Glencore Lydenburg Solar Photovoltaic Facility

On Portion 143 of Farm 30 Potloodspruit, Portions 114, 457 and 471 of Farm 31 Townlands of Lydenburg, Portion 1 of Lydenburg Smelter Erf 6099, Lydenburg Smelter Erf 2540 and Lydenburg Smelter Erf 2541 within the Thaba Chweu Local Municipality, Mpumalanga

Heritage Impact Assessment

Template Number	Document Number	Revision	Date
PGS PJ REP 007 01	745HIA-001	2.0	12/05/2024

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REVISION HISTORY

Version	Issue Date	Description of Changes
01	27/11/2023	First draft
02	12/05/2024	Revised and included palaeontological assessment findings

Declaration of Independence

- I, Jessica Angel, 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;

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ACKNOWLEDGEMENT OF RECEIPT

Report Title	Heritage Impact Assessment – Glencore Lydenburg Solar Photovoltaic Facility		
Control	**Name**	**Signature**	**Designation**
Author	J Angel		PGS Heritage Senior Archaeologist
Reviewer	W Fourie		PGS Heritage Principal Heritage Specialist

CLIENT: **Environmental Impact Management Services (Pty) Ltd**

CONTACT PERSON: **John Von Mayer**
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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 (PGS) was appointed by Environmental Impact Management Services (Pty) Ltd (EIMS) to undertake a Heritage Impact Assessment (HIA) for the proposed Glencore Lydenburg solar photovoltaic facility on Portion 143 of Farm 30 Potloodspruit, Portions 114, 457 and 471 of Farm 31 Townlands of Lydenburg, Portion 1 of Lydenburg Smelter Erf 6099, Lydenburg Smelter Erf 2540 and Lydenburg Smelter Erf 2541 within the Thaba Chweu Local Municipality, Mpumalanga.

A further standalone Palaeontological Desktop Assessment (PDA) was completed for PGS by Dr Elize Butler of Banzai Environmental.

During the fieldwork a total of **four** heritage features and resources were identified (**Figure 16**). These consist of three Iron Age/ agro-pastoral sites (**LS001, LS003 and LS004**), and one structure which is and old school building **(LS002).** See **Figure 17, Figure 18, Figure 20 and Figure 21** and the individual site descriptions as contained in **Appendix B** The field description forms were collected with ArcGIS Survey123 in field software.

Historical Structures

The school structure (**LS003**) is not presented on the 1969 first edition maps, but is on the 1988 second edition topographic maps, and is therefore not older than 60 years. (**Section 4.2.1**). The structure has two rooms is built with brick, and has a corrugated iron roof. Cement lintels are above the three large windows on either side of the two centred doors. The structure is not conservation-worthy.

Archaeological Site

Three Iron Age/Agro-pastoral sites were located. **LS001** is a complex stone-walled Bokoni homestead and is graded as Grade IIIA. Site **LS001** Is a classic example of a complex Bokoni homestead. The inner ring-wall, which was identified, separated the domestic area from the livestock area, which occurs in the centre. The inner ring had two clear entrances, which is also a unique feature in precolonial South Africa, according to Delius *et al* (2014). "*This inner ring would allow for a controlled movement of cattle where some can remain in the central enclosure while others can be moved through its opposite entrance, into the walled passage which in turn gives access to the attached enclosures"* (Delius *et al.,* 2014 pp74). The walled passage described by Delius *et al* (2014) was also identified at this site.

LS002 was very disturbed and overgrown. It was, therefore, difficult to assess the structure and pattern. There were middens and grinding stones in the vicinity. Site **LS002** has a grading of IIIA.

The Bokoni stone ruins are one of the richest visible and enduring forms of heritage from any group of people living in South Africa before the beginning of colonial times (Delius *et al.,* 2014). The remains provide historians and archaeologists with the possibility of reconstructing in detail this now-extinct way of life (Delius *et al.,* 2014). **LS001** and **LS002** are, therefore graded as Grade IIIA and should be avoided with a 30m buffer.

If the sites are affected directly, the sites **LS001** and **LS002** will need to be documented during a Phase II mitigation procedure before a destruction permit can be applied for at the South African Heritage Resources Agency.

LS004 is a single stone wall. The area was also heavily overgrown and it was difficult to discern any structure or patterning to the site. LS004 is graded as Grade IIIC. The chance find procedure must be followed in proximity to this site. No other mitigation measures are required.

The possibility of stillborn burials around the structures **LS001** and **LS002** must be considered. As per African custom stillborn children are buried against the outside wall/foundation or inside the house. The structures (**LS001 and LS002**) must then be provisionally grade as Grade IIIA in regards to burials. As per SAHRA guidelines, all burial grounds and graves should be retained and avoided with a buffer zone of 30m. If this is not possible, the graves could 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.

Palaeontology

The proposed Glencore Lydenburg PV Facility is largely underlain by the Silverton Formation of the Pretoria Group (Transvaal Supergroup) as well as Quaternary superficial sediments. The Pretoria Group sedimentary rocks in and near the study area are extensively intruded, and locally metamorphosed, by sills of diabase. The diabase has no palaeontological significance. However, the existence of the diabase rocks would have had a thermal metamorphic effect on nearby sediments and would decrease the chance of fossil preservation. According to the PalaeoMap of the South African Heritage Resources Information System (SAHRIS) the Palaeontological Sensitivity of the Silverton Formation (Pretoria Group, Transvaal Supergroup) is High, that of the Quaternary Superficial sediments are Low, while that of the diabase is Zero. Updated geology (2014, Council of Geosciences, Pretoria) indicates that the proposed study area is only underlain by the Silverton Formation (Pretoria Group, Transvaal Supergroup).

Based on desktop research it is concluded that fossil heritage of scientific and conservational interest in the development footprint is rare. This is in contrast with the High Sensitivity allocated to the development area by the SAHRIS Palaeosensitivity Map and DFFE Screening Tool. **A medium Palaeontological Significance has been allocated for the construction phase of the PV development pre-mitigation and a low significance post mitigation**. The construction phase will be the only development phase impacting Palaeontological Heritage and **no significant impacts are expected to impact the Operational and Decommissioning phases**. The No-Go Alternative considers the option of 'do nothing' and maintaining the status quo, will have a Neutral impact on the Palaeontological Heritage of the development. The **Cumulative impacts of the development is considered to be medium pre- mitigation and Low post mitigation and falls within the acceptable limits for the project**. It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. **The construction of the development may thus be permitted in its whole extent, as the development footprint is not**

considered sensitive in terms of palaeontological resources. It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils.

Conclusion

It is the combined considered opinion of the heritage specialists that the proposed project **will** have a direct impact on the identified heritage resources, rated as being of low to high heritage significance. Sites LS001 and LS002 are Bokoni homesteads which represent valued historical heritage and it is recommended that the sites should be avoided with a 30m buffer or need to be documented during a Phase II mitigation procedure before a destruction permit can be applied for at the South African Heritage Resources Agency. With the implementation of recommended mitigation measures, the overall impact on heritage resources will be reduced to acceptable positive levels during the project activities.

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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 remains of plants, 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
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
ECO	Environmental Control Officer
EFC	Early Farming Communities
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
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
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PHRA-G	Gauteng Provincial Heritage Resources Authority
PHS	Provincial Heritage Site
PSSA	Palaeontological Society of South Africa
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency

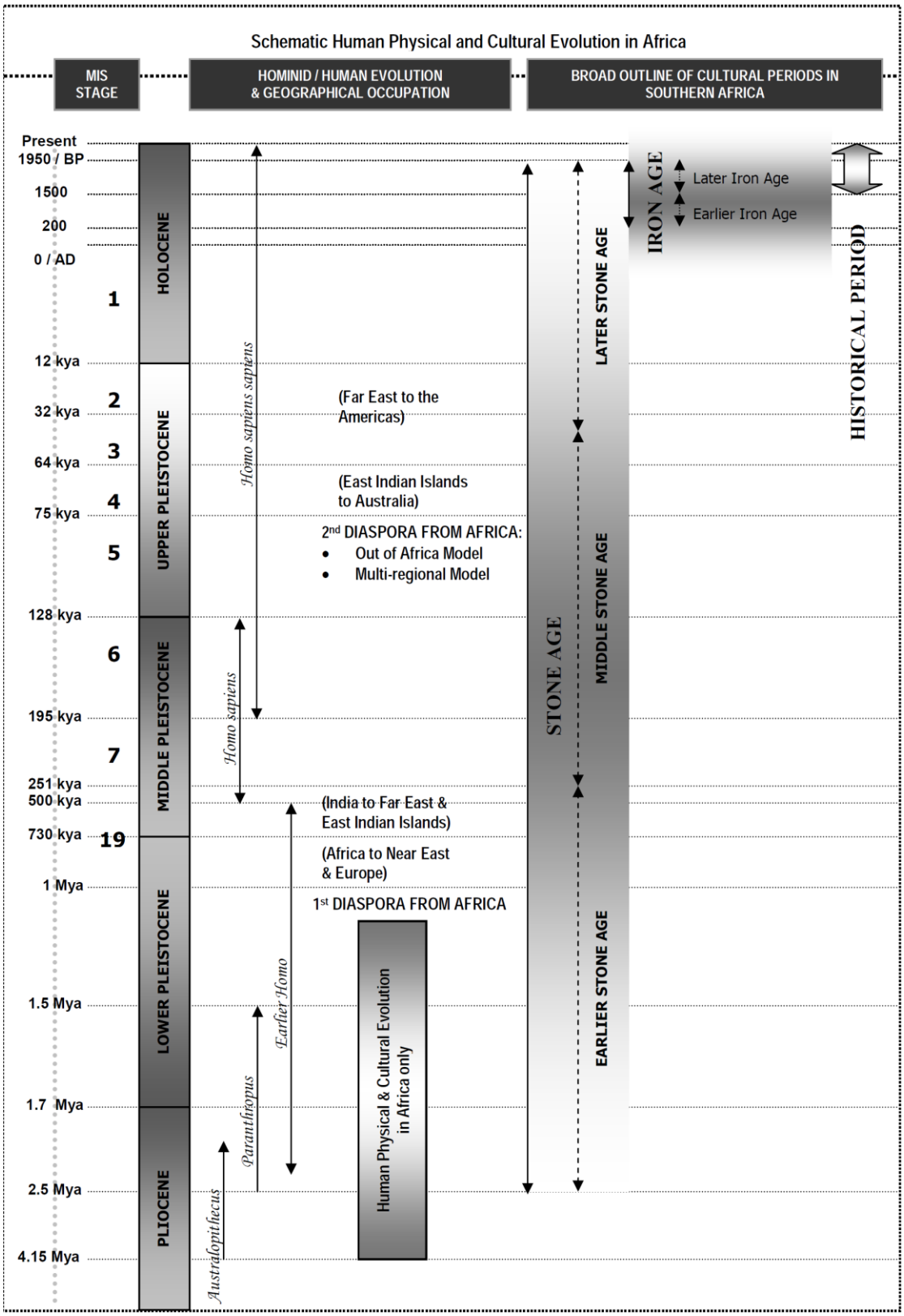


Figure 1 – Human and Cultural Timeline in Africa

1 INTRODUCTION

PGS Heritage (Pty) Ltd (PGS) was appointed by Environmental Impact Management Services (Pty) Ltd (EIMS) to undertake a Heritage Impact Assessment (HIA) for the proposed Glencore Lydenburg solar photovoltaic facility on Portion 143 of Farm 30 Potloodspruit, Portions 114, 457 and 471 of Farm 31 Townlands of Lydenburg, Portion 1 of Lydenburg Smelter Erf 6099, Lydenburg Smelter Erf 2540 and Lydenburg Smelter Erf 2541 within the Thaba Chweu Local Municipality, Mpumalanga.

A further standalone Palaeontological Desktop Assessment (PDA) was completed for PGS by Dr Elize Butler of Banzai Environmental.

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 and propose the appropriate management measures based on their heritage significance and project impacts. The HIA informs the BA to assist the project in managing the discovered heritage resources responsibly, to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999) (NHRA).

1.2 Specialist Qualifications

PGS compiled this HIA Report.

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.

Jessica Angel, the author of this report, is registered as a Professional Archaeologist with the Association of Southern African Professional Archaeologists (ASAPA). She has 10 years of experience in the heritage assessment field and holds a Master’s degree (MSc) in Archaeology from the University of the Witwatersrand.

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.

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 additional heritage features and/or objects be located or observed outside the identified heritage sensitive areas during the project 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 assess as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. If any graves or burial places are 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, 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 Government Notice (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 4.2	
2.2 (b) a preliminary on-site inspection to identify if there are any discrepancies with the current use of land and environmental status quo versus the environmental sensitivity as identified on the national web-based environmental screening tool, such as new developments, infrastructure, indigenous/pristine vegetation, etc.	Section 4.2	-
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 4.2	-
2.3(b) contains motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity;	section 4.2	-

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 the NHRA. This study falls under Section 38(8) and requires comment from the relevant heritage resources authority.

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[1].

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. All applicable documents, including the HIA report, the EIA report and the other supporting studies, will be submitted to SAHRA for Statutory Comment and Feedback, and to the Provincial Heritage Resources Authority (PHRA) for noting.

2 TECHNICAL DETAILS OF THE PROJECT

2.1 Locality

The proposed project is located within the Thaba Chweu Local Municipality, Mpumalanga. The site is located approximately 2km north of Lydenburg town central area. The center point of the site is 25° 4'0.26"S; 30°28’9.47”E (Error! Reference source not found.).

2.1.1 Site Description

The application area is on Portion 143 of Farm 30 Potloodspruit, Portions 114, 457 and 471 of Farm 31 Townlands of Lydenburg, Portion 1 of Lydenburg Smelter Erf 6099, Lydenburg Smelter Erf 2540 and Lydenburg Smelter Erf 254, with a footprint area of approximately 379ha (Error! Reference s ource not found.)

2.2 Technical Project Description

2.2.1 Project description

Glencore Operations South Africa (Pty) Ltd (hereafter referred to as the applicant) has appointed Environmental Impact Management Services (Pty) Ltd (EIMS) as the Environmental Assessment

[1] EIMS appointed PGS to complete the independent HIA process.

Practitioner (EAP) to assist with undertaking the required authorisation processes (including the statutory public participation), and to compile and submit the required documentation in support of application for:

- Environmental Authorisation (EA) in accordance with the NEMA- Listed activity/ies:
- Listing Notice 1 (GNR 983): Activity 11 and 14.
- Listing Notice 2 (GNR 984): Activity 1 and 15.
- Listing Notice 3 (GN 985): Activity 12 and 14.
- Water Use Licence (WUL) in accordance with the National Water Act – NWA (Act 36 of 1998) - Listed activity/ies: Section 21 (c) and Section 21 (i).

Additional listed activities and/or water uses may be identified during the process. The applicant wishes to develop a Solar Photovoltaic (PV) Energy Generation Facility at the Lydenberg Smelter. The generation capacity will be up to 300 megawatts to provide power to Lydenburg smelter or will be wheeled to other Glencore operations. The electricity generated from the facility will be used at the Lydenburg smelter or will be wheeled to other Glencore operations.. Other possible infrastructure will include an on-site substation / switching station, access roads, battery energy storage system and a 132kV power lines.

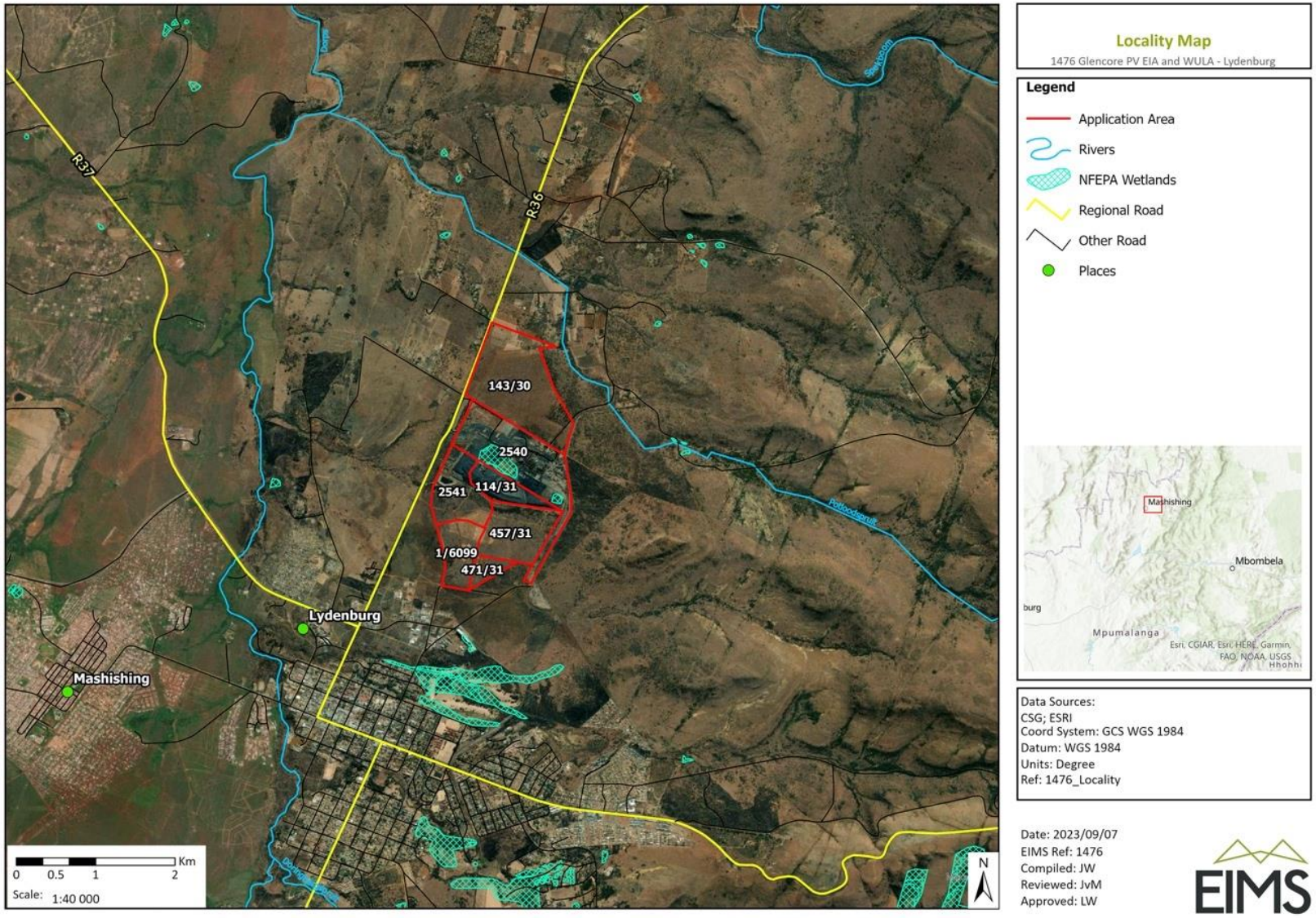


Figure 2 – Locality of the Glencore Lydenburg application area.

2.2.2 Scope of Work

The aims of the HIA are to firstly outline the findings of the desktop studies in relation to the overall exploration right area and secondly to identify heritage sites and finds that occur in the application area currently proposed. The HIA informs the EIA in the development of a comprehensive EMPr to assist the development process in responsibly managing the identified heritage resources, to protect, preserve and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999) (NHRA).

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 for the Glencore Lydenburg PV Facility. 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 vehicle and pedestrian access through the proposed project area by two qualified heritage specialists (9th October 2023), 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, considering the grading system approved by SAHRA for archaeological impact assessments. The updated 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 2** and

Table 3).

Table 2: 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 retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant or the consultant and approved by the authority.	No research potential or other cultural significance

Table 3: 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. 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	Low Significance

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
		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 EIMS and is explained in **Appendix A**.

4 CURRENT STATUS QUO

4.1 Site Description

The study area's vegetation is disturbed by previous activity around the smelter such as slap dumps, roads and clearings. Besides these activities, much of the area remains undisturbed open grasslands with dense vegetation across the landscape.

In terms of region’s vegetation, the study area is characterised by the Lydenburg Thornveld vegetation type. This unit occurs at lower levels at the foot of the mountains and on undulating plains. This is open, frost-hardy woodland. Structurally this unit comprises closed grassland, which is almost always wooded, sometimes densely so in rocky areas and less so in frost-ridden valleys where *Acacia karroo* is still able to persist. Many woody plants have evolved a suffrutex habit (*Argyrolobium wilmsii*), where aerial parts die back to an underground rootstock during cold winters. (Mucina and Rutherford, 2006).

Existing surrounding land uses associated with the project area are mostly agricultural farming and mining activities.

Overall, the accessibility of the project footprint area was difficult. The smelter plant had restrictive access and much of the area was densely vegetated. Several photographs below provide general views of the study area and the landscape within which it is located.

Figure 3 – View of the sunflower crops on the northers side of the proposed exploration area

Figure 4 – View of thornveld vegetation of the application area

Figure 5 – View of dense vegetation at the southern side of the application area

Figure 6 – View of rocky outcrops at the southern side of the application area

4.2 Overview of the study area and surrounding landscape

The high-level archival research focused on available information sources that were used to compile a general background history of the study area and surrounds.

The province of Mpumalanga is known to be rich in archaeological sites that tell the story of humans and their predecessors in the region going back some 1,7 million years (Delius & Hay, 2009). The pre-colonial period is divided broadly into the Stone Age and the Iron Age.

DATE	DESCRIPTION
2.5 million to 250 000 years ago	The Earlier Stone Age (ESA) is the first phase identified in South Africa's archaeological history and comprises two technological phases. The earliest of these is known as Oldowan and is associated with crude flakes and hammer stones. It dates to approximately 2 million years ago. The second technological phase is the Acheulian and comprises more refined and better made stone artefacts such as the cleaver and bifacial hand axe. The Acheulian dates back to approximately 1.5 million years ago. The archaeological literature does not contain much information on the Stone Age archaeology of this area, since this period has not been researched extensively in Mpumalanga (Esterhuysen & Smith, 2007). However, it is clear from the general archaeological record that the larger Mpumalanga region has been inhabited by humans since Earlier Stone Age (ESA) times. Although no Stone Age sites are known from the immediate vicinity of the study area, there are some sites recorded in the greater region (Esterhuysen & Smith, 2007). An Earlier Stone Age site is located at Maleoskop near Groblersdal. Concentrations of ESA stone tools were found in erosion gullies along the Rietspruit (Esterhuysen & Smith, 2007).
250 000 to 40 000 years ago	The Middle Stone Age (MSA) 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. Evidence for the Middle Stone Age (MSA) period has been excavated from Bushman Rock Shelter, situated on the farm Klipfonteinhoek in the Ohrigstad District. The MSA layers indicated that the cave was visited repeatedly over a long period, between approximately 40 000 years ago and 27.000 Before Present (Esterhuysen & Smith, 2007).
40 000 years ago, to the historic past	The Later Stone Age (LSA) is the third archaeological phase identified and is associated with an abundance of very small artefacts known as microliths. Two Later Stone Age (LSA) sites were found at the farm Honingklip near Badplaas in the Carolina District, (Esterhuysen & Smith, 2007).
First millenniu m-1500	The Iron Age as a whole represents the spread of Bantu speaking people whose way of life was pastoral-agricultural and includes both the Pre-Historic and Historic periods. As indicated by the name, this period is distinguished by the knowledge

	of extraction and use of various metals, mainly iron. Similarly to the Stone Age, it can also be divided into three periods: • *The Early Iron Age:* Most of the first millennium AD; • *The Middle Iron Age*: 10th to 13th centuries AD; and • *The Late Iron Age:* 14th century to colonial period (Delius & Hay, 2009; Morris, 2008). The basis of cultural sequence is a combination of ceramic typology, stratigraphy, and radiocarbon dates. The incomplete sequence of the Lydenburg area recognises four phases: Marateng, Eiland, Klingbeil and Lydenburg. In the following section, a short synopsis will be given of the Lydenburg and Klingbeil phases.
1st Millennium	Early Iron Age: Early farming communities moved into the Mpumalanga area around 500 AD. These early farmers used metal tools and pottery and lived in fairly permanent agricultural villages. The most well-known EIA site in the area is the Lydenburg Heads site in the Sterkstroom Valley. Lydenburg Phase: Five sites with Lydenburg pottery have been excavated up to 1981. These are the Heads site, Doornkop, Plaston, Langdraai and Klipspruit. All these sites are located on lower valley slopes in interfluve situations at the confluence of two streams. These sites are relatively large measuring between 7 to 15 hectares. Klingbeil Phase: The sites of the Klingbeil Phase appear to have a similar distribution to the Lydenburg Phase. The Klingbeil Nature Reserve sites and other Early Iron Age sites are essentially in the same topographical location (Evers, 1981). Klingbeil 2530AB1 and 2 The site is situated in the Gustav Klingbeil Nature Reserve. It covers an area of approximately 4 hectares. The site was severely damaged by the construction of a dam spillway in 1976. The sites were covered by a 0,5 to 1 meter layer of colluvium making them impossible to identify from surface features. Both these sites belong to the Early Iron Age Tradition (Evers, 1981).
600-700AD	The Lydenburg Heads Site: During the discovery of the site in 1964 seven clay heads, pottery, achatina and metal beads, bone and ivory objects and some stone bowls were found. Charcoal found was later radiocarbon dated between 600 – 700 AD (Evers, 1981).

	The find of the heads was unique and only two other excavations produced fragments of similar construction, however the Heads site is still the main find spot for these terracotta heads (Evers, 1981)
14th C – Colonial period	Late Iron Age: Late Farmer societies developed extensive stone settlements around Lydenburg, Badfontein, Sekhukhuneland, Roossenekal and Steelpoort (Delius & Hay, 2009). The greater Belfast area specifically, is known for its large complexes of LIA stonewalling. Although there was some early research on the stone ruins in the general region of the then-named eastern Transvaal, systematic investigation of the ruins only began in the last decade (Collett, 1982). Evers (1975) and Mason (1968) both undertook surveys of aerial photographs of the general area and identified a vast number of such settlements between Lydenburg and Machadodorp. Evers noted that settlements are not evenly distributed over the area, largely for topographical reasons (1975). These settlements typically consisted of three interrelated elements: homesteads, with cattle kraals surrounded by enclosures for human habitation; stone-edged paths or roadways, probably for movement of cattle; and stone terraces, for agricultural cultivation. Most of the homesteads were built in symmetrical patterns, some of which were reproduced in rock engravings found close to these settlements (Delius and Hay, 2009). With regard to dating, the beginning of the Late Iron Age in this region is obscure. At the time of Evers' article there were no sites known that were intermediate in age between the Early Iron Age sites and the later stone-walled sites. However, since elsewhere in the then-named Transvaal and Orange Free State, stone-walled building appeared to start around A.D. 1450-1500, this was thought to be true in this region as well (Evers, 1975). Settlement location and layout Collett (1979) as well as Marker and Evers (1976) have indicated that settlements were located on the lower foot slopes and spur ends of koppies/ridges, while a westerly aspect was preferred. Homesteads can be divided into two groups. The first comprises two concentric circles and is mostly small. The second is more elaborate and larger. It comprises a central ring with two opposite openings with a number of concentric circles around it. The huts were usually built between the two walls. The outer wall is usually mistaken for a terrace wall and not seen as part of the settlement (Evers, 1981).

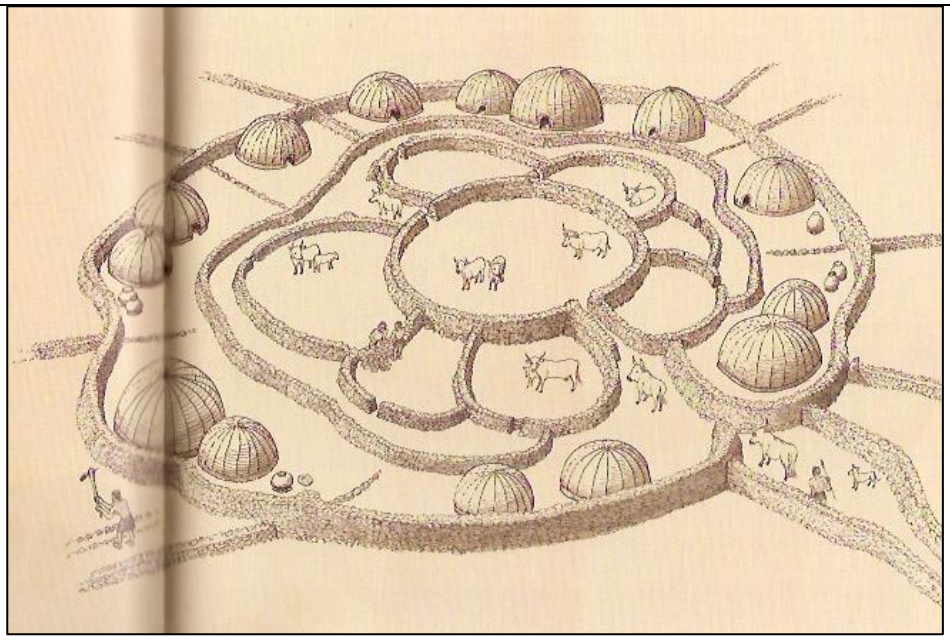


Figure 7 - Artists impression of what a homestead might have looked like during its occupation (Drawing: Tim Maggs, in Delius et al 2014 pp 75)

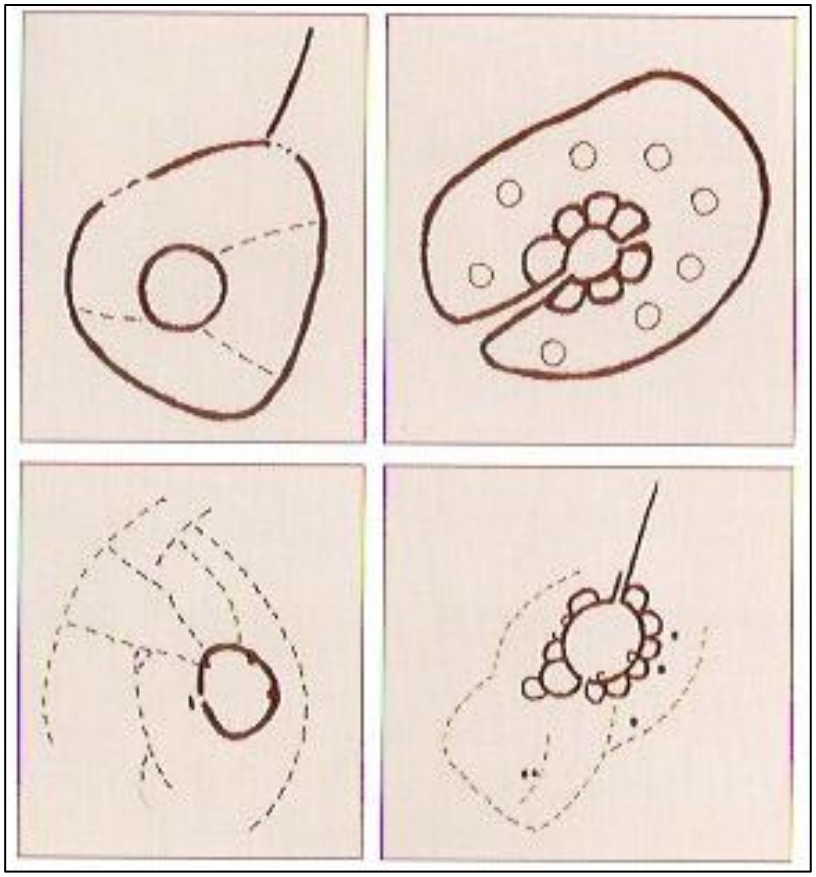


Figure 8 - Examples of Bokoni homesteads. Simple sites on the left. Complex sites with position of homesteads arranged around the central group of livestock pens, on the right (Delius et al, 2014)

Terraces on gentle slopes are often just stone lines, possibly serving as boundary markers between fields. On steeper slopes, close-set, well-built walls are found retaining up to a meter of soil (Evers, 1981).

Cattle tracks usually link directly from the outside of the homesteads to the central kraal. Several major cattle tracks are found with in a settlement linking several homesteads.

Rock Engravings

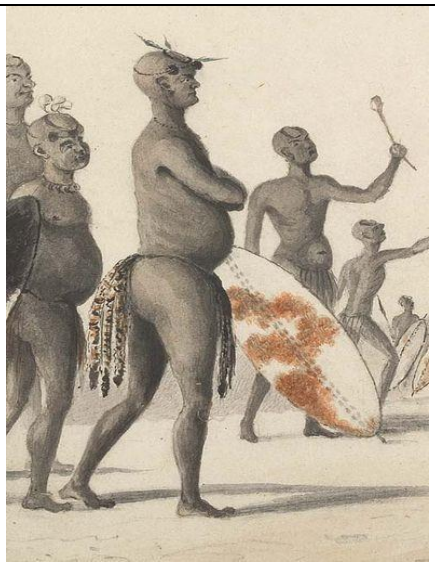
An article by Maggs (1995), explains that these agriculturist engravings are mainly dominated by depictions of ground plans representing the shape of settlements people built and lived in. Virtually all known engraved sites are in the vicinity of Late Iron Age settlements and it is now known that such engravings are much more common than was thought previously. Fieldwork in several such regions has produced many formerly unrecorded sites within the limited areas searched. Therefore, Maggs recommended that future fieldwork on the stone-built settlements should incorporate an examination of neighbouring rock outcrops for possible engravings (*ibid*). Maggs' article highlights that such images may represent abstract or symbolic spatial arrangements reflecting the cosmology of the society that made them. He uses an example taken from the Pedi, a northern Sotho group linked geographically and culturally with the Mpumalanga engravings. Within this system, social and religious structure was, and among many rural communities still is, clearly inseparable. Each member literally knows their place within the homestead according to their age, sex and status (*ibid*).

Bloomplaats National Heritage which is an Iron Age rock engraving site, occurs just north west of the current study area. See Figure 13.

Ethnographic History

The Pedi oral tradition refers to the people living near Orighstad and Lydenburg as Koni (Hunt, 1931 from Evers, 1981). "…*They were raided early in Pedi history under Chief Moukangoe and later came under Pedi rule in the days of Thulare who reigned in the late eighteenth and early nineteenth centuries. One of Thulare's sons was placed in charge of the Koni near Orighstad. The Pedi west*

	of the Steelpoort River and the Koni were devastated by Mzilikazi in about 1826 Hunt (1931) recorded accounts *of retreat to caves and other refuges in the mountains, severe famine, stock loss and cannibalism. Caves near Orighstad and Sabie, and krantz situations near Lydenburg all seem to have been occupied late in the Iron Age…*", (Evers, 1981). <u>Terraced Agriculture</u> The term 'Bokoni' means the area of Koni settlement. Terracing is the most distinctive feature of Bokoni economy and society (Delius *et al*, 2014). The terraces form complicated networks enclosing small fields, from a few square meters to several thousand square meters in size (Delius *et al*, 2014). The function of these terraces was intended to slow down rainwater runoff and reduce soil erosion. Without the terraced walls, the slopes would be rapidly eroded and therefore lost to cultivation (Delius *et al*, 2014). This method of agriculture allowed the Koni to extend sustainable agriculture to much larger areas of the escarpment than had been possible previously (Delius *et al*, 2014).
AD 1821 – AD 1823	After leaving present-day KwaZulu-Natal, the Khumalo Ndebele (more commonly known as the Matabele) of Mzilikazi migrated through the general vicinity of the study area under discussion before reaching the central reaches of the Vaal River in the vicinity of Heidelberg in 1823 (www.mk.org.za). Two different settlement types have been associated with the Khumalo Ndebele. The first of these is known as Type B walling and was found at Nqabeni in the Babanango area of KwaZulu-Natal. These walls stood in the open without any military or defensive considerations and comprised an inner circle of linked cattle enclosures (Huffman, 2007). The second settlement type associated with the Khumalo Ndebele is known as Doornspruit, and comprises a layout which from the air has the appearance of a 'beaded necklace'. This layout comprises long scalloped walls (which mark the back of the residential area) which closely surround a complex core, which in turn comprises a number of stone circles. The structures from the centre of the settlement can be interpreted as kitchen areas and enclosures for keeping small stock. It is important to note that the Doornspruit settlement type is associated with the later settlements of the Khumalo Ndebele, in areas such as the Magaliesberg Mountains and Marico, and represents a settlement under the influence of the Sotho with whom the Khumalo Ndebele intermarried. The Type B settlement is associated with the early Khumalo Ndebele settlements and conforms more to the

	typical Zulu form of settlement. As the Khumalo Ndebele passed through the general vicinity of the study areas shortly after leaving Kwazulu-Natal, one can assume that their settlements here would have conformed more to the Type B than the Doornspruit type of settlement. It must be stressed however that no published information could be found which indicates the presence of Type B sites in the general vicinity of the study area. No sites associated with this period of the archaeological history of the surroundings of the study area are presently known.
	 *Figure 9: King Mzilikazi of the Matabele. This illustration is by Captain Cornwallis Harris in c. 1838 (www.sahistory.org.za).*
1832	At this time, a Zulu impi of King Dingane moved through the general vicinity of the study area on their way to attack the Matabele of Mzilikazi, who were settled along the Magaliesberg Mountains (Bergh, 1999).
1836	The first Voortrekker parties started crossing over the Vaal River at this time. The earliest Voortrekker party to cross over the Vaal River was the one under the leadership of Louis Trichardt and Johannes Jacobus Janse van Rensburg. Although the exact route followed by the Trichardt-Janse van Rensburg party was not recorded, one suggestion is that they passed through the strip of land in-between the Bronkhorst Spruit in the west and the Wilge River to the east (Bergh, 1999). These two rivers are located to the east of Delmas.
1841 – 1850	These years saw the early establishment of farms by the Voortrekkers in the general vicinity of the study area (Bergh, 1999).

1845	Both the district and town of Lydenburg were established in this year (Bergh, 1999). The district of Lydenburg at the time encompassed a massive land mass, and it would appear that the study area fell just within this newly proclaimed district at the time.
1857	The district of Pretoria was established in 1857, with the town of that name established in 1855 (Bergh, 1999). The study area now fell within this newly proclaimed district.
1866	The town and district of Heidelberg were established in this year (Bergh, 1999). The study area fell within the Heidelberg district at this time.
1899 – 1902	The South African War took place during this time. No events or activities during the war can be associated with the present study area. However, a number of such events and activities are known from the general vicinity. These will be briefly mentioned in the paragraphs below. Skirmishes or battles from the surrounding landscape include an action between a British force under the command Lieutenant-General J.D.P. French and a Boer commando of some 1 000 men on 23 July 1900. The main component of the battle occurred a short distance to the east and south-east of the present-day town of Delmas (Changuion, 2001). Another incident occurred during the early morning of 26 December 1900, when a section of the Heidelberg Commando of some 350 men attacked the town of Benoni, as well as some of the gold mines surrounding the town, including the Kleinfontein Mine. The attack was a success, and according to some eye witnesses resulted in 22 British casualties (eight killed and 14 wounded), as well as the capture of three prisoners by the Boer commando (Blake, 2012). It is also interesting to note that the Boer Commando used the farm Rietkol as a meeting place from where the attack on Benoni proceeded (Blake, 2012).

	 *Figure 10 - Henning Petrus Nicolaas Viljoen of the Heidelberg Commando, who's diary provides an eyewitness account of the attack on Benoni and its mines on 26 December 1900 (Blake, 2012).*  *Figure 11 - Lieutenant-General J.D.P. French, the commanding officer of the British force at the battle which occurred in close proximity to Delmas on 23 July 1900 (Changuion, 2001:77).* -
1902	After the end of hostilities in 1902, the new Witwatersrand District was created from farms which were previously located in the districts of Krugersdorp, Heidelberg and Pretoria. The study area now fell within the district of Witwatersrand (Bergh 1999).
1907	The town of Delmas was laid out on the farm Witklip and comprised 192 residential stands, 48 smallholdings (of 4 hectares each) with a commonage of 134 hectares. It was established by the owner of Witklip, who was a Frenchman named Frank Dumat (Erasmus, 2004). The name Delmas was derived from the French phrase 'de le mas', which means 'of the small farm' (www.sa-venues.com).

4.2.1 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 (1969 and 1988) were available for utilisation in the background study. These maps were assessed to observe the area's development and 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.

The 2530AB Lydenburg map sheet was surveyed in 1969 and drawn by the Trigonometrical Survey Office, 1971.

The Maps showed no area of heritage sensitivity.

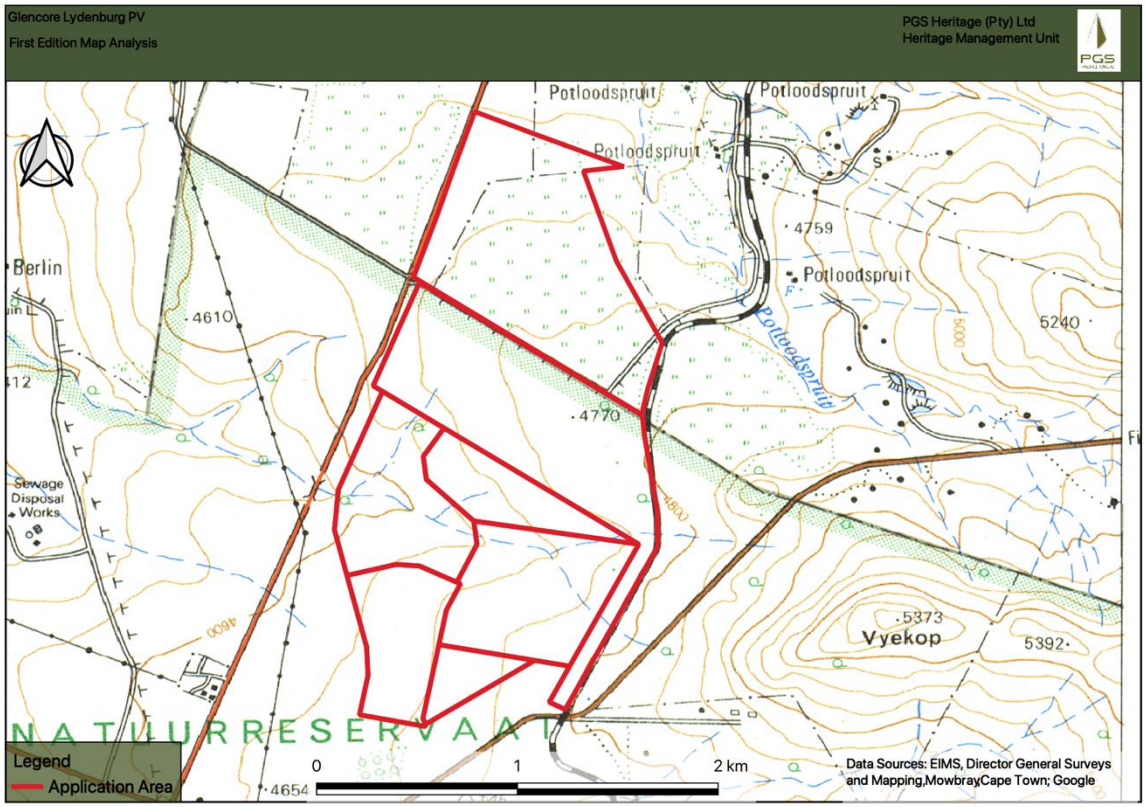


Figure 12 - First edition map showing no heritage sensitive areas.

4.2.2 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:

- A Heritage Impact Assessment (HIA) study for the proposed New Optimum Colliery on the farm Schoonoord 164IS in the Mpumalanga Province of South Africa - Pistorius, J. C. C. (2004). This assessment located **historical structures, graveyards, and remains dating from the relatively recent past.**

- Heritage Impact Assessment, Lydenburg Extensions 49 on the farm Sterkspruit 33 JT, District Lydenburg, Thaba Cheweu Municipality – W Fourie (2005). This assessment located **Iron Age sites as well as Pottery.**

- Imbani Coal Heritage Scoping on Various Portions of Farms in the Carolina District, Mpumalanga – Fourie, W. (2006). This assessment located **cemeteries and informal graves, historic structures and iron ages structures.**

- Extrata Alloys Lydenburg. A phase 1 Heritage Impact Assessment (HIA) Study for the Extrata Alloys Lydenburg new proposed Residue Management Facility (Slag Dump) in the Mpumalange Province of South Africa – Pistorius, J.C.C (2006). This assessment located **Late Iron Age sites.**

- Heritage Impact Scoping Report for the Planned Hendrina-Marathon Power line, Mpumalanga Province – J van Schalkwyk (2007).

- AIA Northern Coal Portion 15 and 16 of the farm Weltevreden 381 JT, Belfast, Mpumalanga- Fourie, W (2008). This assessment located **no heritage features.**

- Arnot Colliery Mine Project of Exxaro On Portions 4 and 5 of the farm Mooifontein 448 JS and Portions 3 And 4 of the farm Tweefontein 458 JS , District Middelburg, Mpumalanga - Fourie, W (2009). This assessment located **cemeteries, an occupied homestead with associated infrastructure dating between 1900 and 1930 and homestead remains.**

- Phase 1 AIA of Portion 39 of Lydenburg Townlands 31 JT, Mashishing/Lydenburg, Mpumalanga Province – C.van Wyk Rowe (2009). This assessment located **several Iron Age sites in the area and recommended a second phase assessment.**

- Phase 1 Archaeological Impact Assessment for Enpact Environmental Consultants concerning the proposed Elandshoek township development on portions 2 and 6 of the farm Lindenau 303 JT and portion 2 of Berlin 466 JT, Mpumalanga Province – JP Cilliers (2010). This assessment located **cemeteries, a Black Concentration Camp and the existence of war graves.**

- Phase 1 Heritage Resource Scoping Report. Residential Development Polt 74, Lydenburg, Mpumalanga – Frans Roodt (2011). This assessment located **Iron Age settlements.**

- A report on a heritage assessment for the proposed Arnot-Gumeni 400 kv powerline project, in the Middelburg/Belfast area, Mpumalanga Province – Pelser, A.(2012). This assessment located **stone walled Iron Age sites, possible Stone Age sites, historical homesteads/farmsteads, historical Anglo-Boer War (1899-1902) battlefield sites and others, as well as graves and burial grounds.**

- Exxaro Paardeplaats Project Heritage Impact Assessment Report – Kitto, J (2012) this assessment located, **heritage structures, cemeteries and areas with historical mining shafts**

- Basic assessment and Environmental Management Programme: construction of a 132kv distribution line between the Merensky and Lydenburg substations, Mpumalanga Province – J.A van Schalkwyk (2013) This assessment located **Stone age sites, Iron Age sites and Historical structures**

- A phase I Heritage Impact Assessment (HIA) study for the consolidated Environmental Management Programme report (consolidated EMPR) for Arnot Coal on the eastern highveld in the Mpumalanga Province - - Pistorius, J. C. C. (2014). This assessment located **historical farmstead complexes consisting of various structures, individual historical structures such as houses, wagon sheds, rondavels, etc. and burial grounds and graves, some of which are older than sixty years.**

- Proposed expansion of existing mining area into portion re of the farm Roetz 210 IS, Jagtlust Colliery, near Carolina, Albert Luthuli Local Municipality, Gert Sibande District Municipality, Mpumalanga Province – Kitto, J (2015). This assessment located **historical structures and graves.**

- Pembani coal mine. Proposed underground mining on the farm Zandvoot 10 IT, near Carolina, Albert Luthuli Local Municipality, Gert Sibande District Municipality, Mpumalanga Province. – Birkholtz, P. (2015). This assessment located **historical structures, a historical cemetery and an informal grave.**

- Heritage Assessment - The Kwagga North Project, Optimum Coal, Arnot, Mpumalanga – Fourie, W (2016). This assessment located **cemeteries with a total of approximately 350 graves, farmsteads and a quarry site.**

4.2.3 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 High Heritage Sensitivity surrounding the study area and a Low Heritage Sensitivity within the study area (**Figure 13**). The fieldwork has confirmed the location of two Grade 3 sites but not in areas the screening tool depicted. Therefore, the screening report was lacking with some sites recovered in the area, this is in part due to the low resolution of the available data that the screening data is based on.

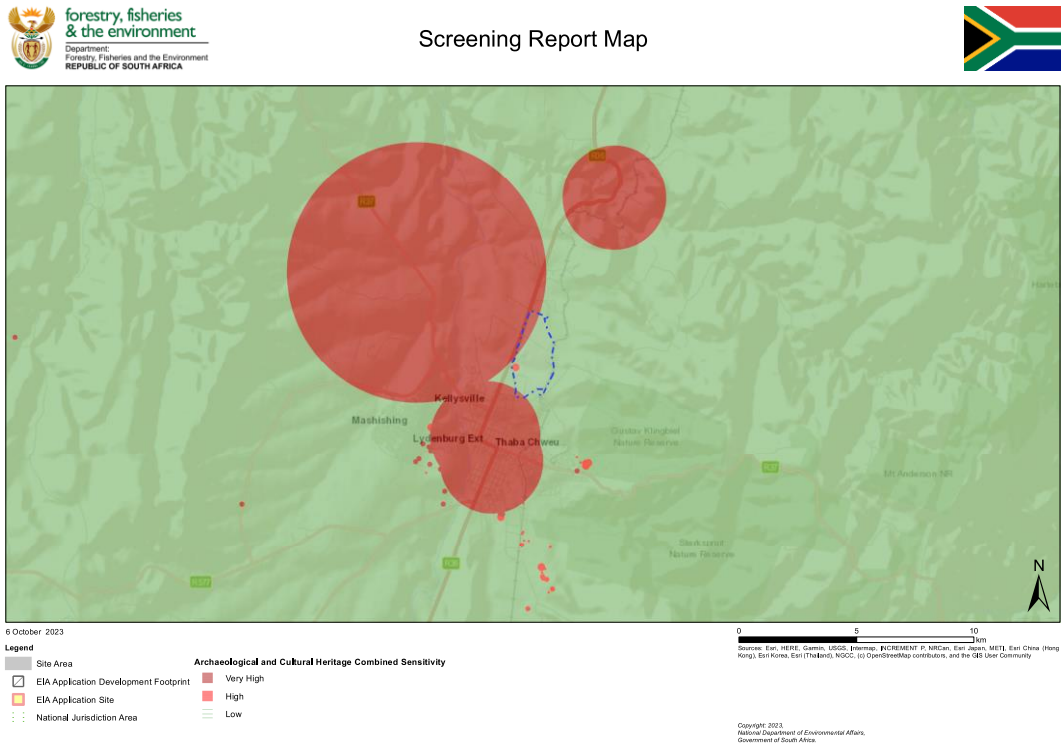


Figure 13 - Screening tool map indicating a high sensitivity rating for archaeology and heritage surrounding the study area.

4.2.4 Palaeontological screening

The National Environmental Web-based Screening Tool indicates a high sensitivity with areas of moderate sensitivity.

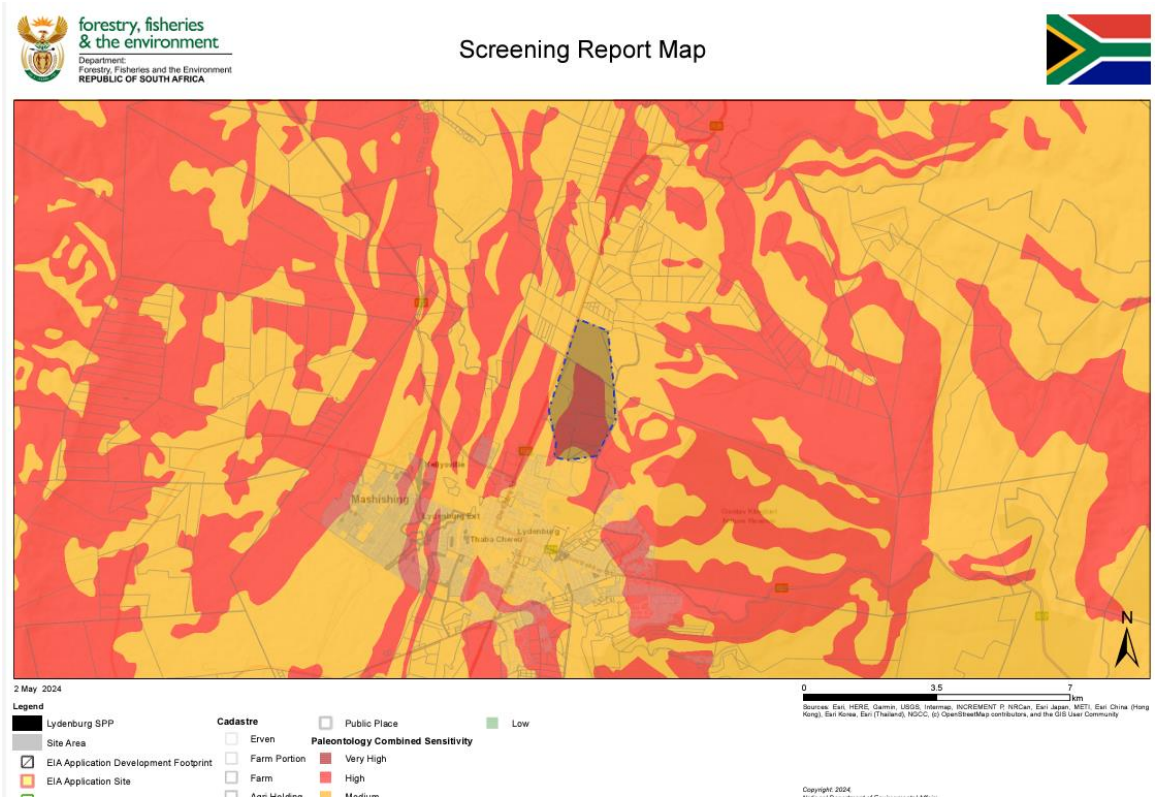


Figure 14 – Palaeontological Sensitivity of Glencore Lydenburg PV Facility by the National Environmental Web-based Screening Tool indicates a Very High Palaeontological Sensitivity

4.2.5 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 4** lists the possible tangible heritage sites identified in the vicinity of the study area and the relevant legislative protection.

Table 4: 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 5**).

Table 5: 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
Water holes/pans/rivers	MSA and LSA sites, LIA settlements
Farmsteads	Historical archaeological material
Ridges and drainage lines	LSA sites, LIA settlements

4.3 Fieldwork findings[2]

The fieldwork was conducted on the 9th of October 2023 by a field team of PGS heritage. Their movement on site was tracked by GPS and a tracklog map can be seen in **Figure 15**.

During the fieldwork a total of **four** heritage features and resources were identified (**Figure 16**). These consist of three Iron Age/ agro-pastoral sites (**LS001, LS003 and LS004**), and one structure which is and old school building **(LS002).** See **Figure 17, Figure 18, Figure 20 and Figure 21** and the individual site descriptions as contained in **Appendix B**. The field description forms were collected with ArcGIS Survey123 in field software.

Historical Structures

The school structure (**LS003**) is not presented on the 1969 first edition maps, but is on the 1988 second edition topographic maps, and is therefore not older than 60 years. (Section 4.2.1). The structure has two rooms and is built with brick and has a corrugated iron roof. There are cement lintels above the three large windows on either site of the two centred doors. The structure is not conservation worthy.

Archaeological Site

Three Iron Age/Agro-pastoral sites wire located. **LS001** is a complex stone walled Bokoni homestead and is graded as Grade IIIA. Site **LS001** Is a classic example of a complex Bokoni homestead. The inner ring-wall which was identified, separated the domestic area from the livestock area, which occurs in the centre. The inner ring had two clear entrances, which is also a unique feature in precolonial South Africa according to Delius *et al* (2014). "*This inner ring would allow for a controlled movement of cattle where some can remain in the central enclosure while others can be moved through its opposite entrance, into the walled passage which in turn gives access to the attached enclosures"* (Delius *et al,* 2014 pp74). The walled passage described by Delius *et al* (2014) was also identified at this site.

LS002 was very disturbed and overgrown. It was therefore difficult to assess to structure and pattern. There were middens and grinding stones in the vicinity. Site **LS002** has a grading of IIIA.

[2] *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.*

The Bokoni stone ruins are one of the richest visible and enduring forms of heritage from any group of people living in South Africa before the beginning of colonial times (Delius *et al* 2014). The remains provide historians and archaeologists with the possibility of reconstructing in detail this now extinct way of life (Delius *et al* 2014). **LS001** and **LS002** are therefore graded as Grade IIIA and should be avoided with a 30m buffer. If the sites will be affected directly, the sites **LS001** and **LS002** will need to be documented before a destruction permit can be applied for at SAHRA.

LS004 is a single stone wall. The area was also heavily overgrown and difficult to discern any structure or patterning to the site. **LS004** is graded as Grade IIIC. The chance find procedure must be followed in proximity to this site. No other mitigation measures are required.

The possibility of stillborn burials around the structures **LS001** and **LS002** must be considered. As per African custom stillborn children are buried against the outside wall/foundation or inside the house. The structures (**LS001 and LS002**) must then provisionally grade as Grade IIIA in regard to burials. 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, the graves could 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.

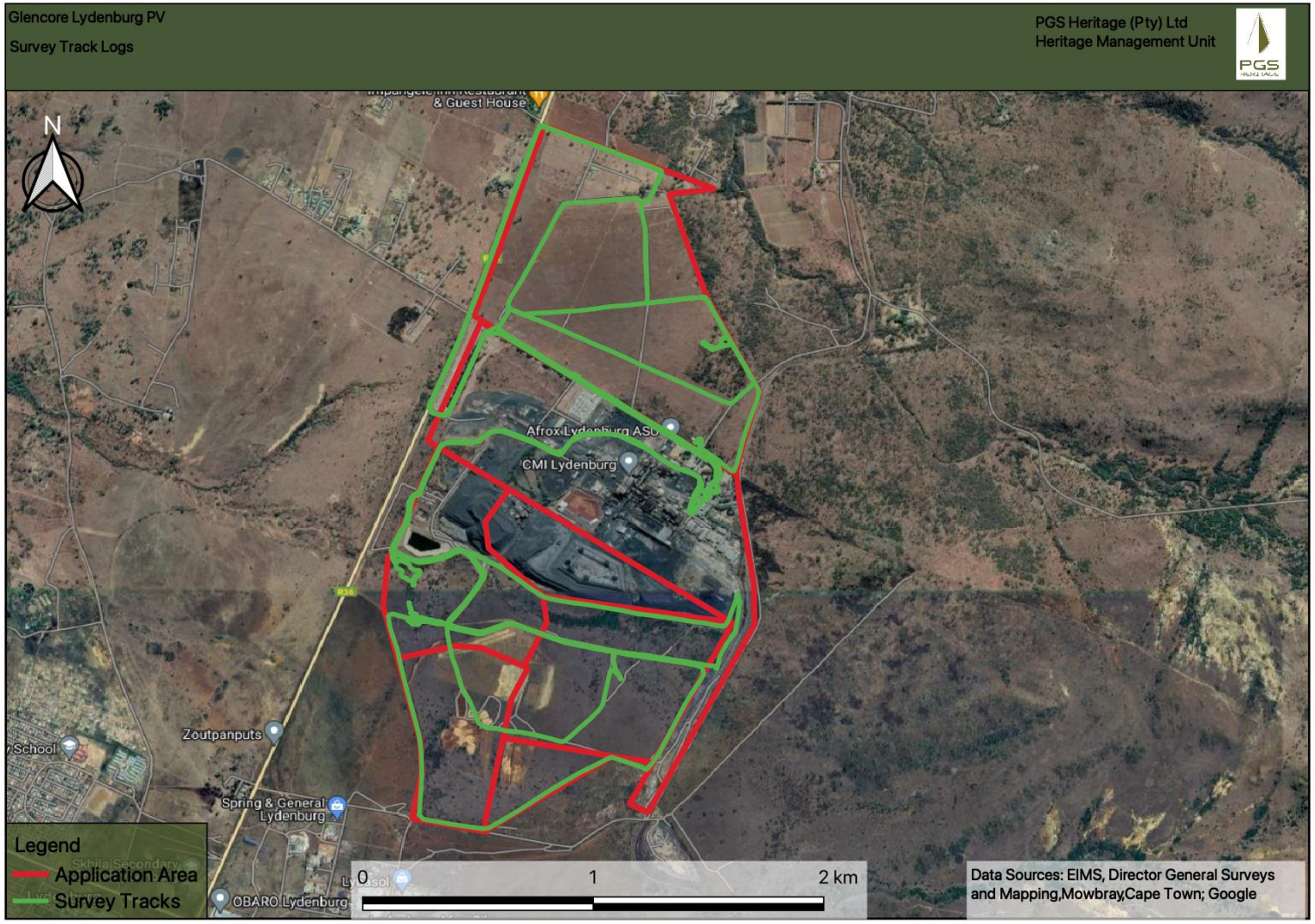


Figure 15 - Fieldwork tracklogs (track in green, study area in red)

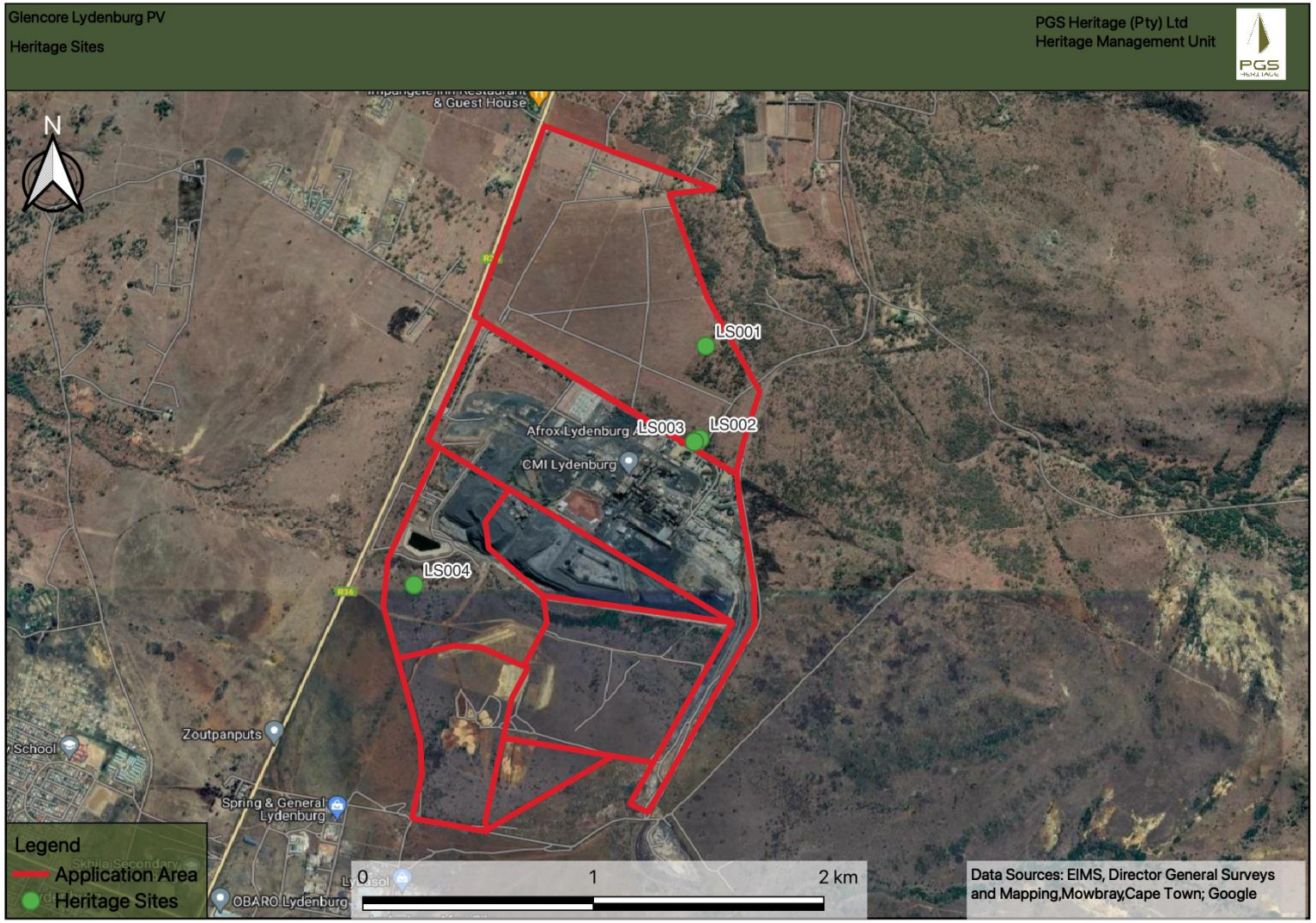


Figure 16 - Identified heritage resources within the exploration rights area.

Cumula

Figure 17 - View of stone walls at LS001

Figure 18 – View of stone walls at LS002

Figure 19 - Google earth image of site LS001

Figure 20 – Lower grinding stone at LS002

Figure 21 – School building at LS003

4.4 Palaeontology

Banzai Environmental was commissioned to conduct the Palaeontological Desktop Assessment (PDA) for the proposed Glencore Lydenburg Solar Photovoltaic Facility, in the Thaba Chweu Local Municipality, Mpumalanga, South Africa. This PDA is required to confirm whether fossil material may potentially be present in the planned development area and to assess the potential impact of the proposed development on the local palaeontological heritage in order to comply with the National Heritage Resources Act (No 25 of 1999, section 38) (NHRA).

The geology of the proposed Glencore Lydenburg PV Facility is indicated on the 1:250 000 Baberton 2530 (1986) Geological Map (Council for Geosciences, Pretoria) (Figure 22). The proposed development is underlain by Quaternary sands (Q, yellow) as well as by the Silverton Formation (Pretoria Group, Transvaal Supergroup). The latter is extensively intruded, and locally metamorphosed, by sills of diabase (Vdi, green). The diabase has no palaeontological significance. However, the existence of the diabase rocks would have had a thermal metamorphic effect on the nearby Silverton Formation (Pretoria Group) and would decrease the chance of fossil preservation.

According to the PalaeoMap of the South African Heritage Resources Information System (SAHRIS) the Palaeontological Sensitivity of the Quaternary is Low (blue), that of the Silverton Formation (Pretoria Group, Transvaal Supergroup) is High (orange, Figure 23), while that of the diabase is Zero (grey). Updated geology (2014, Council of Geosciences, Pretoria) indicates that the proposed study area is entirely underlain by the Silverton Formation (Pretoria Group, Transvaal Supergroup) (Figure 24).

The Transvaal Supergroup is preserved in three structural basins on the Kaapvaal Craton of South Africa namely the Griqualand West Basin, Transvaal Basin, as well as the Kanye Basin in Botswana. The Griqualand West Basin can be subdivided into the Ghaap Plateau and Prieska sub basins. The geometry of the three basins is mostly stratiform with the exclusion of the volcanic precursor of the Kanye Basin and parts of the Griqualand West Basin. Extensive deformation has taken place in the south-western portion of the Griqualand West Basin. Rocks of the Transvaal Supergroup in the Transvaal Basin were intruded by the Bushveld Complex approximately 2060 million years ago. The Transvaal Supergroup overlays the Archaean basement as well as the Witwatersrand and Ventersdorp Supergroups. In the far western and Kanye Basins rocks belonging to the Kanye Formation and Gaborone Granite Suite is also overlain by the Transvaal Supergroup. The Precambrian Transvaal Supergroup is approximately 2550-2050 Ma years old (Bekker et al. 2008; Catuneanu et al 1999), (Late Archaean to Early Proterozoic) and is about 15 km thick. This Supergroup consists of sedimentary, volcanic and unmetamorphosed clastic rocks. The sandstone dominated Magaliesberg Formation overlies the mudrocks of the Silverton Formation, and in turn the Silverton Formation overlies the sandstone Daspoort Formation.

The Daspoort Formation overlies the Strubenkop (Eriksson et al., 1993b). The Daspoort Formation is characterised by subordinate mudrocks and ironstones in the east of the basin (Button, 1973a), and mature quartz arenites. Erikson et al (1993b) also describes pebbly arenites, immature sandstones, conglomerates and mudrocks in this formation that reflects the beginning of a major marine transgression that deposited the Silverton and Magaliesberg Formations (Eriksson et al., 1995). Thin stromatolitic cherts and carbonates (top of formation) normally changes into a condensed, transgressive dolomite or chert and is finally covered by the Silverton Shales. The Silverton Formation is a lithologically varied, mudrock-dominated sequence that was deposited on an offshore shelf along the borders of the Kaapvaal Craton (Eriksson et al. 2002, 2009). Volcanic ash-rich intervals are common as well as minor beds of carbonate and chert. Sandstones become more regular in the upper part of the sequence and was deposited under shallower conditions. In the eastern part of the Pretoria Basin, the Machadodorp Member lies in the middle of the Silverton Formation and is represented by a conspicuous interval of volcanic rocks (including agglomerates basaltic lavas as well as tuffs). The presence the volcanic pillow lavas and water-lain tuffs indicates that they were formed beneath the sea. The deep-water Silverton mudrocks were deposited in high sea levels and was followed by shallowing fluvial and deltaic sandstones in low sea levels of the overlying Magaliesberg Formation. The Hekpoort formation consists of Basaltic andesite and pyroclastic rocks and is volcanic in origin. In the south the basaltic andesitic lavas are more than 1100m thick thinning to 800m in the west and is less than 50m thinning in the north.

Subaerial fissure eruptions are dominant, with local pyroclastic systems (Oberholzer, 1995). Small lacustrine shale deposits are present between recurrent hiatuses in volcanism. Button (1973a) suggested an uppermost, widespread palaeosol.

In the eastern part of the Transvaal Basin the Silverton Formation is approximately 1-3 km thick and consists of recessive weathering producing a topography of rolling hills and valleys (Visser 1989). Carbonate rocks are present at the top of the Silverton Formation. Research indicated that microbial activity under low oxygen conditions causes organic carbon within the shales (Eriksson et al. 1989). Organic-walled microfossils thus may be present in these carbon-rich mudrocks of the Silverton Formation while the chert horizons may contain other microbial assemblages.

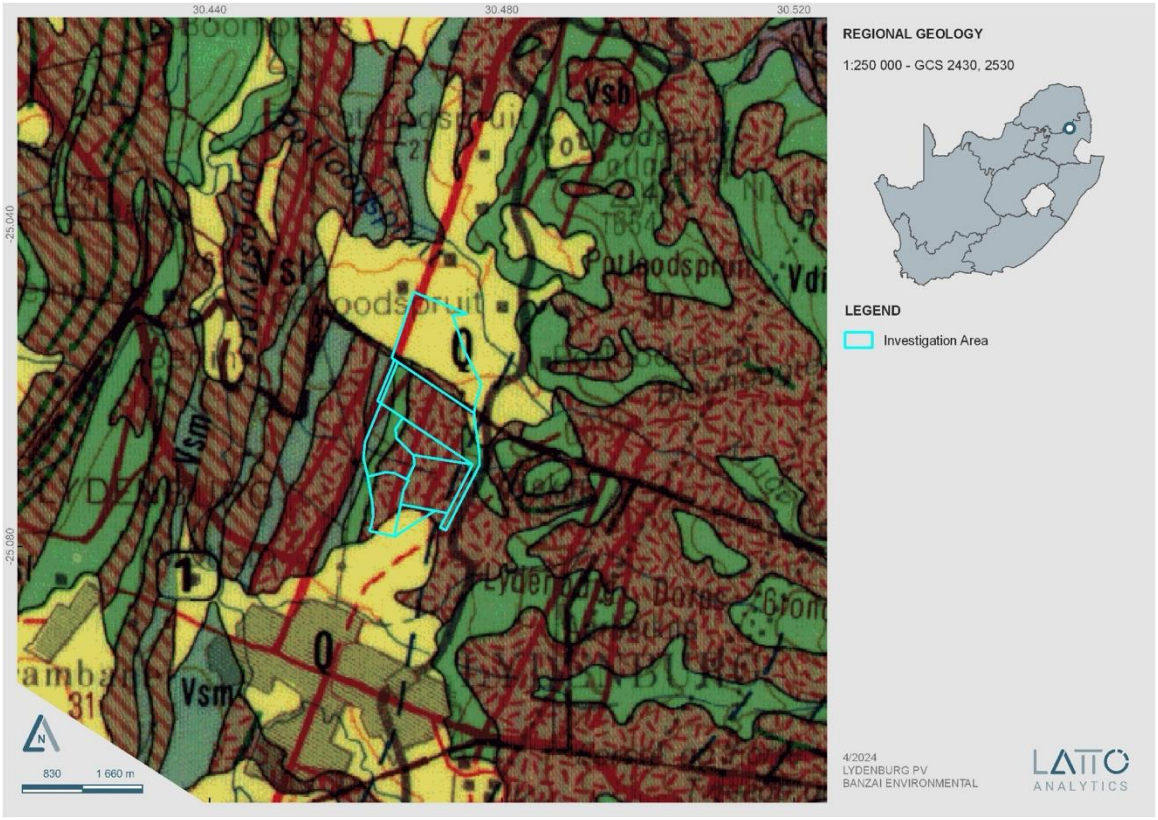


Figure 22 – Extract of the 1:250 000 Barberton 2530 (1986) Geological Map (Council for Geosciences, Pretoria) indicates that the study area is underlain Quaternary sands (Q, yellow), the Silverton Formation (Vsi, brown; Pretoria Group, Transvaal Supergroup) intruded by diabase (Vdi, green).

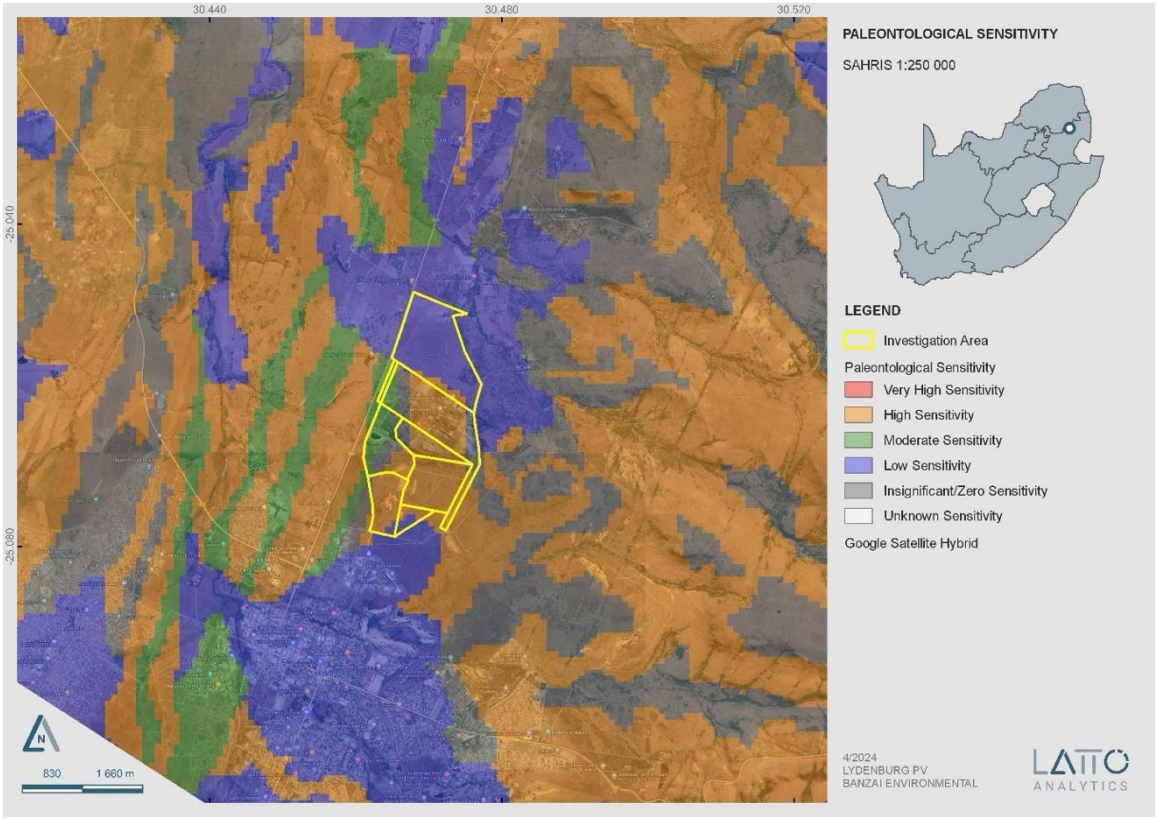


Figure 23 – Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences) indicating the study area is underlain by sediments with a High (orange), Moderate (green), Low (blue) and Zero (grey).

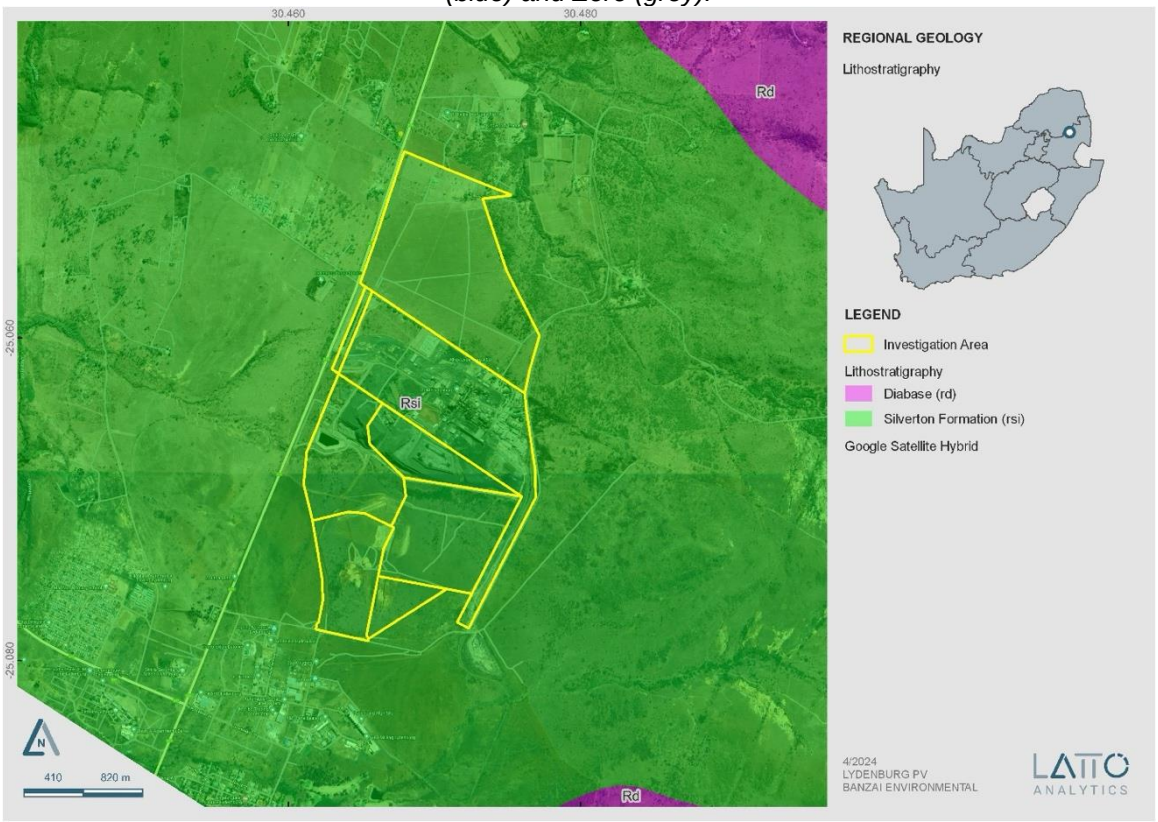


Figure 24 - Updated Geology (Council of Geosciences, Pretoria) of the proposed study area indicates that the development is underlain by the Silverton Formation (rsi).

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 Glencore Lydenburg PV Facility.

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.

No alternatives are considered. The application area of interest is suitable from a heritage perspective.

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 Historical Structures

The school structure (**LS003**) is not presented on the 1969 first edition maps, but is on the 1988 second edition topographic maps, and is therefore not older than 60 years. (Section 4.2.1). The structure has two rooms and is built with brick and has a corrugated iron roof. There are cement lintels above the three large windows on either site of the two centred doors. The structure is not conservation worthy.

5.1.2 Archaeological Site

Three Iron Age/Agro-pastoral sites wire located. **LS001** is a complex stone walled Bokoni homestead and is graded as Grade IIIA. Site **LS001** Is a classic example of a complex Bokoni homestead. The inner ring-wall which was identified, separated the domestic area from the livestock area, which occurs in the centre. The inner ring had two clear entrances, which is also a unique feature in precolonial South Africa according to Delius *et al* (2014). “*This inner ring would allow for a controlled movement of cattle where some can remain in the central enclosure while others can be moved through its opposite entrance, into the walled passage which in turn gives access to the attached enclosures”* (Delius *et al,* 2014 pp74). The walled passage described by Delius *et al* (2014) was also identified at this site.

LS002 was very disturbed and overgrown. It was therefore difficult to assess to structure and pattern. There were middens and grinding stones in the vicinity. Site **LS002** has a grading of IIIA.

The Bokoni stone ruins are one of the richest visible and enduring forms of heritage from any group of people living in South Africa before the beginning of colonial times (Delius *et al* 2014). The remains provide historians and archaeologists with the possibility of reconstructing in detail this now extinct way of life (Delius *et al* 2014). **LS001** and **LS002** are therefore graded as Grade IIIA and should be avoided with a 30m buffer. If the sites will be affected directly, the sites **LS001** and **LS002** will need to be documented before a destruction permit can be applied for at SAHRA.

LS004 is a single stone wall. The area was also heavily overgrown and difficult to discern any structure or patterning to the site. LS004 is graded as Grade IIIC. The chance find procedure must be followed in proximity to this site. No other mitigation measures are required.

The possibility of stillborn burials around the structures **LS001** and **LS002** must be considered. As per African custom stillborn children are buried against the outside wall/foundation or inside the house. The structures (**LS001 and LS002**) must then provisionally grade as Grade IIIA in regards to burials. **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, the graves could 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.

5.1.3 Palaeontology

Loss of fossil heritage will be a negative impact. Only the site will be affected by the proposed development. The expected duration of the impact is assessed as potentially permanent. In the absence of mitigation procedures, the damage or destruction of any palaeontological materials will be permanent. Impacts on palaeontological heritage during the construction phase could potentially occur and are regarded as having a Low probability. As fossil heritage will be destroyed the impact is irreversible. The significance of the impact occurring will be Low.

5.2 Impact assessment summary table

Implementing the impact assessment methodology as supplied by the EIMS. **Table 6** and **Table 7** provides a quantitative assessment of the impacts of the proposed powerline options.

The pre-mitigation impact on the identified archaeological sites located within the application area is calculated as HIGH negative and only focused during the planning phase. Implementation of the recommended mitigation measures will reduce the impact to MEDIUM positive.

The pre-mitigation impact on the identified structures located within the footprint of the exploration area is calculated as LOW negative and only focused during planning phase. Implementation of the recommended mitigation measures will reduce the impact to LOW positive.

The pre-mitigation impact on the palaeontology within the footprint of the exploration area is calculated as LOW negative and only focused during construction phase. Implementation of the recommended mitigation measures will reduce the impact to LOW positive.

Table 6: Impact Table – Archaeological sites

IMPACT DESCRIPTION				Pre-Mitigation							Post Mitigation								Priority Factor Criteria			
Identifier	Impact	Alternative	Phase	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Pre-mitigation ER	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Post-mitigation ER	Confidence	Cumulative Impact	Irreplaceable loss	Priority Factor	Final score
10.1.1	Archaeological sites	Alternative 1	Planning	-1	3	5	5	5	4	-18	1	3	5	2	5	2	7,5	High	1	3	1,25	9,375

Table 7: Impact Table – Structures

IMPACT DESCRIPTION				Pre-Mitigation							Post Mitigation								Priority Factor Criteria			
Identifier	Impact	Alternative	Phase	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Pre-mitigation ER	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Post-mitigation ER	Confidence	Cumulative Impact	Irreplaceable loss	Priority Factor	Final score
10.1.2	Structures	Alternative 1	Planning	-1	3	5	2	5	1	-3,75	1	3	5	1	5	1	3,5	High	1	3	1,25	4,375

Table 8: Impact Table – Palaeontology

IMPACT DESCRIPTION				Pre-Mitigation							Post Mitigation								Priority Factor Criteria			
Identifier	Impact	Alternative	Phase	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Pre-mitigation ER	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Post-mitigation ER	Confidence	Cumulative Impact	Irreplaceable loss	Priority Factor	Final score
10.1.3	Palaeontology	Alternative 1	Construction	-1	2	5	2	5	1	-3.5	1	2	5	1	5	1	3.25	High	1	3	1.25	4.0625

6 MANAGEMENT RECOMMENDATIONS AND GUIDELINES

The following section must be read with **Table 10** of this report.

6.1 Construction and operational phases

The project proposes to develop a Solar Photovoltaic (PV) Energy Generation Facility at the Lydenburg Smelter. The generation capacity will be up to 300 megawatts to provide power to Lydenburg smelter or will be wheeled to other Glencore operations. . Other possible infrastructure will include an on-site substation / switching station, access roads, battery energy storage system and 132kV power lines.

It is possible that cultural material will be exposed during the development phase and may be recoverable, keeping in mind delays can be costly during project timelines, 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.

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 if 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
- Archaeological features (Iron Age or Stone Age)

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 9** gives guidelines for lead times on permitting.

Table 9: Lead times for permitting and mobilisation

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

6.5 Heritage Management Plan for EMPr implementation

Table 10: Heritage Management Plan for EMPr implementation

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
General project area	Implement a chance to find procedures in case where possible heritage finds are uncovered.	Planning/ 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
Archaeological EFC/iron Age Sites	Site **LS001** and **LS002** are likely related to the Bakoni and are significant regarding better understanding the complex settlement patterns of these sites that occur throughout the Mpumalanga escarpment area, and therefore have great research value. Site **LS001** is in a good state of preservation and worthy of conservation, or at the least subject to a phase II mitigation. Site **LS002** is disturbed and not worthy of conservation, however, due to the grinding stones and possible middens present, should also be subject to phase II mitigation. Also, possibly present within middens are still born burials. This can only be confirmed through test excavations 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, the graves could be relocated after completion of a detailed	Planning	During planning phase	Applicant Environmental Control Officer (ECO) Heritage specialist	During survey. 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)
	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						
Historical Structures	The school has no conservation value and requires no further mitigation.	Planning	Planning	Applicant Environmental Control Officer (ECO) Heritage specialist	During survey. Monthly	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report
Palaeontological resources	Implement a chance to find protocol. 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 36 and 38 of NHRA	ECO Monthly Checklist/Report

7 CONCLUSIONS AND RECOMMENDATIONS

PGS Heritage (Pty) Ltd (PGS) was appointed by Environmental Impact Management Services (Pty) Ltd (EIMS) to undertake a Heritage Impact Assessment (HIA) for the proposed Glencore Lydenburg solar photovoltaic facility on Portion 143 of Farm 30 Potloodspruit, Portions 114, 457 and 471 of Farm 31 Townlands of Lydenburg, Portion 1 of Lydenburg Smelter Erf 6099, Lydenburg Smelter Erf 2540 and Lydenburg Smelter Erf 2541 within the Thaba Chweu Local Municipality, Mpumalanga.

During the fieldwork a total of **four** heritage features and resources were identified (**Figure 16**). These consist of three Iron Age/ agro-pastoral sites (**LS001, LS003 and LS004**), and one structure which is and old school building **(LS002).** See **Figure 17, Figure 18, Figure 20 and Figure 21** 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 school structure (**LS003**) is not presented on the 1969 first edition maps, but is on the 1988 second edition topographic maps, and is therefore not older than 60 years. (**Section 4.2.1**). The structure has two rooms is built with brick and has a corrugated iron roof. Cement lintels are above the three large windows on either side of the two centred doors. The structure is not conservation-worthy.

7.2 Archaeological Site

Three Iron Age/Agro-pastoral sites were located. **LS001** is a complex stone-walled Bokoni homestead and is graded as Grade IIIA. Site **LS001** Is a classic example of a complex Bokoni homestead. The inner ring-wall, which was identified, separated the domestic area from the livestock area, which occurs in the centre. The inner ring had two clear entrances, which is also a unique feature in precolonial South Africa, according to Delius *et al* (2014). "*This inner ring would allow for a controlled movement of cattle where some can remain in the central enclosure while others can be moved through its opposite entrance, into the walled passage which in turn gives access to the attached enclosures"* (Delius *et al,* 2014 pp74). The walled passage described by Delius *et al* (2014) was also identified at this site.

LS002 was very disturbed and overgrown. It was, therefore, difficult to assess the structure and pattern. There were middens and grinding stones in the vicinity. Site **LS002** has a grading of IIIA.

The Bokoni stone ruins are one of the richest visible and enduring forms of heritage from any group of people living in South Africa before the beginning of colonial times (Delius *et al* 2014). The

remains provide historians and archaeologists with the possibility of reconstructing in detail this now-extinct way of life (Delius *et al* 2014). **LS001** and **LS002** are, therefore graded as Grade IIIA and should be avoided with a 30m buffer. If the sites are affected directly, the sites **LS001** and **LS002** will need to be documented during a Phase II mitigation procedure before a destruction permit can be applied for at the South African Heritage Resources Agency.

LS004 is a single stone wall. The area was also heavily overgrown and it was difficult to discern any structure or patterning to the site. **LS004** is graded as Grade IIIC. The chance find procedure must be followed in proximity to this site. No other mitigation measures are required.

The possibility of stillborn burials around the structures **LS001** and **LS002** must be considered. As per African custom stillborn children are buried against the outside wall/foundation or inside the house. The structures (**LS001 and LS002**) must then be provisionally grade as Grade IIIA in regard to burials. As per SAHRA guidelines, all burial grounds and graves should be retained and avoided with a buffer zone of 30m. If this is not possible, the graves could 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.

7.3 Palaeontology

The proposed Glencore Lydenburg PV Facility is largely underlain by the Silverton Formation of the Pretoria Group (Transvaal Supergroup) as well as Quaternary superficial sediments. The Pretoria Group sedimentary rocks in and near the study area are extensively intruded, and locally metamorphosed, by sills of diabase. The diabase has no palaeontological significance. However, the existence of the diabase rocks would have had a thermal metamorphic effect on nearby sediments and would decrease the chance of fossil preservation. According to the PalaeoMap of the South African Heritage Resources Information System (SAHRIS) the Palaeontological Sensitivity of the Silverton Formation (Pretoria Group, Transvaal Supergroup) is High, that of the Quaternary Superficial sediments are Low, while that of the diabase is Zero. Updated geology (2014, Council of Geosciences, Pretoria) indicates that the proposed study area is only underlain by the Silverton Formation (Pretoria Group, Transvaal Supergroup).

Based on desktop research it is concluded that fossil heritage of scientific and conservational interest in the development footprint is rare. This is in contrast with the High Sensitivity allocated to the development area by the SAHRIS Palaeosensitivity Map and DFFE Screening Tool. **A medium Palaeontological Significance has been allocated for the construction phase of the PV development pre-mitigation and a low significance post mitigation**. The construction phase will be the only development phase impacting Palaeontological Heritage and **no significant**

impacts are expected to impact the Operational and Decommissioning phases. The No-Go Alternative considers the option of 'do nothing' and maintaining the status quo, will have a Neutral impact on the Palaeontological Heritage of the development. The **Cumulative impacts of the development is considered to be medium pre- mitigation and Low post mitigation and falls within the acceptable limits for the project**. It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. **The construction of the development may thus be permitted in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources.** It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils.

7.4 Mitigation measures

Mitigation measures are described in **Table 10** of this report.

7.5 General

It is the combined considered opinion of the heritage specialists that the proposed project **will** have a direct impact on the identified heritage resources, rated as being of low to high heritage significance. Sites LS001 and LS002 are Bokoni homesteads which represent valued historical heritage and it is recommended that the sites should be avoided with a 30m buffer or need to be documented during a Phase II mitigation procedure before a destruction permit can be applied for at the South African Heritage Resources Agency.

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

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PISTORIUS, J. C. C. 2014. A phase I Heritage Impact Assessment (HIA) study for the consolidated Environmental Management Programme report (consolidated EMPR) for Arnot Coal on the eastern highveld in the Mpumalanga Province .

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8.3 **Historical Topographic Maps**

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

8.4 **Internet**

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www.sanbi.org
www.sahra.org.za
www.mk.org.za

8.5 Google Earth

All the aerial depictions and overlays used in this report are from Google Earth.

APPENDIX A

ENVIRONMENTAL IMPACT METHODOLOGY

ENVIRONMENTAL IMPACT MANAGEMENT SERVICES (EIMS): IMPACT ASSESSMENT METHODOLOGY

TITLE:	ENVIRONMENTAL IMPACT ASSESSMENT RATING PROCEDURE	DOC No:	PRO 106	REV:	00	Page 2 of 7

1. Purpose

The purpose of this procedure is to guide the undertaking of an impact and risk assessment process, as required under the regulations promulgated under the National Environmental Management Act (Act 107 of 1998 - NEMA).

2. Scope

This procedure provides the methodology to be applied to environmental impacts and risks identified during the Environmental Impact Assessment Process. The methodology ensures that consistent impact assessment rating is carried out that is legally compliant and aligned with EIMS's objective of providing a quality service.

3. References

GNR. 982 National Environmental Management Act (Act No. 107 of 1998): Environmental Impact Assessment Regulations, 2014 – hereafter referred to as the Regulations.

4. Additional Guidelines and References

Guidelines and Reference Docs (not exhaustive – please verify with the applicable competent authority).	
Compulsory Compliance: GNR. 982 National Environmental Management Act (Act No. 107 of 1998 - NEMA): Environmental Impact Assessment Regulations, 2014.	National
Companion Guideline for Implementation: Environmental Management Assessment Regulations, 2010 - GN 805/2012 (NEMA)	National
DEAT (2002) Impact Significance, Integrated Environmental Management, Information Series 5, Department of Environmental Affairs and Tourism (DEAT), Pretoria	National

5. Definitions and Abbreviations

Refer to Chapter 1 of the Regulations.

6. Procedure

The impact significance rating methodology, as presented herein and utilised for all EIMS Impact Assessment Projects, is guided by the requirements of the NEMA EIA Regulations 2014 (as amended). The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/ likelihood (P) of the impact occurring. The ER is determined for the pre- and post-mitigation scenario. In addition, other factors, including cumulative impacts and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the overall significance (S). The impact assessment will be applied to all identified alternatives.

a. Determination of Environmental Risk

The significance (S) of an impact is determined by applying a prioritisation factor (PF) to the environmental risk (ER). The environmental risk is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and Reversibility (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$C = \frac{(E + D + M + R) * N}{4}$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 1 below.

Table 1: Criteria for Determining Impact Consequence

Aspect	Score	Definition

TITLE:	ENVIRONMENTAL IMPACT ASSESSMENT RATING PROCEDURE	DOC No:	PRO 106	REV:	00	Page 3 of 7

Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary)
	3	Local (i.e. the area within 5 km of the site)
	4	Regional (i.e. extends between 5 and 50 km from the site)
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years)
	3	Medium term (6-15 years)
	4	Long term (15-65 years, the impact will cease after the operational life span of the project)
	5	Permanent (>65 years, no mitigation measure of natural process will reduce the impact after construction)
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected)
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected)
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way, moderate improvement for +ve impacts)
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease, high improvement for +ve impacts)
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease, substantial improvement for +ve impacts)
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and cost.
	5	Irreversible Impact.

Once the C has been determined, the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/ scored as per Table 2.

Table 2: Probability Scoring

Probability		
	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur),

The result is a qualitative representation of relative ER associated with the impact. ER is therefore calculated as follows:

$$ER = C \times P$$

Table 3: Determination of Environmental Risk

Consequence						
	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	2	3	4	5
	Probability					

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described in Table 4.

Table 4: Environmental Risk Scores

ER Score	Description
<9	Low (i.e. where this impact is unlikely to be a significant environmental risk/ reward).
≥9 ≤17	Medium (i.e. where the impact could have a significant environmental risk/ reward),
>17	High (i.e. where the impact will have a significant environmental risk/ reward).

The impact ER will be determined for each impact without relevant management and mitigation measures (pre-mitigation), as well as post implementation of relevant management and mitigation measures (post-mitigation). This allows for a prediction in the degree to which the impact can be managed/mitigated.

b. Impact Prioritisation

Further to the assessment criteria presented in the section above, it is necessary to assess each potentially significant impact in terms of:

1. Cumulative impacts; and
2. The degree to which the impact may cause irreplaceable loss of resources.

To ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impact ER (post-mitigation). This prioritisation factor does not aim to detract from the risk ratings but rather to focus the attention of the

decision-making authority on the higher priority/significance issues and impacts. The PF will be applied to the ER score based on the assumption that relevant suggested management/mitigation impacts are implemented.

Table 5: Criteria for Determining Prioritisation

Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/ definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable Loss of Resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in Table 5. The impact priority is therefore determined as follows:

$$Priority = CI + LR$$

The result is a priority score which ranges from 2 to 6 and a consequent PF ranging from 1 to 1.5 (Refer to Table 6).

Table 6: Determination of Prioritisation Factor

Priority	Prioritisation Factor
2	1
3	1.125
4	1.25
5	1.375
6	1.5

In order to determine the final impact significance, the PF is multiplied by the ER of the post mitigation scoring. The ultimate aim of the PF is an attempt to increase the post mitigation environmental risk rating by a factor of 0.5, if all the priority attributes are high (i.e. if an impact comes out with a high medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance).

Table 7: Final Environmental Significance Rating

Significance Rating	Description
<-17	High negative (i.e. where the impact must have an influence on the decision process to develop in the area).
≥-17, ≤-9	Medium negative (i.e. where the impact could influence the decision to develop in the area).
>-9, < 0	Low negative (i.e. where this impact would not have a direct influence on the decision to develop in the area).
0	No impact
>0, <9	Low positive (i.e. where this impact would not have a direct influence on the decision to develop in the area).
≥9, ≤17	Medium positive (i.e. where the impact could influence the decision to develop in the area).
>17	High positive (i.e. where the impact must have an influence on the decision process to develop in the area).

The significance ratings and additional considerations applied to each impact will be used to provide a quantitative comparative assessment of the alternatives being considered. In addition, professional expertise and opinion of the specialists and the environmental consultants will be applied to provide a qualitative comparison of the alternatives under consideration. This process will identify the best alternative for the proposed project.

7. Responsibilities

It is the responsibility of each EIMS employee and each external Specialist appointed by EIMS to ensure that this procedure is carried out as described. All the personnel within the organization have the responsibility to report any deviations/changes from the procedures to management. This is to ensure that the necessary changes are documented after approval.

It is the responsibility of the senior/ junior consultant (as applicable) assigned with the task of report compilation to ensure that this methodology/ procedure is strictly applied. It is the responsibility of the assigned Senior Consultant or Quality Reviewer to review and verify that the procedure has been complied with, and such documented at the specified quality check intervals.

8. Records

RECORD	STORAGE LOCATION	STORAGE SYSTEM	RESPONSIBLE PERSON	RETENTION PERIOD
Significance Rating Input Spreadsheet	Project File - /Server/assignments/ Job#/Records	Electronic-Scanned PDF	Project Manager	10 Years

9. Record of Changes, Revisions and Cancellations

RECORD OF CHANGES, REVISIONS AND CANCELLATIONS		
DATE	NATURE / DETAIL OF CHANGE	REV No.

APPENDIX B

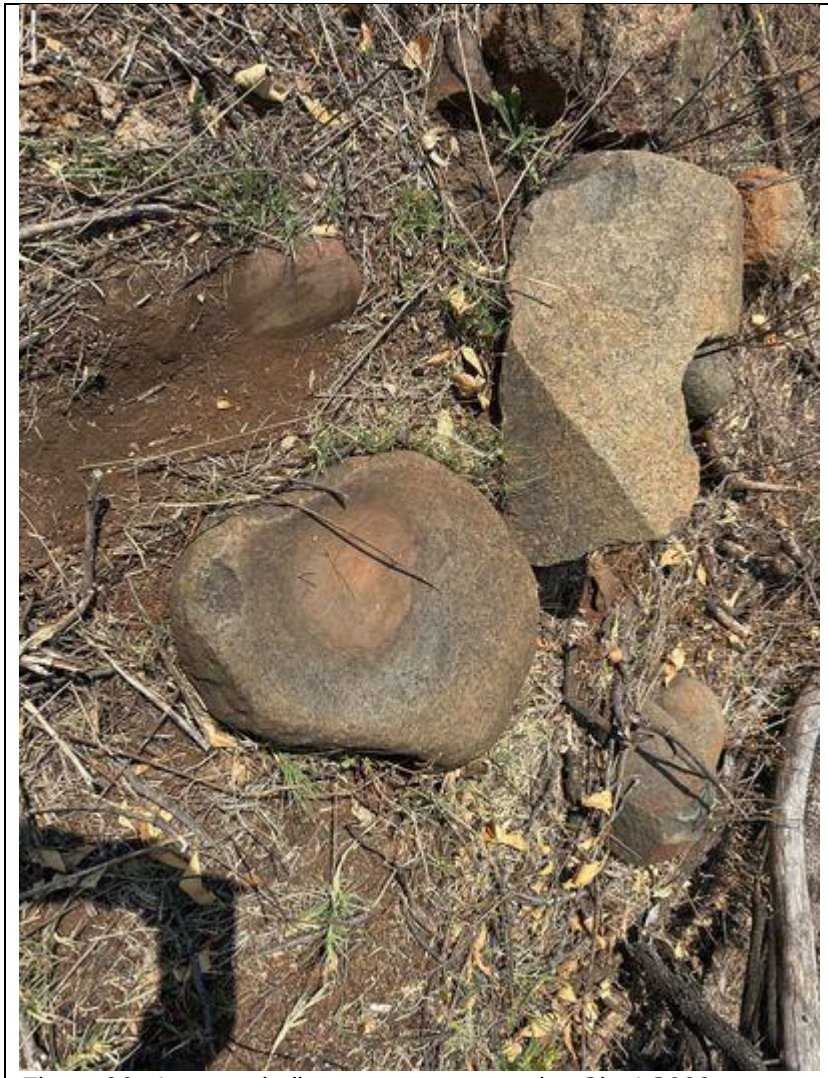
SITE DESCRIPTION FORMS

Site coordinates		
site_nr	**X**	**Y**
LS001	-25.0579	30.47488
LS002	-25.06189	30.47463
LS003	-25.06202	30.47439
LS004	-25.06817	30.46233

Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
LS001	-25.0579	30.47488	Complex late Iron Age settlement. Flower shape pattern with associated sites.		Grade 3 - A (IIIA), NCW

Figure 25 - Site LS001 stone walling

Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
LS002	-25.06189	30.47463	Stone walked site. Very collapsed difficult to see structure. Behind an old school.		Grade 3 - B (IIIB)



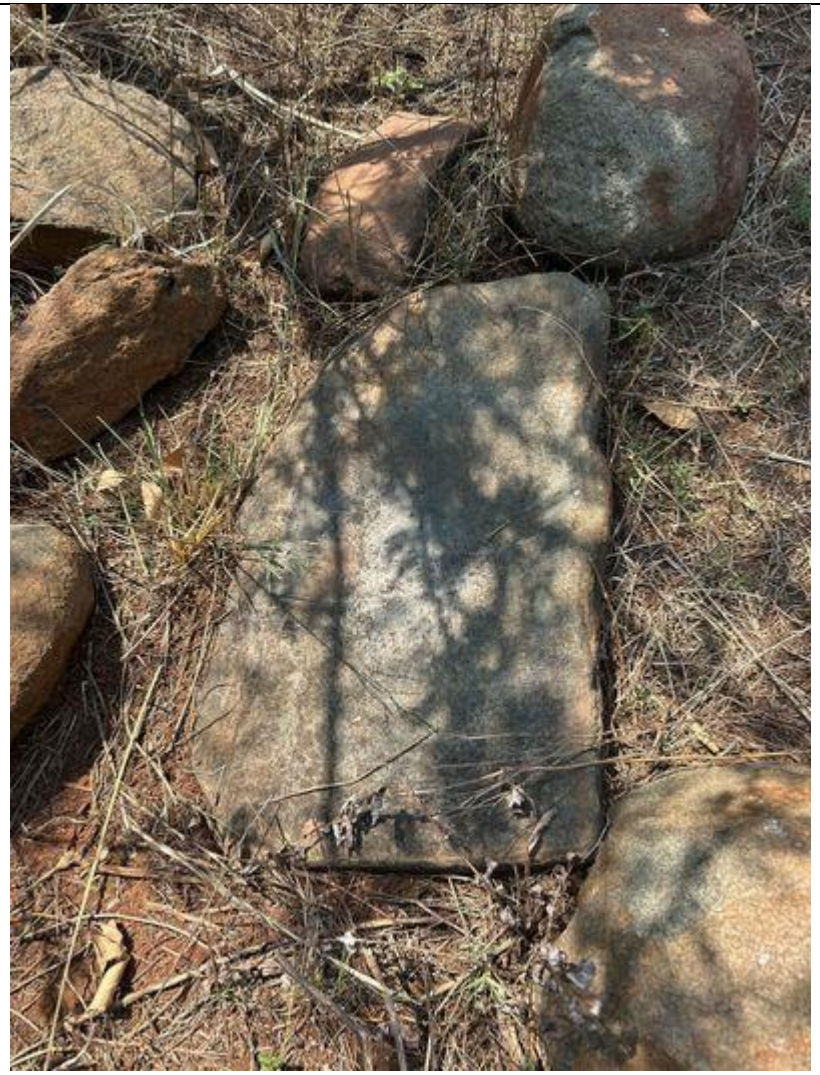


Figure 26 - Lower grinding stones recovered at Site LS002

Figure 27 - Stone walling at Site LS002

Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
LS003	-25.06202	30.47439	Old school		NCW

Figure 28 - Old school building at site LS003

Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
LS004	-25.06817	30.46233	Small stone walled feature with no definitive shape.		Grade 3 - C (IIIC)

Figure 29 - Single stone wall at site LS004

APPENDIX C

PGS TEAM CVS

PROFESSIONAL CURRICULUM VITAE FOR JESSICA ANGEL

Professional Archaeologist for PGS Heritage

Personal Details

- **Name:** Jessica
- **Surname:** Angel
- **Date of Birth:** 25-12-1983
- **Citizenship:** South African
- **Gender:** Female
- **Marital Status:** Single
- **Languages Spoken**: English and Afrikaans
- **Drivers Licence** Code B – competent 4x4 driver
- **First Aid** (Level 1)
- **Snake Handling and snake bite first aid** (March 2019. African Snakebite Institute – Johan Marias)

Education History

- **2002**: Matriculated from Northcliff High School with the following subjects: English, Afrikaans, Mathematics, Science, Biology and Art.
- **2005**: Completed BA at University of the Witwatersrand with Geography and Archaeology Majors.
- **2006**: Completed BSc Hons (Geography) at the University of the Witwatersrand with the following subjects: Environmental Management, Advanced Geographic Information Systems (GIS), Paleogeomorphology and Globalisation and Agro Food Restructuring.
- **2009 – 2013**: M.Sc Archaeology and Geography, with thesis title: *Mpumalanga Late Iron Age: Incorporating Geographic Information Systems (GIS) and Archaeological Data to Better Understand Spatial and Temporal Distribution of Past Societies.* (Graduated March 2014).

Employment History

- **2015 – current:** Senior Archaeologist – PGS Heritage
- **2012-2013:** Basic internship at PGS. Duties include gaining familiarity with gathering relevant background data, field surveys, exhumations and report writing.
- **2013:** Heritage work at NGT. Background research, report writing and ground surveys.
- **2011**: Research Assistant: GIS work for Prof Karim Sadr. Duties include: Google Earth survey work and digitising. (Sadr, K & Rodier, X. 2012. Google Earth, GIS and stone-walled structures in southern Gauteng, South Africa. *Journal of Archaeological Science* xxx: 1-9)

Experience in the field of archaeology:

2012:

- First Phase Heritage Assessment. Belfast, Mpumalanga
- First Phase Heritage Assessment. Delareyville, Stone Age survey
- Heritage Assessment. Belfast Mpumalanga, Ndebele initiation site.

2013:

- Second Phase Impact Assessment. Pretoria East, Gauteng. Documentation and mapping the layout of an Iron Age site.
- Final Phase Impact Assessment. Grave Exhumation. Chlorkop, Gauteng
- First Phase Heritage Assessment. Belfast, Mpumalanga. Exxaro Paardeplaats Project.
- Grave Exhumation. Mafikeng. University of Pretoria research.
- First Phase Heritage Assessment. Port Nolloth, Namaqualand. Powerline.

2015

- Heritage inventory of the Ekuruleni area for Auracon
- Heritage Impact assessment, Heilbron, Freestate
- Second Phase Heritage Impact assessment. Documentation of an Iron age site, Rustenburg.
- Heritage Impact Assessment. Proposed Mining of the farm Zandvoort 10. Carolina, Mpumalanga. (SAHRIS CaseID:11952)
- Heritage Impact Assessment. The Rand en Dal Ext13 proposed development on Portion 29 of the Farm Paardeplaats117 IQ, Krugersdorp, Gauteng. (SAHRIS CaseID:7176)
- Heritage Impact Assessment. Proposed Jeanette Project. Welkom, Freestate.
- Heritage Impact Assessment. Proposed Sendawo 75MW Solar Photovoltaic (PV) Energy Facility. Vryburg, North West Province. (SAHRIS CaseID:9116)
- Heritage Impact Assessment. Proposed Tlisitseng 75MW Solar Photovoltaic (PV) Energy Facility. Lichtenburg, North West Province. (SAHRIS CaseID:9119)
- Second Phase Heritage Mitigation. Clanwilliam Dam Project. Clanwilliam, Western Cape. Heritage management and mitigation of 90 archaeological and historical sites that are to be impacted by the Raising of the Clanwilliam Dam wall. (Collections manager: three year contract).

2016

- Heritage Impact Assessment. Proposed Ngwedi Loop. Rustenburg, North West Province

- Heritage Impact Assessment. Proposed N2 Bypass. Butterworth, Eastern Cape
- Heritage Impact. Sibanye Gold Proposed PV Plant. Westonaria, Gauteng
- Heritage Impact Assessment. Proposed City Parks Wetlands. Middle Soweto, Gauteng.
- Heritage Impact Assessment. Proposed Newtown Development. Pilgrimsrest, Mpumalanga.
- Heritage Impact Assessment. Proposed development of the Platberg Wind Energy Facility and supporting electrical infrastructure. Victoria West, Northern Cape. (SAHRIS CaseID:9301)
- Heritage Impact Assessment. Proposed Aletta and Eureka Wind Energy Facility (WEF). Copperton, Northern Cape. (SAHRIS CaseID:9810)
- Heritage Impact Assessment. Proposed upgrade of the Newlands Bulk Water Supply Scheme. East London, Eastern Cape.
- Heritage Impact Assessment, Leeuwbosch 44, Leeudoringstad, North West Province. Proposed construction of the 5MW Solar Photovoltic (PV) Power Plant. (SAHRIS CaseID:10407)
- Heritage Impact Assessment, Wildebeestkuil 59, Leeudoringstad, North West Province. Proposed construction of the 5MW Solar Photovoltic (PV) Power Plant.
- Heritage Impact Assessment. Proposed development of four Leeuwberg Wind Farms for the Associated Grid Connection near Loeriesfontein, Northern Cape Province. (SAHRIS CaseID:12081, 12082, 12078, 12077)
- Heritage Fatal Flaw Assessment, for the inclusion in the Environmental Screening Investigation for the Proposed Arnot New Ash Disposal Facility, Mpumalanga.
- Heritage Walk Down and Management Plan. Upgrading of the 66KV Network to a 132KV Network in the Hotazel, Kuruman and Kathu Area, Northern Cape Province. Post Authorisation Walkdown from Mothibistad Substation to Sekgame Switching Station. (SAHRIS CaseID:11967)
- Heritage Screening of Portion 9 of the Farm Grootfontein 394 JR, Tswane, Gauteng.
- Second Phase Heritage Mitigation. Mitigation work required with respect to the heritage find PGS06 on the remainder of the farm number 469, Hay District (Registration division), Tsantsabane Local Municipality, Northern Cape Province, in respect to the ACWA Power Solar reserve, Redstone Solar Thermal Power Plant. (SAHRIS CaseID:10081)
- Second Phase Heritage Mitigation. Clanwilliam Dam Project. Continued from 2015

2017

- Heritage Impact Assessment for the Proposed Lanseria Outfall Sewer, Johannesburg. (SAHRIS CaseID:11397)
- Heritage Study. Proposed opencast Mining on the Farm Kwaggafontein 8 IT, near Carolina, Mpumalanga Province. (SAHRIS CaseID:11952)

- Heritage Impact Assessment for the Proposed K60 Road Development, Rabie Ridge Gauteng.
- Heritage Impact Assessment. Kimberly Ekapa Mining Joint Venture 2.8 Slimes Pipeline Project, Kimberly, Northern Cape Province.
- Heritage Screening and Site Assessment. MTK 39/2015/16 Mintek Derelict and Ownerless Mines Rehabilitation Programme 2016-2019. Msauli Mine, Steelpoort Mine, Penge Mine, Langerdraai Mine and Uitkuik Mine.
- Heritage Impact Assessment. Proposed Phalandwa Extension Mine, Delmas, Mpumalanga.
- Site Assessment and Heritage Screening. Wadeville Extension 51. Township establishment and associated infrastructure development on Portion 273 and the remaining extent of Portion 267 on the Farm Klippoortjie 110 – IR. Ekurhuleni, Gauteng.
- Site assessment and Heritage Scoping. Proposed eMakhazeni Project near Belfast, Mpumalanga. (SAHRIS CaseID:12316)
- Heritage Impact Assessment. Proposed extension of the mining operations at the existing Ilima Colliery (Old Pembani Colliery), Near Carolina, Mpumalanga. (SAHRIS CaseID:12793)
- Heritage Impact Assessment. Proposed Mlonzi Golf Estate and Hotel, near Lusikisiki, Eastern Cape.

- Second Phase Heritage Mitigation. Clanwilliam Dam Project. Continued from 2015

2018

- Heritage Impact Assessment. Proposed Extension of the Mining Operations at the Existing Manungu Colliery, near Delmas, Mpumalanga.
- Heritage Impact Assessment. Proposed Mashishing Housing Development, Lydenburg, Mpumalanga. (SAHRIS CaseID:12999)
- Heritage Impact Assessment. Phase 1B1 Thornhill Housing Development, Port Alfred, Eastern Cape Province.
- Heritage Impact Assessment. Target to Freddies Pipeline, Allanridge, Freestate.
- Heritage Impact Assessment. Proposed Leslie Coal Mine near Leandra, Mpumalanga. (SAHRIS CaseID:12399)

2020

- Coega Zone 10, Coega IDZ, Eastern Cape Province. Colonial Period Phase 2 Mitigation Archaeological Excavation

2018 to 2023

- Presently employed on the Polihali Dam Project in Lesotho as Collections Manager (5 year contract).

The Polihali Dam Project is a 2nd Phase CRM operation in mitigation of total inundation of a range of cultural sites, including extant, historical and Stone Age sites. Nine (9) APC and thirty one (31) LSA sites are earmarked for detailed survey and excavation.

WOUTER FOURIE

Professional Heritage Practitioner

PROFILE

Project Manager and Principal Heritage Specialist holds a post-graduate degree in Archaeology and is registered with the Association of Southern African Professional Archaeologists 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 in South Africa.

My work focuses on heritage management through Heritage Impact Assessments, implementation of recommendations and large-scale heritage mitigation projects. I have worked, completed and implemented heritage projects in South Africa, Botswana, Mozambique, Mauritius, Zambia, Lesotho, and the Democratic Republic of the Congo.

CONTACT

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PGS HERITAGE

EDUCATION

University of Pretoria
1993-1996
BA Degree - Majors in Archaeology, Anthropology and Geography

University of Pretoria
1997
BA Hon Archaeology, with further specialisation in environmental management.

University of Cape Town
2016 – present
MPhil Conservation of the Built Environment

WORK EXPERIENCE

PGS Heritage Group of Companies
(***South Africa, Lesotho, Mozambique, and Portugal***)
Director – Heritage Specialist
2003- present
I am actively involved in the management of the business and focus on marketing and new business for PGS, specifically the broader SADC region. Acting as heritage specialist in multidisciplinary teams

The University of the Witwatersrand - Project Manager – Archaeological Contracts Unit
2007-2008
Responsible for conducting heritage and archaeological impact studies, archaeological excavations and general management of the unit

Matakoma Consultants – Director – Heritage Specialist
2000 – 2008
Heritage specialist and Director responsible for heritage and archaeological impact studies

Randfontein Estate Gold Mine – Environmental Coordinator
Oct 1998- Feb 2000
Coordinating all environmental Rehabilitation work

Department of Minerals and Energy Environmental Officer
Oct 1997– Sept 1998

PROFESSIONAL AFFILIATION

Accredited Professional Heritage Practitioner
Association of Professional Heritage Practitioners
Since 2014

Accredited Professional Archaeologist
Association of Southern African Professional Archaeologists –
Since 2001