implementing the impact assessment methodology as supplied by Royal HaskoningDHV**, Table 7** provides a quantitative assessment of the impacts of the proposed 40MW solar park extension.

Table 7: Impact Table

Site	Occurrence		Severity		Impact
Impact	**Probability of occurrence**	**Duration of occurrence**	**Scale/extent of impact**	**Magnitude (severity) of impact**	**SP Rating**
TFC001 Potential Graves	Definite	Permanent	Site only	High	Moderate
Pre-mitigation	5	5	1	8	70
TFC001 Potential Graves	Definite	Permanent	Site only	Minor	Moderate
Post-mitigation	5	5	1	2	40
TFC002 Historic Homestead	Definite	Permanent	Site only	Moderate	Moderate
Pre-mitigation	5	5	1	6	60
TFC002 Historic Homestead	Definite	Permanent	Site only	Minor	Moderate
Post-mitigation	5	5	1	2	40
TFC003 Stone Cairn	Definite	Permanent	Site only	Minor	Moderate
Pre-mitigation	5	5	1	2	40
TFC003 Stone Cairn	Definite	Permanent	Site only	Minor	Moderate
Post-mitigation	5	5	1	2	40
TFC004 Potential Graves	Definite	Permanent	Site only	Moderate	Moderate
Pre-mitigation	5	5	1	6	60
TFC004 Potential Graves	Definite	Permanent	Site only	Minor	Moderate
Post-mitigation	5	5	1	2	40
TFC005 Potential Graves	Definite	Permanent	Site only	Moderate	Moderate
Pre-mitigation	5	5	1	6	60
TFC005 Potential Graves	Definite	Permanent	Site only	Minor	Moderate
Post-mitigation	5	5	1	2	40

6 MANAGEMENT RECOMMENDATIONS AND GUIDELINES

The following section must be read in conjunction with **Table 9** of this report.

6.1 Construction and operational phases

The project will encompass a range of activities during the construction phase, including ground clearance, establishment of construction camp areas and small-scale infrastructure development associated with the project.

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 construction 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.

6.2 Chance finds procedure

- A heritage practitioner / archaeologist should be appointed to develop a heritage induction program and conduct training for the ECO as well as team leaders in the identification of heritage resources and artefacts **during the implementation of the EMPr**.
- 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.

6.3 Possible finds during construction

The study area occurs within a greater historical and archaeological site as identified during the desktop and fieldwork phase. Soil clearance for infrastructure as well as the proposed reclamation activities, could uncover the following:

- Historical structures and foundations
- unmarked burial grounds and graves

6.4 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 8** gives guidelines for lead times on permitting.

Table 8: 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 the development	Service provider – Archaeologist, SAHRA, local government and provincial government	6 months

6.5 Heritage Management Plan for EMPr implementation

Table 9: Heritage Management Plan for EMPr implementation

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
General project area	Implement a chance to find procedures in case where possible heritage finds are uncovered.	Construction	During construction	Applicant ECO Heritage Specialist	ECO (monthly / as or when required)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34-36 and 38 of NHRA	ECO Monthly Checklist/Report
Burial grounds and graves	TFC001, TFC004, TFC005, Site 2-1 and Site 2-2 to be avoided. All burial grounds and graves should be retained and avoided with a buffer zone of 30m as per SAHRA guidelines. If this is not possible, it is recommended that the structures at TFC001, TFC004, TFC005 and site 2-2 be investigated though test excavation to determine if there are graves. If it is found to be graves these graves including the graves at Site 2-2 must be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component, adhering to the requirements of s36 of the NHRA and its regulations as well as the National Health Act and its regulations.	Construction	During Construction	Applicant Environmental Control Officer (ECO) Heritage specialist	Monthly	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
Historical Structures	Site locality TFC002-1 – TFC002-8's structures are of low significance, but to be avoided given the potential for infant burial and unmarked graves. It is recommended that the possibility of still born burials are investigated through a stakeholder engagement process. If it is found that there are still born burials present the remains must be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component, adhering to the requirements of s36 of the NHRA and its regulations as well as the National Health Act and its regulations.	Pre-construction	After the approval of the EA and before construction occurs	Applicant Environmental Control Officer (ECO) Archaeologist		Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	ECO Monthly Checklist/Report
Archaeological sites	Monitoring during site clearing in a 20-meter radius from the identified archaeological sites TFC003 and Site2-4 through the implementing of an archaeological watching brief	Construction	Construction	Applicant Archaeologist SAHRA LIHRA	Monthly	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 of NHRA	Report after construction
Palaeontological resources	If fossil remains or trace fossils are discovered during any phase of construction, either on the surface or exposed by excavations the Environmental Control Officer (ECO) in charge of these developments must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation can be carry out by a palaeontologist	Construction	During Construction	Applicant Environmental Control Officer (ECO)	Monthly	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 and 38 of NHRA	ECO Monthly Checklist/Report

7 CONCLUSIONS AND RECOMMENDATIONS

The HIA identified various heritage resources within the study area including archaeological resources and burial grounds and graves which are rated as having a high heritage significance and will require further mitigation work before the project can continue.

During the fieldwork, twelve heritage features and resources were identified (**Figure 25**). These consist of three potential burial grounds with approximately 5 graves (**TFC001**), 2 graves (**TFC004**) and 3 graves (**TFC005**), one locality with recent historic structures (**TFC002-1 – TFC002-8**) and one low-significance archaeological site (**TFC003**).

Three additional sites previously identified in the 2021 survey (Fourie 2021) also fall within the current study area. **Site 2-1** is a gravesite with **Site2-2**, being a potential gravesite and **Site2-4** is another low significance archaeological site. All previous sites recommendations were detailed in the previous report (Fourie 2021).

See **Figure 24** and the individual site descriptions as contained in **Appendix B.** The field description forms were collected with ArcGIS Survey123 in field software.

7.1 Historical Structures

The multiple historic structures of the locality **TFC002** all receive the heritage significance rating of 3A(IIIA) this is due to the potential for stillborn burials located under the homestead, or unmarked graves in the area. The identified sites all lie within and are disturbed by the large servitude, therefore it would most likely be impossible to utilise the area however, a 30m buffer is advised around all sites identified in the vicinity to avoid costly mitigation measures.

It is recommended that the possibility of still born burials are investigated through a stakeholder engagement process. If it is found that there are still born burials present the remains must be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component, adhering to the requirements of s36 of the NHRA and its regulations as well as the National Health Act and its regulations.

7.2 Archaeological Site

The identified archaeological sites have a low heritage significance. Site **TFC003** will require mitigation, given the extensive mitigation done in the area previously. Monitoring during site clearing is recommended.

If any of the identified archaeological sites are to be disturbed, a Phase 2 archaeological mitigation process must be implemented. This will include surface collections, test excavations and analysis of recovered material. A permit issued under s35 of the NHRA will be required to conduct such work. On completion of the mitigation work, the developer can apply for a destruction permit with the backing of the mitigation report.

7.3 Burial grounds and graves

Burial grounds have a high heritage rating and a heritage grading of IIIA. According to the SAHRA graves management policy a buffer of at least 30-meters, as no-go area, must be kept around burial grounds and graves (TFC001, TFC004, TFC005, Site2-1 and Site2-2).

If this is not possible, it is recommended that the structures at TFC001, TFC004, TFC005 and site 2-2 be investigated though test excavation to determine if there are graves. If it is found to be graves these graves including the graves at Site 2-2 must be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component, adhering to the requirements of s36 of the NHRA and its regulations as well as the National Health Act and its regulations.

7.4 Palaeontology

The project's footprint is underlain by the Quaternary Alluvium and Magaliesberg Formations of the Pretoria Group (Transvaal Supergroup). Despite the vast majority of the study area being of low palaeontological sensitivity, a highly sensitive portion was identified (**Figure 26**) that, given SAHRIS' recommendations, required a Palaeontological Desktop Assessment (PDA). A subsequent PDA was then undertaken, in which a Moderate Palaeontological Significance was allocated for the construction phase of the development and a very low significance was given post-mitigation (see Butler 2023).

However, if fossil remains are discovered during any phase of construction, either on the surface or exposed by fresh excavations the Chance Find Protocol must be implemented by the ECO in charge of these developments. These discoveries ought to be protected (if possible, in situ) and the ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that suitable mitigation (e.g., recording and collection) can be carry out by a palaeontologist.

Preceding any collection of fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university

collection), while all fieldwork and reports should meet the minimum standards for palaeontological impact studies suggested by SAHRA.

7.5 Mitigation measures

Mitigation measures are described in **Table 9** of this report.

7.6 General

It is the combined considered opinion of the heritage specialists that the proposed project will have a direct impact on several identified heritage resources rated being of low to high heritage significance.

With the implementation of recommended mitigation measures the overall impact on heritage resources will be reduced to acceptable levels during the activities of the project.

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8.4 Internet

www.sanbi.org

8.5 Google Earth

MapSource and Google Earth were used to depict contemporary cartographic data.

APPENDIX A

ENVIRONMENTAL IMPACT METHODOLOGY

Royal HaskoningDHV: IMPACT ASSESSMENT METHODOLOGY

1. Impact Rating Methodology:

The potential environmental impacts associated with the project will be evaluated according to its nature, extent, duration, intensity, probability and significance of the impacts, whereby:

- Nature: A brief written statement of the environmental aspect being impacted upon by a particular action or activity;
- Extent: The area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales. This is often useful during the detailed assessment phase of a project in terms of further defining the determined significance or intensity of an impact. For example, high at a local scale, but low at a regional scale;
- Duration: Indicates what the lifetime of the impact will be;
- Intensity: Describes whether an impact is destructive or benign;
- Probability: Describes the likelihood of an impact actually occurring; and
- Cumulative: In relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

This approach incorporates two aspects for assessing the potential significance of impacts, namely occurrence and severity, which are further sub-divided as follows:

Occurrence		Severity	
Probability of occurrence	Duration of occurrence	Scale/extent of impact	Magnitude (severity) of impact

To assess each of these factors for each impact, the following four ranking scales are used:

1.1 Criteria for the Ranking of Impacts

Probability	Duration
5 - Definite/ don't know	5 - Permanent
4 - Highly probable	4 - Long-term
3 - Medium probability	3 - Medium-term (8 - 15 years)
2 - Low probability	2 - Short-term (0 - 7 years) (impact ceases after the operational life of the activity)
1 - Improbable	1 – Immediate
0 – None	0 - None
Scale	**Magnitude**
5 - International	10 - Very high/ don't know
4 - National	8 - High
3 - Regional	6 - Moderate
2 - Local	4 - Low
1 - Site only	2 - Minor
0 – None	0 - None

Once these factors have been ranked for each impact, the significance of the two aspects, occurrence and severity, must be assessed using the following formula:

SP (significance points) = (magnitude + duration + scale) x probability

The maximum value is 100 significance points (SP). The impact significance is then rated as follows:

1.2 Impact significance:

SP >75	Indicates high environmental significance	An impact which could influence the decision about whether or not to proceed with the project regardless of any possible mitigation.
SP 30 – 75	Indicates moderate Environmental significance	An impact or benefit which is sufficiently important to require management and which could have an influence on the decision unless it is mitigated.
SP <30	Indicates low environmental significance	Impacts with little real effect and which should not have an influence on or require modification of the project design.
+	Positive impact	An impact that constitutes an improvement over pre-project conditions

Impacts must be assessed and rated before and after mitigation.

APPENDIX B

SITE DESCRIPTION FORMS

Site coordinates		
site_nr	**X**	**Y**
TFC-001	30.2081	-24.74395
TFC-002-1	30.21443	-24.736
TFC-002-2	30.21495	-24.73581
TFC-002-3	30.2151	-24.73577
TFC-002-4	30.21584	-24.73558
TFC-002-5	30.21617	-24.73554
TFC-002-6	30.21662	-24.73643
TFC-002-7	30.21685	-24.73633
TFC-002-8	30.21567	-24.73666
TFC-003	30.2071	-24.74125
TFC-004	30.18376	-24.74839
TFC-005	30.18434	-24.74597

Site Number	Coordinates	Brief Site Description	Significance
TFC005	-24.74597 30.18434	An undisturbed stone packed feature - potential grave site made up of smaller stones. Bush clearing from the archaeological mitigation on Site 3 is visible close by. The stone mounds can potentially be associated with the archaeological at Site 3, however their alignment and general look indicates that the structures can be potential graves.	Grade 3 - A (IIIA), NCW

Figure 27 -Small stone packed mounded feature – potential grave

Figure 28 – Another view of the stone packed feature

Figure 29 – The second degraded stone packed mound, here much larger stones were used, and it is longer in length than the previous one (potential grave).

Figure 30 – A general view of the area.

Figure 31 – An alternate view of the second stone packed feature.

Figure 32 – The third stone packed feature (potential grave).

Site Number	Coordinates	Brief Site Description	Significance
TFC004	-24.74839 30.18376	Two stone packed features, mounding is indicative of possible graves. One feature with a potential headstone mostly packed with cobbles. Features are in a poor condition and are degraded.	Grade 3 - A (IIIA)

Figure 33 – Stone packed mound (potential grave).

Figure 34 – A closer view of he stone packed mound.

Figure 35 – A general view of the area.

Figure 36 – The second stone packed mound, with a headstone (potential grave).

Figure 37 – An alternate view of potential grave two.

Figure 38 – A close up of potential grave number two.

Site Number	Coordinates	Brief Site Description	Significance
TFC003	-24.74125 30.2071	Stone packed circular feature - potential grain bin/ initiation cairn. Less well-preserved circular features adjacent to the east of this one. This was the best preserved as others could not be explicitly identified.	Grade 3 - C (IIIC)

Figure 39 – Stone packed circular feature (potential archaeological grain bin stand/ initiation cairn).

Figure 40 – An alternate view of the potential grain bin stand/ initiation cairn.

Figure 41 - A general view of the area, other heavily degraded features can be seen the background.

Site Number	Coordinates	Brief Site Description	Significance
TFC002-8	-24.73666 30.21567	Poorly preserved historic homestead made with mud, stone, and concrete. Clear layers of larger stones visible in the walling with smaller stones throughout. Walls are damaged and washed away to the foundation mostly, and at their highest are 35cm tall/40-20cm wide. 4 rooms are observed of various sizes. Floors and pillars are concrete but damaged. Site has been recently used for fires. This site is part of a wider spread of similar houses. Associated artefacts -historic ceramic, glass and metal. Potential still born burials must be investigated	Grade 3 - A (IIIA)

Figure 42 – Poorly preserved historic homestead. Made of mud, stone and cement. Only foundation with bits of crumbled walling have preserved.

Figure 43 - A general view of the area.

Figure 44 – An alternate view of the homestead. Bits of degraded concrete are visible.

Site Number	Coordinates	Brief Site Description	Significance
Tfc002-7	-24.73633 30.21685	Square foundation homestead different from the rest as its a singular room. Packed with large stones around the perimeter of the foundation. This homestead falls within the same area as the other houses but appears differently made. Floor is concrete and is possibly part of TFC002-6 which lies about 5m east. It has a clearly different building style and is a singular separate homestead. Potential still born burials must be investigated	Grade 3 - A (IIIA)

Figure 45- Poorly preserved homestead, built in a slightly different style.

Figure 46 – A close up of the larger rocks used for the foundation.

Site Number	Coordinates	Brief Site Description	Significance
TFC002-6	-24.73643 30.21662	Poorly preserved historic homestead made with mud, stone and concrete. Clear layers of larger stones visible in the walling with smaller stones throughout. Walls are damaged and washed away to the foundation mostly, and at their highest are 1m tall/40-20cm wide. 8 rooms are observed of various sizes. Floors are concrete but damaged. Small patches of intact stone walling to the south. This site is part of a wider spread of similar houses. Associated artefacts -historic ceramic, glass and metal. Potential still born burials must be investigated.	Grade 3 - A (IIIA)

Figure 47 – Larger bit of walling visible of this poorly preserved historic homestead.

Figure 48 – A wider view of the poorly preserved homestead.

Figure 49 – Walling next to the weathered rubble of washed away walling, bits of concrete are visible.

Figure 50 – An alternate view of the homestead.

Figure 51 – A bit of intact stone walling using larger rocks packed with smaller rocks in a semi-circle around the southern portion of the homestead.

Site Number	Coordinates	Brief Site Description	Significance
TFC002-05	-24.73554 30.21617	Square foundation homestead different from the rest as it's a singular room. Packed with large stones around the perimeter of the foundation. This homestead falls within the same area as the other houses but appears differently made. Potential still born burials must be investigated	Grade 3 - A (IIIA)

Figure 52 – A poorly preserved homestead, built in a different style.

Figure 53 – A close-up of the larger rocks used to build its foundation.

Site Number	Coordinates	Brief Site Description	Significance
TFC002-4	-24.73558 30.21584	Historic homestead made with mud, stone, and concrete. Clear layers of larger stones visible in the walling with smaller stones throughout. Walls are damaged and washed away to the foundation mostly, and at their highest are 1.5m tall/40-20cm wide. 8 rooms are observed of various sizes. Floors and pillars are concrete where they are not damaged. Site has been recently used for fires. This site is part of a wider spread of similar houses. Associated artefacts -historic ceramic, glass, and metal. Potential still born burials must be investigated	Grade 3 - A (IIIA)

Figure 54 – A poorly preserved historic homestead.

Figure 55 – An alternate view of the homestead.

Figure 56 – A view of the intact walling of the homestead.

Figure 57 – A column of the homestead with bits of thin concrete attached.

Figure 58 – Intact walling of the homestead.

Site Number	Coordinates	Brief Site Description	Significance
TFC002-3	-24.73577 30.2151	Poorly preserved historic homestead made with mud, stone and concrete. Clear layers of larger stones visible in the walling with smaller stones throughout. Walls are damaged and washed away to the foundation mostly, and at their highest are 35cm tall/40-20cm wide. 4 rooms are observed of various sizes. Floors are concrete but damaged. Site has been recently used for fires. This site is part of a wider spread of similar houses. Associated artefacts -historic ceramic, glass, and metal. Potential still born burials must be investigated	Grade 3 - A (IIIA)

Figure 59 – Poorly preserved historic homestead.

Figure 60 – A close up of the homestead. Evidence of recent fires can be seen.

Figure 61 – Eroded metal artefacts in the vicinity.

Site Number	Coordinates	Brief Site Description	Significance
TFC002-2	-24.73581 30.21495	Poorly preserved historic homestead made with mud, stone and concrete. Clear layers of larger stones visible in the walling with smaller stones throughout. Walls are damaged and washed away to the foundation mostly, and at their highest are 40cm tall/40-20cm wide. 5 rooms are observed of various sizes. Floors are concrete but damaged. Site has been recently used for fires. This site is part of a wider spread of similar houses. Associated artefacts -historic ceramic, glass and metal. Potential still born burials must be investigated	Grade 3 - A (IIIA)

Figure 62 – A poorly preserved historic homestead.

Figure 63 – A close-up of the walling of the homestead.

Figure 64 – A view of the flooring of the homestead.

Site Number	Coordinates	Brief Site Description	Significance
TFC002-1	-24.736 30.21443	Historic homestead made with mud, stone and concrete. Clear layers of larger stones visible in the walling with smaller stones throughout. Walls are damaged and washed away to the foundation mostly, and at their highest are 1.5m tall/40-20cm wide. 7 rooms are observed of various sizes. Floors are concrete where they are not damaged. Site has been recently used for fires. This site is part of a wider spread of similar houses. Associated artefacts -historic ceramic, glass and metal.	Grade 3 - A (IIIA)

Figure 65 – Intact walling of the poorly preserved historic homestead (this one is the best preserved of the locality).

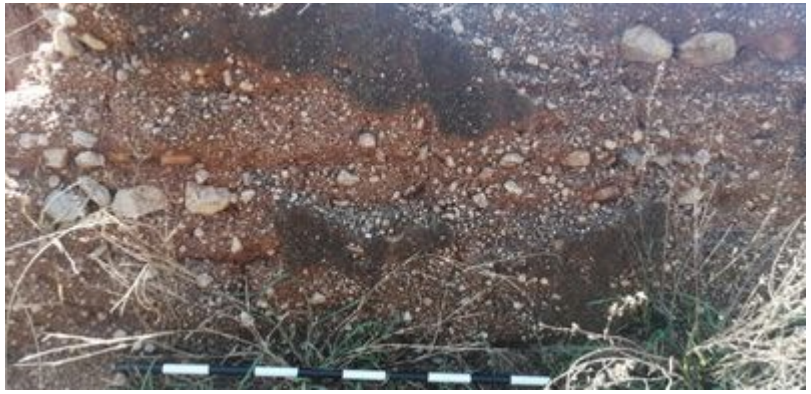


Figure 66 – A view of the method used to construct the walling, with rows of larger stones.

Figure 67 – Portions of concrete flooring still preserved.

Figure 68 – An alternate view of the homestead.

Figure 69 - A general view of the area looking West, the large servitude runs through the locality.

Figure 70 – A view inside the homestead.

Figure 71 - A general view of the area looking East, the servitude keeps the area from being overgrown.

Site Number	Coordinates	Brief Site Description	Significance
TFC001	-24.74395 30.2081	Five stone packed graves, potentially more but limited due to visibility. Mounds of heaped soil with stones packed on top. All facing east-west, no head or foot stones visible. Graves are degrading and no longer visited. Dense shrubbery surrounds the graves with trees growing through. An old metal bar can be seen on the first grave.	Grade 3 - A (IIIA)

Figure 72 – A stone packed, mounded feature (potential grave).

Figure 73 – an alternate view of the stone packed potential grave.

Figure 74 – The second stone packed, mounded feature (potential grave).

Figure 75 – An alternate view of the second degraded potential grave.

Figure 76 - The third stone packed, mounded feature (potential grave).

Figure 77 – An alternate view of the degraded potential grave.

Figure 78 - The fourth stone packed, mounded feature (potential grave).

Figure 79 – An alternate view of the fourth potential grave.

Figure 80 – The fifth stone packed, mounded feature (potential grave) including a general view of the area.

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
Site 2-1	24°44'16.08"S	30°12'20.28"E	Cemetery situated along proposed route of the powerline west of Alternative 2 2. This cemetery contains about 18 graves of various styles including packed stone and granite graves. The oldest marked grave dates to 1952.	High	IIIA

Figure 81 – Cemetery at Site 2-1

Figure 82 – Alternate view of cemetery at Site 2-1

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
Site 2-2	24°44'18.22"S	30°12'26.44"E	Possible graves at Site 2-2. These packed stone features are hidden and overgrown.	High	IIIA

Figure 83 – Possible graves

Figure 84 – Alternate view of Possible graves at Site 2-2

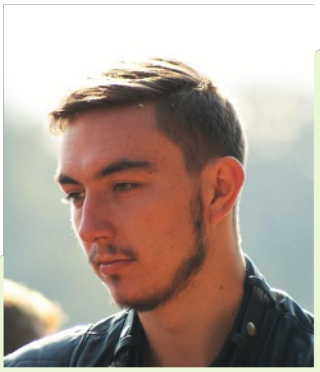
Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
Site 2-4	24°44'18.81"S	30°12'25.76"E	Site 2-4 marks an area with multiple packed stone features. These features are degraded making any identification difficult.	Low	IIIC

Figure 85 – Packed stone feature at Site 2-4

Figure 86 – Packed stone feature

APPENDIX C

PGS TEAM CVS



DANIEL TASKER

Professional Archaeologist

PROFILE

Junior Archeologist- holds a Masters degree in Archaeology specialising in the Early Stone Age and is registered with the Association of Southern African Professional Archaeologists as a Professional Archaeologist.

My work focuses on the process of heritage management through Heritage Impact Assessments, mitigation projects and artefact analysis. I currently work all over South Africa on numerous projects.

CONTACT

PHONE NUMBER: [redacted]

WEBSITE: [redacted]

EMAIL ADDRESS: [redacted]

PGS HERITAGE

EDUCATION

University of the Witwatersrand
2014 - 2016
BA Degree - Majors in Archaeology and Geography

University of the Witwatersrand
2017
BSc Hon Archaeology, with GIS.

University of the Witwatersrand
2018 – 2020
MSc by research in Archaeology, specialising in the Early Stone Age. (Golden Key member)

WORK EXPERIENCE

PGS Heritage -
Junior Archaeologist
2023- present
I am responsible for conducting heritage and archaeological impact studies, material analysis and archaeological excavations.

The University of the Witwatersrand, Origins Centre – Museum Tour Guide
2016 – 2019
Tour guiding of the human origins across Africa.

PROFESSIONAL AFFILIATION

Accredited Professional Archaeologist
Association of Southern African Professional Archaeologists – Since 2018

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, Mauritius, Malawi, Zambia, Mozambique, and the Democratic Republic of the Congo